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Revision of the EU Ecolabel criteria for Paper products

Technical Report 2.0
Draft criteria proposal

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Contents

Table of Contents

Abstract

The current revised technical report (TR2.0) provides an update on the criteria revision, based on new information collected during the revision and provided by the involved parties (i.e. through stakeholders' discussion at the 1st AHWG meeting, further stakeholder inputs following the meetings, emission, energy, and chemical sub-groups co-operation followed by additional desk research).

The most significant proposals and changes are:

- To merge the product groups copying and graphic paper , newsprint paper and tissue paper under one common group : paper products;
- To update current emission limits and scoring system for Criterion 1(a);
- To update or reformulate current AOX emission limits - Criterion 1(b);
- To update and reformulate energy consumption criterion and related CO2 emissions requirement – Criterion 1(c) and Criterion 2;
- To introduce a common ambition level for fibre sourcing criteria for all three product types (more ambitious for Copying and Graphic Paper and Tissue Paper but less restrictive for Newsprint Paper) – Criterion 3;
- To harmonize the chemical criterion according to recent findings of Chemical Task Force – Criterion 4.

For criteria that addresses emissions to water and air and energy use, the recently published BREF document for pulp, paper and board products has been taken as the main reference for the revision of reference values. Further data from the license holders were gathered via responses to the 2nd questionnaire circulated by DG JRC. The emission and energy consumption requirements were discussed with dedicated sub-groups.

For the above issues and several others, questions to stakeholders are embedded throughout the report in *red and italic* where relevant. Further findings are inserted in blue. The purpose of such questions is to help frame the discussion for the 2nd AHWG meeting although responses can be sent prior to the meeting as well in the hope that positions can be clarified before the meeting too.

Each criterion is analysed within a separated chapter that includes the main discussion points after the 1st AHWG meeting, as well as proposed changes and rationales for the revised proposal. The key modifications of the criterion are highlighted in yellow.

1. Introduction

1.1 Brief background to the EU Ecolabel

The EU Ecolabel (European Commission, 2009c) is a voluntary labelling scheme created in 1992 and a key voluntary policy instrument within the European Commission's Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan (European Commission, 2008a) and the Roadmap for a Resource-Efficient Europe. The Roadmap seeks to move the economy of Europe onto a more resource efficient path by 2020 in order to become more competitive and to create growth and employment.

The EU Ecolabel promotes the production and consumption of products with a reduced environmental impact along the life cycle and is awarded only to the best (environmental) performing products in the market.

The entire life cycle of the product is considered, from the extraction of raw material through to production, packaging, distribution, use and disposal. The EU Ecolabel may define criteria that target environmental impacts from any of these life cycle phases, with the aim being to preferentially target those areas of greatest impact. The criteria development process involves scientists, non-governmental organisations (NGOs), Member State representatives and industry stakeholders. The overall ambition level for criteria should aim to target the 10% to 20% most environmentally friendly products currently on the market. Because the life cycle of each product and service is different, the criteria are tailored to address the unique characteristics of each product type. They are revised typically every four years to reflect upon technical innovation such as alternative materials or production processes, reductions in emissions and market advances.

The EU Ecolabel also has links with other policy instruments, such as Green Public Procurement (GPP) (European Commission, 2015b), the Eco-Management and Audit Scheme (EMAS) (European Commission, 2015c), the Ecodesign Directive (European Commission, 2009b) and the Environmental Technologies Action Plan (ETAP) (European Commission, 2006).

The development and revision processes are carried out in accordance with the EU Ecolabel Regulation (EC) No 66/2010. An important part of the process for developing or revising EU Ecolabel criteria is the involvement of stakeholders through publication of and consultation on draft technical reports and criteria proposals. This is achieved by stakeholder involvement in working group meetings and written consultation processes managed via an online platform.

Article 7(2) and 11(2) make provisions to encourage alignment between criteria for the EU Ecolabel and other suitable ISO 14024 Type I ecolabels for similar products. However, care must be taken to ensure that any such alignments are based on scientifically sound rationale, do not create geographical distortions for potential applicants and ultimately, that the proposed criteria are acceptable to the majority of EU Ecolabelling Board (EUEB) members who must vote on the final proposed criteria prior to its adoption.

Other ecolabel schemes of relevance to the paper products that have been identified include: the Nordic Swan (Scandinavia) (Nordic Ecolabelling, 2015), the Blue Angel (Germany) (The Blue Angel, 2015), Umweltzeichen (Austria) (Umweltzeichen, 2015) and the United States Green Seal standards (United States Green Seal, 2015).

1.2 The criteria revision process

The typical standard approach that is taken for the revision of EU Ecolabel criteria is illustrated below. The current stage in the process is highlighted in the red box in Figure 1.

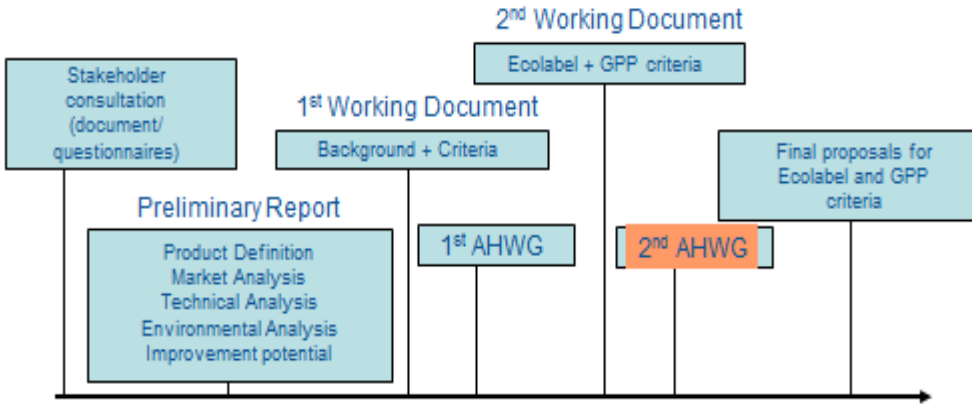

Figure 1. Overview of the typical EU Ecolabel revision process

A draft Preliminary Report (PR) has been published in parallel with Technical Report v.1 (both May 2016) ahead of the 1st AHWG meeting hold in June 2016 in Seville. The PR examines the three paper product groups in the current legal, political market context. The technical aspects of pulp and paper production are presented and considered from an LCA perspective – attempting to identify the main hot-spots. The documents can be found at the project website: http://susproc.jrc.ec.europa.eu/Paper_products/.

This report (TR2.0) should be read having in consideration the information contained in the Preliminary Report and Technical Report v.1. The TR (2.0).provides an update on the criteria revision, based on new information collected during the revision and provided by the involved parties (i.e. through stakeholders' discussion at the 1st AHWG meeting, further stakeholder inputs following the meetings and additional desk research).

Several iterations of the criteria are anticipated before they will be finally voted and these will be reflected in subsequent version of this Technical Report.

The criteria should attempt to target the top 10% to 20% of the most environmentally friendly products currently on the market otherwise the criteria run the risk of becoming meaningless as a basis for highlighting good performance. However, it is appreciated that this is not often possible to judge accurately where multiple criteria are set on a pass-fail basis as is the case with the EU Ecolabel approach.

2 Preliminary Report summary

This section summarises the main conclusions of the PR, which presents background research carried out for the EU Ecolabel for three paper product groups: copying and graphic paper (CGP), newsprint paper (NP) and tissue paper (TP).

The full preliminary report can be found on the BATIS platform for registered stakeholders and also at the project website:

http://susproc.jrc.ec.europa.eu/Paper_products/ .

2.1. Key environmental aspects and relation with the criteria proposal

The life cycle analysis revealed that the key environmental impacts associated with the pulp and paper products are:

- Deforestation and potential loss of biodiversity from sourcing of raw materials (although this is not well captured by land use indicators, land classification factors or biodiversity indicators using current LCA methodology);
- Emissions to air during pulp and paper production (especially CO_2, SO_2 and NO_X)
- Emissions to water during pulp and paper production (especially COD, AOX and P);
- Energy consumption during production (mainly fuel for pulp mills and electricity for paper mills);
- Water consumption during pulp and paper production
- Energy and ecotoxicity due to the production and uses of chemicals during pulp and paper production;

An illustration of the degree of importance of different normalised impacts for a representative graphic paper intermediate product is illustrated in Figure 2.

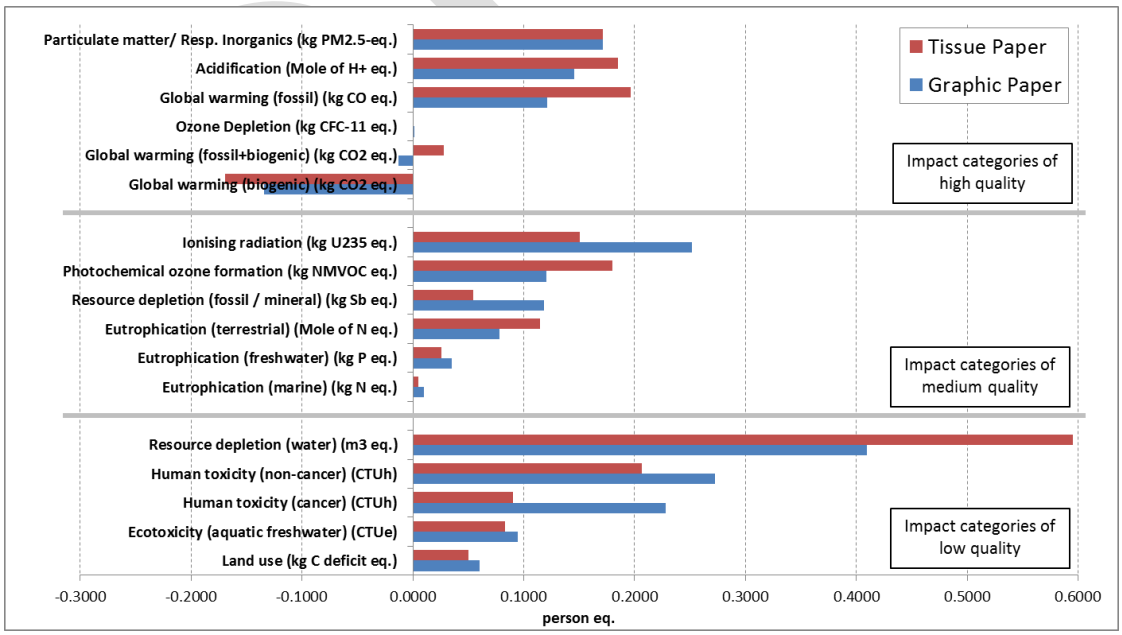

Figure 2: Identification of most relevant impact categories for a representative graphic paper intermediate product (source PEFCR screening study).

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It should be noted that, due to the intermediate nature of the product, the data in Figure 2 does not include the use phase of End-of-Life (EoL). However, it is widely accepted that the use phase is negligible and that the EoL impacts are highly dependent on consumer behaviour and the local waste management infrastructure, which will influence whether paper ends up producing uncontrolled methane emissions in a landfill, is incinerated with or without energy recovery or is recycled.

Raw material acquisition was the dominant stage for global warming (biogenic), human toxicity and land use impact categories. This stage was also important for ozone depletion (mainly due to incomplete combustion of fossil fuels in chainsaws and logging machinery) and marine eutrophication (mainly due to nitrogen fertiliser production and application). All other impact categories were dominated by the pulping and/or papermaking stages.

The life-cycle analysis also looked in more detail at the hotspots identified to determine at which life cycle stage, at the level of specific processes, the largest contributions to each impact category occurred. It was found that:

- The dominant life-cycle stage for each impact category is either related to virgin pulp production or the papermaking process.
- The energy use and chemical additives in both the pulping and papermaking stages were the sources of most impacts.
- The sourcing of wood (impacts on climate change and land use) and water resource depletion (for the pulping and papermaking processes) were also identified as important.
- The most significant impacts were related to human toxicity (non-cancerous effects), climate change, acidification, photochemical ozone formation, particulate matter/respiratory inorganics and ionising radiation.

The links between the LCA and non-LCA impacts and the revised EU Ecolabel criteria are presented in Table 1.

The environmental analysis revealed that best practice in paper production is the result of using processes and technologies with lower environmental impacts, and producing products with improved quality. Combined with sustainable behaviours during the use phase, these can result in more eco-friendly products. The list of best practices by impact category is presented below.

1. Fibre sourcing: virgin, recycled and non-wood:

- Use of wood from sustainably managed sources; and
- Encourage the use of fibre from recycling;

2. Fuel and electricity consumption, CO2 emissions and climate change:

- Substitute coal or fuel oil for natural gas, substitute natural gas for biomass
- Replace traditional boilers with Combine Heat and Power (CHP) units;
- Upgrade recovery boiler units to gasification combined cycle technology

3. Water consumption:

- Optimize the closure of water circuits; and
- Minimise water consumption, use of water savings techniques;

4. Emission to water:

- Use environmentally benign bleaching sequences;
- Minimize the use of poorly biodegradable organic substances;

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- Optimise the dosing of N and P to wastewater treatment processes;

5. Emission to air:

- Reduce sources that contribute to acidification (sulphur); and
- Modernise recovery boilers, replace with gasification combined cycle units;

6. Solid waste:

- Implement integrated waste management plan, minimise waste generation and maximise recycling and waste recovery;

The analysis of best practices undertaken in the preliminary report will be expanded further following the first AHWG meeting, to reflect input from the stakeholders.

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Table 1: Link between the hotspots identified (LCA and non-LCA impacts) and the revised EU Ecolabel criteria

Identified hotspots (LCA impacts)	Revised or new EU Ecolabel criteria	Comments on the related criteria
Acidification	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping and papermaking processes. It limits the hazardous substances and mixtures that can be included in paper, limiting environmental and health risks for consumers.
Particulate Matter / Respiratory Inorganics	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping and papermaking processes. It limits the hazardous substances and mixtures that can be included in paper, limiting environmental and health risks for consumers.
Climate change (fossil/biogenic)	Criterion 2 – Energy use Criterion 3 – Fibres Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping and papermaking processes. Encourage the use of recycled fibres, thereby reducing the need to cut down trees which can contribute to resource depletion. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers.
Photochemical ozone formation	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 3 – Fibres Criterion 4 – Excluded / Limited Substances	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking processes. Reduces use of virgin fibres and increases use of recycled/recovered fibres, thereby reducing the need to cut down trees which can contribute to ozone depletion. It limits the hazardous substances and mixtures that can be included in paper, limiting environmental and health risks for consumers.
Human toxicity (non-cancer)	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances Paper mill infrastructure	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking and pulping processes. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers.
Human toxicity (cancer)	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping process. It limits the hazardous substances and mixtures that can be included in pulp, limiting environmental and health risks for consumers.
Ionising radiation	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking and pulping processes. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers.

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Identified hotspots (LCA impacts)	Revised or new EU Ecolabel criteria	Comments on the related criteria
Eutrophication (freshwater)	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking and pulping processes. It limits the hazardous substances and mixtures that can be included in paper, limiting eutrophication and thereby environmental and health risks for consumers.
Ozone Depletion	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping and papermaking processes. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers.
Land use	Criterion 2 – Energy use Criterion 3 – Fibres	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking process. Encourage the use of recycled fibres, thereby reducing the need to cut down trees which can contribute to land use changes.
Resource depletion (fossil / mineral)	Criterion 3 – Fibres Criterion 4 – Excluded / Limited Substances	Reduces use of virgin fibres and increases use of recycled/recovered fibres, thereby reducing the need to cut down trees which can contribute to resource depletion. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting environmental and health risks for consumers.
Eutrophication (terrestrial)	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking process. It limits the hazardous substances and mixtures that can be included in paper, limiting eutrophication and thereby the environmental and health risks for consumers.
Eutrophication (marine)	Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It ensures a reduction in energy use, which is the main source of indirect emissions in the papermaking and pulping processes. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting eutrophication and thereby the environmental and health risks for consumers.
Ecotoxicity (aquatic freshwater)	Criterion 1 – Emissions to water and air Criterion 2 – Energy use Criterion 4 – Excluded / Limited Substances	It limits the emissions to air and water arising from the pulping process. It ensures a reduction in energy use, which is the main source of indirect emissions in the pulping process. It limits the hazardous substances and mixtures that can be included in paper and pulp, limiting the environmental and health risks for consumers.

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3 Product group names, definitions and scopes proposal

The following section presents the proposed revisions to the existing names, definitions and scopes of the paper product groups considered in this report. Where revisions or additions have been proposed, these have been highlighted in yellow.

3.1 Name, definition and scope of EU Ecolabel

Proposed scope
The product group 'paper products' shall comprise articles made of cellulose pulp in the form of a coherent sheet or web, excluding sheets or laps of pulp as commonly understood for paper making or dissolving purposes, and non-woven products. It includes the paper products as specified below: 1. Copying, graphic and newsprint paper products shall comprise sheets or reels of not converted, unprinted blank or coloured paper. It includes paper made from pulp and used for writing, printing , or conversion purposes. It shall not include: • paper and board intended for packaging conversion; • packaging and wrapping paper; • thermally sensitive paper; • photographic and carbonless copy paper; • fragranced paper. 2. Tissue paper and tissue paper products shall comprise sheets or rolls of tissue paper and tissue paper product fit for use for personal hygiene, absorption of liquids and/or cleaning of soiled surfaces used in substitution of textiles. Tissue paper is not converted paper while "tissue paper product" is "tissue paper that has been converted into a finished article for end-user purposes. It includes but is not limited to handkerchiefs, toilet tissue, facial tissue, kitchen/household towel, hand towels, table napkins, mats,. It includes coloured, printed or fragranced or lotion treated tissue paper products. It shall not include: • absorbent hygiene products as defined in Commission Decision 2014/763/EU[1] including wet wipes and absorbent undergarments such as disposable diapers; • tissue paper products containing cleaning agents designed for the cleaning of surfaces; • coated tissue paper products or tissue paper products laminated with other materials than tissue paper; • products as referred to in Cosmetic Regulation N°1223/2009[2]. *Note: (specific aspect that refer to the scope and definition of Tissue paper will be addressed during separated webinar)*
Complementary definitions

[1] OJ L 320, 6.11.2014, p. 46–63
[2] OJ L 342, 22.12.2009, p. 59–209

For the purpose of this Decision, the following definitions shall apply:

1 ‘pulping’ means the act of processing wood, other plant matter or waste paper to obtain pulp;

2 'pulp' means fibrous material in papermaking produced in a pulp mill, either mechanically, chemically, or by the combination of both;

3 'recycled fibre' means fibres diverted from the waste stream during a manufacturing process or generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for their intended purpose. Excluded is reutilisation of materials generated in a process and capable of being reclaimed within the same process that generated it (mill broke — own produced or purchased);

4 'mechanical woodpulp paper or board' means-paper, board paper or board containing mechanical woodpulp as an essential constituent of its fibre composition;

5 'chemical pulp' means fibrous material obtained by removal from the raw material of a considerable part of non-cellulosic compounds that can be removed by chemical treatment (cooking, delignification, bleaching);

6 'CTMP' means chemithermomechanical pulp;

7 'ECF pulp' means elementary chlorine free bleached pulp:

8 'TCF pulp' means totally chlorine free bleached pulp.;

9 'non-integrated production" means production of market pulp (for sale) in mills that do not operate paper machines, or production of paper/board using only pulp produced in other plants (market pulp);

10 'integrated production' means pulp and paper is produced at the same site. The pulp is not dried before paper manufacture. The production of paper/board is directly connected with the production of pulp:

11 'deinked pulps' means pulp made from paper for recycling from which inks and other contaminants have been removed;

12 'Air dry tonne' of pulp (ADt) meaning dry solids content of 90 %; in case of paper, air dry means paper with 6 % moisture content

3.2 Rationales for the revised proposal

The EU Ecolabel is part of a wider package of product policy instruments that contribute to the Circular Economy. The Fitness Check (evaluation study and stakeholder consultation) results show that the uptake of the schemes could be better and more efficient if applying a more focused approach to maximize impacts on the ground (European Commission, 2017).

In order to improve the performance of the EU Ecolabel Regulation scheme and make it more focused to ensure bigger cumulative impact a more targeted approach should be addressed. It should include bundling of closely related product groups where appropriate. **Accordingly the product groups: Copying and Graphic Paper, Newsprint paper, and tissue paper are proposed to be integrated under a common product group: Paper Products.**

A single combined Decision that accommodates all considered paper products is proposed to be structured readable way. It is therefore proposed to establish criteria in the separated Annexes specific for copying and graphic and newsprint papers, from one side and tissue paper from the other.

Different paper grades can be broadly classified according to their intended use:

- Informative use (e.g. CGP and NP)
- Packaging
- Hygenic (e.g. TP)
- Speciality

Another way of splitting different paper products, which is generally used when reporting market data, is based on the raw material inputs and finishing processes that apply to the paper product, for example:

- Uncoated mechanical pulp
- Uncoated wood-free pulp
- Super-calendered paper
- Lightweight coated paper
- Wood-free Coated etc.
- Paper for recycling

EN 643 is the European List of Standard Grades of Paper and Board for Recycling. Revised in 2013, the new text includes several major improvements, including a grade-specific tolerance level for non-paper component and more detailed descriptions per grade.

Regarding the definitions related to the product groups under revision Table 2 contains examples of paper related terminology included in ISO 4046 standards. (*Note: the definitions provided are given as an example, the full list of definitions and terms is included in the ISO 4046*)

Table 2. Examples of scope related terminology of interest included in ISO 4046 : Paper, board, pulps and related terms — Vocabulary

Terms	Definition
Coated paper	Paper that has undergone a coating process on one or both sides
Copy paper	Xerographic paper, photocopying paper, paper, usually uncoated, used for xerographic, ink-jet and other types of home and office copiers and printers
Crepe paper	Paper that has been subjected to crêping
Embossed paper or board	Paper or board on which a raised or depressed design has been produced, generally by pressure from an engraved roll or plate
Folding boxboard carton board	Board intended for the manufacture of cartons, and having good scoring and folding properties
Kraft paper	Paper made almost entirely from kraft pulp NOTE: In some areas, the term "kraft paper" is also used to refer specifically to paper made essentially from unbleached softwood pulp produced by the kraft process. Such paper usually has higher mechanical strength than is obtainable by other known pulping processes from the same woods.
Mechanical woodpulp paper or board	wood-containing paper or board paper or board having mechanical woodpulp as an essential constituent of its fibre composition
Multi-ply paper or board	Multi-layer paper or board multiplex paper or board paper or board consisting of more than three furnish layers combined together during manufacture cf. two-ply paper or board, three-ply paper or

Terms	Definition
	board NOTE Two or more furnish layers may be of the same composition
Newsprint	Paper intended for the printing of newspapers
Recovered paper	Waste paper recovered for use, reuse, reprocessing or recycling
Recyclable paper	Recovered paper that can be manufactured into paper or board
Recycled-content paper	Recycled paper or board derived partially or totally from recyclable paper
Tissue paper	Crêped web or sheet of closed formation, made of cellulosic fibres and comprising one or more plies of lightweight paper NOTE 1 Crêping is generally carried out before the paper is fully dried. NOTE 2 In certain countries, the use of the word "cellulosic" in this context may lead to practical difficulties and there may be a danger of confusion with cotton wool or wadding, as cotton is also pure cellulose.
Toilet paper	Paper intended for sanitary use
Woodfree paper or board	Freesheet paper or board, paper or board having, in principle, only chemical pulp in its fibre composition NOTE In practice, it may contain a small amount of other pulps.

3.2.1 Copying, graphic paper and newsprint paper

The current EU Ecolabel scopes and definitions for CGP and NP specifically exclude certain types of paper but do not use generic paper-product specific market terms like: newsprint, uncoated mechanical, uncoated wood-free and coated mechanical. This is in contrast to CEPI's definition for graphic papers (CEPI, 2014b). CEPI also offers the following broad definition for paper:

"Paper is a generic term for a range of materials in the form of a coherent sheet or web, excluding sheets or laps of pulp as commonly understood for paper making or dissolving purposes and non-woven products, made by deposition of vegetable, mineral, animal or synthetic fibres, or their mixtures, from a fluid suspension onto a suitable forming device, with or without the addition of other substances. Papers may be coated, impregnated or otherwise converted, during or after their manufacture, without necessarily losing their identity as paper. Whereas board / paperboard is a generic term applied to certain types of paper frequently characterized by their relative high rigidity".

The similarity between copying and graphic paper and newsprint paper product groups is well reflected in the current criteria sets. Specifically, the current definition of copying and graphic paper will also work for newsprint paper.

Reformulation of the definition for copying and graphic paper to include newsprint paper could potentially help increase uptake. Potentially extending the scope of copying and

graphic paper has been discussed favourably by the industry during past criteria revision rounds and was mentioned in the 2009 Technical Report for revising the EU Ecolabel criteria for copying and graphic paper, indicating that this potential revision aligns with industry thinking (ISPRA and LC Engineering, 2009).

The current scope for copying and graphic paper results in constraints as the weight-based restrictions (upper limit of 400 g/m2) is not related to the industry practice. The figure of 400g/m^2 appears to be related to the definition of 'board substrate' in Commission Decision 2014/256/EU on the EU Ecolabel for converted paper products (European Commission, 2014a). According to this Commission Decision, board substrate is*: "Paperboard, cardboard or board, unprinted and not converted, with a basis weight higher than 400 g/m2"* (European Commission, 2014a). None of the other ecolabels (e.g. Nordic Swan, Blue Angel, etc.) propose weight-based restrictions for copying and graphic or newsprint paper (although it should be noted that the scopes of these other labels are not always comparable).

3.2.2 Tissue paper

The stakeholder survey conducted by the IPTS, which is summarised in the Preliminary Report, indicated that only 38.2% of respondents are happy with the current definition and scope for tissue paper. This is in contrast to the definitions and scope for copying and graphic paper and newsprint paper, where the majority of respondents agreed that the current scope and definitions were sufficient.

The EN ISO 12625:2011 (ISO, 2006, p. 12625) includes terms and definitions and "*describes products and base paper made from lightweight, dry or wet creped and some non-creped paper*".

"Tissue paper" is described as "*base paper taken from the tissue machine before conversion (typically between 10 g/m² and 50 g/m²)" while "tissue product" is "tissue paper that has been converted into a finished product for end-user purposes"*.

Following EN ISO 12625:2011: *"Tissue products form an important and growing market for single-use disposable hygiene, and industrial products. The current range of these familiar products includes, toilet tissue, facial tissue, kitchen/household towels (these three products can also be lotion treated), hand towels, handkerchiefs, table napkins, mats, industrial wipes and lotion treated products."*

It is therefore proposed to base the definition of tissue paper product on the ISO 12625 Standard.

The scope set out in Commission Decision 2009/568/EC (European Commission, 2009a, p. 568) specifically excludes following products:

(a) wet wipes and sanitary products;

(b) tissue products laminated with other materials than tissue paper;

(c) products as referred to in Directive 76/768/EEC.

Ad a) Stakeholders suggested that absorbent hygiene products or undergarments (e.g. disposable diapers, etc.), should be specifically excluded from the scope, in consideration to Commission Decision 2014/763/EU, which sets out EU Ecolabel criteria specifically for absorbent hygiene products, such as: *"baby diapers, feminine care pads, tampons and nursing pads (also known as breast pads), which are disposable and composed of a mix of natural fibres and polymers, with the fibre content lower than 90 % by weight (except for tampons)"*

. According to the Cambridge Dictionary a product can be described as '*sanitary*' if it "…protects health by the removal of dirt and waste, especially human waste" or "…describes the things which are used by women during their period". Different eco-labelling schemes group different products into the category 'sanitary products' or sub-categories such as 'sanitary paper products' or 'absorbent hygiene products'. ISO 12625

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specifies hygiene paper as *general term for tissue paper intended for personal hygiene use (also referred to as sanitary paper).*

It is therefore proposed to exclude products that are included in the scope of EU Ecolabel for absorbent hygienic products (2014/763/EU), along with wet wipes, and absorbent undergarments such as disposable diapers. The specific exclusion of "wet wipes and sanitary products, including absorbent undergarments such as disposable diapers" is proposed to be withdrawn as the broad range of tissue product could be considered sanitary products.

Ad (c) Directive 76/768/EEC on the approximation of the laws of the Member States relating to cosmetic products has been repealed by Cosmetic Regulation N°1223/2009. In accordance with Art 2(1)(a) of Regulation N°1223/2009 cosmetic product is defined as substance or mixture(...). Nevertheless in specific cases some products such as i.e. *a* wipes, may be the "vehicle" to deliver a substance or mixture to the human skin. This substance or mixture, if it is intended to be placed in contact with the various external parts of the human body, with a view exclusively or mainly to cleaning these external parts, to perfume them, to change their appearance and/or to correct body odours and/or to protect them or keep them in good condition, falls within the scope of application of the Cosmetics Regulation. Such substances or mixtures are primarily considered to be leave-on cosmetic products (European Commission, 2016a). It is therefore proposed to maintain the exclusion of the products that fall under the scope of Cosmetic Regulation.

3.2.3. Business to Business labels: pulp and paper

The possibility of including a provision for business-to-business (B2B) communication on intermediate products within the existing paper product criteria was discussed at the 1st AHWG meeting in June 2016,

If an independent set of criteria was to be proposed, most provisions would be identical to those for paper, with some minor specific provisions relating just to pulp. Other ecolabels seem to be moving in the same direction. The Nordic ecolabel paper products are all systematically connected to two cross-cutting modules:

- A basic module that covers fibre sourcing, emissions to air and water and energy use.
- A chemicals module that sets out reporting requirements for chemicals used in the process and general restrictions that are placed on those chemicals.

Each actual paper product group (e.g. Tissue Paper or Copying and Printing Paper) then has its own supplementary module which can contain additional new specific criteria, add a higher ambition level to the cross-cutting criteria or introduce specific exemptions and derogations to the cross-cutting criteria.

The cross-cutting modular system permits recognising of market pulps (B2B certification), that meet the requirements of the basic module and chemical module. However, these pulp mills have to be inspected and, subject to approval, the mills are added to a publically available list of approved pulp suppliers. The pulp manufacturer submits the documentation concerning forestry management, emissions, energy use, chemicals used and waste disposal in regard to pulp production. However, it is not permitted to use the Nordic Ecolabel logo on the market pulp so as to avoid any confusion, because technically it is not a final product and no supplementary module exists purely for pulp that would link it to its own specific licencing.

A similar approach regarding the assessment and verification of pulp mills producing market pulp, and linking this to a common database of approved mills appears feasible. This approach could greatly simplify the administrative burdens of both applicants and

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Competent Bodies alike and improve uptake of the license amongst the best performers within the non-integrated part of the paper industry.

The real value in the B2B approach is to make it easy for paper producers to locate approved pulp suppliers, so the need for a common and publically available database is essential. The Nordic approach has a logical approach to how information is stored on the database and a distinction in access levels. For example, Competent Bodies should have access to all relevant documentation and data submitted while applicants and potential applicants should only have access to the bare minimum information and data that is needed to prove their compliance with the EU Ecolabel criteria. The publically available data could simply refer to the company, pulp mill site, production capacity and pulp type(s) produced. The database would also offer some tangible type of public recognition for pulp suppliers without running the risk of contravening the final product requirements of the EU Ecolabel Regulation.

3.3. Outcomes from and after the 1st AHWG meeting:

Some stakeholders were in favour of merging the scope (and criteria) for copying and graphic paper (CGP) and newsprint paper. This would be in line with ISO 1446 and CEPI definitions, where newsprint is a subset of CGP. Other argued that the technical differences observed for the two types of papers would make complicate drafting the common criteria.

The 400 g/m^2 'grammage' upper limit for CGP was assumed as being misleading and far from industry practice. The suggestion to base scope definition on the product intended use (i.e. graphic purposes) was welcomed by the majority.

Most of the stakeholders were not in favour of including "paperboard intended for packaging conversion" in the scope, mainly because of the different production processes. A significant proportion of stakeholders suggested to align the definition of tissue paper product with respective ISO Standard (ISO 12625), and to include similar products such as tablecloths, mats, napkins, etc., within the scope.

The majority of stakeholders are in favour of retaining printed tissue paper in the scope, given that printing inks meet relevant EU regulations on chemicals. By contrary fragranced tissue paper was considered as of limited functionality.

3.4. Further consideration

The product groups: Copying and Graphic Paper, Newsprint paper, and Tissue Paper are proposed to be integrated under one common product group: Paper Products (European Commission, 2017).

A single combined Decision that accommodates all considered paper products is proposed to be structured with separated Annexes: Annex I specific for 'copying, graphic and newsprint paper', and Annex II for 'Tissue paper'.

The wording of the revised scope has been accordingly adapted. The nomenclature used was clarified according to the industry standards i.e. "carbonless copy paper" instead of "carbonless paper" (paper used for obtaining simultaneously one or more copies of an original manuscript or typescript by localized pressure without interposing carbon paper). Additional definitions were added following CEPI terminology, and respective Standards: ISO 12625 (*Tissue paper and tissue products — Part 1: General guidance on terms)* and ISO 4046-4 (*Paper, board, pulps and related terms — Vocabulary).*

The 1st AHWG Meeting and posterior discussion confirms that the use of grammage as reference to specify the product destination is not precise and rather artificial. It is therefore propose to address product group by its functionality and end use. Printed, coated and converted paper products continue not to be included in the scope due to all the additional processes associated with these products.

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Industry consultation revealed that there is a range of converted products which are made with graphic paper and which are not packaging. In fact, introducing additional specification under the definition *"It includes paper made from pulp and used for writing,printing , or conversion purposes",* could potentially associate copying and graphic paper with other EU Ecolabel paper-related product groups, such as: Converted paper (2014/256/EU), and printed paper (2012/481/EU).

The feedback received indicated that there is a need to update the current definition of tissue paper. As tissue paper includes a very broad group of products, the definition should focus on the production process and the functional requirements of tissue paper to ensure that current and future tissue products fit within the revised scope. It was also suggested that the 90% fibre criterion is not representative of all products and it should be revised in line with ISO 12625 on Tissue Paper and Tissue Products. The reference to EN ISO 12625:2011, and the list of products given is the most reliable and international reference to tissue definition. Considering that tissue product to a large extent substitutes the use of textile material, and that the list of products cannot be exhaustive under the standard, it should be cross checked if the additional functionality should be added to the definition.

Regarding the inclusion of air-laid tissue within the scope, it should be stated that air-laid paper is not a homogenous group. Air laid based techniques are used to manufacture product that, even if based on the cellulose fibre, presents different characteristics that water based pulp and paper- making process. This means that several processes can be used to produce air-laid paper products, which contain different materials such as fluff, polymers, as well as man-made cellulose fibres such as viscose. If polymers or viscose can be used to make air-laid paper, then specific criteria need to be introduced for polymers or viscose, based on LCA considerations. It would be inconsistent to exclude coated tissue products or tissue products laminated with materials other than tissue paper from the scope, if air-laid papers are included. Best Available Techniques (BAT) Reference Document for the Production of Pulp, Paper and Board addresses water based paper making process. In this sense air – laid process is considered a separated technology that would require individual LCA analysis and hot spot identification. Additionally, as supported by the majority of stakeholders, the basic intention of the revision of the product group scope and definition is to harmonise the scope with ISO 12625-1. The standard specifically excludes non -woven material from the scope, even if one subgroup of the nonwovens is manufactured in a wet-laid manner according to a process similar to the tissue making process.

In reference to the pulp accreditation, competent bodies commented the importance of getting access to the lists of pulps and chemicals that have been approved by other competent bodies. A significant proportion of stakeholders are in favour of having a central database for 'Approved Pulps', which can help the paper producers to check if the pulps they want to use are listed as approved. This would also ease the verification work of competent bodies, as the evidence for each type of pulp will only need to be checked once for pulp from a given source, rather than for every applicant using pulp from that source. It would also be possible, for example, to calculate emission values simply by using the available data in the 'Approved Pulps' database.

Some stakeholders noted that the market pulp suppliers are becoming increasingly interested in the certification or approval of their pulps. It was suggested that the pulp approval/certification process should include both evaluation of suppliers' documentation and site audits, and there should be a separate charge for the auditing process. It was also suggested that an appendix could be added to the User Manual document where pulp producers can provide the necessary data on the pulp they produce for the use of paper producers and competent bodies. It was noted that in a list of Approved Pulps it must be clearly explained that it is a paper producer who is expected to make the calculations to show if paper meets the Ecolabel criteria. **The calculation should therefore include the information on pulp and paper production.**

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Finally, some stakeholders expressed concern that certification of pulp poses a risk for limiting pulp supplies for paper mills. Thus, instead of certification or approval of pulps per se, a template for recording data should be provided, so that pulp suppliers can record their data in a standardised format, and information can be shared between competent bodies for the approval.

Questions:

1. Does the proposed scope and definitions for each paper product type reflect the specific nature of the paper product groups addressed?

2. Should the list of complementary definitions be extended?

3. Do you agree to withdraw the exclusion for tissue paper product that refers to: "wet wipes and sanitary products, including absorbent undergarments such as disposable diapers"?

4. Should the methodology for market pulp approval be accommodated under User manual, if applicable?

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

The proposed criteria are aimed to cover the different life stages and assessing the hot spots and key parameters identified in the preliminary report.

For the first AHWG meeting some criteria were suggested to be revised in content but maintaining the structure. Moreover, some additional criteria were proposed in order to cover certain aspects not addressed through the current criteria and to be consistent with the revised scope. After the first AHWG consultation the criteria proposal was modified according the stakeholder comments and further research.

The following table shows the changes in the propose criteria structure.

Table 3.Comparison of the criteria structure

Existing EU Ecolabel criteria			***Criteria 2nd proposal***
Neewsprint paper	***Copying and graphic paper***	***Tissue paper***	***Paper products***
Criterion 1: *Emissions to water and air*			***Criterion 1:*** *Emissions to water and air*
Criterion 2: *Energy use*			***Criterion 2:*** *Energy use*
Criterion 3: *Fibres: sustainable forest management*			***Criterion 3:*** *Fibres: sustainable forest management*
Criterion 4: *Excluded or limited substances and mixtures*		***Criterion 4:*** *Hazardous Chemical substances*	***Criterion 4:*** *Excluded or limited substances and mixtures*
n.a.		***Criterion 5:*** *Product Safety*	*To be further analysed under webinar disucssion*
Criterion 5: *Waste management*		***Criterion 6:*** *Waste Management*	***Criterion 6:*** *Waste Management*
Criterion 6: *Fitness for use*		***Criterion 7:*** *Fitness for use*	***Criterion 7:*** *Fitness for use*
Criterion 7: *Information on the packaging*		*n.a.*	***Criterion 8:*** *Information on the packaging*
Criterion 8*:* *Information appearing on the EU Ecolabel*		***Criterion 8:*** *Consumer information*	***Criteiron 9:*** *Information appearing on the EU Ecolabel*

5 Criteria proposal

The following section presents the proposed revised criteria for paper products.

Note: Criteria that deal with specific aspects related to tissue products are planned to be addressed during a separated webinar.

5.1. Criterion 1: Emissions to water and air

Rationales for the revised proposal

During the on-going revision process it was acknowledged by a large part of stakeholders that data contained in BREF for pulp and paper industry (JRC, 2015) continue to be representative for the European pulp and paper industry, and could therefore be taken as the primary reference for the revision process, being contrasted with the data gathered from stakeholders (including license holders) during the 2nd questionnaire, and further consultation process.

The applicability of the emission data contained in BREF was analysed and BAT-AELs values have been contrasted with questionnaire results. Proposed emission thresholds are expressed as specific emission load per tonne of product with defined moisture content where the weight of the pulp product is corrected to reflect the weight that the pulp product would be if the pulp were composed of 10% water and 90% fibre (i.e. kg/ADt). An air dry tonne of paper is defined as paper with 6% moisture content.

It has been assumed that the S and NOx emissions to air from semi-mechanical and mechanical pulping are closely related to the energy generation.

In many cases paper only contains one type of pulp together with fillers and coating. However, there are also cases where different types of pulps are mixed. To reflect the industry practice and to accommodate specificity of the different type of pulps the calculation of emission needs therefore to be weighted according to the weight content of each pulp in the final product.

Monitoring of emission parameters

The JRC Reference Report on Monitoring (ROM) of emissions to air and water from IED installations (revised final draft October 2015) summarises information on the monitoring of emissions to air and water from IED installations provides a practical guidance for the application of the BAT conclusions on monitoring in order to help competent authorities in defining monitoring requirements in the permits of IED installations. The list of standards and methods test that addresses emission into water and air indicated in ROM document are listed below.

During the consultation process it was proposed to use the hierarchy of test methods stated in the BAT document. Such a hierarchy recognises EN and ISO standards first. In the absence of such standards, national standards can be accepted. However, in cases where a national standard is used to monitor emissions instead of an existing EN or ISO standard, it would be necessary to have third party verification that the results from the national standard can be accurately correlated to results that would be obtained from analysing the same given sample under the relevant EN or ISO standard.

Due to the existence of national differences, it was proposed to gather each of the test methods used outside Europe and assess their level of equivalency and potential correlation as part of a progressive approach leading up to the next criteria revision.

Stakeholder feedback revealed that there are many different test methods used to monitor emissions, stemming directly from national permitting requirements, in some situations developing of correlation methodology was perceived as too complex. Following industry feedback, acceptance of equivalent test methods should be considered. Additionally, following the recommendations of BAT 10, there is a trend to replace COD by TOC for economic and ecological reasons. If TOC is already measured as a key process parameter, there should be no need to measure COD; however, a

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correlation between the two parameters should be established for the specific emission source and waste water treatment step. It is proposed to address additional clarification in the user manual.

BAT 9 indicates the frequency of monitoring of parameters that addresses air emission. The recommended monitoring frequency for NOx and S should be based on periodic or continuous measurements. BAT-AELs are reported as yearly average.

