



**Sustainable consumption  
and Environmental policies  
and regulation  
in the furniture sector**

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# CONTENTS

1. European Environmental Policy (EAP) .....	3
1.1. The Sixth Environment Action Programme of the European Community 2002-2012 3	
1.2. Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan.....	3
1.3. Directive 2006/32/EC of the European Parliament and of the Council on energy end-use efficiency and energy services: .....	3
1.4. THE INTEGRATED POLLUTION PREVENTION AND CONTROL (IPPC) .....	4
1.5. The Integrated Product Policy (IPP) .....	4
1.6. Other policy and Plan .....	5
2. Life Cycle Management: LCT- LCA .....	6
2.1. ISO 14040:2006.....	6
2.2. ISO 14044:2006.....	7
2.3. ISO/TR 14047:2003.....	7
2.4. ISO/TS 14048:2002 .....	7
2.5. Forthcoming standards .....	7
3. ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) .....	7
3.1. EMAS .....	8
3.2. ISO 14001:2004.....	8
3.3. ISO 14001 vs EMAS.....	8
3.4. Forthcoming standards .....	9
3.5. Nacional Standard .....	9
4. Environmental Labelling Types Description.....	10
4.1. Type I – Eco-labels: the Environmental Communication Tools.....	11
4.1.1. EUROPEAN ECOLABEL .....	11
4.1.2. OTHER EU ECO-LABELS .....	12
4.1.3. EXTRA-EU PRODUCT ECO-LABELS .....	13
4.1.4. Environment label Standards .....	14
4.2. Type II: of product self-declarations.....	15
4.3. Type III: EPD - ENVIRONMENTAL PRODUCT DECLARATION .....	15
4.4. FOREST CERTIFICATION LABEL.....	16
4.4.1. FSC (Forest Stewardship Council).....	16
4.4.2. PEFC (Programme for Endorsement of Forest Certification schemes).....	19
5. THE GREEN PUBLIC PROCUREMENT AND THE GREEN PROCUREMENT .....	21
6. LEED: Leadership in Energy and Environmental Design.....	22
7. Energy Efficiency .....	23
7.1. Some National Standards.....	24
7.2. Forthcoming standards .....	24
8. EU Legislation .....	25
8.1. THE EUROPEAN CHEMICALS POLICY (REACH).....	25
8.2. EMISSIONS OF ATMOSPHERIC POLLUTION .....	25
8.3. FORMALDEHYDE .....	25
8.4. WASTE LEGISLATION .....	26
9. SYTHESIS OF THE MAIN CRITERIA OF ECOLABELS CONSIDERING THE FURNITURE PRODUCT .....	27
9.1. THE PRODUCTS LIFE CYCLE: MAIN IMPACTS AND BEST PRACTICES.....	27

## **1. European Environmental Policy (EAP)**

EU environment policy is delivering tangible results for citizens and has helped the European industry to become a world leader in a number of high-growth sectors. But despite this progress, global emissions of greenhouse gases are rising, the loss of biodiversity is not yet under control, pollution is still harming public health and volumes of waste are increasing in Europe. The Commission is committed to fully implement the current Environment Action Programme in order to make significant progress towards tackling these issues.

### **1.1. The Sixth Environment Action Programme of the European Community 2002-2012**

It sets out the framework for environmental policy-making in the European Union for the period 2002-2012 and outlines actions that need to be taken to achieve them. The 6th EAP identifies four priority areas:

- Climate change
- Nature and biodiversity
- Environment and health
- Natural resources and waste .

The 6th EAP promotes full integration of environmental protection requirements into all Community policies and actions and provides the environmental component of the Community's strategy for sustainable development. The link is made between environment and European objectives for growth, competitiveness and employment.

### **1.2. Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan**

It includes a series of proposals on sustainable consumption and production that will contribute to improving the environmental performance of products and increase the demand for more sustainable goods and production technologies. It also seeks to encourage EU industry to take advantage of opportunities to innovate.

In general, the main environmental objectives of the SCP strategy are:

- Sustainable Use of natural resources;
- Cutting the energetic consumption, promoting renewable energy and reducing pollution and climate-change emissions;
- Reducing the waste production and their harmfulness;
- Reducing the use of harmful substances.

### **1.3. Directive 2006/32/EC of the European Parliament and of the Council on**

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## **energy end-use efficiency and energy services:**

In which is stressed mainly 2 concepts should be considered in each activity and normative:

- Necessity to improve:
  - efficiency of the final energy use
  - Manage the energy demand
  - Foster the renewable energy production
- Increase the efficiency of the final energy use:
  - Less primary energy consumption and CO2 reduction
  - Exploitation of the potential and profitable energy saving
  - Reduce the energy dependence
  - Foster the technology improvement and the competitiveness

### **1.4. THE INTEGRATED POLLUTION PREVENTION AND CONTROL (IPPC)**

One piece of legislation could be relevant for the furniture sector is the IPPC Directive (2008) on "Integrated Pollution Prevention and Control". This Directive aims to minimise pollution from various industrial sources throughout the European Union. This Directive requires industrial and agricultural activities with a high pollution potential to have a permit, as defined in the Directive. This permit can only be issued if certain environmental conditions are met, so that the companies themselves bear responsibility for preventing and reducing any pollution they may cause, the industrial and agricultural involved activities are: energy industries, production and processing of metals, mineral industry, chemical industry, waste management, livestock farming, etc.

Operators of industrial installations covered by Annex I of the Directive are required to obtain an authorisation (environmental permit) from the authorities in EU countries. "Installations for the surface treatment of substances, objects or products using organic solvents, in particular for dressing, printing, coating, degreasing, waterproofing, sizing, painting, cleaning or impregnating, with a consumption capacity of more than 150 kg per hour or more than 200 tones per year" are in Annex I of IPPC Directive.

Coating materials are commonly used in the furniture industry to provide materials resistance to chemical, mechanical and climatic impacts and also to stain. Furthermore, wood used for furniture (e.g. garden furniture) is often preserved with organic solvent based preservatives to protect it against fungus, insects and weathering. In this context, furniture manufactures which coat, paint, waterproof, etc.

### **1.5. The Integrated Product Policy (IPP)**

The Integrated Product Policy (IPP) intends to create conditions in which environment-friendly products, or products with a low environmental impact, will be accepted among the

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European Union's member states. By looking at all phases of a products' life cycle and taking action where it is most effective, the IPP aims to minimize the environmental degradation caused to a certain extent by products. The IPP applies to all products and attempts to improve their environmental performance.

The IPP approach, gradually developed in the last decade, is based upon 5 general principles:

- To reduce both products and services environmental impact, considering the whole life cycle and acting where it is possible to get the best benefits with solutions that are economically advantageous also for the company.
- To develop a “green market”, on one hand through the introduction, from the offer side, of a series of incentives to direct the market toward more sustainable solutions and to encourage innovation. On the other hand, through the offer, from the demand side, of appropriate information tools for the “consumers” (private and public), in order to push them to buy more ecological products (meaning encouraging demand and offer of more ecological products while informing and rewarding the most innovative companies that promote sustainable development).
- To involve all actors both inside and outside the production line, in order to maximize the real environmental impact reduction (encouraging all those that deal with the product – industries, consumers, public authorities – to intervene within their field, promoting cooperation among the several stakeholders).
- To continuously improve (each company can establish improvements, in relation to their cost/effectiveness ratio).
- To integrate the multiple tools and ensure that the benefits coming from the environmental goals reached are always balanced with the environmental costs of the whole life cycle (we are not talking about the creation of new tools, but about the effective use of the existing ones, from voluntary to normative tools, from local initiatives to international actions).

