

**The European Commission's
science and knowledge service**

Joint Research Centre

EU Ecolabel revision for hard coverings criteria

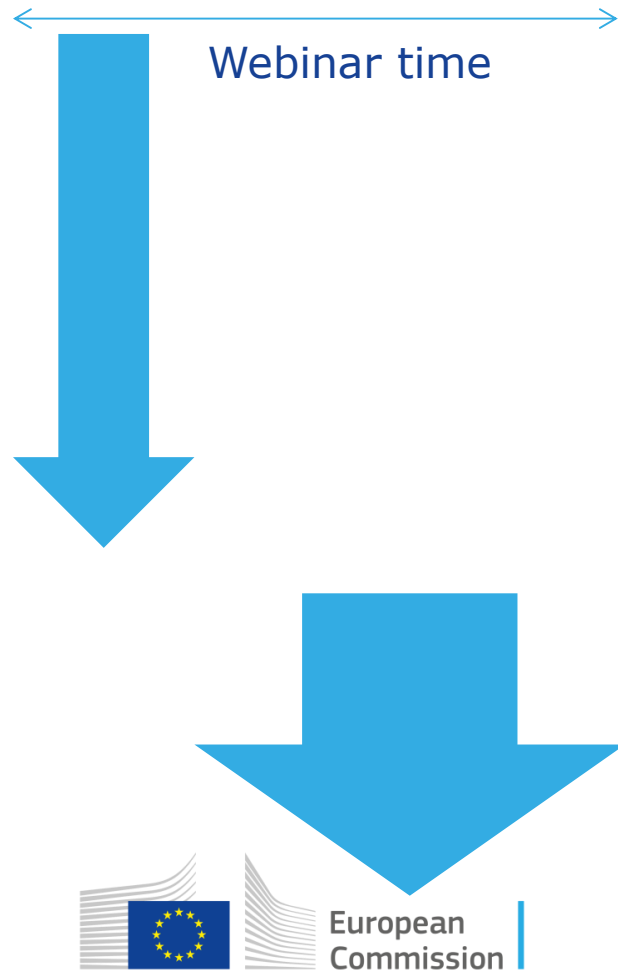
**1st Ad-Hoc Working Group meeting
Webinar on Natural and
Agglomerated stone products**

*Shane Donatello, Elena Garbarino and
Asuncion Fernandez Carretero*



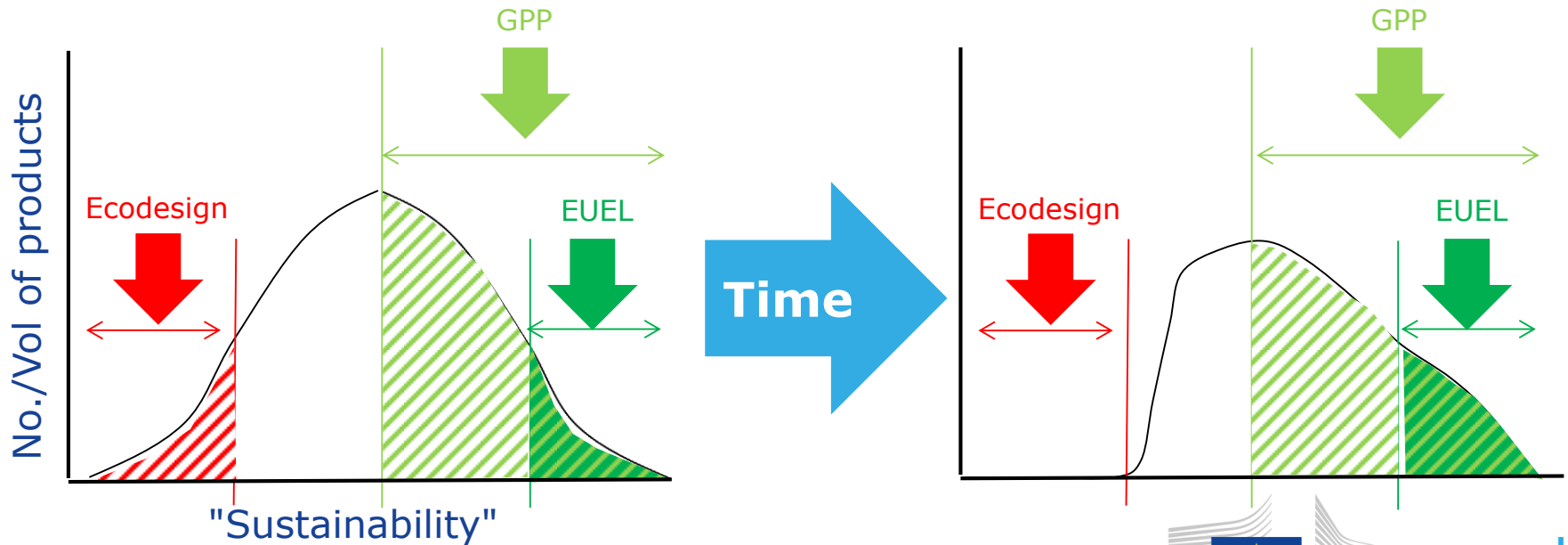
Contents

- Policy and project background.
- Uptake.
- Timeline.
- REFIT considerations.
- Green Building Assessment schemes.
- EPDs (Environmental Product Declarations).
- Aim of the 1st AHWG meeting.
- Scope and definition considerations.
- **Criteria structure and scoring approach.**
- **A look at horizontal criteria.**
- **A look a sub-product specific criteria.**
 - **Natural stone products.**
 - **Agglomearted stone products.**



Policy background

- EU Ecolabel, part of the Sust. Consumption & Production policy.
- COM(2008) 397.
- 26 product groups, > 2100 licenses, >71000 products/services*



Project background

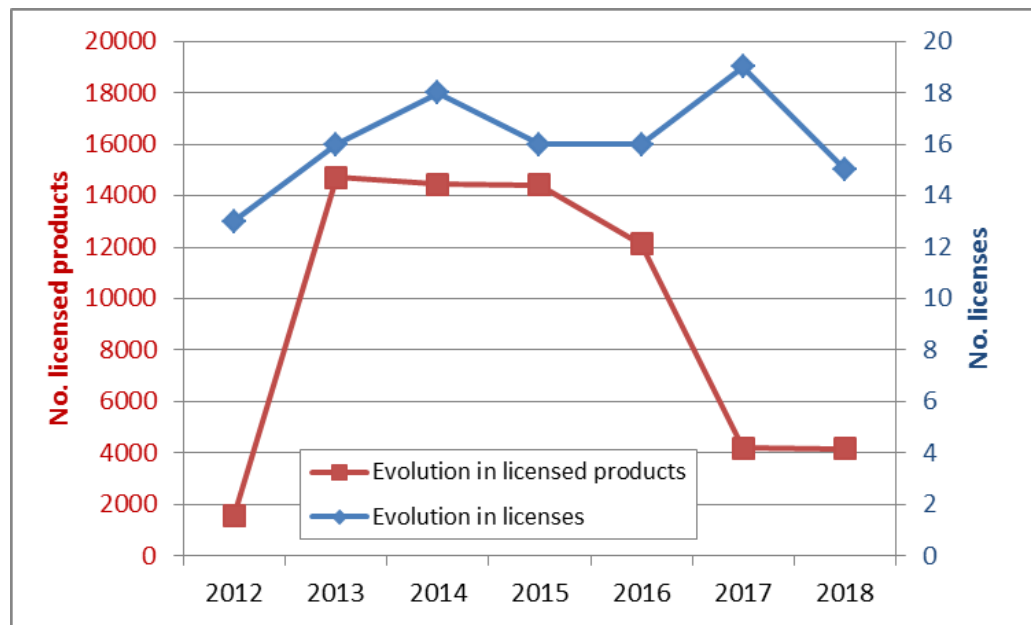
- Existing criteria published in Decision 2009/607/EC.
 - Prolonged until June 2021.
 - Criteria are already 9 years old.
 - Criteria were published before current EU Ecolabel Regulation (EC) No 66/2010.
-
- **A revision of EU Ecolabel criteria is much needed!**

Uptake

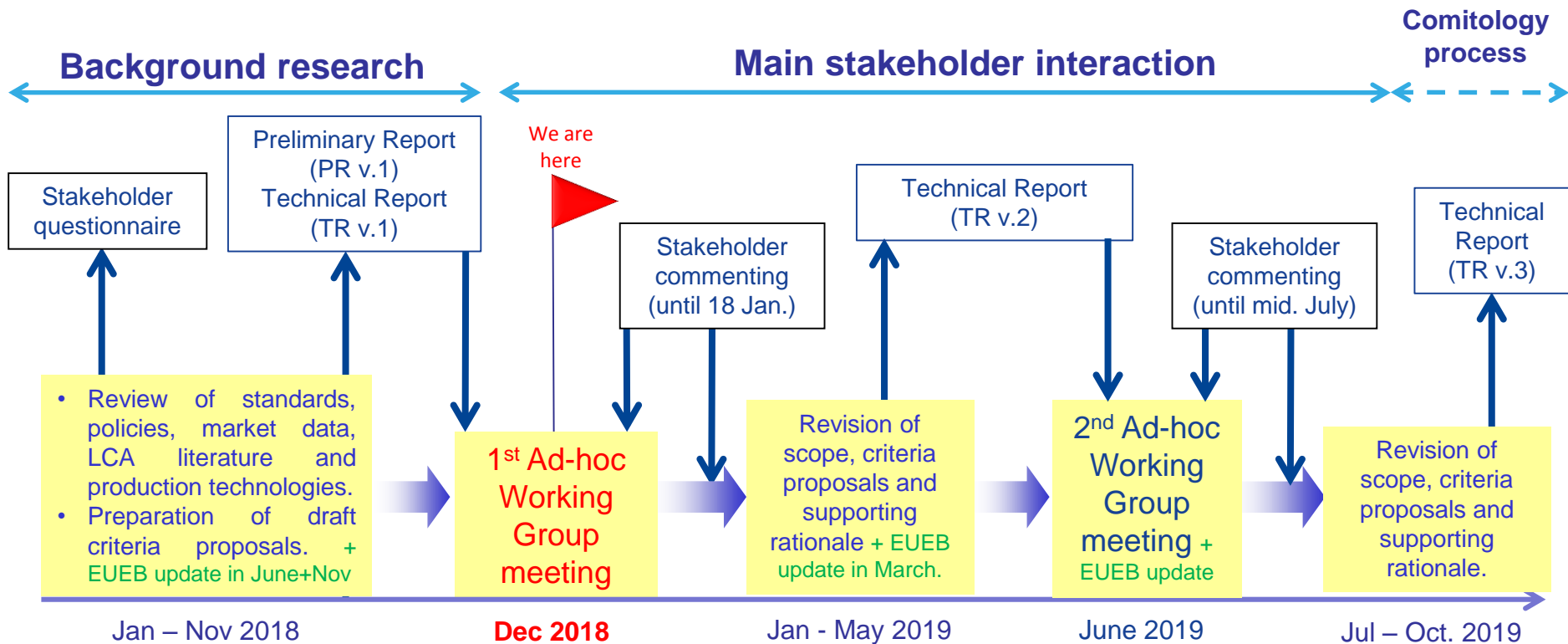
- Moderate uptake achieved for ceramics (mainly IT).
- Small uptake for natural stone (ES). *Concrete + Aggl. Stone = 0*
- Declining trend in licensed products.....*why?*

	Evolution in licenses						
	2012	2013	2014	2015	2016	2017	2018
CZ	1	1	1	0	0	1	1
IE	1	1	1	1	1	1	0
UK	3	0	0	0	1	1	1
ES	1	2	2	1	2	5	4
IT	7	12	14	14	12	11	9
TOTAL	13	16	18	16	16	19	15

	Evolution in licensed products						
	2012	2013	2014	2015	2016	2017	2018
CZ	1	4	4	0	0	2	2
IE	1	35	35	35	35	35	0
UK	6	0	0	0	14	14	14
ES	10	6	44	40	44	575	571
IT	1520	14651	14352	14352	12024	3561	3235
TOTAL	1538	14696	14435	14427	12117	4187	3822

