

## EU GPP Criteria for FURNITURE

Green Public Procurement (GPP) is a voluntary instrument. This document provides the EU GPP criteria developed for the product group "furniture". An accompanying Technical Background Report provides general information on procurement processes and further details on the reasons for selecting these criteria and references for further information.

The criteria are divided into Technical Specifications and Award Criteria. For each set of criteria there is a choice between two ambition levels:

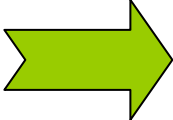
- The *core criteria* are those suitable for use by any contracting authority across the Member States and address the key environmental impacts. They are designed to be used with minimum additional verification effort or cost increases.
- The *comprehensive criteria* are for those who wish to purchase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

### 1 DEFINITION AND SCOPE

The product group “furniture” shall comprise free-standing or built-in units, which are used for storing, hanging, lying, sitting, eating or working purposes both in domestic or business premises and including both indoor and outdoor furniture. Business purposes shall include all kinds of furniture whose primary function is to be used as furniture, for instance furniture for offices, schools, restaurants, hotels, libraries, theatres, cinemas, etc.

Products whose primary function is not to be used as furniture are excluded, e.g. streetlights, bike-parks, playground equipment, carpets, sanitary equipment and building products – such as steps, doors, window frames, floor coverings, wall panels.

## 2 KEY ENVIRONMENTAL IMPACTS

Key Environmental Impacts for Furniture	GPP Approach
<p>Key environmental impacts:</p> <ul style="list-style-type: none"><li>• Loss of biodiversity, soil erosion and degradation as a result of unsustainable forest management and illegal logging.</li><li>• Landscape impact from mining activities.</li><li>• Depletion of resources due to the use of non-renewable resources such as metals and oil/natural gas for plastics.</li><li>• CO<sub>2</sub> and other emissions as a result of energy consumption in the production of several materials.</li><li>• Eutrophication of surface and ground waters as a result of the use of hazardous substances that can be released during production, use or disposal.</li><li>• VOC emissions as a result of the use of organic solvents.</li><li>• Waste and packaging waste due to packaging and early replacement of furniture due to a lack of reparability options, low durability, ergonomics or furniture not fit for purpose.</li></ul>	 <ul style="list-style-type: none"><li>• Procure timber from legal and sustainably managed forests.</li><li>• Use materials made partly or totally from recycled materials and/or renewable materials (such as wood).</li><li>• Limit the organic solvent content and VOC emissions in products and adhesives.</li><li>• Avoid certain hazardous substances in materials production and surface treatment.</li><li>• Ensure recyclability and separability of packaging materials and furniture parts and the use of packaging materials based on renewable raw materials.</li><li>• Procure durable, fit for use, ergonomic, easy to disassemble, repairable and recyclable furniture.</li></ul>

### 3 EU GPP Criteria for Furniture

#### TECHNICAL SPECIFICATIONS

##### CORE CRITERIA

###### 1-Legal Origin and traceability of wood and wood-based materials

All wood and wood-based materials (excluding packaging and recycled wood) must be harvested in accordance with the applicable legislation in the country of harvest. "Applicable legislation" means the legislation in force in the country of harvest covering the following matters:

- rights to harvest timber within legally gazetted boundaries;
- payments for harvest rights and timber including duties related to timber harvesting;
- timber harvesting, including environmental and forest legislation including forest management and biodiversity conservation, where directly related to timber harvesting;
- third parties' legal rights concerning use and tenure that are affected by timber harvesting; and
- trade and customs, in so far as the forest sector is concerned.

###### Verification:

Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply. Other appropriate means of proof accepted are: a due diligence exercise, a valid FLEGT license or a CITES permit.

###### 2-Sustainable wood

At least **50 %** of wood in the final furniture product (excluding packaging) shall come from sustainably managed sources. Recycled wood<sup>1</sup>, following the definition of recycled material as given in ISO 14021<sup>2</sup>, shall also be considered as sustainably sourced materials.

