



**ENTERPRISE DG UNIT E.4**

**FOREST-BASED INDUSTRIES**

## **COMPREHENSIVE REPORT 2002 - 2003**

**regarding the role of Forest products for**

**Climate change mitigation**

**Advisory Committee for Forestry and Forest-based industries  
WORKING GROUP “CLIMATE CHANGE/FOREST PRODUCTS”**

**COMPREHENSIVE REPORT 2002-2003**

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## **1. Introduction**

*In 2002, the Climate Change issue has had significant developments.*

First, the Kyoto Protocol has been ratified by the EU in May 2002, together with the EU burden-sharing agreement. Second, at the eighth Conference of the Parties to the Convention on Climate Change COP8) in November 2002, the “Marrakech Accords” were signed. The Accords include the possibility for Parties to account for forest sinks and forest management activities in their carbon national budgets for the first Kyoto commitment period (2008-2012). Third, at COP9 which will take place in December 2003 in Milano, the Parties will consider “Good practice guidance-GPG” for forest products prepared by the IPCC<sup>1</sup> and will examine the possibility of their inclusion into national carbon budgets for future commitment periods. In view of preparing COP9, the SBSTA<sup>2</sup> invited Parties to submit by 15 January 2003 their views on the implications of harvested wood products accounting, including views of different approaches for consideration at its eighteenth session (May 2003). On that basis, the SBSTA Secretariat will prepare a technical paper on harvested wood products accounting, taking into account socio-economic and environmental impacts for consideration at its nineteenth session (2004).

### **1.1. Working Group Climate Change/Forest products.**

In view of these developments and considering the research and work accomplished regarding the role of forest products for Climate change mitigation<sup>3</sup>, ENTR.E.4 started in 2002 a programme of special sessions on Forest Products and Climate Change, in the framework of its Working Group on Climate Change and Forest Products set up under its Committee on Community Policy regarding Forestry and the Forestry-based Industries<sup>4</sup>.

Along five sessions, the Working Group gathered experts from all sectors of the Forest-based Industries (forest owners, woodworking industries, pulp and paper industries), EU scientific Experts on forest products from EU academic and research institutions and Commission officials from relevant services : DG RTD, ENV and AGRI<sup>5</sup>.

The objective of the Working Group In Sessions I, II and III was to explore, and raise awareness to, the different approaches, methods and models for carbon accounting in wood products and to investigate the role of Forest products for Climate Change mitigation. The objective of the Working Group in Sessions IV and V was to review activities and initiatives in the Member States to increase the role of wood products for Climate change mitigation.

### **1.2. Activities of the Working Group.**

#### ***WG Session I : 19 April 2002***

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<sup>1</sup> IPCC : Intergovernmental Panel on Climate Change

<sup>2</sup> Subsidiary Body for Scientific and Technical Advice

<sup>3</sup> See IPCC 2000 Special Report on Land-use, land-use change and forestry, IPCC 2001 Third assessment report

<sup>4</sup> 83/247/EEC: Commission Decision of 11 May 1983 setting up a Committee on Community Policy regarding Forestry and Forestry-based Industries  
*Official journal NO. L 137 , 26/05/1983*

97/837/EC: Commission Decision of 9 December 1997 amending Decision 83/247/EEC setting up a committee on Community policy regarding forestry and forestry-based industries  
*Official journal NO. L 346 , 17/12/1997*

<sup>5</sup> See list of participants in Annex 6

- Carbon accounting for wood products : approaches, methods and modelling for the EU;
- Carbon sink effects and Carbon substitution effects of wood products.

***WG Session II : 9-10 September 2002***

- Material substitution,
- CO<sup>2</sup> Fix model for carbon accounting,
- IPCC Good Practice Guidance (GPG) for wood products,
- Carbon storage in paper and board products.

***WG Session III : 16 January 2003***

- Inventory methods for quantifying carbon stocks and carbon stocks changes,
- Kyoto impacts on the EU paper industry,
- France's "Accord Cadre et Plan Bois-Environnement-Construction".

***WG Session IV : 7 May 2003***

- Initiatives in the EU Member States for measures and activities to increase the role of forest products for the mitigation of Climate Change :
  - UK : "Wood for good" campaign.
  - The Netherlands : "Centrum Hout"
  - Italy/Austria : "Promolegno".
  - Sweden : "Swedish Wood Association".
  - Spain : "Carbon management in Eucalyptus plantations".

***WG Session V : 13 October 2003***

- Initiatives in the EU Member States for measures and activities to increase the role of forest products for the mitigation of Climate Change :
  - Nordic Timber Council and European initiatives :*
  - Denmark : "Traebranchens Oplyningsgrad-TOP"
  - Finland : "Wood Focus"
  - Belgium : "Centre Interfédéral/Belgian Wood Forum"
  - Action Cost E21 "Contribution of forests and forestry to the mitigation of greenhouse effects"

**2. General analysis of the role of EU forest products for Climate Change mitigation**

**2.1. Additional human-induced activities under the Kyoto Protocol**

Under Article 3.4 of the Kyoto Protocol<sup>6</sup>, activities related to land use, land use change and forestry comprise wood and wood based products<sup>7</sup>. As regards those products, their net effect depends on changes in on-site carbon stocks, but also on the lifetime of carbon in forest

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<sup>6</sup> Art. 3.4 : "The Conference of the Parties shall decide upon modalities, rules and guidelines as to how and which additional human-induced activities related to changes in greenhouse gas emissions and removals in agricultural soil and land-use change and forestry categories, shall be added to, or subtracted from, the assigned amount for parties included in Annex I, taking into account uncertainties, transparency in reporting, verifiability, the methodological work of the IPCC, the advice provided by the SBSTA and the decisions of the Conference of Parties."