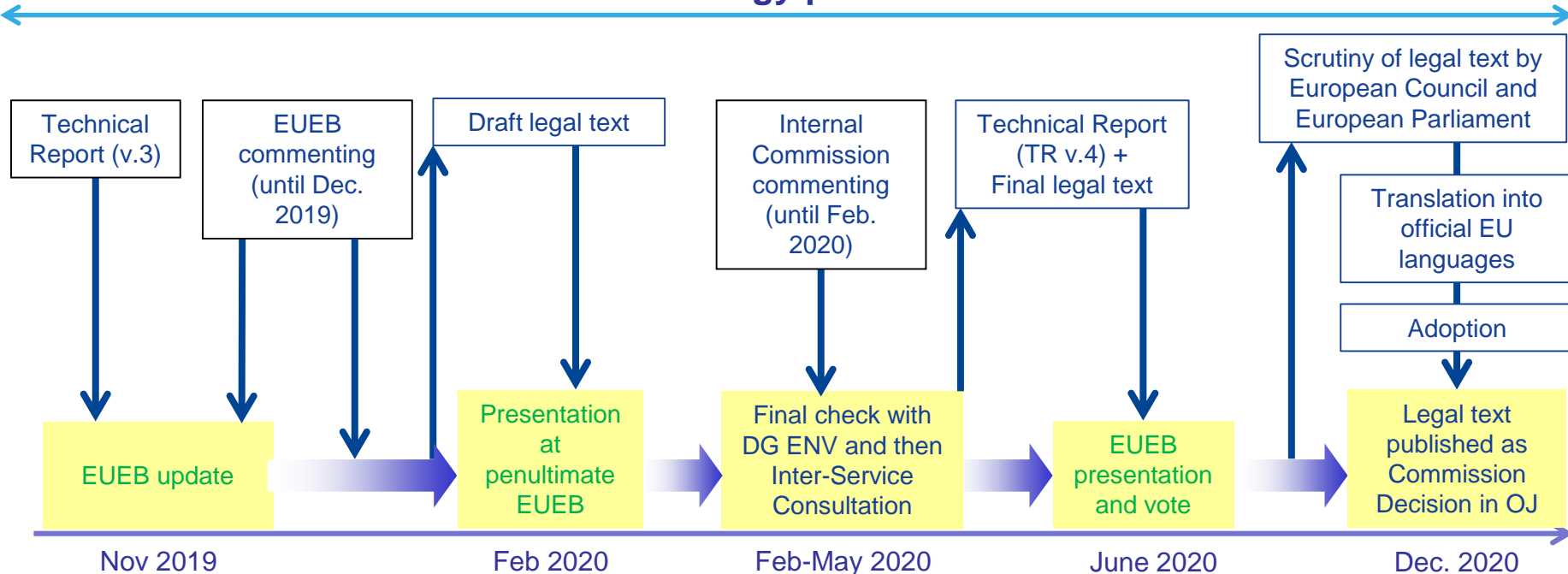


Timeline-1



Timeline-2

Comitology process



REFIT considerations

- Is the EU Ecolabel Regulation working? → REFIT exercise
- Result → *Yes, but could do better!* (see COM(2017) 355).
- Need to improve awareness and uptake.
- Better integration with EMAS and Green Public Procurement.
- Reduce Commission administration efforts (bundling of similar products into a single Commission Decision).
- Reduce criteria complexity (especially with Article 6(6) compliance). Base criteria on data that applicants can easily obtain AFAP.
- Reduce assessment and verification efforts/costs.
- **Need to embrace circular economy opportunities and other related Commission policy goals.**

Green Building Assessment (GBA) schemes

- Look at the environmental impact of buildings.
- A holistic approach but not an LCA as such.
- Specific aspects defined and assessed, **e.g. materials**.
- Well-known and successful in general.
- A plethora of schemes out there: BREEAM, LEED, HQE, VERDE, DGNB etc.
- Commission has launched Level(s) to try and set some common ways of reporting certain building indicators.
- **Major boost** for EU Ecolabel if hard coverings recognised by GBAs.
- EPDs are already recognised but EU Ecolabel not. *Why?*



Environmental Product Declarations (EPDs)

- At global level: ISO 14025 (Type III).
- At EU level, for construction products: **EN 15804 and CEN/TC 350.**
- LCA approach.
- 3rd party certified.
- Quantitative data.
- Assumptions behind them.
- Useful for B2B sector.
- Rise of sectorial EPDs....
- But not understandable to end consumer.
- EPD is no guarantee of envi. excellence – **benchmarks needed!**

Impact	Unit	Value
Global warming potential	Kg CO2 eq.	10.7E-01
Acidification potential	Kg SO2 eq.	3.87E-03
Eutrophication potential	Kg PO4 eq.	1.1E-02
Ozone Depletion Potential	Kg CFC11 eq.	6.1E-07
Photochemical Oxidant Creation Potential	Kg C2H4 eq.	2.8E-04
Abiotic depletion potential	Kg Sb eq.	8.1E-09

Main aims of 1st AHWG meeting

- To present initial ideas about criteria revision and scope.
- To put a lot of criteria on the table.
- Obtain feedback (during and after the meeting) about:
 - The scope and definitions
 - Which criteria are most important (even if not originally proposed).
 - Which criteria could be dropped (REFIT → reduce complexity).
- Identify more specialised stakeholders for further discussion about the criteria revision up until and including 2nd AHWG meeting.
- *Bonus – to obtain feedback about ambition levels of criteria.*

Scope considerations

- REFIT says increase uptake:
- REFIT says increase awareness:
- REFIT says to bundle products:
- EPDs cover ALL construction products:
- GBAs look at ALL construction materials:



Expand scope for EU Ecolabel HC

Already decided to include:

- Kitchen countertops
- Table tops

(Relevant for natural stone, agglomerated stone and ceramics. Important future link to furniture PG)

Propose to include:

- Roofing tiles
- Masonry units

(Relevant for natural stone, concrete and ceramics)

Definitions-1

Decision 2009/607/EC

The product group 'hard coverings' shall comprise — for internal/external use, without **any relevant structural function** — natural stones, agglomerated stones, concrete paving units, terrazzo tiles, ceramic tiles and clay tiles. For hard coverings, the criteria can be applied both to floor and wall coverings, if the production process is identical and uses the same materials and manufacturing methods.

Current proposal

The product group 'hard coverings' shall comprise **floor coverings and wall coverings**, for internal or external use and without **any relevant loadbearing function for building structures**.

Hard coverings shall be made of either: natural stone, agglomerated stone, unreinforced concrete, terrazzo tiles, ceramic tiles or clay pavers.

- **Red text**, to clarify better what is meant by "*structural*".
- Still need to incorporate kitchen counters and table tops **in green text** (and potentially roofing tiles and masonry units). *Opinions?*
- "*Clay pavers*" should say "*fired clay*".

Definitions-2

Specific material standards:

- Agglomerated stone (EN 14618). But also known as "*manufactured stone*" and "*engineered stone*". Cement or resin bound...
- Terrazzo tile (EN 13748). Cement bound only.
- *Difference between cement-bound agglomerated stone and cement-bond terrazzo tile? Where would "epoxy-terrazzo" come in as well?*
- Ceramic tiles (EN 14411: extruded or dry-pressed).
- Concrete paving blocks, paving flags and kerb units (EN 1338-1340).
- Natural stone (EN 1467-1469, EN 12057-12059, EN 1341-1343).

Other potentially relevant standards:

- EN 771 masonry units → engage with CEN/TC 125.
- EN ??? Roofing tiles → engage with CNT/TC 128.
- ¹⁴ EN ??? Kitchen countertops → *engage with who?*

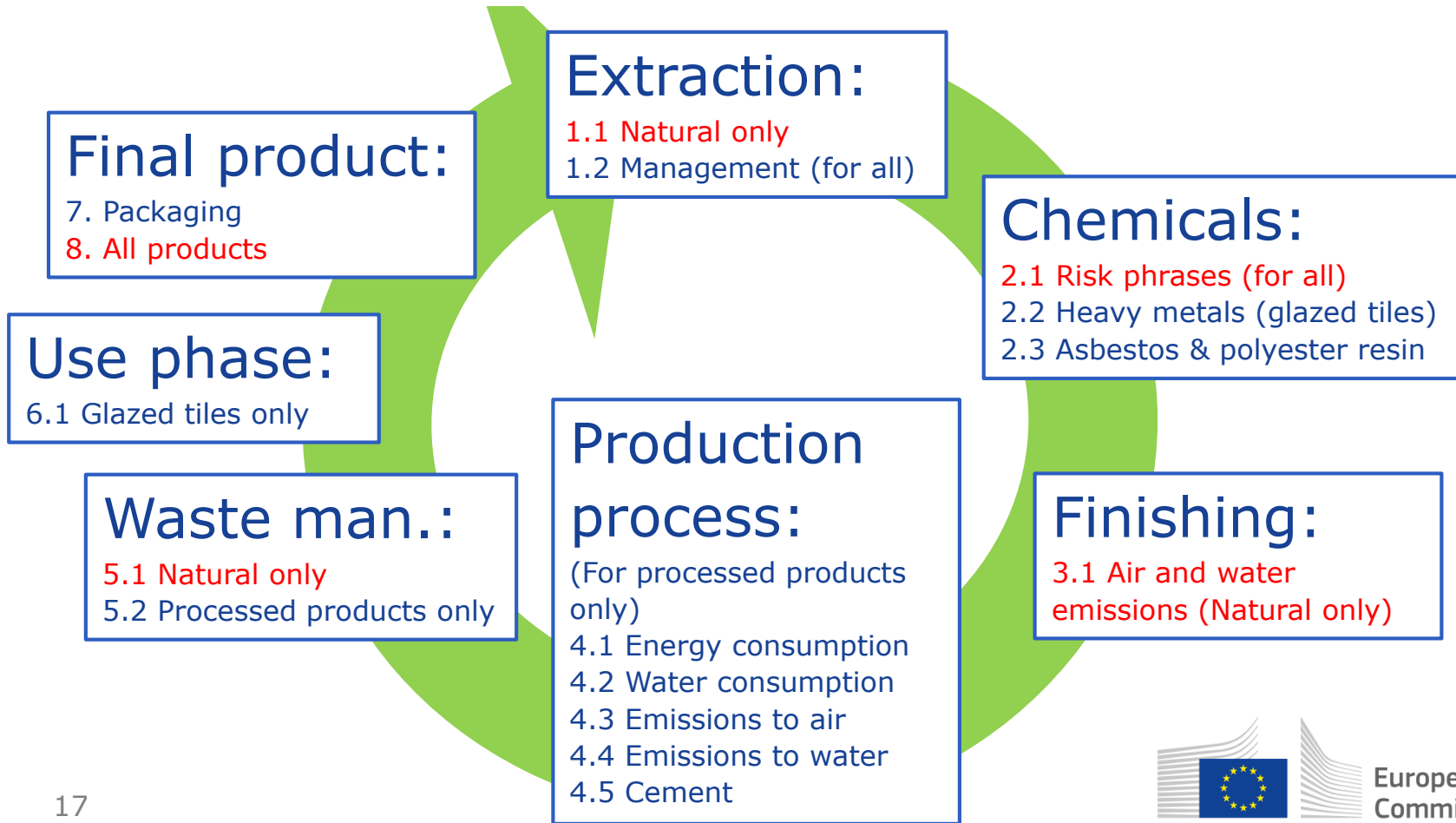
Questions on the high level introductory points?

- Project background?
- Uptake?
- Timeline?
- REFIT considerations?
- Green Building Assessment schemes?
- EPDs (Environmental Product Declarations)?
- Aim of the 1st AHWG meeting?
- Scope considerations?
- Definitions?

