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**COMMISSION STAFF WORKING DOCUMENT**

**A BLUEPRINT FOR THE EU FOREST-BASED INDUSTRIES**  
(woodworking, furniture, pulp & paper manufacturing and converting, printing)

*Accompanying the document*

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN  
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL  
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**A new EU Forest Strategy: for forests and the forest-based sector**

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## **I. Introduction**

The EU Forest-based Industries - EU F-BI<sup>1</sup> - are taken to include: the woodworking industries; the furniture industry; the pulp & paper manufacturing and converting industries, and the printing industry. Together, they represent about 7% of EU manufacturing GDP and nearly 3.5 million jobs. The EU F-BI thus form an important part of the EU's manufacturing industry and their growth can help achieve the goals of the EU's Industrial Policy<sup>2</sup>, including the aspirational goal of raising manufacturing industries' contribution to EU GDP from 15.3% (2012) to 20%, i.e. the "reindustrialisation" of Europe.

Through their value chains (see below), the EU F-BI extend upstream into a sustainable and increasing EU forest resource, which must be healthy and resilient to provide a stable foundation for wood growth and other functions. Downstream, they link into an array of industrial and consumer applications for their products. Their main raw material, wood, is a natural and renewable raw material which is re-usable and recyclable, thus having enormous potential to contribute positively to the EU's 2050 goals, such as to provide a high standard of living from lower levels of energy and resource consumption, so long as it comes from sustainable forest management. Around 90% of the initial wood raw material input to the EU F-BI comes from EU forest, all of which are subject to member-state law requiring sustainable forest management. Of the remainder, most comes from Russia and other neighbouring countries, as well as N. America and very small amounts of tropical woods. The last two sources provide mostly hardwoods.

However, EU-grown wood is becoming increasingly sought after through growing competition, already from bio-energy and in the future from the emerging bio-based industries. Although wood prices fluctuate, any increases further squeeze thin margins which cannot be compensated elsewhere. For example, the F-BI's other raw materials are often imported and hence prone to price volatility. Their bought-in process energy is more expensive and both their environmental and social standards are higher than those of most global competitors. Demand for "traditional" wood-based products, such as in construction and furniture, remains depressed; consumption of some paper grades and printed paper goods is declining in the face of electronic media and is only partially compensated by increases for other formats such as printing on plastics and textiles.

As a complement to the Commission Communication "A new EU Forest Strategy: for forests and the forest-based sector", this Staff Working Document (SWD) sets out descriptions of the EU F-BI's overall sectoral economic and technological outlooks, sub-sectoral profiles of its four component industries. It then identifies the set of major challenges facing them as a prelude to identifying a series of remedial activities to help address those challenges. It is thus

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<sup>1</sup> NACE Rev. 2, Divisions 16, 31, 17, 18.1. Relevant wood harvesting aspects (NACE Rev. 2, Group 2.2) are also covered in this Blueprint. NACE Rev. 2 Regulation is available on:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:393:0001:0039:EN:PDF>.

<sup>2</sup> Commission Communications: *A Stronger European Industry for Growth and Economic Recovery: Industrial Policy Communication Update* (COM(2012)582 of 10.10.2012) and *Integrated Industrial Policy for the Globalisation Era: Putting Competitiveness and Sustainability at Centre Stage* (COM(2010)614 of 28.10.2010).

a blueprint which seeks to address the sectoral issues in a comprehensive, multi-layer manner, in order to help improve the global competitiveness of the EU F-BI through: stimulating demand for existing and new, innovative products in both the EU and other markets; stimulating resource and energy efficiency in manufacturing processes and throughout the life cycle of products; encouraging the adding of value to products whilst cutting the costs of production and delivery to market. To underpin these initiatives, radical steps in innovation, research and development for processes and products are needed, together with education, training and skills development and their updating suitable for the move towards the 2050 economy.

### **EU Forest-based Industries: value chains structure**

The rationale for the EU forest-based industries (F-BI) is their direct or indirect foundation to a greater or lesser extent on a common raw material: wood, which is derived for the most part from sustainably managed EU forests. For example, the woodworking industries (sawmilling, wood-based panels manufacture; builders' carpentry & joinery; wooden packaging and other wooden articles) and pulp & paper manufacturing and converting, are clearly wood-based, even though the latter get over half their "wood" raw material in recycled form.

However, whilst much furniture contains wood, indeed it is that sector's biggest material use by volume, the furniture industry also uses many other materials and adds most of its value through using design to produce consumer goods. Similarly, the printing sector uses paper, a forest-based material, for printing books, leaflets, posters and other documents, but these form only a small part of its overall output which covers a range of materials and formats. However, for convenience and brevity, the term "forest-based industries", abbreviated to "F-BI", is retained here as a convenient shorthand to cover all these four sub-sectors. Based on these, four distinct but inter-linked F-BI value chains have been identified, so as to include the F-BI's emerging bio-economy component. These do not necessarily conform to the four sub-sectors identified above but rather show the linkages between them:

- wood & wooden<sup>3</sup> products: production of round & sawn wood, panels, other wooden products, including wood fuels; cork processing;
- furniture and furnishings of wood and other materials, their components and by-products;
- cellulose fibre<sup>4</sup> pulp, paper & paperboard manufacturing and converting; printing and paper-media publishing; precursors for textiles;
- wood bio-refineries, refining ligno-cellulose<sup>5</sup> into: transport bio-fuels; composite materials and chemical feed-stocks and products.

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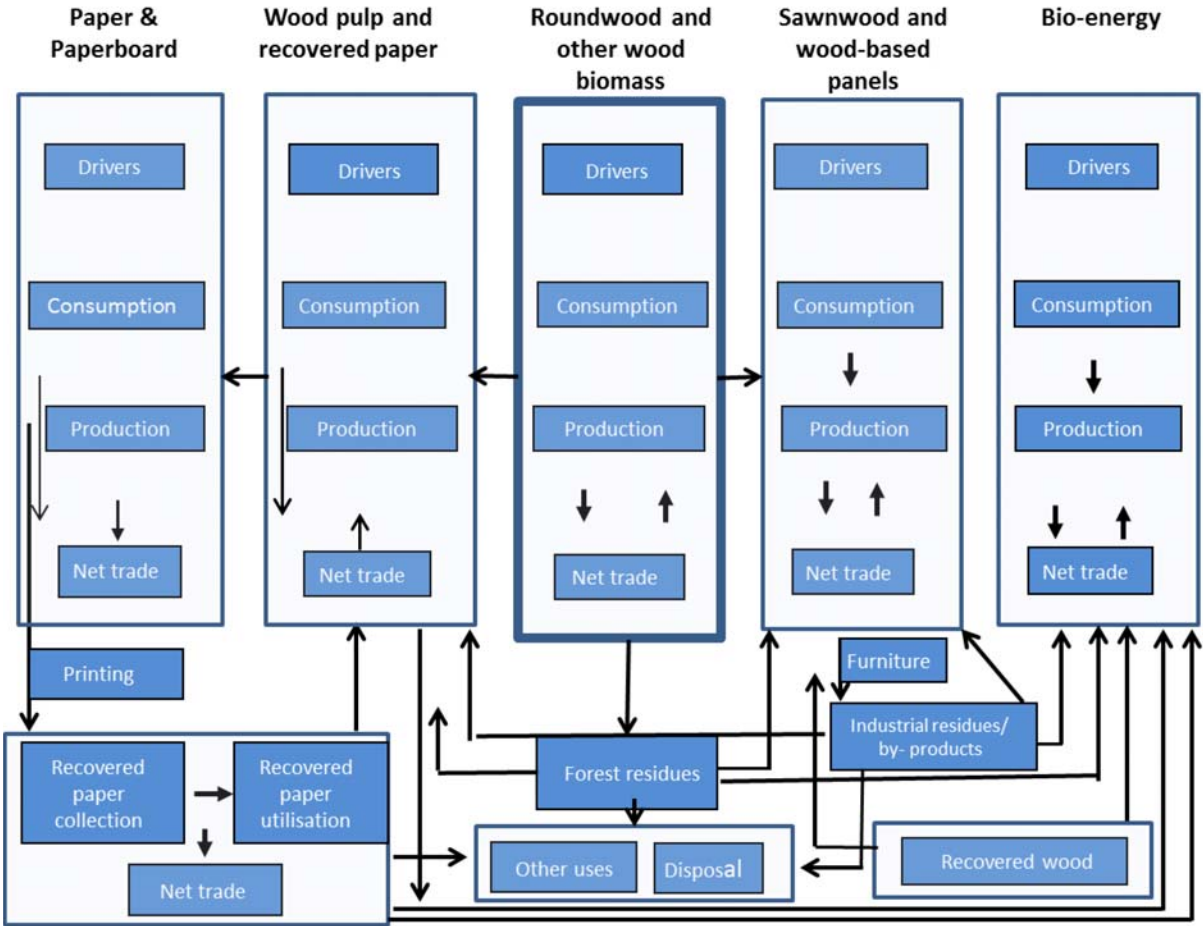
<sup>3</sup> Wood which is visually recognisable.