The EU defined a combination of several policy tools - both voluntary and mandatory, acting at a local, national or European level - to achieve these objectives. The EU suggests that these tools are used taking into account one another, in order to strengthen their reciprocal effect. These tools comprise the IPP toolbox.

On one hand these tools allow the EU to put the SCP strategy into action. On the other hand, they are at the companies' disposal, so that they can improve their environmental performance:

- Analytical tools and strategy (LCT- LCA)
- Tools to communicate the environmental performances of products (Ecolabel, EPD)
- Tools for Environmental Management (EMAS)
- GPP and GP
- Economic tools (taxes, incentives) and agreements.

## **1.6. Other policy and Plan**

The building blocks of the European Union's policy on sustainable consumption and production include:

- Environmental Technologies Action Plan (ETAP)

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- European Compliance Assistance Programme (ECAP): Environment & SMEs
  - EU chemicals policy (REACH)

Some policies include, integrate or develop a range of action tools, which could pertain to the wood furniture industry as well. In the next paragraphs, the descriptions and considerations on the ongoing actions and evolution of each policy and related tools are given.

## **2. Life Cycle Management: LCT- LCA**

Life cycle thinking is defined as a production and consumption strategy that aims at taking into account all of the impacts (environmental, economic and social) that a product or service will have throughout its life cycle, “from cradle to grave”.

The life cycle of a product includes:

- Extraction of raw materials
- Product manufacturing
- Packaging and distribution
- Product consumption
- End of life.

The main operational tool of an LCT approach is represented by the Life Cycle Assessment (LCA). The LCA, an internationally standardized methodology (ISO 14040:2006, ISO 14044:2006), is a technique for assessing the potential environmental aspects and potential aspects associated with a product (or service), is an objective evaluation and quantification method of the energetic and environmental loads and of the potential impacts associated with a product/service/process/activity throughout the whole life cycle, from raw materials to disposal or reuse. The LCA provides a comprehensive framework of environmental impact through a several steps process:

- compiling an inventory of relevant energy and material inputs and environmental releases;
- evaluating the potential environmental impacts associated with identified inputs and releases;
- Interpreting the results to help making better informed decisions.

### **2.1. ISO 14040:2006**

ISO 14040:2006 describes the principles and framework for life cycle assessment (LCA) including: definition of the goal and scope of the LCA, the life cycle inventory analysis (LCI) phase, the life cycle impact assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations of the LCA, the relationship between the LCA phases, and conditions for use of value choices and optional elements.

ISO 14040:2006 covers life cycle assessment (LCA) studies and life cycle inventory (LCI) studies. It does not describe the LCA technique in detail, nor does it specify methodologies for the individual phases of the LCA.

The intended application of LCA or LCI results is considered during definition of the goal and scope, but the application itself is outside the scope of this International Standard.

## **2.2. ISO 14044:2006**

ISO 14044:2006 specifies requirements and provides guidelines for life cycle assessment (LCA) including: definition of the goal and scope of the LCA, the life cycle inventory analysis (LCI) phase, the life cycle impact assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations of the LCA, relationship between the LCA phases, and conditions for use of value choices and optional elements. ISO 14044:2006 covers life cycle assessment (LCA) studies and life cycle inventory (LCI) studies.

## **2.3. ISO/TR 14047:2003**

ISO/TR 14047:2003 provides examples to illustrate current practice in carrying out a life cycle impact assessment in accordance with ISO 14042. These are only examples of the total possible "ways" to satisfy the provisions of ISO 14042. They reflect the key elements of the life cycle impact assessment (LCIA) phase of the LCA.

## **2.4. ISO/TS 14048:2002**

This Technical Specification provides the requirements and a structure for a data documentation format, to be used for transparent and unambiguous documentation and exchange of Life Cycle Assessment (LCA) and Life Cycle Inventory (LCI) data, thus permitting consistent documentation of data, reporting of data collection, data calculation and data quality, by specifying and structuring relevant information.

The data documentation format specifies requirements on division of data documentation into data fields, each with an explanatory description. The description of each data field is further specified by the structure of the data documentation format.

## **2.5. Forthcoming standards**

### **ISO 14045 Eco-efficiency assessment of product systems -- Principles, requirements and guidelines (due 2011)**

ISO / CD 14045 will define eco-efficiency as a concept relating the environmental performance of a product system to its functional value. It will provide practical guidance and support open, comprehensive and understandable presentation of eco-efficiency measures for products. Quantified eco-efficiency for products is understood as a measure or measures that relate environmental performance to functional value created.

## **3. ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)**

An EMS is a management tool for companies and other organizations to evaluate report and improve their environmental performance. It could be defined as a self-correcting and constant improvement system that seeks to reduce environmental impacts associated with a facility's activities while helping to ensure compliance with environmental regulations. It provides a structured method for incorporation of environmental considerations into a step-

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by-step approach, while promoting continual improvement of the environment and, thus, of human health. Within the EMS a company sets out responsibilities, procedures and methods that bring environmental issues into its operational activities.

### **3.1. EMAS**

The Eco-Management and Audit Scheme (EMAS) is voluntary and extends to public or private organizations operating in the European Union and the European Economic Area (EEA).

Companies wanting to qualify for EMAS must review the environmental impacts of their activities, products and services. They then have to set up a management system with fixed objectives and must conduct regular environmental audits and produce statements on their environmental performance.

To receive EMAS registration an organization must comply with the following steps:

- conduct an environmental review;
- establish an effective environmental management system aimed at achieving the organization's environmental policy defined by the top management;
- carry out an environmental audit assessing;
- provide an environmental performance statement;
- the environmental review, EMS, audit procedure and the environmental statement must be approved by an accredited EMAS verifier
- Register the validated statement by the EMAS Competent Body and make it publicly available.

### **3.2. ISO 14001:2004**

ISO 14001:2004 is an international standard; participation is voluntary and it is applicable to any business, regardless of its size, location or income.

ISO 14001 enables the company to develop and implement a policy and objectives, which take into account legal requirements and other requirements the organization has to comply with, and information about significant environmental aspects. It applies to the environmental aspects identified by the organization those that can be controlled and influenced. It does not state specific environmental performance criteria. ISO 14001 has not a seal, usually certified companies use the label of the third-party certifier. ISO-14001 standards only relate to the performance of the company or organization and not to the performance/qualities of the product/service produced by the same company.