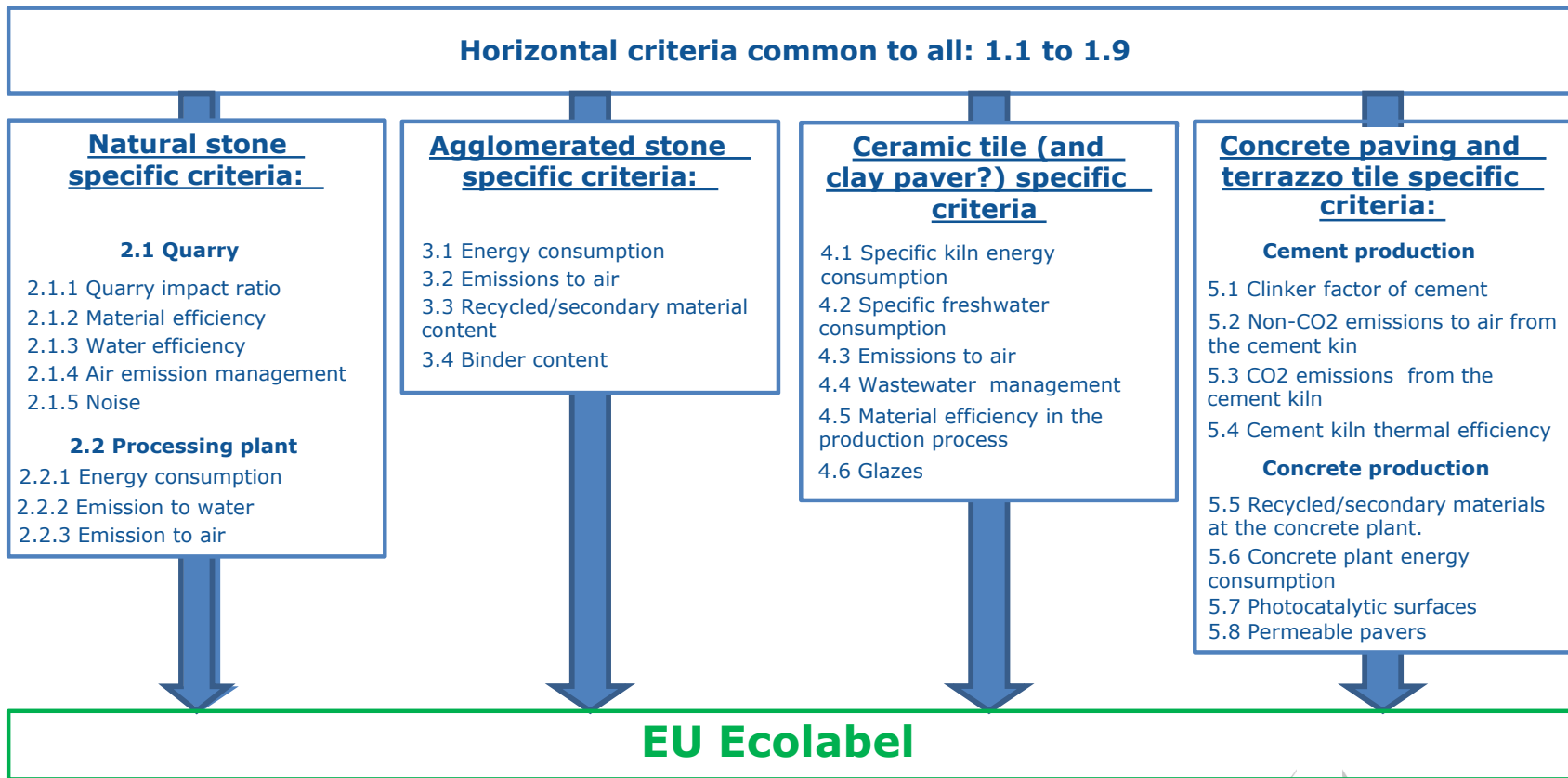
CRITERIA

- General structure.
- Scoring approach.
- Horizontal criteria (not to be read out entirely in webinar).
- Specific criteria (not to be read out entirely in webinar).

Old Criteria Structure



New structure



Scoring approach

- Most criteria have a mandatory element. *Why? → safety net.*
- Some criteria have points. *Why? → encourage all improvement.*
- Some criteria are optional and have points. *Why? → niche/innovative.*
- To get EU Ecolabel, minimum number of points needed (e.g. 50 out of 100).
- No bronze, silver, gold though. *Opinions?*
- No mention of points inside EU Ecolabel logo. *Inconsistency with other EU Ecolabel product groups.*
- But could be mentioned elsewhere by license holder...
- And could be distinguished by GBAs or award criteria in GPP.
- General aim: *bigger environmental impact = more points* but also need to not place all points in supply chain.

Horizontal criteria: apply to all sub-products

1.1 Environmental Management System

JRC considers essential

1.2 Raw material extraction

1.3 Hazardous substances

JRC considers as potentially interesting but needs discussion.

1.4 Asbestos

1.5 VOC emissions

1.6 Business to consumer packaging

JRC considers as a potential criteria to be removed (little added value).

1.7 Fitness for use

1.8 Consumer information

1.9 Information appearing on the ecolabel

All criteria subject to stakeholder discussion and opinions.

Questions after 1.3, after 1.6 and after 1.9.

Criterion 1.1. Environmental Management System



The applicant shall have a documented Environmental Management System in place.

EU Ecolabel points

The applicant shall have a documented environmental management system according to **ISO 14001** in place and certified by an accredited organization (2 points).

or

The applicant shall have a documented environmental management system according to the **EU Eco-Management and Audit Scheme (EMAS)** in place and certified by an accredited organization (5 points).

Assessment and verification:

The applicant shall provide a declaration of compliance with the mandatory requirement of this criterion, supported by a copy of their own Environment Management System documentation.

Where points are claimed for ISO 14001 or EMAS certification, the applicant shall provide a copy of the ISO 14001 or EMAS certificate, as appropriate, and provide the Competent Body with the details of the organization which carried out the accreditation.

In cases where an applicant has both ISO 14001 and EMAS certification, only the points for the EMAS certification shall be awarded.



Criterion 1.1. Environmental Management System

Rationale

- Environmental Management System is needed to be able to systematically collect some or all of the data that would be asked for to demonstrate compliance with EU Ecolabel criteria.
- External certification of EMS not obliged, but encouraged.
- REFIT exercise: better integration with EMAS, most points for EMAS.
- EMAS is still more comprehensive than ISO 14001.

Criterion 1.2. Raw material extraction management activities

The extraction of industrial and construction minerals (for example limestone, clay, aggregates, ornamental or dimension stone etc.) to manufacture any EU Ecolabel hard covering product shall respect the following requirements, as appropriate.

Extraction activity carried out within the EU:

If they are extracted from Natura 2000 network areas, composed of Special Protection Areas under Directive 2009/147/EC on the conservation of wild birds, and Special Areas of Conservation under Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora, extraction activities **have been assessed and authorised in accordance with the provisions of Article 6 of Directive 92/43/EEC** and taking into account the EC Guidance document on non-energy mineral extraction and Natura 2000.

Extraction activity carried out outside the EU:

If they are extracted from areas officially nominated as candidates for or adopted as Areas of Special Conservation Interest, part of the Emerald network pursuant to Recommendation No. 16 (1989) and Resolution No. 3 (1996) of the Standing Committee of the Convention of the Conservation of the European Wildlife and Natural Habitats (Bern Convention), or protected areas designated as such under the national legislation of the sourcing / exporting countries, the extraction activities **have been assessed and authorised in accordance with provisions that provide assurances equivalent to Directives 2009/147/EC and 92/43/EEC.**

Assessment and verification:

In case industrial or construction mineral extraction activities have been carried out in Natura 2000 network areas (in the EU), the Emerald network or protected areas designated as such under the national legislation of the sourcing/exporting countries (outside the EU), the applicant shall provide a declaration of compliance with this requirement issued by the competent authorities or a copy of their authorisation issued by the competent authorities.

Criterion 1.2. Raw material extraction management activities

Rationale

- The requirement on Natura 2000 sites comes from previous discussions that led to this same text for EU Ecolabel Soil Improvers and Growing Media (see Decision (EU) 2015/2099).
- But unintentionally deleted the parts on non-Natural sites...*a mistake!*
- Propose to reintroduce the authorisation, envi. recovery plan/impact assessment and the map of the quarry(ies).
- *What can be considered as equivalent to assurances of Directives 2009/147/EC or 92/43/EEC in reality?*

↑
Birds Directive

↑
Habitats Directive

Criterion 1.3. Hazardous substance restrictions

a) Restrictions on Substances of Very High Concern (SVHC)

The **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 greater than 0.10% w/w**. **No derogation** from this requirement shall be granted.

Assessment and verification:

The applicant shall provide a declaration that the product does not contain any SVHC in concentrations greater than 0.10 % (weight by weight). The declaration shall be supported by safety data sheets of process chemicals used or appropriate declarations from chemical or material suppliers. The list of substances identified as SVHC and included in the candidate list in accordance with Article 59(1) 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.

b) Classification, Labelling and Packaging (CLP) restrictions

Unless derogated, the **product shall not contain substances** or mixtures in concentrations greater than **0.10% (w/w)** that are classified with any of the following hazard statements in accordance with Regulation (EC) No 1272/2008:

- **Group 1 hazards:** Category 1A or 1B 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.
- **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.

The use of **substances or mixtures** that are **chemically modified** during the production process so that any relevant restricted CLP hazard no longer applies **shall be exempted** from the above requirement.

Assessment and verification:

The applicant shall provide a list of all relevant chemicals used in their production process together with the relevant safety data sheet or chemical supplier declaration. Any chemicals containing substances or mixtures with restricted CLP classifications shall be highlighted. The approximate dosing rate of the chemical, together with the concentration of the restricted substance or mixture in that chemical (as provided in the safety data sheet or supplier declaration) and an assumed retention factor of 100 %, shall be used to estimate the quantity of the restricted substance or mixture remaining in the final product. Justifications for any deviation from a retention factor of 100 % or for chemical modification of a restricted hazardous substance or mixture must be provided in writing to the competent body. For any restricted substances or mixtures that exceed 0.10 % (weight by weight) of the final hard covering product but are derogated, proof of compliance with the relevant derogation conditions must be provided.

Criterion 1.3. Hazardous substance restrictions

Rationale

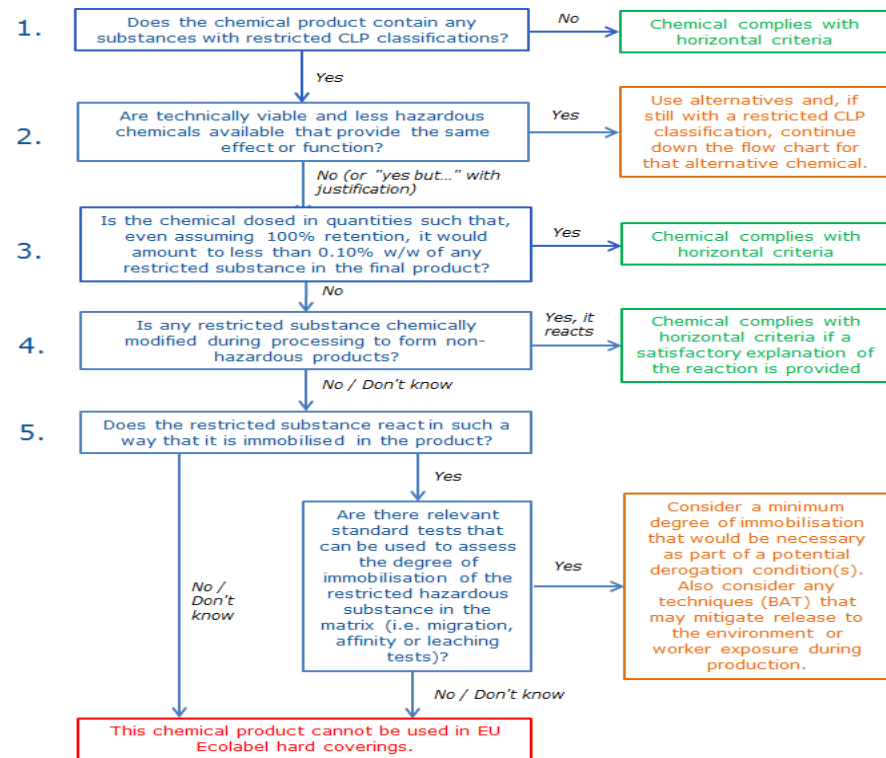
- Had to change to respect Article 6(6) of the 2010 EU Ecolabel Regulation.
- Follows the recommendations of the EU Ecolabel Chemicals Task Force.
- Wording is based predominantly on the most recently voted product group, which is an article (i.e. Graphic paper & Tissue paper).
- 0.10% threshold applies to weight of article or entire glazed article.
- Chemical modification → e.g. resin polymerisation, exemption by default.
- Physical immobilisation → e.g. pigment, no exemption but derogation conditions can be considered (e.g. maximum leachability under standard conditions).
- Any derogations need to be discussed and agreed before adoption, later amendments are problematic. TiO₂ proposed even though not yet classified.
- *Input needed about the use of hazardous substances in the production process and their chemistries in general.*

Criterion 1.3. Hazardous substance restrictions

Step-wise process:

1. Know the chemicals going in (SDS).
2. Are there haz. substances?
3. Know the quantities involved.
4. Chemical modification?
5. If not, do they remain in the product?
6. If so, is there a derogation.