Table 4. Standards and methods for the measurement of emissions to water and air

Analyte	EN or ISO Standard	Monitoring frequency	Monitoring method	Measurements range and measurements limits	Remarks
COD	ISO 15705:2002	Periodic	Oxidation with dichromate via small-scale sealedtube method followed by a) photometric detection or b) titrimetric detection	a) 6 mg/l (LoD) to 1 000 mg/l b) 15 mg/l (LoD) to 1 000 mg/l	No EN standard; several Member States use national standards for regulatory purposes e.g. NEN 6633 in NL, NF T 90 101 in FR, or DIN 38409-41 in DE)
	ISO 6060:1989	Periodic	Oxidation with dichromate via open reflux method followed by titration	30 mg/l to 700 mg/l	
Total P	EN ISO 6878:2004	Periodic	Spectrometry using ammonium molybdate after digestion with peroxodisulphate or nitric acid	0.005 mg/l to 0.8 mg/l	-
	EN ISO 15681-1:2004 EN ISO 15681-2:2004	Periodic	Flow analysis (FIA and CFA) after manual digestion with peroxodisulphate	0.1 mg/l to 10 mg/l	
	EN ISO 11885:2009	Periodic	Inductively coupled plasma optical emission spectrometry (ICP-OES)	LoQ: ~ 0.013 mg/l	
AOX	EN ISO 9562:2004	Periodic	Determination of organically bound chlorine, bromine and iodine (expressed as chloride) adsorbable on activated carbon	10 µg/l to 300 µg/l	-
Nitrogen oxides (NOx)	EN 21258:2010	Periodic	Extraction, filtration and conditioning followed by non-dispersive infrared spectrometry	Up to 1 300 mg/m3 at large combustion plants; Up to 400 mg/m3 at waste (co-)incineration plants	-
Sulphur oxides (SOx)	EN 14791:2005	Periodic	Extraction and filtration followed by absorption in aqueous H2O2 solution with subsequent sulphate determination via ion chromatography or titration	- Ion chromatography: 0.5 mg/m3 to 2000 mg/m3 (sampling duration 30 min) (3) (4); LoD: ≥ 0.1 mg/m3 (flow rate of 1 l/min, 100 ml of absorption solution, sampling duration of 30 min) - Titration: 5 mg/m3 to 2 000 mg/m3 (sampling duration 30 min) (3) (4); LoD ≥ 2.2 mg/m3 (flow rate of 1 l/min, 100 ml of absorption solution, sampling duration of 30 min)	-
Nitrogen oxides (NOX)	EN 14792:2005	Continuous,	Chemiluminescence, FTIR, NDIR, NDUV, DOAS.	Lowest range: ≤ 1.6 mg/m3 (LoQ req.) to 20 mg/m3 Highest range: to 7.5 g/m3	AMS[3], SRM[4]; Certification and calibration standards: EN15267-1:2009, EN15267-2:2009, EN15267-3:2007, and EN 14181:2014.
Sulphur oxides (SOx)	EN 14791:2005	Continuous,	FTIR, NDIR, NDUV, DOAS	Lowest range: ≤ 0.8 mg/m3 (LoQ req.) to 10 mg/m3 Highest range: to 8.0 g/m3	

[3] AMS - automated measuring systems (AMSs)
[4] Validation & calibration methods using Standard Reference Methods (SRMs), after the AMS has been installed.

5.1.1 Criterion 1a) Chemical Oxygen demand (COD), Phosphorus (P), Sulphur (S), Nitrogen oxides (NOx)

Proposed criterion

The requirement is based on information on emissions in relation to a specified reference value. The ratio between actual emissions and the reference value translates to an emissions score.

The score for any individual emission parameter (i.e. P_{COD}, P_S, P_{NOx} or P_P) shall not exceed 1,25 unless exceptional circumstances justify an individual score for one particular parameter being up to 1.5.

In all cases, the total number of points ($P_{total} = P_{COD} + P_S + P_{NOx} + P_P$) shall not exceed 4,0.

Where pulp is the end product, the paper making factors shall be set to zero. In case of non-integrated production the applicant shall provide calculation that includes pulp and paper production.

For pulp and paper making as a whole, the calculation of P_{COD} shall be made as follows (the calculations of P_S, P_{NOx}, P_P shall be made in exactly the same manner).

For each pulp 'i' used, the related measured COD emissions (COD pulp, i expressed in kg/air dried tonne — ADT), shall be weighted according to the proportion of each pulp used (pulp 'i' with respect to air dried tonne of pulp), and summed together. Air dried tonne assumes a 90% dry matter content for pulp, and 95% for paper.

The weighted $COD_{emission}$ for the pulps is then added to the measured $COD_{emission}$ from the paper production to give a total $COD_{emission}$, COD_{total}.

The weighted COD reference value for the pulp production shall be calculated in the same manner, as the sum of the weighted reference values for each pulp used and added to the reference value for the paper production to give a total $COD_{reference}$ value $COD_{reftotal}$. The reference values for each pulp type used and for the paper production are given in the Table 1.

Finally, the total COD emission shall be divided by the total COD reference value as follows:

$$P_{COD} = \frac{COD_{total}}{COD_{ref,total}} = \frac{\Sigma_{i=1}^{n}\,[pulp,i \times (COD_{pulp,i})] + COD_{papermachine}}{\Sigma_{i=1}^{n}\,[pulp,i \times (COD_{ref\,pulp,i})] + COD_{ref\,papermachine}}$$

Table 1. **Reference values for emissions from different pulp types and from paper production**

Pulp Grade/Paper	**Emissions (kg/ADT)**			
	$COD_{reference}$	**$P_{reference}$**	**$S_{reference}$**	**$NOx_{reference}$**
Bleached Chemical pulp (others than sulphite)	16	0,025 0,09[1]	0,35	1,6
Bleached Chemical pulp (sulphite)	24	0.025	0,35	1,6
Unbleached chemical pulp	6,5	0.016	0,35	1,6
CTMP /CMP	16	0.008	0.2	0,25 / 0.7[2]
TMP/groundwood pulp	3	0.008	0.2	0.25
Recycled fibre pulp without de-inking	1.1	0.006	0.2	0.25
Recycled fibre pulp with de-inking	2.4	0.008	0.2	0.25

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Paper (non-integrated mills where all pulps used are purchased market pulps)	1	0.008	0.3	0.7
Paper (Other mills)	1	0.008	0.3	0.7

(1)Reference value unless condition that it is demonstrated that the higher level of P is due to P naturally occurring in the wood pulp.

(2)NOx emission value for non-integrated CTMP mills using flash-drying of pulp with biomass-based steam and recovery of impregnation chemicals

In cases where co-generation of heat and electricity occur at the same plant, the emissions of S and NOx resulting from onsite electricity generation can be subtracted from the total amount. The following equation can be used to calculate the proportion of the emissions resulting from electricity generation:

2 × (MWh(electricity))/[2 × MWh(electricity) + MWh(heat)]

The electricity in this calculation is the electricity produced at the co-generation plant.

The heat in this calculation is the net heat delivered from the power plant to the pulp/paper production.

Assessment and verification: *the applicant shall provide detailed calculations and test data showing compliance with this criterion, together with related supporting documentation which shall include test reports using the following continuous or periodical monitoring standard test methods (or equivalent standard methods that provide data of equivalent scientific quality): COD: ISO 15075 or ISO 6060; NOx: EN 14972 or ISO 11564; S(oxid.): EN 14971 or EPA no.8; S(red.): EPA no 15A,16A or 16B; S content in oil: ISO 8754; S content in coal: ISO 19579; S content in biomass: EN 15289; Total P: EN ISO 6878.*

Rapid tests can also be used to monitor emissions so long as they are checked regularly (e.g. monthly) against the relevant aforementioned standards or suitable equivalents. In the case of COD emissions, continuous monitoring by the analysis of TOC (Total Organic Carbon) shall be accepted so long as a correlation between TOC and COD results has been established for the site in question.

The minimum measurement frequency shall be daily for COD emissions and weekly for Total P emissions. Emissions of S and NOx shall be taken on a continuous or periodic basis. Data shall be averaged across a 12 month reporting period except in cases where:

- the production campaign is for a limited time period only,

- the production plant is new or has been rebuilt, in which case the measurements shall be based on at least 45 days subsequent days of stable running of the plant.

In either case, data may only be accepted if it is representative of the respective campaign and that a sufficient number of measurements for each emission parameter have been made.

The supporting documentation shall include an indication of the measurement frequency and the calculation of the points for COD, Total P, S and NOx.

Emissions to air shall include all emissions of S and NOx which occur during the production of pulp and paper, including steam generated outside the production site, but subtracting any emissions allocated to the production of electricity. Measurements shall include recovery boilers, lime kilns, steam boilers and destructor furnaces for strong smelling gases. Diffuse emissions shall also be taken into account. Reported emission values for S to air shall include both oxidised and reduced S emissions. The S emissions related to the heat energy generation from oil, coal and other external fuels with known S content may be calculated instead of measured, and shall be taken into account.

Measurements of emissions to water shall be taken on unfiltered and unsettled samples at the final effluent discharge point of the mills wastewater treatment plant. In cases where mill effluent is sent to a municipal or other third party wastewater treatment plant, samples from the mill effluent sewer discharge point shall be analysed and results multiplied by a standard removal efficiency factor for the municipal or third party wastewater treatment plant. The removal efficiency factor to apply shall be based on information provided by the municipal or other third party wastewater treatment plant.

The period for the measurements shall be based on the production during 12 months. In the case of a new or a rebuilt production plant, the measurements shall be based on at least 45 subsequent days of stable running of the plant. The measurement shall be representative of the respective campaign.

For integrated mills, due to the difficulties in getting separate emission figures for pulp and paper, if only a combined figure for pulp and paper production is available, the emission values for pulp(s) shall be set to zero and the combined emissions shall be compared against the combined reference values for the relevant pulp and paper production.

For any individual emission score that exceeds 1.25 (but is less than 1.5), the Competent Body shall request, at its discretion, a satisfactory technical justification for this higher individual emission parameter.

5.1.1.1. Rationales for the revised proposal

The emission data was provided by 44 industrial pulp and paper mills, 26 out of which represented tissue production (Table 5). Three competent bodies informed about ranges of emissions provided by their current license holders. In general, data reported represented kraft pulp manufacturing, and covered tissue paper, graphic paper, and to the lesser extend newsprint paper. No specific (or conclusive) data on sulphite pulp, mechanical or recycled pulp (2 sites) was possible to be subtracted from the questionnaire. This is most probably due to the level of integration of mechanical and recycled pulp production (2 sites) from one site, and the limited number of sulphite pulp mills from the other. More detailed information was provided to the members of the emission sub-group, and is also available for the stakeholders registered under BATIS System (preparatory documents and minutes from the meeting). Table 5 shows the summary of the information gathered during the consultation process.

During the emission sub-group calls it was debated whether the revised proposal should shape the criteria based on existing licenses or rather set the target for license holders (and potential applicants) to meet. In the latter case, the emissions criteria might oblige license holders to select other pulp suppliers. For integrated production there is however limited (if any) flexibility to change pulp sourcing without major costs and transport associated emissions (that is not addressed by EUEL criteria). Given the inherent environmental benefits of integrated production (i.e. minimal transport, energy savings, etc.), EUEL emission limits should be revised very much in consideration of the existing license holder data.

Table 5. Ranges of emission values for singular emission parameters addressed by the Criterion 1 and collected during stakeholders consultation

Emission parameter	*Min kg/ADt*	*Max kg/ADt*
COD	0.318	27.97
AOX	$0.463*10^{-3}$	0.32
$P_{(total)}$	0.001	0.44
NO_x	0.010	3.45
SO_2	$0.024*10^{-2}$	1.49
CO_2 fossil	13,00	1461,00

5.1.1.2. Outcomes from and after the 1st AHWG Meeting

Several stakeholders commented on the overall stringency of the proposed criteria and pointed out the difficulties to achieve the revised values. It was also noted that although the criteria ought to be demanding from an environmental perspective, other relevant factors (e.g. technical, environmental and economic aspects), and possible constraints should be considered. From the other side, it was commented by one stakeholder that BAT-AELs in the BREF documents represent the legal framework and can be achieved by 50-70% of the producers. Since the Ecolabel wants to reflect the top 20% of the market, the reference values should significantly be below the upper BAT-AELs. Some of the stakeholders commented on the time required to implement the proposed changes in the criteria. A few stakeholders expressed concerns that the criteria revision has not accounted properly for the difference between papermaking using virgin fibres and using recycled fibres.

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5.1.1.3. Further research and main changes

5.1.1.3.1. METHODOLOGY

The revision of EU Ecolabel emission reference values proposed for the 2nd AHWG Meeting was performed according to the following methodology:

1. To establish the basic threshold for EU Ecolabel reference values at a level corresponding to 80% of the upper BAT-AELs values; in some cases this results in values that are already close to the existing EU Ecolabel reference values.
2. To maintain the scoring system and the current equation, but to reduce the maximum permitted score from 1.5 to 1.25, in order to prevent allowing emissions that would effectively exceed minimum legal requirements in the EU.
3. To perform individual analysis of each emission parameters contrasting information contained in BREF with the questionnaire feedback, and to analyse if there is a possible space for further improvement.
4. On-going consultation process with the dedicated emission sub-group.

The decision to base the proposed revised values on the upper BAT-AELs stems from the comments received from several stakeholders, according to which: a mill performing with the lowest values in the BAT range for all parameters does not exist in reality. The emission parameters are linked and in many cases when one is abated, another tent to raise and an integrated approach was considered necessary. This is in line with BREF findings, i.e. increasing the DS content of the black liquor results in lower SO2 emission and higher NOx emission. Due to this, a recovery boiler with low emission levels for SO2, may be on the higher end of the range for NOx and vice versa. Similar observation refers to data provided from industry stakeholders.

The holistic approach is therefore the most appropriate and feasible in setting the criteria stringency level, i.e. to reach the lowest overall environmental impact in an integrated approach. For the further analysis of the proposal presented it is important to look at criteria document in its entire form. EU Ecolabel is not intended to target the top 20% of European pulp and paper mills in terms of emissions (by Criterion 1) but instead the top 20% of paper products on the European market (represented by the scope of the revise criteria set). The emission criterion is not intended as a benchmarking exercise for mills but it is rather a part of a wider set of EUEL criteria, all of which must be complied with.

Furthermore, the 80% of the BREF upper values means that on average each individual parameter has to be at the level of 80% of BAT-AELs. If one emission parameter is at the upper level of BAT (i.e. 1.25x the EUEL reference value), then another emission parameter, must be lower (i.e. 0.75x the corresponding EUEL reference value), in order to balance the overall score. Each individual mill will have its own, site specific potential for further improvement. The current system is considered as a way of recognising this fact and allowing for flexibility at the mill level while incorporating a moderate but notable increase in ambition level beyond the platform set by work carried out in the BREF study.

It is also important to noticed that the revised proposal contains changes in the emission reference values from one side, and the reduction of maximum allowed score for individual emissions (from 1.5 to 1.25), from the other. When considered together, even moderate reductions in the EUEL reference values will be more challenging than they may first appear.

Considering feedback received from industry stakeholders it is proposed to further discuss the possibility to allow one of the parameters to reach the score 1.5 as long as the final score does not exceed 4. The possible exemption should be granted on the case by case analysis at the level of application, and could include case such as i.e. nature of the raw material used.

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In case of integrated mills, due to the difficulties in getting separate emission figures for pulp and paper, if only a combined figure for pulp and paper production is available, the emission values for pulp(s) shall be set to zero and allocated to the paper mill. Thus the emission from paper production should include both pulp and paper production.

In many cases the produced paper contains only one type of pulp together with fillers and coating. A typical copying paper may include for instance 70% chemical pulp and 30% fillers. However, there are also cases where different types of pulps are mixed. In this case the calculation of final scoring should be weighed according to the pulp content (% of weight).

5.1.1.3.2. CHEMICAL PULP

Figure 3 illustrates the analysis of emission levels for parameters addressed by Criterion 1(a).

For sulphur emission, analysis includes 54 mills out of which 70,3% (38 in number) meets the proposed revised EU Ecolabel reference level (0.35 kg S/ADt).

Following EKONO study (Ekono, 2012) total sulphur emission (kg S/t) for kraft mills in 2011 in Europe varied between 0.02-0.84 (kg S/t)[5]. The median TRS emission was about 0,17 kg S in Sweden and 0,18 kg S/t in Finland. The US kraft mills average was about 0,6 kg S/t, whereas the Canadian 0.7 kg S/t. The study does not specify if S-emission related to heat and energy generation is included in the analysis (Ekono, 2012). The proposed revised emission level is based on the sum up of BAT-AELS emission thresholds for **4 sources: weak gases burners, recovery boiler, lime kiln and residual week gases**.

For NOx emission, analysis includes 53 mills out of which 66% (35 in number) meets the proposed current EU Ecolabel reference level (1.6 kg NOx/ADt).

The revised proposal maintained analogous scope for reporting on NOx and includes **all emissions which occur during the production of pulp and paper, including steam generated outside the production site**.

The upper BAT-AELs values set in Commission Implementing Decision 2014/687/EU establishing the best available techniques (BAT) conclusions for the production of pulp, paper and board are as follows:

- Recovery boiler: 1.7 kg NOx/ADT
- Lime kiln: 0.3 kg NOx/ADT
- TRS burner: 0.1 kg NOx/ADT

It is relevant to state that more ambitious emission limit for NOx is technically feasible considering that:

- In practice only primary NOx-reduction measures are applied, such as low NOx burners and staged combustion. It seems the full potential of primary measures is not being fully utilized. Information available at the 'Paper Environmental Footprint' website indicates that with more extensive staged combustion and integration of an OFA (over fire air) system NOx emissions reductions of 20% - 40% could be achieved.
- Use of selective catalytic reduction (SCR); Lahti Energy RDF gasification plant with ceramic filter for high temperature removal of condensed volatile salts at 400°C illustrated that the risk of catalyst deactivation can in theory be mitigated by installing high temperature filters. These filters can even be designed to be based on catalytic ceramic materials, acting as a SCR reactor.

[5] TRS (Total sulphur emission) comprise the sum of the SO_2 and TRS emission.

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- Another technical option for deep removal of NOx is wet scrubbing at low temperatures.
- New technological developments may allow application of secondary and tertiary measures such as SCR DeNOx, currently not yet applied because of technical risks.

The power boilers and especially the biomass boilers that generate NOx emissions are addressed by Large Combustion Plants BREF, and not by the Pulp and Paper BREF. Cross check with the current license holders and further industry consultation show that the level for NOx of 1.6 kg NOx/ADt is already challenging. Therefore it is proposed to maintain the current value.

COD emissions was analysed on the base of data from 42 mills, out of which 32 mills generate bleached kraft pulp. 50% of bleached pulp mills (16 mills) meet the proposed revised EU Ecolabel reference level (16 kg COD/ADt), whereas the compliance for unbleached kraft pulp (6,5 kg COD/ADt) is equal to 60% (10 mills) of analysed sites.

For phosphorous emission, data includes 42 mills out of which 54,7% (23 mills) meet the proposed revised EU Ecolabel reference level (0,025 and 0,016 kg P/ADt for bleached and unbleached chemical pulp, respectively). Following the indication of BAT conclusions for kraft pulp processing, **a specific reference value is granted to Eucalyptus pulp** (0,09 kg P/ADt).

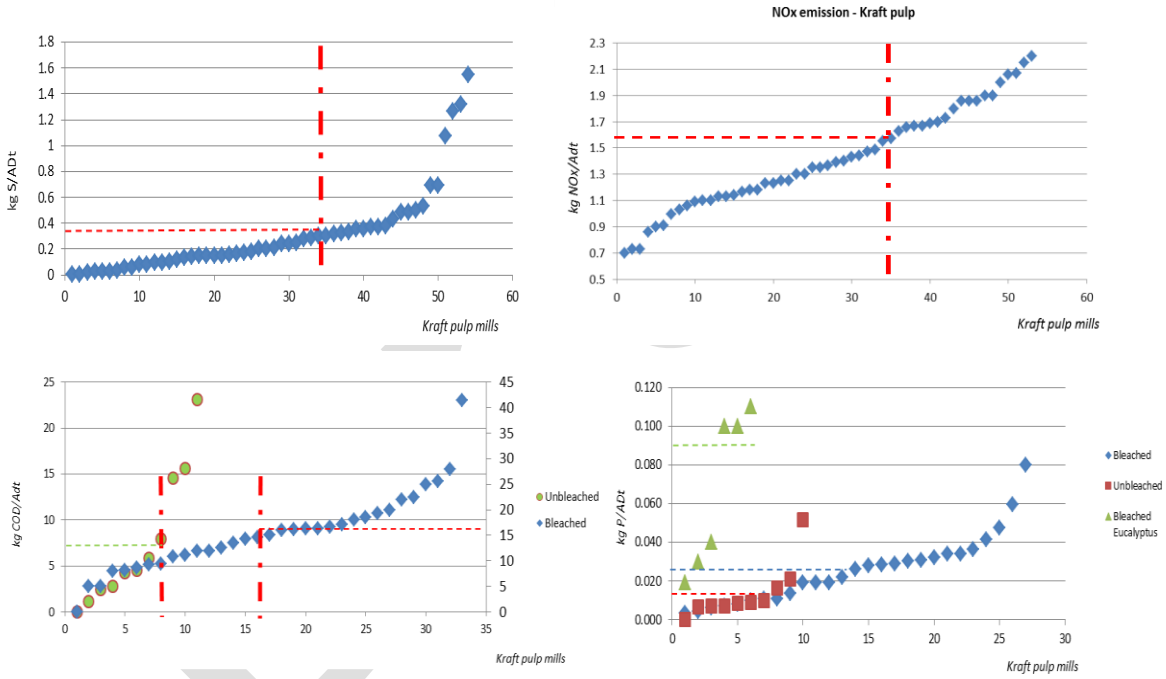

Figure 3 Analysis of emission parameters from kraft pulp mills (Source: BREF)[6]

Table **6** and Figure 4 contain comparative analysis of the current and proposed, revised reference emission values for the criterion 1(a). Figure 4 compares the current and proposed ambition level for: (1) each parameter, (2) combination of air emission requirements, (3) combination of water emission requirements, and (4) emission criterion in its entire form including scoring system. Combined evaluation includes only those mills that specified all emissions parameters, and indicated production capacity. All in all, comparative analysis includes 40 kraft pulp mills manufacturing 18.095.765 ADt/year. In total, 55% of analysed mills, which roughly corresponds to approximately

[6] The air emission data exclude emissions from auxiliary boilers or other steam and power plants.

40% of the kraft pulp market, comply with the proposed sub-criterion 1(a). The data analysis also proves the need to maintain a flexible approach of scoring system

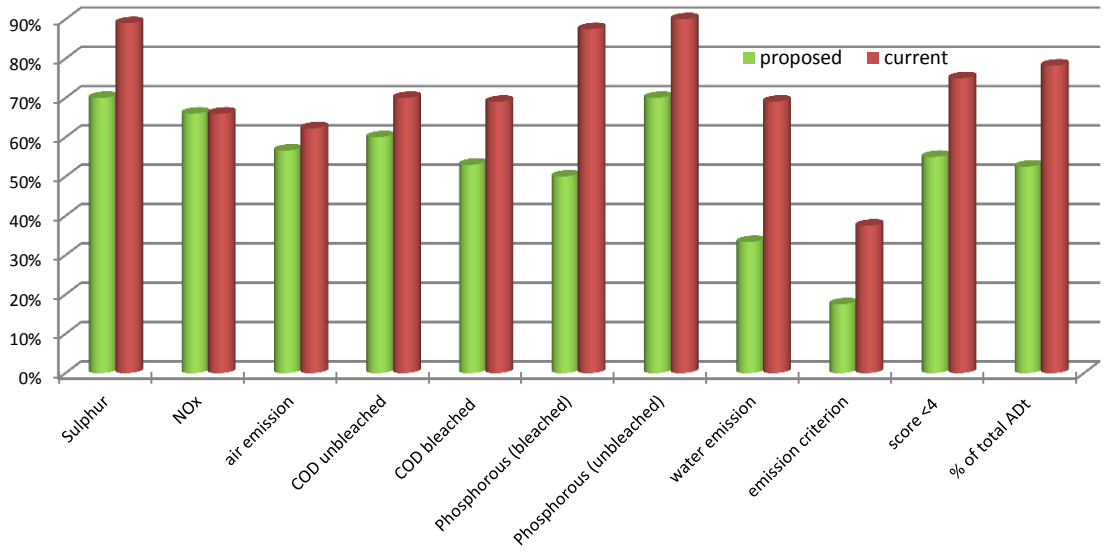

Figure 4 Change in the current and proposed ambition level of the criterion (% of compliant mills)

Table 6 Comparative analysis of the current and proposed emission reference values for the criterion 1(a)

Parameter	Current threshold	Proposed threshold	Number of mills	Comply with the current threshold	Comply with the proposed threshold *(% of mills)*	Change (%)[1]
Sulphur (kg/ADt)	0.6	0.35	54	48	38 *(70%)*	-21%
NOx (kg/ADt)	1.6	1.6	53	35	35 *(66%)*	0%
COD (bleached) (kg/ADt)	18	16	32	22	17 *(53%)*	-23%
COD (unbleached) (kg/ADt)	10	6.5	10	7	6 *(60%)*	-14%
P (bleached) (kg/ADt)	0.045/(0.1)[2]	0.025 (0.09)[2]	32	28	16 *(50%)*	-43 %
P (unbleached)(kg/ADt)	0.04	0.016	10	9	7 *(70%)*	-22%
Criterion 1(a)	x	x	40	15	7 *(17.5%)*	-53%
Criterion 1(a) score<4	x	x	40	30	22 *(55%)*	-27%
Total production (ADt)		18.095.765		14.424.634	7.553.776	-33%

[1]Refereed to the ambition level of the current criteria
[2]Eucalyptus pulp

Emission from sulphite pulp have been harmonised with the BREF reference values, following the general approach of 80% of upper BAT-AELs limit.

5.1.1.3.3. CHEMITERMOMECHANICAL (CTMP) AND CHEMIMECHANICAL PULP (CMP)

Combustion of fuel for on-site energy generation might potentially be a source of emissions into air. It has been therefore assumed that the emission of S and NOx to air from semi-mechanical (also mechanical pulping) is closely related to the energy generation.

The proposal is based on following rationales:

- Process related emissions of S-compounds, including emissions of odorous compounds are negligible;
- There are no residues that have to be incinerated onsite, as with black liquor in sulphate pulping. The bark and other residues produced during wood preparation, pulping and waste water treatment need not be incinerated onsite. In fact, bark is frequently supplied to third parties as a fuel (JRC, 2015) or is utilized as an auxiliary in e.g. composting (SPIN, 1993). Pulp residues, rejects and sludge may also be supplied to external customers as a fuel. These may not always be pulp mills and paper mills, but also district heating plants or biomass fired power stations;
- Theoretically, heat demand for TMP pulping and chemithermomechanical pulping (CTMP) is compensated by the amount of heat that can be recovered in form of steam and/or hot water.

Furthermore, emission values (i.e. COD, P) for CTMP pulp reflect 80% of BAT-AELs values. This proposal was cross-checked with the information sent by the license holders and data contained in BREF (JRC, 2015).

EKONO study (Ekono, 2012) reported emission values from semi-chemical pulp and board mills vary between 0.05 – 3.1 kg/t for NOx emission (median 0.99 kg NOx/t), and 0.02-4.6 kg/t for sulphur emission (median 0.35 kg S/t). Finish mills reported tha value between 0.03-0.79 kg S/t for sulphur, and 1.6-2.1 kg NOx/ADt.

The REFIT study advises to improve consistency and integration between the EU Ecolabel and existing national/regional labels (European Commission, 2017). Accordingly, reference emission values for NOx and sulphur are proposed to be harmonised with the Nordic Swan requirement for pulp and paper basic module. However, according to information gathered from stakeholders a non-integrated CTMP mill with steam drying of pulp and a power plant using biofuels will be characterised by a specific NOx-emissions of about 0,4-0,6 kg/t with BAT technology. With advanced chemical recovery by combustion the NOx-level may be up to 0.8 kg/t. The number of mills that falls under the description is limited as most CTMP mills are integrated with pulp, paper or board mills, or are using different drying technique or fuel base. To address a specific technological solution it is therefore proposed that NOx emission value for non-integrated CTMP mills using flash-drying of pulp with biomass-based steam and recovery of impregnation chemicals is 0,7 kg/ADt.

5.1.1.3.4. MECHANICAL PULP

Mechanical pulping generates emissions to the air that stem mainly from the energy generation by combustion of different types of fossil fuels or renewable wood residuals, among others. In a typical integrated paper mill that uses mechanical pulp high-pressure steam is generated in a power plant. The energy is partially transformed into electricity in a back pressure turbo generator and the rest is used in paper drying. The emission of sulphur dioxide is limited by using selected fuels. Depending on the local conditions there are paper mills using different amounts of energy from external supply (Bajpai, 2015a).

By using emission factors related to specific production data, i.e. fuel, energy, it is possible to estimate the emissions. Table 7 shows as example the emission factors for some combustion facilities. As example, the emission factor for natural gas is 20 x S where S is correlated to the sulphur content of fuel (in wt %), it follows that the combustion of 1 kg of natural gas yields 0.60 g of SO2 (Van Velzen. D. Eds, 2012).

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Combustion of fuels or waste from the pulp, paper and board industry is addressed by the BREF for Large Combustion Plants[7]. Following the prescription of BAT 5, initial characterisation and regular testing of the fuel can be performed by the operator and/or the fuel supplier. If performed by the supplier, the full results are provided to the operator in the form of a product (fuel) supplier specification and/or guarantee. Accordingly, it is understood that the information on fuel and possible emissions related is a common practice within the sector.

Table 7 Emission factors (g/kg) for the combustion of different fuels (S in%)

	Hard coal	lignite	Pressing lignite	Fuel oil	Natural gas
SO_2	19xS	10xS	10xS	20xS	20xS
NO_x (as NO2)	1.5-3.0	0.4-0.8	0.96	5.3	3.0-5.0

Following the EKONO study findings (Ekono, 2012), analysed Swedish and Finnish mills reported total sulphur emission below 0.18 kg S/t. The reference value for Nordic Swan is 0.2 kg S/t. It is proposed to harmonise the value with the Nordic Swan. Nevertheless, the possibility to lower the value to 0.18 kg S/ADt should be further cross checked during the 2nd AHWG Meeting.

The median NO_x emissions were 0.17 and 0.35 kg NOx/t in Sweden and Finland, respectively. Reference emission value for NOx is proposed to be harmonised with the Nordic Swan requirement for pulp and paper basic module.

Figure 5 contains analysis of COD and P emissions from mechanical pulping (groundwood and TMP). Table 8 analyses the level of compliance with the proposal.

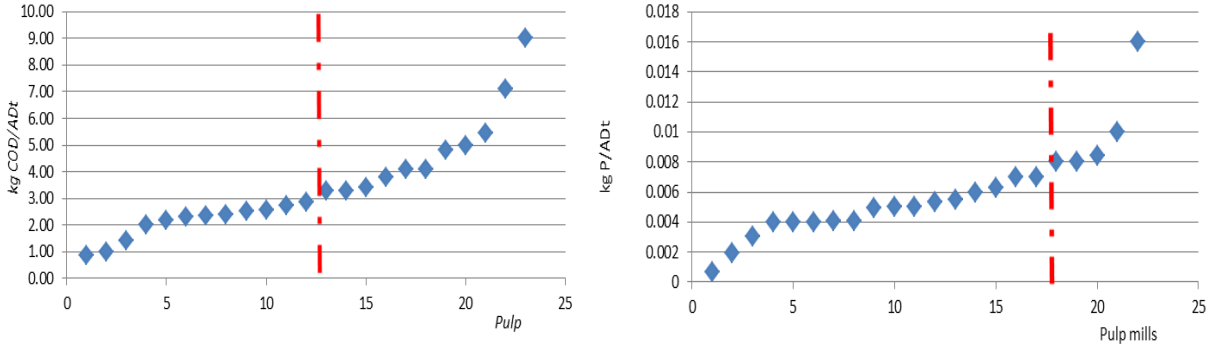

Figure 5 Analysis of emission parameters into water from groundwood and TMP pulp (Source: BREF)

Table 8 Analysis of the ambition level for the values proposed for mechanical pulp mills

	Current threshold	Proposed threshold	Number of mills	Comply with the current threshold	Comply with the proposed threshold	Change (%)*	Ambition level*
COD	3	3	23	12	12	*0%*	*52%*
Phosphorous	0.01	0.008	22	21	20	*-0.5%*	*91%*

[7] Best Available Techniques (BAT) Reference Document for Large Combustion Plants. JRC. 2016. Final Draft

5.1.1.3.5. RECYCLED FIBRE

In most cases, plants processing paper for recycling are integrated with paper production. The intensity of the recovery process, and the presence of some emissions pointed in Figure 6 in depends mainly on the paper grade and paper properties to be achieved and the type of energy supply.

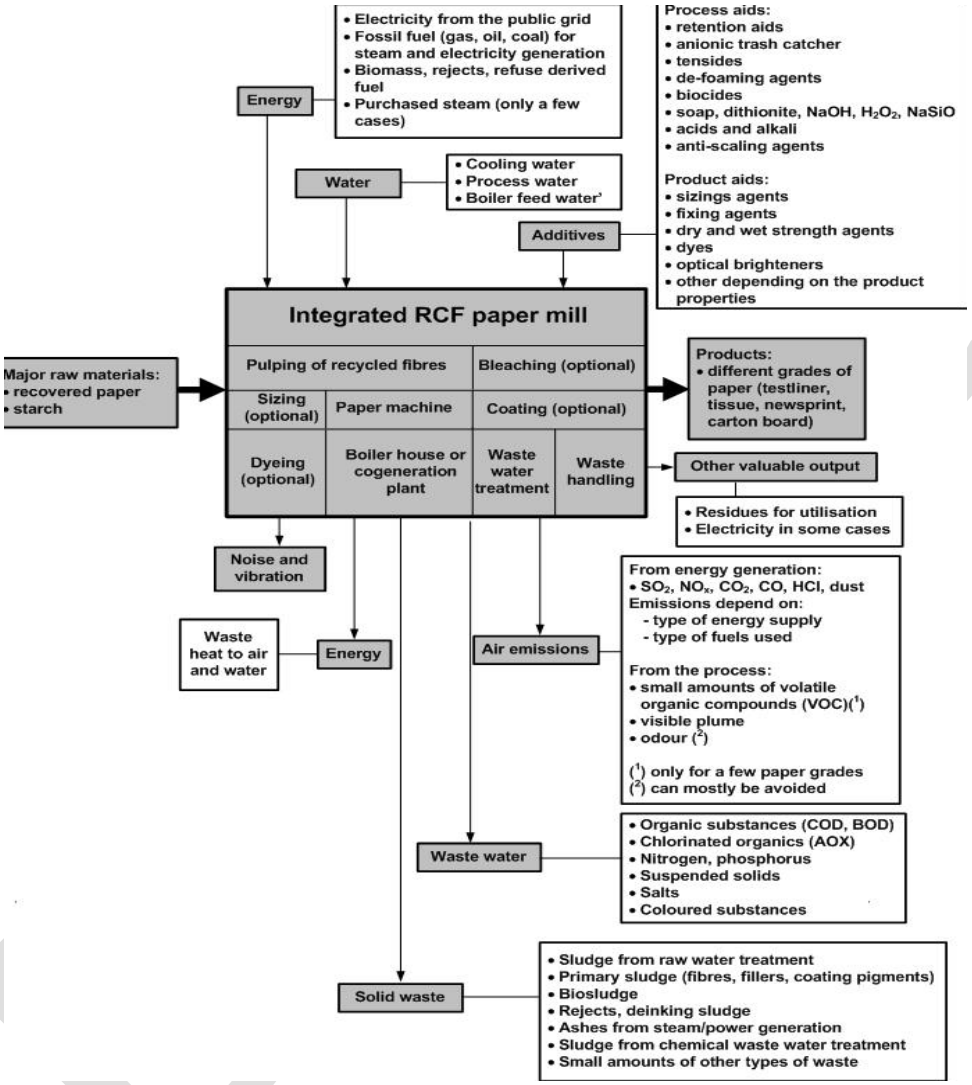

Figure 6 Mass stream overview of an integrated mill for processing paper for recycling (JRC, 2015)

In Europe, it is possible to find large differences in the composition of paper for recycling. The environmental impact of processing paper for recycling basically comprises emissions to water, solid waste generation and atmospheric emissions that are mainly related to energy generation by combustion of fossil or other fuels in steam boilers or combined heat and power plants.

Figure 7 **and**

Figure **8** contain analysis of the emission levels from RCF mills. The division between mills that operates with or without de-inking have been established under proposed criterion in line with BAT –AELs and BREF finding that reflect differences in the emission loads.

Table 9 contains comparative analysis of the prevalent and proposed, revised emission reference values for recycled fibre.

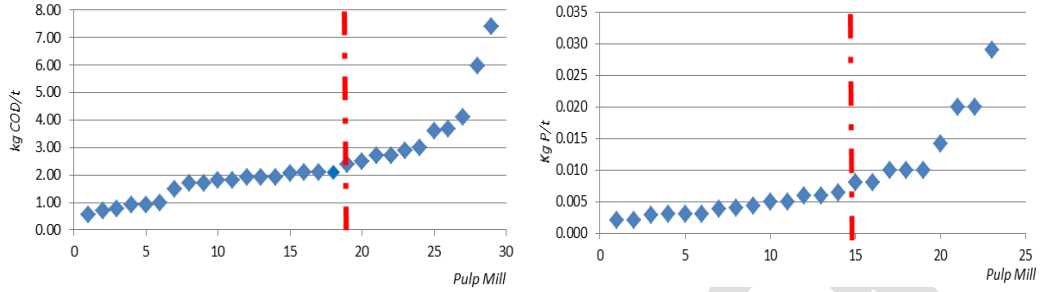

Figure 7. COD and phosphorous emissions from RCF mills with deinking

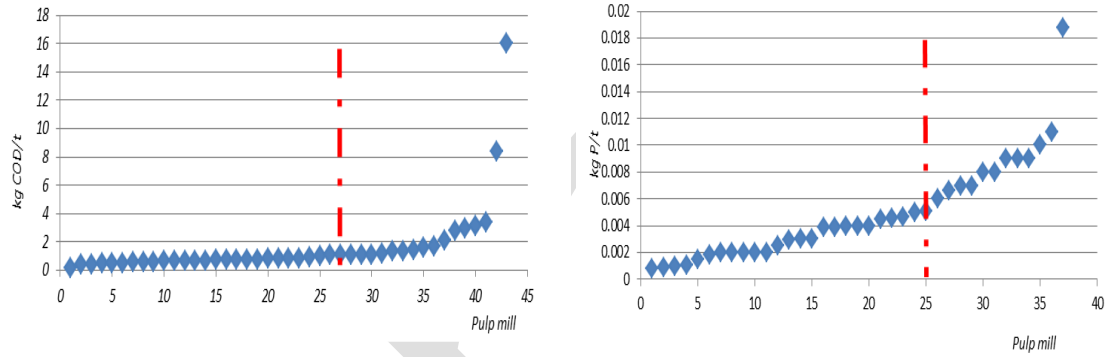

Figure 8. COD and phosphorous emissions from RCF mills without deinking

Table 9 Analysis of the ambition level for the values proposed for recycled pulp

	Current threshold	*Proposed threshold*	*Number of mills*	*Comply with the current threshold*	*Comply with the proposed threshold*	*Change (%)**	*Ambition level**
Emission from RCF mills with deinking							
COD	*2.0*	*2.4*	*29*	*14*	*19*	*+36%*	*65,5%*
Phosphorus	*0.01*	*0.008*	*23*	*19*	*16*	*-16%*	*69,6%*
Emission from RCF mills without deinking							
COD	*2.0*	*1.1*	*43*	*36*	*30*		*69.8%*
Phosphorus	*0.01*	*0.006*	*37*	*30*	*20*		*54.1%*

**Assumed as the representativeness of absolute emission value for the number of mills analysed (score 1.25 is not taken into consideration)*

Similarly to mechanical pulping, emissions to air from paper recycling originate mainly from energy generation (steam and electricity) and less from the manufacturing process itself.

Following the Econo study (Econo, 2012) that addressed mills producing secondary fibre with deinking, NOx emission from Swedish and Finnish mills ranged from 0.07 to 0.8 kg/t.

NOx and sulphur emission values for recycled fibre are proposed to be harmonised with the Nordic Swan requirement for pulp and paper basic module.

5.1.1.3.6. PAPER PRODUCTION

Independently from the paper grade manufactured, paper mill processes can be generally divided into key sections, characterized be a specific emissions as demonstrated on Figure 9.

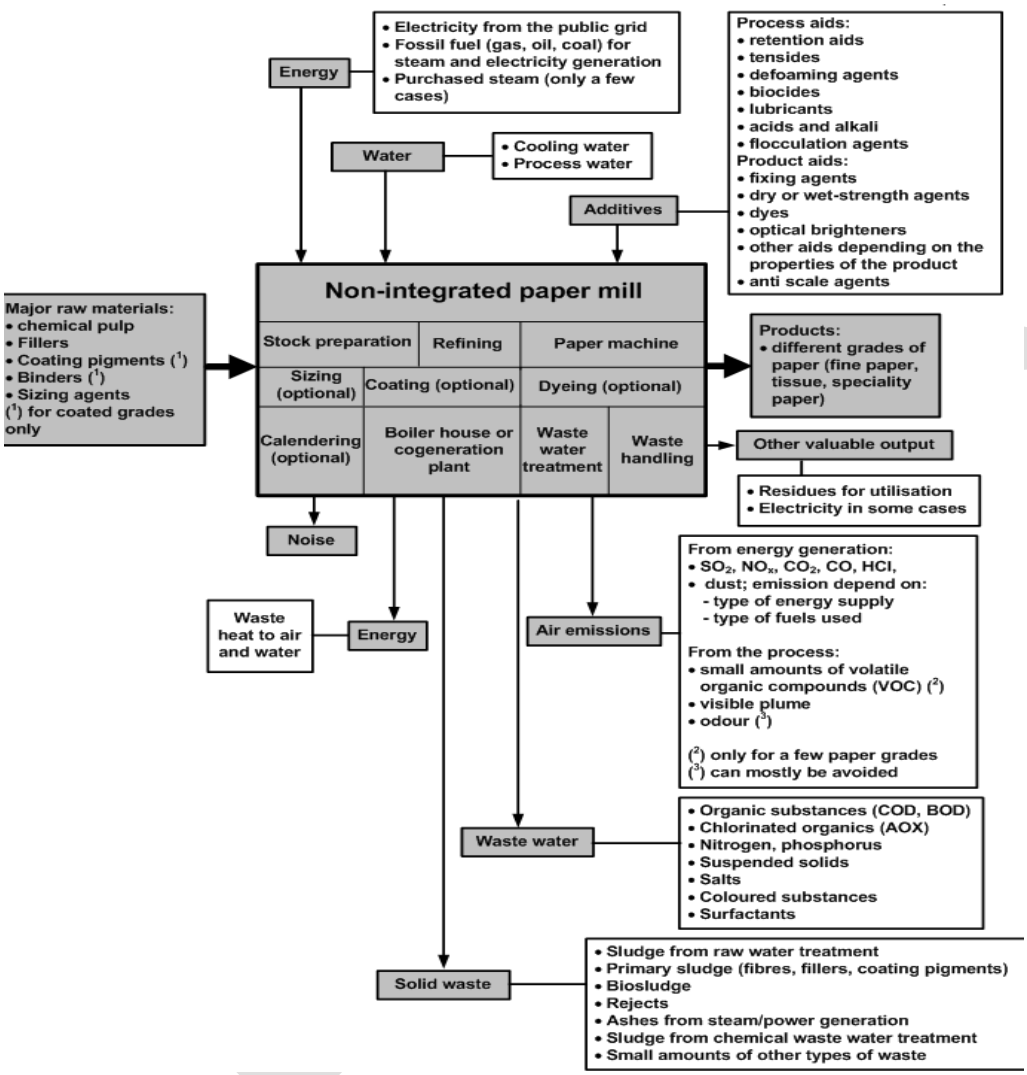

Figure 9 Mass stream overview of paper mill (JRC, 2015)

In non-integrated mills fuel for generation of the process heat required for stock preparation and paper machine constitutes the main source of emission into air. In paper mills utilizing recovered fibres or market pulp, heat demand for stock preparation and paper machine will need to be covered by fossil fuel or biomass fired boilers.