*(to be decided on how to define sustainability, possibly by mentioning the existing*

##### COMPREHENSIVE CRITERIA

###### 1-Legal Origin and traceability of wood and wood-based materials

All wood and wood-based materials (excluding packaging and recycled wood) must be harvested in accordance with the applicable legislation in the country of harvest. "Applicable legislation" means the legislation in force in the country of harvest covering the following matters:

- rights to harvest timber within legally gazetted boundaries;
- payments for harvest rights and timber including duties related to timber harvesting;
- timber harvesting, including environmental and forest legislation including forest management and biodiversity conservation, where directly related to timber harvesting;
- third parties' legal rights concerning use and tenure that are affected by timber harvesting; and
- trade and customs, in so far as the forest sector is concerned.

###### Verification:

Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply. Other appropriate means of proof accepted are: a due diligence exercise, a valid FLEGT license or a CITES permit.

###### 2-Sustainable wood

At least **70 %** of wood in the final furniture product (excluding packaging) shall come from sustainably managed sources. Recycled wood, following the definition of recycled material as given in ISO 14021, shall also be considered as sustainably sourced materials.

*(to be decided on how to define sustainability, possibly by mentioning the existing*

<sup>1</sup> "Recycled wood" means solid wood or 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 and also by-products or co-products of logging and sawmilling operations.

<sup>2</sup> **Recycled content** is defined in ISO 14021 as the proportion, by mass, of post-consumer and pre-consumer recycled material in a product. **Post-consumer recycled content is, within a product, the proportion of material recycled from an earlier product which has reached its end of life and/or of industrial waste generated after the earlier product has reached its end-users and has been discarded. Pre-consumer recycled content is the percentage of material in a product that is recycled from the manufacturing waste stream. In the case of glass products, this waste originates from the processing or re-processing of glass that takes place before the final product reaches the consumer market. However, only material that would otherwise have entered the solid waste stream, but is in fact being reused qualifies as recycled content. Pre-consumer recycled content therefore excludes scrap material that can be reclaimed within the same process that generated it.** "

*national schemes as examples)*

**Verification:**

Wooden furniture bearing the EU Ecolabel or being certificates by FSC, PEFC are deemed to comply with this requirement. Equivalent means of proof must be accepted (*to be detailed further*).

With regards to recycled wood, the geographical origin and nature (pre- or post-consumer) shall be declared and a chain of custody certificate presented.

**3-Formaldehyde emissions from wood-based panels**

Where wood-based panels that contain formaldehyde-based resins are used, formaldehyde emissions from panels prior to machining or coating shall be lower than the threshold value allowing them to be classified as E1 as per EN 13986 annex B or equivalent methods.

**Verification:**

Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply. Otherwise, the tenderer shall provide a third party certification from an accredited laboratory stating that the wood-based materials and production process is consistent with E1 requirements as defined in Annex B of EN 13986. Equivalent methods must show a proven correlation between the EN 717-1 chamber test.

**4. Plastic parts**

Plastic parts with a weight  $\geq 50$  g shall be visibly marked in accordance with the requirements of EN ISO 11469 so that materials can be identified to ensure they are able to be recycled, recovered or disposed of in the correct manner at end-of-life. If a component should be categorised under "other polymer type" designation, the applicant will provide data sheets from the supplier that state the nature of the polymer used in any individual plastic parts. Parts greater than 50g in weight that would be adversely affected by a marking, such as for consumer acceptance and aesthetic reasons, may place the necessary recycling information in the user manual or similar literature.

**Verification:**

Products holding the EU Ecolabel for furniture (Commission Decision /.../EU) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply. Otherwise, documented and photographic evidence demonstrating the markings on all plastic components are marked shall be provided by the tenderer. If a component should be categorised under "other polymer type" designation, the

*national schemes as examples)*

**Verification:**

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**5. Metals**

The tenderer shall describe the type of metal used in any particular furniture component (i.e. Aluminium, Steel, Copper etc.). Where relevant, the grade of the alloy and the main metals (>3 % of total alloy weight) included in the alloy formulation shall be stated. Nickel plated stainless steel shall not be used in any furniture components that may come into direct skin contact with end users.