### **3.3. ISO 14001 vs EMAS**

While EMAS and ISO/EN ISO 14001 share the same objective, they are different in a number of ways; generally EMAS goes beyond the ISO/EN ISO 14001 requirements. The EMAS requires a higher involvement of the company than ISO does, in terms of procedures, requirements and costs. Some relevant differences:

<b>EMAS</b>	<b>ISO</b>
Under legal bases (EU Member States and EEA countries). Regulation of the European Parliament and the Council under public law. Geographical relevance: European	Under no legal bases. (International: world wide) ISO standard under private law. Geographical relevance: international
Obligatory preliminary review, when the organization sets its environmental status for the first time	Initial review is recommended, but not required
Obligatory to demonstrate it. Full legal compliance required. There is a compliance-audit	Only commitment: to comply with applicable legal requirements. There is no compliance-audit
Independence of the auditor required	Independence of the auditor advised

### **3.4. Forthcoming standards**

#### **ISO 14005 Phased Implementation of EMS (due 2011)**

Many organizations have profited from having a formal environmental management system. However, many more organizations, especially small to medium-sized enterprises (SMEs), do not have such a system even though it could benefit them greatly. Taking time and money away from recognized business needs is a major step for any organization. This standard uses a phased approach to build an environmental management system that can grow, if necessary to meet the requirements of the international standard for environmental management systems, ISO 14001.

#### **ISO 14006 Eco-design (due 2011)**

The increasing international concern over climate change and damage to the environment is driving organizations to become increasingly more aware of their impact on the environment. BS EN ISO 14006 will give guidelines to assist organizations in establishing, documenting, implementing, maintaining and continually improving their management of eco-design as part of a management system. It is applicable to all types and sizes of organizations in all sectors.

### **3.5. Spanish National Standard**

#### **UNE 150.301 Standard of Ecodesign**

It is a Spanish standard which is going to be converted in ISO 14006 (due to 2011) and in which AIDIMA has been involved into the Join Group to establish the requirement is the UNE 150.301 standard of Ecodesign. This standard UNE specifies the product / process design and development process requirements for an organization, with which is possible establish a systematic continue improvement of the product / service through an environment management system.

#### 4. Environmental Labelling Types Description

To complete the overview on environmental labels and declarations, it is useful to consider that, in order to ensure common standards in this field, the International Organization for Standardization (ISO) establishes guiding principles for the development and use of environmental labels and declarations, identifying three broad *types* of voluntary labels. The labels under this typology are referred to as ISO-based.

##### **Type I – Eco-labels**

rif. UNI EN ISO 14024:2001 - a voluntary, multiple-criteria based, third party program that awards a license that authorizes the use of environmental labels on products, indicating overall environmental preferability of a product within a particular product category based on life cycle considerations. Part of this type: *Ecolabel, Nordic white SWAN, Eco Mark, Blaue Engel, Environmental Choice Program (the Eco-logo program), Green Seal, Milieukeur ecolabel*

##### **Type II – Self-declared environmental claims**

rif. UNI EN ISO 14021:2002 - informative environmental self-declaration claims *Eg. Recycled content: xx%*. A self-declared environmental claim is a declaration, a label, or a symbol, which draws attention to a certain element of the organization's activities, products or services and which can influence the environment. It is a special type of advertising. It is related to the product, its component or packaging. It can take the form of a statement, a label or a symbol placed on the product or on the product's packaging, in the product's documentation, in technical bulletins, in advertising and promotion. The parameters, environmental aspects that are intended to prove the product's environmental friendliness, are chosen by the company-claimant themselves.

##### **Type III – Environmental Product Declarations**

rif. UNI EN ISO 14025:2006 - voluntary programs providing quantified environmental data of a product, under pre-set categories of parameters set by a qualified third party, based on life cycle assessment, and verified by the same or another qualified third party. Part of this type: EDP®. All the other labels/declarations/schemes are not ISO-based since they developed different evaluation criteria or refer to non-ISO standards, eg. Carbon footprint label, Greenguard, Floorscore, Indoor advantage, Cradle to cradle (c2c), FSC.

The main differences amongst these are shown in the table below:



and services. EU member States designate Competent Bodies that are the national points of access for the scheme. The EU Ecolabel is administered by the European Eco-labelling Board (EUEB). Ecolabels criteria are not based on one single factor (multi-attribute program), but on studies, which analyze the impact of a product or service on the environment throughout its life-cycle, starting from raw material extraction in the pre-production stage, through to production, distribution and disposal. Under the new Flower scheme (the flower is the scheme logo) some of the main reasons why the Flower has been awarded to a specific product will appear in the information box on the product.

In the Official Journal L 320, 05/12/2009 P. 0023 – 0032 it has been published the Commission Decision of 30 November 2009 on establishing the ecological criteria for the award of the Community eco-label for wooden furniture.

Nowadays, the criteria to issue the European Ecolabel focus on “wood furniture only, 90% of the weight of which has to be wood or wood-based material (e.g. chipboard, MDF, plywood). Glass, where easy to change in the event of getting broken, is excluded from the weight calculation. The weight of any individual material, other than solid wood and wood-based materials, shall not exceed 3 % of the total weight of the product. The total combined weight of such materials shall not exceed 10 % of the total weight of the product. Even in their draft shape, the defined criteria don't satisfy yet the Member States, nor the stakeholders involved.

Nowadays the product group "wooden furniture" shall comprise free-standing or built-in units, which are used for storing, hanging, lying, sitting, working and eating of domestic furniture, whether for indoor or outdoor use, or used indoors for business purposes. Business purposes shall include office and school furniture as well as furniture for restaurants and hotels.

The best-known multi-criteria eco-labels - besides the EU Ecolabel - are the Scandinavian label Nordic Swan and national labels like the German Blue Angel. These labels can be placed on furniture, are voluntary and life-cycle based, and they involve the certification of the product by a third party (i.e. not by the producers themselves). They meet high standards of transparency and scientific rigor in terms of setting criteria, and are non-discriminatory. There are several eco-labeling programs in Europe, with different characteristics, environmental preferability criteria and certified product categories.

#### **4.1.2. OTHER EU ECO-LABELS**

##### **Nordic Ecolabel Or Swan** (Denmark, Finland, Iceland)

Together with European Ecolabel, it is the only trans-national eco-label. This label could be issued by a national body, and it follows Nordic eco-label standards. The Swan checks that products fulfil certain criteria using methods such as samples from independent laboratories, certificates, and control visits.

##### **Blauer Engel (Blue Angel)** (Germany)

The Blue Angel is the first eco-label program, created in 1978. It focuses on both environmental protection and consumer protection related concerns. Therefore, it is awarded to products and services that are overall particularly good for the environment and that also fulfil high standards of occupational health and safety. In order to define the criteria, raw materials, production, transportation and distribution are taken into consideration, as well as the possibility to reuse and recycle, and waste and toxic

substances emission. There is a reciprocal acknowledgement between the Blue Angel eco-label with Chinese, Japanese, and South-Korean ones.

**Milieukeur Ecolabel** (The Netherlands):

This label is found on several products, the production process of which complies with environmental requirements.

**Aenor Medio Ambiente** (Spain):

This is a mark that shows compliance with UNE ecological standards, designed to distinguish those products or services that have the lower environmental impact throughout their life cycle: this includes raw materials; design; manufacture; use and disposal after use. The AENOR Medio Ambiente environmental mark aims to provide consumers with information on the environmental aspects of the products and services.

**Umweltzeichen** (Austria):

The Austrian Ecolabel is primarily addressed to consumers, but also to manufacturers and public administration. The eco-label draws consumers' attention to environmental, health and quality (easy to use) aspects. The main declared objectives of the eco-label are raw materials and energy consumption, toxicity, waste generation during the processes, and after-life disposal, quality and safety, use, life length and reparability.