Heat demand for stock preparation and paper machine amounts to approximately 5±1 GJ/ADt of paper on average. In integrated plants producing chemical pulp, TMP pulp or CTMP pulp the heat demand can be (to a large extend) met with heat from recovery boiler/bark boiler and mechanical pulping respectively. For integrated paper mills, the specific pulping processes used and related emission levels should be taken into account.

Following Ekono study (2012) total sulphur emission from non-integrated paper production in 2011 in Europe varied between 0.00 and 0.5kg S/ADt, and for NOx emission between 0.06 and 0.64 kg NOx/ADt. Nordic Swan criteria establishes the

threshold value at the level of 0,3 S ref/ADt, and of 0,7 NOx/ADt for paper machine (coated and uncoated paper), and 0,5 for paper machine for speciality paper. Figure 10 contain analysis of the emission levels from non-integrated paper mills. Table 10 contains comparative analysis of the prevalent and proposed, revised emission reference values for the criterion 1(a).

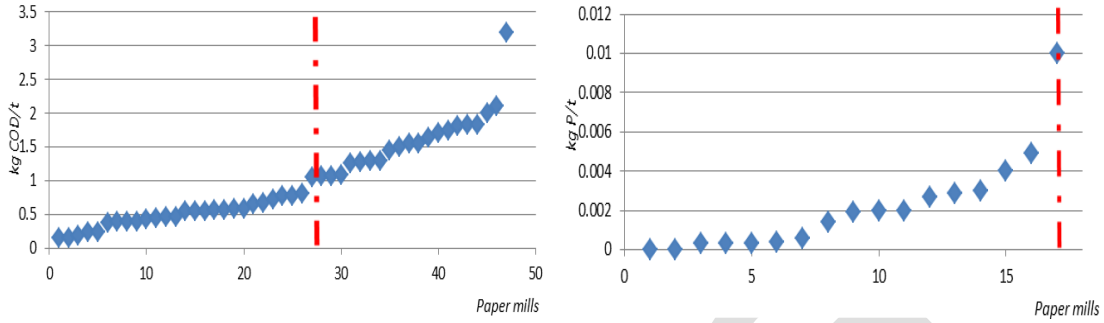

Figure 10. COD and phosphorous emission from non-integrated paper mill

Table 10 Analysis of the ambition level for the values proposed for non-integrated paper mills

	Current threshold	Proposed threshold	Number of mills	Comply with the current threshold	Comply with the proposed threshold	Change (%)*	Ambition level*
COD	1	1	47	26	26	*0%*	*55%*
Phosphorous	0.01	0.008	17	17	17	*0%*	*100%*

5.1.1.3.7. REFERENCE ANALYSIS METHODS

Some limitations of the wording of the criteria set out in Decisions 2011/332/EU and 2012/448/EU for Copying and Graphic Paper and Newsprint Paper respectively when referring to standard methods were:

- No specific allowance for *equivalent* standards made.
- No minimum monitoring *frequency* specified.

Stakeholders were asked to provide details of the actual standard methods used to assess emissions of COD, P, S and NOx from pulp and paper mills so that they could be compared with the actual methods listed in Decisions 2011/332/EU and 2012/448/EU for Copying and Graphic Paper and Newsprint Paper respectively. The recently published BAT Conclusions (Decision 2014/687/EU) for the production of pulp, paper and board were also cross-checked for recommended analytical methods.

With COD emissions, it was found that the standard ISO 6060 method uses significant quantities of hazardous chemicals such as potassium dichromate, mercury sulfate and silver sulfate. By changing the ISO 6060 reaction system from an open reflux to a closed reflux, the consumption of the aforementioned hazardous chemicals can be reduced by a factor of 10. The closed reflux system procedure is described in ISO 15705 and has been available since 2002. For this reason, ISO 15705 is now mentioned as the main standard method for monitoring COD.

The consumption of hazardous chemicals during COD analysis can be reduced even further by accepting Total Organic Carbon (TOC) measurements in lieu of COD data. This

is specifically mentioned in the BAT Conclusions and is already being carried out by some license holders according to the Swedish CB. Nonetheless, even when TOC data is gathered on a daily basis, some intermittent analysis for COD will also be required because a correlation factor between COD and TOC needs to be established for every different mill. A typical correlation is around 3-4 units of COD for every unit of TOC. A new clause has therefore been inserted to make sure that applicants and Competent Bodies are aware that TOC data can be accepted in lieu of COD measurements. The minimum frequency of daily monitoring of COD (or TOC) is also specified, reflecting the BAT requirements.

With P emissions, it has to be considered that there are different types of P that may be present in a wastewater:

- Orthophosphate (will contribute to colour development and be detected).
- Polyphosphate (may or may not contribute to colour development and thus be detected).
- Organophosphate (will not contribute to colour development and will not be detected).

All standard methods for measuring P in wastewater have different sample preparations that can convert polyphosphate and organophosphate into orthophosphate. For clarity, the revised criteria now refer to Total P, which means that all three forms of phosphate should be measured. A minimum weekly measurement frequency should also be respected. This has now been stated in the criteria and also reflects the approach taken in the BAT Conclusions.

With respect to emissions of S and NOx, the BAT Conclusions state that measurements should be continuous in certain situations (i.e. recovery boiler) and periodic or continuous in others (e.g. lime kiln or dedicated TRS burner). Thus it is difficult to simply specify any defined measurement frequency in EU Ecolabel criteria, which will also account for different pulp technologies and paper mills. It was confirmed by stakeholders that the EPA methods specified in the criterion are still relevant although it is to be confirmed whether EN 14791 (Stationary source emissions – Determination of mass concentration of sulphur oxides – Standard reference method) would also be a relevant standard to mention for the measurement of SO_2 emissions from stacks. The same question is also posed with EN 14792 for NOx (Stationary source emissions – Determination of mass concentration of nitrogen oxides – Standard reference method: chemiluminescence). Both of these EN standards have recently been updated (2016 and 2017) and are mentioned in the revised criterion in order to prompt discussion about their relevance.

The standard method for analysis of S in coal has been updated to ISO 19579 since ISO 351 has now been withdrawn and now reference is made to analysing S in biomass as well. It was explained during a CB Forum meeting in June 2017 that when calculating S emissions simply by analysing the S content of the fuel (instead of measuring oxidised and reduced S in exhaust gases) it should be assumed that all of the S in the fuel is emitted to the atmosphere.

One other clarification that was received during the CB Forum meeting, which is related to the S and NOx emission calculation, was that the reason for multiplying onsite generated electricity by a factor of 2 in the equation is related to the concept of Primary Energy Saving (PES) that can be achieved when using cogeneration technology and when there is a use for the heat generated.

Questions:

1. Are the proposed revised emission reference values adequate?

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2. Should the reference value for sulphur be lowered from 0,2 to 0,18 kg S/ADt as suggested by information contained in Econo study? Applicable to mechanical, semi-mechanical and recycled pulp mills.

3. Is the proposed assessment and verification adequate?

4. Are the proposed test methods adequate and up to date?

5. Is the proposed monitoring methodology and frequency adequate?

6. Do you find adequate to change the scoring system as proposed: none of the individual points P_{COD}, P_S, P_{NOx}, P_P shall exceed 1.25?

7. Do you agree to introduce more flexible approach and grant additional flexibility to one of the emission parameters, as follows: The score for any individual emission parameter shall not exceed 1.25 unless exceptional circumstances justify an individual score being up to 1.5. However, even in these exceptional cases, the sum of the 4 emission parameter scores must still not exceed 4.0?

8. If you are positive with granting additional flexibility to one of the parameters, do you find the proposed assessment and verification that relies on Competent Body evaluation adequate?: For any individual emission score that exceeds 1.25 (but is less than 1.5), the Competent Body shall request, at its discretion, a satisfactory technical justification for this higher individual emission parameter.

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5.1.2 Criterion 1b) AOX

Proposed criterion

Proposal 1

This criterion refers to ECF pulp.

Unless separately specified, AOX emissions from the production of each pulp used shall not exceed 0,16 kg/ADT.

AOX emissions shall not exceed 0.17 kg/ADT in case the total wood mix at the integrated mill contains at least 40% of wood species with high tannin content (i.e. chestnut, oak).

Note: The criterion is not applicable to plants that provide evidence that no AOX is generated or added via chemical additives and raw materials

Assessment and verification: the applicant shall provide test reports using the following test method: AOX ISO 9562 accompanied by detailed calculations showing compliance with this criterion, together with related supporting documentation.

The supporting documentation shall include an indication of the measurement frequency. AOX shall only be measured in processes where chlorine compounds are used for the bleaching of the pulp. AOX need not be measured in the effluent from non-integrated paper production or in the effluents from pulp production without bleaching or where the bleaching is performed with chlorine-free substances.

Measurements shall be taken on unfiltered and unsettled samples either after treatment at the plant or after treatment by a public treatment plant. The period for the measurements shall be based on the production during 12 months, reported as an average from monthly measurements. In case of a new or a re-built production plant, the measurements shall be based on at least 45 subsequent days of stable running of the plant. The measurement shall be representative of the respective campaign.

Proposal 2

To incorporate AOX emission into the emission equation following the rules specified under Criterion 1 (a)

The criterion is not applicable to plants that provide evidence that no AOX is generated or added via chemical additives and raw materials

The total number of points (Ptotal = P_{COD} +P_S +P_{NOx} +P_P+ P_{AOX}) shall not exceed 5,0.

The specific AOX emissions from the production of pulp shall not exceed the following values for each type of pulp and for paper production:

Table 2 Proposed reference values for AOX emissions from different pulp types and from paper production

	Reference values kg AOX/ADt
Pulp types	
Bleached sulphate pulp	0,14
Bleached sulphite pulp	0,14

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Assessment and Verification:

With the exemption specified below the applicant shall provide test reports using the following test method: AOX ISO 9562 accompanied by detailed calculations showing compliance with this criterion, together with related supporting documentation. AOX shall only be measured in processes where chlorine compounds are used for the bleaching of the pulp. AOX need not be measured in the effluent from non-integrated paper production or in the effluents from pulp production without bleaching or where the bleaching is performed with chlorine-free substances.

The supporting documentation shall include an indication of the measurement frequency. Measurements shall be taken on unfiltered and unsettled samples either after treatment at the plant or after treatment by a public treatment plant. The period for the measurements shall be based on the production during 12 months, reported as a monthly average. In case of a new or a re-built production plant, the measurements shall be based on at least 45 subsequent days of stable running of the plant. The measurement shall be representative of the respective campaign.

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5.1.2.1. Rationales for the revised proposal

The parameter "AOX" is a sum of all Absorbable Organic Halogens in the waste water. The AOX are generated in the pulp and paper industry during the bleaching process, being formed as a result of reaction between residual lignin from wood fibres and chlorine/chlorine compounds used for bleaching process. A reduction of AOX has been achieved, among others, thanks to the replacement of molecular chorine by chlorine dioxide, and the use of chlorine free bleaching chemicals such as molecular oxygen, hydrogen peroxide, ozone or peracetic acid. Prevention of AOX formation could be achieved by application of bleaching sequences with reduced chlorine containing agents, or using TCF bleaching. It is then reasonable to assume that reporting AOX should primarily target ECF pulps.

5.1.2.2. Outcomes from and after the 1st AHWG Meeting

Some stakeholders considered the current limit for AOX is ambitious enough suggesting no further changes. It was proposed to maintain the upper limit value proposed for the 1st AHWG Meeting - 0.15 kg/ADT – mainly to demonstrate continuous improvement. Others argued that there is no reason why AOX should be treated separately as it is one of the emission parameters, and it was reduced by 35% during the last revision. Lowering the values without achieving any additional environmental gain or reduction of the impact was considered as not appropriate and resulting in the extremely low uptake.

It was also commented that some wood species require more severe bleaching conditions due to the high kappa number (indicates lignin content). Moreover, most integrated mills were assumed to use one type of pulp without the flexibility to use/adapt pulp mix to required emission levels. It was also argued that some of the low limit values for AOX emissions are at the analytical detection limits, measurements of which are often unreliable.

The AOX was assumed as not applicable to plants that provide evidence that no AOX is generated or added via chemical additives and raw materials emission as not relevant parameter, i.e. TCF bleaching. Some stakeholders proposed to exclude AOX criterion for recovered fibre pulp, as the possible emission stems from the feedstock used thus being difficult to control in production of paper from recycled fibres.

5.1.2.3. Further research and main changes

The vast majority of AOX emission comes from the first ClO_2 bleaching stage in the ECF process (Tuula et al. 2010). Following Zhu et al. (Zhu et al, 2016) more than 97% of the AOX is produced during the first 5 minutes of the bleaching sequence, and the reaction rate is primarily determined by the initial amount of lignin in the pulp and ClO_2 dosage.

Under EU Ecolabel scheme, AOX criterion constitutes separated requirement 1(b) without being incorporated into scoring equation. The data collected from the industry shows that all EU Ecolabel licenses met the current limit of 0,17 kg AOX/ADt. The specific AOX emissions of bleached kraft pulp mills at the point of discharge, i.e. after waste water treatment vary between undetectable and 0.3 kg AOX/ADt of bleached pulp (Figure 11).

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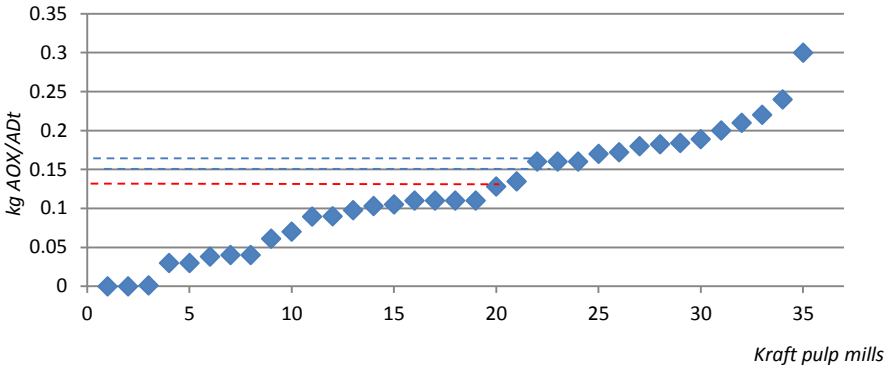

Figure 11 AOX emission levels for bleached Kraft pulp (JRC, 2015)

During the consultation process it was proposed to lower AOX reference value to the level of 0.1 kg AOX/ADt. In order to assess the ambition level of the sub-criterion 1(b), the emission level from the bleached kraft pulp was contrasted with the production capacity of analysed mills. Further analysis of data shows that AOX emission level that is equal or lower than 0.1 kg AOX/ADt corresponds to 38% of bleached kraft pulp production[8] (Figure 12). Data collected within the 2nd EU Ecolabel questionnaire is in line with information contained in the BREF for pulp and paper.

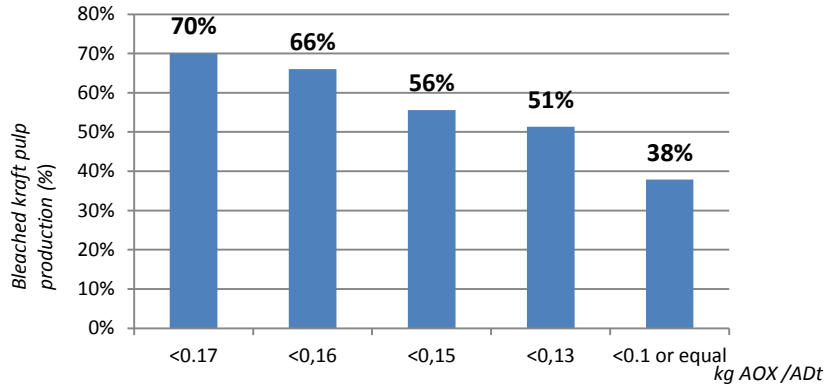

Figure 12 Production capacity of bleached kraft pulp *vs* AOX emission per tonne of bleached pulp

The AOX emission depends on the kappa number achieved before pulp bleaching, the chlorine dioxide charge applied in bleaching, the bleaching sequences including washing and water recirculation, and the effluent treatment. In a bleached kraft pulp mill, the most desirable goal is to reduce the lignin content in pulp (low kappa number) that enters the bleach plant and to preserve the pulp yield as high as possible. Low lignin content before bleaching implies the use of modest bleaching sequences that result in lower AOX emission. This is possible to be achieved to the large extend by in-process measures before the bleaching process, for example, increased delignification by extended or modified cooking and additional oxygen stages (pre-bleaching), spill collection systems, efficient washing, and stripping and reuse of condensates (Bajpai, 2010). It is also important to notice that wood species should be taken into account when proposing AOX emission threshold. In fact, in Figure 13[9] it is possible to observe the influence of main wood types on the AOX emission level.

From the feedstock supply perspective, for an integrated plant it is not always feasible to change the wood type in favour of raw material that could generate lower AOX emission.

[8] Total amount of bleached kraft pulp 37 sources equals 15,222,762 ADt/year
[9] Singular emission data is known to JRC being subjected to its confidentiality

In this sense one of the license holders informed JRC that despite investments done during the last few years and so reducing AOX emission by a third, it is not possible to go beyond certain value[10] because the local wood mix has a very high tannin content (i.e. chestnut wood). To meet the production demand, integrated plant would have to transport fibre from other sources what might cause adverse effect on the environment (i.e. increased transport intensity) and should be analysed on case by case basis. Non-integrated paper mill, by contrary, has certain capacity to select the pulp with appropriate characteristic. The internal communication with license holder shows that derogation of 0,17 kg AOX/ADt for integrated plant that uses more than 40% of wood with high tannin content in the pulp mixture should be considered.

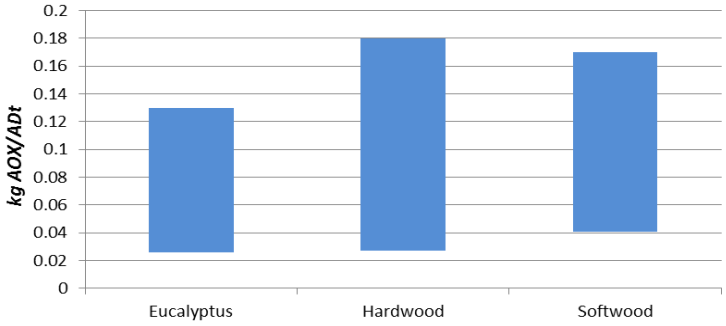

Figure 13 Co-relation between type of wood and AOX emission – license holders

Furthermore, Table 11 shows correlation between wood type, AOX emission and COD emission (JRC, 2015). Following BREF analysis the discharge of residual lignin in kg COD/ADt assumes a discharge of approximately 2 kg COD per kappa unit and a pulp to be bleached to full brightness. However, where the kappa number is less than 10, the discharge of COD is closer to 1.5 kg per kappa unit.

Table 11 Examples of the interrelation between wood type, techniques and degree of delignification before the bleach plant and COD generated during bleaching

Cooking method	*O_2 delignification/ ozone bleaching*	*Hardwood pulp*		*Softwood pulp*	
		Kappa number into bleach plant	*COD [kg/ADt]*	*Kappa number into bleach plant*	*COD [kg/ADt]*
Conventional cooking	–	18	38	30	63
Conventional cooking	O_2 delignification	13	27	15	32
Modified cooking	–	16	34	20	42
Modified cooking	O_2 delignification	10	15	12	25
Further modified cooking	–	13	26	15	30
Further modified cooking	O_2 delignification	10	15	10	15

It is not an intention of EU Ecolabel to require changes in the structure of wood supply at regional level, neither to suggest the use of one type of wood over the other. *It is therefore proposed for the further discussion to analyse to which level of precision revised AOX threshold should accommodate the differences in: a) raw material supply; and b) type of production.*

During the emission sub-group discussion it was claimed that incorporation of AOX under the emission equation would lower the transparency and introduce unequal treatment between ECF and TCF pulp as AOX inclusion under the equation would refer to ECF

[10] Specific data is known to JRC being subjected to its confidentiality

pulps, exclusively. The revised JRC Proposal 2 intends to accommodate equal treatment for all type of pulps. Additionally, Proposal 2 gives to the pulp mill necessary flexibility by considering the correlation between different emission parameters and differences in raw material used. It also stimulates lowering the emission level of singular parameters as long as the score for each individual parameter is lower than 1,25 and the final score is equal or lower than 5.

Additional derogation is proposed to be given to chestnut pulp (Criterion 1(b) considering the information provided by an industry stakeholder, and supported by the respective Competent Body[11].

All in all, considering the emission values reported in BREF and collected from EU Ecolabel questionnaire, it is propose to:

- Proposal 1: maintain the formulation of AOX criterion, and lower the emission reference value to 0,16 AOX/ADt that corresponds to 66% of analysed bleached kraft pulp market, or
- Proposal 2: to incorporate AOX as additional parameter under emission equation with the reference value of 0,14 kg AOX /ADT but with given flexibility to achieve the value of 0.17 kg AOX/ADt (Proposal 2).

Questions:

1. Should the current formulation of the criterion be maintained (Proposal 1), or should AOX parameter be incorporated into Criterion 1(a) (Proposal 2)?

2 For Proposal 1: Is the revised AOX/emission value adequate?

3. For Proposal 1: Should the proposed reference value 0,16 kg AOX/ADt refer to the final value of the weighted average of pulp mix, or should reflect the threshold for each individual pulp?

4. For proposal 1: Should the AOX limit be absolute for any individual ECF pulp used, or should it apply to a weighted average ECF pulp emission in cases where more than one ECF pulp is used.

5. For Proposal 1: Do you agree with the proposed derogation for wood with high tannin content i.e. chestnut (0.17 kg AOX/ADt)?

6. For Proposal 2: Are the proposed reference values adequate?

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[11] Internal communication with DG JRC, B.5

5.1.3 Criterion 1c) CO_2

Proposed criteria
Proposal 1
To withdraw the criterion
Proposal 2
The emission of CO2 from purchased electricity* and fossil fuel used for heating and production of electricity must not exceed the following limit values: • 1,000 kg CO2 /tonne paper for paper made from 100 % DIP/recycled pulp; • 900 kg CO2 /tonne paper for paper made from 100 % chemical pulp; • 1,600 kg CO2 /tonne paper for paper made from 100 % mechanical pulp; • 1100 kg CO2/tonne tissue paper (to be further discussed during separated webinar). For paper comprising of a mixture of cellulose pulp, recycled fibre and mechanical pulp, a weighted limit value is calculated, based on the proportion of each pulp type. The emissions shall be calculated as the sum of the emissions from the pulp and paper production taking into account the mix of pulps used. For paper mill, the CO2 emission of individual pulps shall be gathered from the pulp manufacturer.
Assessment and Verification: the applicant shall provide detailed calculations showing compliance with this criterion, together with related supporting documentation. The applicant shall provide data on the air emissions of carbon dioxide. This shall include all sources of non-renewable fuels during the production of pulp and paper, including the emissions from the production of electricity (whether on-site or off-site). The following emission factors shall be used in the calculation of the CO_2 emissions from fuels:

Fuel	$CO_{2\ fossil}$ emission	Unit
Coal	96	g $CO_{2\ fossil}$/MJ
Crude oil	73	g $CO_{2\ fossil}$/MJ
Fuel oil 1	74	g $CO_{2\ fossil}$/MJ

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Fuel oil 2-5	77	g $CO_{2\ fossil}$/MJ
LPG	63	g $CO_{2\ fossil}$/MJ
Natural Gas	56	g $CO_{2\ fossil}$/MJ
Grid Electricity	384	g $CO_{2\ fossil}$/kWh

The period for the calculations or mass balances shall be based on the production during 12 months. In case of a new or a rebuilt production plant, the calculations shall be based on at least 45 subsequent days of stable running of the plant. The calculations shall be representative of the respective campaign.

For grid electricity, the value quoted in the table above (the European average) shall be used unless the applicant presents documentation establishing the average value for their suppliers of electricity (contracting supplier or national average), in which case the applicant may use this value instead of the value quoted in the table.

The amount of energy from renewable sources (1) purchased and used for the production processes will not be considered in the calculation of the CO_2 emissions. Appropriate documentation that this kind of energy is actually used at the mill or is externally purchased shall be provided by the applicant.

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5.1.3.1. Rationale for the revised proposal

The European pulp and paper industry has a direct emission of about 37 million tonnes of CO_2 per year which accounts for 2% of the emissions under the EU ETS (European Trading Scheme) and less than 1% of the EU total emissions (CITL, 2008).

The CO_2 emissions are mainly caused by combustion processes: producing the electricity and heat needed for the processes. Indirect emissions are caused by purchased electricity (around 62% of the total electricity consumption). Non energy-related emission sources, includes by-product CO_2 emissions from the lime kiln chemical reactions and CO_2/CH_4 emissions from wastewater treatment. Table 12 lists the stationary direct CO_2 (and other GHG) emission sources found in the pulp and paper manufacturing industry (US EPA, 2010).

Table 12 Stationary direct GHG emission sources in the pulp and paper manufacturing industry

Emission Source	Types of pulp and paper mill where emission source typically are located	Type of GHG emission
Fossil fuel and/or biomass boiler	All types of pulp and paper mills	Fossil CO2, CH4, N2O biogenic CO2, CH4, N2)
Thermal oxidizers and regenerative termal oxidizers (RTOs)	Kraft pulp and semi-chemical pulp mill (for combustion unit control)	Fossil CO2, CH4, N2O,
Direct-fired dryers	Gas-fired dryers at some pulp and paper mills	Fossil CO2, CH4, N2O
Combustion turbines	All types of pulp and paper mills	Fossil CO2, CH4, N2O
Chemical recovery furnace - kraft&soda	Kraft and soda pulp mills	Fossil CO2, CH4, N2O Biogenic CO2, CH4, N2O
Chemical recovery furnace - sulphite	Sulfite pulp mills	Fossil CO2, CH4, N2O Biogenic CO2, CH4, N2O
Chemical recovery combustion units – stand alone semi-chemical	Stand alone semi-chemical pulp mills	Fossil CO2, CH4, N2O Biogenic CO2, CH4, N2O
Kraft and soda lime kilns	Kraft and soda pulp mills	Fossil CO2, CH4, N2O Process biogenic CO2
Makeup chemicals (CaCO3, Na2CO3)	Kraft and soda pulp mills	Process CO2
Flue gas desulfurization system	<ills that operate coal-fired boilers required to limit SO2 emission	Process CO2
Anaerobic waste water treatment	Chemical pulp mills (kraft mostly)	Biogenic CO2, CH4
On-site landfills	All types of pulp and paper mills	Biogenic CO2, CH4

In Europe, there is an observable trend within the industrial sector to reduce the use of coal and oil for the benefit of renewable energy forms (biomass and waste) and to a lesser extent electricity. The shift in fuel composition is driven by the mandatory emission reductions that industrial activities should achieve in the context of the Industrial Emissions Directive (IED), as well as because of national action for complying with the binding national targets of the Effort Sharing Decision (ESD) in the short-term (concerning the non-ETS industries) and the increasing ETS prices (concerning the ETS industries) mainly in the long-term (EU Energy, Transport and GHG Emissions Trends to 2050 Reference Scenario, 2013). Following European Environmental Agency (EEA, 2012), the trends indicate that additional policy measures will need to be implemented in order to meet the EU's longer-term emissions reduction targets, particularly for CO_2.

Public heat and electricity production is the largest emission source category in the EU-28, as well as the main source of emissions from energy industries. Fossil fuels continued to dominate the electricity mix in 2013, being responsible for close to one half (45%) of all gross electricity generation in the EU-28. The electricity produced from renewable sources increased by 171% between 1990 and 2013 at an average annual rate of 4.4%. Since 2005, the rate has been higher, at 7.5% per year. The acceleration observed since 2005 occurred in the context of national and EU renewable energy support policies and significant cost reductions achieved by certain renewable energy technologies. The total emissions of CO_2 from electricity and heat production depend on both the amount of electricity and heat produced as well as the CO_2 intensity per unit

produced (which are also fuel specific). Therefore the policies and measures to reduce emissions need to address both demand (e.g. through improvements in the energy efficiency) to stem the rapid increase in electricity and heat production, as well as CO_2 intensity per unit of electricity and heat produced (e.g. by fuel switching, generation efficiency). The large use of biomass within a pulp and paper sector contributes to the reduction of its CO2- intensity. In 2011, about half (55 %) of the energy used by the industry came from biomass and most of the rest (36.2 %) from natural gas (EEA, 2015a, EEA 2015B, European Commission 2014c).

For the sites that rely on the energy supply from the grid, one critical area to establish CO_2 threshold and ensure a level playing field is the variation of local energy mix in the content of a possible CO_2 emission e.g share of coal used as a fuel in the energy mix. This situation is beyond the influence of pulp and paper manufacturer. To follow differences in CO2 emissions of electricity consumption across member States please see the link: https://www.electricitymap.org/?wind=false&solar=false&page=map

Table 13 shows the International Energy Agency (IEA) composite electricity/heat factors (IEA, 2010)

Table 13. EU-28 fuel-based Electricity/Heat Emission Factors for CO2

Country	IEA composite electricity/heat factors (gCO2/kWh)	Country	IEA composite electricity/heat factors (gCO2/kWh)
Austria	182.756	Italy	398.464
Belgium	248.975	Latvia	162.236
Bulgaria	488.862	Lithuania	114.437
Croatia	341.416	Luxemburg	314.782
Cyprus	758.660	Malta	848.708
Czech Republic	543.894	Netherlands	392.079
Denmark	307.755	Poland	653.440
Estonia	751.861	Portugal	383.544
Finland	187.118	Romania	416.646
France	82.717	Slovakia	217.154
Germany	441.181	Spain	325.878
Greece	731.218	Sweden	39.939
Hungary	330.842	UK	486.949
Ireland	486.205	EU-28	379.900

5.1.3.2. Outcomes from and after the 1st AHWG meeting:

During and after the 1st AHWG Meeting it was possible to observe a clear division concerning the future of the sub-criterion. It was stated that CO_2 emission is far more difficult to calculate than energy consumption, and is covered by a large list of specific policy measures. Most of the paper industry operates under EUETs, with the emissions being annually externally verified. The Ecolabel calculation for CO_2 emissions is different to EUETs scheme. It was suggested that the EU ETS benchmark should not be used for setting the reference values for the criterion on CO_2 emissions, as the EU ETS benchmark has been designed for a different purpose, and the EU ETS does not take into account the indirect CO_2 emissions avoided (due to heat and electricity production as a by-product).

Several stakeholders suggested removing the CO_2 emission criterion entirely, as it is already covered by the criterion on energy use.

There was also a disagreement among the stakeholders on which CO_2 emission factor to apply. Some stakeholders suggested on using the EU average due to the interconnection of the grid, whilst others maintained that specific country or specific fuel mix provider factors, or use supplier specific emission factors for the purchased grid electricity in addition to using the EU average emission factor, as this could improve flexibility of the criteria and create the motivation to purchase electricity with a lower CO_2 profile.

The idea of rewarding mills that invested in renewable energy through subtracting the CO_2 emissions attributed to renewable energy purchased or generated on site was supported. It was also stated that the intention with EUEL criteria in general should not effectively support nuclear energy, which is something that a low-CO_2 criteria would effectively do, supplied electricity should be split into renewable (granted a zero CO_2 factor), nuclear (granted the EU-grid average CO_2 factor) and fossil energy (granted the EU-grid average CO_2 factor).

In general it was accepted to relate CO_2 emission levels to the type of pulping process. It was suggested that integrated (RCF) mills need more energy than other types of integrated paper mills, because of deinking and other processes. It was also observed that mechanical pulping is more energy intensive, and in most cases the production relies on grid electricity. It was also noted that the CO_2 emissions for tissue paper will always be higher than CGP or newsprint paper because of the much lower base weight/density.

5.1.3.3. Further research and main changes

5.1.3.3.1. Guarantees of origin

The Guarantee of Origin (GO) is a voluntary certificate giving evidence of electricity generation from renewables and issued on demand to producers. It is an instrument defined in European Legislation under Directive 2009/28 EC[12] that labels electricity from renewable sources to provide information to electricity customers on the source of their energy.

Guarantees of Origin are market-based instruments able to increase the market momentum for renewable energy. In Europe, through a common energy market, rules and cross-border infrastructure, energy can be produced in one EU country and delivered to consumers in another.

The Guarantees of Origin prove to the final customer that a given quantity of energy was produced from renewable energy sources. Guarantees of Origin provide customers with an opportunity to choose renewable energy and signal this choice to the market. The certificates generally expire one year after they are issued.

The European Energy Certificate System (EECS) is the system which allows the electronic transfer of certificates. In practice, this enables Member States to import and export certificates. The EECS was developed by AIB (the Association of Issuing Bodies), to provide a properly regulated platform for renewable energy GOs. AIB members follow EECS rules for their GO issuing activities.

Only 50% of the Member States are members of EECS but this does not necessarily mean little or no transfers take place. A Member State may host their own electronic registry system for issuing and trading (both import and export) of GOs. For the transfer of GOs, the majority of Member States can use their current systems via import and export mechanisms. Member States do have varying levels of restrictions for accepting foreign GOs. The most common requirements are as follows:

- The electronic system must be based on the EECS protocol; and

[12] OJ L 140, 5.6.2009, p. 16–62

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- Disclosure must be the same level of environmental impact as the Member State they are exporting to.

The variability of the regional coverage of GOs across Members States is included in Table: The more detailed summary of key information on the GOs for each Member State is provided in the Annex III

Table 14. Approximate coverage of GOs across Members States

Member States	Coverage
Bulgaria; Croatia; Czech Republic; Estonia; Hungary; Latvia; Lithuania; Poland; Romania; Slovakia; and Slovenia	55% of the Member States in this region include electricity and CHP (or electricity and heating and cooling), with the remaining 45% including just electricity in their GOs.
Austria; Belgium (Wallonia); Belgium (Flanders); Belgium (Brussels); Denmark; Finland; France; Germany; Ireland; Luxemburg; Netherlands; Sweden; and UK	In terms of coverage 77% of the countries in this region include electricity and CHP, with the remaining 23% including just electricity in their GOs.
Cyprus; Greece; Italy; Malta; Portugal; and Spain.	All Member States within this region have GOs in place, however only 50% have a system in place for electricity disclosure. As a result, exporting GOs becomes less likely from this region, as many Member States require similar levels of disclosure in order to accept foreign GOs.

All countries, under EU Directive 2009/28C, must have a GO system in place. Nevertheless according to the information found, some Member States are more advanced in their implementation of GOs than the others. **The possibility to use GOs as the part of assessment and verification scheme will depend on whether the GO being imported is accepted by the competent body.** A GO being imported is more likely to be accepted if using the EECS or if the exporting Member State's system aligns.

There is no specific information found that could relate pulp and paper industry with issuing GOs by a Member States. Based on the information found it is not possible to assess the level of availability of GOs in terms of MWs being consumed and the amount of GOs available in terms of megawatts. This would identify those Member States who could not gain access to GOs in order to comply with Eco-label criteria and as such would need issuing an exemption for meeting this specific standard.

5.1.3.3.2. Data analysis and criterion proposal

As with energy consumption, CO_2 emissions depend on the type of pulp used and the degree of integrated production. However, the current CO_2 requirement is set at the level of paper produced and does not distinguish between different pulp types. During the emission and energy sub-groups meetings, it was pointed out that the limit of 1100 kg CO_2/ADt should remain for paper produced in non-integrated mills. It was also considered that the 1000 kg CO_2/ADT for integrated production was reasonable because copying and graphic paper includes mechanical pulp that alike recycled pulp requires external energy supply. According to feedback received from 2 mills processing recycled fibre, 1000 kg CO_2/ADT could be achieved.

The data collected within the 2nd questionnaire shows that reported CO_2 emission varies between 13 and 1372 kg CO_2/ADt (Figure 14). Most data is based on kraft pulp production. Very little data was provided for papers based on >50% DIP (273–936 kg CO_2/ADt). The carbon intensity of CTMP pulp was 552-886 kg CO_2/ADt. (*It should be noted that data presented on* Figure 14 *does not distinguish between specific types of*

pulps used, and allocate the CO_2 intensity of the process to the final product. This reflects the approach of the current criterion that sets a specific value for integrated or non-integrated production).

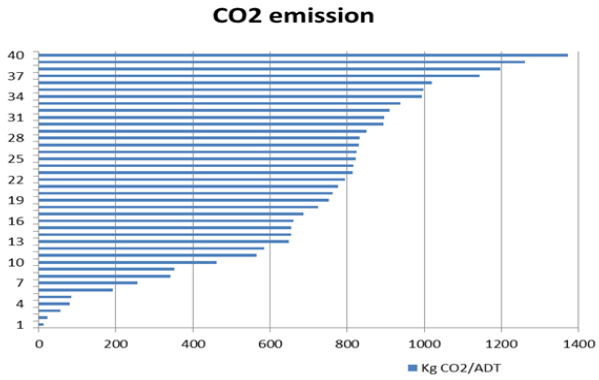

Figure 14 CO_2 emission data reported within the 2nd questionnaire

Further analysis of data collected (Figure 15) shows that when combining fuel and electricity into a single value for energy use, it is possible to directly correlate CO_2 emissions with energy use.

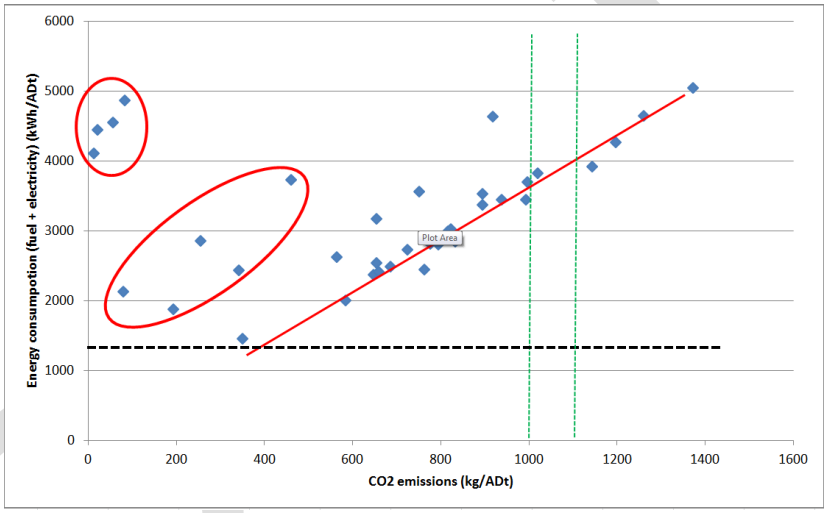

Figure 15. Relationship between energy consumption and CO_2 emission

It is also possible to observe that there is a minimum necessary energy consumption level (in this case it appears to be around 1500 kWh/ADt). However, due to the high degree of use of biomass, there is no minimum limit for CO_2 emission – with 5 results below 100 kg CO_2/ADt. Based on the data presented, it appears that an appropriate ambition level for CO_2 could lie between 750 and 1000 kg/CO_2. Furthermore, the data collected can broadly be split into three categories:

1. Those that respect a general correlation between energy use and CO_2 emissions (28 of 37 points)
2. Those that are very low in CO_2 but relatively high in energy consumption (4 of 37 points)
3. Those that are somewhere in between case 1 and 2 (5 of 37 points)

Based on Figure 15 it can be generally assumed that CO_2 criteria and energy use criteria are essentially measuring the same thing for most of the pulp and paper industry (i.e. a correlation) but also that there is a significant number of exceptions (i.e. very low CO_2 but high energy use).

Proposal 1: *To withdraw the criterion*

- The criterion on CO_2 emissions and the criterion on energy have some degree of overlap; In the pulp and paper industry, CO_2 emissions are generated in steam and electricity production, so they are strongly related to the energy intensity of the processes that is easier to quantify;
- The optimisation of CO_2 emissions is achieved by the optimisation of energy use;
- For certain pulp making technologies (i.e. mechanical pulp) and paper making process and for manufacturers that rely on the external energy supply, CO_2 intensity of the process is heavily influenced by geographical location. Any optimisation of CO_2 footprint of national grid remains out of control of the potential applicant;
- CO_2 criterion could potentially incentivise the selection of different electricity suppliers and, due to the lack of influence of the pulp and paper industry on the electricity supply market, the CO_2 criterion can unintentionally make the EUEL criteria much more complex than they should be.

Energy efficiency is one of the most important and cost-effective means for reducing industrial carbon dioxide (CO_2) emissions. The literature reviews (Fleiter et al, 2012; Shabbira, I. and Mirzaeiana, 2017) and industry feedback confirm the fact that implementation of energy saving techniques i.e. cogeneration technologies in paper mills guarantees the reduction in CO_2 emissions due to high energy utilisation factor as a result of low fuel consumption and on-site electric generation. In this line, Fleiter et al. (2012) assessed opportunities for improving energy efficiency in the German pulp and paper industry and identified a technical saving potential of 21% for fuel and 16% for electricity by 2035. The energy savings can be translated into mitigated CO_2 emissions of 3 Mt. The larger part of this potential is found to be cost-effective from a firm's perspective. The most influential technologies were assumed to be heat recovery in paper mills and the use of innovative paper drying technologies. Nevertheless, it needs to be stated that current paper production processes is not expected to change radically, therefore the improvement potential needs to be assumed as limited due to the technology requirements.