**Verification:**

Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply with core and comprehensive criteria. Otherwise, the tenderer shall describe the metals used in the furniture product, with declarations from downstream suppliers if necessary to clarify the grade of alloy used. In case of doubt, the final product can be tested to determine its elemental composition and thus metal/alloy grade by non-destructive analysis using a suitable handheld X-Ray Fluorescence instrument or by wet chemical methods of metal samples by dissolving the metal in acid and analyzing the solution for elemental composition by Inductively Coupled Plasma- or Atomic Absorption-Optical Emission Spectroscopy.

**6. Substances banned in surface coatings of wood, plastic and/or metal parts based on their hazard statements**

Products used for surface coating shall not contain any of the following hazardous substances according to Regulation No. 1272/2008 (H statements) or Directive 1999/45/EC (equivalent R phrases) in concentrations greater than 0.1%:

- Carcinogenic: H351(R40), H350(R45) or H350i(R49).
- Harmful to the reproductive system: H360F(R60), H360D(R61), H360FD(R60-61), H360Fd(R60-63), H360Df(R61-62), H361f(R62), H361d(R63) or H361fd(R62-63)
- Mutagenic: H340(R46) or, H341(R68)
- Toxic: H300(R28), H301(R25), H310(R27), H311(R24), H330(R23;R26) or H331(R23)
- Hazardous to the aquatic environment: H400(R50), H410(R50-53), H411(R51-53), H412(R52-53) or H413(R53).
- Cause heritable genetic damage: H340(R46).

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- Cause heritable genetic damage: H340(R46).

<ul style="list-style-type: none"> <li>• <u>Causes damage to organs through prolonged or repeated exposure:</u> H372 (R48/25; R48/24; R48/23).</li> <li>• <u>May cause damage to organs through prolonged or repeated exposure:</u> H373 (R48/20; R48/21; R48/22).</li> </ul> <p><b>Verification:</b> Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply. Otherwise, the tenderer shall provide any relevant Safety Data Sheets (SDS) that state the hazard statements and/or risk phrases of all substances that impart hazardous properties to the coating compounds at concentrations greater than 0.1 % w/w.</p>	<ul style="list-style-type: none"> <li>• <u>Causes damage to organs through prolonged or repeated exposure:</u> H372 (R48/25; R48/24; R48/23).</li> <li>• <u>May cause damage to organs through prolonged or repeated exposure:</u> H373 (R48/20; R48/21; R48/22).</li> </ul> <p><b>Verification:</b> Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply. Otherwise, the tenderer shall provide any relevant Safety Data Sheets (SDS) that state the hazard statements and/or risk phrases of all substances that impart hazardous properties to the coating compounds at concentrations greater than 0.1 % w/w.</p>
<p><b>7. Adhesives and glues</b> The VOC content of adhesives used in the assembly of furniture shall not exceed 10% of the total weight of the adhesive formulation.</p> <p><b>Verification:</b> Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply with core and comprehensive criteria. Otherwise, the bidder must present a list with all adhesives used in the assembly of furniture and SDS where the VOC content is displayed demonstrating compliance with the above criteria.</p>	<p><b>7. Adhesives and glues</b> The VOC content of adhesives used in the assembly of furniture shall not exceed 5% of the total weight of the adhesive formulation.</p> <p><b>Verification:</b> Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply with core and comprehensive criteria. Otherwise, the bidder must present a list with all adhesives used in the assembly of furniture and SDS or equivalent documentation where the amount of VOCs is displayed demonstrating compliance with the above criteria.</p>
<p><b>8. Packaging materials</b> a) Packaging must consist of readily recyclable material, and/or materials taken from renewable resources (renewable being defined as biomass-based materials or recycled materials), or be a multi-use system. All packaging materials shall be easily separable by hand into recyclable parts consisting of one material (e.g. cardboard, paper, plastic etc.). Plastic packaging shall be labelled in accordance with ISO 11469 except where it would be adversely affected by a marking, such as for consumer acceptance and aesthetic reasons. In such cases the necessary recycling information in the user manual or similar literature.</p> <p><b>Verification:</b> Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply with core and comprehensive criteria. Otherwise, the tenderer shall describe the product packaging materials used and provide a declaration of compliance with</p>	<p><b>8. Packaging materials</b> a) Packaging must consist of readily recyclable material, and/or materials taken from renewable resources (renewable being defined as biomass-based materials or recycled materials), or be a multi-use system. All packaging materials shall be easily separable by hand into recyclable parts consisting of one material (e.g. cardboard, paper, plastic etc.). Plastic packaging shall be labelled in accordance with ISO 11469 except where it would be adversely affected by a marking, such as for consumer acceptance and aesthetic reasons. In such cases the necessary recycling information in the user manual or similar literature.</p> <p><b>Verification:</b> Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply with core and comprehensive criteria. Otherwise, the tenderer shall describe the product packaging materials used and provide a declaration of compliance with</p>