<sup>4</sup> Not visibly recognisable as wood but its cellulose not transformed.

<sup>5</sup> Transformed cellulose.

These value chains should not be seen either as entirely parallel to one another or in isolation from other economic sectors. Rather, they are inter-linked as a matrix of activities and material and value flows, as can be seen from the following diagram<sup>6</sup>.

**Figure 1: Wood raw-material flows within and between the EU F-BI sub-sectors (woodworking, furniture, pulp & paper, printing) and the bio-energy sector**



Source: Indufor study

<sup>6</sup> Indufor Oy (2013). *Wood Raw Material Supply and Demand for the EU Wood-processing Industries*. Study for DG Enterprise and Industry.

## II. Sectoral economic outlook

There are differences between and within the F-BI values chains as to company sizes, cost structures and productivity. Some of their features are indicated in the following table.

**Table 1: EU forest-based industries - key structural statistics, EU-27, monetary data in current basic prices, 2010-2011**

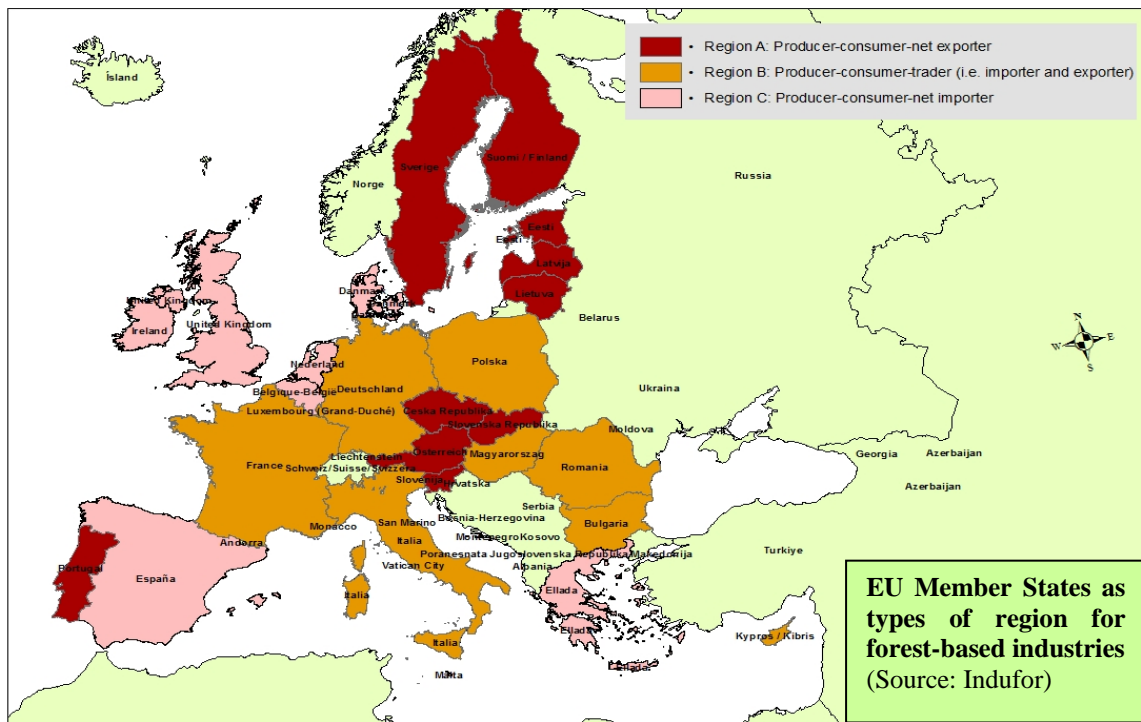
<b>F-BI sub-sector/ Parameter</b>	<b>Woodworking</b>	<b>Furniture</b>	<b>Pulp &amp; paper manufacturing &amp; converting</b>	<b>Printing</b>	<b>Total</b>
N° firms	184 000	130 000	21 000	120 000	455 000
N° jobs	1 093 000	<i>1 000 000</i>	647 500	<i>770 000</i>	<i>3 510 500</i>
Production value (M€)	115 702	92 000	168 000	85 535	461 237
Turnover (M€)	122 264	96 000	180 000	88 009	486 273
Added value (M€)	31 200	30 000	41 000	32 477	134 677

Source: Eurostat (sbs\_na\_ind\_r2), estimates (in *italics*) by DG Enterprise and Industry

Three of the four F-BI sub-sectors (woodworking, furniture and printing) are dominated by SMEs and moreover micro enterprises, having less than 10 employees each, with relatively few large firms and only a handful of very large and multinational companies. In contrast, the pulp and paper sub-sector is relatively concentrated with medium and large firms being the norm and quite a few very large and multinational firms. However, the larger firms are concentrated in pulp and paper manufacturing, whereas amongst the paper and board converting side, SMEs are more common.

There are also variations across the EU Member States as to both the absolute and the relative importance of the F-BI sub-sectors nationally, their consumption of F-BI products, and their export performance. Some are net exporters of wood-based goods, others net importers and yet others are both producers and traders, as shown by map below.

**Figure 2: Map of EU-27 Member States as types of region for forest-based industries**



These differences explain why the effects experienced from the downturn have been modulated across the MS and F-BI sub-sectors. However, the financial and economic crises have only amplified the decline of the F-BI's share of EU manufacturing and of its employment that could already be observed beforehand. For example, F-BI employment fell over the whole of the period 2000-2011 (See Table 2), around 26% overall, but varying between estimated 30% for furniture and 20% for woodworking, all far higher than the decline in the EU manufacturing average of 14%, while employment for the economy as a whole increased by 6%. Figure 3 depicts a drop-off in F-BI jobs over a whole decade, but reinforced since 2008 by the downturn.

**Table 2: Change in employment in the EU forest-based industries, 2000-2011**

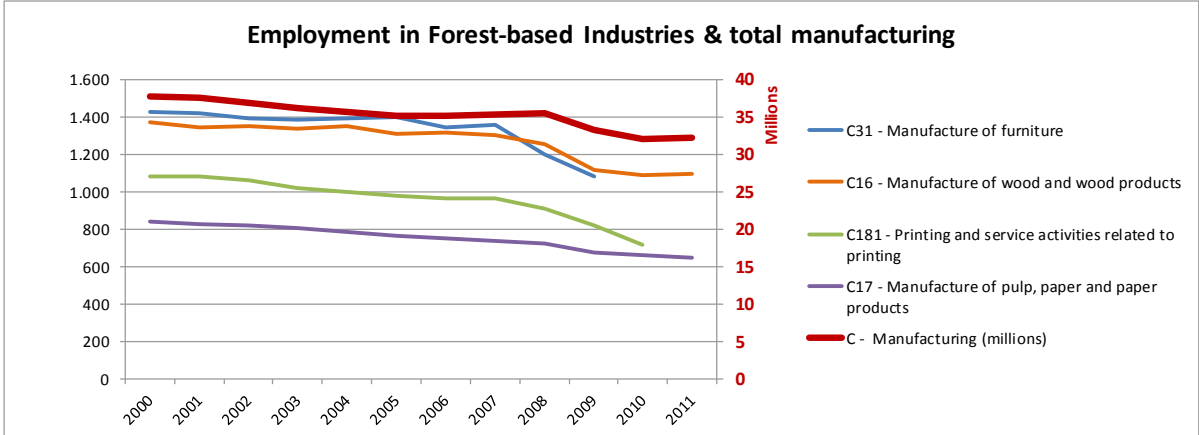
NACE activities	Change 2000-2011 (%)
TOTAL - All manufacturing activities	- 14%
C16 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	- 20%
C17 - Manufacture of paper and paper products	- 23%
C18 - Printing and reproduction of recorded media	- 29% (estimate)
C31-C32 - Manufacture of furniture; other manufacturing	- 30% (estimate)

Source: DG Enterprise and Industry on Eurostat (nama\_nace64\_e) (NB Printing strictu sensu is only C18.1)



Shown graphically, as in Figure 3, the trend of declining employment is even more evident and seems to be accelerating.

**Figure 3: Employment in the EU forest-based industries**



Source: Eurostat (nama\_nace64\_e, sbs\_na\_dade, sbs\_na\_dfdn, sbs\_na\_ind\_r2)

**Table 3: Change in number of F-BI firms by sub-sector, 2003-2010**

Sub-sector	Year	2003	2010	Change (%)
Woodworking		200 144	184 000	- 16 144 (-8%)
Furniture		149 772	130 000	- 19 772 (-13%)
Pulp & paper		19 516	21 000	+ 1 484 (+8%)
Printing		131 434	120 000	- 11 434 (-9%)
<b>Total</b>		<b>500 773</b>	<b>455 000</b>	<b>- 45 773 (-9%)</b>

Source: Eurostat

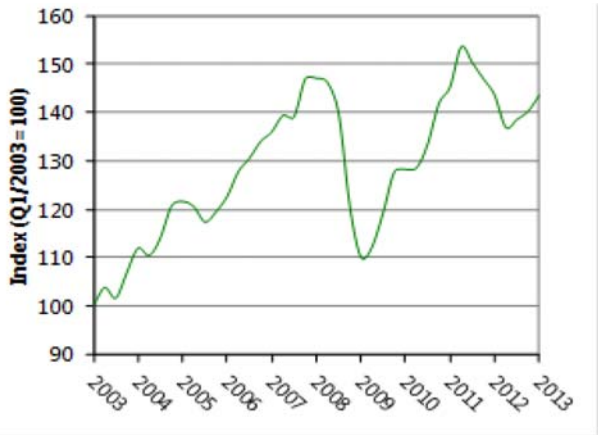
Despite a very small increase in the number of firms in the pulp and paper sub-sector, the overall F-BI trend since before the on-going economic and financial crises is negative, with over 9% of sectoral firms closing over eight years. Even more starkly, the F-BI share of overall EU GDP products has shrunk by about 30% over the last decade (Eurostat).