From the data collected (33 data points), it might be assumed that the magnitude of CO_2 emission remains in rather closer relation to electricity than to heat consumption. The differences in the observed pattern for data points 28 to 31 stems most probably from the source of electricity (e.g. grid or onsite and renewable or non-renewable), but might also be affected by discrepancies in the way energy balances are conducted (e.g. integrated process).

Any reduction in energy usage will reduce CO2 emissions, by contrary reducing CO_2 emissions (by calculation) will not automatically reduce energy usage, i.e. in a plant converting from gas to fuel pellets, the energy use will not decrease (probably increase with transport), but the CO_2 emissions will reduce solely due to the way they are calculated.

Ecolabel might therefore not be an appropriate tool to manage the complexity of CO_2 emissions from biofuels, nuclear, fossil, solar, wind, etc.,

Considering all the above mentioned arguments it is proposed to withdraw the CO_2 criterion, and address CO_2 reduction indirectly through energy efficiency requirement that is more feasible to be verified by the license holders. Energy efficiency of the plant will remain in the hands of manufacturers and their good practices, whereas CO_2 emission might in many cases depend on external factors and national policy. Additionally, targeting improvement in energy consumption will focus on the "at source" practice reducing as result CO_2 emission and removing administrative burdens and possible doubts on the robustness of the sub-criterion.

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Proposal 2: ***To align the emission reference values with the Nordic Swan requirement***

If the removal of CO2 requirement is not acknowledged it is proposed to align the emission reference values with the Nordic Swan requirement. This, as suggested by several stakeholders, will allow linking the CO_2 emission with the irregular energy intensity of different pulping processes. When paper contains a mixture of these pulps, a weighted average CO_2 emission limit is applied. This is a practical approach that would be worth considering. However, from the interaction with stakeholders it was noted that recycled fibre de-inking requires a considerable quantity of energy and the values contained in the Nordic Swan requirement should be adapted accordingly.

Following Nordic Swan criteria: The emission of CO_2 from purchased electricity* and fossil fuel used for heating and internal electricity generation must not exceed the following limit values:

- 1,000 kg CO2 /tonne paper for paper made from 100 % DIP/recycled pulp;
- 900 kg CO2 /tonne paper for paper made from 100 % chemical pulp;
- 1,600 kg CO2 /tonne paper for paper made from 100 % mechanical pulp;
- 1100 kg CO2/tonne tissue paper.

For paper comprising of a mixture of cellulose pulp, recycled fibre and mechanical pulp, a weighted limit value is calculated, based on the proportion of each pulp type.

Table 15. The comparison between Nordic Swan and current EU Ecolabel requirements for CO2 emission

	Ecolabel		Nordic Swan	
	NP, CGP	TP	CGP	TP
Pulp type	**weighted average (kg CO2 / ADt)**			
Non-integrated mills, all pulps purchased	1100	1500		
a) recycled fibre			1000	1100
b) cellulose, chemical pulp			900	1100
c) mechanical pulp			1600	1100
Other mills	1000	1500		
a) recycled fibre			1000	1100
b) cellulose, chemical pulp			900	1100
c) mechanical pulp			1600	1100

The methodology proposed to estimate CO_2 emission from fuel combustion follows the one used by IEA that is based on 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPPC, 2006). The computation follows the concept of conservation of carbon, from the fuel combusted into CO_2. The IEA CO_2 emissions are calculated using the IPCC default values. Generally, the estimation of CO_2 emissions from fuel combustion for a given fuel can be summarised as follows (OECD/IEA 2006):

*CO_2 emissions from fuel combustion = Fuel consumption * Emission factor*

The reference values in the proposed criterion (Proposal 2) have been updated accordingly to the IPPC default emission factors for stationary combustion in the energy industries (IPPC, 2006). The unit of reference values according to the provision of Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources, is expressed in terms of grams of CO_2 equivalent per MJ of fuel, gCO_2eq/MJ.

As to the CO_2 emission from the grid electricity, Figure **16** presents the change in the intensity of CO_2 emissions across OECD Europe from electricity generation over time, as the sum of the change in four driving factors: CO_2 intensity of the fossil fuel mix, fossil

share of electricity, thermal efficiency of fossil fired generation, and total electricity output.

The EU average carbon intensity of the electricity grid, according to MEErP methodology- 0.384 tCO_2/MWhe = 0.107 tCO_2/GJe (MEErP)[13]. It is therefore proposed to adapt the CO_2 emission reference value accordingly.

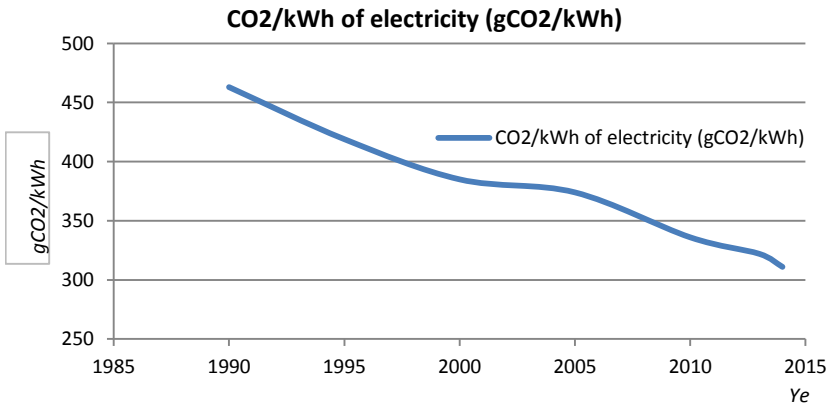

Figure 16 CO2 emission factor from electricity for OECD -Europe (1990-2014)

Questions:

1. Should the criterion on CO_2 be withdraw (Proposal 1), or maintained (Proposal 2)?

2. Do you agree to harmonise the CO_2 requirement with the Nordic Swan reference values?

3. Do you agree to use the EU average carbon intensity of the electricity grid, according to MEErP methodology- 0.384 tCO_2/MWhe = 0.107 tCO_2/GJe (MEErP)?

4. Should the GOs scheme be specifically used as the assessment and verification of "Appropriate documentation that this kind of energy is actually used at the mill or is externally purchased shall be provided by the applicant".

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[13] Methodology for the Ecodesign of Energy-related Products (http://www.meerp.eu/)

5.2 Criterion 2: Energy use

Proposed criterion
The requirement is based on information on actual energy use in production in relation to a specified reference values. The energy consumption includes electricity and fuel consumption for heat production that shall be expressed in terms of points (Ptotal) as detailed below. The total number of points (Ptotal = PE + PF) shall not exceed 2.5 . The reference values for the energy consumption calculation are given in Table 3. In case of mixtures of pulps, the reference value for electricity and fuel consumption for heat production shall be weighted according to the proportion of each pulp used (pulp 'i' with respect to air dried tonne of pulp), and summed together. (a) Electricity The electricity consumption related to the pulp and the paper production shall be expressed in terms of points (P_E) as detailed below. Calculation for pulp production: For each pulp i used, the related electricity consumption ($_{Epulp,i}$ expressed in kWh/ADT) shall be calculated as follows: Epulp,i = Internally produced electricity + purchased electricity – sold electricity Calculation for paper production: Similarly, the electricity consumption related to the paper production (E_{paper}) shall be calculated as follows: Epaper = Internally produced electricity + purchased electricity – sold electricity Finally, the points for pulp and paper production shall be combined to give the overall number of points (P_E) as follows: : $$P_E = \frac{\Sigma_{i=1}^{n} [pulp,i \times E_{pulp,i}] + E_{paper}}{\Sigma_{i=1}^{n} [pulp,i \times E_{ref\,pulp,i}] + E_{ref\,paper}}$$ In case of integrated mills, due to the difficulties in getting separate electricity figures for pulp and paper, if only a combined figure for pulp and paper production is available, the electricity values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production. (b) Fuel consumption for heat production The fuel consumption related to the pulp and the paper production shall be expressed in terms of points (PF) as detailed below. The calculation of PF shall be made as follows. Calculation for pulp production: For each pulp i used, the related fuel consumption (Fpulp,i expressed in kWh/ADT) shall be calculated as follows: Fpulp,i = Internally produced fuel + purchased fuel – sold fuel – 1,25 × internally produced electricity Note: Note: 1. $F_{pulp,i}$ (and its contribution to P F , pulp) need not be calculated for mechanical pulp unless it is market air dried mechanical pulp containing at least 90 % dry matter.

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2. The amount of fuel used to produce the sold heat shall be added to the term sold fuel in the equation above.

Calculation for paper production: similarly, the fuel consumption related to the paper production (Fpaper, expressed in kWh/ADT), shall be calculated as follows:

Fpaper = Internally produced fuel + purchased fuel – sold fuel – 1,25 × internally produced electricity

Finally, the points for pulp and paper production shall be combined to give the overall number of points (PF) as follows:

$$P_F = \frac{\Sigma_{i=1}^{n} [pulp,i \times F_{pulp,i}] + F_{paper}}{\Sigma_{i=1}^{n} [pulp,i \times F_{ref\,pulp,i}] + F_{ref\,paper}}$$

Table 3 Reference values for electricity and fuel

Pulp grade	Fuel kWh/ADT Freference		Electricity kWh/ADT Ereference	
	Non-admp	admp	Non-admp	admp
Chemical pulp	3 650	4 650	750	750
Thermomechanical pulp (TMP)	0	900	2 200	2 200
Groundwood pulp (including Pressurised Groundwood)	0	900	2 000	2 000
Chemithermomechanical pulp (CTMP)	0	800	1 900	1 900
Recovered fibre pulp	1800	2800	1000	350
Paper grade				
Uncoated woodfree fine paper, Magazine paper (SC)		1 700		750
Coated woodfree fine paper Coated magazine paper (LWC, MWC)		1 700		800
Admp = air dried market pulp.				

Assessment and Verification (for both (a) and (b)): the applicant shall provide detailed calculations showing compliance with this criterion, together with all related supporting documentation. Reported details shall therefore include the total electricity and fuel consumption.

The applicant shall calculate all energy inputs, divided into heat/fuels and electricity used during the production of pulp and paper, including the energy used in the de-inking of waste papers for the production of recovered paper. Energy used in the transport of raw materials, as well as conversion and packaging, is not included in the energy consumption calculations.

Total heat energy includes all purchased fuels. It also includes heat energy recovered by incinerating liquors and wastes from on-site processes (e.g. wood waste, sawdust, liquors, waste paper, paper broke), as well as heat recovered from the internal generation of electricity — however, the applicant need only count 80 % of the heat energy from such sources when calculating the total heat energy.

Electric energy means net imported electricity coming from the grid and internal generation of electricity measured as electric power. Electricity used for wastewater treatment need not be included.

Where steam is generated using electricity as the heat source, the heat value of the steam shall be calculated, then divided by 0, 8 and added to the total fuel consumption.

In case of integrated mills, due to the difficulties in getting separate fuel (heat) figures for pulp and paper, if only a combined figure for pulp and paper production is available, the fuel (heat) values for pulp(s) shall be set to zero and the figure for the paper mill shall include both pulp and paper production.

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5.2.1. Summary of the primary proposal

At the 1st Ad-Hoc Working Group meeting in Seville held in June 2016, an open-ended proposal was made for energy use criteria to continue using the same calculation methodology already established in the current criteria but consistent for all paper groups (Copying and Graphic Paper, Newsprint Paper and Tissue Paper). However, discussion and feedback was requested about:

- Any possible problems with the calculation method;
- The relevance and ambition level of current reference values;
- The level of integration of specific types of pulp;
- The relevance of assumptions about boiler efficiencies (i.e. 80%) – could this encourage the continued use of less efficient boilers or de-incentivise the use of more efficient ones?;
- The scope for energy consumption accounting (i.e. is wastewater treatment included?).

5.2.2. Rationales for the revised proposal

The pulp and paper industry is the fourth largest industrial user of energy, consuming some 6.4 EJ worldwide in 2005 (OECD_IEA, 2008). At the EU level, the pulp and paper industry accounts for approximately 12% of energy consumption but this can be much more significant in certain countries, such as Finland and Sweden, where it accounts for more than 50% of national energy consumption (ADEME, 2015). Of the total energy consumption, approximately two thirds are due to fuel use and one third due to electricity consumption (OECD_IEA, 2008). Only 1.8 GJ/t of the total 13.3 GJ/t specific energy consumption was due to purchased electricity.

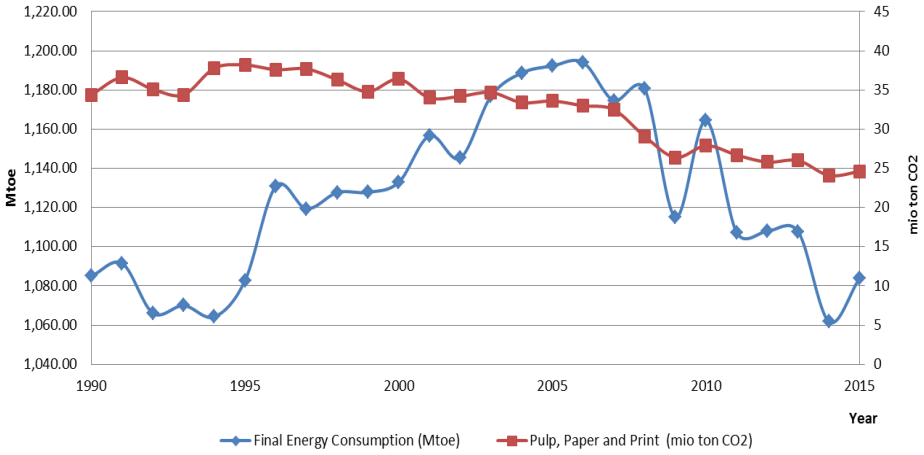

Figure 17. EU- 28 Energy Statistics- total energy consupmtion of paper, pulp, and print (Mtoe) related with CO2 emission (mio ton CO2) (DG Energy, 2017)

The pulp and paper industry has a large potential for creating energy savings (Chen et al, 2012). The use of heat recovery systems and recovery of residual biomass (i.e. bark, black liquor and, to a much lesser extent, wastewater sludge) plays an important role in the overall energy efficiency of the pulp and paper industry. In Europe, the industry produces about 51 % of the electricity it consumes, most (95,2 %) from combined heat and power installations (CHP). Overall, around 56% of the energy requirements for the industry (heat and electricity) are met using biomass (CEPI, website).

The ration between energy consumed/production suggests industry efforts to implement energy saving measures that are proportionally related to operational costs of a site.

Energy costs represents a significant contribution to total production costs, so there is an inherent incentive for the pulp and paper sector to improve energy efficiency when beginning new investment cycles. Fleiter et al., (2012) estimated energy to account for around 13% of total pulp and paper production costs. The pulp and paper sector is characterised by large scale, capital intensive plants and long investment cycles. Boilers and recovery boilers can have expected lifetimes of 30-40 years. This means that any radical shifts to technologies that offer improved energy efficiency is unlikely to occur on an industry-wide scale overnight, and that incremental improvements via upgrades are more likely.

Between 1990 and 2005, overall specific heat consumption has improved towards a defined aggregate BAT level by a factor of approximately 10% (OECD/IEA, 2008). Specific electricity consumption (MWh/t) in CEPI countries has been reduced by 18.7% between 1990 and 2012 and by 8.6% between 2002 and 2012 (CEPI, 2013). Future trends for specific energy consumption in the pulp and paper industry are expected to show a continued decrease of between 0.5% and 1.0% each year until 2050 (DG ENER, 2013). One study estimated that it would be possible to reduce specific electricity consumption by 16% and specific fuel consumption by 21% in the German pulp and paper industry by 2035 (Fleiter et al., 2012).

Table 16. Assessment of subsystems with regard to their relevance for energy consumption

Process ([1])	Integrated uncoated mechanical	Integrated coated mechanical	Non-integrated uncoated wood-free	Non-integrated coated wood-free	RCF without deinking	RCF-based graphic (with deinking)	RCF-based board (with deinking)	Non-integrated tissue	RCF-based tissue	Speciality wood-free
Wood handling			NA	NA	NA	NA.	NA	NA	NA	NA
Refining										
Grinding			NA	NA	NA	NA	NA	NA	NA	NA
Screening										
HC cleaning										
Thickening			NA	NA				NA		NA
Deinking	NA	NA	NA	NA	NA			NA		NA
Bleaching			NA	NA	NA			NA		NA
Mixing										
Approach flow										
Forming										
Pressing										
Drying										
Coating	NA		NA		NA	NA		NA	NA	
Calendering					NA		NA	NA	NA	
Finishing										
Central service										
	Very intensive (greatest consumer in the mill)									
	Considerable (major consumer)									
	Low (has only a minor impact on the energy situation of the mill)									
	Negligible									
NA	The process is not applied in the manufacturing of this grade									
	Varying because of differences in process and production within this grade									
([1]) Chemical pulping is not included.										

Monitoring of energy used in the pulp and paper industry is complex. Different processes will use primary energy in the form of fuel or secondary energy in the form of electricity and steam. Within one paper grade there are differences in raw material composition, product properties and installed process equipment, among others, that influence the overall energy consumption per product. Additionally, when comparing energy consumption data one has to keep in mind that energy data recording and reporting is not yet uniform (Blum et al. 2007). When considering potential EU Ecolabel criteria for energy use, it is necessary to base justifications on energy data that are *technology - specific and up-to-date*. The first point of reference should therefore be the recently published BAT conclusions and the supporting BREF background document that were published in 2013-2014 for the production of pulp, paper and board. The reference level should be formed by energy consumption figures together with the technologies used.

Table 16 shows the assessment of subsystems with regard to their relevance for energy consumption. System borders and reference values of the subsystems are to be considered when assessing the energy balance (Blum et al., 2007).

5.2.3. The general approach of BREF to energy management

The Best Available Techniques Reference report for pulp and paper industry does not contain explicit reference values for BAT energy consumption, but specifies instead "the best practice" reported or gives indicative ranges. Data is reported for different mill types and in some cases the energy consumption is broken down into process stages (EC, 2015). Final BAT conclusions relating to energy have also been published as a binding Commission Decision 2014/687/EU. However, no specific energy consumption reference values are stated in the Decision. Instead, measures that must be taken to reduce specific energy consumption are described together with applicable situations. An overall approach to assessing the energy efficiency of a particular mill is described and split into three steps:

i. **Assessment of the initial energy situation of the mill and benchmarking:** this should involve the gathering of electrical consumption and heat consumption (steam or fuel) data for the whole site as a function of product output and should be specific to different production lines where these involve different equipment and produce different pulp or paper grades.

ii. **Detailed system analysis and improvement by optimisation:** this should provide the specific data necessary to identify and prioritise which parts of the plant could and should be invested in and what improvements are possible.

iii. **Monitoring and sustainable safeguarding of achieved savings:** this should involve the development or continued implementation of an ongoing energy management system that will facilitate the input and storage of energy consumption data in a manner that makes it simpler to monitor the energy performance of the mill and defined production lines and unit processes.

The cross-cutting measures for energy use that can apply to all relevant installations are summarised in Table 17. The requirements in part A of Table 17 should ensure that all mills in the EU are collecting energy consumption data at the mill level and that this data is linked to production intensity. These requirements broadly align with those set out in EN ISO 50001.2011 for Energy Management Systems. The type of information gathered *should complement any reporting requirements that fall under EU Ecolabel criteria*.

Other major energy consuming stages that are specific to pulping are grinding (for mechanical pulp only) and refining (for both mechanical and chemical pulp).

In absolute terms, the energy intensity for producing pulp from Paper for Recycling (PfR) is much lower than producing mechanical pulp or chemical pulp from wood but there is also much less potential for energy recovery when processing PfR.

Table 17. BAT 6 of Decision 2014/687/EU for the production of pulp, paper and paperboard

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	Technique	Applicability
A	Use an energy management system that includes all of the following features: (i) Assessment of the mill's overall energy consumption and production (ii) Locating, quantifying and optimising the potentials for energy recovery (iii) Monitoring and safeguarding the optimised situation for energy consumption	Generally applicable
B	Recover energy by incinerating those wastes and residues from the production of pulp and paper that have high organic content and calorific value, taking into account BAT 12	Only applicable if the recycling or reuse of wastes and residues from the production of pulp and paper with a high organic content and high calorific value is not possible
C	Cover the steam and power demand of the production processes as far as possible by the cogeneration of heat and power (CHP)	Applicable for all new plants and for major refurbishments of the energy plant. Applicability in existing plants may be limited due to the mill layout and available space
D	Use excess heat for the drying of biomass and sludge, to heat boiler feedwater and process water, to heat buildings, etc.	Applicability of this technique may be limited in cases where the heat sources and locations are far apart
E	Use thermo compressors	Applicable to both new and existing plants for all grades of paper and for coating machines, as long as medium pressure steam is available
F	Insulate steam and condensate pipe fittings	Generally applicable
G	Use energy efficient vacuum systems for dewatering	Generally applicable
H	Use high efficiency electrical motors, pumps and agitators	Generally applicable
I	Use frequency inverters for fans, compressors and pumps	Generally applicable
J	Match steam pressure levels with actual pressure needs	Generally applicable

5.2.4. Outcomes from and after the 1st AHWG meeting

Although there were some concerns regarding the stringency of the proposed criterion on energy use, it was proposed to look for the further improvements to the criterion. Following stakeholders feedback on-site generation through renewable sources other than biomass (e.g. hydropower, wind, and photovoltaic) should be promoted, and electricity purchased in the market should be completely 'green'. A complete ban on the use of coal, and introduction of criteria for the sustainable origin of any biomass used was also proposed. Moreover, the provision of incentives for switching to biogas was also suggested.

It was suggested that this criterion should be developed in compliance with the work done by the dedicated Task force on energy.

It was noted that the recycled pulp for graphic paper and tissue paper needs more treatment than that used for newsprint paper. Moreover, the quality of paper collected for recycling has been showing a downward trend. Thus more cleaning and refining steps are required which is increasing the energy (electricity) consumption for recycled paper, especially for CGP and tissue paper production.

Regarding the requirement of different energy reference values for GWP (ground wood pulp) and TMP (thermal and mechanical pulp), it was suggested that there are few

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instances of GWP and TMP production in the market, and those particular cases should be evaluated on a case by case basis without specifying separate reference values.

Some stakeholders suggested that waste water treatment should be included in the calculation of energy consumption. However, other stakeholders informed that it should be excluded from the calculations because mills will not be comparable regarding waste water treatment capacity.

Stakeholders expressed an overall preference to keep the existing calculation method.

5.2.5. Further research and main changes

5.2.5.1. Energy consumption data collection and analysis

Data for the further analysis of energy consumption was collected via responses to 2nd questionnaire circulated by DG JRC and supported by the information form several license holders. Overall, the ranges of energy consumption data provided are set in Table 18 and compared with the current reference values. Data reported addresses mainly chemical and chemithermomechanical pulp. Data lack hinders any possibility to present energy consumption ranges for other pulp types.

Table 18. Reported energy consumption during pulp and paper making processes

	Reported values (kWh/t)		Current EU Ecolabel reference values (kwh/t)	
	Electricity min-max	Heat min-max	Electricity	Heat
Pulp production (chemical)	364-1056	1064-7636	800	4000
CTMP	1305-1960	473-1142	2000	1000
Paper Production				
Uncoated woodfree fine paper, magazine paper (SC)	520-760	553-3904	600	1800
Coated woodfree fine paper, coated magazine paper (LWC, MWC)			800	1800

*In some cases the energy consumption for integrated system is considered as a whole and allocated to papermaking

Table 19 contains information on specific power and heat consumption for different type of pulps (UBA, 2009). The specific consumption does only contain secondary energy (i.e. power and heat for the process and related secondary units). Any losses or own consumption etc. of the energy conversion plant are not contained in the consumption values stated.

The data collected confirms the complexity and dynamic nature of energy consumption within the sector, and so related difficulties to propose the singular values, even on a per pulp-type basis. The singular mills might produce different products and use different raw materials and technologies. Seeking for best practice is therefore not straightforward, and will require certain assumptions to accommodate a series of possible scenarios. In terms of product output, some mills only produce an intermediate pulp product, others only buy market pulp to produce paper (i.e. non-integrated production) while others produce both pulp and paper (integrated production) but may sell some of the excess pulp and purchase minor amounts of market pulp of other types to add as a furnish, allowing for the potential to adjust the technical properties of the

paper they produce and/or to achieve a cost-optimal combination of ingoing and outgoing pulp.

Table 19 Typical specific consumption values for process energy in pulp paper mills (UBA, 2009)

Type of mill	Range of energy consumption	
	Power (kWh/t) (from – to)	Heat (kWh/t) (from – to)
Non- integrated kraft pulpmill	700-800	3800-5100
Integrated uncoated mechanical paper	1200-1400	1000-1600
Integrated coated mechanical paper	1200-2100	1300-1800
Non-integrated uncoated wood free paper	600-800	1300-2500
Non-integrated coated wood – free paper	600-1000	1200-2100
RCF without deinking	300-700	1100-1800
RCF with deinking	900-1400	1000-1600
Non-integrated tissue (no TAD)	900-1200	1900-2800
RCF based tissue mills (no TAD)	800-2000	1900-2800

Further consultation with energy sub-group confirmed that energy data contained in BREF (JRC, 2015) were sufficiently detailed to form a basis for EU Ecolabel reference values.

5.2.5.2. Comparison of energy criteria for the EUEL and Nordic Ecolabel

The current criteria for EU Ecolabel Copying and Graphic Paper (Decision 2011/332/EU) and the Basic Module for "*Nordic Ecolabelling of Paper Products*" (version 2.2, 2011-2019) make reference to fuel and electricity.

The energy use criteria set out for the EU Ecolabel and the Nordic Ecolabel are broadly similar but have some important differences. In order to avoid the repetition of theses relatively lengthy criteria, the key points are summarized in the Table 20 below.

Table 20. Comparison of key features of energy use criteria in EUEL and the Nordic ecolabel

	EU Ecolabel	Nordic Ecolabel
Scope	Energy used in the transport of raw materials, as well as conversion and packaging, is not included in the energy consumption calculations. Electricity used for wastewater treatment need not be included. Combined single values for electricity or for fuel can be used in integrated mills	The energy calculation encompasses the entire production process – both paper manufacturing and the constituent pulp. The calculation for paper does not include filler. Energy calculations do not include energy consumed in transporting raw materials or in converting and packaging.

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	EU Ecolabel	Nordic Ecolabel
Method for dealing with electricity consumption	The basis for the calculation is: Internally produced elec. + purchased elec. – sold elec. Any electricity used to produce steam is to be divided by 0.8 and moved to the fuel score.	Internally produced electricity is also reported and any sold electricity subtracted. However, the actual equation used in EUEL is not stated in the criteria or supporting appendix. The basis for the calculation is simply: $\frac{Electricity_{consumed}}{Electricty_{reference}}$ Any electricity used to produce steam is to be multiplied by 2.5 and moved to the fuel score.
	Calculate electricity score by comparison of actual consumption with reference values for the relevant paper and pulp production processes.	Same idea, but reference values are different.
	Where more than one pulp source is used, a weighted average is calculated	Same idea.
	Ultimately: $\frac{E_{pulp}+E_{paper}}{E_{ref.pulp}+E_{ref.paper}} \leq 1.5$	Ultimately: $\frac{E_{pulp}+E_{paper}}{E_{ref.pulp}+E_{ref.paper}} \leq 1.25$
Method for dealing with fuel consumption	The basis for the calculation is: *Internally produced fuel + purchased fuel – sold fuel – (1.25x internally produced elec.)* *Only 80% of the heat energy generated from onsite wastes is counted.*	Same idea, but better explanations given about: (i) how to also account for any sold heat as well (i.e. divide by 0.8 to convert to equivalent fuel used in an 80% efficient boiler) and (ii) that fuel used to generate electricity is not counted as fuel because it will later be counted as electricity (i.e. avoid double counting).
	Calculate electricity score by comparison of actual consumption with reference values for the relevant paper and pulp production processes.	Same idea, but reference values are different.
	Where more than one pulp source is used, a weighted average is calculated	Same idea.
	Ultimately: $\frac{F_{pulp}+F_{paper}}{F_{ref.pulp}+F_{ref.paper}} \leq 1.5$	Ultimately: $\frac{F_{pulp}+F_{paper}}{F_{ref.pulp}+F_{ref.paper}} \leq 1.25$

One potentially significant difference between the two schemes is that the EUEL criteria state that any electricity used to generate steam is to be divided by 0.8 (to account for a typical boiler efficiency) added to the fuel account. The Nordic criteria also address the situation of steam generated by electric boilers but they request that the electricity consumption be multiplied by 2.5 (to reflect the efficiency of fuel use to generate grid electricity) before it is moved to the fuel account. Another potential difference is that the Nordic criteria specifically exclude filler from their calculations.

Both the EUEL and Nordic criteria allow for any *sold heat* to be converted into an equivalent fuel by dividing by 0.8 (i.e. assuming an 80% efficient boiler). Both the EUEL and Nordic criteria also make allowance for fuel used to generate electricity to be subtracted from the fuel balance and added to the electricity account.

5.2.5.2.1. Issues specific to scope and ambition level for pulp production

The key to the ambition level of the criteria is the reference values that are selected for each particular pulp and paper production process. A comparison of the reference values and conditions for compliance is shown in Table 21.

Table 21. Comparison of reference values for energy use criteria for EU Ecolabel and Nordic Ecolabel pulp and paper

EU Ecolabel			Nordic Ecolabel		
Pulp type / Paper grade	**Fuel reference kWh/t (GJ/t)**	**Electricity reference kWh/t (GJ/t)**	**Pulp type / Paper grade**	**Fuel reference kWh/t (GJ/t)**	**Electricity reference kWh/t (GJ/t)**
Chemical pulp	4000 (14.4)	800 (2.88)	*Bleached chemical pulp*	3750 (13.5)	750 (2.7)
Dried chemical pulp	5000 (18)	800 (2.88)	*Dried bleached chemical pulp*	4750 (17.1)	750 (2.7)
			Unbleached chemical pulp	3200 (11.52)	550 (1.98)
			Dried unbleached chemical pulp	4500 (16.2)	550 (1.98)
CTMP	1000 (3.6)*	2000 (7.2)	*CTMP*	n/a	2000 (7.2)
Dried CTMP	1000 (3.6)	2000 (7.2)	*Dried CTMP*	1000 (3.6)	2000 (7.2)
Recycled fibre pulp***	1800 (6.48)	800 (2.88)	*Deinked pulp (DIP)*	350 (1.26)	500 (1.8)
Dried recycled fibre pulp	2250 (8.1)	800 (2.88)	*Dried deinked pulp (DIP)*	1350 (4.86)	600 (2.16)
Mechanical pulp*	0 (0)	1900 (6.84)	*Thermomechanical pulp (TMP)*	n/a	2200 (7.92)
Dried mechanical pulp*	900 (3.24)	1900 (6.84)	*Dried thermomechanical pulp (TMP)*	1000 (3.6)	2200 (7.92)
Groundwood pulp (GWP)*	0 (0)	2000 (7.2)	*Groundwood pulp (GWP)*	n/a	2000 (7.2)
Dried groundwood pulp (GWP)*	900 (3.24)	2000 (7.2)	*Dried groundwood pulp (GWP)*	1000 (3.6)	2000 (7.2)
Uncoated woodfree fine paper	1800 (6.48)	600 (2.16)	*Uncoated fine paper*	1700 (6.12)	750 (2.7)
Magazine paper (SC)			*SC*	1700 (6.12)	750 (2.7)
Coated woodfree fine paper	1800 (6.48)	800 (2.88)	*Coated fine paper*	1700 (6.12)	750 (2.7)
Coated magazine paper (LWC, MWC)			*LWC*	1700 (6.12)	800 (2.88)
Newsprint**	1800 (6.48)	700 (2.52)	*News*	1700 (6.12)	750 (2.7)
			Folding box board (FBB)	1700 (6.12)	800 (2.88)
			Solid bleached sulphate (SBS)		
			Solid bleached board (SBB)		
			Solid unbleached board (SUB)		
			White lined chipboard (WLC)		

**comparing Decision 2011/332./EU with Decision 2012/448/EU, it is apparent that this value should be 0.*

***energy reference values for mechanical pulp as set out in Decision 2011/332/EU for copying and graphic paper. The equivalent criteria published in Decision 2012/448/EU for Newsprint paper are different (slightly higher) and distinguish between TMP and GWP.*

****energy reference values set out in Decision 2012/448/EU for the same pulp type are much lower than those listed above, which were set out in Decision 2011/332/EU for copying and graphic paper.*

Nordic reference values for fuel and electricity consumption have been set for a much broader set of paper grades and *a much clearer distinction is made between reference values for market pulp and for integrated pulp production*.

The reference values typically indicate that drying of pulp to 10% moisture content has an energy cost of *1000 kWh/t of dried pulp*. and that this is achieved by using additional fuel instead of electricity. The BREF findings (EC, 2015), showed that the energy for pulp drying (only market pulp) can be of the order of 3 GJ/ADt (or 833 kWh/ADt) of pulp or some 25 % of the total heat requirement for a kraft pulp mill and 15 – 20 % of the electrical energy.

In terms of comparing ambition level, the EU Ecolabel sets a margin of 50% above the weighted average reference values meanwhile the Nordic criteria does a similar thing, but sets the margin to 25%.

5.2.5.3 Energy reference values – overview of available data

Reference values for energy consumption in pulp and paper production are to be reviewed within the context of the revision. To accomplish the above specified objective, the Nordic Swan reference values has been crosschecked and compared with the information contained in BREF (JRC, 2015) and other available sources (ÅF-Engineering AB, 2010, Ecofys 2009, Fleiter 2012; PAPRICAN 2008; Preiss et all 2007, UBA 2007; UBA 2009).

5.2.5.3.1 Chemical pulp

The manufacturing of bleached kraft pulp consumes a large amounts of heat energy about 10 – 14 GJ/ADt (2778-3889 kWh/ADt), excluding steam for the production of electrical power. The model mills are very energy efficient and the black liquor alone produces enough steam to satisfy the process steam consumption in each of the mills. The lime kiln is fired with bark powder, or gasified bark, and the remaining bark from the woodyard and chip screening is burned in a power boiler. There is an excess of steam from the recovery and power boilers which is utilized in a condensing turbine to produce in green power which is sold.

The energy consumption for pulp drying is about 25 % of the heat energy and 15 – 20 % of the electrical energy. Over 50 % of the electrical energy consumption is used for pumping. The energy for pulp drying (only market pulp) can be of the order of 3 GJ/ADt of pulp (833 kWh) or some 25 % of the total heat requirement for a kraft pulp mill and 15 – 20 % of the electrical energy. Considering available data, it is proposed to assume 1000 kWh/ADt of fuel consumption for pulp drying in non-integrated system.

The manufacturing of bleached sulphite pulp (Table 22) consumes about 7.5 – 16.5 GJ/ADt (2084 -4583 KWh/ADt) of heat energy (excluding steam for the production of electrical power). The lower levels are achieved when paper pulp is produced and the drying of pulp is not included (pumpable pulp). The consumption of electrical energy is 550 – 900 kWh/ADt. If ozone is used in bleaching, the total consumption of electrical energy may reach 990 kWh/ADt.

Table 22. Indicative energy consumption levels for gross process heat and power for different types of sulphite pulp mills

Type of sulphite pulp mill	Indicative consumption level for gross process heat in kWh/ADt	Indicative consumption level for electricity in kWh/ADt	Remarks
Production of bleached sulphite or magnefite paper grade pulp (pumpable pulp)	2 100 – 2 400	400 – 700	Levels refer to manufacturing of pumpable pulp; pulp drying would additionally consume approx. 780 – 840 kWh/ADt heat and 100 kWh/ADt power
Production of bleached sulphite paper grade pulp (market pulp)	2 900 – 3 200	500 – 800	Levels refer to air dry pulp, i.e. include pulp dryer; if steam-consuming processes for by-products are included, energy consumption may increase accordingly
Production of bleached sulphite pulp for viscose	3 200 – 3 500	700 – 800	Levels refer to air dry pulp (including dryers) and include an ozone bleaching stage

**Note that 1 GJ = 277,78 kWh*

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The potential for electricity generation in the chemical process might generate net negative electricity consumption in the pulp mill. The EUEL and Nordic calculations specify that all electricity consumption (internally or externally sourced) is added and any sold electricity is to be subtracted. Consequently it will not be possible to reach a negative number for specific electricity consumption.

Comparative analysis of energy consumption values collected from different sources of information is presented in **Error! Not a valid bookmark self-reference.**.

Table 23 Comparative energy consumption values for chemical pulp

Pulp types	***BREF, best performance mentioned***		***Nordic Ecolabel***		***Swedish mills, 2007***		***PAPRICAN 2008 (Median)***		***EU Ecolabel***	
	Non-admp (integrated)	*admp (non integrated*	*Non-admp (integrated)*	*admp (non integrated*	*Non-admp (integrated)*	*admp (non integrated*	*Non-admp (integrated)*	*admp (non integrated*	*Non-admp (integrated)*	*admp (non integrated*
Bleached kraft pulp										
Heat (kWh/ADt)	*3530*	*4400*	*3750*	*4750*	*3542*	*4960*	*4500*	*5436*	*4000*	*5000*
Electricity (kWh/ADt)	*700*	*550*	*750*	*750*	*700*	*800*	*550*	*667*	*800*	*800*
Bleached sulphite pulp										
Heat (kWh/ADt)	*2250*	*3050*	*3750*	*4750*					*4000*	*5000*
Electricity (kWh/ADt)	*550*	*650*	*750*	*750*		*800*			*800*	*800*
Unbleached chemical pulp										
Heat (kWh/ADt)	*2900*	*3800*	*3200*	*4500*	*2276*	*5195*			*4000*	*5000*
Electricity (kWh/ADt)	*620*	*470*	*550*	*550*		*800*			*800*	*800*

5.2.5.3.2 Mechanical and termomechanical (TMP), and chemithermomechanical pulp (CTMP)

Electricity is the main energy used in the pulping process, thus this technology may have high primary energy demand and CO_2 emissions. Groundwood pulp used for SC paper and newsprint production consumes in total about 2 200 kWh/t and 1 600 kWh/t respectively, whereas TMP consumes about 3 600 kWh/t and 2 500 kWh/t respectively. However, higher heat recovery in TMP may normally lead to lower overall energy consumption than GW pulping.

Table presents examples of energy consumption of German integrated mechanical plants (UBA, 2007). The total energy consumption for the analysed mills varies between 2400 and 3400 kWh/tone. The specific electricity consumption accounted for 1197 to 2091 kWh/tonne, whereas process heat consumption for 1025 to 1775 kWh/tonne.

Following stakeholder's consultations, only CTMP mills in some cases ((approximately 10 mills in Europe) operate in a non-integrated manner, other mechanical pulp mills are integrated. *There is nevertheless, the need to establish reference values for market mechanical pulp to address the situations where minor amounts of mechanical pulp are added as furnish.*

Table 24. Specific energy consumption of German integrated mechanical pulp mills

Electric power (kWh/t)	Process heat (kWh/t)	Total energy (kWh/t)
2091	1306	3397
1217	1775	2992
1514	1626	3140
1375	1025	2400
n.a.	n.a.	2838
1197	1495	2695

For CTMP pulp, information received from license holders reveals the energy consumption levels from 1305 to 1960 kWh/tonne for the electricity and 473-1142 kWh/tonne for heat. Following information contained in BREF (JRC, 2105) Indicative energy consumption level for CTMP pulp accounts to 0-300 kWh/tonne for heat, and 2300 -3000 kWh/tonne for electricity. The energy consumption levels refer to the entire mill and consider both pulp and paper manufacturing process.

For TMP and CTMP recoverable energy fraction can amount to respectively 80% and 45% of power consumption and for TMP can exceed heat requirement for pulp drying or paper making. The following is prescribed in BAT 41: *"Extensive recovery of secondary heat from TMP and CTMP refiners and reuse of recovered steam in paper or pulp drying"* is considered a technique that applied in order to reduce the consumption of thermal and electrical energy. Also, according to the BREF, heat recovery is "standard practice in all new and recently rebuilt plants" (only a few plants in Europe have not installed them).

Table 25. Energy balance for a non-integrated Finnish CTMP mill

Department	*Heat (kWh/tonne)*	*Electrical power (kWh/tonne)*
Pulp mill		
Recovered steam, only for process used	+750	
External supply	0	+1650
Consumption	0	-1600
Effluent treatment	0	-50
Excess energy from pulp mill	+750	0
Pulp dryer		
Consumption	-1556	-150
Steam boiler (wood residual and fuel oil)	+806	+150
Total external supply	806	1800

Table 25 shows an example of energy balance for energy consumption of a Finnish non-integrated CTMP mill (JRC, 2015).

The reference values for CTMP are proposed to represent the example given in **Error! Reference source not found.**. However, it is proposed to increase the electricity consumption threshold by 100 kWh/ADt in order to reflect information received from license holders. Proposed change in the criterion verification that consist in setting a scoring threshold for the sum of energy used (heat and power), would give necessary flexibility to accommodate different scenarios, and also respond to the information received from license holders. The proposal also accommodates energy consumption data reported by current license holders.

Regarding the requirement of different energy reference values for mechanical pulps (GWP, and TMP), following the energy sub-group feedback there is a great variation in specific energy consumption amongst the handful of mechanical pulp mills in Europe

(mainly in Sweden) and so it would be even more difficult to try to justify values for different types of mechanical pulp (due to the very low numbers of each type of mechanical pulp mill). It was suggested that considering the minor presence of GWP and TMP production in the market, the particular cases should be evaluated on a case by case basis. Nevertheless, following stakeholders consultation and specific values have been proposed to address the presence of mechanical pulp in the pulp mix.

Considering the energy consumption data analysed it is proposed to align the energy consumption for GW and TMP pulp with the values specified in EU Ecolabel for Newsprint Paper (2012/448/EU).

5.2.5.3.3 Recycled pulp

RCF mills require substantial amounts of steam for heating of water, pulp, air and chemical additives and for drying the paper. Nevertheless, RCF pulping requires comparatively less total energy for processing than is needed for virgin pulp, especially for mechanical pulping. In fact, it has been estimated that producing recycled Kraft pulp uses 33% less energy overall, on average, than mills making virgin chemical pulp (Kinsela, 2012).

Energy consumption in recovered fibre processing depends to a large extent on the design, type and amount of process steps involved to achieve a certain product quality (Table 22). Whereas standard deinked stock for newsprint consumes about 300 – 350 kWh/t electrical energy, high-grade deinked pulp with higher ISO brightness (e.g. graphic papers) requires 400 – 500 kWh/t.