#### 4.1.3. EXTRA-EU PRODUCT ECO-LABELS

**Korean Ecolabel:** The Korean Eco-Products Institute carries out various operations related to the improvement of eco-products and product environmental friendliness by setting up the eco-product standards, building an evaluation system, offering eco-products & environmental trend information to the public, facilitating production of eco-products, and constructing the eco-product consumption system.

**Green Seal** (USA): Green Seal certified products meet science-based environmental certification standards that are credible and transparent. Green Seal utilizes a life-cycle approach. Products can only become Green Seal certified after rigorous testing and evaluation, including on-site plant visits.

**Ecologo – Environmental Choice** (North America): The EcoLogo Program, also known as Environmental Choice, is a multi-attribute third-party certification and labelling program. Since 1995 it has been managed by TerraChoice Environmental Marketing, which is now promoting it in the U.S. EcoLogo currently addresses over 250 product types, many of which building-related. EcoLogo standards are life-cycle based and designed to be achievable by the top 20% of existing products in a category. The EcoLogo Program is one of two such programs in North America that has been successfully audited by the Global EcoLabelling Network (GEN) as meeting the ISO 14024 standards for Type I labels, including requirements for a consensus-based standard-development process.

**Eco Mark** (Japan): Eco Mark Program is operated by the Japan Environment Association (JEA), founded in 1989. By applying the Eco Mark to a product that is certified as being useful for the environmental preservation, the product information is provided in an environmental perspective. The Eco Mark program is managed in accordance with the standard and principle of International Organization of Standardization (ISO). The use of the label is accepted by the organization of the third party based on independent and multi standards.

**C2C - Cradle to Cradle (Type I similar)**

Cradle to Cradle Design (sometimes abbreviated to C2C or in some circles referred to as regenerative) is an approach to the design of systems and products that seeks to create

not just efficient, but essentially waste-free systems. The model in its broadest sense is not limited to industrial design and manufacturing; it can be applied to many different aspects of human civilization such as urban environments, buildings, economics and social systems. The model has been implemented by several companies, organizations and governments around the world, and especially in China and the US, leading also to certifications. Differently from LCA (Life Cycle Assessment), which is a typically cradle-to-grave analysis, Cradle to Cradle considers the re-use of the product after the end of its life cycle, in order to eliminate waste.

### **Carbon Footprint Labels (Type I similar)**

A carbon emission label, or carbon label, describes the carbon dioxide emissions of a product. The world's first carbon label, which shows the carbon footprint needed to bring a product to the shelf, was introduced in the UK in 2006 by the Carbon Trust. The Carbon Trust label also requires companies to commit to reduce the carbon emission of the labelled product; otherwise, they lose the right to feature the label. The Carbon Trust and Defra have co-sponsored the publication of PAS 2050 (the product carbon footprinting standard) by the British Standards Institution. PAS 2050 provides a method for assessing the products GHG emissions throughout their life cycle. This new standard is the first widely consulted method that specifically addresses the emerging interest of both organizations and consumers in understanding the carbon footprint of goods and services. Some other example of carbon footprint labels are: carbonfund (USA), carbon-label (UK), planet-positive. At the moment Carbon Emission labels, besides UK Carbon Trust, are not required by any wider certification systems, nor by public or private procurements. In these kinds of label a very low degree of involvement of the company is expected.

It is interesting to note that in light of the recent interest in Carbon footprint measurement and Labeling, and the recently launched PAS 2050 standard on Carbon measurement, European Ecolabel is looking into how carbon footprinting can be systematically considered within its criteria development process. As such, a small study was commissioned to analyze this (before than the PAS 2050 was published), and to raise the question with stakeholders about how any specific carbon footprint criteria might be best presented with the Ecolabel logo. The study is not about the wider issue of carbon measurement standardization and labeling of products in general, nor is it about the European Commission's role in carbon measurement of products.

## **4.1.4. Environment label Standards**

### **ISO 14020:2000**

This International Standard establishes guiding principles for the development and use of environmental labels and declarations. It is intended that other applicable standards in the ISO 14020 series be used in conjunction with this International Standard.

This International Standard is not intended for use as a specification for certification and registration purposes.

NOTE Other International Standards in the series are intended to be consistent with the principles set forth in this International Standard. Other standards currently in the ISO 14020 series are ISO 14021, ISO 14024 and ISO/TR 14025

### **ISO 14021:1999**

Environmental labels and declarations -- Self-declared environmental claims (Type II environmental labelling)

### **ISO 14024:1999**

Environmental labels and declarations -- Type I environmental labelling -- Principles and procedures

### **ISO 14025:2006**

ISO 14025:2006 establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations. It specifically establishes the use of the ISO 14040 series of standards in the development of Type III environmental declaration programmes and Type III environmental declarations. ISO 14025:2006 establishes principles for the use of environmental information, in addition to those given in ISO 14020:2000. Type III environmental declarations as described in ISO 14025:2006 are primarily intended for use in business-to-business communication, but their use in business-to-consumer communication under certain conditions is not precluded

## **4.2. Type II: of product self-declarations**

Product self-declarations have traditionally been widely used by interested parties (manufacturers, retailers, importers...) to advertise the improved environmental performance of their products, and thus attract environmentally-conscious consumers.

- They are visible and easily identifiable by consumers in many cases (e.g.: the Möbius loop recycling symbol, see the figure).



- They help to promote your environmental commitment and strengthen the brand value of your products and services.

The main advantage of product self-declarations over other types of eco-labels is that they are generally cheaper to obtain than any other environmental labelling tool. This is because no certification or validation is required.

## **4.3. Type III: EPD - ENVIRONMENTAL PRODUCT DECLARATION**

EPD presents quantified environmental data for a product, based on information gathered from a life cycle assessment (LCA) according to the ISO-standards (which are the "method" standard regulations). EPD has voluntarily developed information and the

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purpose of an EPD is to provide easily accessible, quality-assured and comparable information regarding the products environmental performances. Certified EPDs are open for all products and services. There is no evaluation of the environmental information since no predetermined

Environmental performance levels are set. Instead, it builds on well-structured and quantitative data, certified by an independent third party. There are two documents, which regulates the calculations and data collection behind an EPD and the information that the EPD must contain:

- Requirements for the EPD system (MSR) and
- Product specific requirements (PSR).

The MSR contains general requirements for all EPDs and the PSR contains more detailed requirements for each product group.

In general, the EPD is a tool thought to improve the environmental communication amongst producers and between distributors and consumers. There are several EPD procedures at the international level, such as the “Ecoleaf®” program in Japan, the “EPD-Norge®” program in Norway, the “EDP®” program in Korea, etc. The more popular, advanced and well-established program in Europe is the “EPD®”, managed by the SEMC (Swedish Environmental Management Council), as requested by the Swedish government.

#### **4.4. FOREST CERTIFICATION LABEL**

The “forest management certification” is the audit procedure that leads to a certification issued by an independent institution to certify that the forest management complies with certain “sustainability” requirements.

