

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

**COMPREHENSIVE REPORT 2002-2003**

**regarding the role of Forest products for Climate change mitigation**

(Adonis nr. 645193)

**ANNEXES: TABLE OF CONTENTS**

<b>1.</b>	<b>Session 1 – Summary Report</b> _____	<b>19</b>
	Annex 1: Carbon accounting for wood products: General approaches and modelling for Europe.....	19
	Annex 2: Carbon Sink Effects and Carbon Substitution Effects of Wood Products .....	24
<b>2.</b>	<b>Session II – Summary Report</b> _____	<b>30</b>
	Annex 1: “The role of wood for substitution in reducing GHG emissions” .....	32
	Annex 2: “CO <sup>2</sup> FIX : modelling framework for quantifying carbon sequestration in forest ecosystems and wood products”.....	34
	Annex 3: “IPCC Good practice Guidance (GPG) for wood products .....	35
	Annex 4: “Carbon storage in paper and board products” .....	38
<b>3.</b>	<b>Session III – Summary Report</b> _____	<b>42</b>
	Annex 1: National initiatives to fight Climate Change: France “Accord Cadre et Plan Bois-Environnement-Construction” .....	44
	Annex 2: Carbo-Invent: multisource inventory methods for quantifying carbon Stocks and stock changes in European forests .....	50
	Annex 3: “The European Paper Industry’s Climate profile and Climate-related challenges” .....	52
<b>4.</b>	<b>Session IV – Summary Report</b> _____	<b>56</b>
	Annex 1 : United Kingdom : “Wood for Good” .....	59
	Annex 2 : The Netherlands : “Centrum Hout” .....	61
	Annex 3 : Spain : “CO <sub>2</sub> sink capacity of eucalyptus plantations in northern Spain and CO <sub>2</sub> storage in harvested wood products” .....	62
	Annex 4 : Italy and Austria : “Promo_legno” .....	63
	Annex 5 : Sweden : “Swedish Wood Association” .....	64

<b>5.</b>	<b>Session V – Summary Report</b>	<b>65</b>
	Annex 1 : Pan-European projects : the “Nordic Timber Council” and the Pan-European projects in cooperation with European timber councils.....	71
	Annex 2 : Denmark : The Danish Timber Information Council .....	73
	Annex 3 : Finland : “Wood focus” .....	74
	Annex 4 : Belgium : “Centre Interfédéral d’Information du Bois” .....	75
	Annex 5 : EU Research : Action Cost E21 .....	76
<b>6.</b>	<b>List of participants</b>	<b>78</b>

**Advisory Committee for Forestry and Forest-based industries  
WORKING GROUP “CLIMATE CHANGE/FOREST PRODUCTS”  
19 April 2002, 9.30-17.00  
27, rue de la Science, Brussels – 4<sup>th</sup> floor, Room 46**

**SESSION I**

**Summary Report**

**Session I focussed on :**

- Carbon accounting approaches, methods and modelling for the EU.
- Carbon Sink Effects and Carbon Substitution Effects of Wood Products.

**Annex 1**

**Carbon accounting for wood products - General approaches and modelling for Europe**

*by Mr. Thies EGGERS, European Forest Institute*

***Part A : Approaches and Methods***

One basic approach, “the so-called “IPCC default approach” considers wood harvesting globally as a carbon source over a year from harvesting. With this approach, the carbon storage effect of wood products along their lifecycle, including recycling and energy production is not acknowledged. Therefore, wood harvesting and the ensuing transformation of roundwood in products results in a global carbon debit.

There are **3 approaches which account for wood products** (source : IPCC Report on LULUCF May 2002):

- **Atmospheric flow approach** : the easiest way to account for wood products, this approach includes trade. This approach is favourable for wood-exporting countries.
- **Stock-change approach including trade** (exports and imports) : this approach is more complex to apply. This approach is favourable for wood importing countries.
- **Stock change approach excluding trade** : this approach is complex too but simpler. The wood-producing country gets the carbon credits including the carbon in wood products exported.

As regards the methods to implement those approaches, they have not been fully designed yet. However, the IPCC has developed in September 2001 **terms of reference with a draft table of content of “Good practice Guidance for LULUCF”**<sup>1</sup> which

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<sup>1</sup> See the following website, attachment 7 and 8 for terms of reference and table of contents of GPG:  
[http://www.ipcc-nggip.iges.or.jp/public/mtdocs/pdfiles/LUCF\\_EGPM\\_Meeting\\_Report\\_Final.pdf](http://www.ipcc-nggip.iges.or.jp/public/mtdocs/pdfiles/LUCF_EGPM_Meeting_Report_Final.pdf)  
<http://www.unep.ch/ipcc/meet/session19/Doc2.pdf>

include wood products, establishing in particular that “treatment of harvested wood products will be consistent with decisions of the Conference of the Parties to the UNFCCC”.

The Kyoto Protocol provides for the accounting of direct human-induced land use change and forestry activities like ARD (afforestation/reforestation/deforestation) under its article 3.3 and for the accounting of additional activities under article 3.4. Wood products could be accounted for under article 3.4. In any case, double accounting must be avoided: an activity will be part of forestry activities, or part of additional activities.

For wood products, **three management strategies** are possible :

- **Conservation management** which conserves existing carbon pools, preserve forests, enlarge forest reserves and controls better hazards such as fires and pests;
- **Storage management** which would increase and save the amount of carbon in products;
- **Substitution management** that would ensure the transfer of wood biomass into products, and the substitution of fossil fuels.

In order **to assess carbon in wood-based products, three approaches** are possible :

- The **inventories approach** which is costly and time-consuming. It is practiced in Finland and Norway. Inventories can be done from housing, building statistics, statistical analysis, modelling;
- The **statistical analysis approach** which entails the analysis of import and export statistics and general domestic production to determine domestic stocks and fluxes of wood products;
- The **modelling approach** where the level of detail and accuracy of data, and the assumptions/simplifications needed may affect the results, which entails a bigger uncertainty.

### ***Part B : Modelling for Europe : the EFISCEN model***

The European Forest Information Scenario model (EFISCEN) 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 (Nabuurs et al. 1998; Päivinen and Nabuurs 1997; Nabuurs et al. In press) and in Russia (Päivinen et al. 1999; Lioubimow et al. 1998). At EFI it has been validated with historical data (Nabuurs et al. 2000).

The EFISCEN model is under constant development. The EFISCEN version 4.0 (in print) will incorporate a multi-country module that links the countries through consumption rates and wood products trade flows

EFISCEN, a large-scale modelling approach has been designed in Finland, and validated on the basis of Finland data. The EFISCEN model has then been applied to the whole of Europe. It includes an “**EFISCEN Wood Product model**”. This model

follows carbon from the forests through the wood processing industries and the products utilization. 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 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. At the moment, the scenarios applied exclude the impact of climate change. 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.

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.

### **Comments by participants on Presentation 1**

#### **1/ Which accounting approach for wood/wood-based products?**

Parties meeting at COP7 in Marrakesh have considered the “IPCC default approach” as lacking in accuracy. However, no decision has yet been taken to select one approach or another. The debate is still open. Discussions and decisions may be taking place in 2004 in view of the 2<sup>nd</sup> commitment period starting in 2012. Wood products could thus be accounted for in the second commitment period, although Canada and New-Zealand lobbied for inclusion in the first commitment period.

Under the stock-change approaches and the atmospheric flow approach, wood products constitute an additional sink, besides the forests sink.

Under any approach, the whole life cycle of products should be analysed, including side effects (for instance, energy efficiency in building).

The two stock-change approaches include semi-finished and finished products.

Using the stock-change approach including, or excluding, trade has a different economic impact. Importing countries would favour the “stock-change approach including trade” whereby the importing country gets the carbon credit. If wood-importing countries (like the Netherlands, the UK) were imposed the stock-change approach excluding trade, they could react by reducing wood consumption, thus reducing wood exports. Wood-exporting countries, on the other hand, (like Finland, Sweden) will favour the “atmospheric flow approach” so as to benefit from the carbon credits resulting from their national production. Negotiations for a common approach

for all Parties will thus be difficult, although in the end the “most sustainable” approach should prevail

## **2/ Which model?**

The EFISCEN model has been conceived on the basis of Finland data (boreal area) and constitutes a good forest resource model for Finland, the wood resources model has not been validated yet. It is debatable if EFISCEN is adapted to other EU bio-geographical areas (atlantic, mediterranean, alpine, continental and macaronesian) and to countries where the forestry sector is not as dominant as in the north of Europe.

EFISCEN considers the whole raw material : virgin and recycled fiber. For paper products, it may be necessary to consider the carbon stored in the fiber and not in the product. The fiber is recycled or landfilled at the end of the product life. Taking into account the carbon content of the fiber would increase the figure of carbon storage in wood/wood-based products (2.9 % at present estimation, source : USA).

Besides EFISCEN, the CO<sup>2</sup>Fix model has been elaborated. CO<sup>2</sup>Fix is a “forest growth” model including wood products. Presently, the coupling of EFISCEN and CO<sup>2</sup>Fix is being worked upon.

At the moment, there is no reporting model for wood products. However, a suitable reporting model is the pre-requisite for carbon accounting in wood products.

The Carbo-Invent study financed by the Commission under its Research Programme will help to give answers. Under Carbo-Invent, different forest inventories in the EU are being analysed, and expansion factors will be established. However, wood products are not considered under Carbo-Invent.

Different measurements of a pool were not always stable, increasing thus the difficulty of defining a calculation method.

## **3/ Waste**

Considering various waste treatments available, such as material recycling, energy recycling through incineration or landfilling, the accounting of wood waste is a complex issue in the carbon accounting exercise. In flux measurement, waste wood presents a specific challenge.

The difficulty to account for waste streams in carbon accounting originates in the different definitions of materials, and in the different standards used across the EU.

The input of carbon comes from virgin fibre or from recycled fibre, it is important to differentiate both sources. The whole input should be considered including recycled wood and paper.

Landfill waste constitutes a major problem for carbon accounting. To consider the carbon budget as a whole, it is necessary to know the decay rates in landfills, and the timespan of products from use to re-use and recycling. Landfills constitute long-lasting pools difficult to assess, in part because landfills are mixed with other organic material besides wood/paper waste. CO<sup>2</sup> are not the only GHG emissions, methane is important too in landfills. The EFISCEN model does not consider methane and CH<sub>4</sub>, 1 ton of carbon is roughly equal to 20 tons of methane.

Sound lifecycle analysis of all wood and wood-based products are a sound basis for increasing knowledge on wood and paper waste, their recycling as secondary raw material or for energy recovery through incineration, or landfilling.

#### **4/ Scenarios : Business as Usual (BaU) versus Multifunctional Forestry (MF)**

Under EFISCEN there is a fixed level of removals taken into consideration and no market model which gives the same results for both scenarios. Under the MF scenario however, disturbances such as forest fires and increased plantations should be taken into account, in particular in southern EU countries. More research is necessary to fine tune the scenarios.

#### **5/ Substitution effect**

Besides the carbon storage property of wood products, the effects of material substitution on the carbon budget have been scientifically recognized<sup>2</sup>. Material substitution covers wood products replacing other materials, and wood as biofuel replacing fossil fuel.

Building materials present a huge potential for substitution effects which are positive for the carbon balance. There are different life-spans : 50 years or more for construction timber, less for other building materials such as wooden floors (16 years). Different life-spans apply too to paper products : from books (chemical pulp) with a longer life span to newspapers (mechanical pulp) with only a few months.

There are sound and valid inventories for wood in the building sector. Therefore, it could be feasible to first develop carbon accounting for the building sector. Lifecycle analysis of different materials (wood, steel, cement, aluminium, plastics) should be carried out.

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<sup>2</sup> See Special IPCC Report on LULUCF, Chapter 4 (Cambridge University Press, May 2000), IPCC Third Assessment Report, November 2001.

**Carbon Sink Effects and Carbon Substitution Effects of Wood Products**  
 by Pr. Arno FRUEHWALD, Center for wood science and technology, University  
 of Hamburg

The carbon stock in wood products is important, in particular in housing (wooden windows, floors, furniture, structural timber). The University of Hamburg has led research on the carbon storage effect of households in Germany.

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**Table 1**      **Wood consumption per capita and year in m3 roundwood  
 equivalent (Source : EUROSTAT 1999)**

<b>Austria</b>	<b>1,48</b>	<b>Ireland</b>	<b>1,34</b>
<b>Belgium</b>	<b>1,51</b>	<b>Italy</b>	<b>1,08</b>
<b>Denmark</b>	<b>2,05</b>	<b>Netherlands</b>	<b>1,43</b>
<b>Germany</b>	<b>1,15</b>	<b>Portugal</b>	<b>0,56</b>
<b>Finland</b>	<b>0,98</b>	<b>Sweden</b>	<b>1,86</b>
<b>France</b>	<b>1,17</b>	<b>Spain</b>	<b>0,96</b>
<b>Greece</b>	<b>0,86</b>	<b>UK</b>	<b>1,18</b>

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The University of Hamburg led an inquiry with german households to try to determine the average volume and weight of wood products per household, including paper products. The inquiry was based on statistics concerning the number of households, number of flats, number of houses. Roughly the wood products C-sink for Germany could be estimated at 334 Mio t C for 80 millions people (static approach). A dynamic approach over 33 years x 5.9 tC/y gives as a result : 195 Mio t C. The extrapolated estimate for the EU 15 would be 1.565 Mio t C for 375 millions people.

The average lifetime of wood products varies from 2 months (newspaper) to 75 years for structural timber. During this lifespan, the carbon initially sequestered in the tree remains in storage in the manufactured wood/wood-based products. The carbon storage effect is further enhanced by the recycling of those products either for secondary raw material, or for energy recovery via incineration. Landfilling is the ultimate option, although Germany and other EU countries are restricting and/or prohibiting the landfilling of wood and wood-based products.



**Table 2** Average lifetime of wood/woodbased products – Germany  
(Source : University of Hamburg inquiry and field research)

<b>Newspaper</b>		<b>0,2 year</b>
<b>Magazine</b>		<b>0,5 year</b>
<b>Book</b>		<b>25 years</b>
<b>Packaging</b>		<b>2 years</b>
<b>Outdoor use</b>		<b>15 years</b>
<b>Furniture</b>	<b>low price</b>	<b>10 years</b>
	<b>high price</b>	<b>30 years</b>
<b>Buildings</b>	<b>decoration</b>	<b>30 years</b>
	<b>structural use</b>	<b>75 years</b>

The lifecycle analysis of wood products brings interesting results as regards energy consumption in production processes and “global warming potential”.