the criteria according to EN 13429 for reusability or EN 13430 for recyclability.

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b) The overall average recycled content of the packaging material(s) on a weight basis must be at least 50%.

**Verification:**

The tenderer shall state the total weight of packaging materials used and the % recycled content of each of the different packaging materials shall be provided in declarations from the relevant packaging material suppliers. The overall recycled content of the packaging materials by weight shall be at least 50%.

**9. Durability, fitness for use, reparability and ergonomics**

a) Furniture must meet any relevant national or international quality standards or equivalent regarding serviceability (e.g. safety, abrasion resistance, tensile strength, light fastness, rub fastness, deformation by compression, ergonomics etc.).

b) Where the furniture consists of more than one component, it must be assembled in such a manner to facilitate manual disassembly into constituent components to allow either repair or replacement of damaged components or to facilitate recycling of components made of different materials.

c) The warranty of the furniture product shall cover a period of at least 3 years from the date of purchase.

d) The manufacturer shall guarantee the availability of spare components and parts for a period of at least 3 years from the date of purchase. If the spare parts are provided for free, this shall be expressly stated. Otherwise prices for the spare parts shall be clearly stated and shall be related to the value of the spare part in relation to the whole piece of furniture.

**Verification:**

Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to comply with requirements a)-d). Otherwise, verification shall be as follows:

a) The tenderer must provide certification stating compliance with any technical standards relevant to the furniture product. As a guide, a list of technical standards considered by the CEN Technical Committee 207 (Furniture) can be consulted in Appendix II of the technical report that accompanies these criteria.

b) Disassembly instructions shall be provided that clearly demonstrate how the furniture can be manually dismantled, for the purposes of spare part replacement, repair or End-of-Life disposal.

c) A written guarantee clearly stating the warranty period of at least 3 years from

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b) Where the furniture consists of more than one component, it must be assembled in such a manner to facilitate manual disassembly into constituent components to allow either repair or replacement of damaged components or to facilitate recycling of components made of different materials.

c) The warranty of the furniture product shall cover a period of at least 5 years from the date of purchase.

d) The manufacturer shall guarantee the availability of spare components and parts for a period of at least 5 years from the date of purchase. If the spare parts are provided for free, this shall be expressly stated. Otherwise prices for the spare parts shall be clearly stated and shall be related to the value of the spare part in relation to the whole piece of furniture.

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a) The tenderer must provide certification stating compliance with any technical standards relevant to the furniture product. As a guide, a list of technical standards considered by the CEN Technical Committee 207 (Furniture) is included in Appendix II of the technical report that accompanies these criteria.

b) Disassembly instructions shall be provided that clearly demonstrate how the furniture can be manually dismantled, for the purposes of spare part replacement, repair or End-of-Life disposal.

c) A written guarantee clearly stating the warranty period of at least 5 years from the date of purchase shall be provided along with relevant contact details.

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d) A list of spare parts, their prices and any relevant codes, that the customer can use to obtain any necessary spare parts during at least the next 3 years. The spare part price, if any, shall be proportional to its specific contribution to the furniture product cost. If no email address or website with email contact function is included, the phone number shall be in the same country as where the product was placed on the market.

d) A list of spare parts, their prices and any relevant codes, that the customer can use to obtain any necessary spare parts during at least the next 5 years. The spare part price, if any, shall be proportional to its specific contribution to the furniture product cost. If no email address or website with email contact function is included, the phone number shall be in the same country as where the product was placed on the market.