To overcome and reverse this downward trend, sustainable growth is needed, which must be brought about through increased competitiveness. This is a challenging prospect on both the supply and demand sides for the EU F-BI.

On the supply side, more wood from sustainably managed EU forests would seem to be available since only 60% or so of the annual growth is harvested. However, EU harvesting costs are very high on a global scale, so increased wood demand may be met more cheaply on the global market. When prices are driven up by increasing domestic demand from competing end uses, including from the expanding and often subsidised bio-energy sector, this can even be positive for some parts of the forest-based sector value chains, such as forest owners and F-

BI revenues from by-products, e.g. sawmills which sell wood chips and sawdust to the pulp, panel and pellet industries. However, overall, the wood raw material costs increase (Figures 4 and 5) and most of the F-BI, especially the pulp and wood-based panels’ manufacturers, cannot compensate either through by-products or sales prices.

**Figure 4: Global softwood sawlog price index, 2003-2013**



Source: UNECE FPAMR 2013

**Figure 5: Global wood fibre price indices, 1989-2013**

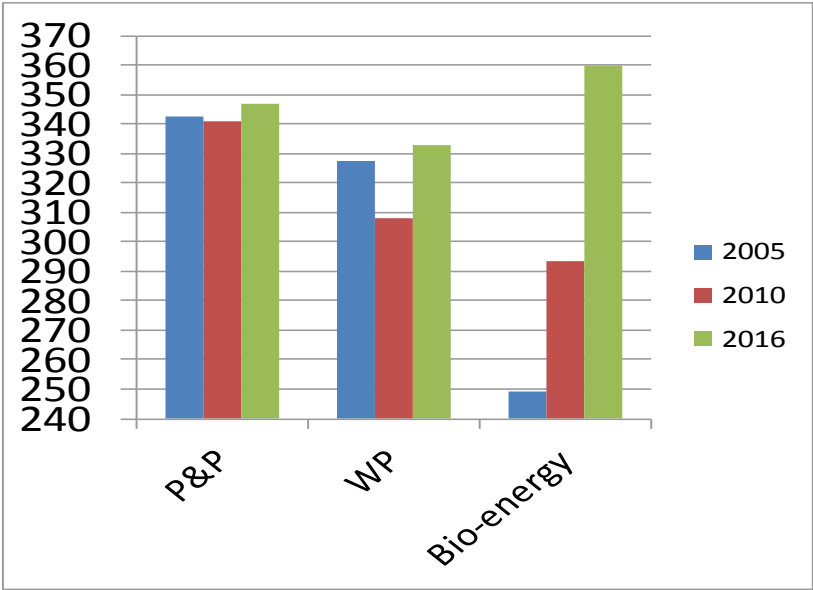


Source: UNECE FPAMR 2013

The following diagrams (Figures 6 & 7) project the competing demands for wood from the EU woodworking products (WP), pulp & paper (P&P) and bio-energy sectors. The second of these indicates that by 2016 (the Indufor study’s forecast horizon) the EU will face a shortfall from EU sources of 63 Mm<sup>3</sup> of RWE per annum in trying to meet the EU renewable energy targets, as shown by the NREAPs (National Renewable Energy Plans<sup>7</sup>). Thus, if significantly more EU wood can’t be mobilised, imports must fill the gap.

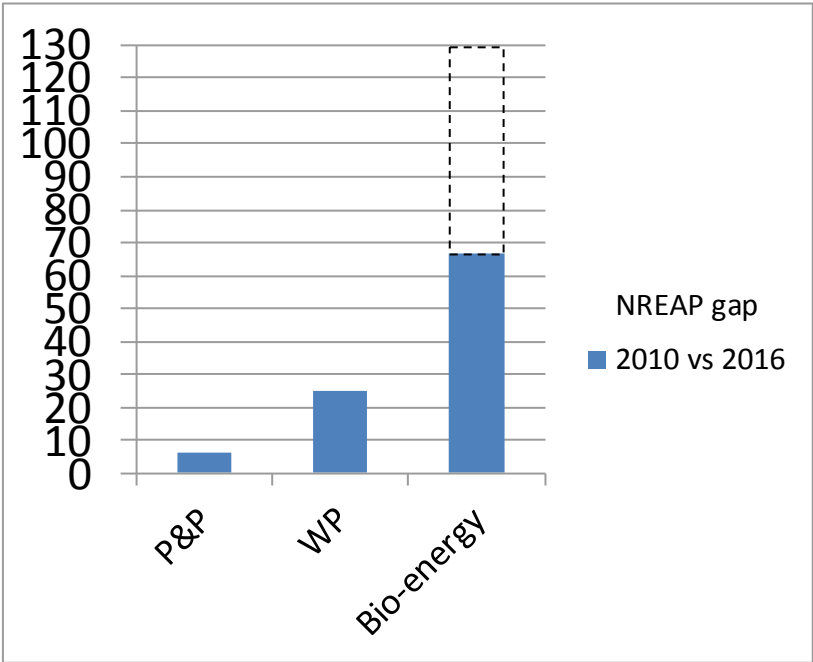
<sup>7</sup> Commission Decision of 30 June 2009 establishing a template for National Renewable Energy Action Plans under Directive 2009/28/EC of the European Parliament and of the Council (2009/548/EC).

**Figure 6: Total wood raw material uses in EU-27 Mm3 (RWE<sup>8</sup>)**



Source: Indufor study (NB for P&P and WP there is some double counting due to the “cascade” effect)

**Figure 7: Change in wood raw material use in EU-27 Mm3 (RWE)**



Source: Indufor study

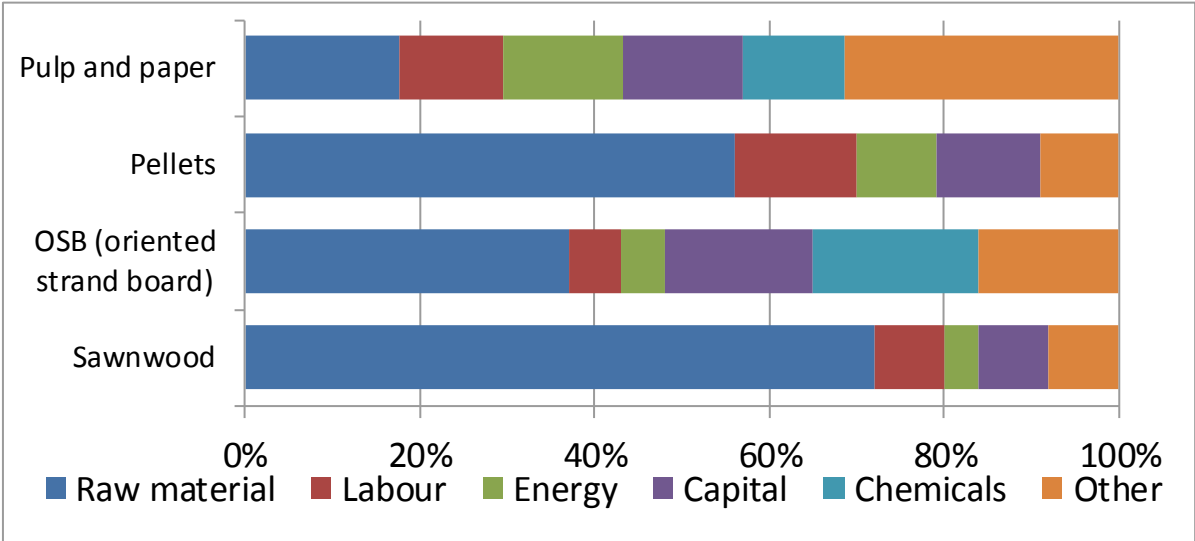
One source of such new imports will be fast-growing forest plantations in Latin America and Southeast Asia, which create a significant potential for increased and cheaper wood supply, especially for competitors of the EU in the pulp and paper sub-sector. Thus, to continue to

<sup>8</sup> RWE = roundwood equivalent, i.e. how much wood raw material is needed for a given quantity of product.

compete globally, even new investments in forests and pulp production by EU-based firms now tend to be in those regions. Meanwhile and in any case, wood cost remains a significant part of variable manufacturing costs for wood-based products, as shown by Figure 8.