To this day the EU has no region-wide law to prevent illegally logged wood products to be imported, and there can be a wide gap in price between products coming from well-managed forests and products coming from poorly managed ones. In order to try to stop illegal logging in developing countries, the EU is considering strengthening its timber import laws. The legislation may recognize existing forest certification labels as mandatory for each wooden product. For this reason, the forest certification and related labels would get a big boost from a potential EU regulatory endorsement. The main international forest certification schemes are the FSC and the PEFC.

##### **4.4.1. FSC (Forest Stewardship Council)**

FSC is an independent, non-governmental, not-for-profit organization established to promote the responsible management of the world’s forests. The FSC forest management standards are based on FSC's 10 Principles and 57 Criteria of responsible forest management.

The FSC’s certification system provides the FSC label, which certifies responsible production and consumption of forest products. To earn the FSC certification and the right to use the label, an organization must first adapt its management and operations to comply with all applicable FSC requirements. What’s established by the FSC standards is globally applied. The FSC is nationally represented in more than 50 countries around the world.

The following table shows the number of FSC Certified Forest Area and Chain of Custody Certificates in Europe:

Europe	Total area (ha)	No.
AUSTRIA	4,876	3
BELARUS	3,020,144	11
BELGIUM	14,693	2
BOSNIA AND HERZEGOVINA	123,486	2
BULGARIA	303,580	12
CROATIA (Hrvatska)	2,018,987	1
CZECH REPUBLIC	51,197	4
DENMARK	192,971	6
ESTONIA	1,081,957	3
FINLAND	9,706	3
FRANCE	16,610	3
GERMANY	373,493	52
HUNGARY	251,906	4
IRELAND	449,573	3
ITALY	66,565	14
LATVIA	590	1
LITHUANIA	1,036,110	43
LUXEMBOURG	18,835	3
NETHERLANDS	142,948	7
NORWAY	75,847	2
POLAND	6,376,834	18
PORTUGAL	449,583	15
ROMANIA	914,676	3
RUSSIA	25,312,538	67
SERBIA	371,659	3
SLOVAKIA	132,583	6
SLOVENIA	212,104	1
SPAIN	96,767	9
SWEDEN	11,094,266	22
SWITZERLAND	505,433	14
UKRAINE	1,262,520	8
UNITED KINGDOM	1,587,137	95
<b>Grand total</b>	<b>57,570,174</b>	<b>440</b>

Europe	No.
AUSTRIA	126
BELARUS	11
BELGIUM	261
BOSNIA AND HERZEGOVINA	21
BULGARIA	10
CROATIA (Hrvatska)	128
CYPRUS	2
CZECH REPUBLIC	64
DENMARK	153
ESTONIA	84
FINLAND	52
FRANCE	502
FRANCE, METROPOLITAN	12
GERMANY	1353
GREECE	3
HUNGARY	36
IRELAND	69
ITALY	754
LATVIA	162
LIECHTENSTEIN	4
LITHUANIA	87
LUXEMBOURG	15
MALTA	5
MONACO	2
NETHERLANDS	994
NORWAY	28
POLAND	540
PORTUGAL	52
ROMANIA	33
RUSSIA	114
SAN MARINO	1
SERBIA	23
SLOVAKIA	48
SLOVENIA	60
SPAIN	277
SWEDEN	226
SWITZERLAND	466
UKRAINE	15
UNITED KINGDOM	2080
<b>Grand total</b>	<b>8873</b>

There are three types of FSC certificates:

- **FSC forest management certification**

Forest managers or owners who want to prove that their forest operations are socially beneficial and managed in an environmentally appropriate and economically viable manner can apply for forest management (FM) certification.

- **FSC chain of custody certification**

FSC chain of custody (CoC) tracks FSC certified material through the production process – from the forest to the consumer, including all subsequent stages of processing, transformation, manufacturing and distribution. Only FSC CoC certified operations are allowed to label products with the FSC trademarks. Thus, the FSC label provides the link between responsible production and consumption, and thereby enables the consumer to make socially and environmentally responsible purchases. CoC certification can be used to demonstrate compliance with public or private procurement policies and specifications such as the EU GPP and Ecolabel scheme for furniture, or the U.S. LEED rating system.

- **FSC Controlled Wood**

Forest Management companies that comply with the five FSC Controlled Wood criteria will be able to supply

FSC Controlled Wood to FSC Chain of Custody operations. FSC Controlled Wood supports the production of

FSC Mixed Sources by providing FSC certified companies with tools to control the non-FSC certified wood in their product groups, and avoid using social and environmentally unfriendly wood. FSC Controlled Wood must be independently verified before it is mixed with FSC certified material to become part of a product that can be sold carrying the FSC label.

There are 7 different FSC logos referring to 3 different typology of labels:

- *FSC 100%*: Products from forests certified as meeting the FSC Standards
- *FSC Recycled*: Products that, according to the FSC standards, support the re-use of forest resources and use only post consumer reclaimed material.
- *FSC Mixed Sources*:
  - from well managed forests and other controlled sources;
  - from well managed forests, controlled sources, and recycled wood or fibre;
  - from well managed forests and recycled wood or fibre.

In these last two instances, labels may include a recycling symbol, to indicate post-consumer content in materials such as paper. FSC Mixed Sources label contain at least 70% FSC certified and recycled material. Recent changes made the FSC system more accessible to small and low intensity managed forests - recognizing their importance for responsible forest management worldwide. Through the Small and Low Intensity Managed Forests (SLIMF) initiative, FSC has worked to find and implement practical solutions to the problems faced by small forest operations and low intensity forest operations in accessing and retaining FSC forest management certification.

#### **4.4.2. PEFC (Programme for Endorsement of Forest Certification schemes)**

The PEFC Council is an independent, non-profit, non-governmental organization, founded in 1999 PEFC shares some common aims with FSC: it promotes sustainable managed forests through independent third party certifications and it guarantees to buyers of wood and paper products that they are promoting the sustainable management of forests.

PEFC operates on the basis of mutual recognition of independent national forest certification standards that

Effectively operate under a single brand. However, no such recognition exists between FSC and PEFC. There is no doubt that significant differences exist between the FSC forest management process and the various schemes that make up the PEFC process. These are mainly differences an emphasis and interpretation of forest management criteria, but there are some philosophical differences as well.

There are three different typologies of PEFC certification: “pure PEFC”, the products of which are produced exclusively with material from PEFC managed forests; “mixed PEFC”, which allow a certain percentage of recycled material; “recycled PEFC”, the products of which are made of 100% recycled wood.

	<b>Certified forest area (ha)</b>	<b>Number of certificates*</b>	<b>Number of PEFC logo users</b>
Austria	1 955 799	308	212
Belgium	278 236	207	281
Czech Republic	1 883 149	184	164
Denmark	227 834	46	67
Estonia	51 468	9	12
Finland	20 786 936	143	152
France	4 606 650	1663	19131
Germany	6 355 285	1079	1333
Hungary	0	4	4
Ireland	0	33	20
Italy	738 892	292	490
Latvia	0	4	16
Lithuania	0	5	2
Luxembourg	27 496	17	51
Monaco	0	1	1
Netherlands	0	217	145

Norway	9 115 902	32	53
Poland	0	32	9
Portugal	205 030	24	49
Romania	0	8	4
Slovak Republic	1 262 613	26	57
Spain	1 255 989	271	415
Sweden	7 628 284	118	96
Switzerland	261 150	46	233
UK	1 298 047	1299	980
<b>Total</b>	<b>57.938.760</b>	<b>6.068</b>	<b>23.977</b>

\* This number does not include companies participating in group C-o-C certification but only covers individual and group certificates.