Particleboard is a good example : V20 for interior use and V100 for building purposes. The use of glu and the energy consumption are the two most important sources of CO<sup>2</sup> emissions. MDF (medium density fiber) has the highest global warming potential (GWP), twice as much as OSB (oriented strand board).

**Table 3** Impact assessment for particleboard :V10, V100, MDF, OSB  
Source:University of Hamburg, Centre for Forestry/Forest products

<b>Impact category (ISO-EN 14042)</b>	<b>Particleboard</b>		<b>MDF</b>	<b>OSB</b>	
	<b>V 20</b>	<b>V 100</b>		<b>PF</b>	<b>PMDI</b>
<b>(kg/m3 of board)</b>					
<b>Global Warning Potential</b>	<b>240</b>	<b>275</b>	<b>540</b>	<b>235</b>	<b>265</b>
<b>Acidification</b>	1,4	2,0	2,1	1,7	1,6
<b>Eutrophication</b>	0,2	0,24	0,28	0,21	0,21
<b>Photochemical Ozone Creation Potential</b>	0,40	0,45	0,50	0,37	0,4

**Table 4** Material inflow and outflow for particleboard V10 and V100  
Source : University of Hamburg, Centre for Forestry/Forest products

<b>Input (kg/m<sup>3</sup>)</b>	<b>V 20</b>	<b>V 100</b>	<b>Output (kg/m<sup>3</sup>)</b>	<b>V 20</b>	<b>V 100</b>
Round wood 1)	94	87	Boards 1)	642	636
Industrial residues 1)	471	394	Water in boards	55	54
Recovered wood	95	184			
Incl. Recycled boards 1)					
<b>Wood total 1)</b>	<b>660</b>	<b>665</b>	<b>Total boards</b>	<b>697</b>	<b>690</b>
Water in wood	416	411	By-products (mainly sander dust)	82	105
<b>Glue (dry matter)</b>	<b>58</b>	<b>65</b>	Process water	192	225
Water in glue	31	63	Solid waste	2	2
Process water	254	240	Metals	1	1
Other materials	3	3	Packaging material	1	1
			Emission to air (water vapor)	448	425
<b>Total</b>	<b>1.423</b>	<b>1.449</b>	<b>Total</b>	<b>1.423</b>	<b>1.449</b>

1) dry matter

2) incl. paraffine, hardener etc.

When compared to other materials, timber shows the best results in terms of CO<sup>2</sup> emissions and energy consumption. The following table compares a wooden house and a brick type house.

**Table 5**      **Comparison of timber and non-timber construction products**  
**Source : Waltjen.R. et al. 1999**

	<b>wooden house (1m2)</b>	<b>brick type house (1m2)</b>
<b>Weight (kg)</b>	<b>71</b>	<b>273</b>
<b>Energy (mj)</b>	<b>271</b>	<b>876</b>
<b>CO<sup>2</sup> emissions (kg)</b>	<b>- 50</b>	<b>58</b>
<b>Acidification</b>	<b>128</b>	<b>196</b>

Wood products constitute thus an important carbon sink all along their lifecycle from their manufacturing to their use, re-use and recycling.

**Table 6 :**      **Carbon stocks in wood products**  
**Source : University of Hamburg inquiry and field research**

	<b>Carbon stock estimated</b>
<b>Wooden window</b>	<b>25 kg C per unit</b>
<b>Wooden floor (parquet)</b>	<b>5 kg C per m<sup>2</sup></b>
<b>Furniture per family</b>	<b>1.000 kg C per family</b>
<b>Roof brick type house</b>	<b>1.000 - 3.000 kg C per unit</b>
<b>Wooden house</b>	<b>10.000 - 25.000 kg C per unit</b>

## **Comments on Presentation 2**

### **1/ Building sector**

The building sector varies a lot in different EU countries with different traditions. There are wide differences too for wood/paper utilisation. Therefore, data given for Germany on carbon sinks in wood products in the above presentation may be different in other countries.

In Germany, 25 % of the houses are built with wood. If 100.000 more houses were built with wood, a supplementary 100 Mio m<sup>3</sup> wood would be necessary. It appears that there is a potential of 200 Mio m<sup>3</sup> which, however, is not readily available.

The price of wooden buildings is roughly the same as for buildings using other materials, but the construction time is shorter, less energy is needed and there is a carbon storage effect. Moreover, when the life-time of the structural timber is over, the wood can be recovered or used as biofuel.

## **2/ Substitution**

Substitution effects : if wood products substitute non-wood products, fossil energy use decreases because of lower energy needs and energy generation from wood residues and waste. This has a direct effect on GHG emissions, hence mitigation Climate Change.

There are two types of substitution :

- Material substitution whereby wood products replace non-wood products;
- Energy substitution whereby biomass (wood residues and waste) replaces fossil fuels.

Therefore, it is a sound objective to increase the use of wood, for example in private and public construction (buildings, bridges, earth retaining structures for example), since the enhanced use of wood can reduce carbon in the atmosphere, therefore mitigating climate change. The building sector will need more specific training to work with wood.

## **3/ Lifecycle assessment**

Life cycle assessments of products are crucial to determine the carbon storage effect. Four steps are recommended : goal and scope definition, inventory analysis, impact assessment and, ultimately, interpretation. Life cycle assessment allow to take into consideration the whole life of the product from the raw material (roundwood) to processing (debarking), to the manufacture of products (sawn goods, panels, joinery, carpentry, structural timber, furniture, windows/doors/floors), the use of products, and at the end of life : their re-use, their recycling for secondary raw material or energy generation via incineration.

## **4/ Questionnaire to determine the average kg of wood in a house**

The persons interviewed in Germany had to estimate the wood they had in all their living spaces. Estimations were then rationalised and compared to the results of enquiries with manufacturers (especially kitchen manufacturers).

## **CONCLUSIONS OF SESSION I**

- Wood products can be considered in putting up carbon balances for Annex I countries under the Kyoto Protocol.
- Internationally agreed specifications on accounting approaches and methods is necessary.
- For carbon accounting in wood products, the EU needs to choose a common approach such as the stock change approach, a model (EFISCEN, CO<sup>2</sup>fix, combined or not) and a calculation method. Moreover, a reporting model is necessary for future carbon crediting.
- In choosing an approach and a model, it is crucial to take into account the bio-geographical differences in the EU where six different forest biomes are present.
- Wood products constitute pools and fluxes of carbon relatively easy to access, but they will be affected by future political guidelines.
- A larger use of wood products would be beneficial for mitigating Climate Change, entailing the so-called “substitution effects”, by which more wood products

substituting for other materials decrease the use of fossil fuels and increase the time span of carbon storage, thereby reducing carbon in the atmosphere.

- The increased use of wood products in the building sector would bring the highest benefits for climate change mitigation.
- The “multifunctional forestry scenario”(MF) could be beneficial for biodiversity.
- The whole lifecycle of wood products must be carefully analysed and quantified in terms of “global warming impact-GWI”.
- Wood products recycling has two components : material recycling (for secondary raw material), or energy recycling (energy recovery through incineration).
- Data on the impact of recycling on the carbon budget are insufficient. In particular as regards the impact of virgin fibre versus recycled fibre. Two ways are possible : increase the use of fresh fibre or increase the life of fibre through recycling.
- Waste wood poses a specific challenge since there is a lack of data on waste disposal, in particular on landfilling due to the fact that landfills have mixed wastes.

**Advisory Committee for Forestry and Forest-based industries  
WORKING GROUP “CLIMATE CHANGE/FOREST PRODUCTS”  
Session I : 9-10 September 2002,  
27, rue de la Science, Brussels – 4<sup>th</sup> floor, Room 46**

**REPORT ON SESSION II**

**Session II focussed on the following issues :**

- Products substitution : the role of wood.
- CO<sup>2</sup> Fix model for carbon accounting.
- Good Practice Guidance for wood products under IPCC.
- Carbon storage in paper and board products.

**CONCLUSIONS OF SESSION II**

**Products Substitution : the role of wood**

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.

- Wood harvesting is the first essential step which allows carbon sequestration in the ensuing wood and wood-based products, and which allows material substitution.
- Material substitution brings a win/win/win situation at three levels :
  - Production : energy savings in production processes
  - Use : carbon storing in wood components and structures
  - End of life : material recycling and energy recovery
- Material substitution has the following advantages :

Replacing fossil-fuel intensive materials by wood products brings a win-win-win situation :

  - carbon emissions are avoided in the production process
  - recycling is very high : energy recycling + material recycling
  - the wood products carbon sink increases in the long term
- Material substitution can be effective for example in the building sector, the packaging sector
- Obstacles to material substitution :
  - price competitiveness of other materials,
  - risk and safety regulations (fire, eathquakes)
  - socio-cultural patterns

- Emerging markets like the CEEC's benefit from favourable conditions for material substitution : cost competitiveness, subsidies, green procurement and large supply of wood;
- Carbon accounting for wood and wood-based products requires accurate lifecycle analysis, in particular to calculate energy input of different materials.

### **The CO<sup>2</sup> Fix model for carbon accounting**

- A good tool for emissions trading and CDM.
- It will include the 6 greenhouse gases (at present only CO<sup>2</sup>)
- Useful for forest certification
- It ensures transparency
- It allows to compare results and provides a users' forum
- The model is an open structure where parameterisation is key to get sound results:

### **Good Practice Guidance for Wood Products under IPCC**

- HWP (harvested wood products) provide income for afforestation, reforestation and forest management
- HWP provides wood for wood/wood-based products, hence for materials substitution
- HWP allows to increase the wood products carbon sink which has greater potential than the forests carbon sink.
- Carbon sequestration in forests must be balanced with carbon sequestration in wood/wood-based products
- Carbon sequestration in forests reaches saturation quickly
- Carbon sequestration in wood/wood-based products has a huge potential.
- When carbon accounting and reporting will be made mandatory, the approach chosen will be mandatory too for all countries under the Kyoto Protocol
- Choice of the approach for reporting is "lifetime analysis" in the GPG model
- Choice of the approach for accounting (atmospheric flow/stock-change/production excluding trade) under the Kyoto Protocol is sensitive as it will have an impact on national commitments
- End-of-life products are not included under the GPG, due to lack of statistical data.

### **Carbon storage in paper and board**

- 1 t of paper = 1.4 kg C
- Direct CO<sup>2</sup> emissions from paper processes : 10Mt C = 40M t CO<sup>2</sup>
- The lifespan of products is subject to uncertainty, although it is basic for carbon storing calculation.
- Carbon accounting is easier for roundwood and semi-finished products. Finished products require specific research.
- Paper recycling helps mitigating climate change, by reducing :
  - the sequestration emissions in landfills (methane),
  - the emissions of biogenic carbone resulting from the oxidation of paper products,
  - the emissions from the production processes,
  - the volume of wood harvested.

- Wood harvest decreases the growing stock, but forest management ensures annual forest increment that balances. Besides, wood harvest provides an income to forest owners for better forest management, in particular afforestation and reforestation.

## Annex 1 Session II

### “The role of wood for substitution in reducing GHG emissions”

*by Pr. Timo Karjalainen, European Forest Institute*

If we consider the Global Carbon Cycle, the net uptake of carbon in oceans and terrestrial biosphere is not big enough to compensate for CO<sup>2</sup> emissions. However, the terrestrial uptake of carbon, or carbon sequestration, in soils and global vegetation has increased by 20% between 1980 and 1998, and nowadays the terrestrial uptake is 1.0 to 3.6 Gt C per year (2.3 +- 1.3) (source : IPCC Special Report on LULUCF).

#### Options for carbon sequestration :

*There are basically three options for carbon sequestration :*

- **enhancing carbon stocks in biomass, soils and products;**
- **materials displacement** : wood instead of other materials, since wood is renewable endlessly, wood used can be regrown;
- **Replacing fossil fuels with wood bioenergy** : using wood bio-energy instead of fossil fuels. When bioenergy forest is harvested and the wood burned in place of fossil fuels, it prevents irreversible emissions of carbon to the atmosphere.

When energy substitution occurs, the potential for carbon sequestration is infinite : there is no saturation. On the other hand, afforestation and reforestation are limited by the amount of land available and, therefore, reach saturation quickly. The potential for material substitution (or displacement) is important, but will saturate at some point in time.

Let's consider 3 illustrative examples :

*1/ How large area needed to offset emissions of a big city like Berlin, Germany ?*

Energy-related CO<sup>2</sup> emissions in 1996 in Berlin : 6.3Mt C (24.7Mt CO<sup>2</sup>)

Average net uptake by German Forests : 0.8 to 1.3 Mg/C per ha/year, which means that 5.2 to 8.4 millions ha of average German forests needed to offset those 6.3 Mt C (or 24.7Mt CO<sup>2</sup>) emissions. At present, total forest and wooded land area in Germany is 10.7 M ha.

Therefore, considerable afforestation or reforestation would be needed to offset such emissions. However, land for afforestation/reforestation is very limited, hence their potential to offset emissions is very limited too.

*2/ Car use*

Suppose you drive for 40 years, 16000 km per year, at a fuel efficiency of 5 liters gasoline per 100 km, and a C emission of 0;86 kg C per liter of gasoline. You must compensate 27.5 t C for 40 years (or 0.67 t C per year) emitted by the car.

Assuming a net sequestration of 0.8 to 1.3 t C/ha per year (with an average stem increment up to 3-4m<sup>3</sup>/ha per year), you would have to plant 0.5 to 0.8 ha of forests,



provided the carbon would be actually stored and not released in the atmosphere (because of fire for instance).

### *3/ Stockpiling carbon in harvested wood*

The UK offers an example (see Tench and Matthews 1999). First, a forest is planted on a relatively high yielding site. Then, harvested wood is stockpiled as a reserve of carbon. A maximum potential carbon sink of about 2.3t C ha/year can be sustained, provided that the productivity of the forest site is maintained, and provided the carbon in the harvested wood is retained indefinitely.

Thus, in theory, UK could completely offset emission of CO<sup>2</sup> at current rates by maintaining an area of about 70 M ha of carbon stockpiling forests, equivalent to about 3 times the total land area of the country.

### **Substitution**

Substitution is generally defined as :

*“any use of biomass that reduces the use of non-biomass inputs”*

In forestry, substitution means :

*“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”*

Substitution can be indirect or direct :

- Indirect substitution is *“using wood instead of non-wood materials”*
- Direct substitution is *“using wood instead of fossil fuels”*

### **Is there wood available for substitution management in Europe?**

There is wood available for substitution management in Europe, taking into account the following elements.