<sup>7</sup> See IPCC Special Report on land use, land-use change and forestry, Chapter 4 p.183 to 281 published by Cambridge University Press (2000) ISBN 0 521 80083 8

products and how they replace other products that require more or less energy to produce and use. The wood products carbon pool, like other pools, has practical upper limits.

Ecosystem carbon stock changes are determined by the balance of carbon inputs –via photosynthesis and organic matter imports- and carbon losses through plant, animal and decomposer respiration, fire, harvest and other exports. Carbon is stored in terrestrial ecosystems in diverse organic forms with a wide range of mean residence times. The mean residence time (MRT) is the average time a carbon atom spends in a given pool. Some carbon, such as that in wood products may persist for decades.

Activities should be broadly defined and verifiable by a third party using techniques such as statistical sampling and remote sensing and all activities that can be shown to have consequences on the atmospheric concentration of GHG should be included.

The EU<sup>8</sup> has already recognised the value of replacing fossil fuels and energy intensive materials with sustainably produced wood, including the storage and/or recycling of carbon in wood products and incentives to promote such uses.

## **2.2. Carbon Sink : absorption capacity of the European terrestrial biosphere<sup>9</sup>**

Novel direct estimates from measurements of atmospheric CO<sub>2</sub> and CO concentrations over the past five years (1996-2001) show that the European terrestrial biosphere is acting as a carbon sink. The new unique approach developed by European research groups can eventually be used to verify the integrated effect of Kyoto implementation measures at a continental scale, and may be extended in the future to give increased precision.

Our current best estimates reveal a European carbon sink of 0.7 GtCy<sup>-1</sup> for the European continent. Synthesis of eddy flux measurements and ecosystem inventories reveal a sink between 0.2 and 0.3 GtCy<sup>-1</sup> for EU15 which is about 20-30% of the EU15 fossil fuel emissions. The sink is a result of past land-use and changes in the environmental conditions. The uncertainties of the sink estimate, however, are of the same order of magnitude.

There is a considerable potential for protecting and enhancing the current European biospheric carbon sink. The estimate is that by improved management methods in addition up to 0.2-0.3 GtCy<sup>-1</sup> could be provided. In order to achieve this potential strong incentives are required, to promote sustainable forest management practices, to develop novel carbon management strategies for forestry, agriculture and other land uses at the European scale and to enhance the use and the life time of forest products.

According to the IPCC, (SAR 1996), the current global stock of C in forest products is about 4.2GtC and the net sink is 0.026GtC/yr. Whether the physical pool of carbon in wood products in use acts as a sink depends on the relative rates of input and output from the product pool, i.e., the difference between the production of new products and the decay of the C stock in existing products.

## **2.3. The role of the Forest-based Industries<sup>10</sup>**

In 1996, the world's forests produced 3.4 billion m<sup>3</sup> of harvested roundwood. About 1.9 billion m<sup>3</sup> (56%) of this harvest was fuelwood, 1.5 billion m<sup>3</sup> was industrial roundwood

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<sup>8</sup> See below 5.3 The views of the EU

<sup>9</sup> See « The Carbon Sink : absorption capacity of the European terrestrial biosphere » (p.5)  
2001 OPOCE ISBN 92-894-1641-6

<sup>10</sup> Idem (p.11 and 12)

(44%) such as sawlogs and pulpwood. The industrial roundwood corresponds to a harvesting flux of about 0.3 Gt C per year.

The EU has a total forest area of 130 million ha, of which 87 million ha are considered exploitable forests (73% of EU forests), managed for wood production and non-wood goods and services (cork, hunting for example). The EU has become the world's second largest paper and sawnwood producer, the world's foremost importer of forest products and third largest exporter of forest products. The EU is a net importer of raw materials, mainly roundwood mostly from the CEEC's and the CIS, and wood pulp mostly from North and South America; Production value amounts to 300 billion Euros (10% of the total for manufacturing industries), direct employment is circa 2.2 million persons.

The EU Forest-based industries constitute an enormously important sector for the EU in economic terms. Therefore, the EU Forest-based industries have a crucial role in the global carbon cycle and the fight against Climate change (see Communication "Climate change-towards a EU post-Kyoto's strategy COM (1998)353).

The demand for wood raw material from the Forest-based industries, and for wood fuel in the context of increasing renewable energy use, is a strong stimulus for increasing forest growth and forest productivity and for improving forest management practices. EU Forests in majority are managed in a sustainable way: only between 65 and 70% of annual forest increment is harvested. In turn, harvested wood is transformed into value-added products storing carbon that are recycled at the end of their life.

The Forest-based industries use a renewable raw material, which is too a renewable source of energy. For example, pulp and paper plants produce a significant amount of their own energy needs (up to 60/70% in some cases) by using wood and paper residues and black liquor on site. Energy is sometimes being sold to the national grid and used for local communities. The use of bioenergy by the Forest-based Industries ensures low CO<sup>2</sup> emissions in production processes, and therefore "Kyoto-friendly" products. Further to the use of bioenergy, the energy efficiency has increased enormously in the last decades with huge investments in CHP (co-generation of steam and electricity), making the Forest-based industries the least fossil-fuel users compared to other industrial sectors such as steel, plastics, aluminium for instance.

Wood and wood-based products cumulate 3 important characteristics for mitigating climate change : their raw material, wood, is renewable, they store the carbon initially trapped in the trees (paper products for instance go on storing 60/70% of the carbon from the tree), they are produced with low fossil fuel processes.

### **3. Carbon Accounting for wood products : approaches and models**

#### **3.1. Carbon accounting for wood products : approaches**

The IPCC default method accounts for any wood harvested as a net carbon emission. However, three other different approaches taking wood products into account have been developed and evaluated.

The EU will have to choose a common approach for all Member States. Already, the Council Expert Group on Sinks in its submission to the Subsidiary body for scientific and technical advice (SBSTA) to the IPCC has identified “the stock change approach as the most promising one for further development”, recognising however that they should aim at “an approach that would be methodologically feasible, transparent, accurate and verifiable, and not over-sensitive to annual variations, e.g. in the balance of imported and exported wood products”.