At the same time, it should be noted that the existing small but significant supply stream of tropical wood to the EU, mostly hardwoods from developing countries, should not be directly affected by the increase in EU demand for wood biomass for energy and bio-based products, although those markets may offer opportunities for wood-exporting countries. Even now, the EU is a relatively big market for such countries and forest products often play a pivotal role in their economies. Therefore, vigilance is necessary to avoid the possibility of unintended consequences of EU policy changes, whether from renewable energy policies, the EU “Timber Regulation” (EU TR)<sup>9</sup> or other such initiatives. In this context, the EU FLEGT Action Plan<sup>10</sup>, including the EU TR and voluntary partnership agreements (VPAs) with wood-exporting countries, as well as other EU Development Policy measures seek to address issues of this type.

**Figure 8: Analysis of manufacturing costs between F-BI sub-sectors.**



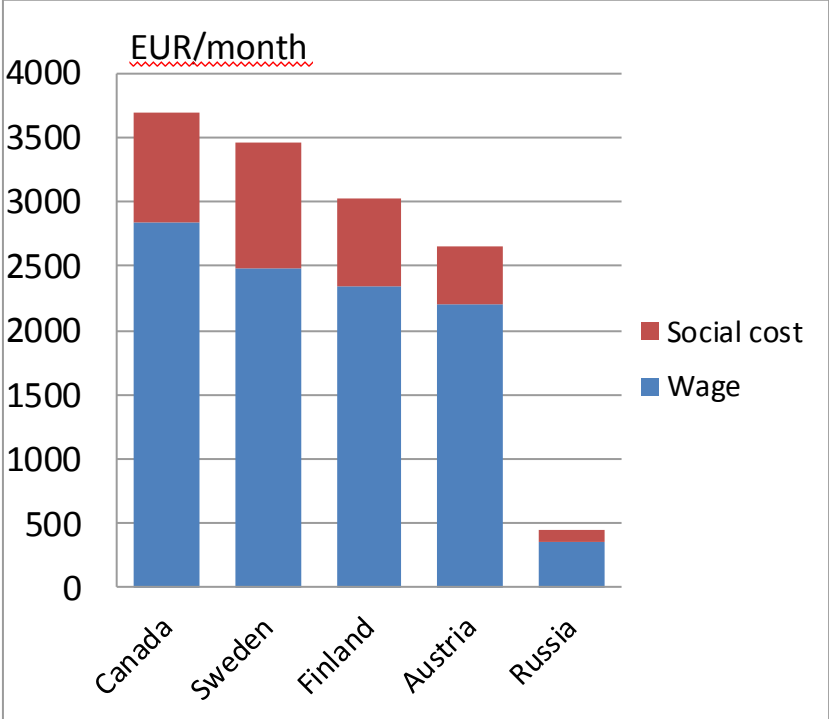
Source: Indufor study (NB “raw material” includes wood fibre and recovered paper)

<sup>9</sup> Regulation of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market (995/2010).

<sup>10</sup> Commission Communication: *Forest Law Enforcement, Governance and Trade (FLEGT): Proposal for an EU Action Plan* (COM(2003)251 of 21.5.2003).

After wood, labour costs are very significant for the EU F-BI, especially in the labour-intensive SMEs, as indicated by Figure 9, showing labour costs for sawn softwood.

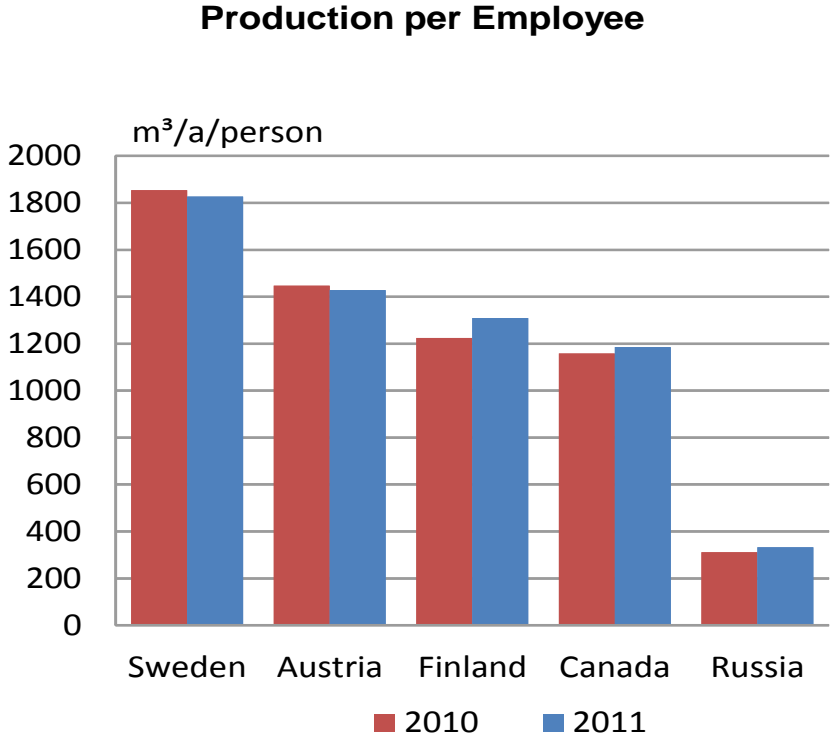
**Figure 9: Sawmilling labour cost (2011)**



Source: Indufor study

Up to now, the EU producers have been able to compensate high labour costs through high labour productivity. For example, the EU labour productivity (by volume) for sawn softwood is the highest in the world, as shown by Figure 10.

**Figure 10: Sawmilling sector – labour productivity**



Source: Indufor study

Figure 8 indicates that raw materials other than wood, of which the main ones are listed under “raw materials” in the challenges section below, also represent major cost components. Amongst these, energy is a significant cost item<sup>11</sup> for the F-BI, especially for paper and wood products such as pellets. Whilst bark and wood-processing residues can be used for heat process energy, e.g. for drying by the woodworking and pulp and paper sub-sectors, and by some furniture manufacturers, much energy has to be bought in as oil, gas and electricity. In the EU, these fuels are all expensive, especially in comparison with those in other global F-BI producers, such as Russia and the USA, which have significant energy resources, and China which subsidises energy to manufacturers.

The EU’s focus here must be on energy efficiency, as well as a wider use of bio-energy by the F-BI, both of which can alleviate the high price of bought-in energy to a certain extent. The effect of such energy efficiencies can be further enhanced when combined with resource efficiency, including for the use of expensive wood. Nevertheless, the energy price differential with competitors cannot be equalised and, in any case, both energy and resource efficiencies represent technological challenges for the EU F-BI.

<sup>11</sup> As indicated in Section V under “Coherence of EU legislation and costs arising”, a cumulative cost assessment (CCA) is envisaged, in line with the Commission’s Industrial Policy Communication (COM(2012)582).

### **III. Sectoral technological outlook**

The main technological challenges for the EU F-BI are:

- How to innovate and develop new products and services to meet rapidly changing societal needs, including up to 2020, 2030 and 2050?
- How to design and develop new production processes that use less wood, other raw materials and energy, while minimising waste, and are capable of manufacturing completely new groups of products?
- How to educate and update the knowledge and skills of the F-BI's researchers and workforces to be able to develop such products and implement such processes?
- How to produce wood more cost-effectively and sustainably from existing EU forests and other wooded land in qualities and assortments better matched to manufacturing needs?

#### **How to innovate and develop new products and services to meet rapidly changing societal needs including up to 2020, 2030 and 2050?**

The so-called bio-based economy (see below) is a vision of the future in which some of the existing products of our everyday life, many of which are currently derived from unsustainable fossil-based natural resources, would be replaced by those based on biomass feed-stocks, provided it is economic to do so. One of the major feed-stocks for this would be wood. Whilst this could on the one hand increase competition for wood raw material and help to increase its sustainable supply, it could on the other hand open the door to a whole new range of bio-based, wood-derived products for building, packaging, hygiene and health care, etc. Research in this area is thus essential, although attention should be paid to avoid a technology driven production of goods. One particularly promising area of research is nano-materials, i.e. those in which the structure of the wood or wood-derived material is modified at the microscopic level. These can have such diverse applications such as the versatile nano-pulp for making e.g. super-absorbent hygienic products and light-weight car parts, which can safely bio-degrade after use. Other potential products include intelligent packaging products. Currently, such products are expensive to make and not yet available at the level of a pilot plant. But breakthroughs must come through fundamental and applied research, investment and perseverance.

Moreover, significant benefits for the sector could come through innovations to current industrial processes (e.g. kraft process) aiming at improved energy efficiency and adding more value to the raw materials. Such innovations could provide, in parallel to the traditional outputs of the industry, new products that could be utilised by other industrial sectors, with creations of new "bio" value chains and higher value creation by the FB-I. The deployment of these new processes on the industrial scale could be easier as they could be integrated on existing production facilities, providing impact in the short term.

As regards second generation biofuels, economies of scale are bringing down costs.