## AWARD CRITERIA

CORE CRITERIA	COMPREHENSIVE CRITERIA
<p><b>Additional points will be awarded for:</b></p> <p><b>1 – Higher contents of sustainable wood than core specifications</b> Points shall be awarded for products that exceed the minimum <b>50 %</b> requirement for sustainable wood shall be covered by valid sustainable forest management certificates issued by an independent third party certification scheme such as FSC, PEFC or equivalent. Recycled wood, following the definition of recycled material as given in ISO 14021, shall also be considered as sustainably sourced materials.</p> <p><b>Verification:</b> The tenderer shall provide valid, independently certified chain of custody certificates and demonstrate that wood has been grown according to Sustainable Forestry Management principles. Certificates from FSC, PEFC or equivalent schemes shall be accepted as independent third party certification. With regards to recycled wood, the geographical origin and nature (pre- or post-consumer) shall be declared and a chain of custody certificate presented.</p>	<p><b>Additional points will be awarded for:</b></p> <p><b>1 – Higher contents of sustainable wood than core specifications</b> Points shall be awarded for products that exceed the minimum <b>70 %</b> requirement for sustainable wood shall be covered by valid sustainable forest management certificates issued by an independent third party certification scheme such as FSC, PEFC or equivalent. Recycled wood, following the definition of recycled material as given in ISO 14021, shall also be considered as sustainably sourced materials.</p> <p><b>Verification:</b> The tenderer shall provide valid, independently certified chain of custody certificates and demonstrate that wood has been grown according to Sustainable Forestry Management principles. Certificates from FSC, PEFC or equivalent schemes shall be accepted as independent third party certification. With regards to recycled wood, the geographical origin and nature (pre- or post-consumer) shall be declared and a chain of custody certificate presented.</p>
	<p><b>2 – Recycled content of plastics</b> Points will be awarded where furniture products contain at least 10 % by weight of hard plastic components (excluding packaging).</p> <p><b>Verification:</b> The tenderer shall specify the overall plastic content (w/w) in the furniture product. For recycled plastic content, the tenderer shall provide a declaration from the manufacturer or plastic supplier stating the proportion of recycled content and providing 3<sup>rd</sup> party verified chain of custody certificates or supplier declarations that lead to the source of the recycled plastic and state that it meets the definition for recycled material stated in ISO 14021.</p>
	<p><b>3 – Padding materials</b> Any latex foam or polyurethane (PU) foam shall comply with the requirements specifically for PU foam or Latex foam as set out in the EU Ecolabel criteria (Decision <b>xxx/xxx/EU</b> for furniture).</p>

**Verification:**

Products holding the EU Ecolabel for furniture (Commission Decision /.../EU ) or another relevant Type 1 Eco-label fulfilling the listed requirements will be deemed to fully comply with the award criteria. Otherwise, certification of PU or Latex foam under equivalent industry standard schemes shall also be accepted. In other cases the tenderer shall provide all required test certificates and documentation in accordance with the criteria set out for latex foam or PU foam. For information, these specific criteria and verification methods are detailed in Decision [xxxx/xxx/EU](#).

**4 - Final textile product testing**

In addition to points that may be awarded for core award criteria for textiles, the final textile product should be free of carcinogenic amine dye residues listed in Table 1 and comply with the limits for extractable formaldehyde and extractable heavy metals as listed in Table 2.

**Table 1. Limits for extractable substances in furniture textile fabrics**

Compound (limit)	
Formaldehyde (75 mg/kg)	Cobalt (1.0* or 4.0 mg/kg)
Antimony (30 mg/kg)	Copper (25* or 50 mg/kg)
Arsenic (0.2* or 1.0 mg/kg)	Lead (0.2* or 1.0 mg/kg)
Cadmium (0.1 mg/kg)	Nickel (1.0* or 4.0** mg/kg)
Chromium (1.0 or 2.0** mg/kg)	Mercury (0.02 mg/kg)

\* applies to textiles used in furniture designed for small children (<36 months of age)

\*\*the highest limit applies to normal textiles or cases where metal complex dyes have been used.