- Net annual increment exceeds the fellings, and gap between the net annual increment and felling has increased resulting in increasing growing stock.
- There has also been a shift in the age structure of forests : they are getting older.
- There is a certain amount of abandoned agricultural land : giving possibility for afforestation.

### **Different management scenarios for European forests**

The European Forest Institute has studied two different management scenarios for European forests :

- Business as usual(BaU), assuming fellings to be at the level of early 1990's, resulting in decreasing increment due to ageing forests
- Multifunctional forest management (MultiF) with less decreasing increment assuming also some afforestation taking place. MultiF ensures better biodiversity as old growth forests are left unmanaged.

The MultiF scenario provides better possibilities to increase material substitution, since fellings increase by 0.5 to 1% per year till 2020.

Environmentally sound technologies can play a role too by offering ways to overcome barriers to mitigation potential, in the use of timber as construction material in

residential buildings in particular. North American countries are ahead of EU in this area.

### **Obstacles to increase material substitution.**

- Competitive costs of non-wood materials
- Capital-intensive infrastructure
- Risk & Safety-related issues: resistance to fire, insects, earthquakes
- Legal barriers : building standards which vary in the EU, fire regulations
- Socio-cultural aspects and traditions

### **Ways to increase material substitution**

- increase of wooden buildings versus other materials
- increase of wooden components in mixed-material buildings
- Incentives for the use of wood

## **Annex 2 Session II**

### **“CO<sup>2</sup>FIX : modelling framework for quantifying carbon sequestration in forest ecosystems and wood products”**

*by Pr. Timo Karjalainen, European Forest Institute*

The CO<sup>2</sup> Fix model has been developed under the CASFOR project (carbon sequestration in afforestation and sustainable forest management) by 4 research institutions, one of which was the European Forest Institute.

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

Presently, the new version aims at being more user-friendly with new soil and product modules and new case studies. CASFOR II, the follow-up project is getting set up.

New features include : mortality, growth, competition. In this model, forest increment is a function of age, biomass content, diameter as breast height–DBA.

### **CO<sup>2</sup>Fix wood products module**

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.

**Diagram : Products module** (see attached document)

### **Four sets of parameters**

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

- 1) Products allocation: sawnwoods, board, paper (long-term, medium term, short term)
- 2) end of life : recycling, energy, landfill
- 3) recycling-lifespan : recycling table (long, medium and short term) and
- 4) lifespan (long, medium and short term)

Latest case studies are the following :

- Even-aged monoculture of Norway spruce in regular rotation in Central Europe
- Even-aged mixed stands of beech and Douglas-fir in regular rotation in Atlantic Europe
- Mixed uneven-aged oak and pine forests in Mexico
- Multiple cohort agro-forestry plantation in Costa-Rica and a teak plantation in Costa-Rica.
- Multiple cohort selective logging systems in tropical rainforest (Costa-Rica)

### **Future of CO<sup>2</sup> Fix model**

Version 3 is being developed under CASFOR II (2001-2004). 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.

Web-site : [www.efi.fi/projects/casfor](http://www.efi.fi/projects/casfor)

## **Annex 3 Session II**

### **“IPCC Good Practice Guidance (GPG) for wood products”**

*By Dr. Kim PINGOUD, VTT Processes, Finland*

#### **The terms of reference of the GPG are :**

*“...to ensure that country inventories on LULUCF are neither over-) nor underestimated as far as can be judged, and uncertainties are reduced as far as practicable and facilitate the best use of available resources, taking different national circumstances into account”.*

#### **The work is based on :**

- The revised 1996 IPCC Guidelines for national greenhouse gases inventories. Countries' reports are an important basis.
- The IPCC 2000 Report on Good Practice Guidance and uncertainty management
- Relevant decisions of the Conference of the Parties
- The IPCC Special Report on land use, land use change and forestry

The incoming 2002 IPCC Report (November 2002) will report on wood products under Chapter 3 “Land use change and Forestry Sector Good Practice Guidance”, 3.2 “Forest land”, 3.2.2.3 Changes in wood products. Chapter 4 is devoted to “supplementary methods and GPG arising from the Kyoto Protocol.

#### **Timetable for establishing the GPG in general is as follows :**

- First review of governments and experts : December 2002-January 2003
- Second review of governments and experts : May-June 2003
- Final draft for governments : July 2003
- Final review for governments and experts : September 2003
- Presentation of the final report to the 9th Conference of the Parties (COP9) to the UN Framework Climate Change Convention : December 2003.

### **Mandate for the development of Harvested Wood Products (HWP) reporting**

A reporting method is “an estimation method to be used in the national greenhouse gases inventories for the Conference of the Parties. Thus, the reporting method is distinct from the “accounting rule” which has an impact on the national commitments deriving from the Kyoto Protocol implementation.

Reporting methods must be developed for each of the 3 IPCC identified approaches for carbon accounting:

- Atmospheric flow approach
- Stock-change approach
- Production change approach (stock-change approach excluding trade).

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### **Table 2 : Approaches expressed through flux terms**

#### **Atmospheric-flow HWP**

Additional sink = Roundwood production -decomposition/combustion of wood consumed

= Wood consumption + net export - decomposition/combustion of wood consumed

#### **Stock-change HWP**

Additional sink = Roundwood production-net export - decomposition/combustion of wood consumed

= Wood consumption - decomposition/combustion of wood consumed

#### **Production HWP**

Additional sink = Roundwood production - decomposition/combustion of wood grown in country

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### **Table 3 : Approaches expressed through stock-change terms**

#### **Atmospheric-flow HWP**

Additional sink = Stock change products + net export

#### **Stock-change HWP**

Additional sink = Stock change products

#### **Production HWP**

Additional sink = Stock change domestic grown products

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A final decision will have to be made by the Conference of the Parties on the approach to be used. This decision will obviously have an impact on the countries' carbon balance. For example, Finland, which has a net export of GHG emissions (8M t C/year), would be favoured by the atmospheric flow approach where final products are excluded or by the production change approach where trade is excluded. On the other hand, the UK, which has a net import of GHG emissions (5M t C/year), would be favoured by the stock-change approach.

Greenhouse gas emissions	Total without CO2 from LUCF	CO2 from LUCF	Emissions from HWP Stock-change approach			Emissions from HWP Atmospheric-flow approach			Emissions from HWP Production approach		
	Base year	Base year	2000	% of total base-yr	% of LUCF base-yr	2000	% of total base-yr	% of LUCF base-yr	2000	% of total base-yr	% of LUCF base-yr
CO2 equivalent (Gg)											
Australia	417575	76206	-2061	-0.5 %	-3 %	-443	-0.1 %	-1%	-2117	-0.5 %	-3 %
Austria	76939	-9215	-3088	-4.0 %	34 %	-3355	-4.4 %	36 %	-1835	-2.4 %	20 %
Belgium	142396	-1256	-1443	-1.0 %	115 %	1342	0.9 %	107 %	-694	-0.5 %	55 %
Canada	604717	-59032	-9207	-1.5 %	16 %	-91509	-15.1 %	155 %	-33848	-5.6 %	57 %
Denmark	69953	-916	-1892	2.7 %	207 %	2286	3.3 %	250 %	-106	-0.2 %	12 %
Finland	77093	-23798	-2381	-3.1 %	10 %	-23582	-30.6 %	99 %	-4484	-5.8 %	19 %
France	545665	-52020	-6707	-1.2 %	13 %	-2995	-0.5 %	6 %	-8077	-1.5 %	16 %
Germany	1206637	-33719	-10844	-0.9 %	32 %	6725	-0.6 %	20 %	-12566	-1.0 %	37 %
Greece	105333	1391	-591	-0.6 %	-42 %	1536	1.5 %	110 %	-52	0.0 %	-4 %
Japan	1175558	-83824	-1187	-0.1 %	1 %	29843	2.5 %	-36 %	5153	0.4 %	-6 %
Netherlands	215798	-1500	-966	-0.4 %	64 %	4792	2.2 %	-319 %	-458	-0.2 %	31 %
Norway	46805	-9590	-720	-1.5 %	8 %	-1409	-3.0 %	15 %	-182	-0.4 %	2 %
Portugal	64644	-3994	-1146	-1.8 %	29 %	-2690	-4.2 %	67 %	-660	-1.0 %	17 %
Spain	305832	-29252	-5512	-1.8 %	19 %	7848	2.6 %	-27 %	-1293	-0.4 %	4 %
Sweden	69562	-20292	-1051	-1.5 %	5 %	-18397	-26.4 %	91 %	-2808	-4.0 %	14 %
UK	741882	8791	-3434	-0.5 %	39 %	15068	2.0 %	171 %	-3073	-0.4 %	-35 %
USA	6038192	-1059900	-72571	-1.2 %	7 %	-40302	-0.7 %	4 %	-46085	-0.8 %	4 %

Stock changes in forests are already included in the present reporting system. The additional wood products C sink, calculated with one of the above approaches, has to be reported too.

However, regardless of the approach, the additional wood products C sink can be calculated either through C fluxes, or C stock changes.

#### **Table 4 : Estimated emissions from HWP using the different approaches**

##### **Alternative methods for reporting**

Similar methods can be used for each approach, due to the above-mentioned equivalent expressions. Methods can be based on :

- Direct estimation of emissions from harvested wood products-HWP Estimates of all forms of decomposition and combustion of wood/wood-based products in a given country are necessary. For instance : wood bio-energy, fires in building, waste incineration, natural decay of HWP, emissions from landfills.
- Estimation of changes in HWP stocks can be made with two methods :
  - flux-data methods :  $\text{stock change} = \text{output flux} - \text{input flux}$  (to estimate input fluxes, statistics on consumption and trade rates of various HWP are used, like FAO). Two analysis possible : “lifetime analysis” (decay of HWP pool calculated on the basis of estimated lifetimes and decay patterns of HWP), “inflow-outflow analysis” (decay or outflow of HWP pool observed directly, this analysis is prone to errors since stock-change represents a small difference between large inflows and outflows)
  - stock-data methods : with direct inventories of HWP pools; the stock-change is obtained by sequential inventories. This method is suitable for major pools of long-life HWP such as building timber.

### **Choice of the basic method for Good Practice Guidance**

The basic method chosen is the “lifetime analysis” using a dynamic model. The lifetimes are different for solid wood products and for paper products. To estimate inflows, the FAO database is used. This database includes the production and the international trade fluxes of various primary and dsemi-finished HWP since 1961 for all countries, although the quality of data varies.

The decay pattern is exponential, with a decay flux proportional to the actual stock, i.e; as a constant percentage per year of the existing stock.

The modelling of HWP in solid waste disposal sites is compatible with the Good Practice Guidance for the Waste sector (cf. IPCC 2000 Report on GPG and uncertainty management).

Model equations describe the C stocks in semi-finished HWP (sawn wood for instance). Integration starts from the year 1900, using the estimated inflows as input to the HWP stocks

### **Basic weaknesses in the HWP reporting method**

- Uncertainties in the estimation of average lifetimes of HWP
- End-of-life products are not reported due to lack of statistics
- Specific difficulty if the production approach is used : in practice it is almost impossible to follow the fate of HWP grown in the forests of a given country.

**Annex 4  
Session II**

### **“Carbon storage in paper and board products”**

*by Dr. Paul-Antoine LACOUR, AFOCEL*

### **Overview of paper and board in the carbon cycle**

Paper and board products have to be considered in the context of the overall carbon cycle approach. From the forest, wood is harvested (roundwood) and goes into timber, sawn goods and panels, or pulpwood. Wood chips go to the pulpmill and pulp is then used in the papermill to become paper and board (recovered paper represents some 47% of the industry’s fibre raw material), then transformed into final products by the converting industries, and by the printing and publishing industries.

### **Fibre and carbon flows (2001) in CEPI countries (13 EU + Switzerland + Norway)**

Wood supply : 135.7 Mt

Woodpulp supply : 37.9 Mt production + 7.8 Mt imports, 1.4 Mt exports

Consumption : 43.9 Mt

Recovered paper supply : 44.7 Mt collection + 0.3 Mt imports, 4.0 Mt exports

Consumption : 42.0 Mt

Paper and board production : 88.2 Mt

Paper and board imports : 4.9 Mt

Paper and board exports : 10.5 Mt

Paper and board apparent consumption : 81.3 Mt.

Newsprint : 10.9 Mt

Other graphics : 30.6 Mt

Corrugated papers : 20.4 Mt

Other packaging : 13.4 Mt

Sanitary papers : 5.4 Mt

Others (photo, security,etc) : 3.3

In those countries, the following flows can be reported :

- Net import of woodpulp : net import of carbon : 3MtC
- Net export of recovered paper : net export of carbon : 1.5MtC
- Net export of paper and board : net export of carbon : 2.2 MtC

For woodpulp, recovered paper, paper and board products, CEPI countries as a whole are net exporters (circa 0.7 MtC).

### **Carbon sequestration : in forests or in the forest products pool ?**

Wood harvest decreases the growing stock, but not necessarily the total carbon pool of forests + products. Besides, wood harvest is part of an important economic cluster : it provides an income to forest owners for better forest management, in particular afforestation and reforestation. Wood harvest is the first essential step which allows carbon sequestration in the ensuing wood and wood-based products, and which allows materials substitution.

Thus, there is a trade-off between sequestration in forests and/or in the pool of forest products.

### **Direct CO<sup>2</sup> emissions for CEPI countries**

Fossil direct CO<sup>2</sup> emissions for CEPI countries (13 EU + Switzerland + Norway) amount to 40Mt CO<sup>2</sup> (circa 11MtC).

From 1990 to 2001, specific CO<sup>2</sup> emissions (CO<sup>2</sup>/Air dry tonne of paper and board) decreased by 25%.

For this sector, and for a panel comprising almost all of CEPI member countries, biomass represents 50% of primary energy consumption (gas : 34%, fuel oil : 9%, coal : 5%).

### **Carbon sequestration in paper products**

Four elements are essential to assess carbon sequestration in paper products :

- Uses
- Life-span
- Carbon content
- Consumption rate

The life-span of products is difficult to estimate accurately. However, the carbon content of paper products is relatively easy to determine.

Total carbon contained in paper and board products for CEPI member countries is 31M t C.