### ***3.1.1. The stock-change approach***

The stock-change approach is favoured by most EU countries. It offers incentives for sustainable forest management, use of long term products and bio-energy. This approach makes up the balance of changes in forest stocks, logging and the difference from changes in the stocks of consumed long term products. The emissions of total logging are attributed to the producer country. The critical issues of the stock-change approach to be resolved are the advantage for importing countries, the incentives for imports of non sustainably produced wood, the sensitivity to variations in the levels of imports/exports. On the one hand, export countries like Sweden are disadvantaged because emissions from exported wood are accounted for in the producing country. On the other hand, importing countries like the Netherlands are advantaged, and enabled to build up sinks in long term products in a short term.

### ***3.1.2. The production approach***

The production approach is rejected by the majority of EU countries because the accounting of emissions of all products produced regardless of trade effects is not consistent with the principle of counting emissions where and when they occur.

The production approach makes up the balance of changes in forest stocks, emissions from fuelwood and short term products, waste from production (no secondary use) and inherited emissions of long term products produced, taking into account only domestically produced wood.

### ***3.1.3. The atmospheric flow approach (or consumption flow approach)***

The atmospheric flow approach favours producer/exporter countries like Sweden and Finland, with low consumption within the country and disadvantages countries with low forest cover and high imports such as the Netherlands. It makes up the balance of changes in forest stocks, emissions from consumed fuelwood and short term products, waste from production (no secondary use) and inherited emissions of long-term products consumed. Since the focus is on consumption, imports and exports are taken into account.

## **3.2. Accounting for wood products : the CO<sup>2</sup> Fix model, the EFISCEN model**

Two models are available to assist in developing estimates of carbon fate in wood products, depending on their initial size, quality, and industrial utilization. Those are the CO<sup>2</sup> Fix model and the EFISCEN model.

### ***3.2.1. The CO<sup>2</sup> Fix Model***



has been developed under the CASFOR project (carbon sequestration in afforestation and sustainable forest management)<sup>11</sup> by 4 research institutions, among which the European Forest Institute.

The CO<sup>2</sup> Fix model has already become a worldwide accepted model for carbon- budgeting of forest ecosystems. It is disseminated via the World Wide Web, and required input data comes through it as well.

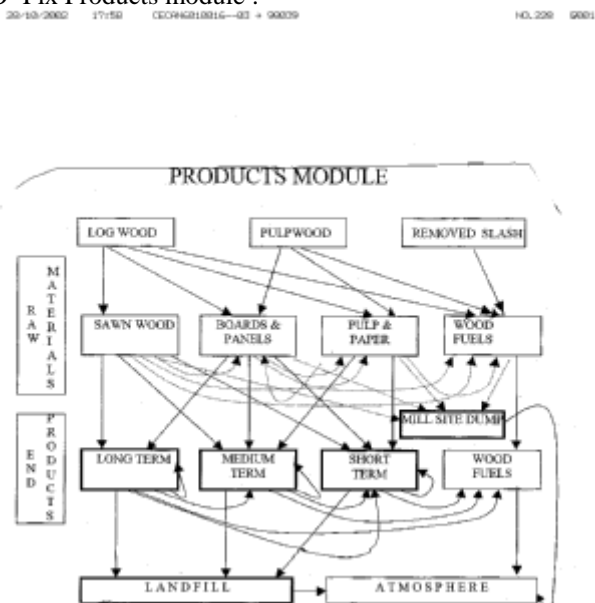
Under the CO<sup>2</sup> fix model, a specific products module has been developed to keep track of carbon all along its cycle until carbon is released back into the atmosphere. It is divided into product categories, and product lifespans.

The parameterisation of the model is key. The module has four sets of parameters :

- Products allocation: sawnwoods, board, paper (long-term, medium term, short term);
- End of life : recycling, energy, landfill;
- Recycling-lifespan : recycling table (long, medium and short term) and
- Lifespan (long, medium and short term).

By end 2003, a “financial module” will be ready. In particular, the calculation of certified emissions reductions (CER) for emissions trading will be included, together with afforestation and reforestation options under the Kyoto Protocol.

<sup>11</sup> See : [www.efi.fi/projects/casfor](http://www.efi.fi/projects/casfor)  
CO<sup>2</sup> Fix Products module :



### **3.2.2. The EFISCEN model (European Forest Information Scenario model)**

EFISCEN is a large-scale modelling approach, is a forest resource assessment model, especially suitable for strategic, large scale (>10000 ha) and long-term (20–50 years) analysis. The main advantage of this model is that it is not very data intensive. It requires rather basic forest inventory data which most European countries have available. The basic output of the model consists of the state of the forest at five year intervals, e.g. growing stock, increment, felling and age class distribution.

Nowadays EFISCEN is in use and under further development at the European Forest Institute (EFI) for new forest resource projections at the European level.

The latest version 4.0 (in print) will incorporate a multi-country module that links the countries through consumption rates and wood products trade flows

EFISCEN was originally designed in Finland, and validated on the basis of Finland data. It has then been applied to the whole of Europe. It includes an “EFISCEN Wood Product model” which follows carbon from the forests through the wood processing industries and the products utilisation. It allows to take into account the major production lines of wood/wood-based products in Europe (sawn timber, particle board, plywood/veneer, pulp, paper, fuelwood). Those products are classified in 4 different lifespans from a few months up to 60 years. Final use options include : recycling as secondary raw material, incineration for energy production or landfilling.

The parameterisation of the model is based on the use of the FAO database on forestry and forest products, and the UN-ECE trade statistics and commodity producer information (FAOSTAT, COMTRADE). Parameterisation may have different levels such as national, regional and supra-regional, depending on data availability. The parameterisation of production efficiency and wood use in the EFISCEN model is static. There are two “forest-related” scenarios :

- “business as usual” (BaU) where felling levels stay at the level of 1990 with no expansion of forested area;
- “multifunctional forestry”(MF) where felling levels and thinning are increasing, with expansion of forested area and environmental measures such as set-aside of old growth forests.