Table 26. Energy consumption different RCF paper grades

	Packaging,paper	Newsprint	LWC/SC paper	Tissue paper and market pulp
Main paper for recycling (depends on availability and price of paper for recycling and quality of the end product)	Mixed paper for recycling and boards, paper for recycling and packaging from stores and supermarkets	Deinkable paper for recycling (old newsprint and old magazines)	Deinkable paper for recycling (old newsprint and old magazines)	Deinkable paper for recycling (old newsprint + magazines); wood-free office paper for recycling
***Energy** consumption - Electricity -Thermal energy (e.g. steam)*	150 – 250 kWh/t 0 MJ/t (if dispersing is applied heating is required)	300 – 420 kWh/t 450 – 900 MJ/t (=0.2 – 0.4 t_{steam}/t)	400 – 600 kWh/t 650 – 1 200 MJ/t (=0.3 – 0.5 t_{steam}/t)	400 – 500 kWh/t 650 – 1 100 MJ/t (=0.3 – 0.5 t_{steam}/t)

Integrated RCF-based mills are often partially integrated, i.e. part of pulp is manufactured on site and the rest is purchased pulp. In Europe, nearly all RCF-based mills are integrated. In RCF paper mills, steam is normally produced on site by each company. Electricity can also be purchased from the public grid. Paper mills usually use a mixture of different fibre types. The total energy consumption is directly proportional to the share and type of mechanical pulp in the supplied pulp. Power consumption for RMP (refiner mechanical pulp) and GW (groundwood) is significantly higher than for RCF processing.

During the consultation process, industry stakeholder clarified that recycled fibre feedstock quality is a continually evolving phenomenon that depends directly on market features such as demand for different grades of paper for recycling, spot prices and wastepaper collection rates in different countries. The reduction in consumption of copying and graphic paper and the demand of external markets (mainly China) were mentioned as factors that strongly affect the market for secondary fibre. The pulp and paper sector has to constantly adapt to fluctuations in recycled fibre quality. Demand for the best quality recycled fibres is extremely high and when using lower grades of paper for recycling, it was confirmed that pulp yields were lower and energy demands higher. Accordingly, Nordic reference electricity values for DIP pulp were perceived as too low (600 kWh) to satisfy the energy demand of modern DIP installations.

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The information subtracted from the German RCF plants (UBA 207, 2009) has been contrasted with data contained in BREF. For the UBA analysis of energy consumption levels, it was assumed that the selected mills represent technological solution able to achieve a high level of environmental protection (Table 27). The analysis included 20 RCF mills (13 without deinking and 7 with deinking) (UBA, 2007). The total energy consumption (heat and electricity) for the analysed mills varies between 1400 and 4170 kWh/tonne (electricity: 758-1430 kWh/tonne, heat: 1146-2793 kWh/tonne). Following the BREF, the indicative energy consumption levels for RCF pulps with deinking designated for copying and graphic paper and newsprints, varies from 1000 to 1800 kWh/tonne for process heat consumption, and from 900 to 1300 kWh/tonne for electricity consumption. The ranges include all process units related to RCF processing and papermaking.

Table 27 Specific energy consumption of German RCF mills with deinking

Electric power (kWh/t)	Process heat (kWh/t)	Total energy (kWh/t)
927	1146	2073
1285	1113	1400
1430	1400	2830
1000	1600	2600
1377	2793	4170
758	1942	2700
1158	2589	3747

Following the above information, it is proposed to set the energy consumption threshold at: 1800 kWh/tonne (for process heat), and 1000 kWh/tonne for electricity consumption.

As an example, for newsprint based on 100% recycled fibres, values are given for the specific energy consumption (SEC) and the energy balance (

Table **28**. Example is based on a Swedish mill with a production capacity of 500.000 t/yr (BREF, 2015).

Table 28. Specific energy consumption in an integrated Swedish mill producing newsprints from deinked pulp

Process unit	Process heat (kWh/ADt)	Electrical power (kWh/ADt)
Pulp mill		
Deinking	56	175
Washing and screening	0	50
Bleaching	0	75
Total pulp mill	56	300
Paper mill		
Stock preparation	0	235
Paper machine	1472	350
Total paper mill	1528	585
Effluent treatment	0	32

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Total pulp and paper mill	1528	917

The table above allows subtracting the specific energy consumption for pulp mill section. Considering the quantity of energy required to dry pulp (1000 kwh/tonne in form of fuel), in the theoretical case the energy consumption for the market pulp for the mill analysed would be 1056 kWh/ADt for process heat, and 300 kWk/ADt for electrical power. Electricity consumption for air dried DIP market pulp is proposed to be aligned with Nordic Swan at the level of 350 kWh/ADt.

Data indicated contained the papermaking section, considering the level of integration of RCF pulps it is to be discussed if the specific values for integrated and no integrated production should be developed.

5.2.5.3.4 Paper mill

The total electrical energy consumption at paper mills is summarised in Table 29. All electric power inside the paper mill building is included. i.e. all power usage inside the paper mill starting from the pulp storage towers (in integrated mills) and ending at the finishing operations is included. The values are based on 100 % efficiency at the reel to make paper machines comparable. An example of a non-integrated fine paper mill with on-line coating with a technical age of no more than five years shows the total consumption of process heat of 1795 (kWh/t) and electric power of 829 (kWh/t) (JRC, 2015). Considering information found, it is proposed to harmonise the reference values for the paper grades with the Nordic Swan requirements. (*Note: Reference values for tissue paper are not considered and will be addressed during a separated webinar*)

Table 29. Typical electrical energy consumption at modern paper mills based on the dimensioning capacity (= 100 % at reel) of the paper machine

Paper grade	*Power consumption in kWh/t (based on dimensioning capacity, Paper machine without stock preparation)*	*Power consumption in kWh/t (data refer to the whole paper mill)*
Newsprint	480 – 630	500 – 700
LWC paper	550 – 750	500 – 800
SC paper	600 – 700	450 – 700
Fine paper (uncoated)	450 – 650	450 – 650
Fine paper (coated)	600 – 850	600 – 750
Multi-ply board	~ 680	
Sack paper	~ 850	700 – 850
Testliner	~ 550	
Tissue	500 – 3 000 *	

The different drying systems used in tissue mills through-air drying or hybrid technologies have a significant effect on the energy consumption of the mill. Apart from the tissue-making process, there are additional processes that can significantly influence the energy consumption of a tissue mill:

- Integrated deinking will require more energy;
- CHP/cogeneration will require more natural gas consumption;
- Electrical steam boilers will require more electricity;
- Biomass boilers will require less fossil fuel.

Nordic Swan set the reference values for the tissue paper machine's consumption of fuel at 1800 kWh/tonne, and for electricity at 1030 kWh/tonne. The same reference values shall be used for tissue paper products that are manufactured using non-woven or TAD technology. Where the tissue is produced our of recycled fibre fuel consumption is set at

500 kWh/tonne, and for electricity at 500 kWh/tonne. In case where dried recycled fibre is used fuel consumption is set at 1500 kWh/tonne, and for electricity at 700 kWh/tonne. BREF indicates that the heat consumption for non-integrated tissue with conventional drying system is at 1800-2100 kWh/tonne, and for electricity 900-1100 kWh/tonne.

5.2.6. Summary of the reference sources for the proposed values

The summary of proposed revised reference values for the energy consumption, together with the reference sources are summarized in Table 30.

Table 30 Proposed revised reference values for the energy consumption, together with the reference sources

Pulp grade	Fuel kWh/ADT $F_{reference}$		Electricity kWh/ADT $E_{reference}$		*Reference*
	Non-admp	admp	Non-admp	admp	
Chemical pulp	3650	4650	750	750	*BREF, ÅF-Engineering AB, 2010, PAPRICAN 2008 license holders, Nordic Swan*
Thermomechanical pulp (TMP)	n/a	800	1800	1800	*Nordic Swan*
Groundwood pulp (including Pressurised Groundwood)	n/a	900	2 000	2 000	*Nordic Swan, UBA*
Chemithermomechanical pulp (CTMP)	n/a	800	1900	1900	*BREF, license holders*
Recovered fibre pulp	1 800	2800	1000	350	*UBA, BREF, Nordic Swan*
Paper grade		Fuel kWh/tonne		Electricity kWh/tonne	
Uncoated woodfree fine paper, newsprint paper, Magazine paper (SC)		1700		750	Nordic Swan
Coated woodfree fine paper Coated magazine paper (LWC, MWC)		1700		800	Nordic Swan
Tissue paper		To be discussed during dedicated webinar			
Admp = air dried market pulp.					

5.2.7. Methodology for reporting on energy consumption

In terms of energy consumption, there are three main sources of information that need to be considered:

- electricity consumption/production,
- steam consumption/production and
- fuel consumption.

The requirement is based on information on actual energy consumption in form of heat and power use to manufacture 1 tonne of product (pulp or paper, as appropriate), in comparison to the reference value defined in the criteria. The ratio between actual energy consumption and the reference value translates to an energy score. Where different pulps are used, these are combined in a weighted average score. The overall final score then relates to the average of the pulp and paper scores. The calculation includes energy scores for all pulps used and energy scores for the paper production. The quotient shall be less than or equal to 1,5. By the way of comparison, the Nordic energy calculation places an extra margin of 1.25 to the weighted average instead of 1.5 with the EUEL.

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It can be argued that there is no need to report steam consumption (unless steam is purchased from an external source nearby) once best practice is well understood for a specific type of pulp or paper making process because any improvements in the efficiency of steam use and steam generation from fuel combustion or waste heat recovery would be reflected in a reduced net fuel consumption and/or net electricity consumption for a specific production volume of a particular pulp type or paper grade.

Further analysis of the specific data for energy consumption from German pulp and paper mills (UBA, 2007) shows the possible scenario of reaching adequate overall energy performance of the plant (sum total of fuel and power) with the low specific electricity consumption but fuel consumption higher than the reference values. On the other side, stakeholder's consultation revealed the existence of the current industry trends towards higher electricity and lower fuel consumption due to the impact of climate change policies.

To address the complexity of the possible energy saving measures and grant flexibility for the possible technological solution it is proposed to establish the holistic requirement. In this sense, addressing fuel and electricity consumption together (as a sum up) would maintain flexibility in the scoring system and could accommodate different scenarios. Consequently, the alternative methodology on reporting energy consumption is proposed, as follows:

$$\textit{Total score } P(\textit{fuel}) + P(\textit{electricity}) \leq 2.5$$

This proposal was primary supported by the energy sub-group members, as scoring fuel and electricity together would address the current trends in energy management.

The consumption of electricity and fuel shall be based on bills and electricity meter readings. It should encompass the entire production process – both paper manufacturing and the constituent pulp.

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The consumption of electricity and fuel shall be based on bills and electricity meter readings. It should encompass the entire production process – both paper manufacturing and the constituent pulp.

The calculation rule requires a reduced set of parameters considering key energy inputs and outputs. The formula considers onsite power generation. In this way the approach takes into account all aspects relevant for onsite optimisation of energy consumption; heat demand per process, heat integration and recovery of residual heat, conversion efficiencies (e.g. boiler efficiencies).

Energy used in the transport of raw materials, as well as conversion and packaging, is not included in the energy consumption calculations. Electricity used for waste-water treatment and – for tissue paper – air cleaning need not be included.

In case of integrated mills, due to the difficulties in getting separate electricity figures for pulp and paper, if only a combined figure for pulp and paper production is available, the electricity values for pulp(s) shall be set to zero and the figure for the paper mill shall include both respective pulp and paper production.

For non-integrated production, the calculated points should be passed on by the pulp manufacturer to the paper manufacturer that can perform a calculation of the total energy score for the finished paper. The calculation includes energy scores for all pulps used and energy scores for the paper production.

According to current Ecolabel criteria fuel(heat) consumption considering all contributions is to be calculated as:

Consumption *= Internally produced fuel +0,8 x bleed steam [(a)] + 0,8 x steam from electrode boilers[(b)] + purchased fuel – sold fuel – 1,25 × internally produced electricity[(c)] – sold heat[(d)]*

[(a)] According to the 2011 Commission Decision on Ecolabel criteria for copying and graphic paper: 'Total heat energy includes .... as well as heat recovered from the internal generation of electricity — however, the applicant need only count 80 % of the heat energy from such sources when calculating the total heat energy.' This has been interpreted as referring to bleed steam from a back pressure steam turbine.

[(b)] 'Where steam is generated using electricity as the heat source, the heat value of the steam shall be calculated, then divided by 0,8 and added to the total fuel consumption'.

[(c)] The factor of 1.25 in the EUEL equation for internally produced electricity reflects efficiency (80%).

[(d)] As mentioned in the Commission Decision: 'The amount of fuel used to produce the sold heat shall be added to the term 'sold fuel' in the equation above'.

The criterion refers to the calorific value of the fuel converted into heat - *Fuel (heat)* - and not of the steam produced from the fuel, therefore any purchased steam is to be converted back to fuel for the purposes of the EU Ecolabel calculation, using an assumed efficiency factor. To remove a possible misinterpretation the term "fuel" is proposed to be altered to "fuel consumption for heat production". That in practice means that any electricity generated from fuel in a CHP unit can and should be subtracted from the fuel consumption calculation.

Questions:

1. Do you think proposed reference values for fuel and electricity for each pulp type are adequate and reflect the current energy management best practice?

2. Should the equation for energy reporting system be changed as it is proposed, to accommodate the flexibility between fuel and power consumption: The total number of points (Ptotal = PE + PF) must not exceed 2.5?

3. Should the 25% margin be applied to individual pulp or paper scores only, or rather as is currently the case, to the overall weighted average? (final score 2.5)?

4. Should specific value for market pulp be developed for mechanical or RCF pulps, knowing that basically the production is integrated with paper manufacturing?

5. Should the reference value for GW and TMP pulp be unified and refer as mechanical pulp?

6. Should the reference value be linked to the final paper grade in which DIP is to be used? (e.g. a higher value for LWC paper than for newsprint?)

7. Do you think that the specific reference values should be introduced for RCF pulp with and without deinking?

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5.3 Criterion 3: Fibres – conserving resources, sustainable forest management

5.3.1 Criteria proposal – fibre sourcing

Proposed criteria	
3(a) Copying and Graphic Paper	**3(b) Newsprint Paper**
The fibre raw material in the paper may be recovered fibre or virgin fibre. Any virgin fibres shall not originate from GMO species and shall be legally sourced. The following requirements, as appropriate, shall be respected for fibre content allocated to the EU Ecolabel paper product or production line: • A minimum of 70% (w/w) of the fibre content shall be sustainable certified virgin fibre and/or recovered fibre for paper produced by non-integrated mills or production lines. • A minimum of 55% (w/w) of the fibre content shall be sustainable certified virgin fibre and/or recovered fibre for paper produced by integrated mills or production lines. ** for the purposes of this criterion, an integrated mill or production line shall be considered as a mill or production line where at least 90% of the input fibre material going to the paper machine has been produced by a pulping process on the same site.*	At least 90% (w/w) of the total amount of fibres used for newsprint paper shall be recovered fibres. Excluded from the calculation of recovered fibre content is the reutilisation of waste materials generated in a process and capable of being reclaimed within the same process that generated it (e.g. mill broke, own produced or purchased). Any virgin fibres shall not originate from GMO species and shall be legally sourced.

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Assessment and Verification: Assessment and verification of compliance with this criterion may be demonstrated by one of the two ways described below. 1 - In cases where the minimum fibre content requirement (i.e. 70% or 55%, as appropriate) is met by recovered fibres only, and when the product and supply chain is not covered by 3rd party schemes such as the Forest Stewardship Council (FSC), the Programme for the Endorsement of Forest Certification (PEFC) or equivalent schemes, the applicant shall provide a declaration of compliance with the criterion signed by both the applicant and an external environmental auditor accredited[14] to audit paper mills. The applicant shall also make the following information available to the Competent Body for inspection: • Delivery invoices over a period of the last 12 months that quantify any inputs of Paper for Recycling (PfR) to the process. Mill broke (own or purchased) shall not be counted. • Delivery invoices over a period of the last 12 months that quantify any inputs of virgin fibre, stating the original forest or plantation from which it originates. • A statement of the average amount of different grades of PfR entering the process and assumed average yields for converting PfR into recovered fibre. • Details about any allocations of recovered fibre content to the product or production line. • Proof of the legality of any sources of virgin fibres in accordance with Regulation (EU) 995/2010 and that any virgin fibre material does not originate from GMO species. 2 – In cases where the paper product has been verified by an independent 3rd party scheme such as FSC, PEFC or equivalent schemes, the applicant may provide a copy of their own valid Chain of Custody certificate and a valid product label. In appropriate cases where the certified fibre content is less than 70% (w/w) but higher than 55% (w/w), a valid product label shall not be required. Instead evidence that the product is linked to sufficient certified fibre claims that are equal to or exceed 55% (w/w) shall be provided to the Competent Body. If the product or production line includes uncertified virgin material, proof shall be provided that the content of uncertified virgin material does not exceed 30% or 45%, as appropriate, and is covered by a verification system which ensures that it is legally sourced and meets any other requirement of the certification scheme with respect to uncertified material. In case the scheme does not specifically require that all virgin material is sourced from non-GMO species, additional evidence shall be provided to demonstrate this.	**Assessment and Verification**: Assessment and verification of compliance with this criterion may be demonstrated by one of the two ways described below. 1 - In cases where the product and supply chain is not covered by 3rd party schemes such as the Forest Stewardship Council (FSC), the Programme for the Endorsement of Forest Certification (PEFC) or equivalent schemes, the applicant shall provide a declaration of compliance with the criterion signed by both the applicant and an external environmental auditor accredited[15] to audit paper mills. The applicant shall also make the following information available to the Competent Body for inspection: • Delivery invoices over a period of the last 12 months that quantify inputs of Paper for Recycling (PfR) to the process. Mill broke (own or purchased) shall not be counted. • Delivery invoices over a period of the last 12 months that quantify any inputs of virgin fibre, stating the original forest or plantation from which it originates. • A statement of the average amount of different grades of PfR entering the process and assumed average yields for converting PfR into recovered fibre. • Details about any allocations of recovered fibre content to the product or production line. • Proof of the legality of any sources of virgin fibres in accordance with Regulation (EU) 995/2010 and that any virgin fibre material does not originate from GMO species. 2 – In cases where the paper product has been verified by an independent 3rd party scheme such as FSC, PEFC or equivalent schemes, the applicant may provide a copy of their own valid Chain of Custody certificate and a valid product label so long as it can be demonstrated that the product label is linked to recovered fibre content claims that are equal to or exceed 90% (w/w). If the product or production line includes uncertified virgin material, proof shall be provided that the content of uncertified virgin material does not exceed 10% and is covered by a verification system which ensures that it is legally sourced and meets any other requirement of the certification scheme with respect to uncertified material. In case the scheme does not specifically require that all virgin material is sourced from non-GMO species, additional evidence shall be provided to demonstrate this.

[14] Auditors should be accredited according to ISO 9001 and ISO 14001
[15] Auditors should be accredited according to ISO 9001 and ISO 14001

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5.3.2 Summary of the primary proposal

The ambition level for requirements relating to fibre sourcing is generally being raised but has also been adapted in terms of its application.

Table 31 Comparison of proposed criteria and existing published criteria

	Existing criterion summary	Proposed criterion summary
Newsprint Paper	Decision 2012/448/EU: At least 70% of the fibre content shall be recovered fibres.	At least 90% of the fibre content shall be recovered fibres. All fibres shall be covered by CoC certificates.
Copying and Graphic Paper	Decision 2011/332/EU: At least 50% of any fibre content shall be covered by valid SFM and CoC certificates or be from Paper for Recycling sourced from a CoC certified supply chain???	At least 70% of the total fibre content shall be virgin fibres covered by valid SFM certificates and/or recovered fibres except in exceptional cases for integrated mills, where the minimum requirement can be reduced to 55%. All fibre material shall be covered by CoC certificates.

For Newsprint Paper, the consistently high sectorial use of Paper for Recycling (89.9%) suggests that a higher recovered fibre content ambition level is justified (increase from 70 to 90%). However, the inputs of Paper for Recycling 89.9%) and the conversion to recovered fibre are not equivalent. There is a yield loss caused by converting Paper for Recycling into recovered fibre pulp. Not all material in ingoing paper is actually useful fibre. Inks, fillers, inserts, varnishes and adhesives account for a significant fraction of the weight of magazines and newspapers must be removed. This removal process may also result in the simultaneous loss of minor amounts of fibre.

The European Fibre Flow Model published by Meinl et al. (2016), suggests an overall loss of 21% in the Newsprint Paper sector. This would mean that the sector average input of Paper for Recycling of 89.9% equates to an average recovered fibre content of around 71%. Consequently, it can now be argued that the previous ambition level set out in Decision 2012/448/EU was representative of the sectorial average but now the proposed ambition level goes significantly beyond that.

For Copying and Graphic Paper, the criterion set out in Decision 2011 set requirements for the certification of virgin fibres (both CoC and SFM) but is somewhat ambiguous with how recovered fibre inputs should be treated. Are they considered as equivalent to certified virgin material when FSC/PEFC/eqvt. certified? Are they considered as equal to uncertified virgin material when not FSC/PEFC/eqvt. certified? Does the 50% certification requirement refer only to the virgin material fraction of the paper or does it apply to the whole fibre content of the paper product?

A look at the FSC and PEFC labelling scheme rules helps to shed light on the intended interpretation of the fibre criterion in Decision 2011/332/EU.

	FSC 100%	FSC Mix	FSC Recycled	PEFC certified	PEFC recycled
Sustainable virgin	100%	70-100%	0%	70-100% (with a maximum of 84.99% recycled material)	70-100%
Post-consumer recycled	0%		100%		
Pre-consumer recycled					
Controlled		0-30%	0%	0-30%	0-30%

Figure 18. FSC and PEFC labels and related fibre input requirements for paper products

The labelling rules make it quite clear that recycled fibre can be considered as equivalent to sustainable certified virgin fibres in both the FSC and PEFC schemes.

A lower ambition level has been made for integrated mills in situations where there are genuine barriers to improving the uptake of forest certification that are beyond the

control of the license holder/applicant. In order to recognise the environmental benefits that integrated mills achieve (by avoiding the need for pulp drying – equivalent to 1000 kWh/ADt of fuel energy and associated CO2, NOx and S emissions) a lower ambition level of 55% has been set. This value is still higher than the 50% in the existing criterion in order to stimulate efforts to improve beyond business as usual.

5.3.3 Rationale of proposed criterion text

The need for Sustainable Forest Management (SFM)

Sustainable forestry and widespread awareness of the adverse environmental impacts of deforestation originally came to the fore around 1990. Since then, a political commitment at the ministerial level in Europe to the definition, monitoring, understanding and promotion of sustainable forestry has become well established under the voluntary Forest Europe initiative, to which 46 European countries have now signed up and which defines sustainable forest management as:

"The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems."

The Forest Europe initiative has defined qualitative and quantitative indicators of sustainable forest management, initially in 1998, then again in 2003 and most recently in 2015. The most recent criteria cover 11 qualitative indicators and 34 quantitative indicators[16] (see Appendix I).

The environmental impact of wood harvesting from forests or plantations can vary significantly depending on how the whole process is carried out and how the forest or plantation is managed in the long term. In terms of LCA impact categories, the harvesting of wood has a strong influence on global warming potential and land use as well as impacts on biodiversity.

Positive impacts on climate change due to the sequestration of carbon in the wood biomass and in forest/plantation soil are obvious although these short term positive impacts are meaningless in the long term if the harvesting operation results in net deforestation or forest degradation.

The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (IPCC, 2014) quotes forestry and land use as the second most important source of anthropogenic carbon dioxide (fossil fuel combustion being the first). These conclusions are supported by other independent scientific studies, *e.g.*, the work carried out by van der Werf et al., (2009). The subject is sufficiently important to have been addressed specifically in an IPCC special report (IPCC, 2000) and the development of the "United Nations Reducing Emissions from Deforestation and forest Degradation" UN-REDD initiative.

Land use impacts are generally negative due to the need for building access roads and clearcutting operations but the latter impact can be minimised over the longer term when the harvested area is replanted and the forest or plantation is managed in a manner that maintains or enhances the overall levels of growing stock in the forest/plantation. Land use change relating to forestry operations can in some limited cases be positive (due to land reclamation or the conversion of intensive agricultural land to plantations) but can also be negative (due to the conversion of naturally regenerated or primary forests to plantations).

[16] Madrid Ministerial Declaration. 25 years together promoting Sustainable Forest Management in Europe, 7th Ministerial Conference, Madrid, 20-21 October 2015. Accessed online July 2017.

Threats to biodiversity caused by forestry activities are evident if care is not taken to maintain minimum levels of deadwood and a minimum spread of different tree species and ages in the forest unit.

Chain of custody certification and sustainable forest management auditing

The Forest Europe criteria are useful in terms of the periodic assessment of the "*state of Europe's forests*" reports in 2007, 2011 and 2015, but for the purposes of EU Ecolabel criteria, it is necessary for an applicant to be sure that the material delivered to their mills is indeed sourced from sustainably managed forests.

The best way to ensure this is to make sure that the material only passes through suppliers and intermediaries that are covered by chain of custody certificates awarded by an independent 3rd party organisation and that the source forest is also certified as being sustainably managed – again according to periodical audits by an independent 3rd party organisation.

The market for such certification is dominated by the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC). Both schemes are global in their reach and also allow for the supply chain certification of Paper for Recycling.

Environmental benefits of recovered fibres

The use of Paper for Recycling (PfR) has obvious environmental benefits in the sense that waste is diverted from landfill or incinerators, that the paper industry's demand for raw wood is reduced and that generally less energy is required to convert PfR into useful fibres than to convert raw wood into useful fibres.

The use of PfR is promoted in the criterion for Copying and Graphic Paper by recognising recovered fibre as equivalent to virgin fibre from sustainably managed forests and requiring a mandatory minimum of 70% of fibres from PfR and/or sustainably managed forests. With Newsprint Paper, a fixed minimum requirement for recovered fibres from PfR is set.

Due to doubts about how well the supply chain for PfR is covered by FSC and PEFC CoC certificates, a means for alternative verification of compliance with the fibre criterion has been provided for cases where the limits can be met purely due to the use of recovered fibres. Clarification on this issue will be sought with stakeholders during the 2nd AHWG meeting.

Initial criterion proposal prior to 1st AHWG meeting

No criterion wording was proposed in the Technical Report (version 1.0) that was presented at the 1st AHWG meeting.

Instead, the future formulation of the criterion was broadly discussed during the 1st AHWG meeting, especially focussing on the issue of directly mentioning of the FSC and PEFC schemes within the criterion and assessment and verification text.

The direct mention of FSC and PEFC was considered as not only a convenient way to refer to the principles of Sustainable Forest Management, but also to refer to acceptable Chain of Custody (CoC) and allocation principles throughout the supply chain.

It was emphasised that while these schemes dominate the market for fibre sourcing in the paper industry, any EU Ecolabel requirement would also allow for other equivalent schemes. Therefore, the reference of FSC and PEFC is not to be considered as an exclusive recognition of those schemes.

Consequently, in TR 1.0 a placeholder was inserted instead of a criterion proposal. The placeholder mentioned that the intention of the criterion, once clarification on whether FSC and PEFC can be mentioned in the criterion or not was received, would be to require that at least 70% of all fibres used in Newsprint Paper or Copying and Graphic Paper are virgin fibres from sustainably manged forests and/or recovered fibres.

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5.3.4 Outcomes from 1st AHWG meeting

There were four main talking points during the 1st AHWG and in the follow up commenting period:

- The possible substitution of FSC and PEFC references with basic SFM principles
- Mandatory minimum requirements for recovered fibres
- Increasing the ambition level of minimum sustainable virgin fibre and/or recovered fibre contents
- Allocation of fibres to EU Ecolabel products

Replacing direct reference to FSC and PEFC with basic SFM principles - feedback

An overwhelmingly negative response was received from stakeholders regarding this proposal. Industry stakeholders stated that they work exclusively with FSC and PEFC and that, while it is possible that there are some regional or national level programmes for forest management, there is no way that these could be considered as "equivalent" to FSC or PEFC.

Member State Competent Body (CB) representatives emphasised that directly embedding sustainable forest management principles in the criteria in the wording could result in serious consequences. It would open the door to applicants potentially submitting evidence of SFM which CBs would be required to assess and verify by themselves, which would go well beyond their existing capacities and competencies and would simply not be feasible under the current fee structure. Previous discussions and agreements reached at the EUEB level that led to the existing wording of "*FSC, PEFC or equivalent*" were referred to. It was claimed that if any CB was presented with an application that claimed to comply with the criteria by virtue of certification by another scheme that was not FSC or PEFC, then this would need to be discussed at the EUEB level and decided if it could be accepted as equivalent. So far no such equivalent scheme has been presented. It was emphasised that this was talking about "*equivalent schemes*", not about "*equivalent SFM principles*" – because there is a huge difference between the two in terms of work required, evidence gathering and control.

One forest management expert stakeholder added that great care should be taken if trying weave together a set of basic sustainable forest management principles from the existing principles, criteria and indicators set out under the FSC and PEFC schemes and the Forest Europe initiative. For a start, the Forest Europe initiative should not be confused with sustainable forest management as such. Forest Europe simply reports on the state of the forest at a particular point. The Commission continues to make efforts to define what sustainable forest management is, but it is facing difficulties with this, and several Member States have shown reluctance to allow the Commission to propose anything that could be interpreted as being normative. Any basic management principles would need to be equally applicable to the different forests across the world and the development of these principles would be a process which would require expert input and significant resources and time and still not guarantee any satisfactory outcome even after several years.

Minimum requirements for recovered fibre content - feedback

The use of recovered fibres in EU Ecolabel products was discussed at length, with split views apparent amongst stakeholders. Some stakeholders wanted to maintain or even increase the minimum recycled fibre content for Newsprint Paper (from 70% to 90%) - while others wanted no mandatory minimum recovered fibre content for any paper product group.

Arguments in favour of recovered fibre content were largely based on the general lower environmental impact associated with recovered fibres compared to virgin fibres, consumer perception and the alignment with a circular economy philosophy.

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Arguments against mandatory minimum recovered fibre contents were largely based on the fact that recycled fibres cannot be recycled ad-infinitum (maximum 5-6 cycles), thus requiring a constant influx of virgin material in the broad paper loop. It was also stated that while minimum recovered fibre contents may be easy to achieve in regions like Germany (large population centres), it would be much more difficult in others like the Nordic countries (fewer and smaller population centres). It was added that recycling rates in Europe had improved considerably in the last 20 years but further increases were unlikely to be possible. Consequently, any mandatory minimum requirement for recovered fibres in Copying and Graphic Paper would simply require the importing of Paper for Recycling (PfR) to licence holders in certain European countries instead of being used in mills closer to the source.

The need to distinguish between "white fibres" and "brown fibres" was mentioned. While both are suitable for recycling into packaging applications, only white fibres are generally suitable for recycling into graphic papers. Consequently, any minimum requirements for recycled content may simply result in recycled fibres being diverted from packaging production to graphic paper production, with no overall environmental benefit and with potential technological challenges to maintain process parameters in the paper machine and final product quality.

Increasing the ambition level for SFM virgin fibres and/or recovered fibres - feedback

The principal reasons for raising the ambition level from 50% to 70% were to bring the criteria into line with other EU Ecolabel product groups and to ensure that the ambition level aligns with the labelling requirements set out by FSC and PEFC. It was explained the 70% minimum requirement could be met by either virgin fibres from sustainable certified forests or recovered fibres or a combination of both. Stakeholders were generally in favour of considering sustainable virgin fibres and recycled fibres as equals under the EU Ecolabel criteria.

However, split views were expressed by stakeholders about raising the ambition level. Those against the increase stated that going from 50% to 70% effectively required the quantities of certified fibres coming in to increase by 40%, which would be a major challenge. They also added that the forest sector was facing increased competition from the energy sector, which was further increasing costs and that the growth in certified forests across Europe had slowed down.

Those in favour of the increase in certified fibre availability pointed to the 2015 report by the International Council of Forest & Paper Associations, which showed that, of the forests owned by its member companies, the percentage of certified forest area increased from 48% to 52% between 2010/2011 and 2012/2013 (*this figure has since increased further to 54% in 2014/2015*). In this context, the existing ambition level of 50% does not seem ambitious at all. It was reiterated that EU Ecolabel criteria ambition levels are not intended to apply to the entire market, but only to the best performing products on the market.

In response, the example of integrated mills in Portugal was provided, where certified fibre availability is limited due to the ownership structure of Portuguese forests (lots of inherited smallholdings owned by individuals or families that may not even be aware of this, let alone be interested in the additional costs of forest certification). Any increase in certified sustainable virgin fibre requirements would effectively require the import of market pulp from third countries (e.g., Brazil) instead of the use of locally sourced virgin wood.

It was countered that the forest certification system is not a one way process but that the market can respond to increased demand for certified fibres by seeing more forest owners looking to obtain certification. The Portuguese government was looking at a potential Regulation to resolve the problems with the forest ownership structures in Portugal although how long this would take to create conditions more amenable to achieving higher forest certification was unknown.

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One stakeholder claimed that raising the ambition level to 70%, effectively aligning with the ambition level of FSC and PEFC, may encourage some companies to simply market their products as FSC or PEFC instead of EU Ecolabel because the fibre requirements are the same but there is no need to limit emissions to water and air, limit energy use or avoid the use of certain chemicals for the former labels. Others argued that this was precisely the added value of the EU Ecolabel, which looks at all relevant environmental impacts associated with the life cycle of the products, unlike labels such as FSC and PEFC, which are purely focussed on one, albeit very important, aspect of the product.

The debate continued by stating that the pressure of finding an extra 40% of certified fibre can be considerably reduced by allowing recycled fibres to also be accepted. However, this was disputed by one stakeholder who claimed that many paper plants are not set up to accept any recycled fibres and investment would be needed to accept any injection of recycled fibres into the process line.

Allocation issues in fibre accounting

With regards to the issue of demonstrating the appropriate allocation of sustainable certified virgin fibres or recycled fibres to the EU Ecolabel product, it was explained that in certain cases, CBs need to be given access to a full balance sheet that accounts for all the inputs and outputs of certified and non-certified materials and products and the % claims associated with them. Industry stakeholders claimed that they already operate with such accounting systems, which are set up in a manner analogous to a bank account with monthly updates to the balance. JRC asked for details of this to be shared with a view to setting up a common template that all EU Ecolabel applicants could use to ensure consistency between different applications and between different CBs.

5.3.5 Further research and main changes

Based on the comments received during and following the 1st AHWG meeting, further research was conducted, focussing on the following aspects:

- Market trends for PfR in Europe.
- Forest certification trends for FSC and PEFC in Europe
- Investigation into the Portuguese forestry ownership situation
- Balance sheets suitable for fibre allocation in cases where the product is not double labelled with FSC or PEFC and the EU Ecolabel.

Market trends with PfR in Europe

The annually reported CEPI statistics offer a very useful source of information for understanding the current market situation for PfR. Overall trends in the recycling rate in Europe have been calculated by dividing the total quantities of PfR going into mills by the total quantities of paper and board coming out of those same mills.

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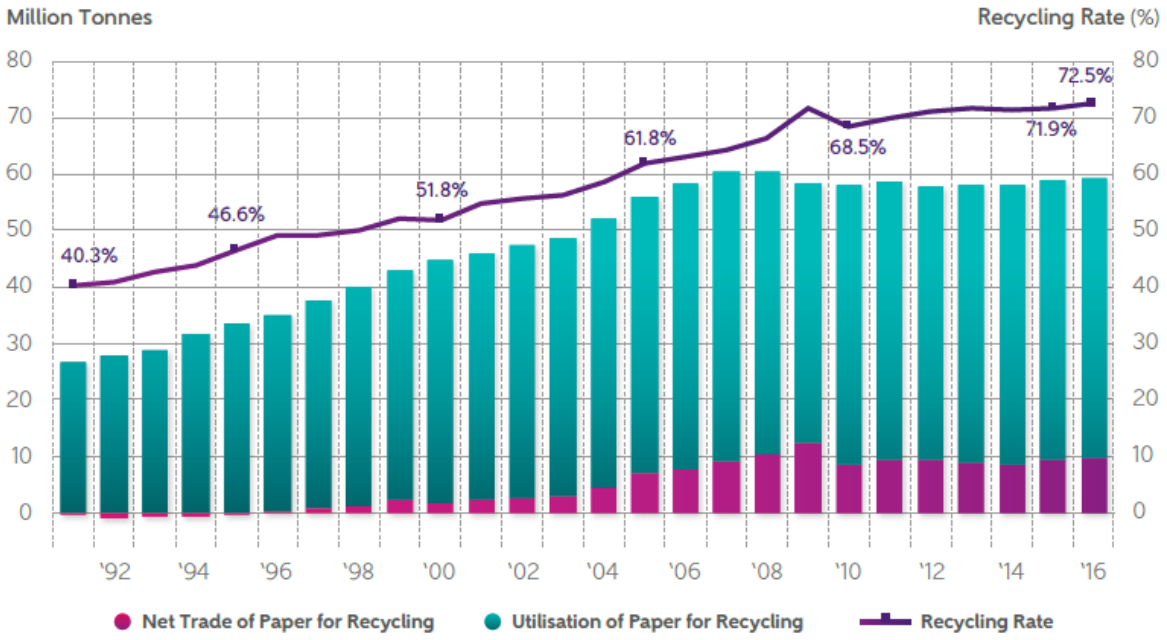
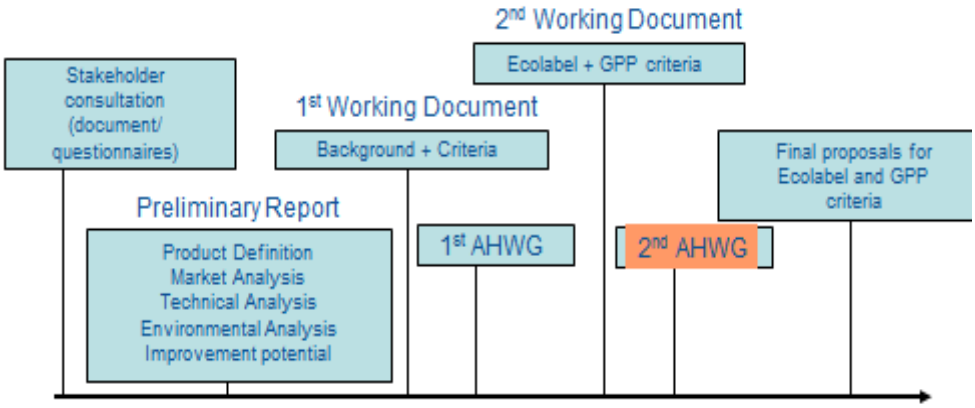


Figure 19. Trends in paper recycling rates in EU28 + Norway and Switzerland (CEPI).



The data in

Figure 1Figure 19 show that major progress has been made in the recycling rate of paper between the years 1991 and 2011. Since 2011, rates have plateaued at around 71-72%. It is also apparent that net exports of PfR (mainly to China) have increased notably between 1999 and 2009 before stabilising at around 10 million tonnes per year (around 10% of annual paper and board consumption).

Significant further increases in recycling rates are not expected due to a combination of certain paper products being used in such a way that prevents their recycling (e.g. toilet paper) and limitations due to sub-optimal post-consumer collection and sorting of waste paper. However, a target of 74% has been set for 2020, which could only be achieved with the aid of other legislative measures such as the banning of the landfill disposal of paper and a shift away from the commingled collection of paper with other materials[17].

Table 32 CEPI PfR statistics for the European Industry in 2016 (thousand tonnes)[18]

	Grades of Paper for Recycling (PfR)				

[17] European Paper Recycling Council press release, May 2017. Accessed online, July 2017.
[18] CEPI Key Statistics 2016. European Pulp and Paper Industry. Accessed online, July 2017.

Paper sector	Mixed grades	Corrugated and kraft	Newspapers and magazines	Other grades	Total use of PfR	Utilisation by sector	Total P&B production	% PfR in sector
Newsprint	22	0	5732	131	**5885**	12.3%	6549	89.9%
Other graphic papers	129	27	2986	667	**3809**	8.0%	27360	13.9%
Total Graphic papers	**151**	**27**	**8718**	**798**	**9694**	20.3%	**33909**	**28.6%**
Case materials	4571	20254	231	944	**26000**	54.5%	27733	93.8%
Carton board	1865	581	90	850	**3386**	7.1%	9049	37.4%
Wrappings, other packaging	1914	1707	170	454	**4245**	8.9%	8888	47.8%
Total Packaging	**8350**	**22542**	**491**	**2248**	**33631**	70.4%	**45671**	**73.6%**
Sanitary and household	269	126	535	1882	**2812**	5.9%	7301	38.5%
Other paper & board	245	1044	190	132	**1611**	3.4%	4050	39.8%
Total paper & board	**9015**	**23739**	**9934**	**5060**	**47748**	**100.0%**	**90931**	**52.5%**
Share of total	**18.9%**	**49.7%**	**20.8%**	**10.6%**	**100.0%**			

Reading the top and bottom of columns 2 to 5 shows the main sources of PfR and, by reading horizontally together with column 1, how the sources of PfR in columns 2-5 are split within a particular paper sector. Column 6 shows the total amount of PfR used and, when compared to the total paper/board production of that sector in column 8, an average % PfR for that sector can be calculated (column 9).

Note: *The %PfR in the final column for each paper sector is expressed as PfR and not recovered fibres. In reality, PfR will contain varying degrees of unusable materials and impurities, such as fillers, binders, laminates and inks, which will be removed during the fibre recovery process. Consequently, the %PfR values in the final column are essentially an overestimate of the overall % of recovered fibres used in these sectors.*

Looking at the first 5 columns, it is important to note the following:

- The dominant source of PfR (49.7%) is from the packaging sector (corrugated and kraft) and almost 95% of this fraction (22542 of 23739 thousand tonnes) goes to the manufacture of new packaging materials, especially case materials.
- Mixed grades of PfR accounted for 18.9% of the total PfR produced in 2016 and, like corrugated and kraft, is predominantly (93%) destined for use in packaging.
- Newspapers and magazines accounted for 20.8% of all PfR in 2016, which was predominantly (88%) reused in making new newsprint or other graphic paper.
- Other grades accounted for 10.9% of PfR, whose use was split between packaging (44%), sanitary and household paper (37%) and graphic paper (16%).

From these trends, it is clear that PfR from packaging goes to make new packaging, PfR from graphic papers goes to make new graphic papers and that PfR from grades of variable composition and quality tends to go predominantly to the manufacture of new packaging.