Please share any relevant SDSs and any relevant dosing rate ranges.



Questions / comments

- Criteria structure
- General scoring approach
- 1.1 Environmental Management System.
- 1.2 Extraction Management.
- 1.3 Horizontal hazardous substance requirement.

Criterion 1.4. Asbestos

No asbestos shall be present in the raw materials used for the manufacture of hard coverings products, as laid down in entry 6 of Annex XVII to Regulation (EC) No 1907/2006.

Assessment and verification:

The applicant shall provide a declaration of compliance with the criterion. In cases where natural stone is used, the applicant shall additionally specify the type of stone used. If the natural stone is one of the types at risk of containing naturally occurring asbestos, the Competent Body may request the applicant to provide a representative chemical and mineralogical analysis of the natural stone.

Rationale

- Requirement already present in Decision 2009/607/EC.
- May be unintentionally present in certain natural stone.
- But of questionable added value as a criterion. General need to streamline criteria and focus on main areas (REFIT). *Opinions?*
- Already covered by horizontal criteria >0.10%....

Criterion 1.5. VOC emissions



The applicant shall declare if the final product surface has been treated with any waxes, adhesives, coatings, resins or similar surface treatment chemicals.

In cases where treatment has been carried out, safety data sheets or supplier declarations for the waxes, adhesives or resins used shall be provided together with the approximate dosing rate used and an estimate of the total quantity of the resin or wax remaining in the final product.

No formaldehyde-based resins are permitted.

In cases where the VOC content of the wax or resin used exceeds 5% and the total quantity of wax or resin on the final product accounts for more than 1% of the final product weight, VOC emissions of the final product shall also be tested.

EU Ecolabel points

Up to a maximum of 5 points shall be awarded for applicants that can demonstrate compliance with the following aspects:

Where the wax or resin used is less than 1% by weight of the final product (2 points).

Where the wax or resin used has a VOC content less than 5% by weight (3 points).

Where the results of a chamber test according to EN 16516 or ISO 16000 show that after 28 days the air concentration is: ≤ 0.01 mg/m³ formaldehyde; ≤ 0.3 mg/m³ TVOC, ≤ 0.1 mg/m³ TSVOC and ≤ 0.001 mg/m³ category 1A and 1B carcinogens (excluding formaldehyde); styrene 450 μ g/m³ (5 points).

Where **no final surface treatment with VOCs** has been applied (5 points).

Assessment and verification:

The applicant shall provide a declaration of the use or non-use of surface treatment chemicals used during product finishing operations.

In cases where such chemicals have been used, the safety data sheet or supplier declarations shall be provided regarding the VOC content. Furthermore, the applicant shall provide an estimate of the quantity of surface treatment chemicals used in the finishing operations (in g or ml per m²) and how much remains in the final product (% w/w).

In cases where a VOC emission test is required, or where the applicant voluntarily wishes to obtain the extra 5 points for compliance with this requirement, the applicant shall provide a declaration of compliance, supported by a test report carried out according to EN 16516 or the ISO 16000 series or standards. If compliance with the chamber concentration limits specified at 28 days can be met at any other time between 3 and 28 days, the chamber test may be stopped prematurely.

A maximum of 5 points can be awarded under this criterion.



Criterion 1.5. VOC emissions

Rationale

- Hard coverings can be coated with waxes and resins.
- But VOC emissions not normally an issue *except agglomerated stone*.
- Want to positively recognise this aspect in *all hard covering products*.
- Plug into recognition by Green Building Assessment schemes.
 - E.g. BREEAM and LEED.
- Testing only an option, not mandatory.
- No surface treatment = Surface treatment complying with limits.
- Limits set correspond to requirements defined in BREEAM (exemplary).
- Styrene limit also added (important when polyester resins used).
- *Request for information (SDSs) of surface treatment chemicals.*

Criterion 1.6. Business to consumer (B2C) packaging

Packaging must be made out of one of the following:

- materials made out or **recycled** materials
- materials intended to be **reusable**;
- easily recyclable materials;

Assessment and verification:

A sample of the product packaging shall be provided together with a corresponding declaration of compliance with all the requirements.

Tiles packed in cardboard boxes



Natural stone stacked in wooden crates



loose gaps tightened with filling material like wood, foamsheet



Criterion 1.6. Business to consumer packaging

Rationale

- Existing requirement in Decision 2009/607/EC (paperboard packaging design for reuse or 70% recycled content).
- Quite a narrow focus (only paperboard).
- Type and specific quantity of packaging can vary a lot.
- Wood, wood fibres, polystyrene and plastic film also important.
- Focus now expanded to all packaging materials, but
- *Is B2C packaging really important in terms of environmental impacts? (REFIT)*
- *Or is it an important aspect to maintain with regards to the circular economy? Which the EU Ecolabel should support (REFIT)*
 - ***In latter case, need to define "reusable" and "easily recyclable"?***

Questions/comments

- 1.4 Asbestos.
- 1.5 VOC emissions.
- 1.6 Business to Consumer (B2C) packaging.

Criterion 1.7 Fitness for use

The applicant shall have a quality control and quality assessment procedure in place to ensure that products are fit for use. Where relevant, evidence demonstrating fitness for use may be provided. Any such evidence provided should be based on test results according to appropriate ISO or EN standards or equivalent test methods. An indicative list of potentially relevant standards is included below.

Assessment and verification:

The applicant shall provide a declaration of compliance with the criterion, supported by a description of their in-house quality control and quality assessment procedures.

In cases where test data according to EN or ISO standards, or equivalent methods is considered necessary, an indicative list of potentially relevant standards is indicated below:

- Natural stone: EN1341, EN1342, EN1343, EN1467, EN1468, EN 1469, EN12057, EN12058 or EN12059;
- Cement-based terrazzo tiles: EN13748
- Agglomerated stone: EN15285, EN15286, EN 15388 or EN16954
- Clay pavers and ceramic tiles: EN1344, **EN13006** or EN 14411
- Concrete paving blocks, flags and kerb units: EN1338, EN1339 or EN1340

Rationale

- Good quality products will tend to have longer life.
- Requirements applicable for construction material CE marking (not for counter-tops and table tops though).
- No limits set because too much nuancing needed.
- *If no specific requirements, do we need it? (REFIT)*

Criterion 1.8. Consumer information

The product shall be sold with **relevant user information**, which provides advice on the product's **proper and best general and technical use** as well as its **maintenance**. It shall bear the following information on the packaging and/or on documentation accompanying the product:

- a) **Recommendations for correct use and storage** so as to maximise the product lifetime (e.g., whether the product needs coating or sealing, etc). As appropriate, reference should be made to the features of the product's use under difficult climatic or other conditions, for example, frost resistance/water absorption, stain resistance, resistance to chemicals, necessary preparation of the underlying surface, cleaning instructions and recommended types of cleaning agents and cleaning intervals. The information should also include any possible indication on the product's potential life expectancy in technical terms, either as an average or as a range value;
- b) **Installation instructions including recommended techniques and materials**. These instructions must not specify nor require the use of any component that does not comply with the materials requirements of this criterion.
- c) **Maintenance instructions**, if required. Maintenance instructions must not specify nor require the use of any chemical or coating limited by any part of this criterion.
- d) Recycling or environmentally preferable disposal instructions for the product end-of-life.

Assessment and verification:

The applicant should provide a sample of the packaging and/or texts enclosed.

Rationale

- A general requirement for almost all EU Ecolabel product groups.
- Important to ensure optimum use/maintenance of product.
- Correct installation is a crucial factor in all applications (some even more so).
- *Other suggestions welcome.*

Criterion 1.9. Information appearing on the ecolabel

The applicant shall follow the instructions on how to properly use the EU Ecolabel logo provided in the EU Ecolabel Logo Guidelines:

http://ec.europa.eu/environment/ecolabel/documents/logo_guidelines.pdf

If the optional label with text box is used, it shall contain the following three statements, as appropriate

For natural stone products:

- From limited landscape impact quarries;
- Material efficient extraction and processing operations;
- Reduced emissions to water and air.

For agglomerated stone products:

- Energy efficient production process;
- Reduced emissions to air;
- Maximum binder content xx% / minimum recycled or secondary material content yy% (as appropriate).

For concrete products:

- Reduced CO2 footprint cement
- Reduced air emissions
- Minimum recycled or secondary material content xx% / energy efficient production / anti-NOx surface / permeable paving (as appropriate)

For ceramic products:

- Energy efficient production process;
- Reduced emissions to air;
- Material efficient product (in case of thin format tiles < 10mm thick or tiles with a high recycled content > 10%)/Material efficient production process (in all other cases).

Assessment and verification:

The applicant shall provide a declaration of compliance with this criterion, supported by an image of the product packaging that clearly shows the label, the registration/licence number and, where relevant, the statements that can be displayed together with the label.

Criterion 1.9. Information appearing on the ecolabel

Rationale

- Standard criterion required for all EU Ecolabel product groups.
- As per Article 8 (3b).
- A simple message that can be communicated to consumers.
- Must be related to the EU Ecolabel criteria.
- Premature to specify the messages now.
- First need to agree on criteria.
- Then on final messages to the consumer.
- Message may differ depending on sub-product involved.

- *Maybe look at it from the opposite angle – what is the message we want to give? → then make sure criteria support that message...*

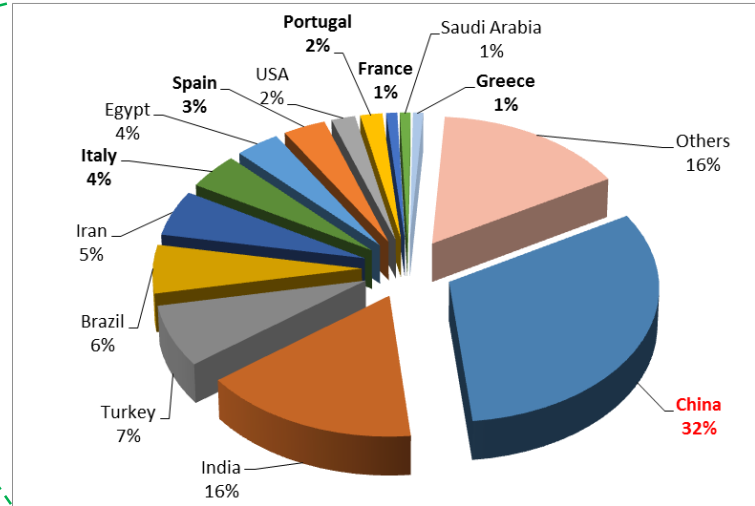
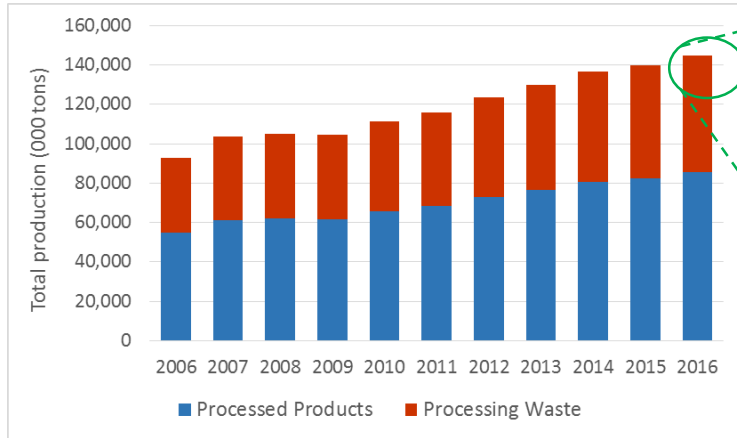
Questions/ comments

- 1.7 Fitness for use.
- 1.8 Consumer information.
- 1.9 Information appearing on the EU Ecolabel.