**Table 2. Carcinogenic aromatic amine dyes to be tested for by EN 14362-1 and -3.**

Aryl amine	CAS Number	Aryl amine	CAS Number
4-aminodiphenyl	92-67-1	4,4'-oxydianiline	101-80-4
Benzidine	92-87-5	4,4'-thiodianiline	139-65-1
4-chloro-o-toluidine	95-69-2	o-toluidine	95-53-4
2-naphtylamine	91-59-8	2,4-diaminotoluene	95-80-7
o-amino-azotoluene	97-56-3	2,4,5-trimethylaniline	137-17-7
2-amino-4-nitrotoluene	99-55-8	4-aminoazobenzene	60-09-3
4-chloroaniline	106-47-8	o-anisidine	90-04-0
2,4-diaminoanisol	615-05-4	2,4-Xylidine	95-68-1
4,4'-diaminodiphenylmethane	101-77-9	2,6-Xylidine	87-62-7
3,3'-dichlorobenzidine	91-94-1	p-cresidine	120-71-8

3,3'-dimethoxybenzidine	119-90-4	3,3'-dimethylbenzidine	119-93-7
3,3'-dimethyl-4,4'-diaminodiphenylmethane	838-88-0	4,4'-methylene-bis-(2-chloro-aniline)	101-14-4

**Verification:**

The tenderer shall provide results from tests where 5 g of material is immersed in 100 g of an artificial sweat solution as defined in EN ISO 105-E04:2013 in a water bath at 40 °C for 1 hour. The solution is then filtered and analysed by ICP-OES or ICP-MS for the heavy metals listed in Table 1 below. In the case of formaldehyde, testing according to EN ISO 14184-1 shall only be required for textiles where an “easy care finish” has been applied. Otherwise the formaldehyde test is not required and shall be replaced by a declaration of non-use of such substances. Textiles that carry the EU Flower Ecolabel shall be deemed to be compliant with the final product criteria.

## 4 COST CONSIDERATIONS

With furniture, the cost of a product over its lifetime (life-cycle cost) is dominated by the purchase price and the durability/repairability of the furniture, which will directly influence its useful lifetime. Ultimately the purchase cost of furniture, like many products, is highly subjective and will depend on factors such as brand names, discounts for bulk buying and with international suppliers, even exchange rates for different currencies. The EU study "Costs and Benefits of Green Public Procurement"<sup>3</sup> compared the cost of green certified mobile cabinets, storage units and office chairs in 4 different EU countries in 2007 and found that in 10 of the 12 cases, the green products commanded a market price of 13% or more compared to conventional alternatives. However, since 2007 a much wider range of green furniture products have entered the market and such a price disparity between green and conventional products may not be so large as competition amongst green products increases.

A comparison of the anticipated financial costs and environmental impacts of selected furniture GPP criteria is summarised below:

Criterion	Influence on financial cost	Influence on environmental benefit
Sustainable wood	<p>To produce certified sustainable wood involves extra costs to the wood producer from paying for auditors to visit the site and carry out an initial assessment and to make annual visits. These costs become less significant as the forest size for a particular licence becomes larger. In the US, anecdotal evidence from suppliers suggests that sustainable certified wood could fetch prices that are 5-20% higher than non-certified wood. However, these are only limited examples and as the quantity of FSC certified forest is continually increasing, the availability of sustainable certified wood does too and so there is competition between FSC wood suppliers that may be keeping any price premiums low. A clearer picture will emerge once the market comes to scale<sup>4</sup>. A report by CBI Ministry of Foreign Affairs stated that a general price premium of 10-30% existed for FSC-certified wood imported to the Netherlands<sup>5</sup>.</p> <p>The above factors reflect costs to the furniture manufacturer. How much the manufacturer will pass these costs on to the consumer is uncertain and will depend on their marketing strategy. Also the effect on price will be related to the overall contribution of wood raw materials to the total furniture price, which may vary widely.</p>	<p>Sustainable forest management brings about a series of myriad environmental benefits including reduced adverse impact on ecosystems, reduced risk of soil erosion and reduced carbon emissions.</p>
Low VOC content adhesives	<p>Low VOC content adhesives include "water-based" and "hot-melt" type formulations. Compared to organic solvent-based formulations, it has been stated that water-based adhesives are 15-20% cheaper to purchase<sup>6</sup>. However, where factory production times are important, it must be noted that water-based adhesives require 3 times more heat to dry fully and generally do not provide the same performance as organic solvent-based adhesives in terms of sheer or peel strength. The performance of hot melt adhesives is generally very high but requires specific techniques for their use.</p>	<p>There are obvious environmental and health benefits associated with lower VOC emissions both for workers and end users. However, if a low VOC content adhesive does not perform as well as an organic solvent-based adhesive and results in a reduction of product lifetime, then this would lead to a net negative environmental impact. The risk of such a scenario is minimised by requiring that</p>