The results of both scenarios appear rather similar, considering that EFISCEN is a “wood demand model”.

Besides, there is one “end-use related” scenario :

- the EU landfill scenario based on the implementation of the EU Directive 1999/31/EC which covers wood/wood-based products in general.

## **4. Measures to increase the role of wood products for Climate Change mitigation**

Harvested timber is converted into a wide variety of wood products. The carbon in the wood is fixed in products until they decay or are burned and the carbon is subsequently released back into the atmosphere. With increasing industrial use of wood, the amount of carbon fixed in wood products will raise proportionally. Most of the forest harvest in the boreal and temperate zone is for industrial roundwood (i.e., cut logs). About one-half to two thirds of the roundwood finds its way into final products, and the rest is used for energy or ends up as decomposing residues (e.g., Apps *et al.*, 1999). The annual production of roundwood,

according to FAO (1997) statistics, corresponds to a harvest flux of about 1.6 billion m<sup>3</sup>, resulting in about 0.9 billion m<sup>3</sup> in final products. This represents a C flux of about 0.3GtC/yr into the product pool.

The 6<sup>th</sup> Environment Action Programme of the European Community identifies Climate change as one of its four priority areas. For the integration of climate change objectives into the Community's sectoral policies, the 6<sup>th</sup> EAP<sup>12</sup> indicates that "carbon sequestration should be exploited through techniques which enhance carbon sinks in agriculture and forestry and through the use of wood based products in housing and industry."

As identified in the IPCC Special Report<sup>13</sup>, there are various ways to positively influence the carbon balance. Besides, as acted in the ECCP report of the Working Group on Forest-related sinks, options to increase carbon stocks in wood products include<sup>14</sup>:

- Increasing market share of existing wood products;
- Substitution of more energy intensive<sup>15</sup> materials by forest products;
- Improving the quality of wood products;
- Improving processing efficiency of the forest based industry;
- Enhancing recycling and re-use of wood and wood products.

#### **4.1. Material substitution<sup>16</sup>.**

Substitution in general is defined as : "*any use of biomass that reduces the use of non-biomass inputs*". In forestry, substitution is defined as : "*increasing the transfer of forest biomass into wood products by replacing the use of fossil-fuel-based products and energy by using wood instead of non-wood materials or/and using wood instead of fossil fuels*". There are two types of substitution : direct (energy substitution), and indirect (material substitution). Both types can be combined.

The manufacturing and transport of wood products requires less fossil fuel than energy-intensive construction materials such as aluminium, steel and concrete. Recent comparisons show that the production of steel and concrete as building material requires up to two times more energy than wood-based products, with concomitant greater generation of GHG. Increased use of solid timber, engineered wood, and wood-based panels, paper displaces energy-intensive materials (cement, steel, bricks, and plastics) in two main ways. On the one hand, it increases the amount of carbon stored in wood products, particularly those with long life spans. On the other hand, it reduces emissions during production processes. The use of by-products (wood fuels) for energy generation in production processes has an additional positive impact on the overall carbon balance. Therefore, the substitution of high-energy products (e.g.: steel, aluminium, concrete) by wood/wood-based products offers a strong potential to decrease the use of fossil fuels and increased carbon storage, thus enhancing the carbon sink effect.

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<sup>12</sup> See Sixth Environment Action Programme 2001-2010, p.27

<sup>13</sup> See IPCC Special Report on LULUCF, Chapter 4.5.6

<sup>14</sup> See Final report on [http://europa.eu.int/comm/environment/climat/forest\\_sinks\\_final\\_report.pdf](http://europa.eu.int/comm/environment/climat/forest_sinks_final_report.pdf)

<sup>15</sup> Energy intensity of a material relates to the amount of energy related to produce a quantity of it. This means that metals, glass, concrete, plastics etc. are more "energy intensive" than wood and thus less climate friendly to the extent that their production process depends on the use of fossil fuel.

<sup>16</sup> See Intergovernmental Panel for Climate Change, Special Report on Land use, land use change and forestry, Chapter 4.5.6

While C sequestration in wood products can reach saturation, the C benefits of materials substitution can be sustained. Assuming a material substitution effect of 0.28tC/m<sup>3</sup> of final wood product and a flux corresponding to a roundwood volume of 0.9 billion m<sup>3</sup> annually, the substitution impact of industrial wood products may be as large as 0.25GtC/yr. Although this estimate is highly uncertain, it is possible that for wood products the substitution impact is larger than the sequestration impact

Due to the substitution effect, an added carbon sink of 139 Tg C yr could be obtained, because of the increased consumption of wood and wood-based products coupled with their increased lifetime. This sink of 139 Tg C yr is calculated, assuming that a ton of wood is equivalent to 1.8 tonnes of CO<sub>2</sub>. This potential is particularly important in the housing/construction sector.

Replacing fossil-fuel intensive materials by wood products brings a triple gain, with carbon emissions avoided in the production process, very high rates of recycling for wood, paper and board products, an increase of the carbon sink in the long term. However, there are obstacles to material substitution, such as price competitiveness of other materials, risk and safety regulations (e.g. for fire, earthquakes), socio-cultural patterns.

#### **4.2. Recycling**

Wood and paper products are among the most commonly used materials for recycling into new products. Utilization of recovered wood in the paper industry is a good example. In Europe, recovered paper accounts for more than 40% of annual paper production and is predicted to increase to 45% in the next years. An increase in the number of times a material is recycled, and the recycling of more wood and paper products will enhance the storage of carbon and reduce GHG emissions.