There are some simple technical reasons behind these market trends. First of all, graphic papers have a certain requirement for whiteness, while packaging paper and board generally does not. Consequently, it is much simpler to accept PfR with a known or variable content of "brown fibres" in a packaging paper production line. Secondly, the manufacture of newsprint paper is done with short, mechanical pulp-based fibres - it is advantageous that any inputs of PfR are rich in the same type of fibres (i.e. newspapers and magazines).

In terms of any potential EU Ecolabel requirements relating to mandatory minimum contents of recovered fibres, it is important to consider columns 6 and 8 and especially column 9 of Table 32.

While the 2016 sector average PfR content in Newsprint Paper is very high (89.9%), other graphic papers (the relevant sector for the Copying and Graphic Paper product

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group) has a much lower average use of PfR (13.9%). This distinction is well reflected in the existing EU Ecolabel criteria for Newsprint Paper and Copying and Graphic paper where a minimum recovered fibre content of 70% is set for Newsprint Paper and no minimum recovered fibre content is set for Copying and Graphic Paper.

It is proposed to continue with the same distinction (i.e. minimum recovered fibre content for Newsprint but not for Copying and Graphic paper) in the new criteria proposals. When considering the ambition level for any minimum recovered fibre content, it is important to consider the declining market for graphic paper in general – since these are the predominant source of PfR for graphic papers.

Table 33. Production and %PfR trends for Newsprint and other graphic papers (CEPI key statistics 2010-2016)

		2010	2011	2012	2013	2014	2015	2016
Newsprint paper	Total production	9787	9715	8590	8156	7594	7019	6549
	Input of mixed grade PfR	136	476	463	0	25	27	22
	Input of corrugated and kraft PfR	63	0	70	0	0	0	0
	Input of newspaper and magazine PfR	8828	8361	7252	7894	7163	6428	5732
	Input of other grade PfR	56	34	8	13	55	59	131
	Sector average % PfR	**92.8%**	**91.3%**	**90.7%**	**96.9%**	**95.4%**	**92.8%**	**89.9%**
Other graphic papers	Total production	34293	33199	31607	30023	29328	28246	27360
	Input of mixed grade PfR	244	223	128	111	154	165	129
	Input of corrugated and kraft PfR	16	4	12	7	18	22	27
	Input of newspaper and magazine PfR	2556	2590	2696	2720	2766	2733	2986
	Input of other grade PfR	826	598	633	575	706	686	667
	Sector average % PfR	**10.6%**	**10.3%**	**11.0%**	**11.4%**	**12.4%**	**12.8%**	**13.9%**

The data in Table 33 shows a clear and continual decline in the annual production of newsprint paper (-33% since 2010) and other graphic paper (-20% since 2010). Any decline in graphic paper production means that less PfR is required to maintain a particular sector average PfR %. However, the decline in production also means that the dominant source of PfR for the next year for this sector is also reduced. Despite these declines, Table 33 shows that the sector average % PfR has remained relatively stable at around 90% for newsprint and 10-15% for other graphic papers.

Forest certification in Europe

Both FSC and PEFC publish regular updates about the number of hectares covered by their forest management certificates in each country. For European countries, the certified areas can be put into context by comparing to the total forest areas identified in periodic "State of Europe's Forests" reports – the most recent report was in 2015.

The growth in forest certification has been questioned in the past due to a lack of control over double certified forests (i.e. FSC + PEFC) which would effectively be counted twice when considering the % areas covered for SFM certificates. This criticism has led to a joint initiative by FSC and PEFC to identify and quantify double certified forests. A summary of recent data relating to certified forests in Europe is provided below.

The data in Table 34 reveal some significant differences between different European countries. The >100% forest certification in Belarus and Croatia implies some discrepancy between the way that forests are quantified by SFM certification schemes and by the researchers putting together the State of Europe's Forests report. In the latter, it is clear that much of the data was rounded for ease of reporting in smaller numbers as Mha instead of ha.

Overall, slightly more than half of all of Europe's forests are covered by SFM certificates but this hides significant variation between individual countries, where certified forest fractions can range from 0% to almost 80% (ignoring Croatia and Belarus).

Table 34. Forest certification in European countries

Country	Total forest area (2015)[19]	FSC (2017)[20]	PEFC (2017)[21]	Double certified (2016)[22]	Total forest area certified
BELARUS	8,600,000	8,497,225	8,710,234	7,671,975	110.9%
CROATIA	1,900,000	2,039,223	0	0	107.3%
POLAND	9,400,000	6,939,230	7,252,197	6,870,607	77.9%
AUSTRIA	3,900,000	587	2,983,979	0	76.5%
FINLAND	22,200,000	1,357,012	16,571,224	1,233,000	75.2%
BOSNIA AND HERZEGOVINA	2,100,000	1,532,625	0	0	73.0%
ESTONIA	2,200,000	1,370,289	1,174,511	1,010,000	69.8%
SLOVAKIA	1,900,000	146,271	1,245,922	106,041	67.7%
GERMANY	11,400,000	1,146,324	7,384,605	893,111	67.0%
CZECH REPUBLIC	2,700,000	52,629	1,794,917	48,000	66.6%
NORWAY	12,100,000	445,626	7,380,750	411,000	61.3%
SWEDEN	28,100,000	12,259,756	11,549,700	7,200,000	59.1%
IRELAND	800,000	446,647	376,108	376,108	55.8%
LATVIA	3,400,000	1,010,491	1,683,604	845,038	54.4%
UNITED KINGDOM	3,100,000	1,633,904	1,410,288	1,400,000	53.0%
LITHUANIA	2,200,000	1,089,532	0	0	49.5%
FRANCE	17,000,000	33,987	8,198,260	24,612	48.3%
SWITZERLAND	1,300,000	611,683	208,949	208,949	47.1%
DENMARK	600,000	213,976	263,650	208,794	44.8%
BELGIUM	700,000	1,654	299,500	0	43.0%
NETHERLANDS	400,000	170,407	0	0	42.6%
LUXEMBOURG	100,000	21,446	34,203	13,500	42.1%
ROMANIA	6,900,000	2,596,947	0	0	37.6%
SERBIA	2,700,000	1,001,347	0	0	37.1%
UKRAINE	9,700,000	2,880,029	0	0	29.7%
BULGARIA	3,800,000	1,079,030	0	0	28.4%
SLOVENIA	1,200,000	260,291	49,204	9,000	25.0%
SPAIN	18,400,000	1,763,053	2,006,236	157,641	19.6%
HUNGARY	2,100,000	304,354	0	0	14.5%
PORTUGAL	3,200,000	373,717	256,369	248,267	11.9%
ITALY	9,300,000	43,271	811,040	32,569	8.8%
CYPRUS	200,000	0	0	0	0.0%

[19] From "FOREST EUROPE, 2015: State of Europe's Forests 2015.
[20] From "FSC Facts & Figures, January 6, 2017", accessed online July 2017.
[21] From "PEFC Global Statistics: SFM and CoC Certification. Data: March 2017.
[22] From joint statement released by FSC and PEFC: "Double certification FSC and PEFC – estimation end 2016

GREECE	3,900,000	0	0	0	0.0%
TOTAL	**197,500,000**	**51,322,563**	**81,645,450**	**28,968,212**	**52.7%**

Investigation into problems with forest certification in Portugal

The previous comments about difficulties for integrated mills in Portugal meeting increased ambition levels for minimum sustainable fibre contents appear to be well founded based on the data presented in the previous sub-section. Only 11.9% of Portuguese forests are currently certified.

Considering other countries with EU Ecolabel licenses for Copying and Graphic Paper or Newsprint Paper, it is clear that any integrated mills in Slovenia, Spain, Portugal and Italy, may also face challenges with sourcing sustainable virgin raw materials from the same country in which they operate.

One of the main obstacles to increasing forest certification in Portugal was claimed to be due to the fact that most of the available forest is privately owned by individuals or families who are not interested in either selling the land or paying for certification.

In a 2009 statement made by Portugal at the 67th UNECE/Timber Committee, it was revealed that the forest ownership structure in Portugal was split as follows:

- Public ownership: 1.5% of forest area
- Private ownership: 98.5% of forest area
  - of which owned by individuals: 88.9%
  - of which owned by private business entities and institutions: 5.3%
  - of which owned by local communities: 4.3%

The same statement identified the ownership regime as the single biggest barrier to increased uptake of forest certification. In particular, owners of the smallest forest holdings in the North and Central regions of Portugal where considered as being unaware of the importance of forest certification.

Overall, the concerns raised by the Portuguese industry representative appear to be completely valid and there could be a case to make an exemption to the increased ambition level for certified fibres in the particular cases of integrated mills located in countries where there are obstacles preventing the further uptake of forest certification. This will be an issue to be discussed at the 2nd AHWG meeting.

Balance sheets for sustainable fibre content

In cases where a) a product is double labelled with both EU Ecolabel and FSC or PEFC and b) the minimum requirements for that FSC or PEFC label are equal to or more stringent than the fibre criterion for EU Ecolabel, then it is only necessary to provide a valid chain of custody certificate and valid product label that can be cross-checked in the FSC or PEFC databases.

However, in cases where a) the product is not double-labelled, b) the EU Ecolabel fibre criterion is more stringent or specific than FSC and PEFC or c) the EU Ecolabel product contains a significant combination of FSC certified material and PEFC certified sustainable virgin material, it will be necessary to provide a balance sheet to the Competent Body that captures all inputs and outputs of certified raw materials and fibres and outputs of certified materials at the site level and at a monthly time resolution.

The most simplified version of an example balance sheet that could be considered as acceptable is provided below. In mills that accept Paper for Recycling, a separate row

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would be needed which accounts for significantly different yields when converted, with or without deinking treatment, into recovered fibre pulp.

It may also be more helpful to see the volume of sales and average fibre contents reported together with a breakdown of the allocations of certified fibre contents – which would then be added together to calculate the total output of certified fibres.

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Table 35 Example of certified fibre balance sheet for a mill accepting Paper for Recycling and virgin fibre.

	Units	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Start Site Balance (A)	**tonnes**	**0**	**1250**	**2515**	**3775**	**5040**	**6295**	**7550**	**8810**	**10460**	**12125**	**13780**	**15045**
Certified Virgin Fibre Purchases	**tonnes**	500	500	500	500	500	500	500	500	500	500	500	500
Conversion Factor (Yield)		0.90	0.93	0.92	0.93	0.91	0.91	0.92	0.90	0.93	0.91	0.93	0.93
Credit Input from Virgin Fibre (B)	**tonnes**	**450**	**465**	**460**	**465**	**455**	**455**	**460**	**450**	**465**	**455**	**465**	**465**
Certified Paper for Recycling Purchases	**tonnes**	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Conversion Factor (Yield)		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Credit Input from Paper for Recycling (C)	**tonnes**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**	**1200**
Total Credit Input (B+C)	**tonnes**	**1650**	**1665**	**1660**	**1665**	**1655**	**1655**	**1660**	**1650**	**1665**	**1655**	**1665**	**1665**
Total Sales [D]		**400**	**400**	**400**	**400**	**400**	**400**	**400**	**0**	**0**	**0**	**400**	**400**
Site Balance (A+B+C-D)		**1250**	**2515**	**3775**	**5040**	**6295**	**7550**	**8810**	**10460**	**12125**	**13780**	**15045**	**16310**

Some basic rules should apply to the balance sheet. For example, that the monthly site balance (bottom row) should never fall below zero and that the overall yearly balance can be reported for a calendar year or for a rolling 12 month period that is linked to the original awarding of the EU Ecolabel licence. Any net credits from 24 months ago must be set to zero to prevent the balance sheet from becoming too long.

It is proposed to have a standard calculation spreadsheet that all Competent Bodies can use to ensure that compliance with this criterion, when FSC or PEFC double labelling is not the case or is not sufficient, is done in a consistent and transparent manner.

Questions:

1. How well do FSC and PEFC cover the suppliers of Paper for Recycling in Europe with CoC certificates? Can EN 643 delivery invoices fit into FSC and PEFC auditing if the original supplier of PfR is not covered by a CoC certificate?

2. What is the experience in the implementation of external auditing of recovered fibre content in the Blue Angel scheme? What type of evidence is submitted? What minimum qualifications/experience do auditors need to have?

3. Opinions about the lower ambition level for integrated mills in exceptional cases as proposed for Copying and Graphic Paper?

4. Opinions about the increased minimum recovered fibre content proposed for Newsprint?

5. Why should purchased mill broke be excluded from calculations of recovered fibres? Is this not simply pre-consumer recycled material? Or is it to prevent cynical exchanges of mill broke between companies to technically comply with the criteria? Regardless, if mill broke is not PfR, is it simply assumed that it all goes back in the process anyway and that no is produced? Or is there a way it is calculated as uncertified material in FSC and PEFC accounting on licence holder balance sheets? How is mill broke dealt with by EN 643?

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5.4 Criterion 4: Restricted hazardous substances and mixtures

Criterion 4 is split into 8 sub-criteria which relate to different types of restrictions that are placed on different chemicals that may be used in the pulp and paper manufacturing process. The 8 sub-criteria can be split into two groups as follows:

- Horizontal criteria that are linked to Articles 6(6) and 6(7) of the EU Ecolabel Regulation, which are based on hazard classifications rather than specific substances and which apply at the level of the final product (i.e. criteria 4a and 4b).
- Specific criteria that refer to individual substances or groups of chemicals which apply at the level of the purchased chemical (e.g. criteria 4c, 4d, 4e, 4f, etc.).

5.4.1 Criteria proposal – horizontal hazardous substance and mixture restrictions

Proposed Criterion 4: Restricted hazardous substances and mixtures

(For copying and graphic paper and newsprint paper):

Preamble

The basis for demonstrating compliance with each of the sub-criteria under criterion 4 shall be the applicant providing a list of all the chemical products used in the pulp and paper production process, together with appropriate documentation, such as Safety Data Sheets (SDSs). This list shall include the approximate quantities used per production volume, their function, the stages in the process where they are used and to what extent they may be considered to remain in the final paper product.

Criterion 4a) Substance of Very High Concern (SVHC) restrictions

(For copying and graphic paper and newsprint paper):

The paper product shall not contain substances that have been identified according to the procedure described in Article 59(1) of Regulation (EC) No 1907/2006 and included in the Candidate List for SVHCs in concentrations higher than 0.10% (weight by weight). No derogation from this requirement shall be given.

Assessment and verification:

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

http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

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

The applicant shall prove compliance with this criterion by providing Safety Data Sheets (SDSs) that are in accordance with Article 31 of Regulation (EC) No 1907/2006 showing that no SVHCs are listed in any SDS. In cases where a SVHC is listed in a SDS of a chemical used in the pulp or paper production process, data on the amount (kg /ADT paper produced) of SVHCs used in the process shall be provided. Unless demonstrated otherwise, it shall be assumed that 100% of any ingoing SVHCs remain in the final paper product.

Criterion 4b) CLP restrictions

(For copying and graphic paper and newsprint paper):

The paper product shall not contain substances or mixtures meeting the criteria for classification with the hazard statements in accordance with Regulation (EC) No 1272/2008 specified below in concentrations higher than 0.10% (weight by weight):

- Group 1 hazards: Category 1A or 1B Carcinogenic, Mutagenic and/or Toxic for Reproduction (CMR): H340, H350, H350i, H360, H360F, H360D, H360FD, H360Fd, H360Df
- Group 2 hazards: Category 2 CMR: H341, H351, H361, H361f, H361d, H361fd, H362; Category 1 aquatic toxicity: H400, H410; Category 1 and 2 acute toxicity: H300, H310, H330; Category 1 aspiration toxicity: H304; Category 1 Specific Target Organ Toxicity (STOT): H370, H372, Category 1 Skin Sensitiser*: H317.
- Group 3 hazards: Category 2, 3 and 4 aquatic toxicity: H411, H412, H413; Category 3 acute toxicity: H301, H311, H331; Category 2 STOT: H371, H373; Other EU hazard classes: EUH029, EUH031, EUH032, EUH059, EUH070.

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**H317 restrictions apply specifically to commercial dye formulations, surface finishing agents and coating materials applied to paper.*

Assessment and verification: the applicant shall prove compliance with these criteria by providing data on the amount (kg/ADT paper produced) of substances or mixtures used in the process and by demonstrating that the substances or mixtures referred to in this criterion are not retained in the final product above the concentration limits specified. The concentrations of substances and mixtures shall be specified in the Safety Data Sheets in accordance with Article 31 of Regulation (EC) No 1907/2006.

5.4.1.1 Rationale of proposed criterion text

The general structure of the horizontal hazardous substance criteria (preamble, 4a) and 4b) aims to follow the general recommendations of the EU Ecolabel Chemicals Task Force. However, because their final recommendations will not be ready before November 2017, it is possible that the exact wording or structure of these parts may change. In any case, no fundamental changes that would alter the meaning of the text are anticipated.

There is no longer any reference to risk phases (e.g. R45, R50 etc.) when mentioning the classification of substances and mixtures because these were linked to the Dangerous Substances Directive (67/548/EEC) which was repealed by the CLP Regulation as of June 2015. Instead, reference is exclusively made to hazard statements and classes.

For criterion 4b), reference to "*concentration limits defined in Article 10 of the CLP Regulation*" has been removed. This is due to a mismatch in the applicability of these concentration limits. While a general concentration limit of 0.10% is set in criterion 4b) for the paper product, by referring to Article 10, a whole range of other concentrations potentially come into play, which are specifically linked to the classification of substances and mixtures, but not paper.

The restriction of H317 has been nuanced to reflect the original text already published in Decisions 2011/332/EU and 2012/448/EU but to fit into the presentation structure of the new criteria proposal. However, reference is no longer made to chemicals considered as "*auxiliaries*" because no suitable definition of this term could be found that would be applicable to the pulp and paper industry.

5.4.1.2 Outcomes from 1st AHWG meeting regarding criteria 4a) and 4b)

One of the main talking points about the horizontal criteria for hazardous substances was the proposal to remove the following exemption clause:

"Substances or mixtures which change their properties upon processing (e.g., become no longer bioavailable, undergo chemical modification) so that the identified hazard no longer applies are exempted from the above requirement."

It was emphasised that the reason for removing the clause was that the text is too vague to be used in a legal text and is open to different interpretations and inconsistencies between different Competent Bodies. It was uncertain how much this clause was actually being used by EU Ecolabel licence holders but simply due to the fact that (i) the existing criteria have no derogation conditions and (ii) that the application of hazardous substance criteria has not been an issue affecting the uptake, suggest that the exemption clause has either been widely used or was not an issue in the first place.

It was explained that the idea of removing the exemption clause is not to create a major obstacle for existing licence holders but instead to force applicants and licence holders to reveal what hazardous substances are used in process and functional chemicals and consider if they will remain in the final paper product. If hazardous substances with restricted classifications can be considered to remain in the final product, then their use should not be permitted unless a derogation is granted.

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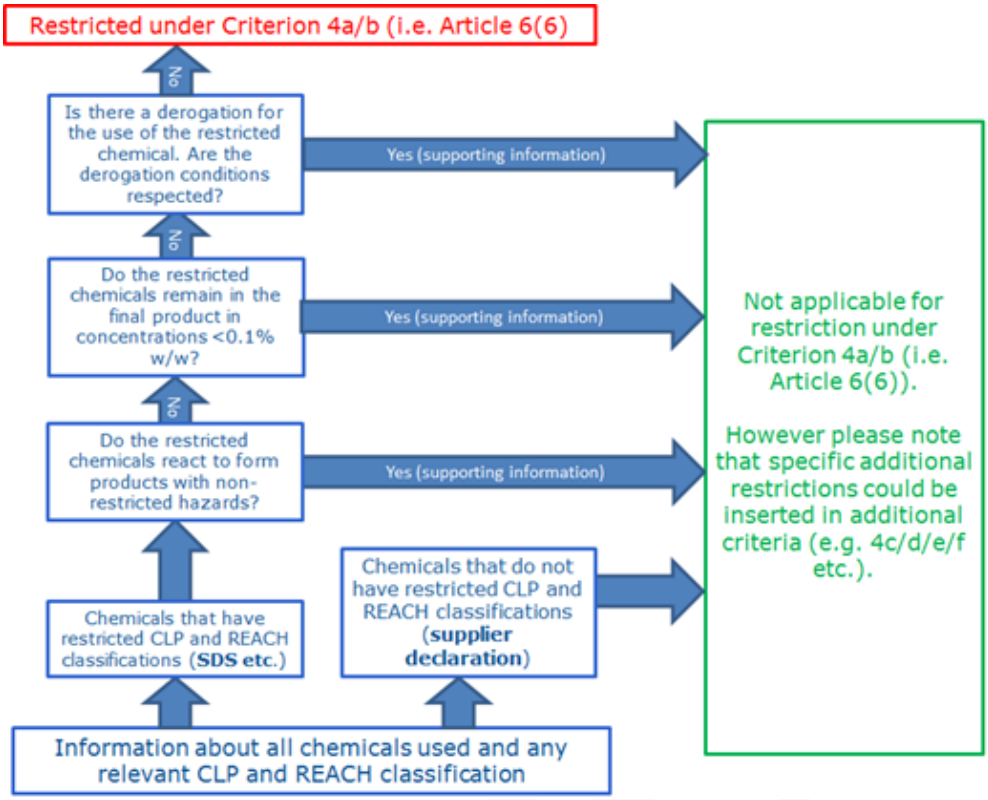

Figure 20. Illustration of the horizontal approach for hazardous substance and mixture criteria in EU Ecolabel paper products.

The general approach that should be followed for criterion 4b) is illustrated in Figure 20 above. The same approach applies for SVHCs but with the one difference that no derogations can be made for SVHCs.

The potential need to derogate for cationic polymers, de-foamers, cleaners, sizing agents, wet strength agents and dyes was raised. It was emphasised that justifications for the use of hazardous substances that may remain in the final product should be predominantly focussed on the environmental benefits that their use provides and any potential improved process efficiency, product quality or functionality compared to a situation when they are not used. Where relevant, the lack of any less hazardous alternatives on the market to achieve a similar function should be mentioned.

It is anticipated that most attention to potential derogations will need to be given to "*functional chemicals*" rather than "*process chemicals*". The main reason for this is that functional chemicals are deliberately intended to remain in the final product in order to impart some desirable function to the product. The most obvious examples of functional chemicals include: optical brightening agents, dyes, sizing agents and coatings.

There was confusion about what level of information about hazard classifications is being requested. Some stakeholders claimed that suppliers will not provide declarations that their chemical products do not contain any substances with the classifications listed in criterion 4b). JRC explained that the basis for all information should be a REACH compliant Safety Data Sheet (SDS). If a hazardous substance is present in a supplied mixture above a certain trigger concentration that is related to the hazards it presents, it must be listed on the SDS.

If the SDS of a mixture reveals no restricted hazardous substances, then there are no restrictions placed by criterion 4a) and 4b) on the use of that mixture.

When the SDS reveals the presence of restricted hazardous substances, its use has to be quantified by estimating the total quantity of the substance added and dividing this by the total production volume of the EU Ecolabelled product. This will provide a final product concentration that assumes that all the added substance remains in the final product and none of it reacts to form different products. This initial assumption can then be multiplied by factors that account for degrees of chemical reaction and any losses due to washing out of substances or so on.

It was added that the issue of Substances of Very High Concern has not been an issue with chemicals used in the pulp and paper industry. However, the continued need to screen process chemicals at the level of SDSs will be needed as the SVHC Candidate List is periodically updated.

5.4.1.3 Further research and main outcomes

From the feedback received from stakeholders, it was clear that detailed discussions about the use of functional chemicals in paper production will be needed in order to decide what derogations could potentially be justifiable.

The use of chemicals and additives in the pulp and paper industry has generally increased over the last 20 years as the understanding of the role that such chemicals can play in reducing operating costs, reducing environmental impacts and improving paper quality has improved. Broadly speaking, the types of chemicals used can be split into 3 groups:

- ***Commodity chemicals:*** chemicals that are traded in large quantities worldwide that are highly relevant to the pulp and paper industry. Examples include chlorine dioxide, hydrogen peroxide, sodium salts, sulfuric acid, china clay and calcium carbonate.
- ***Process chemicals:*** chemicals that are used to optimise process conditions, such as improving the runnability and speed of paper machines, reducing fouling and reducing steam consumption. Examples include retention aids, defoamers, fixative agents and biocides.
- ***Functional chemicals:*** chemicals that directly influence certain physical qualities of the paper such as strength, brightness or water repellency and which will affect the printability of the paper. Examples of functional chemicals include dyes, coating pigments, binders, wet strength agents and sizing additives.

Some chemicals carry out more than one function and there is no definite boundary between process chemicals and functional chemicals. However, in terms of scale, functional chemicals are much more significant than process chemicals (Bajpai, 2016).

Based on initial feedback, it is clear that further research will be needed to review the market for the following chemical groups:

- Sizing agents
- Binders, dry-strength and wet-strength agents
- Fillers and coating pigments
- Optical brighteners

Input from stakeholders would be to help compile a list of the commonly used functional chemicals in paper production and the associated hazard classifications.

One example is the consideration of coating pigments. It can be assumed that these chemicals do not react to form non-hazardous products during processing and that they do indeed (intentionally) remain in the final product. Some examples of commonly used pigments, together with possible hazard classifications that may appear in SDSs are included below.

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Table 36. Examples of hazard classifications of common coating pigments

Name (formula)	CAS Number	Classification entries in ECHA C&L inventory		
		Harmonised	**Joint**	**Individual**
Zinc Oxide (ZnO)	1314-13-2	H400 – Aquatic Acute 1 H410 – Aquatic Chronic 1	H400 – Aquatic Acute 1 H410 – Aquatic Chronic 1 H302: Acute Tox. 4 H332: Acute Tox. 4 H360: Repr. 1A H373: STOT RE 2	H400 – Aquatic Acute 1 H410 – Aquatic Chronic 1 H302: Acute Tox. 4 H332: Acute Tox. 4 H360: Repr. 1A H373: STOT RE 2 H315: Skin Irrit. 2 H319: Eye Irrit. 2 H335: STOT SE 3 H300: Acute Tox. 2 H330: Acute Tox. 2 H317: Skin Sens. 1 H318: Eye Dam. 1 H350: Carc. 1A H314: Skin Corr. 1B
Barium Sulfate (BaSO4)	7727-43-7	No harmonised classification	Joint entry says: Not classified	H302 – Acute Tox. 4 H332 – Acute Tox. 4 H371 – STOT SE 2 H319 – Eye Irrit. 2 H373 – STOT RE 2 H335 – STOT SE 3
Barium Carbonate (BaCO3)	513-77-9	H302 – Acute Tox. 4	H302 – Acute Tox. 4	H302: Acute Tox. 4 H332: Acute Tox. 4
Calcium Carbonate (CaCO3)	471-34-1, 7440-70-2	No harmonised classification	Joint entry says: Not classified	H315 – Skin Irrit.2 H318 – Eye Dam. 1 H319 – Eye Irrit. 2 H335 – STOT SE 3
Titanium Dioxide (TiO2)	13463-67-7	No harmonised classification	Joint entry says: Not classified	H351: Carc. 2 H332: Acute Tox. 4 H319: Eye Irrit.2 H335: STOT SE 3 H372: STOT RE 1 H350: Carc. 1B H302: Acute Tox. 4 H315: Skin Irrit. 2 H413: Aquatic Chronic 4 H336: STOT SE 3

The information provided above is listed on the ECHA Classification and Labelling inventory. The inventory registers all submissions that have been made to ECHA regarding the hazard classification of that particular substance. Initial submissions are normally made by individual producers with a relatively small data set. By sharing data and agreeing on conclusions, large numbers of producers and other interested parties using the substance in question can submit a joint submission. When the data is considered mature, comprehensive and conclusive enough, a harmonised classification can be made.

However, there is always the possibility that new toxicological data becomes available that would result in the substance being reclassified. One highly relevant example if this is the proposal made by France to reclassify Titanium Dioxide as a Cat. 2 carcinogen[23]. It appears that this proposal will be formally accepted by ECHA in late 2017 or early 2018[24].

Such reclassifications can have an impact on the interpretation of EU Ecolabel criteria (precisely criteria 4a and 4b here) that are linked to Articles 6(6) and 6(7).

[23] https://chemicalwatch.com/43791/france-proposes-carcinogen-1b-classification-for-titanium-dioxide
[24] https://echa.europa.eu/-/titanium-dioxide-proposed-to-be-classified-as-suspected-of-causing-cancer-when-inhaled

Consequently, it is important that the use of hazardous substances in the pulp and paper production process, especially focussing on functional chemicals intended to remain in the final product, are well researched.

Questions:

1. Do you think the EUH hazards should continue to be restricted? Are there any examples of these types of chemicals that may remain in the final paper product?

2. What are the main functional chemicals of concern that should be researched?

3. Would you be able to share information about the general market for functional chemicals in the paper industry?

4. Would you be able to share specific examples of Safety Data Sheets for functional chemicals used in paper production? (*In case of confidentiality concerns, the sole reason for this request would be to collate the different hazardous substances and their classifications only - there would be no need to mention supplier details*).

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5.4.2 Criteria proposal – specific hazardous substance restrictions

Proposed Criterion 4c): Chlorine
(For copying and graphic paper and newsprint paper): Chlorine gas shall not be used as a bleaching agent. This requirement does not apply to chlorine gas related to the production and use of chlorine dioxide. **Assessment and verification:** The applicant shall provide a declaration from the pulp producer(s) that chlorine gas has not been used as a bleaching agent. Note: while this requirement also applies to the bleaching of recycled fibres, it is accepted that the fibres in their previous life-cycle may have been bleached with chlorine gas.
Proposed Criterion 4d) APEOs
(For copying and graphic paper and newsprint paper): Alkylphenol ethoxylates or other alkylphenol derivatives shall not be added to cleaning chemicals, de-inking chemicals, foam inhibitors, dispersants or coatings. Alkylphenol derivatives are defined as substances that upon degradation produce alkyl phenols. **Assessment and verification:** The applicant shall provide a declaration(s) from their chemical supplier(s) that alkylphenol ethoxylates or other alkylphenol derivatives have not been added to these products.
Criterion 4e) Acrylamide
(For copying and graphic paper and newsprint paper): Acrylamide shall not be present in coatings, retention aids, strengtheners, water repellents or chemicals used in internal and external water treatment in concentrations higher than 700 ppm (calculated on the basis of their active solid content). The competent body may exempt the applicant from these requirements in relation to chemicals used in external water treatment. **Assessment and verification:** The applicant shall provide a declaration of compliance with this criterion, together with appropriate documentation (such as Safety Data Sheets).
Criterion 4f) Surfactants
(For copying and graphic paper and newsprint paper): All surfactants used in deinking processes shall demonstrate ready or inherent ultimate biodegradability (see test methods and pass levels below). The only exception to this requirement shall be the use of surfactants based on silicone derivatives upon the condition that paper sludge from the deinking process is incinerated. **Assessment and verification:** The applicant shall provide a declaration of compliance with this criterion together with the relevant safety data sheets or test reports for each surfactant which shall indicate the test method, threshold and conclusion stated, using one of the following test method and pass levels: • For ready biodegradability: OECD No 301 A-F (or equivalent ISO standards) with a percentage degradation (including absorption) within 28 days of at least 70% for 301 A and E, and of at least 60% for 301 B, C, D and F. • For inherent ultimate biodegradability: OECD 302 A-C (or equivalent ISO standards), with a percentage degradation (including adsorption) within 28 days of at least 70 % for 302 A and B, and of at least 60 % for 302 C. In cases where silicone-based surfactants are used, the applicant shall provide a Safety Data Sheet for the chemicals used and a declaration that paper sludge from the deinking process is incinerated, including details of the incineration plant or plants.
Criterion 4g) Biocidal product restrictions for slime control
The active substances in biocidal products used to counter slime-forming organisms in circulation water systems containing fibres shall have been approved, or be under examination pending a decision on approval, under Regulation (EU) No

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528/2012 and shall not be potentially bio-accumulative.

For the purposes of this criterion, the potential to bio-accumulate shall be characterised by log Kow (log octanol/water partition coefficient) > 3,0 or an experimentally determined bioconcentration factor (BCF) > 100.

Assessment and verification:

The applicant shall provide a declaration of compliance with this criterion together with the relevant material safety data sheet or test report which shall indicate the test method, threshold and conclusion reached, using the following test methods: OECD 107, 117 or 305 A-E.

Criterion 4h)Azo dye restrictions

(For copying and graphic paper and newsprint paper):

None of the aromatic amines listed in Directive 2002/61/EC shall be used during the paper production process and the use of other dyes that may cleave to form these aromatic amines during processing shall be avoided. (See Appendix II for a full list of banned aromatic amines and an indicative list of dyes that may cleave during processing to form these restricted aromatic amines).

If any of the dyes listed in Appendix II that may cleave to form the restricted aromatic amines during processing are used, testing of the dyed paper product shall be required.

Assessment and verification:

The applicant shall provide a declaration of non-use of dyes or of compliance with the requirements of this criterion, supported by safety data sheets or other relevant documentation from chemical suppliers.

In cases where testing is required, test reports from an accredited laboratory shall be provided showing the non-detection of the restricted aromatic amines listed in Appendix II according to extraction tests based on the methods provided in EN 645, EN 647, EN 15519 or equivalent standards.

Criterion 4i) Metal complex dye stuffs or pigments

(For copying and graphic paper and newsprint paper):

Dyes or pigments based on: aluminium, silver, arsenic, barium, cadmium, cobalt, chromium, copper, mercury, manganese, nickel, lead, selenium, antimony, tin or zinc shall not be used.

The restriction for copper shall be exempted in the case of copper phthalocyanine. The restriction of aluminium is not intended to apply to aluminosilicates.

Assessment and verification:

The applicant shall provide a declaration of compliance with the requirements of this criterion, supported by safety data sheets or other relevant documentation from chemical suppliers.

Criterion 4j) Ionic impurities in dye stuffs

(For copying and graphic paper and newsprint paper):

The levels of ionic impurities in the dyestuffs used shall not exceed the following: Silver 100 ppm; Arsenic 50 ppm; Barium 100 ppm; Cadmium 20 ppm; Cobalt 500 ppm; Chromium 100 ppm; Copper 250 ppm; Fe 2,500 ppm; Mercury 4 ppm; Manganese 1,000 ppm; Nickel 200 ppm; Lead 100 ppm; Selenium 20 ppm; Antimony 50 ppm; Tin 250 ppm; Zinc 1,500 ppm.

The restriction for copper impurities shall not apply to dye stuffs based on copper phthalocyanine.

Assessment and verification:

The applicant shall provide a declaration of compliance with the requirements of this criterion, supported by safety data sheets or other relevant documentation from chemical suppliers.

5.4.2.1 Summary of the primary proposal

The same criteria that were presented in the TR 1.0 for Newsprint Paper and Copying and Graphic Paper have been presented here with only minor changes, which can be summarised as:

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- Specific mention of "*active solid content*" instead of "*solid content*" when calculating the concentration of acrylamide residues in polyacrylamide.
- The scope of surfactant restrictions has been narrowed back down to deinking chemicals only and will remain so unless stakeholders will be able to present evidence justifying the expansion of the scope. A conditional allowance has been made for silicone-derivative based surfactants too, mirroring the Nordic approach.
- It has been clarified that the biocidal product restrictions only apply to slime control agents. Biocidal products are not expected to be used anywhere else in the day to day process.
- The criteria for dyes, dyestuffs and pigments have been split up again into three, reflecting its original structure. Specific reference to the restricted azo dyes has now been included in Appendix II and also to non-restricted dyes that may cleave during processing to for these restricted dyes. Some testing conditions have been provided in cases when these latter dyes are used. Some minor clarifications have been added in the 2nd and 3rd parts.

5.4.2.2 Outcomes from 1st AHWG meeting

Chlorine

No changes had been proposed to the criterion that bans bleaching with chlorine gas but does not ban the use of chlorine dioxide. It was requested that the possible restriction of chlorine gas based on the manufacturing process used to make it be considered.

Stakeholders mentioned that ECF bleaching (which will use chlorine dioxide as a bleaching agent instead of chlorine gas) has improved a lot in recent years and that ambitious limits on AOX are an acceptable means of restricting the use of chlorine-based bleaching agents. A limit of 0.15 kg/ADt of ECF pulp was suggested by one stakeholder although this issue has been discussed at length with the emissions sub-group and the reader is referred to section 5.1.2 for rationale regarding the proposed AOX emission limits in criterion 1b). Overall, there were no objections to the proposed criterion for chlorine.

APEOs

No comments were received or objections raised regarding the proposed criterion for alkylphenol ethoxylates (APEOs). As a consequence, no further research has been carried out.

Acrylamide

Stakeholders overwhelmingly supported the removal of the restriction of residual monomers present in coatings, retention aids, strengthening agents, water repellents or chemicals used in internal and external water treatment at levels exceeding 100ppm. The main reasons for this were cited as a lack of clarity about how this could be possibly verified and the disproportionate level of restriction compared to other hazardous substance criteria. One stakeholder claimed that this approach was being successfully implemented in the Nordic ecolabel for paper. However, stakeholders representing Nordic countries that had actually awarded licences for the Newsprint Paper and Copying and Graphic Paper product groups were happy to remove the residual monomer requirement.

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Split opinions were expressed regarding the issue of residual acrylamide in coatings, retention aids, strengtheners, water repellents or chemicals used in internal and external water treatment. Some stakeholders wanted the proposed 700ppm limit to remain, others wanted it raised to 1000ppm and others felt that there was no reason to single out acrylamide, considering the horizontal criteria 4a) and 4b) as sufficient.

Surfactants

After proposing to extend the minimum biodegradability requirement to all surfactants used in pulp and paper production (instead of just those used during deinking processes) the industry expressed doubts about this – requesting time to take a closer look at the actual situation in these other, non-deinking processes. Only if the use of surfactants is significant in other parts of the process would a broader application of the restriction be justifiable.

Other comments received suggested that anaerobic biodegradability should also be specified and there was some apparent confusion about what is meant exactly by the term "*inherent ultimate biodegradability*" – which is not to be confused with the less stringent "*inherent primary biodegradability*".

One point that was raised was a potential alignment with the Nordic criteria for surfactants, which include an exemption for silicone-based surfactants although supporting arguments would need to be expanded up.

Biocidal products

Stakeholders were supportive of a specific reference to the Biocidal Products Regulation (EC) No 528/2012 but also that it must be clear that the substances should "*be approved or currently be under evaluation*". The need for this added part is due to the fact that there is a backlog with updating the previously approved biocidal active substances under the Biocidal Product Directive 98/8/EC.

Dyes, dyestuffs and pigments

In response to a question about the importance of phthalates in dye, dyestuff an pigment formulations, one industry stakeholder clarified that no low molecular weight phthalates were used (e.g. DBP, DIBP, BBP and DEHP) due to the fact that no authorisation requests have been received prior to the sunset date for these substances in February 2015. For high molecular weight phthalates, the situation is less clear because these substances do not yet have harmonised classifications and their use to date only needs to be reported in toys and childcare articles.

There was a perceived need for clarity regarding the definition of terms such as "dye", "dyestuff" and "ink".

It was confirmed that the REACH restricted azo dyes are not used by the paper industry and that the restriction is not so relevant. This could be considered to already be controlled by criteria 4a) and 4b). Another option would be to restrict the use of those azo dyes that are known to be able to cleave into the restricted aromatic amines. Otherwise, it would be necessary to test for these amines in the paper product – for example using the methodology that one stakeholder was familiar with (EN 645, EN 647 and EN 15518) where water extracts are analysed by HPLC-MS.

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In the TR 1.0, the three separate requirements for dyes, for dyestuffs and for pigments had been grouped together into a single criterion with three parts (instead of 3 criteria each with one part). This was not accepted by a highly relevant industry stakeholder who claimed that the members of their association would potentially be confused by this change. Consequently the criterion will once again be split into three parts.

The exemption that applies for Copper Phthalocyanine when looking at metal complexes in dyestuffs or pigments must also be repeated in the next sub-criterion that looks at ionic impurities in dye stuffs.

Another request for clarification was to ensure that aluminium restrictions are not intended to be applied to aluminosilicates, such as natural kaolin clay.

5.4.2.3 Further research and main changes

Chlorine

Even though the use of chlorine gas as a bleaching agent is banned by the EU Ecolabel criteria, it can still be used onsite to manufacture the less stable but lower environmental impact chlorine dioxide bleaching agent in situ. Some stakeholders were interested in the EU Ecolabel criteria requiring that any chlorine gas used in the process, even if only used to manufacture Chlorine Dioxide at the mill site.

The manufacturing method for chlorine gas is one further step away from the applicant and it is uncertain if it would be realistic to implement this requirement. Nonetheless, the subject has been investigated here.

There are three main methods to produce chlorine:

- *the diaphragm process*, where a nearly saturated brine solution enters an electrolytic cell separated by a diaphragm, resulting in the production of chlorine gas, hydrogen gas and a cell liquor of 10-12% sodium hydroxide and 16% sodium chloride.
- *the membrane process*, where ultra-pure brine is fed to the anode of an electrolytic cell, producing chlorine gas and selectively letting water and cations(i.e. sodium ions) pass through the membrane to the cathode, where hydrogen gas and 30-35% sodium hydroxide i(with <100ppm chloride impurity) s produced.
- *the mercury process*, where brine is fed into an electrolytic cell where mercury acts as a liquid cathode along the bottom of the cell and anodes are suspended a few millimetres above. Chlorine gas is generated at the anode and sodium dissolves in the mercury, forming an amalgam that, once treated with deionised water, will produce a 50% sodium hydroxide solution and a mercury metal that can be recirculated.

The market share of chlorine production capacity using the mercury process has been gradually decreasing due to regulatory pressure both at the EU level and, via the UNEP Mercury Global Partnership, at the global level.

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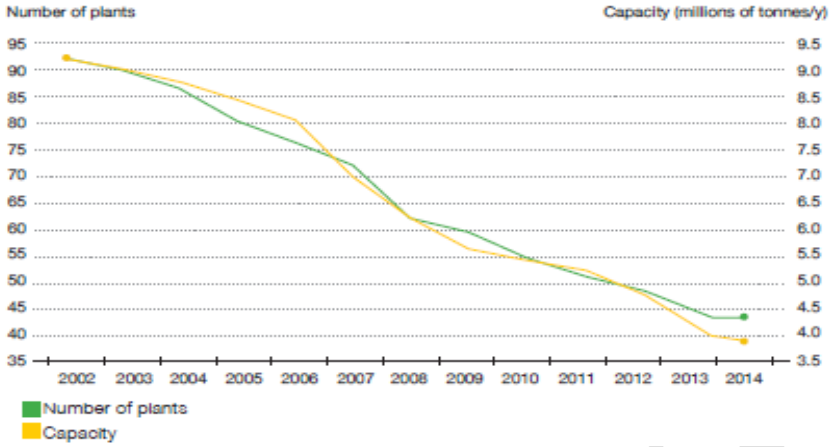

Figure 21. Number of plants and capacity of mercury electrolysis units in USA, Canada, Mexico, Europe, Russia, India, Brazil, Argentina and Uruguay.