SUB-PRODUCT SPECIFIC CRITERIA

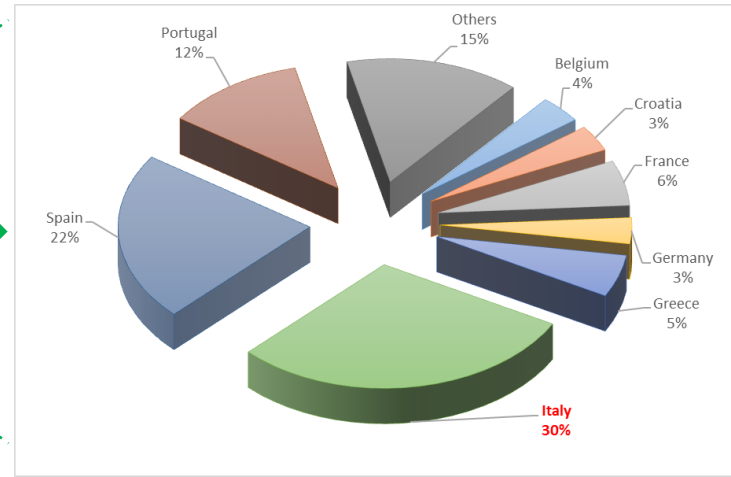
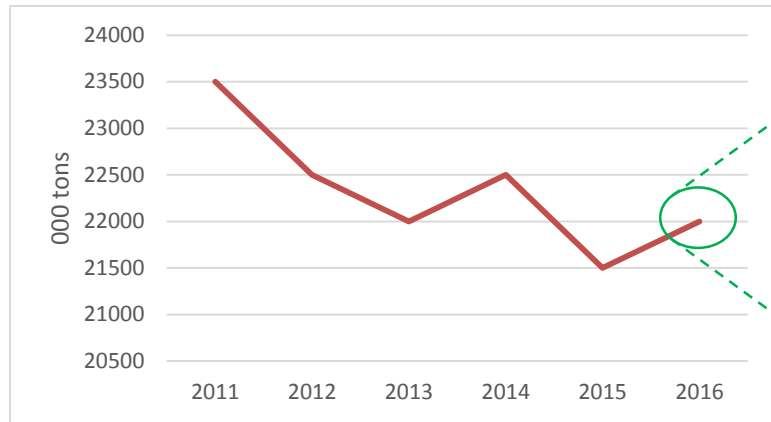
NATURAL STONE PRODUCTS

Market analysis - Worldwide



- Global production in 2016 = **85 Mt**
- Production dominated by China, India & Turkey (55%)
- Globally, 145 Mt rock → 85 Mt natural stone product (*i.e.* >40% waste)
- "Waste" can often be reused in "Agglomerated stone"...

Market analysis - Europe



- Total EU28 production in 2016 = **22 Mt** (26% of global)
- Production dominated by "Southern European" countries (IT, ES & PT).
- **Only 3 licences (9 products) !!!** In Spain

Classification - Mohs Scale of Hardness

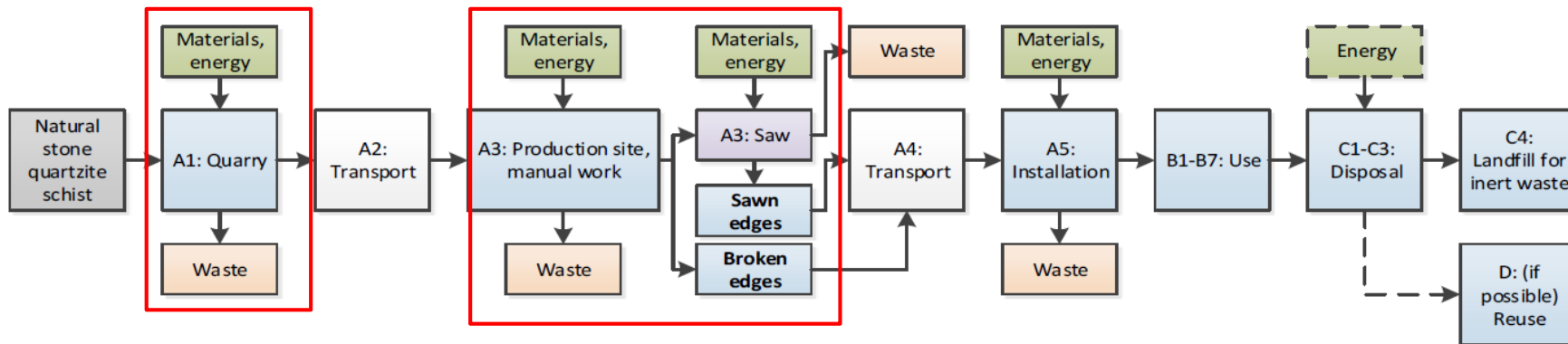
Classification	Mohs Scale		Examples
Sedimentary	3	Soft	Limestone, Travertine, Sandstone
Metamorphic	3- 4		Marbles, Serpentine (green marble) Onyx
Igneous	5-6	Hard	Granite Basalt



Influence the **techniques and machineries** to be used

Ex. Diamond wire technology --- soft stone quarries
Dynamic splitting ----- hard stone quarries

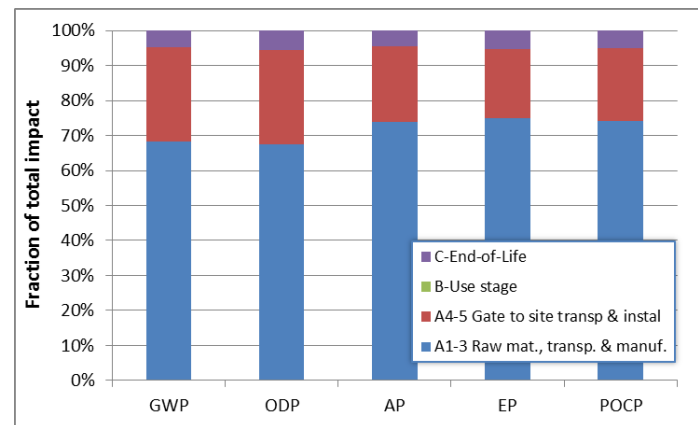
Environmental impacts –LCA



A1 and A3 is LCA hotspots

Environmental impacts are affected by :

- Characteristics of the quarry
- Mineral composition of the rock type
- Type of final product
- Technologies and machinery used
- Location



(Oppdal, 2015).

Manufacturing process – Environmental impacts

1. Quarrying Operations

- Pre-production operations
- Modelling
- Isolation of blocks by cutting them free on all sides



- Loss of natural landscape and biodiversity - Erosion
- Extraction of non renewable raw material
- Production of extractive waste (30-70%)
- Changes to local hydrology (water flow and quality)
- Air and water pollution
- Noise pollution

2. Processing Operations

2a. Cutting

Primary Cut
from BLOCK to SLABS

Secondary Cut
from SLABS to TILES



2b. Finishing Operations

Polishing



Curing



Edge Profiling



3. Storage

Packaging and Storage



- Energy demanding processes
- Loss of material finishing operations (5-30%)
- Water pollution

Environmental innovations and improvements

- 1. Resin treatments**
 - ➔ Increase yield of excavation (up to 80%)
 - Reinforce performance- mechanical properties of final product
 - Use of water-based resins (reduce VOC emissions)
- 2. Cutting tools**
 - ➔ Reduction energy consumption
 - Waste reduction (e.g. thinner cutting disks)
- 3. Modelling methods**
 - ➔ Optimization of extraction –defining productive cutting pattern
 - Reinforce performance- mechanical properties of final product
- 4. Dust reduction**
 - ➔ Structures to confine dust
- 5. Waste management**
 - ➔ Recycle of slurries
 - Use of sludge

New structure

Horizontal criteria common to all:
1.1 to 1.9

Natural stone specific criteria:

2.1 Quarry

- 2.1.1 Quarry impact ratio
- 2.1.2 Material efficiency
- 2.1.3 Water efficiency
- 2.1.4 Air emissions management
- 2.1.5 Noise

2.2 Processing plant

- 2.2.1 Energy consumption
- 2.2.2 Emission to water
- 2.2.3 Recycling of waste

Agglomerated stone specific criteria:

- 3.1 Energy consumption
- 3.2 Emissions to air
- 3.3 Recycled/secondary material content
- 3.4. Binder content

Ceramic tile (and clay paver?) specific criteria

- 4.1 Specific kiln energy consumption
- 4.2 Specific freshwater consumption
- 4.3 Emissions to air
- 4.4 Wastewater management
- 4.5. Material efficiency in the production process
- 4.6. Glazes

Concrete paving and terrazzo tile specific criteria:

- 5.1 Clinker factor of cement
- 5.2 Non -CO2 emissions to air from the cement kiln
- 5.3 CO2 emissions from the cement kiln
- 5.4. Cement kiln thermal efficiency
- 5.5 Recycled/secondary materials at the concrete plant
- 5.6. Concrete plant energy consumption
- 5.7 Photocatalytic surfaces
- 5.8 Permeable pavers

EU Ecolabel

Criterion 2 : Natural stone criteria and scoring system

Proposed criteria	Decision 2009/607/EC	Proposed criteria details	
		Mandatory?	Points?
1.1. Environmental Management System	No	Yes	5
1.5. VOC emissions	No	Yes	5
2.1 Quarry			
2.1.1 Quarry landscape impact ratio	Yes	Yes	15
2.1.2 Material efficiency	Yes	Yes	20
2.1.3 Water and wastewater management	Yes	Yes	5
2.1.4 Air pollution minimisation	Yes	Yes	-
2.1.5 Noise control	Yes	Yes	-
2.2. Processing plant			
2.2.1 Energy consumption	No	Yes	30
2.2.2 Emissions to water	Yes	Yes	-
2.2.3 Recycling of waste from processing operations	Yes	Yes	20
TOTAL points available in proposed criteria			100
MINIMUM points needed in proposed criteria			50

Questions/comments

- Market data for natural stone.
- LCA hotspot identification.
- Innovation and environmental improvements.
- Criteria structure for natural stone products.
- Scoring for natural stone products.

Criterion 2.1 Quarry requirements

2.1.1 Quarry landscape impact ratio

2.1.2. Material efficiency

2.1.3 Water efficiency

2.1.4 Air emissions management

2.1.5 Noise

Criterion 2.1.1. Quarry landscape impact ratio

The applicant shall identify the quarry from which the dimension stone or ornamental stone blocks have been procured. The impact of the quarry on the landscape shall be evaluated according to the following metrics:

$$\text{quarry footprint ratio} = \frac{QF_S (m^2) + EWDA (m^2) + BPDA(m^2)}{\text{total authorized area (m}^2\text{)}}$$

QFs is the **active quarry front** as observed from a satellite view.

EWDA is the **Extractive Waste Deposition Area**, including the Extractive Waste Facility.

BPDA is the **By-Products Deposition Area** occupied for storage of materials that may, in principle, qualify as by-products/products.