The European Declaration on paper recovery was launched on 9 November 2000. It was signed first by the Confederation of European paper industries-CEPI and the European Recovered paper association-ERPA, then by the European Federation of Corrugated manufacturers-FEFCO. Besides the International Confederation for printing and allied industries-INTERGRAF, the European Federation of waste management and environmental services-FEAD and the European Paper merchants Association-EUGROPA expressed their support.

The aim of the European declaration on paper recovery is to increase the level of paper recycling in Europe up to a European recycling rate of 56% by 2005, and to further improve the environmental performance of the industry.

#### **4.3. Increasing the useful life of products**

Extending the lifespan of wood products implies not only a longer service life but a longer carbon sequestration period and less energy consumption for their replacement through other new materials. These cumulative effects have an impact on CO<sub>2</sub> mitigation.

The service life of wood products can be extended by using the appropriate timber species for particular end uses, by applying wood protection against fungi and insect attack, and by a wise use and maintenance of the products themselves.

#### **4.4. Research & development, efficiency of processes, best available techniques**

Research plays a key-role in developing new applications, improving process efficiency and product quality, and extending product life spans.

The pulp and paper manufacturing industry has developed “Calculation tools for estimating greenhouse gas emissions from pulp and paper mills”<sup>17</sup>. Those tools allow to identify emissions sources and ownership of those emissions, and to estimate them.

Emissions sources identified include: stationary fossil fuel combustion, fossil-fuel fired units (such as biomass boilers, recovery furnaces), on-site vehicles and machinery, mill wastes in landfill, off-site core operations, imports of CO<sub>2</sub>, power and steam imports, power and steam exports.

By identifying emission sources, it is possible as well to identify areas where it could be possible to achieve better efficiency and decrease emissions, thanks to improved or new processes. In fact, in the framework of its European Declaration on paper recovery, the paper industries have committed themselves to improve technical, operational and environmentally benign solutions by stimulating and supporting research and development.

In the framework of the implementation of Directive 96/61/EC on the integrated pollution prevention and control, a reference document on “best available techniques” (“Bref”) in the pulp and paper industries was compiled by the Commission services and industry stakeholders. This “Bref” analyses all existing techniques in that sector, among which techniques and processes that can reduce energy consumption and emissions in the atmosphere.

### **5. Forest sinks and forest products**

#### **5.1. ECCP Working Group on Forest-related sinks<sup>18</sup>**

In the framework of the European Climate Change Program (2000-2003), a Working Group on Forest-related sinks (March 2002-March 2003) considered, in general terms, the relationship between carbon sequestration in forests, and the use of forest resources for material substitution and for energy substitution. The following observations were made:

- Preserving and enhancing the amount of carbon in the forests through sustainable forest management is a pre-condition for enhancing material and energy substitution in a long term perspective;
- Wood products are a physical pool of carbon (currently not accounted for under the Kyoto Protocol) and can act as a substitute for more energy-intensive materials;
- A carbon-conscious hierarchy for the use of wood and the residues and by-products of its processing should be respected, whilst ensuring a level playing field for all economic operators and allowing the market to operate without distortions.

##### ***5.1.1. The link between forest sinks and downstream activities : carbon stocking in harvested wood products<sup>19</sup>***

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<sup>17</sup> A project of the Climate Change Working Group of the International Council of Forest and Paper Associations (ICFPA), with special contribution of the Confederation of European Paper industries (CEPI)

<sup>18</sup> See Final report of ECCP WG on Forest-related sinks on [http://europa.eu.int/comm/environment/climat/forest\\_sinks\\_final\\_report.pdf](http://europa.eu.int/comm/environment/climat/forest_sinks_final_report.pdf)

Wood products are an integral part of the carbon cycle, in which they play three roles: as a physical pool of carbon, as a substitute for more energy-intensive materials and as a raw material to generate energy.

The EU wood harvest currently constitutes only 65 to 70 % of measured increment in EU forests. This leads to the conclusion that there is room for increasing forest products consumption within a framework of sustainable forest management and increase of the forest area.

While C storage in wood-based products can reach saturation because of their limited useful life, important GHG benefits may also result from substitution of more energy intensive materials by wood or wood-based products. Although no reliable estimates on this exist, it has been advanced that the substitution impact from wood products may be larger than the storage impact. This means that carbon sinks in standing forests would have to be seen only as part of the potential to use the storage capacity of the forest biomes to meet the Kyoto objectives. It also means that, once a tree is cut, the challenge will be to enhance the useful life of the forest products made from it and to recycle them as much as possible, in order to keep carbon fixed in the product.

## **5.2. The views of the EU on Harvested Wood Products<sup>20</sup>**

On behalf of the EC and its MS, and of Croatia, Lithuania, Estonia, Latvia, Slovakia, Czech Republic, Hungary, Poland and Slovenia, Denmark made a submission delineating its views on the implications of harvested wood products (HWP) accounting, including views on different approaches and methodologies. This submission was requested from Parties to the Convention by the secretariat of the UN Framework Convention on Climate Change for consideration at the eighteenth and nineteenth session of the subsidiary body for scientific and technical advice (SBSTA) on 21 March 2003 and December 2003.

In summary, the views of the EU are :

- Accounting of HWP is an issue for consideration for the second commitment period and beyond. This is because the decision in the Marrakech Accords does not include HWP, either as a pool under Article 3 or as an activity under Article 3.4. Furthermore, there is still a need for further analysis and development of approaches, methodologies and availability of accurate and relevant data.
- Decisions on HWP should be consistent with other relevant LULUCF decisions.
- Inclusion of HWP accounting should not be allowed to weaken the environmental integrity of the Kyoto Protocol.
- The EU recognises the value of replacing fossil fuels and energy intensive materials with sustainably produced wood, as well as the storage and/or recycling of carbon in wood products and incentives to promote such uses.
- The EU therefore believes that Parties should aim at an accounting approach that would be methodologically feasible, transparent, accurate and verifiable and not over sensitive to annual variations e.g. in the balance of imported and exported wood products.