According to Figure 21. Number of plants and capacity of mercury electrolysis units in USA, Canada, Mexico, Europe, Russia, India, Brazil, Argentina and Uruguay., during the years 2002 to 2014, both the number of mercury process plants and their production capacity has decreased by more than 50%. Perhaps, importantly, the data did not include China, which is the single largest producer of chlorine in terms of installed capacity.

Nonetheless, it has been estimated that less than 5% of global chlorine production capacity is based on the mercury process and that the pulp and paper industry accounts for around 5% of total chlorine consumption (CEPS, 2014).

Focussing on Europe, as of the beginning of 2016, around 20% of the chlor-alkali plants were based on the Mercury process (with 64% being due to the membrane process and around 14% due to the diaphragm process)[25].

Following the publication of the BAT conclusions for the chlor-alkali industry (Decision 2010/732/EU) it will no longer be permitted to use the mercury process in the EU as of December 2017. This would reduce the total share of mercury-based global production to less than 2%, assuming that no other mercury-based process units were closed down outside of Europe.

Based on the above considerations, it is uncertain what additional benefit the banning of using chlorine produced using the mercury process would have on current practice in the chlor-alkali industry.

Acrylamide

Stakeholders representing the chemicals industry were requested to provide evidence of the net environmental benefits of using polyacrylamide in the pulp and paper industry as well as considerations of the environmental fate of residual acrylamide – for example does it remain in the final product or end up in wastewater effluent or wastewater sludge.

[25] Chlor-Alkali Industry Review 2015-2016. Accessed online, July 2017.

Using polyacrylamides in the paper machine allows for higher production rates and capacities due to improved machine speeds and wire widths. This is possible specifically due to the following polyacrylamide-induced effects:

- Increased retention of paper pulp on the paper machine, reducing the waste of fillers, fibres and other additives and increasing paper quality.
- Improved wet and dry strength.
- Improved drainage of water, resulting in significant reductions in drying energy requirements.

Concerns about occupational exposure in the paper mill can be minimised by using water in oil emulsions that are automatically dosed and prevent any contact with the chemical. In the worst case scenario, assuming the use of one 700kg super sack of granular polyacrylamide, exposure time is less than 10 minutes and there is practically no respirable dust if deliveries are emptied by vacuum in an enclosed environment. Up to 1000ppm of acrylamide impurities are permitted in polyacrylamide used to make food contact paper materials[26].

In terms of environmental fate, testing of paper products carried out as part of the BfR 36th Recommendation and FDA Regulation 2 CFR 176.170 found that acrylamide was not detectable (detection limit of 0.5ppb). Any residual acrylamide that makes it to white water will be susceptible to reaction with oxidants and sulfites. It is considered as a readily biodegradable substance and therefore unlikely to pass through any wastewater treatment plant with secondary biological treatment.

Surfactants

The results of the industry cross-check about the scale of use of surfactants in other pulp and paper processes will be provided in this section when ready.

One proposal was made to permit the use of silicones as surfactants despite the fact that they are less biodegradable than the fatty acids and soaps that have traditionally been used in deinking.

The main argument in favour of silicones is that they are more efficient and can be used in total quantities that are 15-20 times lower that fatty acids to provide a given effect. However, due to their poorer biodegradability, their use should only be permitted in cases where the resulting paper sludge is incinerated.

Biocidal products

Update on progress with the transition from Biocidal Products Directive to the Biocidal Products Regulation to be included here…

[26] According to both the German BfR (Bundesinstitut fur Risikobewertung) and the US FDA.

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5.5 Criterion 5: Waste Management

No further changes are proposed

Proposed criteria
All pulp and paper production sites shall demonstrate to have a system for handling of waste arising from the production of the licensed product. The application should provide a comprehensive waste minimisation and management plan that details the system and includes information on the following points: • Procedures for waste prevention; • Procedures for waste separation, reuse and recycling; • Procedures for the safe handling of hazardous waste; • Continuous improvement objectives and targets. **Assessment and verification:** the applicant shall provide a waste minimisation and management plan for each of the sites concerned and a declaration of compliance with the criterion. The declaration should inform about the amount of waste generated per each class/category.

5.5.1. Summary of the proposal

Waste Framework Directive (2008/98/EC) provides guidance in planning implementation of a comprehensive waste management scheme. The majority of residues generated during pulp and paper process could be reused, recycled or recovered. Stakeholders were inquired about the feasibility of quantitative requirements for the waste dispose was further discussed with stakeholders.

The BAT 12 specifies (Commission Implementing Decision 2014/687/EU) ways in which solid waste could be minimised by using additional processes and/or making them available to other industries (Table 37).

Table 37: Waste Management BAT (JRC, 2015)

Technique	Description
Pre-treatment of process residues before reuse or recycling	*Pre-treatment comprises techniques such as:* • dewatering e.g. of sludge, bark or rejects and in some cases drying to enhance reusability before utilisation (e.g. increase calorific value before incineration); or • dewatering to reduce weight and volume for transport. For dewatering belt presses, screw presses, decanter centrifuges or chamber filter presses are used; • crushing/shredding of rejects e.g. from RCF processes and removal of metallic parts, to enhance combustion characteristics before incineration; • biological stabilisation before dewatering, in case agricultural utilisation is foreseen
Material recovery and recycling of process residues on site	*Processes for material recovery comprise techniques such as:* • separation of fibres from water streams and recirculation into feed stock; • recovery of chemical additives, coating pigments, etc.; • recovery of cooking chemicals by means of recovery boilers, causticising, etc.

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Energy recovery on- or off-site from wastes with high organic content	Residues from debarking, chipping, screening etc. like bark, fibre sludge or other mainly organic residues are burnt due to their calorific value in incinerators or biomass power plants for energy recovery
External material utilisation	*Material utilisation of suitable waste from pulp and paper production can be done in other industrial sectors, e.g. by:* • firing in the kilns or mixing with feedstock in cement, ceramics or bricks production (includes also energy recovery); • composting paper sludge or land spreading suitable waste fractions in agriculture; • use of inorganic waste fractions (sand, stones, grits, ashes, lime) for construction, such as paving, roads, covering layers etc. The suitability of waste fractions for off-site utilisation is determined by the composition of the waste (e.g. inorganic/mineral content) and the evidence that the foreseen recycling operation does not cause harm to the environment or health
Pre-treatment of waste fraction before disposal	Pre-treatment of waste before disposal comprises measures(dewatering, drying etc.) reducing the weight and volume for transport or disposal

5.5.2. Outcomes from and after the 1st AHWG meeting

Generally stakeholders were not in favour of setting a limit on maximum amount of waste disposal. It was observed that the limit would be difficult to administer as the legal definition of waste as well as the availability of disposal and recovery facilities varies depending on the country/region in question. Moreover, one of the main drivers for waste production is wastewater treatment, and a limit on waste generation is therefore in conflict with the need for waste water treatment. Another stakeholder commented that the waste management in the paper industry is already comprehensive due to other criteria, and an additional limit on waste generation will not be beneficial. For example, it was suggested that an environmental management system (EMS) or an ISO standard could be used achieve the same environmental improvements instead of a criterion on waste minimisation, and it would be easier for the CBs to assess and verify. In support of this, one stakeholder suggested that it would be sufficient to implement an on-site waste management system with evidence of continuous improvement but without any limit value.

In regards to setting a higher limit for RCF pulp production, it was noted that integrated RCF mills normally produce more waste that has to be disposed of outside the mill (e.g. deinking sludge, non-fibrous materials, metal, sand, etc.). It was also suggested that residues from production should be recycled as much as possible, which requires thorough separation and usage of non-toxic print. Also, waste streams sent to incineration or agricultural use should be minimized.

5.5.3. Rationale for the revised proposal

There is limited data availability to assess the total amount of waste generated at pulp and paper mills. Most pulp and paper mills already implemented internal rejects handling procedures. In accordance with the Waste Framework Directive (2008/98/EC) term re-use refers only to products or components that are not waste. For example, mill brokes are directly recirculated into the process being considered as fully valuable substrate; on-site incinerated bark residues and sludge remains in form of ashes, etc. Often the flow of internally treated material is not registered quantitatively, and this is one of the reasons of limited data availability to assess the total amount of waste generated at pulp and paper mills (including process rejects, and on – site treatment).

A waste management system is a valuable tool that ensures control over the material flow, and drives to waste prevention, and preparing for reuse, recovery, recycling, and safe disposal.

Key prevention activities are highlighted as;

- minimising the amount of fibre rejects having to be removed from the process;
- suitable handling and recovery to avoid having to discard coating chemicals;
- using good quality make-up chemicals to reduce the amount of material having to be bled out from a kraft or sulphite recovery system; and
- preventing fibre losses and fibre rejects from entering the effluent.

Some of the recovery options for paper mill residues are as follows;

- **Industrial** - bricks, cement, roads, mining, iron and steel;
- **Agricultural** – land spreading; and
- **Composting.**

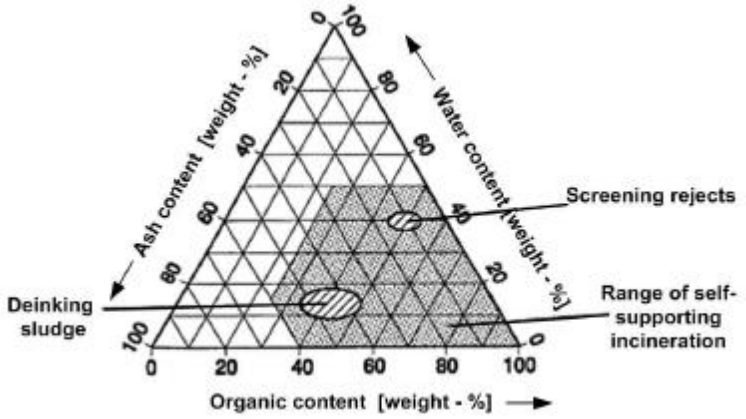

Figure 22. Fuel triangle for waste and residues from the paper industry (JRC, 2015)

As demonstrated in Figure 22 incineration can be self-supporting (with no additional energy input) for high calorific value rejects and deinking sludge with a high ash content. Effluent sludge can also be incinerated, but unless it has been dried to >40% dry solids, the net energy production may be negative.

Table 38. Example Solid Waste from European Paper Mills

Plant	Ortviken, Sweden (SCA, 2016)	Skogn, Norway (Norske Skog, 2015)	Golbey, France (Norske Skog, 2015)	Saugbrugs, Norway (Norske Skog, 2015)	Hylte, Sweden (Stora Enso, 2015b)	Nymolla, Swededn (Stora Enso, 2013)	Chapelle Darblay, France (UPM, 2014b)
Pulp Process	Integrated thermos-mechanical	Mechanical pulp, DNP	Mechanical pulp, recovered fibre	Mechanical pulp	De-inked pulp	Integrated sulphite	De-inked pulp
Paper Type	Newsprint, LWC	Newsprint	Newsprint	Super Calendared	Newspaper	Copy Paper	Newspaper
Production (ktons)	843	450	537	429	480	429	380
Solid Waste to landfill (kg/t)	0.7	16.85	2.4	19.56	82.9	0.31	20

Example data on generation of waste from a few of the larger European pulp and paper mills, namely UPM, SCA, Norske Skog, Stora Enso, are presented in Table 38. These figures show the vast differences, often up to ten times, even between mills that use the same pulp process.

One of the limiting factors to implement a comprehensive waste management strategy within pulp and paper mill is the availability of possible routes for waste treatment either internally or externally. Although it is possible to achieve a zero waste to landfill target, this requires access to end markets which should be developed over time and will vary depending on local infrastructure and demand. Therefore no specific waste treatment routes are required under revised criterion proposal. The wording of the criterion was adapted to reflect the main objective which is to ensure the implementation of a long-term waste management strategy.

Further research and main changes

The feedback received suggested **not to strengthen the requirement** with an introduction of quantitative threshold for waste. For recycled fibre, the resulting waste during the process of stock preparation of recycled fibres is mainly depending on the waste paper grades and the contamination. The rejects in integrated RCF-mills is normally waste, that has to be deposed outside the mill (deinking sludge, non-fibrous materials (plastic, metal, sand). The amount varies depending on the used grade of waste paper. It was considered that the implementation of a waste management system would be sufficient. **No further changes are proposed** to Criterion 5.

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5.6 Criterion 6: Fitness for use

No further changes are proposed for Copying and graphic paper as well as for Newsprint papers.

Proposed Criteria
The product shall be suitable for its purpose. *Requirements for tissue paper will be discussed in a dedicated webinar*
Assessment and verification: The applicant shall provide appropriate documentation demonstrating compliance with the scope of the criteria. The product shall fulfil the requirements for permanence in accordance with applicable standards. The user manual will provide the list of norms and standards which shall be used for the permanence assessment. As alternative to the use of the above methods, the producers shall guarantee the fitness for use of their products providing appropriate documentation demonstrating the paper quality, in accordance with the standard EN ISO/IEC 17050-1:2004, which provides general criteria for suppliers' declaration of conformity with normative documents.

5.6.1. Rationales for the revised proposal

Paper products are subject to a series of technical requirements that vary as a function of their intended purpose and quality level. A few of the main technical/quality features are described below:

- Paper surface: A quality parameter which affects subsequent performance characteristics. Each paper is double-sided, i.e. the side which during production was in contact with the wire is called the wire side (bottom side). This side also bears the wire mark and is slightly more uneven. In the case of coloured papers, this side tends to be darker as pigments are deposited on the bottom. The upper side is called the felt side or the right side, as it is the first to come into contact with the felt. It is smoother and generally brighter as fibres can be freely arranged on this side. It also contains more fillers.
- Surface smoothness (roughness) - both obtained in the machine and during glazing – a parameter that is relevant is for printing quality. The roughness of paper or board is assessed by measuring the flow of air which passes between the edge of a measuring head and the surface of the material under specified conditions
- Clarity, opacity, and transparency: Clarity indicates if the paper is coarsely ground or finely ground. Opacity is related to paper thickness and for a given thickness, a high filler content has a direct effect on this characteristic. Transparency is an undesirable characteristic for many paper qualities, with the notable exception of tracing paper or paper for detailed drawings.
- Sizing is especially important for writing and drawing papers, but also for other paper grades. The role of paper sizing is to bind fibres and filling agents. It must be uniform and dosed so that when ink or drawing ink is applied, the lines are clean and there is no bleed. Insufficient, poor sizing can be recognized by visible jagged lines often bleeding through to other side of paper or by picking (loose fibres on the paper surface).
- Strength: Mechanical properties of paper are defined by a series of parameters such as: breaking length, tensile strength, elongation, tearing index, folding resistance and stiffness.
- Grammage and thickness: Grammage is defined as the weight per square meter and expressed in gsm (g/m^2). Paper thickness, measured in microns, defines if the paper is a compact paper with a lot of fillers or a high volume paper.

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- Ageing of paper (yellowing): Resistance to ageing of different paper grades depends primarily on the quality of raw materials. In the case of products with a short life cycle, such as newsprint, packaging etc., this property is not very important.
- Brightness: Measures the visual parameters of a paper sheet: the amount of reflectance of a specific wavelength of blue light. Paper brightness affects the images printed on the paper, especially the vibrancy of the colours.

Paper products are essentially single use in nature. Paper quality requirements are directly related to the final product fitness for use requirements. It is therefore very complex to fix any common set of technical requirements in EU Ecolabel criteria that in the market reality are dynamic, reflecting the multiple different uses for paper products and related consumer expectations that is currently the case.

Considering the existing markets for Copying and Graphic Paper and for Newsprint Paper and the standard practice that is already prevalent in them, it is considered of little added value to specify fitness for use requirements in EU Ecolabel criteria.

Tissue Paper is a different case because there is a hygiene issue which can result in some products being treated with biocidal products to impart a final disinfective effect to the product. In order to avoid this occurring in EU Ecolabel Tissue Paper, there is a requirement for testing of the Tissue Product in accordance with EN 1104.

Again with Tissue Paper, there is a risk exposure issue for dyes and optical brighteners (where these are used) when paper is used in applications where it will come into contact with food. For this reason, compliance with EN 646/648 is required.

It should be noted that these requirements for Tissue Paper were already set out in the existing criteria but have simply been moved to a different criterion.

5.6.2. Outcomes from and after the 1st AHWG meeting

Stakeholders in general opposed the inclusion of EN 12281 and EN 12858 standards in the criterion on fitness for use, being perceived as of minor relevance. Additionally, a large number of paper types that can be Ecolabelled under copying and graphic papers are currently not covered by the scope of the standards (e.g. coated papers, offset papers, preprint papers, inkjet papers, etc.). It was commented that a clear distinction should be made between the "product definition and characteristics" and "fitness for use". The assessment of "fitness for use" and the quality of the product varies from one market to other, and the quality and fitness for use of paper would be controlled by the consumer and therefore the market itself. A stakeholder noted that this can be assessed independently of the specific technical specifications of a product (e.g. strength, absorption, etc.).

Some stakeholders agreed that EN 646, 648 and 1104 can be considered under this criterion, but these should be clearly marked as "safe use requirement" criterion under the "fitness for use" criterion. However, another stakeholder argued that EN 646/648 are only applicable to papers that could have food and skin contact, and should not be included in this criterion, as these would already be covered by other specific food and safety regulations outside the EU Ecolabel.

One stakeholder commented that, almost all paper producers have internal procedures to manage complaints regarding their products under their ISO 9001 Quality Management System, which can substitute the requirements of this criterion, or be used as the assessment and verification mechanism.

Further research and main changes

ISO/IEC 17050-1:2004 specifies general requirements for a supplier's declaration of conformity in cases where it is desirable, or necessary, that conformity of an object to the specified requirements be attested, irrespective of the sector involved.

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A large number of type of papers that can be submitted to the Ecolabel decision for copy and graphic papers that are not covered by the scope of the standards EN 12281 and EN 1285 i.e coated papers, lightweight coated papers, offset papers, preprint papers, inkjet papers. The assessment of "fitness for use" and common quality of the product differs along markets. Fitness for use is definitely not linked with specific technical criteria (strength, absorption…) but with market conditions, regulated by specific quality specifications (internal) and/or by general technical specifications which are the core of the contract between producers and distributors. The verification for this criterion is made by controlling the compliance to internal quality controls, to external (tender/technical/…) specifications, and checking the grounds for claim.

A paper that is not fit to be used will not be chosen by consumers and anticipating product applications that might not occur is not feasible. Moreover almost all paper producers have internal procedures to manage the complaints on their products under their ISO 9001 Quality Management System.

Following stakeholder's feedback there is no further specification needed. It is therefore **proposed to maintain the current criterion**.

Fitness for use requirements for tissue product will be addressed during a separated webinar.

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5.7 Criterion 7: Information on the packaging (Copying and graphic paper/Newsprint Paper only)

Proposed Criteria
The following information shall appear on the product packaging: 'Please print double sided" (applicable for paper for office printing purposes) "Please collect used paper for recycling" ***Assessment and verification:*** the applicant shall provide a sample of the product packaging bearing the information required.

Rationales for the revised proposal

The consumers should be encouraged to follow the waste hierarchy and to maximise the benefits of paper recycling.

Outcomes from and after the 1st AHWG meeting

Most of the stakeholders were not in favour of any change in the existing criterion. It was argued that the proposed text is too long and there is no space for the text in the packaging as the packaging features on average 7 languages; sometimes up to 13 languages. For this reason the optional text 'Please print double sided" is proposed for graphic paper designated for office printing purposes.

It was also argued that the language of the English text needs to be simple enough for non-English speakers to understand, as this message is often not translated into other languages.

5.8 Criterion 8: Information appearing on the EU Ecolabel (Copying and graphic paper/Newsprint Paper)

Proposed Criteria
The optional label with text box shall contain the following text: — Low air and water pollution, — Uses sustainable fibres, — Low greenhouse gas emissions and energy use, — Hazardous substances restricted', — Contains xy% of recycled fibre (if applicable). The guidelines for the use of the optional label with the text box can be found in the Guidelines for use of the Ecolabel logo on the website: http://ec.europa.eu/environment/ecolabel/promo/pdf/logo%20guidelines.pdf ***Assessment and verification:*** the applicant shall provide a sample of the product packaging showing the label, together with a declaration of compliance with this criterion.

Rationales for the revised proposal

The rationale is that this provides a more accurate reflection of the key issues addressed in line with the extended range of technical criteria proposed.

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Outcomes from and after the 1st AHWG meeting

The stakeholders were generally not in favour of the proposed changes, and wanted the criteria to remain optional, mainly due to the space constraints in the product packaging. One stakeholder remarked that licence holders rarely use the text-box to provide this information. It was suggested that for readability and credibility, a maximum of 2 to 3 general claims could be provided. The purpose of this information should be to highlight the specific environmental performance of the Ecolabelled product, rather than to provide a list of what the product can generally achieve.

Regarding the choice of which of the three statements to keep, one stakeholder suggested the following statements:

- Uses sustainable fibres;
- Low greenhouse gas emissions and energy use; and
- Reduced use of hazardous substances.

Furthermore, to distinguish EU Ecolabel products from the other products on the market, it could be indicated that banned or limited substances have been excluded/reduced.
It was also commented that the statement indicating the minimum percentage of recycled fibres and certified fibres is not feasible, as the proposed statement would not be in accordance with the FSC and PEFC certifications standards when the products are also PEFC/FSC certified, because they measure slightly different criteria. Moreover, for the non-certified products, consumers might misinterpret the statement as a forest certification claim.

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6 Proposed criteria areas

6.1 Water consumption control

Considering the current status of other ecolabel schemes, it appears that any minimum requirement relating to water consumption would be ambitious while a full water footprint calculation including the forestry stage would present many challenges.

A reasonable intermediate level of ambition is to refer to the BREF approach, which simply focuses on process water requirements and wastewater flow rates and provides a range of BAT-AELs for annual average wastewater production for different pulp production processes.

It is considered more straightforward to target water consumption rather than wastewater emission because it tends to be directly metered, captures water used for cooling and is not subject to significant influence by variable factors such as storm events increasing flows from site impermeable areas into the WWTP and variable water contents of sludge removed from the WWTP.

In this initial proposal, no actual minimum benchmark is set for water consumption, although this could be set in future EU Ecolabel criteria revisions, based on data that has been collected from applicants by Competent Bodies during the next 4-5 years.

A reasonable intermediate level of ambition is to refer to the BREF approach, which simply focuses on process water requirements and wastewater flow rates and provides a range of BAT-AELs for annual average wastewater production for different pulp production processes.

Table 39: BAT waste water flows at the point of discharge after waste water treatment as yearly averages

Sector	BAT-associated waste water flow
Bleached kraft pulp	25 – 50 m3/ADt
Unbleached kraft pulp	15 – 40 m3/ADt
Bleached sulphite paper grade pulp	25 – 50 m3/ADt
Magnefite pulp	45 – 70 m3/ADt
Dissolving pulp	40 – 60 m3/ADt
NSSC pulp	11 – 20 m3/ADt
Mechanical	9 – 16 m3/ADt
CTMP and CMP	9 – 16 m3/ADt
RCF paper mills without deinking	1.5 – 10 m3/t (the higher end of the range is associated with mainly folding boxboard production)
RCF paper mills with deinking	8 – 15 m3/t
RCF-based tissue paper mills with deinking	10 – 25 m3/t
Non-integrated paper mills	3.5 – 20 m3/t

It is considered more straightforward to target water consumption rather than wastewater emission because it tends to be directly metered, captures water used for cooling and is not subject to significant influence by variable factors such as storm events increasing flows from site impermeable areas into the WWTP and variable water contents of sludge removed from the WWTP.

6.1.1. Outcomes from and after the 1st AHWG meeting

Although a couple of stakeholders were in favour of the newly proposed criterion on water minimisation, many others disagreed with its inclusion, mainly on the grounds that water use will largely depend on the local/regional water cost and availability, and it is not an environmental hotspot as determined by the LCA studies.

A few stakeholders proposed that, instead of introducing a new criterion on water minimisation, it would be sufficient to define procedures for water management through an environmental management system (EMS) or equivalent (e.g. ISO14001 or EMAS). This will ensure that mills situated in areas where water is limited will have to improve on water consumption, whereas mills situated in areas where there is no water scarcity will be able to focus on other aspects that would benefit the environment more. It should be noted that technical solutions to minimize water usage might be difficult to justify and implement where the price of water is low. One stakeholder opposed the idea of a tiered approach for introducing more stringent measures on water minimisation for mills located in the geographical regions with high water scarcity or stress, as every mill should use clean water prudently.

It was noted that BAT already provides benchmarks for wastewater effluent discharge for different types of mills, which should be used as benchmarks for wastewater discharge.

Further considerations

Considering the feedback received, and the fact that water consumption is dynamic and will depend on the product type, **it is proposed to withdraw the criterion proposal**.

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6.2 EDTA and DTPA

During the literature review process, a possible further restriction that could potentially be applied to EDTA and DTPA as process chemicals used to make EU Ecolabel paper products was identified. The background information compiled is given below.

In chemical or mechanical pulp mills, complexing/chelating agents are used to protect oxygen-based bleaching chemicals against catalytic degradation prior to or during the bleaching stages (i.e. in TCF). The complexing agents are used in neutral, slightly acidic or slightly alkaline (depending on the formulation and the process requirements) washing and bleaching steps to eliminate transition metals (mainly Mn and Fe, and Cu). The most widely used chelating agents are EDTA (ethylenediaminetetraacetic acid) and DTPA (polyamino carboxylic acid), in different product formulations.

The BREF notes that DTPA and EDTA are powerful chelants, but are poorly biodegradable (Hinck, Ferguson, & Puhaakka, 1997) and are emitted to receiving water bodies at the end of the process. These can then mobilise heavy metals from the ground in lakes and rivers. The BREF describes various techniques for minimising their emissions in effluent. So, while useful in the TCF bleaching processes, their use needs to be minimised or they need to be treated in the effluent. One study notes (Rodríguez et al., 1999) that a combination of O_3 and UV (pH 7.0 by 15 min) combined with biological treatment, can be very efficient in the removal of the EDTA and DTPA chelants (98 %) and COD (95 %), however this has cost and energy implications for the effluent treatment plant.

Some references show that there are far more biodegradable and relatively harmless alternatives (Kołodyńska, 2011),Jones & Williams, 2002) including Iminodisuccinic acid (N-1,2-dicarboxyethyl)-D,L-aspartate acid (IDS), Polyaspartic acid (DS), Ethylenediamine-N,N'-disuccinic acid (EDDS), Methylglycinediacetic acid (MGDA) and tetrasodium of N,N-bis(carboxymethyl) glutamic acid (GLDA) and aspartic acid diethoxysuccinate (AES).

For example, MGDA is readily biodegradable (>68%) and does not require adapted bacteria for decomposition. GLDA is also readily biodegradable and is based on monosodium glutamate, a flavour enhancer produced by the fermentation of corn sugars. Acid washing can also be considered as possible alternative to complexing agents.

The BREF notes that BAT is to "*reduce the release of not readily biodegradable organic chelating agents such as EDTA or DTPA from peroxide bleaching*" (where used) using a combination of techniques, including monitoring, process optimisation, and the preferential use of biodegradable or eliminable chelating agents, gradually phasing out non-degradable products. The revision of the Blue Angel criteria for Tissue, Newsprint and graphic paper (carried out in 2014) bans the use of EDTA and DTPA entirely.

What other ecolabels and green initiatives say

Part 3.14 of the RAL UZ 5 Blue Angel criteria for Sanitary Paper (July 2014) prohibits the use of any complexing agents that are not readily biodegradable, specifically mentioning EDTA and DTPA for the avoidance of doubt.

In the Basic Module for Nordic Paper Products (Version 2.2, June 2011), EDTA and DTPA are not restricted per se. Instead, pulp manufacturers are required to report the quantities of complexing agents used per tonne of 90% dry pulp produced. If the quantities of EDTA or DTPA used exceed 1.0 kg per tonne of pulp then a reduction plan must be submitted.

Level of Ambition

Clearly the use of EDTA and DTPA is an issue. The Blue Angel approach is the most stringent, but perhaps this is possible because the Blue Angel is effectively limited to using deinked pulp.

The Nordic approach is more progressive and, depending on how well licence holders have adapted to those requirements, either a similar approach could be adopted for the

Post-AHWG and further consideration

Chelating agents have been considered essential chemicals and a prerequisite in both mechanical and chemical pulping (though not for recycled fibres), and both ECF and TCF bleaching. Most stakeholders argued that the effectiveness of alternative chelating agents is not at the level of EDTA/DTPA. Moreover, the production of EDDS, one such alternative, produces toxic waste, even though the end product itself would be more biodegradable than EDTA.

Considering the general agreement of stakeholders, the proposal has been withdrawn.

6.3 Optical Brightening Agents

Optical brightening agents (OBAs) are used in graphic papers and tissue to achieve higher levels of brightness than achievable in the wood-derived or deinked pulp and as an alternative to whitening fillers. To a degree there is a trade-off between the level of bleaching in the pulping process and the use of OBAs after bleaching, the latter sometimes being more cost-effective (Moreira Barbosa, Gomes, Colodette, Carvalho, & Manfredi, 2013).

Numerous OBAs are used in wet end paper making and coating and have various properties. Many modern OBAs are stilbene and tetrasulfonic types. While there is widely reported concern over the use of OBAs in laundry detergents there is very little information in terms of concern over their use in paper making.

A UNEP SIDS study (OECD, 2005) regarding disodium 4,4'-bis[(4-anilino-6-morpholino-1,3,5-triazin-2-yl)- amino]stilbene-2,2'disulphonate (Fluorescent Brightener FWA-1) found no human toxicity concerns but a hazard for the environment (chronic toxicity to daphnia in water). Examination of other Material Safety Data Sheets indicate that most OBAs are irritants to eyes, skin and respiratory tract and eco-toxic in water. Some also have risk phrases H302 (Acute toxicity category 4, harmful if swallowed) and H314 (Skin corrosion Category 1B, causes burns).

Blue Angel bans the use of OBAs entirely in some papers (essentially where brightness is not deemed essential) but allows the use of low hazard OBAs in 'white' papers:

"*The use of optical brighteners shall not be permitted. Notwithstanding this, SC, LWC, MWC and HWC papers (according to Appendix 1 to these Basic Award Criteria) may be produced using the optical brighteners C.I.220, benzenesulfonic acid, 2,2'-(1,2-ethendiyl) bis [5[4-[bis(2-hydroxy-ethyl) amnino]-6-[(4-sulfophenyl)amino]- 1,3,5, triazin-2yl]amino]-, tetra sodium salt and C.I. 113 or C.I.28 disodium salt 4,4'-bis[6-anilino-4-[bis(2-hxdroethyl)amino]-1,3,5-triazin-2-yl]amino]stilbene-2,2'-disulphonate.*"

The Green Seal standard restricts OBAs in the following manner:

"Optical brighteners may be used as a functional papermaking additive at a dosage not to exceed 200 parts per million (0.02%) by weight in the finished product. This level does not include any optical brighteners that may be present in the furnish through the use of recovered materials."

Post AHWG Meeting and further consideration

During the stakeholders interaction it was argued that almost all of the OBAs used in the paper industry have been registered under REACH during the 2010 and 2013 registrations, and none of these have been classified. OBAs used in paper-making are of low risk to health and the environment, and are used to improve the aesthetics of the finished paper in order to reduce or replaces the more hazardous bleaching stages. Moreover, OBAs might be better than using peroxide to obtain a certain level of brightness gain in pulps. It was clarified that toxicology of OBAs refers to FWA-1, which is

used in detergents, and not in the manufacturing of paper products. Additionally, classified OBAs would be already banned by the criterion on hazardous substances.

All in all it was agreed that the restrictions on OBAs would not match the requirements of most national markets for copy paper quality, as it would reduce the whiteness of the final product. **Considering the general agreement reached by stakeholders, the proposal has been withdrawn.**

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7. Impact of changes to criteria

The majority of the existing criteria are still relevant and they are proposed to be kept with minor or major corrections, such as adjusted thresholds that better highlight the best performers on the market. Additionally, some criteria are proposed to be deleted, added or restructured in order to harmonize the different product group criteria.

The main changes proposed compared to the existing criteria are:

1. Changes in the name of the product group, scope and definitions.

- Product groups under revision are proposed to be addressed under a common Commission Decision for 'paper products'. The type of products covered by the merged criteria is not intended to change significantly.
- The existing distinction between copying and graphic paper and newsprint paper (based on grammage only) is proposed to be removed – creating a single definition for these two product groups that is harmonised with industry practice that links to functionality of the paper.
- For tissue paper, following the feedback received the definition of product group has been modified to align with the ISO 12625 standard.

2. Changes in the reference values and criterion formulation under criterion 1.

- For Criterion 1(a), the revised proposal contains changes in the emission reference values from one side, and the reduction of the maximum allowed score for individual emissions (from 1.5 to 1.25), from the other. When the compound effects of moderate reductions to individual emission reference values are considered, they are always greater. For example for kraft pulp mill, following data analysed the number of mills that complies with the proposed criterion 1(a) is reduced approximately by 27%. In total, the production of mills that comply with the criterion 1(a) was reduced by 33%.
- For Criterion 1(b) the reference value have been updated and reduced. The AOX emission level equal to or lower than proposed 0.16 kg AOX/ADt corresponds to 66% of bleached kraft pulp produced.
- For Criterion 1(c) the reference values for CO2 emission are harmonised with the irregular energy intensity of different pulping processes.

3. Changes in the energy reference values and criterion formulation under criterion 2

- The alternative methodology on reporting the final score for criterion 2 (energy consumption) was proposed. Addressing score for fuel and electricity consumption together (as a sum up) would maintain flexibility in the scoring system and could accommodate different scenarios. The ambition level of the criterion is increased by reducing the final score flexibility by 25%. Reference values have been updated.

4. Criterion 3: Fibres – conserving resources, sustainable forest management

- Different approaches to fibre sourcing criteria have previously been set out for copying and graphic paper and newsprint paper. This is based on previous (and current) market practice relating to the collection and use of Paper for Recycling.
- A mandatory minimum requirement (50%) of sustainable certified fibres has been set for any virgin fibres used in Copying and Graphic Paper. It is proposed to raise

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this to 70% to align with the ambition level of other EU Ecolabel products and also with current labelling rules for FSC and PEFC. However, an allowance is made for exceptional cases for integrated mills (ambition level lowered to 55%) where sourcing of sustainable certified fibres in the local or regional catchment area is not possible for reasons beyond the control of the paper manufacturer (e.g. lack of interest of local/regional forest owners in certification). For clarity, the intention of raising the ambition level of the sustainable fibre criteria is not to encourage the decoupling of pulp and paper production in certain areas. The proposals count sustainable virgin fibre and recovered fibre as equal in terms of meeting the 70% or 55% target.

- For Newsprint Paper, the mandatory minimum recovered fibre content is proposed to be raised from 70% to 90%. Current market practice implies that this is possible to achieve although there may be the need to incorporate some virgin fibres to ensure product quality. By going above 70%, the PEFC recycled label is no longer sufficient as a means of proof (it only guarantees at least 70% recovered fibre content). This means greater efforts will be needed in assessment and verification by Competent Bodies by looking at delivery invoices and claims etc.

5. Criterion 4: Restricted hazardous substances and mixtures.

- The horizontal hazardous substance criteria relating to the REACH Candidate List and CLP classifications have been updated. However, preliminary research has revealed that there is an identified need for a number of potential derogations, particularly for pigments and wet strength agents. This will require further detailed discussion during the meetings.
- Only minor changes (if any) have been proposed to the remaining specific hazardous substance criteria. For example, an update in reference to relevant legislation for biocidal products, clarifications relating to dye stuff and pigment criteria and the proposed allowance of silicone-based surfactants under certain conditions in line with Nordic Ecolabel experience.

6 Following feedback received no major changes have been proposed for the revision of Criterion 5 to 8.

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References

AENOR. (2010). Forest Product Chain of Custody (CoC) - Sustainable Raw Material for an Environmentally Responsible Product. Retrieved August 11, 2015, from http://www.en.aenor.es/aenor/certificacion/mambiente/mab_cdc.asp#.VcoWJflViIU

ÅF-CTS Oy. (2006). *ECF-TCF Comparison*.

ÅF-ENGINEERING AB (2010). Market Area Forest Industry. Energy consumption in the pulp and paper industry - Model mills 2010. Bleached kraft market pulp mill. 2010 http://www.aforsk.se/sites/default/files/09-163.pdf

Agriculture & Agri-Food Canada. (1997). *agroecosystem greenhouse gas balance indicator: nitrous oxide component*.

Bajpai, P. (2005). Chapter 6 - Closed-cycle bleach plant. In P. Bajpai (Ed.), *Environmentally Benign Approaches for Pulp Bleaching* (pp. 229 – 267). Amsterdam: Elsevier. Retrieved from http://www.sciencedirect.com/science/article/pii/B9780444517241500071

Bajpai, P. (2005). *Environmentally Benign Approaches for Pulp Bleaching* (1st ed.). New York: Elsevier.

Bajpai, P. (2010) Environmentally Friendly Production of Pulp and Paper. Hoboken, NJ, USA: Wiley, 2010

Bajpai, P. (2015). *Green Chemistry and Sustainability in Pulp and Paper Industry*. Springer International Publishing. Retrieved from http://link.springer.com/10.1007/978-3-319-18744-0

Bajpai,P. (2015a) Biological Odour Treatment. SpringerBriefs in Environmental Science

BASF. (2008). *The Sustainable Solution for Your Business*. Retrieved from http://www.intermediates.basf.com/chemicals/web/en/function/conversions:/publish/content/news-and-publications/brochures/download/BASF_Glyoxal_Brochure.pdf

Berger, M., & Finkbeiner, M. (2013). Methodological Challenges in Volumetric and Impact-Oriented Water Footprints. *Journal of Industrial Ecology*, *17*(1), 79–89. http://doi.org/10.1111/j.1530-9290.2012.00495.x

Biedermann, S., Tschudin, P., & Grob, K. (2010). Transfer of bisphenol A from thermal printer paper to the skin. *Analytical and Bioanalytical Chemistry*, *398*(1), 571–576.

Blum, O., Maur, B., Oller, H-J. 2007. Revision of Best Available Technique Reference Document for the Pulp & Paper Industry. Ue of energy saving techniques. Umwelt Bundessamt

CEPI. (2013). *European List of Standard Grades of Paper and Board for Recycling: Guidance on the revised EN 643*. Retrieved from http://www.cepi.org/system/files/public/documents/publications/recycling/2013/CEPI_EN%20643_brochure_FINAL.pdf

CEPI. (2014a). *CEPI Position Paper*. Retrieved from http://www.cepi.org/system/files/public/documents/positionpapers/recycling/2014/Recyclingtargets_positionpaper.pdf

CEPI. (2014b). *Pulp and Paper Industry - Definitions and Concepts*. Retrieved from http://www.cepi.org/system/files/public/documents/publications/statistics/2014/FINAL%20CEPI%20Definitions%20and%20Concepts_0.pdf

CEPI. (2015). *Best Available Technique (BAT) Conclusions for the Production of Pulp, Paper and Board*. Retrieved from http://www.cepi.org/node/19413

Draft

CEPI. (2016). *CEPI Preliminary Statistics 2015*. Retrieved from http://www.cepi.org/system/files/public/documents/publications/statistics/2016/Preliminary%20Statistics%202015.pdf

CEPS Study, 2014. Composition and drivers of energy prices and costs in energy intensive industries: the case of the chemical industry. Accessed online, July 2017.

Chen, H-W. Chung-Hsuan, H. Gui-Bing, H. 2012. The case study of energy flow analysis and strategy in pulp and paper industry. Energy Policy 43, p. 448–455

Confederation of Paper Industries. (2014). *Code of Good Practice For Landspreading Paper Mill Sludges*. Retrieved from http://www.paper.org.uk/information/guidance/landspreadingcode.pdf

Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations, (OJ L 85, 29.3.1999, p. 1–22). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31999L0013&from=EN

Council Directive 2013/12/EU of 13 May 2013 adapting Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency, by reason of the accession of the Republic of Croatia (OJ L 141/28 of 28.5.2013). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013L0012&from=EN

CPI. (2013). *Environmental Aspects of ECF and TCF Chemical Woodpulp Bleaching*. Retrieved from http://www.paper.org.uk/information/factsheets/environmental_aspects_ECF_TCF.pdf

DG Energy (2017) EU Energy statistical datasheet https://ec.europa.eu/energy/en/news/get-latest-energy-data-all-eu-countries

Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (OJ L 334, 17.12.2010, p. 17–119). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN

Directive 2012/27/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 (OJ L 315, 14.11.2012, p. 1–56). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0027&from=EN

Directive (EU) 2015/720 of the European Parliament and of the Council of 29 April 2015 amending Directive 94/62/EC as regards reducing the consumption of lightweight plastic carrier bags (OJ L 115, 6.5.2015, p. 11–15). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L0720&from=EN

ECHA. (2014, March 19). RAC proposes to strengthen the classification of bisphenol A. Retrieved May 4, 2016, from http://echa.europa.eu/en/view-article/-/journal_content/title/rac-proposes-to-strengthen-the-classification-of-bisphenol-a

ECHA. (2015, December 7). ECHA's committees finalise evaluation of bisphenol A restriction proposal. Retrieved May 4, 2016, from http://echa.europa.eu/view-article/-/journal_content/title/echas-committees-finalise-evaluation-of-bisphenol-a-restriction-proposal

Ecofys (2009), Methodology for the free allocation of emission allowances in the EU ETS post 2012 Sector report for the pulp and paper industry. 2009. https://ec.europa.eu/clima/sites/clima/files/ets/allowances/docs/bm_study-pulp_and_paper_en.pdf

Draft

EKONO (2012) Inc. Strategic Study, Environmental Performance Regulations and Technologies in the Pulp and Paper Industry. 2013.

EPA. (2006). *Final report: Pulp, paper, and paperboard detailed study* (No. EPA-821-R-06-016). Retrieved from http://water.epa.gov/lawsregs/lawsguidance/cwa/304m/upload/2006_12_27_guide_304m_2006_pulp-final.pdf

European Commision. Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel (OJ L27/1 of 30.1.2010) (2009). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010R0066&from=EN

European Commission. Council Directive 76/768/EEC of 27 July 1976 on the approximation of the laws of the Member States relating to cosmetic products (OJ L 262 of 27.9.1976) (now amended by Directive 2003/15/EC) (1976). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=URISERV:l21191&from=EN

European Commission. Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants (2001).