Authorized Area is the total **surface area authorized** in the permit for extraction activity.

$$\text{quarry visual impact} = \frac{QF_V (m^2)}{QF_S (m^2)}$$

QFv is the **vertical profile surface area** of the active quarry front. Any active quarry surface that is underground shall not be counted towards QFv but will be counted towards QFs.

Criterion 2.1.1. Quarry landscape impact ratio

- EU Ecolabel points.** Points shall be awarded for applicants that can prove the following
- Quarry footprint ratio of less than 0.6 and as low as 0.2 (Up to 5 points)
 - Quarry visual impact of less than XX and as low as 0 (Up to 5 points).
 - Demonstrate progressive rehabilitation activities during the operational phase (5 points).

Assessment and verification:

The applicant shall provide declare the quarry from which the material used to produce the EU Ecolabel natural stone tiles or slabs has been sourced, supported by delivery invoices.

Furthermore, a declaration from the quarry operator shall be provided together with documentation including maps or satellite images in which the QFs, EDWA, BPDA and the authorized area are outlines and estimations of the surface area of each provided.

The quarry operator shall also declare a value for the QFv value, which shall only count vertically exposed rock that has been cut and which is included in the same area as the QFs. The estimation of QFV shall be supported by photographic evidence.

Any points shall be awarded in proportion to how closely the result reaches the minimum threshold value (e.g. quarry footprint ratio of 0.51 = 0 points, quarry impact ratio of 0.2 = 5 points).

Criterion 2.1.1. Quarry landscape impact ratio

Rationale

The main purpose of this criterion is to recognise the efforts of quarries that:

- try to minimise the environmental impacts by **occupying less land area for quarrying and storage of extractive waste and by-products** (indirectly encouraging more efficient extraction practices and/or use of extractive waste and by-products);
- Avoid certain impacts to flora, fauna and visual landscape altogether by conducting **extractive activities underground**, and
- Undertake **progressive rehabilitation activities** during the operational period in order to reduce the risk of erosion.

The criterion rewards a responsible use of the land, regardless of the nature or the typology of the quarry

Progressive rehabilitation examples

Integrate the quarry with the natural landscape and restore the native vegetation, imitating the geomorphology of the area, and the natural vegetation (**EcoQuarry program**)

Technologically innovative computer simulation software tools were utilized for visual impact evaluation and simulation of the foreseen restored site.



Criterion 2.1.1. Quarry landscape impact ratio

Points for discussion about quarry landscape impact ratio

- Q. The Quarry Footprint Ratio is presented as a better explained version of what the authors understand to be the original quarry impact ratio. Opinions?
- Q. Is feasible to present the required values, QFs, EWDA, BPDA? Which values should be presented, an average from the last 12 months?
- Q. The Quarry Visual Impact is supposed to reward underground mining but it is uncertain what range of QFV/QFS values exist in reality. It could be >1.0 . Would be useful to be able to look at some quarry metrics to determine a range of values.
- Q. Would it be interesting to have any requirement for a rehabilitation/restoration plan?

Criterion 2.1.2. Material efficiency

The quarry operator shall, for the most recent calendar year provide data relating to the extraction activities and provide the following information:

- A:** Total quantity of **material extracted** (m³).
- B:** Yield of **saleable blocks sold** (m³).
- C:** Total quantity of **extractive waste and** materials that qualify as **by-products** (i.e. irregular blocks, stones and fine fraction) that is **sold or used internally** for useful purposes by replacing other materials which otherwise would have been used to fulfil that particular function (m³).
- D:** Total quantity of **extractive waste and** materials that qualify as **by-products** (i.e. irregular blocks, stones and fine fraction) that is stored from excavation that are **stored or deposited onsite** (m³).

In cases where data is available in tonnes, it should be converted to m³ using a fixed bulk density factor for the rock material being extracted.

Criterion 2.1.2. Material efficiency

a) Extraction efficiency ratio

The **minimum** extraction efficiency ratio that must be achieved is **0.25**, calculated as:

$$\text{extraction efficiency ratio} = \frac{B \text{ (Yield of saleable blocks sold m3)}}{A \text{ (Total quantity of material extracted m3)}}$$

EU Ecolabel points

Points shall be awarded for applicants that can demonstrate a higher extraction ratio up to best practice target of 0.50. (Up to 10 points)

b) Useful by-product/waste ratio

No minimum ratio is set. The ratio shall be calculated as:

$$\text{Useful by – product/waste ratio} = \frac{C \text{ (total extractive waste and by – products sold)}}{C + D \text{ (total extractive waste and by – products stored)}}$$

EU Ecolabel points

Points shall be awarded for applicants that can demonstrate a higher useful by-product/waste ratio up to a best practice target of 0.60. (Up to 10 points).

Criterion 2.1.2. Material efficiency

Rationale

The main purpose of this criterion is to recognise the efforts of quarries that:

1. try to **maximise the extraction efficiency**, thus **reducing the production of by-products and extractive waste** (\approx improving quarry footprint ratio)
 - 3D technologies - mapping and evaluation of joints, bedding planes, fault zones
maximize the economic value of big blocks*
reduce the production of extractive waste
 - Resins treatments – reinforcing the blocks mechanical properties

*Value of saleable block dominates quarry output.

Ex. Block Carrara marble 1600€/m³ but irregular block 7€/m³

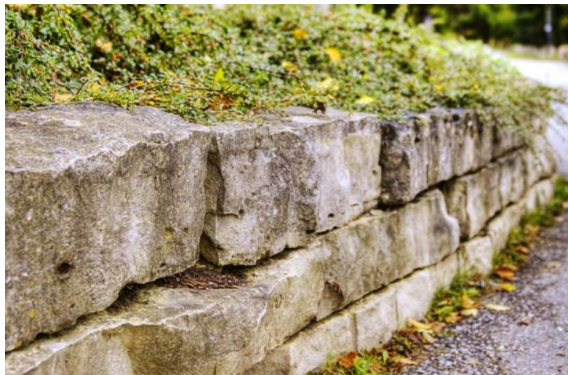
Criterion 2.1.2. Material efficiency

Rationale (cont')

- try to **maximise the secondary material reuse** by finding useful application for extractive waste or by-products.

No minimum requirement is set due to the difficulties of finding external markets and demand for by-products and extractive waste, but any acceptable internal use or external sale is encouraged via the awarding of points.

large shapeless blocks - armourstone



3rd choice blocks – dry wall



Criterion 2.1.2. Material efficiency

Points for discussion about material efficiency

Q. Opinions about this approach

Q. Are the minimum requirements acceptable?

Q. Should be set a minimum value for the useful by-product/waste ratio?

Criterion 2.1.3. Water and wastewater management

Note: This requirement only applies in cases where wet stone cutting techniques are used in the extraction phase.

The applicant shall provide a **description of water use in quarrying operations including strategies and methods for recirculation and reuse of water**. The following conditions shall be met:

- Water used by the cutting equipment shall be **stored in an impermeable container** (for example a tank, lined pond or an excavated pond set in impermeable rock).
- The site shall make provisions for the opportune **collection of water run-off to compensate for water lost in wet sludge and evaporation**.
- The site shall make provisions for the **diversion of water run-off via a drainage network to prevent the surface flow of rainwater** across the working area carrying suspended solid loads into the impermeable container which supplies water to the cutting equipment.
- The separation of solids from cutting wastewater shall be achieved by **sedimentation systems, retention basins, cyclone separators** inclined plate clarifiers, filter presses or any combination thereof. Clarified water shall be returned to the impermeable container which supplies the cutting equipment.
- **Settled sludge shall be dewatered** prior to: internal use for useful purposes, external use for useful purposes or transport offsite to a suitable waste disposal facility.

Criterion 2.1.3. Water and wastewater management

EU Ecolabel points

The non-use of organic flocculants in the solids separation process or the use of readily biodegradable organic flocculants **(5 points)**.

Assessment and verification:

The applicant shall provide a declaration of compliance with this criterion, supported by a declaration from the quarry operator and relevant documentation. The documentation should include details of the water management system, sludge separation and sludge disposal operations and destinations.

Criterion 2.1.3. Water and wastewater management

Rationale

The reuse of water for stone cutting in the extraction phase is the norm and that, as a general rule, all of the settled water is reused (\approx **recycling ratio of 100%**).

The only losses from the system were due to possible seepage into the ground via cracks in basins or ponds, via evaporation and via wet sludge. Therefore is required

- the **water container is impermeable** to avoid losses via infiltration from the container or basin to the surrounding ground area.
- **optimum use of water run-off** to compensate for evaporative losses and water lost as moisture content in removed sludge. Uncontrolled inflow of water run-off must be avoided because this could result in significant suspended solid loads being carried into the water that supplies the cutting equipment.
- **solids separation (primary water treatment)** - minimum treatment of the wastewater from cutting equipment before it is returned to avoid accumulation of solids load other pollutants

Criterion 2.1.3. Water and wastewater management

Rationale (cont')

** use/non-use of flocculants

The use of flocculants when dosed optimally can greatly accelerate sedimentation processes by providing opposite surface charges which attract suspended solids into larger agglomerations.

Two main types of flocculants: inorganic and organic.

- the use of **inorganic flocculants** significantly **increases the quantity of sludge**.
- with **organic flocculants**, it is recommended to only use those organic flocculants that are readily **biodegradable**, to minimise the possible deterioration of nearby surface water, which follows the same logic as BAT Conclusion 42(e) of the BAT Reference Document for the management of waste from the extractive industries

Any available information about the type of flocculants?

Criterion 2.1.4. Air pollution minimisation

The applicant shall:

- focus **dust control water sprays** close to any dry cutting activities or other activities that are likely to generate significant quantities of dust.
- regularly **assess meteorological and air quality monitoring data** and have a plan developed for the relocation/modification/stoppage of operations onsite to prevent or minimise dust emissions to air during normal and adverse weather conditions;
- to include **wind protection systems** in the quarry design that aim to reduce wind speed and thus minimise dust emissions and soil erosion onsite (e.g. wind fences or windbreaks consisting of one or more rows of plants along the border of the extractive waste deposition area, including the extractive waste facility and/or extractive waste handling area).

Assessment and verification:

The applicant shall provide a declaration of compliance with this criterion, supported by a declaration from the quarry operator and relevant documentation. .

Criterion 2.1.4. Air pollution minimisation

Rationale

The minimisation of dust emissions is a key environmental issue and operational plans and equipment should be designed to reduce dust emissions both for worker health and safety and local residents.

Dust is managed on site through a variety of potential control measures. The exact combination of measures required at a site can vary widely, and depends on the production and shipping rates, size of the site, and distance to neighbouring residents. Therefore **the criterion does not require a specific technique or measure to be implemented but the assessment and implementation of the most convenient techniques** to minimise the air quality impacts.

Practical mitigation measures and best management practices must be implemented to prevent or mitigate impacts on the air quality within the local areas.

Covering stock piles, conveyor belts, and loads in trucks, Spraying, washing, paving of haul roads, parking areas, entrances and exits. Reducing haul trips and limiting speeds on unpaved roads. Re-vegetating disturbed areas
Wetting material prior to processing or loading. Locating stock piles in locations that limit their exposure to wind.

Criterion 2.1.5. Noise

The applicant shall provide a noise management plan which, as a minimum, covers the following aspects:

- A map of the site with agreed **monitoring points** and whether the monitoring is to be continuous or during random periods by the competent authority.
- Identification of the **main sources of noise** and an estimate of the average and maximum dB(A) during working hours on site or in specific parts of the site.
- Identification of any **measures taken to reduce noise emission**.
- Provision of adequate **ear protection** for all employees and visitors.
- In cases where there is a **residential population within a 5km distance** of the quarry site the **noise level** from the operation **must not exceed an average of 80dB (A)** during working hours, measured at the perimeter of the quarry.

Assessment and verification:

The applicant should provide a map and appropriate documentation to verify the conditions in which the noise is measured.