## **5.3. Good Practice Guidance on land use, land use change and forestry<sup>21</sup>**

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<sup>19</sup> See idem

<sup>20</sup> See FCCC/SBSTA/2003/MISC.1 p.9

<sup>21</sup> See FCCC/SBSTA/2003/INF.11 on <http://unfccc.int/cop9/index.html>

The intergovernmental panel on climate change will submit its report on the above for consideration by the next Conference of the Parties (COP9). The report introduces improved methodologies and new reporting categories for the land use, land use change and forestry (LULUCF) sector. It includes draft tables of a common reporting format for the purpose of reporting annual greenhouse gas information under the Convention and the Kyoto Protocol.

## **6. Initiatives for measures and activities to increase the role of forest products for the mitigation of Climate Change**

*(France “Charte et Plan Bois-Environnement-Construction”, UK “Wood for good”, The Netherlands “Centrum Hout”, Italy/Austria “Promolegno”, Spain, Sweden “Swedish wood association”, Denmark “Timber information Council”, Finland “Wood Focus”, Belgium “Centre Interfédéral/Belgian Wood Forum”, Nordic countries “Nordic Timber Council”, Spain’s University of Vigo)*

### **6.1. Objectives**

The overall objective of all initiatives under review is the promotion of wood in all its forms and uses. Since 2001, under the impulsion of the Nordic Timber Council, instead of promoting wood from a specific origin, national sectoral organizations for the promotion of wood have taken the decision of promoting “generic” wood regardless of its geographic origin. The practical objectives are the following :

- Increasing wood consumption and wood market share.
- Improving perception of wood through better knowledge of its environmental, sanitary and health properties.
- Creating a “wood culture” for interior/exterior design and building, and for wood in contact with food : “living and building with wood”, “wood for food”.
- Developing good practice in the woodworking industries such as energy efficiency, reduction of greenhouse gases, use of renewable resources, environmental R&D.
- Ensuring the sustainability of forests from which the wood originates.

### **6.2. Climate Change : an asset, a target, a market**

Climate Change appears as an important objective in all the initiatives presented, giving prominence to actual scientific and technical findings about the carbon storing properties of wood products, and their known lower environmental impact on the environment throughout production, use and post-use. In the longer term, all those initiatives prepare the ground for reporting, verifying and granting carbon credits under an EU system of emissions trading including wood products.

The initiatives under review all advocate a greater use of wood products in all forms, knowing that the “substitution effect” can be significant not so much in “all wood” buildings, but in the wider market segment of DIY, timber frames, wood components, wood parts, decking, outdoors and indoors use, and packaging. This is summed up in the slogan : “building with wood/living with wood/wood for food and transport”. Specific uses in civil engineering works such as bridges, earth-retaining structures for example would increase significantly too the “substitution effect”.

- An asset : because wood has specific carbon storing properties and removes CO<sup>2</sup> from the atmosphere, the climate change issue is an asset for wood, giving a strong environmental incentive for its promotion.

- A target : greenhouse gases must be reduced by 8% in the EU compared to 1990 emissions. Wood products substitution by reducing the use of more fossil-fuel intensive materials can contribute to reach the reduction target.
- A market : with the setting up of the EU emissions trading scheme for industrial undertakings as well as other initiatives such as the Chicago Carbon Exchange (CCX), the World Bank BioCarbon Fund and the UNCTAD Carbon Market Programme, climate change has become a marketable value. In the medium to long-term, following the decision on forest sinks carbon accounting may include wood and wood products, allowing the trading of wood products carbon credits.<sup>22</sup>

### 6.3. Structure of national initiatives for the promotion of wood

Generally, initiatives involve public bodies (Ministries, government agencies) together with national organisations in the timber and wood products sectors. In some cases, multinational organisations such as the Nordic Timber Council are involved too, or initiatives are joint ventures between sectoral organisations of two different countries.

- The “**Plan Bois-Construction-Environnement**”, and its accompanying “Charter”, launched in 2000 in France involves the Agence de l’Environnement et de la Maîtrise de l’énergie (ADEME), French government officials and professionals from 8 Ministries, 9 sectoral Federations.
- “**Wood for good**” launched in June 2000 in the UK involves the Nordic Timber Council, the UK Forestry Commission, the Northern Ireland Forest Service, the Timber trade Federation, the Timber growers Association, the UK sawn wood promoters
- “**Centrum Hout**”, created in 1953 in the Netherlands, involves the Ministry of Transport and water, the Union of timber frame builders.
- “**Promo\_legno**” involves only sectoral organisations and is a joint initiative between ProHolz Austria, and the Italian sectoral organisations Assolegno, Fedecomlegno, Federlegno-Arredo, Agelegno.
- “**Swedish Wood Association**” was founded in 2000 through the merging of the Swedish Wood Exporters’ Association, the Swedish Timber Council, the Association for Swedish Wood Products’ Research. As of May 2003, it joined the Swedish Forest Industries Federation.
- **Spain** has no national initiative, but only regional ones. The region of Galicia, where eucalyptus plantations are important, prompted the University of Vigo initiative for an extensive study of the environmental benefits of such plantations, in particular as regards their benefits for Climate change mitigation.

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<sup>22</sup> The decision to include forest sinks taken in Marrakech in 2001 at the Conference of the Parties to the UN framework Convention on Climate Change opens the way for the possible inclusion of wood products as of 2013-2017 (second commitment period of the Kyoto Protocol). Since wood products store the carbon initially trapped into trees, there is carbon removed from the atmosphere as long as the wood product remains in use and, further, when the product is being re-used or recycled for secondary material or energy recovery. Besides, the more wood products replace other materials, the so called “substitution effect” reduces further CO<sub>2</sub> in the atmosphere. CO<sub>2</sub> reductions achieved by wood products are eligible under Art. 3.4 of the Kyoto Protocol, and the woodworking industries may be granted carbon credits in the framework of the emissions trading scheme, at EU and international level, if and when decisions and procedures are put in place.