- 1 t of paper contains around 1.4 kg of CO<sup>2</sup>

Paper grades can be characterized by the following figures :

- moisture : 5% for all paper products
- coating pigments and fillers (kaolin, calcium, carbonate) : up to 30%
- fillers : kaolin, calcium, carbonate

- cellulose and other carbon containing compounds (lignin, hemicelluloses)

**Table 2 : Carbon sequestration in paper products/Breakdown by grades**

	specific carbon content of paper (tC/Adt)	consumption CEPI area (kt) (2001)	total carbon stock (t)
<b>newsprint</b>	0.425	10 985	4 669
<b>printing-writing</b>			
<b>uncoated mechanical</b>	0.425	4 668	1 984
<b>uncoated woodfree</b>	0.383	9 257	3 545
<b>coated mechanical</b>	0.375	6 520	2 445
<b>coated woodfree</b>	0.315	8 398	2 645
<b>packaging</b>	0.383	32 676	12 515
<b>Sanitary &amp; household</b>	0.428	5 640	2 414
<b>others</b>	0.338	3 156	1 067
<b>total</b>		81 300	31 284

### **Trends in paper consumption**

Paper consumption (apparent)<sup>3</sup> has been growing steadily in Europe since 1983, with a peak in 2000 and a slight reduction in 2001. The annual consumption increase rate is 3.7%. However, the more products are consumed, the shorter lifespan they may have since the consumer discards the products faster.

The increase in consumption has an automatic effect on the carbon stock increase in paper products, provided the life-span of products is stable.

An analysis and inventory of consumer behaviour is necessary to assess carbon storage.

### **Recycling**

Recycling has no effect on the amount of carbon sequestered in paper products. Different ratios of virgin and recovered fibre in paper products do not alter the consumption rate, neither the life-span of products.

However, recycling has 3 positive impacts on Climate Change :

- avoiding greenhouse gases emissions in landfills (methane)
- avoiding emissions of biogenic carbone resulting from the oxidation of paper products
- avoiding emissions from the production processes
- reducing the volume of wood harvested

<sup>3</sup> Paper consumption is defined by official statistics as the mean purchase of paper reels and sheets.



### **Carbon stock in paper and board products : accounting principles**

The calculation model takes into account : a given grade, a given country, a reference date (31 december 2001), statistical consumption rate (the products are not obligatorily used), destruction (landfilling, recycling).

**C 2001** = stock of carbon (tonne) that could be inventoried on 31<sup>st</sup> December 2001 in the stock of paper.

**P 2001, j** = stock of paper (tonne) consumed in year I and not destroyed in 2001

**S I** = amount of paper consumed in year i.

**$\alpha$  i** = carbon content of paper consumed in year i

Therefore, the amount of paper that could be inventoried on 31 December 2001 is equal to :

the carbon content of one tonne of paper  
multiplied by :  
the quantity of paper consumed in 2001 and not destroyed on 31 December 2001  
plus  
the quantity of paper consumed in 2000 and not destroyed on 31 December 2001  
plus  
the quantity of paper consumed in 1999 and not destroyed on 31 December 2001  
etc...

The difficulty is to calculate the stock of paper (tonnes) consumed in year i and not destroyed in 2001 (P 2001, j).

The speed of the decrease of the carbon stock is characterised by the « half-life » of paper. The half-life is the duration (in months) obtained by dividing by two the carbon per year (Ci)

**C 2001** : stock of carbon

**P 2001 j** : stock of paper

**A1** : carbon content of paper consumed in a year.

The estimated half-life is a guessed estimate.

Half life of paper : 3 months with carbon content of 0.385 C/Adt

The increase of carbon stock is circa 200000 t C

The key parameter is the life-span of products : it needs to be assessed more accurately.

**Advisory Committee for Forestry and Forest-based industries  
WORKING GROUP “CLIMATE CHANGE/FOREST PRODUCTS”  
Session III 16 January 2003  
15, rue de la Science, Brussels  
Ground floor, Room 30**

**REPORT ON SESSION III**

**Session III focussed on the following issues :**

- Fighting Climate Change with Wood products :
- France “Accord Cadre et Plan Bois-Environnement-Construction”
- Inventory methods for quantifying carbon stocks and carbon stocks changes
- Kyoto impacts on the EU paper industry

**CONCLUSIONS OF SESSION III**

**Fighting Climate Change with Wood Products: France’s “Accord cadre et Plan Bois-Environnement-Construction”**

- The French Plan demonstrates the role of wood and wood-based products and buildings for Climate Change mitigation, through the “substitution effect”:
  - Paper and board in building, besides wood, can achieve a significant “substitution effect”.
  - It is the global use of wood in buildings as timber frames and components which is significant, rather than the number of “all wood” buildings. The volume of wood parts and components in a building is therefore the market segment to influence for Climate change mitigation.
  - Specific uses of wood in civil engineering works such as bridges, earth-retaining structures, etc. can increase Climate Change mitigation.
- Certification of wood products is a big obstacle : it is difficult and costly for SME’s, it is better done by rival materials.
- Legislation can be used as an incentive to increase the ratio of wood material in public buildings, as provided by the french draft Decree under the Air law
- Subsidies as already exist for the use of wood as fuel should be developed for the use of wood as material.
- The use of wood and wood-based products allows to reach three complementary objectives : Sustainable development/Climate change mitigation/Energy efficiency.
- Increase information on wood advantages and capacities in multiple uses is necessary to achieve better results.
- Putting together at EU level all Climate Change initiatives in MS in the area of wood and wood-based products would give a value-added and increase the visibility of the role of wood products in Climate Change.

### **Carbo-Invent : multisource inventory methods for quantifying carbon stocks and stock changes in European forests**

- Harmonized inventory methods for quantifying carbon stocks and stock changes will be a pre-requisite for the accounting of wood products under the Kyoto Protocol, and to meet future commitments for wood products.
- A prototype for an integrated database of wood products C, biomass expansion factors, remote sensing and wood products inventory data should be envisaged.
- Remote sensing is the best available technique for detection in forests because of the limited uncertainty of results achieved. It could be a BAT (best available technique) for harvested wood products too.
- Test methods combining different data sources for an improved estimate of C stock changes at national and EU levels could be evolved for harvested wood products.
- Test sites for wood products will have to be designated.
- A set of biomass expansion factors (BEF) developed for major EU forest types to expand from inventory volumes estimates to C content of tree components, should be developed too for harvested wood products.
- Different methods will be evolved in different EU biomes (boreal, continental, atlantic, alpine, mediterranean) that could be extrapolated for wood products harvested in those different bio-geographical zones.

### **The European Paper Industry's Climate profile and Climate-related challenges**

- The Kyoto Protocol compliance costs do not apply to main competitors such as the USA and thus penalize EU industry. Besides, the EU paper industry is jeopardized by competitive disadvantages such as energy, labor and wood prices.
- The Kyoto-induced trade flows changes at world level may benefit non-Kyoto countries to the detriment of Kyoto countries.
- The paper industry is the largest user and producer of RES
- The EU paper industry is developing its own greenhouse gases emissions reporting scheme which will be ready in March 2003 and further tested in selected mills.
- Climate change mitigation can be achieved through specific measures such as :
  - paper recycling,
  - paperwaste incineration for energy recovery
  - substitution of other materials by paper

**National initiatives to fight Climate Change : France**  
**“Accord Cadre et Plan Bois-Environnement-Construction”**

The framework agreement, launched by ADEME (Environment and Energy Agency), gathers French Government Officials and Professionals (8 Ministries + 9 Federations and the Agence de l’Environnement et de la Maîtrise de l’énergie)<sup>4</sup> around 3 main objectives and 10 targets. Every partner has its own commitments, according to its specific mission or interest.

**3 main objectives**

- Sustainable development.
- CO<sup>2</sup> emissions and greenhouse effect mitigation.
- Rational use of energy.

**10 targets**

- Communication and information.
- Market: adequate offer of products, technical solutions for architects.
- Competitiveness : increase technical and economic performance, structural investment in the wood chain.
- Research and training: public and private research on wood and composite material, wood techniques training,
- Legislation and standardization: review legal provisions unfavorable to wood, Air law decree for minimal wood use in buildings

**Promote the use of wood as construction material in association with other materials**

- Main objective : promote the use of wood as construction material in association with other materials, rather than promoting wood-only buildings.
- Increase the market share of wood from 10% to 12.5% by 2010

**Law on Air and rational energy use**

The Plan originated in the French Law on air and rational energy use (December 1996) and more specifically, its Art 21-V which provides that « a decree will define the conditions for using a minimum rate of wood material in public buildings ». The Plan has been signed in March 2001 while the specific above decree is still in progress.

The french initiative combines a legislative and technical approach, gathering both public and private sector representatives and focussing on the three complementary objectives of sustainable development, climate change and energy use. The plan is national, but the local level is very important for its implementation.

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<sup>4</sup> 8 Ministries : Transport/Lodging, Environment, Agriculture, Education, Research, Culture/Communication, Industry, SME’s

9 Federations : Builders, Architects, Social Housing, SME’s in the building sector, Wood industries, Wood producers

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.

- Class 1 : 1 to 1.25 x threshold
- Class 2 : 1.25 to 2 x threshold
- Class 3 : More than 2 x threshold

[Table 1 : Types of buildings and classes thresholds](#)

**ADEME**

**Air Law - Article 21-V**

Types of buildings and classes thresholds

Réf	Type	Class 1	Class 2	Class 3
1	Detached houses	60	75	100
2	Block of flats	35	45	70
3	Offices	20	25	40
4	Shops	35	45	70
5	Garages, car parks, transport	10	15	20
6	Hotels	35	45	70
7	District residential buildings	25	30	50
8	Teaching and research buildings	30	40	60
9	Healthcare and social buildings	25	30	50
10	Sport, recreation, cultural and religious building	25	30	50
11	Farm buildings	15	20	30
12	Industrial and warehouses buildings	15	20	30

*Volume of Wood in dm<sup>3</sup> per net surface m<sup>2</sup>*

10

[Table 2 : Ratio calculating method](#)

**ADEME**

**Air Law – Article 21 - V**

Ratio calculation method

Réf	Éléments d'ouvrage	Unité	Q	Réf	Éléments d'ouvrage	Unité	Q
1	Plancher bois porteur	m <sup>2</sup>	50	13	Volets en bois	m <sup>2</sup>	30
2	Pan d'ossature bois porteur	m <sup>2</sup>	30	14	Ossature bois non-porteuse	m <sup>2</sup>	15
3	Ossature poteaux-poutres	ml	25	15	Lambris	m <sup>2</sup>	15
4	Charpente traditionnelle et lamellé-collé	m <sup>2</sup>	40	16	Huissierie en bois	u	20
5	Charpente industrielle	m <sup>2</sup>	30	17	Portes intérieures en bois	Vantail	25
6	Couverture à support discontinu	m <sup>2</sup>	5	18	Escaliers bois	ml	60
7	Couverture à support continu	m <sup>2</sup>	20	19	Parquet massif rapporté	m <sup>2</sup>	30
8	Sous-face de débord	m <sup>2</sup>	15	20	Autres parquets rapportés	m <sup>2</sup>	15
9	Bardage en lames de bois	m <sup>2</sup>	25	21	Plinthes en bois	m <sup>2</sup>	2
10	Bardage en panneaux dérivés du bois	m <sup>2</sup>	15	22	Garde-corps en bois	m <sup>2</sup>	30
11	Portes extérieures pleines	m <sup>2</sup>	35	23	Divers	m <sup>2</sup>	2
12	Fenêtres, portes-fenêtres et châssis divers	m <sup>2</sup>	25				

*Wood volume in dm<sup>3</sup> per component unit*

11

Table 3 : Townhouse in Paris, France

**ADEME**

### Maison de ville à Paris (75)

Maitre d'ouvrage : M<sup>me</sup> Lacerna et M. Scherer  
Architecte : Pascale BUFFARD

Classe 1	60
Classe 2	75
<b>Classe 3</b>	<b>100</b>

Catégorie : Logements individuels  
142 dm<sup>3</sup> par m<sup>2</sup> de SHON : classe 3

Réf	Elément d'ouvrage	Unité	Nb. d'unité	Ratio bois en dm <sup>3</sup> / unité	Volum e bois / élément d'ouvrage	% du volum e
1	Plancher bois porteur	m <sup>2</sup>	106	50	5 300	23,3
2	Pan d'ossature bois porteur	m <sup>2</sup>	180	30	5 400	23,7
3	Ossature poteaux-poutres	m <sup>3</sup>	95	25	2 375	10,4
4	Charpente traditionnelle et lamellé-collé	m <sup>2</sup>	60	40	2 400	10,5
5	Charpente industrielle	m <sup>2</sup>		30	0	0
6	Couverture à support discontinu	m <sup>2</sup>		5	0	0
7	Couverture à support continu	m <sup>2</sup>	60	20	1 200	5,3
8	Sous-face de débord	m <sup>2</sup>	2	15	30	0,1
9	Bardage en lames de bois	m <sup>2</sup>	38	25	950	4,2
10	Bardage en panneau dérivé du bois	m <sup>2</sup>	15	15	225	1,0
11	Portes extérieures pleines	m <sup>2</sup>	2	35	70	0,3
12	Fenêtres, portes-fenêtres	m <sup>2</sup>		25	0	0,0
13	Volets en bois	m <sup>2</sup>	6	30	180	0,8
14	Ossature bois non-porteuse	m <sup>2</sup>	80	15	1 200	5,3
15	Lambris	m <sup>2</sup>		15	0	0,0
16	Huissierie en bois	U	7	20	140	0,6
17	Portes intérieures en bois	vantail	7	25	175	0,8
18	Escalier en bois	m <sup>l</sup>	12	60	720	3,2
19	Parquet massif rapporté	m <sup>2</sup>	70	30	2 100	9,2
20	Autres parquets rapportés	m <sup>2</sup>		15	0 16	0,0
21	Plinthes en bois	m <sup>2</sup>	8	2	270	0,1
22	Garde-corps en bois	m <sup>l</sup>	9	30	14	1,2
23	Divers	m <sup>2</sup>	7	2		0,1
Volume total de bois dans l'ouvrage (en dm <sup>3</sup> )					22 765	100
SHON de l'ouvrage					160	
Volume de bois en dm <sup>3</sup> / m <sup>2</sup> de SHON					142	



12

Table 4 : Mixed building : lodging + offices in Paris, France

**ADEME**




### Immeuble d'habitation et de bureau à Paris (75)

Maitre d'ouvrage : SCI La maison bleue  
Architectes : GZA - F. Payen, E. Hochart (75)  
BET : GNUMATIC (75)

Classe 1	35
Classe 2	45
<b>Classe 3</b>	<b>70</b>

Catégorie : Logements collectifs  
87 dm<sup>3</sup> par m<sup>2</sup> de SHON : classe 3