## 5. THE GREEN PUBLIC PROCUREMENT AND THE GREEN PROCUREMENT

The GPP (Green Public Procurement) and the GP (Green Procurement) are the tools that allow the replacement of existing products and services with lower environmental impact ones, through the identification of specific environmental criteria to make the purchases of Public Administrations (GPP) and companies (GP) more sustainable.

Currently, the GPP is an environmental policy tool with a strategic and powerful impact. Public Procurement spending amounts to as much as 16% of the EU's gross domestic product. This purchasing power can have a significant impact on the market by influencing suppliers and setting an example for private procurements (GP). It is important to highlight that the GPP is currently considered by the European policies not only as a tool for environmental improvement, but also to boost technological innovation and the competitiveness of the production system.

The European Commission strongly recommends Member States to increase the level of green public procurement in their respective countries. National action plans have set targets and outlined the actual measures to implement this policy. For Example, Regulation and a Communication on public procurement for a better environment, which suggests a voluntary 50% GPP target for Member States to be reached by 2010. The EU Commission services have developed GPP criteria for ten priority product and service groups, which Member States have been invited to endorse through a National Action Plan (NAP).

The GPP NAP in different countries has to guarantee a general framework on Green Public Procurement, define national objectives, and finally identify the categories of goods, services and priority interventions for environmental impacts and costs volumes, upon

which the “minimum environmental Criteria” can be defined. To define the minimum environmental criteria, NAP establishes a procedure and sets up ad hoc management bodies, which also have other tasks, to answer the peculiarities of the national productive system while considering the indications of the European Commission (the minimum environmental criteria will integrate the basic criteria of the European toolkit). The EU furniture purchasing recommendations can be examined in the Background Product Report (downloadable at [http://ec.europa.eu/environment/gpp/pdf/toolkit/furniture\\_GPP\\_background\\_report.pdf](http://ec.europa.eu/environment/gpp/pdf/toolkit/furniture_GPP_background_report.pdf)), as in the follow:

Table 1. Key environmental impacts - furniture		
Impact		GPP Approach
<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>• Use of non-renewable resources such as metals and oil/natural gas for plastics</li> <li>• High water and energy consumption in the production of several materials</li> <li>• Use of hazardous substances that can be released during production, use or disposal</li> <li>• Use of organic solvents and generation of VOC emissions</li> <li>• High amount of packaging</li> <li>• 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 legal timber and timber from 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, adhesives and surface treatment substances</li> <li>• Avoid certain hazardous substances in materials production and surface treatment</li> <li>• Ensure recyclability and separability of packaging materials and furniture parts</li> <li>• Procure durable, fit for use, ergonomic, easy to disassemble, repairable and recyclable furniture</li> </ul>

Source: [http://ec.europa.eu/environment/gpp/pdf/toolkit/furniture\\_GPP\\_background\\_report.pdf](http://ec.europa.eu/environment/gpp/pdf/toolkit/furniture_GPP_background_report.pdf)

These recommendations provide an interesting overview of core criteria for furniture produced with environmentally friendly materials and processes. Several experts believe that the criteria and application modalities of the GPP principles will soon be applied to private purchases (GP) as well. Many companies, which already involved suppliers in the environmental process, already make greener purchases.

## 6. LEED: Leadership in Energy and Environmental Design

The Green Building topic has become extremely popular both in Europe and USA, and concerns even the wood furniture industry. The topic has been officially addressed by the EU mostly in terms of Energetic Performance of Buildings, which has been the focus of several Communitarian initiatives. From this point of view, doors and windows are fairly. Important to guarantee good energy savings in buildings. Nowadays, the most important, internationally acknowledged certification for green building is the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. LEED is an

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internationally recognized certification system that measures how well a building, or a community, performs across all the metrics that matter most: energy savings, water efficiency, CO2 emissions reduction, etc.

It was created and promoted by USGBC (US Green Building Council) and defined by the Green Building Certification Institute (GBCI), a US member-driven organization. LEED provides building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions. It is a US-centered certification whose criteria are being extended also to other countries. It is possible to declare that LEED is becoming internationally recognized. *A credit area to be considered for the wood furniture industry is the EQ 4.2 - VOC - Volatile Organic Compounds emissions.*

## **7. Energy Efficiency**

Energy efficiency is one the main aspects of sustainability, and it deserves a deep investigation. The energy consumptions in the wood production chain are mainly due to the need for motive-power in machinery and equipment (guaranteed by electric energy) and for heat, which is used in several different environments depending on productive processes.

A lower energetic consumption in buildings and plants has two main consequences: reduction of production costs and dropping of CO2 and greenhouse gas emissions having a relevant impact on the current climate changes. The fields in which companies can intervene are mainly two: energy efficiency in buildings and energy efficiency in production.

The production building can be energetically more efficient thanks to interventions at different levels: insulation, windows and doors, heating system, use of renewable energy. All these interventions should be evaluated as a form of a long-term investment. Each improvement made to the structure leads to energy savings, thus savings in raw material used for heating and a real economic saving.

As regards the production plants, currently more than 75% of the companies' energy is used for often obsolete or inefficient machinery. Motors, inverters, re-phasing systems, lighting are all elements on which it is possible to intervene. Even in this instance, the substitution of current systems in a company with ones that are more efficient immediately results in costs cuts. Even in this instance, deductions will be applied if electrical engines with an established power will be bought and installed, or if speed converters for electrical engines will be installed. These deductions will be applied in different ways, according to the national context.

It is important to highlight that there is a strong tendency of the companies of the wood furniture industry to reuse wood wastes to produce energy. It is clear that this practice represents a great opportunity for the whole production line, especially at a time when fossil fuels are decreasing, energy costs are increasing, and environmental requirements push towards the use of alternative energy.

However, we should highlight that this tendency is slowed down by increasing bureaucratic-legislative difficulties. This represents an issue especially for the near future, when the new directive on wastes will be integrated by the local legislations of the individual member states.

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## 7.1. Some National Standards

### Ireland

- IS 393:2005 Energy Management System – Specification with guidance for Use
- IS 393:2005 Technical Guideline (2006)

### Dinamark

- DS 2403:2001 Energy Management Specification and DS/INF 136:2001 Energy Management Guidance on Energy management

### Sweden

- SS 627750:2003 Energy Management System Specification

### USA

- ANSI/MSE 2000:2005 management System for Energy

### Spain

- UNE EN 16001 - energy management system

## 7.2. Forthcoming standards

The future ISO 50001 standard for energy management was recently approved as a Draft International Standard (DIS). ISO 50001 will establish a framework for industrial plants, commercial facilities or entire organizations to manage energy. Targeting broad applicability across national economic sectors, it is estimated that the standard could influence up to 60% of the world's energy use.