Criterion 2.1.5. Noise

Rationale

The primary source of noise from quarrying is from onsite vehicles and machinery, cutting operations, deposition and optional screening of by-product material and extractive waste and breaking up of larger irregular blocks into smaller pieces.

Directive 2002/49/EC relating to the assessment and management of environmental noise applies to noise to which humans are exposed but does not apply to noise that is caused by the exposed person himself, noise from domestic activities, noise created by neighbours, noise at work places or noise inside means of transport or due to military activities in military areas. It **does not set limit or target values**, nor does it prescribe the measures to be included in the action plans, thus leaving those issues at the discretion of the competent Member State authorities.

The **European Union's Seventh Environment Action Programme (7th EAP)** sets the objective that **by 2020 noise pollution** in the EU will have **significantly decreased**, moving closer to World Health Organization (WHO) recommended levels. The WHO recommends that for a good night's sleep, continuous background noise should stay below 30 dB and individual noises should not exceed 45dB.

Criterion 2.1.5. Noise

Rationale (cont')

In the **Carrara site**, where there are almost 200 individual quarries in operation, it was explained that permits for **extraction activities are based on noise limits during working hours** of three general classes: <80dB(A); 80-85dB(A) and >85dB(A).

The criterion addresses the fact that **noise is an inherent impact from the quarrying activities but it can be mitigated through different techniques depending also on the location of the quarry**. Therefore a conditional maximum value (80 dB (A)) is established that aligns with the lower limit that was mentioned during initial discussions with experts.

Criterion 2.1.5. Noise

Rationale (cont')

* **Examples of noise mitigation techniques.** The impacts of noise are highly dependent on the noise frequency, site topography, ground cover of the surrounding site, and climatic conditions. Topographic barriers or vegetated areas can shield target areas or absorb noise.

- Landscaping, berms, and stockpiles can be constructed to form sound barriers.
- Noisy equipment (such as crushers) can be enclosed in sound-deadening structures.
- Conveyors can be used instead of trucks for onsite movement of materials.
- Noisy operations can be scheduled or limited to certain times of the day.
- The proper location of access roads, the use of acceleration and deceleration lanes, and careful routing of trucks can help reduce truck noise.
- Workers can be protected from noise through the use of enclosed, air-conditioned cabs on equipment and, where necessary, the use of hearing protectors.

Questions/comments

- 2.1.1. Quarry landscape impact ratio.
- 2.1.2. Material efficiency.
- 2.1.3. Water and wastewater management.
- 2.1.4. Air pollution minimisation.
- 2.1.5. Noise control .

Criterion 2.2 Processing plant requirements

2.2.1 Energy consumption

2.2.2. Emissions to water

2.2.3 Recycling of waste



Criterion 2.2.1. Energy consumption

The applicant shall **assess and document the electricity consumption (kWh) and fuel consumption (L diesel, etc.)** of the process plant equipment (including for lifts and trucks used for onsite transport) for a defined period of 12 months.

The total production during the same 12 months shall be expressed in terms of kg of final product sold.

EU Ecolabel points

Points shall be awarded for applicants that can demonstrate the following aspects:

- **Up to 30 points** can be awarded in proportion to how much of the **energy consumed** is **from renewable sources** (i.e. 0 points for 0% renewable electricity, 30 points for 60% renewable electricity).

Assessment and verification:

The applicant shall provide a declaration of compliance with the mandatory requirement for energy consumption and any relevant declaration regarding the onsite CHP and renewable energy sources and use of electric vehicles.

For continuously operating production, data shall be collected over a 12 month period. In cases where production is non-continuous, the production period shall be mentioned and should not be less than 30 days.

Criterion 2.2.1 Energy consumption

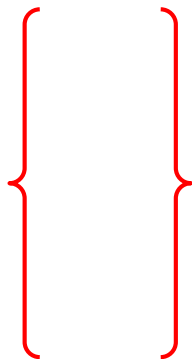
Rationale

The processing of blocks of ornamental or dimension stone into natural stone slabs or tiles requires a significant amount of energy for squaring and cutting of blocks and polishing of slab or tile surfaces.

Energy consumption during cutting

There are a number of different cutting techniques available with different requirements

diamond mono-wire
diamond mono-blade
giant disk saw
steel grid gang saw
diamond blade multi-saw
diamond blade multi-wire
diamond disk.



the type of rock to be cut
the slab dimensions to be cut
Upgrade to the newer technique – economical factors

Criterion 2.2.1 Energy consumption

Rationale (cont')

Energy consumption during finishing

The degree of surface finishing required **depends not only on the final product specifications but also on the effect of the cutting technique on the rock surface.**

gang saw cutting of hard stone will produce a rougher surface than diamond saw blade cutting of soft stone, and the former will require much more polishing than the latter to meet the same surface smoothness.

Other finishing operations: bush hammering, flaming, waterjet or sand blasting

Other treatments : Impregnation with an epoxy or polyester resin in order to maximise the yield from fragile or partially fractured slabs and ensure protection from water infiltration. The resin treatment process involves drying the slab at a moderately elevated temperature (ca. 35°C), applying the resin and then drying again at a similar temperature to allow the resin to cure.

Criterion 2.2.1 Energy consumption

Rationale (cont')

Due to the **great variety of cutting and finishing techniques** that can be used and the general lack of specific energy consumption data, it was decided to **not set any specific process energy requirement** for natural stone slab and tile products. Nonetheless, it is recognised that energy consumption in the processing plant is an important issue and so applicants should be **monitoring energy consumption** closely. Such monitoring would undoubtedly already be a part of any Environmental Management System in place in the organization.

Points are available for any applicant that can demonstrate a **share of renewables** (onsite or via supplier) in the energy (presumably only electricity) they use. Unlike ceramic tile or concrete production, the potential use for waste heat from any onsite CHP was not considered as particularly relevant for ornamental and dimensional stone processing operations.

Criterion 2.2.2. Emissions to water

Effluent water discharged to the environment from processing operations **must not exceed the following limits**. These limits apply after waste water treatment, whether on-site or off-site.

Parameter	Limit (mg/l)
Total Suspended Solids (TSS)	35
COD (mg/l O ₂)	100
Cr(VI)	<0.15 mg/l
Fe	<1.5 mg/l

If the **settled wastewater is discharged to a municipal sewage works or other third party operated treatment plant**, the applicant shall be **exempted** from demonstrating compliance with the emission limits defined above.

Assessment and verification:

The applicant shall provide a declaration of compliance with the mandatory requirements of this criterion, clearly state if process wastewater is discharged to local watercourses or to the sewerage network.

In cases where treated process wastewater is discharged to local watercourses and it is not possible to provide specific data for a production line or product, the applicant shall refer to data for the entire plant and provide test reports based on weekly analysis of the discharged wastewater according to the standard test methods defined above or equivalent in-house laboratory methods. Less frequent testing may be permitted in cases where the operating permit sets less frequent testing requirements.

Criterion 2.2.2. Emissions to water

Rationale

Sources of wastewater

Cutting
Finishing } water carrying away **solid particles** from the rock and from cutting/polishing media.

Solids separation at the processing facility requires more intensive separation techniques than the quarry

- ➡ inclined plate clarifiers and/or flocculant dosing are more likely to be employed.
- ➡ the separated sludge is highly likely to be dewatered to reduce the sludge volume prior to collection and transport offsite (for economic reasons).

Criterion 2.2.2. Emissions to water

Rationale (cont')

- New testing is required: **Chemical Oxygen Demanding (COD) in cases where wastewater is discharged directly to local watercourses.** Wastewater can be contaminated dissolved organics or fats, oils and grease that will float from the lubricants and greases used for the cutting and finishing operations.
- The **monitoring of emissions to air is not considered practical for a natural stone processing plant.** The activity may be intermittent and plants do not tend to run all potential sources of dust or styrene emissions through a central chimney.

Criterion 2.2.3. Recycling of waste

At least **70% by mass of the process waste*** generated from natural stone processing operations onsite shall be diverted from landfill.

*i.e. sludge from polishing and other finishing operations, cutting operations, broken specimens and off-cuts from squaring, rectification and any customized shaping.

EU Ecolabel points

Points shall be awarded for applicants that can demonstrate higher reuse rates of process waste up a maximum of **90% reuse by mass (up to 20 points)**.

Assessment and verification:

The applicant shall provide a declaration of compliance with the mandatory requirement of this criterion, supported by a calculation of total production process waste (in kg or t). Details about the destination of these process wastes shall also be provided with clarifications about whether it is external use in another process or sent to landfill. For any external use or landfill disposal, shipment notes shall be presented.

In case it is not possible to provide specific data for a production line or product, the applicant shall refer to data for the entire plant.

Points shall be awarded in proportion to how closely the data reaches the maximum benchmark set (e.g. process waste reuse rate of 70% = 0 points and 90% = 20 points).

Criterion 2.2.3. Recycling of waste

Rationale

- The normal practice is that a plant may process blocks from different quarries, resulting in a high heterogeneity of the process waste.
- There is no real opportunity for the process waste to be reincorporated into the production process (unlike ceramic tile production)
- The criterion has a **relative low mandatory requirement** but **encourage a higher reuse** by the awarding of points
- Potential reuse depends of type of stone, waste and economical factors

large to medium sized scraps for low cost external floorings (no treatment)



use the stone sludge to produce artificial stones and tiles (after treatment)



crushing and pulverizing the stone waste (<90 microns – Carbonate waste only) to produce cement and quicklime (after treatment)



Questions/ comments

2.2.1 Energy consumption

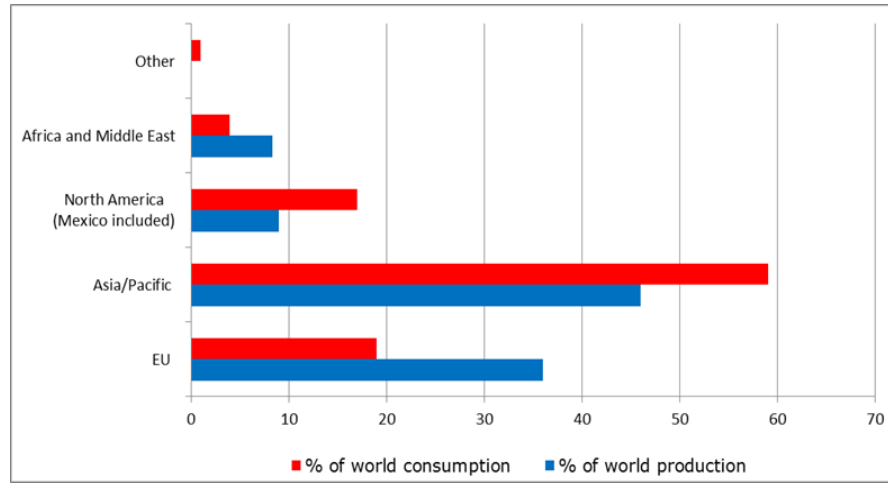
2.2.2. Emissions to water

2.2.3 Recycling of waste

SUB-PRODUCT SPECIFIC CRITERIA

AGGLOMERATED STONE PRODUCTS

Market analysis

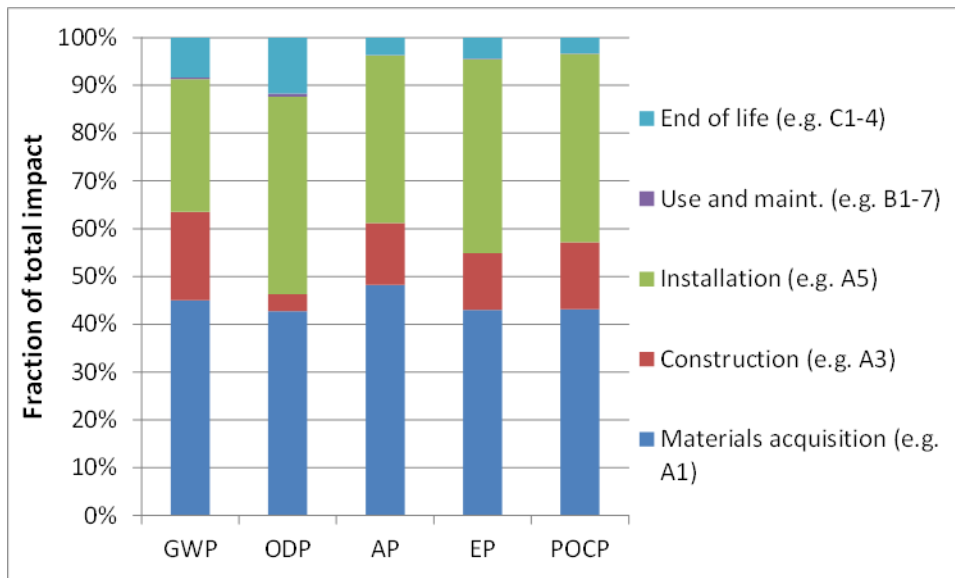


ASTA – Confidential market research in 2014

- Global production in 2014 = **47Mm²**
- **Production dominated by Asia /Pacific (46%) , EU (36%)**
- Forecast 2019 = Global production 78.5Mm²
- *Furniture (vanities, countertops) dominated the demand (70%)*

Environmental impacts –LCA

A1 and A3 is LCA hotspots – 45- 65% of the total impacts



American product (Corian, Quartz).