Réf	Elément d'ouvrage	Unité	Nb. d'unité	Ratio bois en dm <sup>3</sup> / unité	Volum e bois / élément d'ouvrage	% du volum e
1	Plancher bois porteur	m <sup>2</sup>	144	50	7 200	34,0
2	Pan d'ossature bois porteur	m <sup>2</sup>	145	30	4 350	20,7
3	Ossature poteaux-poutres	m <sup>3</sup>	22	25	550	2,6
4	Charpente traditionnelle et lamellé-collé	m <sup>2</sup>	48	40	1 920	9,2
5	Charpente industrielle	m <sup>2</sup>		30	0	0,0
6	Couverture à support discontinu	m <sup>2</sup>		5	0	0,0
7	Couverture à support continu	m <sup>2</sup>		20	0	0,0
8	Sous-face de débord	m <sup>2</sup>	16	15	240	1,1
9	Bardage en lames de bois	m <sup>2</sup>	22	25	550	2,6
10	Bardage en panneau dérivé du bois	m <sup>2</sup>	134	15	2 010	9,6
11	Portes extérieures pleines	m <sup>2</sup>		35	0	0,0
12	Fenêtres, portes-fenêtres	m <sup>2</sup>		25	0	0,0
13	Volets en bois	m <sup>2</sup>		30	0	0,0
14	Ossature bois non-porteuse	m <sup>2</sup>		15	0	0,0
15	Lambris	m <sup>2</sup>	84	15	1 260	6,0
16	Huissierie en bois	U	10	20	200	1,0
17	Portes intérieures en bois	vantail	10	25	250	1,2
18	Escalier en bois	m <sup>l</sup>	10	60	600	2,9
19	Parquet massif rapporté	m <sup>2</sup>	48	30	1 440	6,9
20	Autres parquets rapportés	m <sup>2</sup>		15	0	0,0
21	Plinthes en bois	m <sup>2</sup>	11	2	22	0,1
22	Garde-corps en bois	m <sup>l</sup>	13	30	390	1,9
23	Divers	m <sup>2</sup>		2	0	0,0
Volume total de bois dans l'ouvrage (en dm <sup>3</sup> )					20 982	100
SHON de l'ouvrage					240	
Volume de bois en dm <sup>3</sup> / m <sup>2</sup> de SHON					87	

13

### **Case study : Regional Charter (Vosges) on « Use of wood in construction »**

The Charter has been launched by the « Conseil général du département des Vosges » in partnership with the municipalities.

The objective is to boost the use of wood in construction through the impact of building examples, by means of technical and financial assistance to private owners. A subsidy of up to 10% of total cost is granted together with a two persons technical team.

The subsidy is granted on the basis of compliance with environmental and technical criteria, and the declaration of the quantity of wood actually used, expressed as a percentage of total cost (new building : more than 65% of costs ; renovated building : more than 30% of total cost).

Results so far have been encouraging with 120 municipalities signing the charter (i.e. 25% of total), 9 funded projects (schools, town hall) for a total grant of 74 000 € 4 projects in progress.

Creation of the « Route du Bois », a special itinerary to visit wood construction examples in the Vosges.

### **Case study 1 : Wood windows market in France**

In 1990, wood accounted for 50% of the market for windows. In 2000, it accounted only for 21% of the market with 1.6 M units.

- the challenge for the SME's is to develop the market share of customized wooden windows
- the Quality Charter « Menuiseries 21 » has been signed in 2002 by 10 companies. It covers technical, environmental and service quality.

It is a voluntary agreement which allows to meet technical/environmental regulations and consumer requirements without having to incur the high cost of existing certification procedures .

### **Case study 2 : CO<sup>2</sup> emissions from the production of a U beam of 3m able to support 20 tonnes**

<b><u>Wood (epicea)</u></b>	<b><u>Steel</u></b>	<b><u>Reinforced concrete</u></b>
60 kg	80 kg	300 kg
CO <sup>2</sup> neutral	+ 76 kg CO <sup>2</sup>	+ 101 kg CO <sup>2</sup> emission

### **CO<sup>2</sup> emission balance through wood substitution**

In the forest, 1 m<sup>3</sup> of wood absorbs one ton of CO<sup>2</sup> for growing. The substitution of 1 m<sup>3</sup> of wood to other materials results in 0.8 ton of CO<sup>2</sup> savings

- Wood use in France in 2000 was : 13 M of m<sup>3</sup> per year
- Wood use target for 2010 is : 17M of m<sup>3</sup>
- Additional CO<sup>2</sup> sequestration in French forest : + 4 Mt CO<sup>2</sup> per year
- Additional CO<sup>2</sup> savings from material substitution : + 3Mt CO<sup>2</sup> per year
- Total CO<sup>2</sup> savings : 7 Mt CO<sup>2</sup> per year, i.e. 14% of France's Kyoto reduction target



### **French National research programme for Wood Construction Material**

The Programme is supported by Public bodies (Ministries, Agency for Energy-ADEME). It has 5 targets (percentage of budget allocated):

- Develop “clean” wood preservatives 33%
- Develop the use of wood in buildings’ frames 33%
- Develop competitive wood construction products with high performance and quality control methods 12%
- Assess and reduce environmental impacts 12%
- Develop composite products (wood with other materials) 7%

### **The French « Charte du Bois » : a blueprint for similar initiatives**

The governments of Chile and Australia are considering the french initiative as a blueprint for their own action regarding wood products for Climate Change mitigation.

## «Carbo-Invent : multisource inventory methods for quantifying carbon stocks and stock changes in European forests»

by Dr. Bernhard SCHLAMADINGER, Joanneum Research, Graz, Austria

The Carbo-Invent Project is financed under the CARBO-EUROPE project set up by DG RTD. It gathers 14 Research Institutions from 8 EU countries, from the Czech Republic and Hungary under the coordination of Joanneum Research, Austria.

### Methods for assessing forest carbon (C) stock changes at national and EU levels

CarboInvent will identify/develop/test methods for assessing forest carbon (C) stock changes at national and EU levels, for the purpose of reporting under the UNFCCC and the Kyoto Protocol (KP), using multi-source inventory methods: biomass expansion factors, soil C assessments combined with forest inventories; remote sensing techniques to enhance accuracy and reduce cost. This will aid the design of "national systems" as called for in the KP. Methods/integration techniques will be applied in Boreal, Continental, Oceanic, Alpine, Mediterranean test sites. Upscaling to national level will be tested for both "full C accounting" and selective accounting under the KP. Separate national and EU stock-change estimates will result from integrating multi-source data with a European Forest Resource Database. C monitoring/verification procedures will be suggested to translate KP decisions into inventorying requirements at national/project levels.

### System to quantify carbon (C) stock changes at national and regional scales to meet commitments of the UNFCCC and the Kyoto Protocol

CarboInvent will set up a system to quantify carbon (C) stock changes at national and regional scales to meet commitments of the UNFCCC and the Kyoto Protocol (KP), in five parts:

- 1 - C inventories of above- and below-ground biomass: Data related to biomass allocation of different tree species by regions will be collected and refined. A database of biomass expansion factor (BEF) default values will be developed using existing and new measurements. Procedures for harmonisation of sample based assessments, their methods and spatial/temporal resolutions will be developed. In a top-down integration process, forest inventory data from the European Forest Resource Database (EFRD) which covers data from National Forest Institutes in 31 European countries, and the EFISCEN model (European Forest information Scenario Model) are integrated with the BEFs to estimate carbon stock changes at national levels. More than 2500 forest types (region, ownership, site class, tree species) covering about 146 M ha are covered in the database, taking into account changes in forest area due to reforestation/afforestation/deforestation, and disturbances such as fires or harvesting.
- 2 - C inventories of soils and litter pools: A map of forest soils will be generated from the European Soil Reference Base. Soils surveys will be integrated with national forest inventory data (EFRD, see above).

- 3 – Bottom-up integration of multi-source inventory data in test sites: Test sites will be used to integrate BEF estimates with soil C, forest inventory data and remote sensing techniques at the local level. Remote sensing allows to detect lands that are subject to afforestation / reforestation / deforestation activities, to monitor changes in land use, and to update land-use maps to reference years and thus to pinpoint areas with significant changes. All methods will be applied at Boreal, Continental, Oceanic, Alpine and Mediterranean test sites (Southern Finland, Germany ; Ireland, Austria and Catalonia-Spain). Upscaling procedures will be developed, with special attention on assessment accuracy and error propagation. Criteria of good practice in reporting of land-use, land use change and forestry will be applied.
- 4 - C budgets for activities under KP Art. 3.3 and 6. Multi-source inventory methods will be integrated in test sites (in Ireland and Hungary) towards stock-change estimates at national and project levels of afforestation / reforestation / deforestation activities, based on the definitions and accounting rules of the KP.
- 5 - Techniques for monitoring impacts of forest management changes and disturbances on C stocks will be developed.

#### **Expected results:**

- Improved regional/national estimates of carbon (C) stock changes in EU forests.
- Harmonised multi-source inventory methods for assessing C stock changes.
- "Full" and "Kyoto" C budgets for test sites.
- Monitoring standard for detecting C impacts of disturbances and forest management changes.
- Prototype for integrated database of soil C, biomass expansion factors, remote sensing and forest inventory data.

#### **Relevance of the Carbo-invent Project for wood products**

The Carbo-invent project is of relevance to wood products, since the different methods could be adapted to wood products in the perspective of their C accounting under the 2<sup>nd</sup> commitment period of the Kyoto Protocol.

## **“The European Paper Industry’s Climate profile and Climate-related challenges”**

*by Mrs. Annick CARPENTIER, CEPI Deputy Director general*

18 national pulp and paper associations

1300 mills and 900 companies

Turnover: €76 billions (indirect turnover : €400 billions)

Production: 90MT paper, 38MT pulp, 28% of world paper production

Recovered fibres: 46.5% of the fibre raw material

Direct employment: 260000 persons

### **Greenhouse gas emissions of the EU pulp and paper industry**

- On-site fuel combustion : 52% of total
- Indirect emissions of purchased heat and power : 37% of total
- Biofuels represent an important part of energy used, with carbon neutral emissions
- Co<sup>2</sup> emissions in the production process are the most important
- N<sup>2</sup>O and CH<sub>4</sub> emissions from landfilling of waste are minor
- Co<sup>2</sup> from transportation and composting are marginal

### **Climate profile of the European pulp and paper industry**

Climate change mitigation can be achieved by paper recycling, incineration for energy recovery, carbon storage in paper products and substitution.

- Recycling avoids emissions from landfilling and leads to improved energy efficiency compared to virgin fibre processing. Besides recycling can be done several times over.
- Incineration of used paper that cannot be recycled anymore and of residues allows to produce energy in equivalent quantities as direct burning of wood or residues/used paper. Besides, it allows to avoid landfilling, thereby decreasing greenhouse gases emissions both in energy consumption and in landfills.
- Carbon storage in paper has been calculated as 1.4 t of CO<sup>2</sup> equivalent for 1 t of paper, therefore substitution of non-renewable products with paper products allows to increase the storage effect.

### **Energy profile**

- The EU pulp and paper industry produces 17% of the EU renewable energy, and 28% of EU biomass-based energy, making it the single largest EU producer of renewable energy.
- Energy represents up to 25% of production costs (10.9 GJ/t)
- Co<sup>2</sup> emissions come mainly from the combustion of fuels.
- Between 1990 and 2001, the pulp and paper industry has decreased by 16% its primary energy consumption, and by 25% its CO<sup>2</sup> emissions per tonne of product.
- The pulp and paper industry is the largest user and producer of RES, with more than 50% of its energy coming from RES on average.
- Measures to achieve energy efficiency have included the switch to low carbon fuels, the increased use of biofuels, investments in co-generation installations (CHP).

Table 1 : Specific CO<sub>2</sub> emissions vs. production

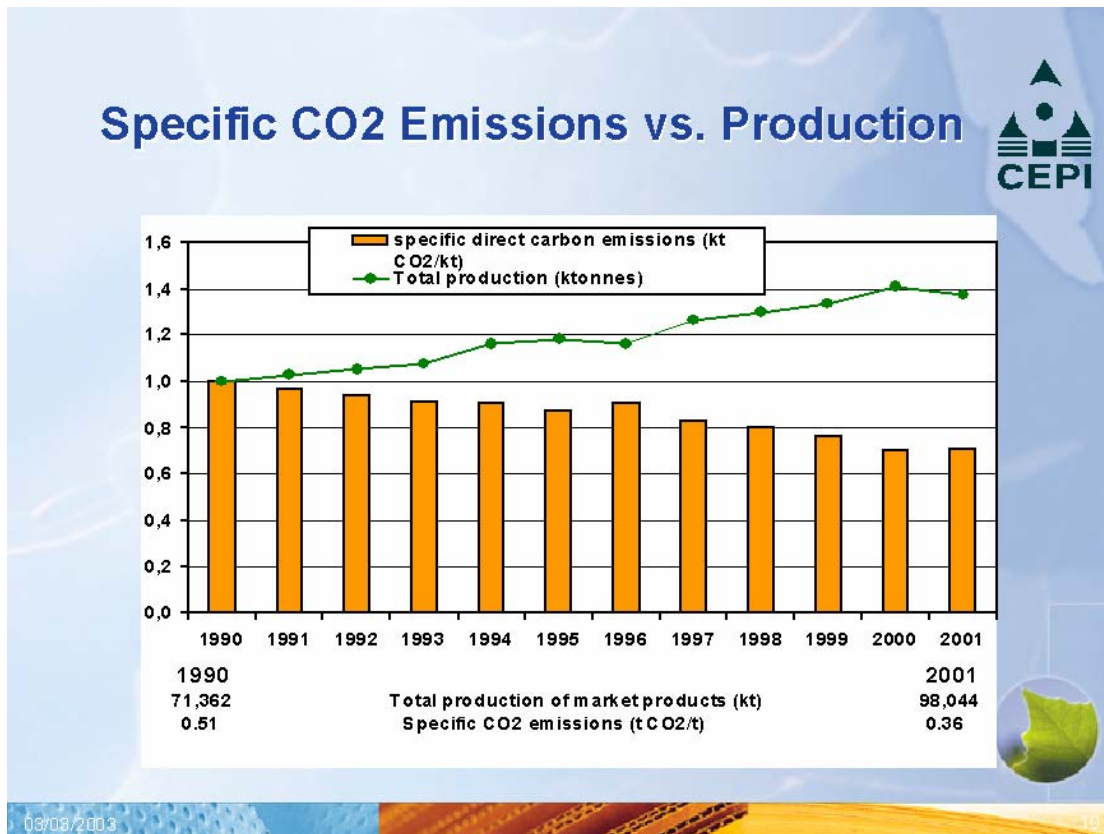
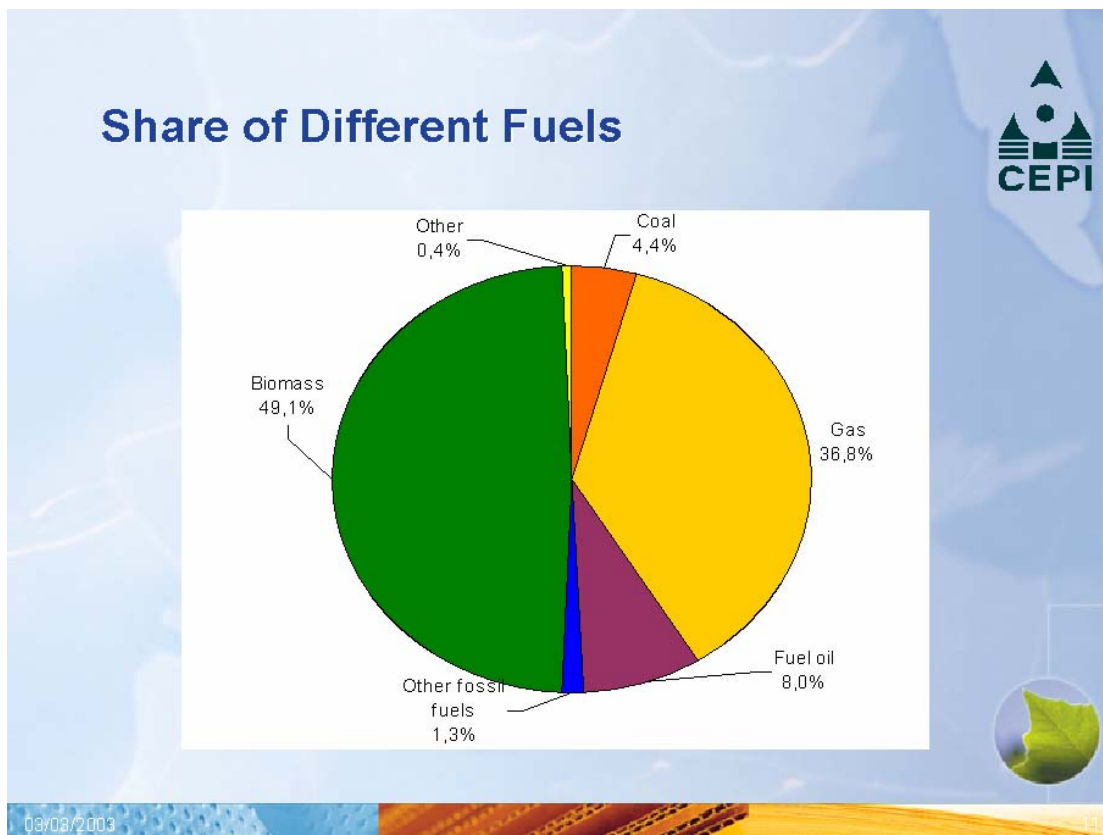