The document is based on the common elements found in all of ISO's management system standards, assuring a high level of compatibility with ISO 9001 (quality management) and ISO 14001 (environmental management). ISO 50001 will provide the following benefits:

- A framework for integrating energy efficiency into management practices
- Making better use of existing energy-consuming assets
- Benchmarking, measuring, documenting, and reporting energy intensity improvements and their projected impact on reductions in greenhouse gas (GHG) emissions
- Transparency and communication on the management of energy resources
- Energy management best practices and good energy management behaviours
- Evaluating and prioritizing the implementation of new energy-efficient technologies
- A framework for promoting energy efficiency throughout the supply chain
- Energy management improvements in the context of GHG emission reduction projects.

If the outcome of the DIS voting is positive, the modified document will then be circulated to the ISO members as a Final Draft International Standard (FDIS). If that vote is positive, ISO 50001 is expected to be published as an International Standard by early 2011.

## **8. EU Legislation**

### **8.1. THE EUROPEAN CHEMICALS POLICY (REACH)**

The furniture industry is a downstream user of chemicals and as such has obligations under REACH. REACH is a new European Community Regulation on chemicals and their safe use. It deals with the Registration, Evaluation, Authorisation and Restriction of Chemical substances. The new law entered into force onto 2007.

The aim of REACH is to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances. The REACH Regulation gives greater responsibility to industry to manage the risks from chemicals and to provide safety information on the substances.

As this policy should be applied to the chemical substances produced, the furniture sector has to control that the substances entering in the production process have been registered and authorized (see art. 7, annex 14 of the directive).

### **8.2. EMISSIONS OF ATMOSPHERIC POLLUTION**

A relevant Directive for the furniture sector is the VOC Solvents Emissions Directive on the limitation of emissions of Volatile Organic Compounds (VOCs) due to the use of organic solvents in certain activities and installations. Activities such as adhesive coating, coating of metallic, plastic and wood surfaces, surface cleaning, wood impregnation, manufacture of coatings preparations, varnishes, inks and adhesives, wood and plastic lamination are covered by the VOC Directive. VOCs are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors.

Some of the plants covered by the VOC Solvents Directive are also covered by the IPPC Directive. In these cases, the VOC Solvents Directive only sets minimum obligations which are not necessarily sufficient to comply with the IPPC Directive. Such compliance may involve more stringent emission limit values, emission limit values for other substances and other media, and other appropriate conditions. Details of emissions from installations falling under both VOC Solvents Directive and IPPC Directive can be accessed via the European Pollutant Emission Register (EPER).

### **8.3. FORMALDEHYDE**

Formaldehyde is largely used in the wood industry, as a thermosetting adhesive for assembling multilayer boards, chipboards, MDF and other wood products. The large use of urea resins is tied to the relatively low cost, good performance, and ease of use.

The boards manufactured with it produce formaldehyde molecules, which are proven to be a high cause for nose and throat cancer.

Since 2004, the International Agency for Research on Cancer (IARC) included formaldehyde among the substances that are surely cancerogenous. It is fair to say that formaldehyde concentrations within buildings are generally low. The World Health

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Organization indicated the maximum level of acceptable formaldehyde concentrations in the house to be 100 micrograms/cubic meter (equal to 0.01ppm).

The German Institute for Building Techniques DIBT first issued a directive for classifying and controlling the wood-based panels with reference to the formaldehyde emissions. This directive, which nowadays is used in many European standards for panels classification, defines the limits referred to different tests for E1 panels. In short, this is the situation of the standards in Europe, where some Countries only allow in E1 panels (eg. Denmark, Sweden).

The European standard EN 13986 on building panels, and other EN standards on different kind of wood-based panels (EN 312 for chipboard, EN 622 for fibre panels, EN 363 for plywood, etc.) define two different categories of formaldehyde emissions: E1 and E2. This system, originally established by the German national legislation, has in time become common reference for the whole EU. It has been adopted and used by current compulsory legislations in several European countries, which in several different instances prohibited marketing and using E2 panels. A more restrictive class than E1 (EPF-S) is being defined by the European Panel Federation (EPF). In the near future, it will be possible to apply this class, currently defined in an internal EPF document, only to particles panels and MDF. The IOS-MAT-0003 standard looks very interesting.

Obviously, even the European Ecolabel, which is being defined and should be applied to wood-based products, establishes criteria related to the formaldehyde emissions: wood-based products (2009/894/EC: Commission Decision of 30 November 2009 on establishing the ecological criteria for the award of the Community eco-label for wooden furniture - notified under document C-2009 – 9522).

On January 1st 2009 a new regulation have come into force in California, with important consequences for furniture export in USA. It is the airborne toxic control measure (ATCM), approved by California Air Resources Board (CARB), with the aim of progressively reducing formaldehyde emissions from the composite wood products sold or used within the state of California. The new limitations (0.08 parts per million for broadleaf plywood, 0.18 ppm for plywood panels and 0.21 for MDF) will remain at a comparable level to the limitations set for the E1 European class. However, with phase 2, which will take place from 2010 to 2012, those values will be drastically reduced to 0.05 ppm, 0.09 ppm and 0.11 respectively.

#### **8.4. WASTE LEGISLATION**

As in many other industrial processes, furniture production generates waste (e.g. waste from wood processing and the production of panels and furniture, wood preservation wastes and wastes from the use of paints and varnishes). Although the type of waste generated from one type industry to another, in general several types of waste are generated in the furniture industry classified as: **non-hazardous waste** such as wood chips, sheet and board traces, wood cuts, packaging waste that have not has been in contact with hazardous substances, etc. and **hazardous waste** such as waste oils, cleaning products, solvents, batteries, fluorescent tubes, etc.. that must be properly managed by an authorized hazardous waste manager. In this context, furniture producers have to comply with Directive 2008/98/EC on Waste.

The revised directive sets the basic concepts and definitions related to waste management and lays down waste management principles such as the "polluter pays principle" or the "waste hierarchy".

The directive wants to be general and give direction. Thus, each individual country should integrate it and complete it in their national legislation. For this reason, it is appropriate to analyze the situation in the three countries involved in the project.

## **9. SYTHESIS OF THE MAIN CRITERIA OF ECOLABELS CONSIDERING THE FURNITURE PRODUCT**

The main eco-labels throughout Europe, which we previously generically analyzed, tried to give indications about environmental performances of furniture products. These labels expect an evaluation of the impact for wood, plastics, metals, textiles, leather, glues, energetic consumption, assembly and disassembly, duration.

- Wood: all labels provide environmental criteria both for wood based materials, which include sustainable management of forests and the evaluation of possible toxic or environmentally relevant components, such as heavy metals, formaldehyde, volatile organic compounds (VOC). The limit for VOC can be expressed as a maximum concentration (indoor emissions) or as a level of emissions throughout the manufacturing process.
- Metals: criteria are set both for furniture in general and for office furniture. In particular, prescriptions are referred to the use of recycled materials (especially aluminum), restrictions about metal emissions in water during galvanic processes, and emission limits during the phase of covering and veneering of wood surfaces.
- Plastics: some labels allow the use of specific materials only, PVC excluded. Others evaluate only CFC, additives (metals, flame retardants) and the possibilities of post-consumption recycle.
- Textiles: requirements for this typology vary greatly according to the different labels. The main criteria regard raw material, additives, pigments and formaldehyde emissions, and VOC. In some instances, fibers containing chlorine are excluded.
- Energetic consumption: NF Environnement provides indications about the quantity of energy needed to transform raw materials to create chairs, dressers and armoires, while Nordic Swan considers the maximum energy consumption for producing wood panels.
- Assembly/disassembly/duration: the majority of the labels require the products to be easy to disassemble at the end of their life. In this way, the correct disposal and recycling of the different materials used for producing furniture are promoted.