**How to design and develop new production processes that use less wood, other raw materials and energy, while minimising waste, and are capable of manufacturing completely new groups of products?**

The development of very thin wood veneers and of light-weight paper grades, such as for packaging, are examples of doing more with less fresh wood fibre. Block-boards, laminated veneer lumber and small parquet are examples of upgrading small-dimension and/or low-quality woods to higher-grade uses. Engineered wood products<sup>12</sup>, such as structural I-section beams and “glu-lam” (glued-laminated) beams for flooring and roofing can use low-grade and small-dimensioned wood into highly performing structural products with predictable properties.

Integration of the “cascade principle”<sup>13</sup> into the use of raw materials such as wood not only helps store for longer, in the form of wood-based products, the carbon they have sequestered but can also provide more added value and jobs than can the direct use of wood or its residues for energy. At the end of the “cascade” sequence, the post-consumer recovery of both wood and paper help delay the energy use of wood even longer and also increase the overall supply of industrial wood fibre.

Notwithstanding the ideal application of the “cascade principle” for using wood, it should however be borne in mind that, according to economic and local circumstances, such as economic downturns or locations without viable alternative wood markets or energy supplies, changing demands or forest fire prevention, the use of wood for bio-energy may sometimes be the practical first or only option. Moreover, as part of a mix of outputs from woodworking plants, wood-based fuels (e.g. pellets) or excess process bio-energy (in the form of heat and/or electricity) derived from wood residues can be profitable outlets for the woodworking industries themselves, if sold to the market, including electricity to the public grid. In this context, pulp mills and even some of the larger sawmills and panel mills may even be able to run as some of the “wood-based bio-refineries” and produce transport bio-fuels amongst their products.

Wood fibres can be used and recycled in the F-BI in the most optimal way for the highest possible added value. For example, in the pulp and paper manufacturing industries, 1 m<sup>3</sup> of wood raw material can create products having a total wood-equivalent volume of up to 2.38 m<sup>3</sup> and a job multiplication factor of five vis-à-vis using wood directly for bio-energy. This ratio rises to 7:1 if the upstream and downstream value chain activities are included (Source:

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<sup>12</sup> EWP: customised wood-based materials & components, having designed, uniform and predictable properties.

<sup>13</sup> According to “cascade principle”, wood resources are used in the following order of priority: production and use of wood-based products; post-consumer recovery (collection); re-use of products; recycling into other wood-based products; use as bio-energy source, based on e.g. affordability, adding value & maintaining and/or creating jobs (DG Enterprise and Industry definition: also check Indufor study).



Pöyry<sup>14</sup> for CEPI). As regards added value, pulp and paper making can double the value generated by bio-energy and, together with their ancillary activities, the ratio can be up to five times overall. These figures should increase with future technological advances.

Using less wood or wood fibre to make a given product and/or deriving it from residues or recovered material, contribute to resource and energy efficiency. In using recovered paper fibre in making recycled paper, less fresh wood and energy are used per unit of production. The reliance on bought-in energy has been also reduced in the F-BI (e.g. woodworking, furniture and pulp & paper) by using generating and consuming bio-energy from biomass, thus increasing their energy self-sufficiency. Furthermore, when the production process itself is rationalised, overall energy use can be further reduced. When both the product itself can be redesigned to use less material and its production process can be further optimised, significant material and energy efficiencies can be achieved. If on top of these achievements the product has a higher added value, its overall competitiveness can be upgraded.

Fundamentally redesigning existing F-BI products and processes may offer significant scope for resource and energy saving, whilst the thermal properties of wood as a building and insulating material can help reduce the energy consumed in heating our buildings and make homes and offices of the future net energy generators.

### **How to educate and update the knowledge and skills of the F-BI's researchers and workforces to be able to develop such products and implement such processes?**

The increased use of technology in conceiving, designing, developing and manufacturing both “traditional” and bio-based innovative F-BI products, as well as the ICT incorporated into process control, increasingly calls for highly trained and skilled F-BI researchers and production work-forces. Whilst “low-tech” traditional skills, e.g. for furniture making, can be passed on to a new generation of workers and technicians by word of mouth, demonstration, experience and supervision, new processes, products and markets call for high levels of academic qualifications, laboratory and workshop techniques and industrial awareness. Retraining is also essential to update existing knowledge and skills or replace them with new ones. Thus, appropriate course development, to be applied through life-long learning will be increasingly important, whether on the job or on-line. Investments in new types of knowledge and skills are also needed in order to seize the opportunities created by changing market and consumer demands, including to manage the shift to new business models. An example of good practice in this area is provided by the printing sector, which has developed a methodology for planning and executing socially responsible restructuring which it is currently implementing with the full support of the sector's social partners.<sup>15</sup>

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<sup>14</sup> Pöyry (2012). *Employment and value added: a comparison between the European pulp & paper sector and the bio-energy sector*.

<sup>15</sup> Intergraf website: [http://www.intergraf.eu/index.php?option=com\\_k2&view=item&id=103:the-future-of-the-european-print-industry-in-our-own-hands&Itemid=208](http://www.intergraf.eu/index.php?option=com_k2&view=item&id=103:the-future-of-the-european-print-industry-in-our-own-hands&Itemid=208)

## **How to produce wood more cost-effectively and sustainably from existing EU forests and other wooded land in qualities and assortments better matched to manufacturing needs?**

The steady but slowing expansion of EU forests and their accumulating wooden growing stock does not guarantee an automatic increase in usable wood supply to the EU F-BI. The problems of the so-called “fragmented forests”, i.e. those in small ownerships, with sometimes unidentifiable owners and a lack of integration into F-BI value chains, are particularly difficult to resolve without the co-ordinated sharing of good practices evolved through applied experience. An increasing problem in this context is that the share of wood-based revenues in the total income of forest owners in many MS is decreasing, making market-based incentives less effective. Outside the forests, other wooded land, including parks, gardens and road-sides, can provide significant quantities of usable wood. However, the use of wood raw material from all forests and other wooded land must be done in a sustainable way, as detailed in the Commission Communication: “A new EU Forest Strategy: for forests and the forest-based sector”. More information on the spatial distribution of forest resources and additional information, such as wood quality, dimensions and species, is also needed to assess and plan wood availability and its mobilisation for future uses, and to have a better communication throughout the value chain.

Whilst all wood can be used for energy production, at least theoretically, there are limits as to how flexibly different wood types can be used between different end uses within the F-BI, as indicated by Figure 11. This does not account for further limitations caused by wood species, qualities and dimensions.

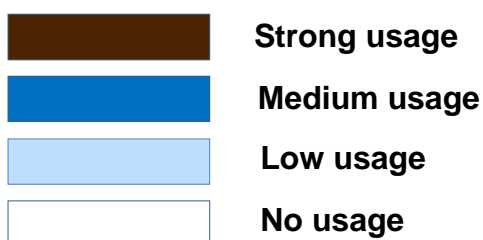
**Figure 11: Qualitative substitutibility of different wood sources between competing end uses**

Raw material types		Sawn-wood	Ply-wood	Pulp, Paper & Board	Oriented Strand Board (OSB)	Particle Board	Medium Density Fibreboard (MDF)	Pellets	CHP Combined Heat & Power
Wood	Pulpwood			Strong usage	Strong usage	Medium usage	Medium usage	Strong usage	Medium usage
	Logs	Strong usage	Strong usage	Medium usage	Medium usage	Medium usage	Medium usage	Medium usage	Medium usage
	Forest residues					Low usage			Strong usage
Industrial residues	Bark								Strong usage
	Chips			Strong usage		Strong usage	Strong usage	Strong usage	Medium usage
	Sawdust			Low usage		Strong usage	Strong usage	Strong usage	Low usage
Recycled material	Recovered paper			Strong usage					Medium usage
	Recovered wood			Low usage		Strong usage	Strong usage	Low usage	Strong usage

Source: Indufor Oy

**RAW MATERIAL SOURCES FOR VARIOUS END USES**

*NB: wood products' raw materials are further limited by species, quality and dimensions (not shown) but bio-energy can use all wood sources.*



As indicated in detail below, any improvement in wood mobilisation must overcome not only physical (e.g. technical and logistical) and cost issues but also be based on easier location of suitable species, dimensions and qualities of wood raw material. Topographical surveying and infra-red or laser-based forest inventory can help to assess economically the potential harvesting output of forests, including fragmented areas, both in terms of the equipment needed and potential market outlets for the wood produced. Moreover, the further

development of tools for forest modelling and inventory which allow optimisation of the harvesting operations, with consequent cost reduction, providing early information on the standing trees (quality, amount, etc..) and allowing information exchange (e.g. demand, value, etc.) in near “real time” among the actors along the value chain (owners, customers, etc.), could be valuable in helping to optimise harvesting operations and costs, sustainably harvest more wood in Europe and provide the forest owners with better income for their raw material. Further use could be made of such inventory results through their harmonisation at the macro level, e.g. between Member States.

As regards the costs, a judicious use of incentives, such as a re-direction of the subsidies, currently given to the energy supply industry for generating bio-energy, into mobilising more wood from unharvested forest areas, such as fragmented forests, could:

- provide more wood raw material to the market on an equitable basis for all end users;
- reduce/eliminate the cost differential for wood raw material between the energy industry and other wood users, such as the EU F-BI;
- help improve the forests by stimulating their renewal and hence maintain or even improve bio-diversity.