Table 2 : Share of different fuels



## **Climate related challenges for the pulp and paper industry**

The industry is subject to international competition, with a commodity price fixed on the world market. The fact that main competitors such as the USA have not ratified the Kyoto protocol creates an added jeopardy for the EU pulp and paper industry, besides the existing higher production costs in Europe due to higher prices of labour, energy, and wood.

- Increased production costs because of the GHG reduction measures, and the obligation to purchase emissions allowances.
- Increased energy costs
- Energy taxation appears inefficient for energy intensive industries.
- The RES electricity Directive puts pressure on the supply of wood as a raw material.
- The potential for increased energy production through CHP technology in the pulp and paper industry is significant –with equivalent significant GHG emissions reductions- but CHP investments are uneconomic. Hence, without support to CHP investments, the potential foreseen in the CHP Directive is unlikely to be realized.
- Potential changes in trade flows if EU competitiveness is jeopardized on import and export markets

### **“Competitiveness Impact of the Kyoto related measures” A study by J.Pöyry**

The objective of the study is to analyze the impacts of Kyoto related measures on EU competitiveness, compared with other regions, in particular North America.

The study analyzes costs in the EU, the US and Brazil on the basis of three case studies :

- Testliner mills EU / US
- Newsprint/Low weight coated-LWC mills EU / US
- Market pulp mills EU / Brazil

The conclusions of the study are the following :

- Comparative disadvantage for EU mills because of CO<sup>2</sup> emission limits and cost of purchasing CO<sup>2</sup> allowances.
- High Kyoto compliance costs with a cost difference possibly totalling 1.5 billion € for the EU pulp and paper industry over the period 2002-2010 (including differences in investments, operating costs and emissions trading related costs).
- Potential changes in trade flows between continents with increased imports from non-Kyoto countries and consequent loss of export markets for EU industry.
- Possible further deterioration of EU pulp and paper companies after 2010 due to tighter CO<sup>2</sup> and other GHG emission limits.
- Rising energy prices in the EU.

## **Calculation tools for estimating GHG emissions from pulp and paper mills**

This initiative was launched by the International Council of Forest and Paper Associations (ICFPA) of which CEPI is member in November 2002. The objective is to provide improved and more consistent tools for estimating greenhouse gases emitted from pulp and paper mills. The tools indicate how to report, but not what should be reported, as reporting requirements may vary from country to country.. The initiative is consistent with the respective protocols of the World Resource Institute and the Intergovernmental Panel on Climate change. The tools cover the following, with the exception of carbon sink and storage effect :

- Direct GHG emissions : CO<sup>2</sup>, CH<sub>4</sub>, N<sub>2</sub>O
- Bio-energy : carbon neutral
- Core on-site pulp and papermaking operations
- Other core operations company owned, but off-site
- Indirect emissions (debits and credits) from imported/exported power and steam

## **CEPI GHG emissions reporting scheme**

On that basis, CEPI is evolving its own GHG emissions reporting scheme, covering :

- Direct emissions of CO<sup>2</sup>, CH<sub>4</sub>, N<sub>2</sub>O and company-owned boilers emissions
- CO<sup>2</sup> emissions from biomass (carbon neutral)
- Indirect emissions of CO<sup>2</sup>, CH<sub>4</sub>, N<sub>2</sub>O from on-site production of heat and electricity (CHP units) and emissions from purchased fossil fuels and biomass
- Gate-to-gate approach, 90/10 principle

This scheme will be ready in March 2003 and will be first tested in selected mills.

**Advisory Committee for Forestry and Forest-based industries**  
**WORKING GROUP “CLIMATE CHANGE/FOREST PRODUCTS”**  
**Session IV 7 MAY 2003**  
**15, rue de la Science, Brussels**  
**Room 00/31**

**SESSION IV**  
**SUMMARY REPORT**

**Initiatives in the EU Member States for measures and activities to increase the role of forest products for the mitigation of Climate Change. (UK, The Netherlands, Italy, Sweden, Spain)**

**1/ Objectives**

All initiatives that were presented have as their main objective the promotion of wood and wood products to increase their market share and to inform about their specific environmental and health benefits, in particular the mitigation effect on Climate Change.

The strategic objectives are :

- increasing wood consumption
- improving perception of wood through better knowledge of its properties
- creating of a “wood culture” for interior and exterior design and building
- 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

**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 climate change issue constitutes an asset for the wood products because wood has specific carbon storing properties that reduce CO<sup>2</sup> in the atmosphere and thus mitigate Climate change and its damaging effects on the environment and the economy.

Climate change, its mitigation, is a target with quantitative reductions as spelled out in the Kyoto Protocol and in the so-called “Burden-sharing agreement” of the EU which provides for quantitative greenhouse gases reductions or increases for each MS in order to reach the overall EU reduction of 8% of emissions by 2010 compared to 1990 emissions.



Climate change constitutes now a market with the setting up of the EU emissions trading scheme for industrial undertakings. The decision to include forest sinks taken in Marrakesh 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<sup>2</sup> in the atmosphere. CO<sup>2</sup> 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 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. Specific uses in civil engineering works such as bridges, earth-retaining structures for example would increase significantly too the “substitution effect”.

### **3/ Structure**

In most cases, the 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.

- “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.

#### **4/ Target audiences**

The initiatives target three main audiences :

- Professionals which can be
  - Clients : developers, housing associations, local authorities,
  - Merchants, retailers
  - Specifiers : architects, designers, engineers, quantity surveyors,
  - Users : contractors, sub-contractors,
  - Public bodies : planners, public procurement, local authorities
  - Future professionals such as students, apprentices.
- Final Consumers : homeowners, DIY-ers and children as future consumers

#### **5/ Activities**

Activities can be classified in three main categories :

- PR activities : web-sites and portals, newsletters, exhibitions, awards, competitions, TV and 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, specific handbooks and manuals, documentation centers, specific web-sites and portals, workshops.

In most organisations, activities are assessed at regular intervals by third parties. This assessment allows to measure significant changes in wood consumption patterns and quantities and to modify accordingly the different activities in order to progress. 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 increase consumption on a permanent basis.

#### **6/ Legal and economic measures**

##### Building regulations

Legislation on buildings can be used as an incentive to increase 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.

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

### Certification of wood products

This is seen as more and more necessary by all the organisations in order to increase the market share of wood products and to inform the consumers via adequate labelling. Certification of the forest is necessary prior to the certification of wood products, followed by the labelling of products. However, certification is costly and difficult for most SME's which predominate in the woodworking sector.

### 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). The Commission is studying the legal implications of such clauses for the Internal market, and in the WTO context.

### Subsidies

Subsidies for the use of wood as fuel already exist in some countries. Subsidies for the use of wood as material are being considered.

## **7/ Perspectives 2004-2010 : - Environmental and health benefits of wood - A European project**

All organisations consider that the specific properties of wood 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.

A European initiative is being initiated by the Nordic Timber Council which gathers Sweden, Norway and Finland representatives. The "Environmental timber promotion project" will involve Sweden, Norway, Finland and ten more European countries who will cooperate together to convey to the general public and professionals the environmental benefits of wood and wood products as regards Climate Change, as well as eco-efficiency and energy efficiency. Ways to realise those objectives include the support of political processes for an increased use of wood, a common positive approach to environmental communication, generating positive information on wood and the development of a European press relation network. As a first step, the first issue of the "**European Wood magazine**" will be published on 19 November 2003. A common web site and data base are being considered.

### Annex 1

**United Kingdom : « Wood for Good »**  
*by Mr. Charles Trevor*

"Wood for good" was launched in June 2000 as a joint effort of the Nordic Timber Council, the UK, and CEI-Bois. It started from the fact that wood and wood products were perceived negatively in the UK entailing a low wood consumption. To remedy this, proper information had to be given to consumers to change that perception and increase wood consumption. The initiative is the largest single timber industry

promotion ever mounted in the UK, targeting both trade and consumer audiences. Besides encouraging the use of wood and wood products, and encouraging long-term growth by developing a wood culture, “Wood for Good” tackles sensitive issues such as illegal logging in tropical countries which has considerably damaged the image of wood products in general, including those produced in the EU. This is done by providing help and advice to developing countries. The “shoddy product” image of wood products which prevails in the public is being tackled by an emphasis on attractive “design” products through competitions, awards, exhibitions. Thus the usual perception of “wood as a material of tradition not innovation” is slowly being reversed. Health benefits and environmental benefits of wood products, in particular Climate change mitigation, are being demonstrated in the campaign. The motto is “Let’s siphon the carbon out of the atmosphere and turn it into houses”. On the economic front, wood products are price competitive compared to other materials.

On the legal side, public procurement by local authorities provides for specific clauses defining a minimum content of wood in public buildings. The overall strategy of the campaign has a “360°” approach with two separate Internet portals for professionals and for final consumers, specific literature : pamphlets, manuals, videos, TV and Press advertising ( like on Jewson TV), education activities such as seminars at the Building Centre in London attracting up to 450 architects, exhibitions at fairs, shows of furniture designers at major retailers.

“Wood for good” has been already assessed by a consultant, Jaacko Poyry, for the years 2000-2002. The results of the assessment were quite encouraging, indicating o that the UK market outperformed other European markets by 6.2%, especially as regards plywood, with a 601,000 m<sup>3</sup> increase in consumption from 2000 to 2002, despite low new housing starts. Thus, plywood imported from Finland grew by 25%. The assessment reported an increased usage of timber frame building in the UK, increased sales of wood windows, wood I-beams, wood decking and wood for gardens, wood flooring. 60% of campaign members in the retail sector reported an increase in sales between 5 and 20%, acknowledged as resulting from the campaign. In particular the DIY sector worth 25 billions pounds a year is growing for wood products. . The assessment report concluded : “it seems like the wood for good campaign, has been remarkably successful in conveying its message and influencing the consumer market in such a short time”.

However, it is considered that 10 to 20 years are necessary for the campaign to really reach its basic objectives on a long-term basis:

- change public perception
- change industry perception, and industry positioning on the market
- create “ “wood culture”.

“Wood for good” advocates wood products, but is not a selling campaign. However, the assessment indicates that the public should be better informed on where to get the wood products. Presently, a “network of companies is being built up, with a corresponding label, on the model of the “woolmark” label dating back to 1936. The certification of wood products is considered as useful in this context. However, the assessment of the quality of retailers and their products remains a difficult challenge.

## Annex 2

### **The Netherlands : « Centrum Hout »**

*by Dr. Eric De Munck*

Centrum Hout is the Timber Information Centre of the Netherlands, created fifty years ago in 1953. Originally, there were 25 bodies and organisations participating. Nowadays, there are only 3 participants : Centrum Hout proper, the Ministry of Transport and Water, the Union of Timber frame builders.

The Netherlands produce very little wood (0,9 M m<sup>3</sup> in 2001), and import twenty times as much (19,7 M m<sup>3</sup> in 2003, mostly softwood), of which 1 M m<sup>3</sup> of tropical wood. Of those circa 21 M m<sup>3</sup> of wood and wood products, 6 M m<sup>3</sup> are exported. Timber is transformed mainly into paper (49%), sawn timber (30%) and wood-based panels (15%). The Forest area is 341.000 ha, of which 316.000 ha are commercial forests, and 124.163 ha are SFM certified. Ownership is shared almost equally between State forests (51%), and private forests (49%). Only 64% (1.547.000 m<sup>3</sup>) of annual increment (2.412.000m<sup>3</sup>) is harvested. Dutch forest-owners do not favor wood harvesting. The Forest-based industries represent 2.8% of GNP, with an import value of Euro 4.728 M, and exports value of Euro 3.036 M.