- The **Danish Timber Information Council** (TOP-Træbranchens Oplysningsråd) gathers more than 1200 members from the wood and building industries.
- “**Wood Focus**” in Finland results from the merging of the Finnish Timber Council and Finnish Wood Research Ltd. at the end of 2000. One sixth of its budget is financed by the State of Finland, the remaining five by Industry.
- The “**Centre Interfédéral d’Information sur le Bois**” was created in 1957 by the Belgian Timber Council. Nowadays, its members are the National Federation of Sawmills and the various Federations of Carpenters (Brussels, Wallonia, Flanders), the Wood Importers and Traders. As of 2004, the Centre will be renamed the “**Belgian Wood Forum**” and will welcome as new members the Federation of Forest owners (Fedemar), the “Société Royale Forestière”, the Belgian Wood Federation (Febelbois) and three sectoral unions.
- The “**Nordic Timber Council**” is a joint wood promotion organisation funded by the wood products industries in Finland, Norway and Sweden. The NTC has launched specific partnerships with the UK (“Wood for good”), with France (Centre national du Bois-CNDB) as well as projects in China and Japan. Besides, pan-european projects are being launched in partnership with the network of European Timber Councils (Building Europe, Wood for food, European environmental declaration).

#### **6.4. Target audiences and targeted action**

The initiatives target two main audiences :

- Professionals : merchants and retailers; specifiers such as architects, designers, engineers, quantity surveyors; users such as developers, contractors, sub-contractors; public bodies :such as planners, public procurement and local authorities; future professionals such as students, apprentices.
- Final Consumers : homeowners, DIY-ers and children as future consumers.

Schematically, there are two areas of action, each one corresponding to one specific target :

- Building/professional use of wood : civil works, frames, roofing, carpentry, joinery.
- Living with wood /final consumer outdoors and home use of wood : decking, fencing, pergolas, conservatories, flooring, furniture, DIY, bathrooms, kitchens, cabinets, doors, windows.

#### **6.5. Activities and their assessment**

Activities can be classified in four main categories :

- Political lobbying activities: the political lobbying is done primarily for legislation in the making in order to achieve sound legislative decisions when it comes to national law or EU directives and regulations. It targets too other actions relevant to the industries such as fiscal and other incentives. The lobbying is done at local and national level with elected representatives , but even more at EU level with the Members of the European Parliament, and with the services of the European Commission. The Nordic Timber Council and the network of the European Timber Councils allow to involve most EU countries into those lobbying activities at EU level. The Nordic countries have been the first to include those activities in parallel with wood promotion and information. This is the case of the Nordic Timber Council, of Finland for example.

- PR activities : web-sites and portals, newsletters, exhibitions, awards, competitions, TV/press information and “image” campaigns.
- Training and education : seminars, courses, lectures and specific degrees in wood technology, lumber engineering and economy in collaboration with research institutes, universities and technical schools, internships in companies, education programs for children, CD-Rom for children.
- Technical advice to professionals and final consumers with handbooks and manuals, help-desks, phone line and online inquiries, documentation centres, dedicated web-sites and portals, conferences, seminars and workshops.

In most organisations, activities are assessed at regular intervals by third parties. This assessment allows to measure significant variations in wood consumption patterns and wood consumption volumes and to modify accordingly the different activities in order to progress. After two years, it has been possible to record positive increase in wood consumption in several countries (UK, Denmark, Italy, Belgium). However, an estimated 10 to 20 years is necessary for those initiatives to reach the overall objectives of creating a “wood culture”, changing perception of professionals and consumers about wood and increasing wood consumption on a long term basis.

## **6.6. Legal and economic measures**

### **6.6.1. Building regulations**

Legislation on buildings can play a major role as an incentive for the use of wood.

- In the Netherlands, building regulations will make it compulsory to give environmental impact information for all buildings. This measure will benefit wooden buildings and wood components in buildings since their negative impacts on the environment are less important than other materials. In particular, the shortage of sand due to environmental restrictions of sand extraction makes it necessary to reduce concrete use especially in the construction sector, therefore creating opportunities for wood construction.
- France is preparing a specific decree to “define the conditions for using a minimum rate of wood material in public buildings”, in the framework of its law on air and rational energy use. The Air Law (Article 21-V) identifies 12 types of buildings classified in three classes according to their wood content. A volume ratio of wood per net surface m<sup>2</sup> has been calculated for each type, which constitutes the threshold, with a corresponding ratio calculating method.

Multi-storey wood buildings of more than two floors are becoming more common, following changes in national building regulations.

- For instance, after successful lobbying of the wood sector, Denmark has amended its building regulations in order to allow four-storey wood buildings.
- Finland regulations allow for four storeys as well.
- Sweden has no set limit on the number of floors and six-storey wood buildings are common.
- Switzerland has amended its building codes to allow six-storey wood buildings.

The Eurocodes<sup>23</sup> play a major role in creating a Single market for wood building. The Eurocodes, endorsed by the EU and the EFTA are reference documents used as a means to prove compliance of building and civil engineering works with the essential requirements of Council Directive 89/106/EEC on construction products<sup>24</sup>. Besides, the Eurocodes can be used as a basis for specifying contracts in construction works and related engineering services, as well as a framework for drawing up harmonised technical specifications for construction products.

### **6.6.2. Certification of wood products**

Following the certification of forests, the certification of forest products can contribute to increase their market share. The subsequent labelling of products can successfully inform the consumers that the wood products are made of sustainably produced wood. However, certification of forest and of products remains costly and therefore more difficult to achieve for very small and SME's which predominate in the woodworking sector.

### **6.6.3. Public procurement clause**

Several countries are trying to include specific clauses in public tenders to encourage the use of wood because of its Climate change benefits (better insulator, energy efficiency, renewable material).