European Commission. Communication from the Commission - Biomass action plan (COM (2005) 628 final) (2005). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52003DC0302&from=EN

European Commission. (2006). *Environmental Technologies Action Plan (ETAP)*. Retrieved from http://ec.europa.eu/environment/ecoap/sites/ecoap_stayconnected/files/pdfs/etap_action_plan.pdf

European Commission. Communication from the Commission to the European Parliament, the European Economic and Social Committee and the Committee of the Region on the Sustainable Consumption and Production and Sustainable Industry Policy Action Plan (COM (2008) 397 final) (2008). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008DC0397&from=EN

European Commission. Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (IPPC) (OJ L24/8 of 29/1/2008) (2008). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0001&from=EN

European Commission. (2008c). Public procurement for a better environment (COM (2008) 400). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Region*. Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52008DC0400

European Commission. Commission Decision of 9 June 2009 establishing the ecological criteria for the award of the Community Eco-label for tissue paper (OJ L197/87 of 29.7.2009) (2009). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009D0568(01)&from=EN

European Commission. Directive 2009/125/EC of the European Parliament and of the Council Establishing a Framework for the Setting of Ecodesign Requirements for Energy-Related Products, Pub. L. No. 2009/125/EC (2009). Retrieved from http://eur-lex.europa.eu/legal-content/EN/ALL/;jsessionid=yKy6T5RGh1LGXT1h9GXZ39ZRkv7csDJTB9G1gPzLnLM3Qfy8KHcd!-641085469?uri=CELEX:32009L0125

European Commission. Regulation (EC) No 66/2010 of the European Parliament and of the Council of 25 November 2009 on the EU Ecolabel (OJ L27/1 of 30.1.2010)

(2009). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010R0066&from=EN

European Commission. Regulation (EU) No 995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market (OJ L 295/23 of 12.11.2010) (2010). Retrieved from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:295:0023:0034:EN:PDF

European Commission. Commission Decision of 12 July 2012 establishing the ecological criteria for the award of EU Ecolabel for newsprint paper (OJ L202/26 of 28.7.2012) (2012). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012D0448&from=EN

European Commission. Commission Decision of 16 August 2012 Establishing the Ecological Criteria for the Award of the EU Ecolabel for Printed Paper (2012/481/EU) (OJ L 223/55 of 21/8/2012) (2012). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012D0481&from=EN

European Commission. Commission Decision of 2 May 2014 Establishing the Ecological Criteria for the Award of the EU Ecolabel for Converted Paper Products (2014/256/EU) (OJ L 135/24 on 8.5.2014) (2014). Retrieved from http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014D0256&from=EN

European Commission. (2014b, July 2). Europe 2020 targets. Retrieved from http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/targets/index_en.htm

European Commission, (2014c) Energy Efficiency and CO2 Reduction in the Pulp and Paper Industry, SETIS https://setis.ec.europa.eu/system/files/Technology_Information_Sheet_Energy_Efficiency_and_CO2_Reducton_in_the_Pulp_and_Paper_Industry.pdf

European Commission. (2015a). The BioGrace-II GHG calculation tool for electricity, heating and cooling products. Retrieved May 4, 2016, from http://www.biograce.net/app/webroot/biograce2/content/ghgcalculationtool_electricityheatingcooling/overview

European Commission. (2015b, June 19). Green Public Procurement (GPP). Retrieved August 19, 2015, from http://ec.europa.eu/environment/gpp/index_en.htm

European Commission. (2015c, July 10). EU Eco-Management and Audit Scheme (EMAS). Retrieved August 19, 2015, from http://ec.europa.eu/environment/emas/index_en.htm

European Commission. (2016). Circular Economy Strategy. Retrieved May 4, 2016, from http://ec.europa.eu/environment/circular-economy/index_en.htm

European Commisssion (2016a) Manual of the working group on cosmetic products (sub-group on borderline products) on the scope of application of the Cosmetics Regulation (EC) No 1223/2009 (Art. 2(1)(a))

European Commission. (2017) REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the review of implementation of Regulation (EC)No 122/2009 of the European Parliament and of the Council on 25 November 2009 on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS) and the Regulation (EC) No 66/2010 of the parliament and of the Council of 25 November 2009 on the EU Ecolabel. COM(2017) 355 final

EEA, 2013, CO2 intensity of electricity and heat generation https://www.eea.europa.eu/data-and-maps/indicators/co2-intensity-of-electricity-and

EEA, 2015a Annual European Union greenhouse gas inventory 1990–2013 and inventory report 2015 Submission to the UNFCCC Secretariat. Technical report No 19/2015. European Environment Agency

EEA 2015b Data viewer on greenhouse gas emissions and removals, sent by countries to UNFCCC and the EU Greenhouse Gas Monitoring Mechanism (EU Member States) , European Environmental Agency, http://www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-1/assessment,

EU Energy, Transport and GHG Emissions Trends to 2050 Reference Scenario 2013. https://ec.europa.eu/energy/sites/ener/files/documents/trends_to_2050_update_2013.pdf

EU Commission, DG ENER, Unit A4, Energy statistics https://ec.europa.eu/energy/en/statistics/country

EU Community Independent Transaction Log (CITL)) 2008 data,

FAO. (2012). *Pulp and paper capacities*. Retrieved from http://www.fao.org/docrep/016/i3005t/i3005t.pdf

Finish Forest Industries. (2013, July 10). Global paper consumption is growing. Retrieved April 19, 2016, from http://www.forestindustries.fi/industry/paper_cardboard_converted/paper_pulp/Global-paper-consumption-is-growing-1287.html

Fisher International, Inc. (2011). Fisher Solve. Retrieved May 4, 2016, from http://www.fisheri.com/

Fleiter. T, Fehrenbach, D., Worrell, E. Eichhammer, W. (2012). Energy efficiency in the German pulp and paper industry—a model-based assessment of saving potentials Energy, 40, pp. 84–99

Forestry Commission. (2005). *Bold Colliery Community Woodland; District Valuer's Report on Property Values*. North West England Conservancy. Retrieved from http://www.forestry.gov.uk/pdf/urgp_case_study_021_Bold_Colliery.pdf/$FILE/urgp_case_study_021_Bold_Colliery.pdf

FSC. (2015). Forest Stewardship Council (FSC). Retrieved August 19, 2015, from https://ic.fsc.org/en

Fukazawa, H., Hoshino, K., Shiozawa, T., Matsushita, H., & Terao, Y. (2001). Identification and quantification of chlorinated bisphenol A in wastewater from wastepaper recycling plants. *Chemosphere*, *44*(5), 973–979. http://doi.org/10.1016/S0045-6535(00)00507-5

González-García, S., Berg, S., Moreira, M. T., & Feijoo, G. (2009). Evaluation of forest operations in Spanish eucalypt plantations under a life cycle assessment perspective. *Scandinavian Journal of Forest Research*, *24*(2), 160–172. http://doi.org/10.1080/02827580902773462

Green Seal Standard for Sanitary Paper Products. (2013). Retrieved from http://www.greenseal.org/Portals/0/Documents/Standards/GS-1/GS-1_Ed6-1_Sanitary_Paper_Products.pdf

Gremer, E., Métais, A., & Hostachy, J.-C. (2011). State-of-the-art industrial ozone bleaching. *Tappsa Journal*, *6*.

H2O Online. (2014). Verbeterde verwijdering van fosfaat en zwevend stof op rwzi Zeist. Retrieved May 4, 2016, from http://vakbladh2o.nl/index.php/h2o-online/recente-artikelen/entry/verbeterde-verwijdering-van-fosfaat-en-zwevend-stof-op-rwzi-zeist

Hinck, M. L., Ferguson, J., & Puhaakka, J. (1997). Resistance of EDTA and DTPA to aerobic biodegradation. *Forest Industry Wastewaters VSelected Proceedings of the*

Draft

5th IAWQ International Symposium on Forest Industry Wastewaters, *35*(2–3), 25–31. http://doi.org/10.1016/S0273-1223(96)00911-0

Hoekstra, A.Y. Chapagain A.K., Aldaya M.M. and Mekonnen M.M. 2009. Water Footprint Manual. State of the art. A report for the Water Footprint Network.

Honghi Tran, & Esa K. Vakkilainnen. (2008). *The Kraft Chemical Recovery Process*. Retrieved from http://www.tappi.org/content/events/08kros/manuscripts/1-1.pdf

Hostachy, J.-C. (2010). Use of ozone in chemical and high yield pulping processes: latest innovations maximizing efficiency and environmental performance (pp. 349–354). Presented at the 64th Appita annual conf. and exhibition, Melbourne, Australia.

IBIS World. (2015). *Global Paper & Pulp Mills: Market Research Report*. Retrieved from http://www.ibisworld.com/industry/global/global-paper-pulp-mills.html

IEA (2010) CO2 Emissions from Fuel Combustion–Highlights. http://www.iea.org/publications/free_new_Desc.asp?PUBS_ID=2143

IPCC (2000): *Land use, Land-use change and Forestry: IPCC Special Report;* Robert T. Watson, Ian R. Noble, Bert Bolin, N. H. Ravindranath, David J. Verardo and David J. Dokken (Eds.). Cambridge University Press, UK.

IPCC (2006) Guidelines for National Greenhouse Gas Inventories http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf

IPCC (2014) *Climate Change 2014: Synthesis Report*. *Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland.

ISO. (2006). *ISO 14044 Environmental management - Life cycle assessment - Requirements and guidelines*.

ISO. (2015). ISO 14001:2015 - Environmental management systems - Requirements with guidance for use. Retrieved April 19, 2016, from http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=60857

ISO 4046-1:2002 - Paper, board, pulps and related terms - Vocabulary - Part 1: Alphabetical Index. (2013). Retrieved from http://www.iso.org/iso/catalogue_detail.htm?csnumber=29836

ISPRA. (2009). *Study for the copying and graphic paper criteria revision: Final Background Report*. European Commission.

ISPRA and LC Engineering. (2009). *Study for the Copying and Graphic Paper criteria revision - First Background Report*.

Jann, O., & Wilke, O. (2002). Möglichkeiten und Grenzen bei der Bestimmung von SVOC-Emissionen aus Materialien und Produkten (Methods and limits of determining SVOC emissions from materials and products). *Neuere Entwicklungen Bei Der Messung Und Beurteilung Der Luftqualität 2002*, (1656), 357–367.

Jawjit, W., Kroeze, C., Soontaranun, W., & Hordijk, L. (2006). An analysis of the environmental pressure exerted by the eucalyptus-based kraft pulp industry in Thailand. *Environment, Development and Sustainability*, *8*(2), 289–311. http://doi.org/10.1007/s10668-005-9019-y

Jones, P. W., & Williams, D. R. (2002). Chemical speciation simulation used to assess the efficiency of environment-friendly EDTA alternatives for use in the pulp and paper industry. *Protagonists in Chemistry: Helmut Sigel*, *339*, 41–50. http://doi.org/10.1016/S0020-1693(02)00924-6

Draft

Jour, P., Halldén, K., & Wackerberg, E. (2012). Environmental systems analysis of alternative bleaching sequences with focus on carbon footprint. In *Proceedings of the ABTCP 2013*. Sao Paulo, Brazil. Retrieved from https://www.akzonobel.com/eka/system/images/AkzoNobel_Environmental_Systems_Analysis_of_AlternativeBleachingSequences_With_Focus_on_CarbonFootprint_tcm56-90952.pdf

JRC. 2008. *European Union Risk Assessment Report: 4,4'-ISOPROPYLIDENEDIPHENOL (Bisphenol-A) Part 1 Environment*.

JRC. 2015. *Best Available Techniques (BAT) Reference Document for the Production of Pulp, Paper and Board*. Retrieved from http://eippcb.jrc.ec.europa.eu/reference/BREF/PP_revised_BREF_2015.pdf

Kinsella, S. 2012. Re-pulping project. Comparing Recycled to Virgin Paper Why Recycled Content is Crucial for Printing & Writing Paper

Kołodyńska, D. (2011). Chelating Agents of a New Generation as an Alternative to Conventional Chelators for Heavy Metal Ions Removal from Different Waste

Laurijssen, J., Faaij, A., Worrell, E. 2013. Benchmarking energy use in the paper industry: A benchmarking study on process unit level. Energy Efficiency 6, pp. 49-63

Laurijssena,J., Faaijb,A. Ernst Worrellb, E. 2012. Energy conversion strategies in the European paper industry – A case study in three countries. Applied Energy 98, pp. 102–113

Waters. In *Expanding Issues in Desalination, Prof. Robert Y. Ning (Ed.)*. InTech. Retrieved from http://cdn.intechopen.com/pdfs-wm/20357.pdf

Lorenzini, R., Fiselier, K., Biedermann, M., Barbanera, M., Braschi, I., & Grob, K. (2010). Saturated and aromatic mineral oil hydrocarbons from paperboard food packaging: estimation of long-term migration from contents in the paperboard and data on boxes from the market. *Food Additives & Contaminants: Part A*, *27*(12), 1765–1774. http://doi.org/10.1080/19440049.2010.517568

Loureiro, P. E. G., Evtuguin, D. V., & Carvalho, M. G. V. S. (2011). The final bleaching of eucalypt kraft pulps with hydrogen peroxide: relationship with industrial ECF bleaching history and cellulose degradation. *Journal of Chemical Technology & Biotechnology*, *86*(3), 381–390. http://doi.org/10.1002/jctb.2527

MARE. (2016). PAE G3. Retrieved May 4, 2016, from http://www.mare.com/product/pae-g3

G. Meinl, L. Tempel, J. Ringman and S. Bousios, 2016. European Fibre Flow Model. Published as output D1.4 of the EU co-funded REFFIBRE project.

Métais, A., & Hostachy, J.-C. (2011). Light-ECF Bleaching – Why implementing Green bleaching practices is a real plus for pulp production. *Tappsa Journal*, *2*, 32–37.

MERP, Methodology for the Ecodesign of Energy-related Products: http://www.meerp.eu/

Mondi Group. (2016). TCF (Totally chlorine-free). Retrieved May 4, 2016, from http://www.mondigroup.com/products/desktopdefault.aspx/tabid-1824

Moreira Barbosa, B., Gomes, F., Colodette, J., Carvalho, D., & Manfredi, M. (2013). Effect of Optical Brightening Agent (OBA) on Bleaching Process on Paper of Eucalyptus Kraft Pulp. *Natural Resources*, *4*(5), 378–382.

National Council for Air and Stream Improvement, Inc. (NCASI). (2013). *Environmental Footprint Comparison Tool (EFCT): Effects of Decreased Water Use*. Retrieved from http://www.paperenvironment.org/PDF/water/Water_General_Overview.pdf

Nordic Ecolabelling. (2011). *Nordic Ecolabelling of Copy and Printing Paper - Supplementary Module*. Retrieved from

Draft

file:///C:/Users/christina.tsiarta/Desktop/Kriteriedokument_044_Kopierings_och_tryckpapper_4_Engelska%20(1).pdf

Nordic Ecolabelling. (2015). Pulp & Paper Producers - Nordic Swan Ecolabel. Retrieved August 11, 2015, from http://www.nordic-ecolabel.org/portals/paper/pulp--paper-producers/

Nordic Ecolabelling. (n.d.). Nordic Ecolabelling - Paper, pulp and printing: Pulp suppliers. Retrieved May 2, 2016, from http://www.nordic-ecolabel.org/portals/paper/my-swan-account1/pulp-suppliers/

Norske Skog. (2015). Sustainability reports. Retrieved April 19, 2016, from http://www.norskeskog.com/Responsibility/Environment/Sustainability-reports.aspx

OECD. (2005). *SIDS Initial Assessment Report for Optical Brightener FWA-1*. Washingotn D.C., USA. Retrieved from http://www.inchem.org/documents/sids/sids/16090021.pdf

OECD/IEA. 2016. CO2 emissions from fuel combustion. Highlights.

PAPRICAN (2008), Benchmarking energy use in Canadian Pulp and Paper Mills, Pulp and Paper Research Institute of Canada, 2008

Paper Profile. (2016). Paper Profile - the environmental product declaration for professional paper buyers. Retrieved April 19, 2016, from http://www.paperprofile.com/what.html

PEFC. (2012). *Issuance of PEFC Logo use licenses by the PEFC Council* (PEFC Procedure Document No. PEFC GD 1005:2012). Retrieved from http://www.pefc.org/images/documents/PEFC_GD_1005-2012_Issuance_of_PEFC_Logo_Use_Licenses.pdf

Pivnenko, K., Pedersen, G. A., Eriksson, E., & Astrup, T. F. (2015). Bisphenol A and its structural analogues in household waste paper. *Waste Management*, *44*, 39–47. http://doi.org/10.1016/j.wasman.2015.07.017

PIRA International (2005), Review of Opportunities and Potential Barriers to Using Recycled Content Magazine Paper, available at: http://www.wrap.org.uk/sites/files/wrap/OppPotBarriersMagazinePaper.bc65a5f4.3196.pdf

Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products Text with EEA relevance (OJ L 167, 27.6.2012, p. 1–123). Retrieved from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:167:0001:0123:en:PDF

RIVM. (2015). *Bisphenol A Part 2: Recommendations for risk management* (No. 0192).

Rodríguez, J. B., Mutis, A., Yeber, M. C., Freer, J., Baeza, J., & Mansilla, H. D. (1999). Chemical degradation of EDTA and DTPA in a totally chlorine free (TCF) effluent. *Forest Industry Wastewaters VISelected Proceedings of the 6th IAWQ Symposium on Forest Industry Wastewaters*, *40*(11–12), 267–272. http://doi.org/10.1016/S0273-1223(99)00727-1

Ryynänen, H., & Nelson, P. J. (1996). Environmental life cycle assessment of some new methods for producing bleached pulps from Australian eucalypt woods. *Appita Journal*, *49*(3), 167–172.

Savant, D. V., Abdul-Rahman, R., & Ranade, D. R. (2006). Anaerobic degradation of adsorbable organic halides (AOX) from pulp and paper industry wastewater. *Bioresource Technology*, *97*(9), 1092–1104. http://doi.org/10.1016/j.biortech.2004.12.013

DRAFT

SCA. (2016, March 31). Sustainability. Retrieved April 19, 2016, from http://www.sca.com/en/Sustainability/

Secretariat of TPAC. (2008, October). Dutch Procurement Criteria for Timber - Timber Procurement Assessment Committee (TPAC). Retrieved August 11, 2015, from http://www.tpac.smk.nl/Public/TPAC%20Assessments%20results/Dutch%20Timber%20Procurement%20Criteria.pdf

Shabbira, I. and Mirzaeiana, M. (2017). Carbon emissions reduction potentials in pulp and paper mills by applying cogeneration technologies. Energy Procedia 112, pp 142 – 149

UBA (2007) Schabel, S and Hamm, U. Revision of Best Available Technique Reference Document (BREF) for the Pulp & Paper Industry Report 1: Further development of BAT in Germany Commissioned by Federal Environmental Agency Germany, Dessau – FKZ:

Shen, Y., Zhou, X., & Lu, X. (2012). TCF Bleaching of Eucalyptus Urophylla xEucalyptus Grandis LH107 oxygen-delignified kraft pulp- partial Mg2+/Ca2+ substitution for chelants in chelation stage. *Cellulose Chemistry and Technology*, *46*, 97–103.

Stora Enso. (2013). *Environmental statement 2013: Nymölla Mill*. Retrieved from http://assets.storaenso.com/se/printingandreading/Documents/Environmental%20statement%20Nym%F6lla%20Mill%202013%20EN.pdf

Stora Enso. (2015a). *Sustainability Facts - Stora Enso Fact Sheet for Stakeholders*. Retrieved from http://assets.storaenso.com/se/com/DownloadCenterDocuments/Pulp_bleaching_Fact_sheet.pdf

Stora Enso. (2015b). *Sustainability Report 2015*. Retrieved from http://assets.storaenso.com/se/com/DownloadCenterDocuments/Sustainability_Report_2015.pdf

The Blue Angel. (2010, January). Basic Criteria for Award of the Environmental Label: Environmentally Friendly Ship Operation RAL-UZ 110. Retrieved from http://www.blauer-engel.de/en/products_brands/search_products/produkttyp.php?id=506

The Blue Angel. (2014). The Blue Angel Recycled Paper (RAL-UZ 14 | Edition 2014). Retrieved April 19, 2016, from https://www.blauer-engel.de/en/products/home-living/recycled-paper/recycled-paper-edition-january-2014

The Blue Angel. (2015). The Blue Angel - Environmentally Friendly Printing Papers (RAL-UZ 72 | Edition 2014). Retrieved August 20, 2015, from https://www.blauer-engel.de/en/products/office/printing-papers-290

The Environment Agency. (2005). *Landspreading on Agricultural Land: Nature and Impact of Paper Wastes Applied in England & Wales*.

The Finish Ministry of Environment. (1997). *The Finnish Background Report for the EC Documentation of Best Available Techniques for Pulp and Paper Industry*. Retrieved from https://julkaisut.valtioneuvosto.fi/bitstream/handle/10138/40277/SY_96.pdf?sequence=1

Tuula, L., Ville, T., Susanna, K. Annastina, J., and Tapani, V. 2010. The effect pf process variables in chlorine dioxide prebleaching of birch kraft pulp. Part 2. AOX and OX Formation. Journal of Wood Chemistry and Technology 30 (1), 19-30ng

Umweltzeichen. (2015). The Austrian eco-label - Office, Paper & Printing (RL 02) Edition 2013. Retrieved August 11, 2015, from https://www.umweltzeichen.at/richtlinien/Uz02_K7a_Graphisches_Papier-2013.pdf

Draft

US EPA 2010 Available and emerging technologies for reducing greenhouse gas emissions from the pulp and paper manufacturing industry

Van Velzen. D. Eds, (2012). Sulphur Dioxide and Nitrogen Oxides in Industrial Waste Gases: Emission, Legislation and Abatement. Commission of the European Communities, Joint Research Centre Ispra, Environment Institute,. Springer Science & Business Media. 281 pp

Zhu, H., Yao S., Jiang, L., Wang, S., and Qin, C. 2016. Kinetics of AOX formation. BioResources , 1194, p. 8820-8830

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List of abbreviations and definitions

ADt	Specific chemical and energy consumption, costs and emissions are expressed as 'per 90 % air dry pulp
Air dry	Air dry tonne of pulp (ADt) meaning dry solids content of 90 %; in case of paper, air dry means paper with 6 % moisture content
BAT-AELs	The range of emission levels obtained under normal operating conditions using a best available technique or a combination of best available techniques, as described in BAT conclusions, expressed as an average over a given period of time, under specified reference conditions (Art 3.12. of Directive 2010/75/EU)
CTMP	Chemithermomechanical pulp
DIP	Deinked pulp – pulp produced from recovered printing paper, e.g. newsprint, through deinking process
ECF	Elemental Chlorine Free. Bleach sequence containing chlorine dioxide but not elementary chlorine gas
GW	Groundwood pulp
Hardwood	Group of wood species including aspen, beech, birch and eucalyptus. The term hardwood is used as opposition to softwood
Kappa number	Measures the amount of residual lignin content in unbleached pulp, determined after pulping and prior to bleaching. The lower the Kappa number, the less associated lignin. The kappa number is dimensionless
Kraft pulp	Chemical pulp which is manufactured using sodium sulphide as the main cooking chemical. Wood chips are digested in an alkaline cooking liquor, an aqueous solution of sodium hydroxide and sodium sulphide (white liquor)
Lime kiln	Unit in the kraft recovery cycle. In this lime kiln, the lime mud is reburnt to lime: $CaCO_{3\ (s)} + heat \rightarrow CaO_{(s)} + CO_2$
LWC	Light-weight coated paper
Mechanical pulp	Papermaking pulp made entirely by mechanical means from various raw materials, i.e. by grinding wood against an abrasive surface (groundwood pulp) or by processing wood chips or sawdust through a refiner (refiner mechanical pulp). Mechanical pulp contains a considerable amount of non-cellulosic compounds
MWC	Medium-weight coated paper
Pulping	Process of converting raw fibre (e.g. wood) or recycled fibre to a pulp usable in papermaking
RCF	Recycled fibre; pulp obtained from processing paper for recycling
SC	Supercalendered paper
SGW	Stone groundwood (pulp)
Softwood	Wood from conifers including pine and spruce. The term softwood is used as opposition to hardwood
Sulphite pulp	Chemical pulp where various sulphites or bisulphites are used as the main cooking chemical
TCF	Totally Chlorine Free. Bleaching of pulp without using chlorine compound chemicals
TMP	Thermomechanical pulp
TOC	Total Organic Carbon; alternative measurement for COD. Analytical method used to determine the content of organics in a sampling of waste water
Yield	Amount of useful fibre after pulping and/or bleaching or deinking, expressed as a percentage of the useable fibre in relation to the raw material input.

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List of figures

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List of tables

Draft

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Appendices

Appendix I. Forest Europe criteria and indicators (2015)

Criteria	No.	Indicator	Full text
Criterion 1: Maintenance and Appropriate Enhancement of Forest Resources and their Contribution to Global Carbon Cycles	**C.1**	**Policies, institutions and instruments to maintain and appropriately enhance forest resources and their contribution to global carbon cycles**	
	1.1	Forest area	Area of forest and other wooded land, classified by forest type and by availability for wood supply, and share of forest and other wooded land in total land area
	1.2	Growing stock	Growing stock on forest and other wooded land, classified by forest type and by availability for wood supply
	1.3	Age structure and/or diameter distribution	Age structure and/or diameter distribution of forest and other wooded land, classified by availability for wood supply
	1.4	Forest carbon	Carbon stock and carbon stock changes in forest biomass, forest soils and in harvested wood products
Criterion 2: Maintenance of Forest Ecosystem Health and Vitality	**C.2**	**Policies, institutions and instruments to maintain forest ecosystem health and vitality**	
	2.1	Deposition and concentration of air pollutants	Deposition and concentration of air pollutants on forest and other wooded land
	2.2	Soil condition	Chemical soil properties (pH, CEC, C/N, organic C, base saturation) on forest and other wooded land related to soil acidity and eutrophication, classified by main soil types
	2.3	Defoliation	Defoliation of one or more main tree species on forest and other wooded land in each of the defoliation classes
	2.4	Forest damage	Forest and other wooded land with damage, classified by primary damaging agent (abiotic, biotic and human induced)
	2.5	Forest land degradation	Trends in forest land degradation
Criterion 3: Maintenance and Encouragement of Productive Functions of Forests (Wood and Non-Wood)	**C.3**	**Policies, institutions and instruments to maintain and encourage the productive functions of forests**	
	3.1	Increment and fellings	Balance between net annual increment and annual fellings of wood on forest available for wood supply
	3.2	Roundwood	Quantity and market value of roundwood
	3.3	Non-wood goods	Quantity and market value of non-wood goods from forest and other wooded land
	3.4	Services	Value of marketed services on forest and other wooded land
Criterion 4: Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems	**C.4**	**Policies, institutions and instruments to maintain, conserve and appropriately enhance the biological diversity in forest ecosystem**	
	4.1	Diversity of tree species	Area of forest and other wooded land, classified by number of tree species occurring
	4.2	Regeneration	Total forest area by stand origin and area of annual forest regeneration and expansion
	4.3	Naturalness	Area of forest and other wooded land by class of naturalness
	4.4	Introduced tree species	Area of forest and other wooded land dominated by introduced tree species
	4.5	Deadwood	Volume of standing deadwood and of lying deadwood on forest and other wooded land
	4.6	Genetic resources	Area managed for conservation and utilisation of forest tree genetic resources (in situ and ex situ genetic conservation) and area managed for seed production
	4.7	Forest fragmentation	Area of continuous forest and of patches of forest separated by non-forest lands

	4.8	Threatened forest species	Number of threatened forest species, classified according to IUCN Red List categories in relation to total number of forest species
	4.9	Protected forests	Area of forest and other wooded land protected to conserve biodiversity, landscapes and specific natural elements, according to MCPFE categories
	4.10	Common forest bird species	Occurrence of common breeding bird species related to forest ecosystems
Criterion 5: Maintenance and Appropriate Enhancement of Protective Functions in Forest Management (notably soil and water)	**C.5**	**Policies, institutions and instruments to maintain and appropriately enhance of the protective functions in forest management**	
	5.1	Protective forests – soil, water and other ecosystem functions – infrastructure and managed natural resources	Area of forest and other wooded land designated to prevent soil erosion, preserve water resources, maintain other protective functions, protect infrastructure and managed natural resources against natural hazards
Criterion 6: Maintenance of other socioeconomic functions and conditions	**C.6**	**Policies, institutions and instruments to maintain other socioeconomic functions and conditions**	
	6.1	Forest holdings	Number of forest holdings, classified by ownership categories and size classes
	6.2	Contribution of forest sector to GDP	Contribution of forestry and manufacturing of wood and paper products to gross domestic product
	6.3	Net revenue	Net revenue of forest enterprises
	6.4	Investments in forests and forestry	Total public and private investments in forests and forestry
	6.5	Forest sector workforce	Number of persons employed and labour input in the forest sector, classified by gender and age group, education and job characteristics
	6.6	Occupational health and safety	Frequency of occupational accidents and occupational diseases in forestry
	6.7	Wood consumption	Consumption per head of wood and products derived from wood
	6.8	Trade in wood	Imports and exports of wood and products derived from wood
	6.9	Wood energy	Share of wood energy in total primary energy supply, classified by origin of wood
	6.10	Recreation in forests	The use of forests and other wooded land for recreation in terms of right of access, provision of facilities and intensity of use

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Appendix II. Azo dye restrictions

Included here are the substances listed in Entry 43 of Annex XVII to Regulation (EC) No 1907/2006 that shall not be permitted in any dyes, dyestuffs or pigment formulations.

Table 40. REACH restricted carcinogenic arylamines.

Aryl amine	CAS Number	Aryl amine	CAS Number
4-aminodiphenyl	92-67-1	3,3'-dimethyl-4,4'-diaminodiphenylmethane	838-88-0
Benzidine	92-87-5	4,4'-oxydianiline	101-80-4
4-chloro-o-toluidine	95-69-2	4,4'-thiodianiline	139-65-1
2-naphtylamine	91-59-8	o-toluidine	95-53-4
o-amino-azotoluene	97-56-3	2,4-diaminotoluene	95-80-7
2-amino-4-nitrotoluene	99-55-8	2,4,5-trimethylaniline	137-17-7
4-chloroaniline	106-47-8	4-aminoazobenzene	60-09-3
2,4-diaminoanisol	615-05-4	o-anisidine	90-04-0
4,4'-diaminodiphenylmethane	101-77-9	p-cresidine	120-71-8
3,3'-dichlorobenzidine	91-94-1	3,3'-dimethylbenzidine	119-93-7
3,3'-dimethoxybenzidine	119-90-4	4,4'-methylene-bis-(2-chloro-aniline)	101-14-4

A number of other dye compounds, which are not directly restricted by Entry 43 of Annex XVII to Regulation (EC) No 1907/2006, are known to potnetially cleave during processing to form some of the prohibited substances listed in Table 37. In order to avoid the need to potentially test for the substances in Table 37 in dyed paper, manufacturers are recommended, but not obliged, to avoid the use of the dyes listed in Table 38 below.

However, if any of the dyes used in Table 38 are used, then it shall be obligatory to test the dyed paper product for the presence of the restricted aromatic amines in table 37.

Table 41. Indicative list of dyes that may cleave to form carcinogenic arylamines

Disperse dyes		Basic dyes	
Disperse Orange 60	Disperse Yellow 7	Basic Brown 4	Basic Red 114
Disperse Orange 149	Disperse Yellow 23	Basic Red 42	Basic Yellow 82
Disperse Red 151	Disperse Yellow 56	Basic Red 76	Basic Yellow 103
Disperse Red 221	Disperse Yellow 218	Basic Red 111	
Acid dyes			
CI Acid Black 29	CI Acid Red 4	CI Acid Red 85	CI Acid Red 148
CI Acid Black 94	CI Acid Red 5	CI Acid Red 104	CI Acid Red 150
CI Acid Black 131	CI Acid Red 8	CI Acid Red 114	CI Acid Red 158
CI Acid Black 132	CI Acid Red 24	CI Acid Red 115	CI Acid Red 167
CI Acid Black 209	CI Acid Red 26	CI Acid Red 116	CI Acid Red 170
CI Acid Black 232	CI Acid Red 26:1	CI Acid Red 119:1	CI Acid Red 264
CI Acid Brown 415	CI Acid Red 26:2	CI Acid Red 128	CI Acid Red 265
CI Acid Orange 17	CI Acid Red 35	CI Acid Red 115	CI Acid Red 420
CI Acid Orange 24	CI Acid Red 48	CI Acid Red 128	CI Acid Violet 12
CI Acid Orange 45	CI Acid Red 73	CI Acid Red 135	
Direct dyes			
Direct Black 4	Direct Blue 192	Direct Brown 223	Direct Red 28

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Direct Black 29	Direct Blue 201	Direct Green 1	Direct Red 37
Direct Black 38	Direct Blue 215	Direct Green 6	Direct Red 39
Direct Black 154	Direct Blue 295	Direct Green 8	Direct Red 44
Direct Blue 1	Direct Blue 306	Direct Green 8.1	Direct Red 46
Direct Blue 2	Direct Brown 1	Direct Green 85	Direct Red 62
Direct Blue 3	Direct Brown 1:2	Direct Orange 1	Direct Red 67
Direct Blue 6	Direct Brown 2	Direct Orange 6	Direct Red 72
Direct Blue 8	Basic Brown 4	Direct Orange 7	Direct Red 126
Direct Blue 9	Direct Brown 6	Direct Orange 8	Direct Red 168
Direct Blue 10	Direct Brown 25	Direct Orange 10	Direct Red 216
Direct Blue 14	Direct Brown 27	Direct Orange 108	Direct Red 264
Direct Blue 15	Direct Brown 31	Direct Red 1	Direct Violet 1
Direct Blue 21	Direct Brown 33	Direct Red 2	Direct Violet 4
Direct Blue 22	Direct Brown 51	Direct Red 7	Direct Violet 12
Direct Blue 25	Direct Brown 59	Direct Red 10	Direct Violet 13
Direct Blue 35	Direct Brown 74	Direct Red 13	Direct Violet 14
Direct Blue 76	Direct Brown 79	Direct Red 17	Direct Violet 21
Direct Blue 116	Direct Brown 95	Direct Red 21	Direct Violet 22
Direct Blue 151	Direct Brown 101	Direct Red 24	Direct Yellow 1
Direct Blue 160	Direct Brown 154	Direct Red 26	Direct Yellow 24
Direct Blue 173	Direct Brown 222	Direct Red 22	Direct Yellow 48

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Appendix III Guarantees of origin certification across Members States

Table below provides a summary of key information on each of the Member States' GOs. Where information is available and accessible it provides the following information:

- The **competent body** for delivering the GO system and the associated link to the page where information on the scheme and who to contact can be found.
- The **coverage** of the GO in place, i.e. whether it includes renewable energy sources only or with high efficient cogeneration (CHP), both of which could be consumed by paper mills.
- The **transferability** of GOs across Member States, in terms of import and export.
- Whether or not the Member State is an **EECS member**, meaning their GOs are registered to an electronic system which allows the electronic transfer of certificates, enabling Member States to import and export certificates in line with EECS rules.
- **AIB link** to national datasheets of GOs and disclosure for each Member State. Within these datasheets the respective national systems for GOs and disclosure is described, as well as information on for example, renewable electricity support schemes.[27]
- A **conclusion** on the respective Member State's national system for GOs.

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[27] See: https://www.aib-net.org/national-datasheets-on-gos-and-disclosure

Table 42 Summary of Member States Guarantees of Origin

Country	Competent Body	Coverage	Transferability	EECS Member	AIB Link	Conclusion
Austria	Energie-Control Austria	Electricity	Yes	Yes	Link	Austria issues GOs for electricity only, is an EECS member and their GOs are transferable. Their system is advanced and well-functioning.
Belgium (Brussels)	CWAPE	Electricity and CHP	Yes	Yes	Link	Belgium (Brussels) issues GOs for electricity and CHP, is an EECS member and their GOs are transferable.
Belgium (Flanders)	VREG	Electricity and CHP	Yes	Yes	Link	Belgium (Flanders) issues GOs for electricity and CHP, is an EECS member and their GOs are transferable.
Belgium (Wallonia)	BRUEGEL (can't find specific webpage)	Electricity and CHP	Yes	Yes	Not available	Belgium (Wallonia) issues GOs for electricity and CHP, is an EECS member and their GOs are transferable.
Bulgaria	Sustainable Energy Development Agency (can't find specific webpage)	Electricity and CHP	Yes	No	Link	Bulgaria issues GOs for electricity and CHP, the country is not an EECS member but their GOs are still transferable. There is currently no disclosure system implemented, GOs are mainly used to determine eligibility for feed-in-tariffs.
Croatia	HROTE	Electricity and CHP (to be implemented)	Not yet	Planned	Link	Croatia currently issues GOs for electricity, CHP is soon to be implemented. The country has limited disclosure; GOs are used as a tracking instrument and are not yet transferable. Croatia is not an EECS member although this is planned. Disclosure is limited to electricity origin and does not address environmental concerns.

Cyprus	Cyprus Energy Regulatory Authority (can't find specific webpage)	Electricity and CHP	Yes	No	Link	Cyprus issues GOs for electricity and CHP. The country is not an EECS member but their GOs are transferable. Disclosure system not yet fully implemented.
Czech Republic	OTE (can't find specific webpage)	Electricity	Only imports. Exports not allowed until full disclosure system is implemented	Yes	Link	The Czech Republic issues GOs for electricity only. The country is not an EECS member and only trades imports. There is not a full disclosure system and only once this is in place will exports be traded.
Denmark	Energinet.dk	Electricity and CHP	Yes	Yes	Link	Denmark issues GOs for electricity and CHP, is an EECS member and their GOs are transferable. Denmark has issued a standard for green electricity and the country asks for an especially comprehensive list of attributes to be tracked for disclosure.
Estonia	Elering AS	Electricity and CHP	Yes	Soon	Link	Estonia issues GOs for electricity and CHP. The country has is soon to be an EECS member and their GOs are transferable.
Finland	Fingrid	Electricity and CHP	Yes	Yes	Link	Finland issues GOs for electricity and CHP, is an EECS member and their GOs are transferable.
France	Powernext	Electricity and CHP	Yes	Yes	Link	France issues GOs for electricity and CHP, is an EECS member and their GOs are transferable.
Germany	German Federal Environment Agency (UBA)	Electricity	Yes	No	Link	Germany issues GOs only for electricity and their GOs are transferable. Their system has been implemented in line with EECs rules but they are not a member.
Greece	Hellenic Electricity Market Operator (LAGIE)	Not Available	No	No	Link	There is limited information available for GOs in Greece. It is likely that there is currently no disclosure system in place and that the country is not trading GOs.

Hungary	MEKH	Electricity, heating and cooling	Yes	No	Link	Hungary issues GOs for electricity and heating and cooling. The country is not an EECS member but their GOs are transferable.
Ireland	SEMO	Electricity	Yes	No	Link	Ireland issues GOs for electricity only. The country is not an EECS member but their GOs are transferable.
Italy	GSE	Electricity and CHP	Yes	Yes	Link	Italy issues GOs for electricity and CHP, is an EECS member and their GOs are transferable.
Latvia	Ministry of Economics	Electricity and CHP	Yes	No	Link	Latvia issues GOs for electricity and CHP. The country is not an EECS member. Their GOs are transferable.
Lithuania	AB Litgrid	Electricity, heating and cooling	Yes	No	Link	Lithuania issues GOs for electricity and heating and cooling. The country is not an EECS member but their GOs are transferable.
Luxemburg	Luxemburg Institute of Regulation (ILR) (can't find specific webpage)	Electricity and CHP	Yes	Yes	Link	Luxemburg issues GOs for electricity and CHP. The country is an EECS member and their GOs are transferable.
Malta	Malta Resources Authority	Electricity and CHP	Yes	No	Link	Malta issues GOs for electricity and CHP. The country is not an EECS member but their GOs are transferable.
Netherlands	CertiQ	Electricity, heating and cooling	Yes	Yes	Link	The Netherlands issues GOs for electricity and heating and cooling. The country is an EECS member and their GOs are transferable.
Poland	Energy Regulatory Office/ The Polish Power Exchange/ ministry of economy (can't find specific webpage)	Electricity	Yes	No	Link	Poland issues GOs for electricity only. The country is not an EECS member but their GOs are transferable.
Portugal	EN is no longer the Portuguese competent body	Electricity, heating and	Yes	Yes	Link	Portugal issues GOs for electricity and heating and cooling. The country is an

	for guarantees of origin: this role has been inherited by the Directorate-General for Energy and Geology and the AIB Secretariat has already made contact with DGEG to discuss membership (can't find specific webpage).	cooling				EECS member and their GOs are transferable.
Romania	National Regulation Authority for Energy - ANRE has the responsibility to operate the electronic registry (can't find specific webpage).	Electricity	Yes	No	Link	Romania issues GOs for electricity only. The country is not an EECS member but their GOs are transferable.
Slovakia	Office for the Regulation of Network Industries	Electricity	Yes	Not Available	Link	Slovakia issues GOs for electricity only. It is unclear whether the country is a member of EECS, their GOs are transferable.
Slovenia	Javna agencija RS za energijo (AGEN-RG)	Electricity	Yes	Yes	Link	Slovenia issues GOs for electricity only. The country is an EECS member and their GOs are transferable.
Spain	National Energy Commission Since 2007, the Spanish National Regulatory Authority (National Commission on Markets and Competition - CNMC) is the official Issuing Body for guarantees of origin of electricity from renewable energy sources and high-efficiency cogeneration in Spain	Electricity & CHP	Not Available	Yes	Link (empty doc)	Spain issues GOs for Electricity and CHP. The country is an EECS member, there is no information as to whether their GOs are transferable.
Sweden	The Swedish Energy Agency is preparing to take over the role as issuing body for EECS guarantees of origin from June 1st 2017, provided that the AIB approves the Swedish Energy Agency as	Electricity & CHP	Yes	No (but there is a separate EECS issuing body, Grexel)	Link	Sweden issues GOs for Electricity and CHP. The country is not a member of Grexel, a separate EECS issuing body. Their GOs are transferable.

	member on June 9th 2017. EECS guarantees of origin will thereafter be issued in the Swedish Energy Agency's registry Cesar (new link blank).					
UK	Ofgem	Electricity & CHP (but no electronic register for the latter)	Yes	No	Link	The UK issues GOs for electricity and CHP. The country is not an EECS member but their GOs are transferable.

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