New structure

Horizontal criteria common to all:
1.1 to 1.9

Natural stone specific criteria:

2.1 Quarry

- 2.1.1 Quarry impact ratio
- 2.1.2 Material efficiency
- 2.1.3 Water efficiency
- 2.1.4 Air emissions management
- 2.1.5 Noise

2.2 Processing plant

- 2.2.1 Energy consumption
- 2.2.2 Emission to water
- 2.2.3 Recycling of waste

Agglomerated stone specific criteria:

3.1 Energy consumption

3.2 Emissions to air

3.3

Recycled/secondary material content

3.4. Binder content

Ceramic tile (and clay paver?) specific criteria

4.1 Specific kiln energy consumption

4.2 Specific freshwater consumption

4.3 Emissions to air

4.4 Wastewater management

4.5. Material efficiency in the production process

4.6. Glazes

Concrete paving and terrazzo tile specific criteria:

5.1 Clinker factor of cement

5.2 Non -CO2 emissions to air from the cement kiln

5.3 CO2 emissions from the cement kiln

5.4. Cement kiln thermal efficiency

5.5

Recycled/secondary materials at the concrete plant

5.6. Concrete plant energy consumption

5.7 Photocatalytic surfaces

5.8 Permeable pavers

EU Ecolabel

Criterion 3 : Agglomerated stone criteria and scoring system

Proposed criteria	Decision 2009/607/ EC	Proposed criteria details	
		Mandatory ?	Points?
1.1. Environmental Management System	No	Yes	5
1.5. VOC emissions	No	Yes	5
3.1. Energy consumption	Yes	Yes	25
3.2. Emissions to air	Yes	Yes	-
3.3. Recycled/Secondary material content	No	No	40
3.4. Binder content	Yes	Yes	25
TOTAL points available in proposed criteria			100
MINIMUM points needed in proposed criteria			50

Questions/comments

- Market data for agglomerated stone.
- LCA hotspot identification.
- Innovation and environmental improvements.
- Criteria structure for agglomerated stone products.
- Scoring for agglomerated stone products.

Criterion 3.1. Energy consumption

Mandatory requirement

The specific energy consumption for agglomerated stone production shall not exceed **1.1 MJ/kg**.

EU Ecolabel points

Points shall be awarded for applicants that can demonstrate the following aspects:

Installation of **onsite CHP** (10 points).

Up to **15 points** can be awarded in proportion to how much of the supplied **electricity** is from **renewable sources** (i.e. 0 points for 0% renewable electricity, 15 points for 20% renewable electricity).

Assessment and verification

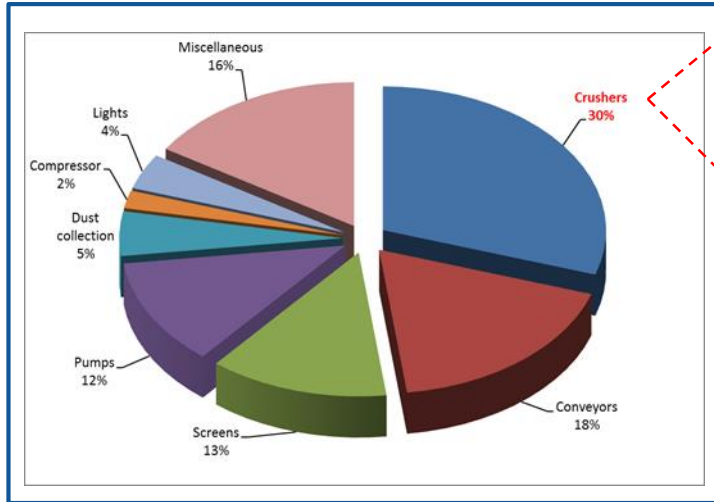
The applicant shall provide a declaration of compliance with the mandatory requirement for energy consumption and any relevant declaration regarding the onsite CHP and renewable energy sources and use of electric vehicles.

For continuously operating, the production period should be 12 months. In cases where production is non-continuous, the production period shall be mentioned and should not be less than 30 days.

Criterion 3.1. Energy consumption

Rationale

Electricity energy use breakdown



Crusher selection

rock type
required size reduction
output rock shape
production rate

Optimisation

number of crushing stages,
use premium efficiency motors
maximum load capacity
elimination of the re-circulating load circuits
shut off the equipment when not needed

A significant number of facilities have **older crushers with inefficient controls** that present a significant **potential for increasing production efficiencies**.

Criterion 3.2. Emissions to air

The emissions to air in the following parameters for the **entire manufacturing process** shall **not exceed** the following values

Parameter	Limit (mg/m ²)
Particulate matter (dust)	300
Styrene	2000
Nitrogen oxides (as NO _x)	1200
Sulphur dioxide (SO ₂)	850

Assessment and verification

The applicant shall provide a declaration of compliance with the mandatory requirements of this criterion, supported by site data in mg/Nm³ and expressed as an annual average value calculated from daily average values. The data shall have been generated via continuous monitoring according to EN 13284-1 for dust, EN 14792 for NO_x and EN 14791 for SO₂.

The air pollutant emission factors shall be calculated as follows:

- the concentration in the exhaust gas emitted to the environment of each parameter considered in the tables shall be calculated,
- the measurements used for the calculation must be made following the testing methods indicated in the tables,
- the samplings shall be representative of the considered production.

Criterion 3.2. Emissions to air

Rationale

The **main concern**, during the manufacturing process, is the **emission to air of toxic substances**, such as those used in the resins preparations (e.g. styrene, formaldehyde and other VOC), and CO₂.

The mixture contains resins → **VOC emissions** (see Chapter 1. Criterion 1.5).

VOC emissions from polyester resin operations occur when monomer contained in the liquid resin evaporated from fresh resin surfaces into air during application curing.

Styrene and methyl methacrylate most common monomers

The potential for emissions depends how the resin is mixed, applied, handled, and cured among the different fabrication processes.

NO_x and SO₂ emissions limits but ... **are significant in the agglomerated stone productions process since high temperatures (and thus onsite fuel combustion) are not expected in the process?**

Criterion 3.3. Recycled/secondary material content

The applicant shall **assess and document** the **regional availability** of **recycled or secondary aggregates**, including fillers.

EU Ecolabel points

Points shall be awarded for applicants that can demonstrate the incorporation of recycled/secondary materials into the agglomerated stone product up to **40% w/w content** (Up to 40 points).

The incorporation of returned or rejected agglomerated stone product into new product shall not be considered as recycled content if it is going back into the same process that generated it.

Assessment and verification:

The applicant shall provide a declaration of compliance with the mandatory requirement of this criterion, supported by a copy of their company policy for the identification of potential sources of recycled materials.

An inventory of all sold or stored agglomerated stone production, existing raw materials in stock and raw material deliveries (virgin, secondary and recycled origin) to the manufacturing plant shall be provided, supported by production reports for a period of 12 months.

In cases of manufacturing plants that only produce one type of product and specification, results should be averaged across the entire production. Where the EU Ecolabel products are produced in specific batches only, any secondary or recycled materials should be allocated according to batch mix compositions used.

Criterion 3.3. Recycled/secondary material content

Rationale

Recycled content (ISO1421): Proportion, by mass, of recycled material in a product or packaging.

- **Pre-consumer material** - diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials generated in a process and capable of being reclaimed within the same process that generated it.
- **Post-consumer material**-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 its intended purpose. This includes returns of material from the distribution chain.

Recycled material: Material that has been reprocessed from recovered [reclaimed] material by means of a manufacturing process and made into a final product or into a component for incorporation into a product.

- **Recovered [reclaimed] material:** Material that would have otherwise been disposed of as waste or used for energy recovery, but has instead been collected and recovered [reclaimed] as a material input, in lieu of new primary material, for a recycling or a manufacturing process.

Common practice to use a fair amount of **pre-consumer recycled materials**, intended as derivate and by-products of natural stones quarrying operations

Commercial products with high content of **recycled content, from 5 % up to 30% in weight**. These products qualify for LEED which requires materials with recycled content such that the sum of post-consumer recycled content plus 1 /2 of the pre-consumer content constitutes at least 10% or 20%, based on cost, of the total value of the materials in the project

Criterion 3.4. Binder content

Rationale

The **use of polyester, epoxy or other resins** in the production shall be **limited to 10%** of the total weight of raw materials.

EU Ecolabel points

Where the content of resin used is **less than 10%** by weight of the final product, towards a benchmark of 5% (up to 20 points).

Where the resin used is at least 10% **bio-based or from recycled plastics** (5 points).

Assessment and verification:

The applicant shall provide a declaration of compliance with the mandatory requirements of the criterion, supported by a calculation of the total use of resin binder(s) as a function of total raw material consumption. In case it is not possible to provide specific data for a production line or product, the applicant shall refer to data for the entire plant.

Points shall be awarded in proportion to how closely the data reaches the maximum benchmark set (e.g. a resin use rate of 10% = 0 points and a resin use rate of 5% = 15 points).

Criterion 3.4. Binder content

Rationale

A typical agglomerated stone material will consist of 85 -93% stone aggregates by weight and 15-7% resin. The nature and content of binder have a large influence on the mixture.

- polymeric resins as binding agents – 90-96 % in weight of natural stones' gravel
- hydraulic cement (criteria 5) - 76-78 % weight percentage of natural stones' gravel in the mixture



How common is the use of cement as a binder instead of resins?
Should we set criteria for the cement binder in agglomerated stones as well?
Or should we maintain a split between **organic binder (agglomerated stone)**
and **inorganic binder (concrete pavers and dry-cast terrazzo tiles)**?

Environmental friendly options

Polyester resins free of reactive diluents (without styrene) - require new infrastructure

Renewable and/or recycled raw materials - bio-resins made from renewable plant sources (for instance from no-food vegetable oil produce no volatile emissions to the atmosphere).

expanding options for end-of-life recycling and reuse

potential compliance with LEED program which encourages use of recycled or bio-based materials

Questions/comments

- 3.1. Energy consumption
- 3.2. Emissions to air
- 3.3. Recycled/secondary material content
- 3.4. Binder content

Next steps

- Draft minutes to be sent out to participants within 1 week.
- Few days to suggest any amendments.
- Anonymised minutes published together with presentation (BATIS and JRC website)
- BATIS is open for written comments on Technical Report until **18 January 2019**.
- Please embed comments on html file in BATIS (*instructions about how to do this have been uploaded on BATIS*).
- 2nd Technical Report due in **May 2019**.
- 2nd AHWG meeting in **June 2019**.



Thanks

Any questions?

Email: JRC-B5-HARDCOVERINGS@ec.europa.eu

Keep up to date with the project:

JRC website: http://susproc.jrc.ec.europa.eu/Hard_coverings/index.html (for everyone)

BATIS: <http://eippcb.jrc.ec.europa.eu/batis/> (for registered stakeholders only)