<sup>3</sup> Costs and Benefits of Green Public Procurement in Europe. Part 1: Comparison of the Life Cycle Costs of Green and Non-green products. Germany, 2007.

<sup>4</sup> FSC US Fact Sheet, accessed online at: [http://us.fsc.org/download\\_costs-and-benefits-of-forest-certification.198.htm](http://us.fsc.org/download_costs-and-benefits-of-forest-certification.198.htm)

<sup>5</sup> CBI report, accessed online at: [http://www.cbi.eu/system/files/marketintel/FSC-certified\\_tropical\\_timber\\_garden\\_furniture\\_in\\_The\\_Netherlands.pdf](http://www.cbi.eu/system/files/marketintel/FSC-certified_tropical_timber_garden_furniture_in_The_Netherlands.pdf)

<sup>6</sup> Special Chem Editorial available online at: <http://www.specialchem4adhesives.com/home/editorial.aspx?id=232>

		furniture products meet any relevant technical standards and that the product should be easy to disassemble manually into component parts – which generally favours screws and fittings rather than adhesives.
Recycled Plastics	The most successfully recycled post-consumer plastics tend to be HDPE and PET used in containers. According to a report by Plastic ZERO <sup>7</sup> , the market price for recycled plastics closely follows the prices for virgin plastics which in turn is influenced by crude oil prices. It is debateable therefore, whether or not the price of recycled plastic is truly independent of crude oil prices., Regardless, due to significant energy and raw material savings compared to plastic manufactured from virgin materials, the cost of recycled plastic should in theory, and at least where efficient recycling facilities are in place be significantly lower than that of virgin plastic. However, other factors such as economies of scale and collection and sorting costs may significantly affect the price of recycled plastic.	The production of PET or HDPE by recycling consumes around significantly less energy (up to 70-90% less) <sup>8</sup> than production from virgin raw materials.
Recycled Aluminium content	Aluminium is an energy and raw material intensive product. The production of virgin aluminium involves converting bauxite ore to alumina, then alumina to aluminium. Compared to production from virgin raw materials, recycling of aluminium is widely regarded as the most advantageous, both in environmental and economic terms, of all materials. The relatively high value (currently €650-900/tonne scrap) and demand for scrap aluminium also confers an economic incentive to end consumers to recycle aluminium furniture/components. On average in Europe, the production of recycled aluminium represented slightly more than half of total aluminium production.	The energy required to produce a certain weight of primary aluminium (the embodied energy) is around 160 GJ/t. However, aluminium produced via recycling routes has an embodied energy of around 8-16 GJ/t, some 90-95% less. The reduced energy requirements translate into not only reduced costs but also reduced emissions and waste production. To produce 1 tonne of primary aluminium requires 4000-5000 kg of bauxite and the main solid waste material is red mud slurry, a highly caustic waste that is typically stored in lined open lagoons.
Recycled Steel content	Steel is produced from iron ore, coke, limestone and specific alloying metals depending on the grade of steel. Primary steel production involves the costs of mining iron ore, producing pig iron at temperatures up to 2000°C in a blast furnace and then combining the pig iron with alloying elements in a second furnace operation. Different production process routes for steel are the Basic Oxygen Furnace (which can accept up to 25% recycled steel) and the Electric Arc Furnace (which can accept up to 100% recycled steel). Like aluminium, the recycling market for steel is well developed and there is an clear economic incentive for end users to recycle steel (currently €700-1000/tonne scrap). Production from recycled steel in Europe accounted for slightly more than half of European production. The energy savings of recycled steel compared to virgin steel are significant but not as large as those associated with aluminium.	The embodied energy of virgin steel is undoubtedly higher than that of recycled steel because it is not necessary to convert iron ore into pig iron as a preliminary step in a blast furnace. For every 1 tonne of steel that is recycled, the consumption of 1400kg of iron ore, 400kg of coal and 55kg of limestone is avoided.