### **9.1. THE PRODUCTS LIFE CYCLE: MAIN IMPACTS AND BEST PRACTICES**

In this paragraph the main impacts of the several steps in the life cycle of a product in the wood-furniture industry will be highlighted, with some examples of good operational practices.

Phase	Activity	Environmental impacts	Best practices
<b>RAW MATERIALS</b>	Wooden raw materials	<ul style="list-style-type: none"> <li>• DEFORESTATION AND SOIL EROSION, CO2 STORAGE REDUCTION,</li> <li>• LOSS OF BIODIVERSITY</li> </ul>	<ul style="list-style-type: none"> <li>• VIRGIN MATERIAL FROM CERTIFIED FOREST</li> <li>• LOCAL ORIGIN</li> <li>• MONO MATERIALS</li> </ul>
	Recycled raw materials	<ul style="list-style-type: none"> <li>• DUST EMISSION AND WASTE</li> <li>• ENERGY CONSUMPTION</li> </ul>	<ul style="list-style-type: none"> <li>• PROCESS AND ENERGY OPTIMISATION FOR WOOD BASED PANELS</li> <li>• MAXIMIZE THE WOOD WASTE REUSE</li> </ul>
	Secondary raw materials - others (plastics, metals, leather & textile, foam)	<ul style="list-style-type: none"> <li>• HIGH PRODUCTION IMPACTS</li> </ul>	<ul style="list-style-type: none"> <li>• CHOISE OF LOW IMPACT AND RICICLED PRODUCTS LOW COV AND/OR WATER BASED COATING</li> <li>• WASTE PRODUCTION ALSO FOR DISASSEMBLING</li> </ul>
	Trasportation	<ul style="list-style-type: none"> <li>• HIGH TRANSPORTATION IMPACTS AND EMISSIONS</li> <li>• PACKAGING WASTE</li> </ul>	<ul style="list-style-type: none"> <li>• CHOISE OF LOCAL SUPPLIERS</li> <li>• MINIMAL PACKAGING</li> <li>• WASTE REUSE AND REYCLE</li> </ul>
<b>PRODUCTION MANUFACTURING</b>	Wood carving	<ul style="list-style-type: none"> <li>• ELECTRIC POWER CONSUMPTION</li> <li>• DUST EMISSION</li> <li>• WOOD WASTE</li> </ul>	<ul style="list-style-type: none"> <li>• ADOPTION OF HIGH ENERGY</li> <li>• PERFORMANCE MACHINERY</li> <li>• WASTE REUSE</li> </ul>
	Assembling and finisching	<ul style="list-style-type: none"> <li>• ELECTRIC POWER CONSUMPTION</li> <li>• USE OF AZARDOUS SUBSTANCE (GLUE, RESINS, EPOXY...)</li> <li>• DUST AND FORMALDEHYDE EMISSIONS</li> <li>• WASTE MATTER</li> </ul>	<ul style="list-style-type: none"> <li>• ADOPTION OF HIGH ENERGY PERFORMANCE MACHINERY</li> <li>• USE OF GLUES WITH LOW CONTENT OF TOXIC SUBSTANCES</li> <li>• WASTE REUSE AND CORRECT DISPOSAL</li> </ul>
	Coating/treatment	<ul style="list-style-type: none"> <li>• ELECTRIC POWER , FUEL AND WATER CONSUMPTION</li> <li>• VOC EMISSION</li> <li>• WASTE MATTER</li> </ul>	<ul style="list-style-type: none"> <li>• LIMITATION OF VOCs AND CERTAIN AROMATIC SOLVENT</li> <li>• USE WATER-BORNE VARNISHES</li> <li>• BANNING THE USE OF HAZARDOUS SUBSTANCES (HEAVY METAL, PHTHALATES AND HALOGENATED)</li> </ul>

	Cross-actions	<ul style="list-style-type: none"> <li>ENVIRONMENTAL IMPACTS OF THE WHOLE</li> <li>MANUFACTURING SYSTEM</li> <li>COV AND FORMALDEHYDE EMISSIONS</li> </ul>	<ul style="list-style-type: none"> <li>ADOPTION OF AN ENVIRONMENTAL MANAGEMENT SYSTEM</li> <li>LOW COV GLUES</li> </ul>
<b>PACKAGING/ DISTRIBUTION/ COMMUNICATION</b>	Packaging	<ul style="list-style-type: none"> <li>NATURAL RESOURCES</li> <li>CONSUMPTION (PAPER, WOOD, IRON, PLASTICS)</li> </ul>	<ul style="list-style-type: none"> <li>USE OF RECYCLED OR/AND RECYCLABLE MATERIALS</li> <li>DISASSEMBLE PACKAGING AND OPTIMIZATION</li> <li>USE OF DIE-CUT CARTBOARD</li> </ul>
	Distribution	<ul style="list-style-type: none"> <li>FUEL CONSUMPTION</li> <li>AIR POLLUTION</li> </ul>	<ul style="list-style-type: none"> <li>LOGISTICS OPTIMIZATION</li> <li>REDUCTION OF OVERALL DIMENSIONS</li> <li>REDUCTION OF DISPLACEMENTS</li> <li>EVALUATION OF TRANSPORTATION OPTIONS (BY RAILWAYS OR BY TRUCK)</li> </ul>
	Communication	<ul style="list-style-type: none"> <li>EXTREME WASTE OF MATERIALS FOR PROMOTIONAL ACTIVITIES</li> </ul>	<ul style="list-style-type: none"> <li>COMMUNICATION OF ECO-LABEL CERTIFICATIONS THROUGH SUSTAINABLE ACTIONS</li> </ul>
<b>USE</b>	Product in use	<ul style="list-style-type: none"> <li>THE UNCORRECT USE OF THE PRODUCT AND ITS PACKAGINGS CAN ENCREASE THE AMOUNT OF WASTE</li> <li>VOC EMISSIONS (INDOOR POLLUTION)</li> </ul>	<ul style="list-style-type: none"> <li>TO PROVIDE INFORMATION ABOUT PACKAGING AND DISPOSAL MANAGEMENT, ABOUT PRODUCT MANTAINANCE AND SPARE PARTS</li> <li>DURATION</li> <li>REPARABILITY</li> </ul>
<b>END LIFE</b>	Disassembling recycling dismantling	<ul style="list-style-type: none"> <li>THE PRODUCT END LIFE PHASE IS VERY IMPORTANT. IT IS NECESSARY TAKE INTO CONSIDERATION IN THE DESIGN PHASE ALL THIS ACTIVITIES TO EDUCE NOTABLY THE RELATED ENVIRONMENTAL IMPACTS</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
		<ul style="list-style-type: none"> <li>HIGH TRANSPORTATION IMPACTS AND EMISSIONS</li> <li>PACKAGING WASTE</li> </ul>	<ul style="list-style-type: none"> <li>CHOISE OF LOCAL SUPPLIERS</li> <li>MINIMAL PACKAGING</li> <li>WASTE REUSE AND RECYCLE</li> </ul>