The Dutch national Climate policy has set a target of 6% CO<sup>2</sup> reduction by 2012 as compared to 2000 levels. In order to reach this target, the Dutch Electricity Company is financing afforestation, reforestation and non-deforestation projects in tropical countries under the clean development mechanism as provided by the Kyoto Protocol.

Centrum Hout targets professionals in the building sector such as architects and architecture students, and consumers including children. The magazine Houtblad prints 18 000 copies, 8 times per year. Technical handbooks are produced. Lectures on building projects are given by wood engineers. A CD-Rom for children on the wood cycle has been produced. Centrum Hout gives free advice for half a day on technical problems related to wood, and with a small fee for additional time. A web-site exists in dutch only.

Specific environmental benefits of an increased use of wood, besides the impact on Climate Change, have been put forward such as the decrease of toxic metals in waters. The health benefits of wood products are too given prominence such as the fact that there are no toxic components, that wood is beneficial for asthmatic patients or people with respiratory diseases because it provides constant air moisture and adjusts smoothly to temperature fluctuations.

The Dutch building regulations will include in the coming years a compulsory environmental impact information for all types of buildings. This should include climate change impact information.

Centrum Hout activities are assessed every five years. The last assessment took place in 2000. Between 1990 and 1999 there was a 16% increase in the use of wood in the Netherlands. For 2003, Centrum Hout will focus on sustainable forest management with the development of certification for forests and products. Keurhout is the organisation responsible for assessing certification systems. A new initiative to encourage more wood building will be launched. This initiative is due to the limitation of sand and gravel national supplies for environmental reasons in order to protect extracting areas. As a consequence, the amount of new buildings in concrete will have to be reduced, and wood building offers a solution to the shortage.

### Annex 3

#### **Spain : “CO<sup>2</sup> sink capacity of eucalyptus plantations in northern Spain and CO<sup>2</sup> storage in harvested wood products”**

*by Professor Juan PICOS MARTIN, University of Vigo, Spain*

The study describes an interesting example of a plantation with a positive environmental impact because of its Climate Change mitigation effect, a positive impact on industry and business by providing raw material for the manufacture of products, and a positive impact on employment as well.

The study concerns specific eucalyptus plantations in the region of Galicia in Spain geared towards industrial supply, mostly pulp for papermaking (55%), MDF panels (36%), but too veneer and plywood and specific uses such as rafts for mytiliculture due to the sea water resistance properties of eucalyptus wood. The use of eucalyptus for wood panels and sawn goods is growing. Two-third of wood residues are used as energy source. The harvesting rate in this type of plantation is high : 50% of eucalyptus grown in Galicia. Less than 15% of increment is harvested each year. Eucalyptus represent about 5% of forests in Spain, corresponding though to 23% of total wood harvested in Spain per year.

Forest cover in Galicia has significantly increased due to this eucalyptus afforestation on former agricultural and shrub land, from 4% in the 18<sup>th</sup> century to 15% nowadays.

Most plantations are small (below 5ha), with about 5% of really large plantations.

The main conclusion of the study is that growing forests as well as harvesting forests can be beneficial to mitigate Climate Change, due to the carbon storing property of the tree and the ensuing wood products. Afforestation and reforestation activities, along with harvesting activities can be done simultaneously and contribute to the reduction of CO<sup>2</sup> in the atmosphere, thereby mitigating Climate change. Rotations go from 12 to 30-35 years, and could be shortened. The “eucalyptus globulus” species is predominant in plantations (87%). The Galicia eucalyptus plantations are certified under the Pan European Forest Certification system.

The Climate Change benefits of eucalyptus plantations are interesting. The Vigo plantations which were examined in the framework of the study offer an example of a “carbon strategy” through planting, wood harvesting and manufacture of wood products. Under the Kyoto Protocol, the eucalyptus wood harvested from 1990 and after could be eligible for carbon credits if a carbon sink effect can be verified, in compliance with Art. 3.3 and Art. 3.4 of the Protocol. In order to calculate those CO<sup>2</sup> sinks, the CO<sup>2</sup> Fix model developed under the CASFOR Project was chosen. The CO<sup>2</sup> Fix model includes the forests and the ensuing wood products. Although the carbon molecule is not a permanent one, the study demonstrates that a permanent sink effect is possible with this type of eucalyptus plantation, taking into account the standing forest, the harvested wood and the multiple products manufactured. Re-use and recycling of wood products add a further 6% to the overall carbon sink effect from tree to product.

## Annex 4

### **Italy and Austria : « Promo\_legno »**

*by Mrs. Renate KREITNER*

Started in 2002, Promo\_legno is a joint initiative of the organisations “**proHolz Austria**” on the one hand, and **AssoLegno, Fedecomlegno, Federlegno-Arredo** and **Agelegno** in Italy. The reason for this cooperation lies in the complementarity of both countries : Austria is an important roundwood producer, while Italy still has a very low wood consumption compared to other EU countries. The absence of wood science curricula in Italian Universities made it necessary to set up an organization to inform. Besides, Italy is an earthquake-prone area where wood can offer safe building solutions.

The main objectives of Promo\_legno are to promote the use of wood in Italy, whatever the country where the wood originates, or the location of the producing companies, and, on the other hand, to disseminate information about wood, its uses and properties.

The target is an increase in wood consumption in Italy from 0.11 m<sup>3</sup> per capita now to 0.18 m<sup>3</sup> per capita by 2010. By comparison, present wood consumption in Finland is 0.76 m<sup>3</sup> per capita, 0.60 m<sup>3</sup> in Austria, 0.46 m<sup>3</sup> in Sweden, 0.20 m<sup>3</sup> in Germany. The initiative has five components : the consumer use of wood products, the sustainability of forests from which the wood originates, the multiple uses and flexibility of wood as material, the aesthetic and physical properties of wood, the cooperation between Austria and Italy for exchange of know-how and experience.

The activities of Promo\_legno are directed towards building professionals and students, and Italian consumers.

Activities for building professionals (contractors, architects, engineers, et al.) entail the dissemination of technical information via an annual Promo\_legno Conference, specific technical conferences held by the woodworking companies, four technical manual (wood beams and uprights, panels, wood roofing, large wooden structures), a web site for consumers and a separate web site for professionals which offers a common platform and a network for professionals, PR activities, fairs exhibitions. The cooperation with research institutes, universities and technical schools in Italy and Austria is given special emphasis with exchange of know-how with other EU universities through a common Technical Council. A Master degree in lumber engineering and economy has been created in various universities. Woodworking companies in Austria and Italy grant internships to students. A competition for architects : “il premio legno” rewards the best wooden buildings every year to help foster innovations in wood technology and architecture. “La Piazzetta Promo\_Legno” offers a market place for Italian and Austrian companies, associations, interest groups . Activities targeting consumers include advertising, PR activities and a promotional “image” campaign.

Promo\_legno can already be credited with positive results as regards the wood consumption per capita in Italy. In less than two years, wood consumption has increased by 0,03 m<sup>3</sup>.

## **Annex 5**

### **Sweden : « Swedish Wood Association »**

*by Mrs. Gunilla BEYER and Mr. Mikael WESTIN*

The Swedish Wood Association was founded in 2000 through the merging of three organisations with unique fields of expertise. As of May 2003, it joined the Swedish Forest Industries Federation as the woodworking section "Swedish Wood". This merger is intended to increase further its role. The Swedish Wood Association was created to increase market opportunities for the Swedish mechanical wood processing industry. The overall objective of the association is to make wood a leading and highly competitive material in today's building and interior design sectors.

Sweden is the second wood producer in the EU, after Finland, with a total timber stock of over 3 billion m<sup>3</sup> (including bark), an annual growth of 105 million m<sup>3</sup> and an annual felling of 75 million m<sup>3</sup>. The increase of timber stocks has been steady since 1930 when the stock reached about 1.9 billion m<sup>3</sup>.

The action of the association is implemented by the participating companies and the unions. A national wood building programme has been set up for the 5 coming years (2003-2008) to encourage more public buildings in wood, such as airports, bridges, concert halls. The programme is aimed at increasing the domestic use of wood in Sweden and at increasing the export of wood. "Building systems" based on wood are being elaborated so as to facilitate wood building.

An environmental declaration has been done, together with "Wood Focus" in Finland, and the Norwegian Sawmill Industries Association which commits all concerned to the reduction of greenhouse gases, sustainable forestry, the use of renewable sources for the making of wood products, energy efficiency and environmental research and development.



**Advisory Committee for Forestry and Forest-based industries  
WORKING GROUP “CLIMATE CHANGE/FOREST PRODUCTS”  
13 October 2003  
15, rue de la Science, Brussels  
Room 00/31**

**SESSION V  
SUMMARY REPORT<sup>5</sup>**

- **Initiatives in the EU Member States for measures and activities to increase the role of forest products for the mitigation of Climate Change :**
  - **The Nordic Timber Council,**
  - **Denmark,**
  - **Finland,**
  - **Belgium**
  
- **EU Research : Action Cost E2**

**Initiatives in the EU Member States for measures and activities to increase the role of forest products for the mitigation of Climate Change**

**1/ Objectives**

All initiatives that were presented have as their main objective the promotion of wood and wood products to increase their market share and to inform about their specific environmental and health benefits, in particular the mitigation effect on Climate Change.

The strategic objectives are :

- promotion of generic wood, regardless of its origin, since 2001, under the impulsion of the Nordic Timber Council.
- increasing wood consumption
- improving perception of wood through better knowledge of its properties
- creating a “wood culture” for interior/exterior design and building : “living and building with wood”
- 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

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<sup>5</sup> Please note that Session V continues Session IV, therefore respective summaries have some common content.

## **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 climate change issue constitutes an asset for the wood products because wood has specific carbon storing properties that reduce CO<sup>2</sup> in the atmosphere and thus mitigate Climate change and its damaging effects on the environment and the economy.

Climate change, its mitigation, is a target with quantitative reductions as spelled out in the Kyoto Protocol and in the so-called “Burden-sharing agreement” of the EU which provides for quantitative greenhouse gases reductions or increases for each MS in order to reach the overall EU reduction of 8% of emissions by 2010 compared to 1990 emissions.

Climate change constitutes now a market with the setting up of the EU emissions trading scheme for industrial undertakings. The decision to include forest sinks taken in Marrakesh 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<sup>2</sup> in the atmosphere. CO<sup>2</sup> 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 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. This is summed up in the slogan : “building with wood/living with wood”. Specific uses in civil engineering works such as bridges, earth-retaining structures for example would increase significantly too the “substitution effect”.

## **3/ Structure**

In most cases, the 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*” launched in 2000 in France involves ADEME (Environment and Energy Agency), French Government Officials and Professionals from 8 Ministries and 9 sectoral Federations, together with the Agence de l’Environnement et de la Maîtrise de l’énergie.
- “*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 Houf*”, 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.
- 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 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.

#### **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 categories 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.

## **5/ Activities**

Activities can be classified in four main categories :

- Political lobbying activities. 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. The lobbying is done at national level, but even more at EU level with the Members of the European Parliament, and with the services of the European Commission. It ensures proper information of government representatives and decision-makers at national and EU level in order to achieve sound legislative decisions when it comes to national law or EU directives and regulations. 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.
- 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, specific handbooks and manuals, documentation centres, specific web-sites and portals, workshops.

In most organisations, activities are assessed at regular intervals by third parties. This assessment allows to measure significant changes in wood consumption patterns and quantities and to modify accordingly the different activities in order to progress. 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 increase consumption on a permanent basis.

## **6/ Legal and economic measures**

### Building regulations

Legislation on buildings can be used as an incentive to increase 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.

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 too amended its building codes to allow six-storey wood buildings.

Under its pan-european project “Building Europe”, the Nordic Timber Council is preparing a common European knowledge base on wood building in preparation for the Eurocodes 2008<sup>6</sup>. It supports too the ongoing EC5 project of harmonised European design standards.

### Fire regulations

Fire regulations in buildings vary according to the material concerned, and from one EU country to another. Generally, regulations are stricter and more costly to enforce for wood buildings. For instance,

### Certification of wood products

This is seen as more and more necessary by all the organisations in order to increase the market share of wood products and to inform the consumers via adequate labelling. Certification of the forest is necessary prior to the certification of wood products, followed by the labelling of products. However, certification is costly and difficult for most SME’s which predominate in the woodworking sector.

### 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). The Commission is studying the legal implications of such clauses for the Internal market, and in the WTO context.

### Subsidies/Fiscal incentives

Subsidies for the use of wood as fuel already exist in some countries. Subsidies and/or fiscal incentives for the use of wood as material are being considered. For instance, as

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<sup>6</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

more energy-efficient due to good insulating properties, wood products in construction could benefit.

### **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.

### **8/ Wood for food : packaging, conditioning, transport, retail/restaurant/kitchen**

As of late, there is focus on specific qualities of wood as regards its use in contact with food. Wood can be used for packaging and conditioning food (e.g.: tea boxes, wine barrels). 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) to prepare or display the victuals. In private kitchens as well as restaurant kitchens, wood is too a good material for preparing meals. In shops, restaurants and kitchens, wood is a healthy material for interior fittings, cabinets and cupboards.

- **EU Research : Action Cost E21**

Cost is a process hosted by the EU in order to provide better international cooperation in scientific and technical research. It gives impulsion to the EU scientific community, organises the cooperation, monitor and assess the actions and their results. Countries choose to join Cost on a voluntary basis by signing a memorandum of understanding. Today, 32 countries participate, including the 15 Member States of the EU.

COST E21 puts the emphasis on the quantification of carbon storage in the forest ecosystems and on the understanding of linkages between human activities and climate change, particularly the role of forests and forestry. The COST Action E21 will integrate natural, socio-economic as well as methodological aspects of cross-sectoral issues relevant for reporting and decision-making at the EU level. See below details in Annex.

## Annex 1

### **Pan-European projects : The “Nordic Timber Council” and the Pan-European projects in cooperation with European timber councils** *by Mr. Jan Söderlind and Mrs. Gunila Beyer*

The Nordic Timber Council AB is a joint wood promotion organisation funded by the wood products industries in Finland, Norway and Sweden. The Nordic Timber Council has a strategy of generic promotion of wood, based on environmental properties and sustainable forest management.