Such forest improvement could include: wood quality, age-class structure, health, robustness against biotic and abiotic threats (e.g. disease, fire prevalence and intensity, climate change), since forest operations such as thinning and final felling stimulate not only a resurgence in the growth of uncut trees but also help to improve bio-diversity by allowing light to reach the forest floor.

At the sawmill level, computed tomography (CT) scanning can then be applied to harvested roundwood to identify the best out-turn from individual logs or whole trees. Following sawmilling, automated stress grading of sawnwood can ensure that individual wood beams meet exacting structural and other standards.

#### **IV. EU Forest-based Industries (F-BI) by sub-sectors:**

The current composition of the EU Forest-based Industries includes the sub-sectors listed below. Each of these sub-sectors is examined in turn as to its key features, main challenges and opportunities.

- a) Woodworking industries
- b) Furniture industry
- c) Pulp & paper manufacturing & converting industries
- d) Printing industry

#### **EU Forest-based Industries (F-BI): historical rationale:**

The F-BI definition has evolved to reflect the changing structure, perspectives and needs of the sectoral industries concerned. When the Advisory Committee on Community Policy regarding Forestry and Forest-based Industries (AC F-BI) was first set up in 1983<sup>16</sup>, the forest-based industries included: the mechanical wood industry (i.e. woodworking), the pulp, paper and board manufacturing and converting industries, the printing and the publishing industries. This grouping was confirmed in the Committee's amended decision in 1997<sup>17</sup>. However, in its 2008 Communication<sup>18</sup>, the Commission defined the EU forest-based industries as: the woodworking industries, the pulp and paper manufacturing and converting industries and the printing industries, reflecting the shift of focus of large parts of the publishing industry into electronic media.

The EU F-BI form a sectoral division of the EU's Industrial Policy, a complementary Union competence under Art. 6 TFEU<sup>1</sup>. Conversely, there is no Treaty basis for forest or forestry activities per se. The term "forest-based sector" includes the upstream forest resource and ancillary forestry activities as well as the downstream forest-based industries.

#### **a) WOODWORKING INDUSTRIES**

##### *Key features*

The EU woodworking industries include some 184,000 companies generating an annual turnover of around 122 billion Euro on a production value of over 115 billion Euro and generate an added value of over 31 billion Euro. They employ more than 1 million workers. Most companies are small or medium-sized; the exception being the wood-based panel sub-sector and a handful of sawmills, which have a number of large enterprises, a few belonging to multinational companies.

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<sup>16</sup> Commission Decision of 11 May 1983 setting up a Committee on Community Policy regarding Forestry and Forestry-based Industries (83/247/EEC)

<sup>17</sup> Commission Decision of 9 December 1997 amending Decision 83/247/EEC (97/837/EC)

<sup>18</sup> Commission Communication: *Innovative and sustainable forest-based industries in the EU: A contribution to the EU's Growth and Jobs Strategy* (COM(2008)113 of 27.2.2008)

The main sub-sectors are: sawmilling; wood-based panels; builders' carpentry & joinery; flooring and other wooden articles. Overall, the main uses of sawnwood, carpentry & joinery are in construction and furnishings. The main uses of wood-based panels are in furniture, flooring and non-structural wall and roofing panels. Accordingly, the EU woodworking industries have been heavily affected by the economic and financial crises. As can be seen from Figure 3, the long-term gradual reduction in the number of sub-sectoral firms between 2003-10, during which period 8% of companies went out of the market, has been sharply accelerated from 2008 onwards.

### *Main challenges*

The main challenges facing the woodworking sub-sector on the supply side are: the legal and/or sustainable availability of wood raw material; roundwood and other material costs, whether from EU or imported sources and the lack of optimal wood mobilisation strategies; high energy and labour costs and an ageing workforce. Additionally, the problem with a shrinking workforce due to an ageing population in the EU and urbanisation, both factors which make, in particular, the mobilisation of wood difficult and more costly, should be stressed. The solution to this problem calls for increased productivity through technological development, mainly in the harvesting of timber. On the demand side the challenges are: the reduced demand from the construction sector and from the pulp subsector; competition from low-cost imports; increasing scrutiny of wood sources, especially for public procurement; an increasing need for product and process innovation in the face of costly finance, low profitability and hence low investment in plant and skills.

Voluntary chain-of-custody certification, indicating the origin of wood from sustainably managed forests via an identified supply chain, has been an increasing feature of EU wood supply over the last 15 years. Since March 2013, the EU "Timber Regulation" (EU TR)<sup>19</sup> has banned illegally harvested wood from the EU market and required legal wood which is placed on the market to undergo a due diligence process, with traceability upstream to its source and downstream to traders. A small but significant number of other developed markets make comparable legality requirements (USA, Australia, Japan, Switzerland). However, such measures should not lead to unintentional and unexpected implications for timber trade flows.

All wood and wood-based products placed on the EU market are subject to the EU TR but, even if they pass muster, low-cost imports often have an added market advantage over their EU counterparts if their production is subsidised and/or they do not have to meet the EU's high environmental and social standards. In some cases, even mandatory EU technical standards are flaunted, such as has been the case with some building components, like imported plywood which was apparently CE-marked but did not meet those requirements. The consequences of such violations are potentially deadly.

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<sup>19</sup> Regulation 995/2010.

## *Opportunities*

Wood is a natural, renewable and environmentally friendly raw material (carbon storage, reusable, recyclable, combustible) and has excellent thermal properties. However, it is also a heterogeneous material, varying by species, dimension and quality. Whilst such variations can limit the substitutability between different wood types (see above) and make it a difficult task to manufacture standardised products, wood's visual artefacts give scope for design for both functional and cultural uses. It is also a healthy life-style material.

Even though the role for wood in “traditional” construction applications, such as window and door frames, doors and flooring, may remain curtailed by the on-going crises, its potential use in renovation, retrofitting and wood-framed construction is enormous. Even without new buildings going up, existing ones have to be maintained and refreshed, to which end, wood offers a consumer-friendly and healthy material, the natural surface of which can often add character to refurbishing and furnishings of existing buildings. Likewise, retrofitting of and extensions to the existing building stock can benefit from wood's efficient thermal and acoustic properties at competitive prices.

These applications, together with new wood-framed buildings (for homes, offices, functional buildings such as wide-span sports halls, bridges and other structures) are part of what is increasingly referred to as “sustainable construction”, in which durable, low-impact and energy-efficient solutions are sought. Whether in structural or non-structural applications, for new buildings or for renovation, wood can help improve the energy performance of buildings on a life-cycle basis by harnessing its insulating properties to reduce heat loss and so reduce energy costs. Wood-framed buildings are well suited to pre-fabricated manufacture, which can reduce assembly time and material waste on the construction site. Scope also exists for wooden building in zones prone to earthquakes, where specific wood-framed structures have been proven to be more resistant to tremors.

Due to its natural structure, wood is permeable and this property can be used to impregnate it with substances to prolong its natural life time or to combine it into so-called “wood bio-composites” for diverse uses such as: thermal insulation; acoustic panelling, specialist packaging and absorbing liquids. Such enhanced applications can add much value to relatively small volumes of wood material but require strategic development.

## **b) FURNITURE INDUSTRY**

### *Key features*

The European furniture sector employs around 1 million workers in 130.000 companies generating an annual turnover of around 96 billion Euro. It is a labour-intensive and dynamic industry, dominated by SMEs and micro firms, which produce kitchen, office, bedroom and other specialist types of furniture. Its success factors lie in creative capacity for new designs and responsiveness to new demands, ability to combine new technologies and innovation with

cultural heritage and style, highly skilled employees and performing production systems. The European furniture manufacturers set the trends at the global level, which is reflected by the fact that 12% of designs registered in the Office for Harmonization in the Internal Market relate to the furniture sector. The EU is also a world leader in the high-end segments – nearly two out of three high-end furniture products sold in the world are produced in the EU.

### *Main challenges*

The European furniture sector faces enormous competition from countries having low production costs, in particular in the low- and mid-range price segments, where the EU share in world furniture trade has significantly dropped in the last decade. China's EU market penetration is growing rapidly and it is now the largest furniture exporter to the EU, supplying more than half of total furniture imports to the EU. The reliance on innovation and design as a competitive advantage of the European furniture sector, combined with an increase in global trade and digitalisation, makes it more vulnerable to weak protection and enforcement of intellectual property rights on the global markets.

The European furniture sector is also faced by structural problems. The ageing workforce combined with difficulties to attract young workers may lead to disruptions in maintaining a skilled workforce and continuity of traditions and craftsmanship. Furthermore, boosting research and innovation requires sufficient finance, which is often inaccessible to SMEs.

While the EU is the most open global market, protectionist measures exist on other international markets, creating market distortions. EU furniture producers face both duties on imported materials and semi-finished products used in furniture, and tariffs on their exports of finished furniture products, thus decreasing the sector's global competitiveness. Moreover, their operational costs are increased by environmental, sustainability and technical standards and regulations.

All the above factors, combined with the fact that the furniture sector has been severely hit by the recent crises, have led to a significant drop in the number of companies, jobs and turnover, from which the sector is still trying to recover.