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<sup>23</sup>The Member States of the EU and EFTA recognise that Eurocodes serve as reference documents for the following purposes:

- as a means to prove compliance of building and civil engineering works with the essential requirements of Council Directive 89/106/EEC, particularly Essential Requirement N° 1 – Mechanical resistance and stability – and Essential Requirement N° 2 – Safety in case of fire;
  - as a basis for specifying contracts for construction works and related engineering services;
  - as a framework for drawing up harmonised technical specifications for construction products .
- EN 1990, Eurocode: Basis of Structural Design  
EN 1991, Eurocode 1: Actions on structures  
EN 1995, Eurocode 5: Design of timber structures  
EN 1997, Eurocode 7: Geotechnical design  
EN 1998, Eurocode 8: Design of structures for earthquake resistance

<sup>24</sup> In particular :Essential Requirement N° 1 – Mechanical resistance and stability  
Essential Requirement N° 2 – Safety in case of fire;

#### **6.6.4. Subsidies for the use of wood as material**

Subsidies for the use of wood as fuel already exist in some countries. Subsidies for the use of wood as material are being considered, in view of its positive impact to reduce CO<sup>2</sup> in the atmosphere thanks to the “substitution” effect. For instance, as more energy-efficient due to good insulating properties, wood products in construction could benefit.

#### **6.7. Environmental and health benefits of wood**

All organisations consider that the specific properties of wood which are beneficial for the environment and for human health should be better conveyed. As regards the environmental benefits of wood, emphasis is being put more and more on the carbon removal achieved by wood products, mitigating thus the Climate change effect. As regards the health benefits, wood used in buildings allows for constant humidity in households which is beneficial to humans, in particular asthmatic patients.

##### **6.7.1. Wood in food contact : packaging, transport, retail/restaurant/kitchen**

Since two decades, the traditional use of wood in food contact has been abandoned in favour of other materials such as plastics and steel. However, new studies demonstrate the good performance of wood in food contact, in particular as regards hygienic properties.

Wood can be used for packaging and conditioning food, in some cases being part of the manufacturing of the foodstuffs with controlled denomination (e.g.: oak barrels for cognac). It can be used for transport of food : wood pallets, wood casing (e.g. : for fruits and vegetables, fish, meat, poultry).

Wood has good hygienic properties too in food retail shops (butchery shops, grocery shops, fishmongers) for interior fittings, cabinets and cupboards, as well as to prepare or display the victuals. In private kitchens as well as restaurant kitchens, wood is too a good material for preparing meals.

### **7. Conclusions & recommendations**

Forest products definitely play a role in mitigating Climate Change, by increasing carbon removals from the atmosphere. As stressed and demonstrated above, their specific properties such as carbon storage capacity, high recyclability, renewability of their raw material, and the fact that they are less fossil-fuel intensive than other materials, make them the products of choice in the context of policies to fight Climate change by reducing greenhouse gas emissions and increasing greenhouse gas removals. In particular, important greenhouse gases reductions (CO<sup>2</sup>) may result from substitution of more energy intensive materials by wood or wood-based products.

As a reminder, the annual world production of roundwood corresponds to a harvest flux of circa 1.6 billion m<sup>3</sup>, of which only 0.9 billion m<sup>3</sup> ends into wood products. This 0.9 billion m<sup>3</sup> represents a carbon (C) flux of about 0.3 GtC/yr. It has been calculated unofficially that in Europe only, if wood consumption was increased by 4% every year, by 2010 an additional 1.5 billions of tonnes of CO<sup>2</sup> stored in wood products would be removed from the atmosphere. In turn, this carbon removal could result in carbon credits currently valued at €18.2 billions.

The 9<sup>th</sup> Conference of the Parties to the UN Framework Convention on Climate Change in Milano from 1 to 12 December 2003 will consider the submitted “Good practice guidance” for forestry and forest products and may decide on subsequent steps to identify modalities, rules and guidelines. However, carbon accounting in wood products and their inclusion in

formal emissions trading could not take effect before the second commitment period of the Kyoto Protocol, i.e. in 2013, and substantial progress on this issue is expected at the 2004 10<sup>th</sup> Conference of the Parties. The fate of the Kyoto Protocol, considering the reluctance of some countries to ratify it, should be made clearer too in Milano.

The present implementation of the EU Directive on emissions trading, together with the coming of age of various international initiatives for emissions trading will bring significant experience and lessons, as well as an indication of the fluctuations of the price of a ton of CO<sub>2</sub>, that will be relevant to the decisions to be taken on the wood products carbon sink.

The inclusion of wood and wood-based products into carbon accounting will constitute a positive step to increase wood consumption and carbon removals from the atmosphere by wood products. The EU and its Member States have already recognized the value of wood products substitution for Climate change mitigation, as well as their possible contribution to reach the emissions reduction provided for under the Kyoto Protocol. The EU recognizes too the importance of incentives to increase wood consumption.

The following measures could be recommended to increase wood consumption and the substitution of wood to other non-carbon storing/fossil-fuel intensive materials such as steel, concrete, plastics, aluminium :

- Replacing fossil fuels and energy intensive materials with sustainably produced wood products;
- Incentives and subsidies to increase the use of wood products on the model of subsidies granted for the use of wood as fuel;
- Incentives to increase wood, paper and board collecting, sorting and recycling;
- Fiscal incentives such as a reduced VAT level for wood products, in particular labelled wood products from sustainably managed forests under schemes such as FSC (Forest Stewardship Council) and PEFC (Programme for endorsement of forest certification schemes);
- Market incentives such as public procurement clauses to encourage the use of wood products such as minimum wood content in public buildings to be stipulated in public tenders, as is the case already in some MS (France, Germany);
- Raising awareness on the role of wood products for fighting Climate Change.

**Annexes 1 to 5 : Summaries of Sessions I, II, III, IV, V**  
**Annex 6 : List of participants to the Working Group**