The “Nordic Timber Council” is a joint wood promotion organisation funded by the wood products industries in Finland, Norway and Sweden. The objective of Nordic Timber Council is to increase the consumption of wood in Europe to 0,25 m<sup>3</sup> /capita by the year 2010. It has focussed its efforts on the European market, although of late projects have been started in Japan and China in order to expand on new markets. Co-operation for wood promotion with other European countries, and at a global EU level has become the priority since 2001. Up to 2001 the NTC promoted exclusively wood originating in Norway, Sweden and Finland, getting only “a slice of the pie”. In 2001, however, a new strategy was decided in order to promote generic wood, regardless of its origin, “not just a slice of the pie, but the whole pie”. This fundamental shift allowed to set up a common platform with the network of European timber councils, with the basic objective of increasing domestic consumption of wood and foreign consumption (exports). The promotion of generic wood is also an incentive for bilateral projects with other EU countries, with non-EU countries in Asia, as well as pan-European projects gathering more than 10 EU countries around a common strategy. A general web site for the NTC is available at [www.ntc.com](http://www.ntc.com).

#### Bilateral EU projects

In the UK, the “Wood.for good” campaign managed by Wood for Good Ltd is running for its third year in the UK (see Summary of Session IV for details).

In France, the Nordic Timber Council in close co-operation with the French sister organisation “Centre National du Bois-CNDB are starting a campaign on wood promotion and information in 2004. The campaign will highlights three basic themes : “living with wood”, “building with wood”, “transporting, packaging with wood”.

#### “New Markets” project : Japan and China

The Nordic Timber Council has been active in China and Japan since 1993 and is presently gathering cooperation partners among the European National timber councils. Back in 2001, at the time of the Swedish EU presidency, the Japanese authorities expressed interest for the “New Markets” project and willingness to negotiate, but on the condition that “Europeans can speak with one voice”.

An “Asia Wood Day” was held in Stockholm (28.08/03) and Helsinki (12/09/03), in particular to analyze and clarify the new japanese building standards (in particular the compulsory performance evaluation of formaldehyde-emitting building materials), and the JAS certification.

A European Wood Day will be held in Tokyo, Japan in spring 2004, demonstrating European cooperation in Asia.

In Japan, the situation for wood consumption is fairly good with already substantial quantities of wood in building. The “New markets” project in Japan will therefore support this situation, and introduce extended uses of softwood, developing new segments such as windows, doors and interiors. Spectacular building and interior projects will be realised. A forum to foster meetings between wood producers, Japanese traders and Japanese end-users will be created.

In China, the Nordic Timber Council has been following and influencing the new “wood construction standard”, implemented since 1 May 2003. For example, European spruce and pine are listed as “recommended species” in the standard. This standard is presently only for single-family homes. The NTC is lobbying for a “wood construction standard in the multi-storey construction sector, where bricklaying for inner walls and exterior infills can be changed for wood stud walls, wood partitions, and where weatherproof wood-trussed roofs and wood floors can be added. The main challenge for wood construction is the lack of proper wood distributors for the construction sector in China.

#### Pan European projects

Pan-european projects are being launched in partnership with the network of European Timber Councils. There are three main projects : the “*environmental communication*”, “*building Europe*”, “*Wood and food*”. A web site ([www.ntc.com](http://www.ntc.com)), a “European wood magazine” and a reference “Book of arguments” which inventories positive claims on wood and their scientific demonstration, allow interaction and communication.

The “*Environmental Communication*” is a strategic platform for communication on wood and its environmental performance to be used by national timber councils. The communication delineates five areas : climate change, sustainable development, enhanced use of wood, development of building systems, research and innovation.

There is an Advisory Board, an internal web-site and a data-base. The key messages on wood and wood products are being elaborated and validated with technical and scientific data in order to become valid claims and arguments. Ultimately a “book of arguments” will be constituted as a useful reference for all wood promotion actions.

“*Building Europe*”’s objective is to make wood products the leading solution for builders in Europe. Besides, it is a project designed to support harmonised EU design standards and prepare for Eurocode 2008. A “toolbox” for EU specifiers is being elaborated in order to offer technical solutions to architects and builders when using wood frames and components. The “European wood magazine”, launched in November 2003, is intended for architects and builders as well.

The “*Wood and Food*” project aims at regaining the market share of wood material in the food industry for utensils, pallets, packaging and interior design.

Wood has traditionally been used for centuries in preparation and for packaging, storage and transportation of food. But since wood is an absorbent and porous material, the hygienic properties of wood are disputed and its market share has been eroding in favour of other materials such as plastics and steel.



Results from recent R&D projects and studies show however that wood has good hygienic properties, and in some cases better, than other materials. Studies on bacteriology and wood in comparison to plastic and other materials (Dr. Steinkamp) have been made. Good manufacturing quality, good handling practise and proper sanitation treatments surely make wood a suitable material for most applications in the food industries.

Industry is calling for a review of the existing guidelines and regulations for the use of wood in the food industry.

A specific web site has been created [www.wood-food.com](http://www.wood-food.com) offering information such as facts and figures about pallets and packaging, leaflets for consumers, industries and legislators and environmental aspects, the use of pallets, packaging and containers in the food industry.

A data bank with the latest news and the most recent results from research- and development on the hygienic properties of wood can be consulted on the web site, together with reports, references and summaries from seminars and articles concerning wood in the food industry.

## **Annex 2**

### **Denmark**

#### **The Danish Timber Information Council (TOP-Træbranchens Oplysningsråd)**

*by Bjarne-Lund Johansen, Director*

The Danish Timber Council (“Top”) gathers 1200 members from the woodworking industries for the promotion of wood and wood products. Staff numbers seven people, annual turnover is one million € The organisation has a web site in danish : [www.top.dk](http://www.top.dk).

In the last decade, the situation in Denmark as regards wood supply has drastically changed due to delocalisation of sawmills in Eastern Europe. Fellings in Denmark have been dwindling because of too high cost and low quality of local wood. Today local harvested wood is used for energy production mainly. This situation is to some extent similar to the one in the Netherlands. Only 2 softwood sawmills and 5 hardwood sawmills remaining today. Most wood (2 millions m<sup>3</sup>) is being imported from Germany, Sweden, Finland, Norway and some from non-EU countries. The emphasis therefore is on value-added end products, in particular in building, home design and furniture.

As regards the building sector, TOP has lobbied successfully for the amendment of national fire regulations in order to allow four floors buildings. This has been an incentive for more wood consumption. In Denmark, 150 companies nowadays build wood houses. In 1996, 3% of houses were built with wood, in 2004 there will be 15% of wooden houses.

Architects and builders are the main target of TOP information and communication strategy in order to make them aware of the performance of wood products (floors, partitions, roofs, joinery, windows, doors, etc...) and to teach them the technical methods and means to build with wood. As of late, TOP has launched a specific

initiative on wooden bathrooms (floors, panelling) that has met with a lot of success, contradicting common public assumptions on wood in wet areas.

A series of manuals are available on : timberframe houses, wood facings, wood bathrooms, glulam, wood trusses, wood panels. Final consumers can get DIY information. 25 print guides on DIY can now be viewed on the web site.

### **Annex 3**

#### **Finland**

#### **“Wood focus”**

*by Mr. Petri Heino*

The organisation started in 1987 as the “Finnish Timber Council”, with a political will from the beginning. Industry and trade first committed themselves, with the State authorities of Finland joining in 1991 with a commitment in R&D and education projects. In 2000, the “Finnish timber council” merged with “Finnish wood research Ltd” to become “Wood Focus, Finland”. The overall mission of the organisation is to increase the demand and consumption of wood and wood products by creating co-operation in lobbying, promotion and research. The organisation is national, but the emphasis is on activities with an EU reach. The ambition is to make wood , Europe’s leading material for building and for home&office interiors.

In 2003, activities carried out by Wood Focus represented 7.25 millions € of which 1/6<sup>th</sup> was financed by the State. Today, Ministries are active in the planning of activities and politicians commit themselves personally for the promotion of wood. 1996 was the national “Year for wood”, 1997-2000 was “Time for wood”, 2001-2005 has been named “Wood Europe”.

“Vision 2010” is a long term project whose ambition is to delineate a vision for the woodworking industries by outlining the most important factors to take into account, by drawing up a long-term strategy to achieve the vision goals, by committing all stakeholders in the private and public sector to this common vision, to influence funding bodies for the development of the woodworking industries. The achievement of Vision 2010 requires that resources are concentrated into two strategic areas : “building systems” solutions, and high quality homes and office furnishings.

In the building sector, efforts have been geared towards the creation of an “open wood building system” on the model of what exists in North America. This entails a method of construction where buildings can be designed and erected using industrial pre-fabricated components from different suppliers and manufacturers but compatible. The system itself is composed of “product systems”, information systems (product models for example, use of wood computer assisted design) and implementation systems delineating technical procedures. This “system building” allows substantial savings in time and money and is seen in Finland as key to the expansion of wood building. Large experimental projects were carried out to elaborate the system. The latest development is the elaboration of system solutions and design principles for large wood components such as walls, floors and roofs. The software “Wood cad-pro” offers more data-based automation for architects and designers. Sound insulation and anti-seismic design of wood structures based on Eurocode 8 are two recent developments as well.

In order to promote wood building, Wood focus has been lobbying for new fire regulations. Presently, the Finnish fire regulations are more stringent for wood buildings

than for non-wood buildings (cement, steel, glass). For example, sprinklers are mandatory in wood buildings only.

The specific qualities of wood for healthy living and better indoor climate (stable moisture level), for a better quality of life and affordable housing are being advocated.

Promotion activities include guides and manuals, education, advertising, fairs, competitions and awards, TV and radio programmes, research projects, building projects, study tours, an internet web site with an english section ([www.woodfocus.fi](http://www.woodfocus.fi)) where all information is available for free. The role of politicians for the promotion of wood and wood products is an original aspect of Wood focus compared to other national initiatives.

Since 1980, wood consumption per capita in Finland has increased significantly from 0.60 m<sup>3</sup> to 1.00 m<sup>3</sup> per capita. As a comparison US consumption per capita is stable at 0.40 m<sup>3</sup>, and the EU average is stable too at 0.18 m<sup>3</sup> per capita.

#### **Annex 4**

##### **Belgium**

##### **“Centre Interfédéral d’Information du Bois”**

*by MM. De Mesel and Defays*

The Centre interfédéral d’information du bois was created in 1957. Nowadays, it gathers the “Société royale Forestière” (private forests), Fedemar (forest managers), Febelbois (wood, panels, furniture), the Sawmills Federation, the three Federations of Carpenters, Nacebo (importers and traders) and three unions. As of 1<sup>st</sup> January 2004, the organisation will be renamed the “Belgian Wood Forum”.

The objective is the promotion of wood and wood products, regardless of the wood origin. The target groups are architects and builders and final consumers. The organisation acts as an information source and resource, offering advice to professionals and private citizens. The qualities and performances of wood products are advertised and referenced, in particular 85 specific species are classified according to their suitability and resistance for various uses. The magazine for professionals “Le Courier du Bois” has a circulation of 30.000 copies. There is a technical publication : “Pratique Bois”. There is a telephone info line, and e-mail contact for queries, together with a web site ([www.fnn.be](http://www.fnn.be)) . A Scientific Council appointed by the Centre interfédéral checks all content produced and assists in its production.

The organisation supports the promotion of wood on a European scale. In particular, the Centre interfédéral participates to Timber FOT, the technical information database developed for the European Forest and Timber industry by nine European Timber Councils under the co-ordination of Eurofortech, Dublin, Ireland, whose aim is to promote the sale of timber in the building and construction market.

It participates too to the Innovawood web portal which aims to serve as a gateway to technical information and services for the forestry-wood sector. The development of this portal is supported by the European Commission, through the 5th Framework Quality of Life Programme and the Leonardo da Vinci programme.

Besides, the Centre interfédéral has joined the Nordic Timber Council and other national timber councils for the project “Building Europe” and the “European Magazine”.

## **Annex 5**

### **EU Research**

### **Action Cost E21**

*By Mr. Eric Laitat, Chairman*

Cost is a process hosted by the EU in order to provide better international cooperation in scientific and technical research.. Cost is not a funding mechanism. It gives impulsion to the EU scientific community, organises the cooperation, monitor and assess the actions and their results. Research itself is financed by the member country, but the costs of coordination between countries are shared. A researcher in a COST member country can propose an action. A Cost member country can also initiate an action. No research domain is prohibited, no specific priorities in a given domain exist. Countries choose to join Cost on a voluntary basis by signing a memorandum of understanding. Today, 32 countries participate, including the 15 Member States of the EU.

There are 12 research domains : agriculture/food/biotechnology, chemistry, health & medicine, materials, meteorology nanoscience, physics, social sciences, telecommunications, transport, urban civil engineering, environment, and Forests/Forestry products. The annual value of research funded by the 32 participating countries is estimated at 2.000 Mio €, with 40.000 scientists involved. COST is the most important platform for scientific cooperation in Europe.

There are 19 forest and forestry-related actions under COST, with more than 1900 scientists involved, an annual budget of about 61 Mio € per year. Cost is organised into technical committees-TC.

The COST Action E21 targets the quantification of carbon storage in the forest ecosystems and the understanding of linkages between human activities and climate change, particularly the role of forests and forestry. The COST Action E21 will integrate natural, socio-economic as well as methodological aspects of cross-sectoral issues relevant for reporting and decision-making at the EU level. It gathers 260 participants.

The main objective of Cost E21 is to bring together scientists to analyse and advance the contribution of forests and forestry to the mitigation of climate change effects. The action will address the complex issue of carbon accounting with the objective of contributing to the development of a common carbon accounting strategy for European forests within the framework of the Kyoto protocol. The Action will further seek to define and quantify the influence of forest management on the carbon balance of forests. In particular, it will assess the impacts of climate change, land use changes, forest cover changes, forest management and disturbances impacts on actual changes in carbon pools between 1990 and 2008-2012.

The “forestry” section headed by Mr. Y. Birot is split into two working groups. WG1 is making the inventory of carbon pools and evaluating the variations of those carbon pools. WG2 is defining and quantifying the role of forest management for CO<sup>2</sup> mitigation at stand level, land level and national level.

The forest and forestry products technical committee (TC FFP) supervises the work of three sections : “pulp and paper” headed by Mr. J.E. Levlin, “wood technology” headed by Mr. H. Resch, and “forestry” headed by Mr. Y. Birot. A clearing house is in charge of searching, editing and distributing key documents and literature related to Action E21.

It is worth mentioning cross-sectoral Cost actions of relevance to forestry :

E9 : “life-cycle assessment of forestry and forestry products” (1997-2001)

E10 : “wood properties for industrial use” (1997-2001)

E20 : “wood fibre cell wall structure” (1999-2003)

COST is a valuable initiative for fostering international cooperation and networking among researchers, giving more exposure to research. However, the coordination of the different actions could be improved, supporting studies should be developed and results should be more largely published. Information and documents are available on the web site : <http://www.bib.fsagx.ac.be/COSTE21>

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