### *Opportunities*

In the light of these developments, the EU furniture sector has undergone significant changes – restructuring, technological advances and business model innovations, allowing it to be more export-oriented, and to focus on upgrading quality, design and innovation. Continuing investment in skills, design, creativity, research, innovation and new technologies can result in new products which are in line with the changing population structure, lifestyles and trends, as well as with new business models and supplier-consumer relationships. Moreover, research in advanced manufacturing technologies can result in the creation of high technology and knowledge intensive jobs, which would give the sector the attractiveness it needs towards the new generations. This could help to rejuvenate the sector while keeping it highly competitive on the world stage.



European furniture manufacturers being recognised world-wide for their quality and design also creates opportunities for the sector to further seize other markets, in particular in the high-end segments and emerging markets. The synergies with construction and tourism could also be exploited, building up on the sector's excellent track record in sustainability. Specifically, reliance on raw materials from sustainable sources used in the furniture production could have a positive impact on sales among environmentally concerned end-users within and outside the EU.

## **c) PULP & PAPER MANUFACTURING AND CONVERTING INDUSTRIES**

### *Key features*

The European pulp and paper manufacturing and converting industries employ around 647.500 workers in 21.000 companies, generating an annual turnover of around 180 billion Euro, from the production of pulp as well as graphic, hygienic, packaging and specialised paper grades and products. The pulp and paper manufacturing sector is energy- and raw materials-intensive, with high capital costs and long investment cycles, and has an excellent track record in resource-efficiency and innovation. Over the last two decades, it has substantially reduced all environmental emissions and also water and energy consumption, effectively de-coupling all of these from production growth, thanks to improved process efficiency. It has become more energy self-sufficient and less CO<sub>2</sub>-intensive by generating more than half of its primary energy from biomass. Thanks to the voluntary, industry-led initiatives in addition to legislative measures, the paper recycling rate in Europe exceeds a high level of 70% and raw materials used in paper and board production and converting come from sustainable sources. The high level of expertise and continuous research and innovation well position these industries to exploit new business models, develop novel products and applications, and technologies, progressing toward a low-carbon bio-economy.

### *Main challenges*

Overall paper consumption in Europe has stagnated, due to the economic slowdown and also structural developments. A continuing decrease in graphic paper consumption is expected as a result of the growing pace of digitalisation and changing lifestyles. However, this is counter-balanced by growth in packaging and hygiene papers, mainly due to demographic trends in Europe. Innovative business models and products create new opportunities for the sector, however, these require new skills and education.

The pulp and paper sector is increasing its share of exports outside the EU. Even so, tariff barriers, applied to nearly half of the exports and protectionist subsidies for rival goods, create an uneven playing field, further restricting market potential. On the raw materials supply side, taxes and exports duties imposed by EU trade partners on wood exports, notably by Russia, also raise concerns, especially when combined with heavy bureaucracy. Fibre raw material, from primary and secondary sources, represents the highest share of production costs, thus its availability at affordable prices is crucial for the sector.

The demand for domestic EU wood supply is increasing from other end-users, notably bio-energy. Increasing mobilisation of wood in a sustainable way and developing new, innovative ways to further optimise the added value from raw materials would help to match wood supply and demand. To this end, progress is needed to increase forest management efficiency as part of an overall policy framework supporting the sustainable supply and cascading use of wood resources, in addition to energy efficiency. The paper recycling rate in Europe is very close to its maximum limit, as determined by deteriorating quality and the non-collectable and non-recyclable fractions. Improvements in collection and sorting systems and technology can further increase the quality and availability of the secondary raw material. However, its supply may also be challenged by the increasing recovered paper exports to third countries, notably to China.

Rising prices of energy in Europe, combined with an increasing difference in gas prices compared to North America, also place the sector at a global competitive disadvantage. The EU environmental, climate change, energy and transport policies also have major influences on the future of the sector. The right and coherent regulatory framework is thus essential to support sustainable growth, investor's certainty and level playing field.

### *Opportunities*

Continuous technological improvements can further reduce environmental impacts and optimise the use of resources, in particular raw materials, water and energy. New advanced and more efficient processes can also offer innovative ways to develop new products and applications based on cellulose fibre, generating more added value. Breakthrough technologies, such as to reduce heat use in paper production through reduced water consumption and improved paper drying processes and to develop new products, are needed, however, to achieve the sector's ambitious objectives for the 2050 Roadmap towards a low-carbon bio-economy of 80% CO<sub>2</sub> reduction and 50% value growth by 2050<sup>20</sup>.

The European pulp and paper sector is seizing the opportunities of a bio-based economy. New business concepts will allow it to use the entire potential of the raw materials and by-streams of the forest-based sector efficiently to produce a broad range of high added-value products and novel materials for use in the textile, food and pharmaceutical industries, bio-based fuels and chemicals, alongside traditional wood-based products. In this framework, it is also important to develop innovative processes and technologies suitable for integration in the existing production facilities, as this could allow for faster industrial-scale deployment, delivering a positive impact in the shorter term, without having to wait for the phasing out of the running plants.

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<sup>20</sup> CEPI (2011). *Unfold the future – The Forest Fibre Industry – 2050 Roadmap to a low-carbon bio-economy*.

## **d) PRINTING INDUSTRY**

### *Key features*

The European printing sector covers 120.000 companies that employ around 770.000 workers, generating an annual turnover of around 88 billion Euro, from printing on a number of media, including paper, plastics, textiles, etc., and using a series of technical processes. The sector is dominated by family-owned, small and micro companies, operating mainly on domestic markets. Such high fragmentation facilitates reacting to niche markets and local needs, and gives flexibility to respond to consumers' variable orders in ever-shortening lead times and small print runs. The modern and efficient technologies available have increased the sector's productivity and ability to provide a complete range of services. At the same time, process automation has resulted in a change of the workforce profile from craftsmen to technicians. Investments in the printing sector are still primarily focused on production equipment, to the detriment of non-production activities, such as research and development and marketing. The sector is also characterised by a structural production over-capacity, estimated at up to 30%, as result of a declining demand for many printed products, increasing global competition and improved machinery productivity.

### *Main challenges*

Changes in reading habits and the shift toward web-based media and e-solutions have significantly reduced the demand for print and revenue from paper-based advertising. A growth in printing output is mainly restricted to printed packaging and digital print. Competitors from low-cost countries, notably Asia, are capable to fulfil the European consumers' standards in terms of quality and are putting strong pressure on prices. Consequently, imports from China of printed products to the EU have increased more than four-fold over a decade.

The recent crises have had a major impact on the European printing sector, prone to economic cycle fluctuations. It exacerbated a decline in demand for printed products and increased financial institutions' reluctance to provide loans to SMEs often lacking financial capacity. The increasing costs of production in Europe, specifically energy, raw materials and labour costs, have further decreased the margin. The relative concentration of the printing sector suppliers places it also in a disadvantaged position.

In response to these challenges, the printing sector is undergoing a profound market transformation, with implications for company closures and redundancies. A risk of unemployment is intensified by the workforce's low mobility, partly due to specialised skills, unique to this sector but which are non-transferable. At the same time, opportunities arising from technological developments and new business models change the industry's skills and competency requirements, which will supplement, and in the longer-term replace, its ageing workforce and its traditional skills.

The European printing sector operates in a strict environmental framework and undertakes ambitious voluntary initiatives to demonstrate to consumers its commitment to environmental sustainability. Despite these efforts, the use of print on paper may give rise to a negative environmental perception, sometimes reflected by unsubstantiated environmental statements.

### *Opportunities*

The structural overcapacity is optimised through market consolidation and socially responsible restructuring, adopted by printing companies to build economic sustainability while developing a ‘culture of employability’. Strategic alliances are possible, although complex to implement and uncertain in these mainly family-owned companies. Conversely, the flexibility of small size companies facilitates exploring new niche markets.

The emergence of new media and technologies supports the building of closer relationships with customers and creating more added value through diversified services, such as offering print services with database management, and innovative processes, such as 3D printing. Integrating multi-media communication services not only widens the product range, but can also increase the attractiveness of the sector to new employees. The European printing sector can also benefit from increasing consumer awareness toward sustainability, and its excellent track record of environmental and social performance, by using them as differentiating factors from non-EU, low-cost competitors.

In this field research and innovation are highly needed to provide new paper-based products with added functionalities such as paper-printed electronics. These new products could exploit the sustainability of the support (i.e. paper) but provide the user with added functionality beyond simple printed paper, resulting in new markets and higher added value for the printing industry.

## V. Detailed description of challenges faced by the EU F-BI and remedial initiatives

This chapter describes more fully the F-BI sectoral challenges mentioned in the Communication “A new EU Forest Strategy: for forests and the forest-based sector”, together with potential responses which could be foreseen for the EU, Member States, F-BI and other bodies to carry out.

These challenges do not exist in isolation from each other but as part of a functional system, depicted in Figure 12, in which the challenges are in bold italics. In this system, information and communication are pathways linking the other elements.