<sup>7</sup> Plastic ZERO report accessed online at: [http://www.plastic-zero.com/media/30825/action\\_4\\_1\\_market\\_for\\_recycled\\_polymers\\_final\\_report.pdf](http://www.plastic-zero.com/media/30825/action_4_1_market_for_recycled_polymers_final_report.pdf)

<p>Durability</p>	<p>The durability of products inherently involves better quality materials and more stringent quality control processes and/or attention to detail during furniture manufacture. These factors will increase the financial cost of production and the final product cost. When considering the life-cycle cost, product durability is a fundamental consideration since once a furniture product is broken, if it cannot be repaired easily, then it is likely to be discarded and a new product will need to be purchased. Thus, there is great potential for monetary savings for public authorities.</p>	<p>If a piece of furniture can be used over a longer time, this saves resources for production of new ones. In specific cases, improving the durability of a product may entail adverse environmental impacts. For example using higher VOC content surface coatings on wooden tables for improved scratch resistance or using wood preservatives in outdoor wooden furniture or using thicker plastic components that are less likely to snap under heavy pressure. However, these increased impacts can be offset against improved furniture lifetime.</p>
<p>Reparability</p>	<p>In a similar manner to durability, reparability is an important consideration for life cycle costing and includes a great potential for monetary savings. Reparability becomes more influential as the purchase cost of the furniture product increases. Except for where spare parts are cheap and the repairs can be done by the end consumer relatively easily, there is little point in repairing cheap furniture items since the cost of repair may be similar to or even exceed the cost of buying a new product in some cases.</p>	<p>If a piece of furniture can be repaired and thus used over a longer time, this saves resources for production of new ones. Where repairs are carried out, the avoided environmental impacts of buying a new piece of furniture can be weighed against the impacts associated with the production of any spare parts or substances used.</p>

## 5 SPECIFIC POINTS TO BE DISCUSSED FURTHER

### **a) Refurbished/Remanufactured furniture**

Furniture items as per the above definition are generally low maintenance and do not consume energy during the use phase of their lifetime. The dominant life cycle impacts are associated with the raw materials, chemicals and processing techniques used to manufacture the individual furniture components. There is an increasing demand for refurbished and remanufactured furniture from public authorities which is well reflected in an explanatory note by the UK government with regards to furniture buying standards which states:

*"It is proposed that from 1 April 2011 government departments and their agencies are encouraged to meet at least 5% of the office furniture and 10% of the domestic/residential items through reuse/refurbish/re-upholster of their current furniture stock. The intention is to increase this level over time (for example; 5% by 2011, 10% by 2015, etc)."*

The use of remanufactured furniture has the double benefit of diverting waste from landfill/incineration and reducing the demand for new materials. Perhaps most importantly, this can often translate to significant cost savings – particularly in cases where only reupholstering of chairs is required for example.

It is extremely difficult or even impossible for refurbished or remanufactured furniture to meet the criteria defined above for new furniture due to a lack of knowledge regarding the materials used. Therefore it should be discussed how such refurbishing/remanufacturing services may be incorporating into the criteria or to decide if they should be considered as an alternative type of green public procurement.

### **b) Precise definition of sustainable wood**

### **c) Possible further award criteria**

- For longer product warranties?
- For buy back or take back schemes where an appropriate waste management system with allowances for material re-use and recycling is demonstrated?
- For recycled metal contents?