**Figure 12: The relationship between F-BI challenges**

<b>Drivers</b>	<b>Tools</b>	<b>information &amp; communication</b>
<i>stimulating growth</i> through new & efficient processes, products & markets	<i>innovation, research &amp; technological development</i> <i>trade and co-operation</i>	
<i>resource and energy efficiency:</i> - <i>raw material supply</i> - <i>logistics</i>	<i>innovation, research &amp; technological development</i> <i>education, training, skills</i>	
human resource efficiency: - <i>structural adaptation</i> - labour productivity		
<b>Drivers conditioned by:</b>		
<i>international competition</i> for EU and third-country markets.	<i>innovation, research &amp; technological development</i> <i>education, training, skills</i>	
<i>regulatory framework</i> , including EU & MS policies, in particular those on: - <i>climate</i> - <i>energy</i> - <i>trade</i>	<i>policy coherence</i>	
Finance	EU & MS funds <i>Other: outside scope of F-BI strategy</i>	
<i>image</i> (the resultant of a set of perceptions arising from information received, which may often be incomplete but also incorrect and/or biased).		

### **Stimulating growth**

If one wants to increase the competitiveness of and demand for wood-based and related products and services, one must improve the quality and efficiency of existing processes, products and related services. In addition, innovative new processes, products and services can be developed and marketed, such as so-called “bio-based products”<sup>21</sup>, which together

<sup>21</sup> CEN Definition of Bio-Based Products used in the CEN-Report on Mandate M/429, Resolution of 3/11/09):

1. Bio-based = derived from biomass. 2. Biomass = material of biological origin, excluding material embedded in geological formations and/or fossilised. Note: This definition refers to the well-known short-cycle of carbon, i.e. the life cycle of biological materials (e.g. plants, algae, marine organisms, forestry, micro-organisms,

with their specific processes could provide opportunities as part of the “bio-based economy”. New business models are also vital, responding to changing societal needs through an integrated value-chain approach.

Follow-up by the F-BI of the Communication on “Strategy for the sustainable competitiveness of the construction sector and its enterprises”<sup>22</sup>, will be crucial, for example by providing markets with competitive, performance-based solutions derived from wood - for building, retro-fitting and renovation, while realising synergies with furniture and paper-based products. Among proposed activities are the following:

1. stimulating favourable investment conditions - in particular in the renovation and maintenance of buildings and infrastructures - by promoting financial instruments such as loan guarantees or project bonds and encouraging national level incentives such as reduced VAT rates;
2. boosting innovation and improving labour qualifications and mobility by promoting the share of information on curricula, employment market and employer's needs;
3. improving resource efficiency and environmental performance, promoting mutual recognition of sustainable construction systems in the EU;
4. providing standard design codes of practice for construction companies making it easier for them to work in other Member States;
5. fostering the global position of European construction enterprises to stimulate good performances and sustainable standards in third countries.

To further underpin the communication’s implementation, Member States could develop mechanisms, incentives and tools to encourage sustainable construction, retro-fitting and renovation, including appropriate and integrated sustainability objectives (environmental, social and economic) for construction schemes, as well as relevant objective criteria for rating systems - to be based on life-cycle assessments, in order to compare options.

In anticipation of a further communication (on sustainable buildings) which is under preparation, industry could complement such initiatives by identifying apparent EU and Member States’ barriers to building products of natural and renewable materials, given their potential for improving the energy efficiency of buildings, and suggesting potential solutions.

In addition, improving information to customers on specific qualities of furniture, and possibly on other F-BI products, placed on the EU market, could facilitate their informed

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animals, and biological waste from households, agriculture, animals and food/feed production). 3. Bio-based product = product wholly or partly bio-based. Note: The bio-based product is normally characterised by the bio-based content.

<sup>22</sup> Commission Communication: *Strategy for the sustainable competitiveness of the construction sector and its enterprises* (COM(2012)433 of 31.7.2012).

decision-making. This could, in particular, promote products performing to high standards for the environment and human health throughout their life cycle.

Furthermore, the delivery of both current and new products from all the above four F-BI value chains can be expanded in existing and into new markets within and outside the EU. Exploring new markets outside the EU, especially in emerging economies such as the so-called BRICs, can assist the EU F-BI's competitiveness to be further realised. To this end, exports of EU wood-based and related goods could be facilitated by identifying tariff and non-tariff barriers and addressing them in bilateral trade negotiations. In this context, the F-BI sectoral information of the Market Access Data Base<sup>23</sup> (MADB - about import conditions in third-country markets) could be improved and the involvement of the F-BI sector in the Market Access Advisory Committee could be further strengthened, so as to play a more important role.

Simultaneously, active market development and trade promotion in existing and new markets outside the EU, including for SMEs, will continue to be carried out by Member States and also at EU level (e.g. through "Missions for Growth", EU Gateways).

### **EU Resource and energy efficiency objectives**

**Resources:** Using the "cascade principle" increases raw material availability, enables more output from a given input and maintains or creates more jobs and added value for the economy<sup>24</sup>, as well as – in the case of wood - delaying the release to the atmosphere of its stored carbon. The EU F-BI use or sell most of their wood-processing residues: in other product lines, as secondary raw materials or fuel, or as process energy. Thus, in addition to having high labour productivity, the F-BI are resource-efficient and so in line with the mainstay of the EU policy framework, the "Roadmap to a Resource Efficient Europe"<sup>25</sup>. In such cases where waste can become a resource in a virtuous cycle, it forms part of the "circular economy"<sup>26</sup>.

**Energy:** After raw materials, energy represents a high proportion of EU F-BI production costs but its level varies between F-BI sub-sectors (see Figure 8). The EU F-BI generates much of its own process energy from its wood residues. However, energy bought in to the sector costs up to two and a half times that in the USA. Given little prospect in the EU of significantly decreasing per-unit prices for bought-in energy, savings in energy costs can only be made by the EU F-BI through wider generation of bio-energy and their further energy efficiencies.

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<sup>23</sup> European Commission, DG Trade, Market Access Database: <http://madb.europa.eu/madb/indexPubli.htm>

<sup>24</sup> Mantau, U. (2012). *Wood flows in Europe (EU 27)*. Project report for CEPI, CEI-Bois and EPF.

<sup>25</sup> Commission Communication: *Roadmap to a Resource Efficient Europe* (COM(2011)571 of 20.9.2011)

<sup>26</sup> Commission Memo: *Manifesto for a resource-efficient Europe* (MEMO/12/989 of 17.12.2012). Available on: [http://europa.eu/rapid/press-release MEMO-12-989\\_en.htm](http://europa.eu/rapid/press-release_MEMO-12-989_en.htm).

Concerning the competition for wood raw material from the bio-energy sector, a study recently carried out for the Commission<sup>27</sup> indicated that the total use of wood biomass in the EU for bio-energy will rise from 292 to 360 Mm<sup>3</sup> (+ 68 Mm<sup>3</sup> or + 23%) of roundwood equivalent (RWE) between 2010-16. But this would still leave a shortfall of 63 Mm<sup>3</sup> vis-à-vis the wood requirements anticipated by EU MS in their National Renewable Energy Action Plans (NREAPs). Thus by 2016, the amount of roundwood equivalent used for bio-energy will be greater than that used for either the woodworking industries (332 Mm<sup>3</sup>) or for pulp and paper manufacture (347 Mm<sup>3</sup>). The huge increase foreseen will be drawn mainly from forest residues (+26 Mm<sup>3</sup>) but also significantly from roundwood<sup>28</sup> (+21 Mm<sup>3</sup>) and industrial residues (+17 Mm<sup>3</sup>) but very little from recovered wood (+4 Mm<sup>3</sup>), thus confirming the missed opportunity of the unused potential of the last category. (These totals however hide member-state variations, which are detailed in the national case studies of the overall study).

Starting upstream in the F-BI value chains, stakeholder proposals and inputs for improving forest inventory information on the supply of wood, and market information on demand for wood, wood-based materials and products, will be essential to increase market transparency and hence operational efficiency. As far as possible, such proposals could be reconciled into existing or programmed work by the EU institutions. Otherwise, if justified, feasible and affordable, new provisions might be considered.

An EU-wide catalogue of examples of good practice, especially amongst small and micro firms, on successful resource- and energy-efficient measures for wood-processing, could be a highly useful and desirable sectoral tool, for example in the form of a users' guidance manual. To this end, a joint public-private initiative could be launched in which, contingent upon industry identifying and sharing their good-practice examples as a basis, a study could catalogue the results and render them transferable. In any case, a set of life-cycle-based sustainability criteria could be developed for the uses of wood, based on a common set of criteria for sustainable forest management, and including efficiency requirements for greenhouse-gas saving, energy use and optimising the use of the cascade principle.

Within the framework of the next revision of the Waste Framework Directive (2014), the targets and measures for stimulating wood recovery and paper collection would be assessed at the EU level. Policy initiatives in the field of environment, renewable energy and climate action could further promote resource efficient use of biomass through e.g. recycling and cascading use. In this context, and also in that of the National Renewable Energy Action Plans (NREAPs), Member States and F-BI are encouraged to recover more wood, wood products and residues from industrial & post-consumer waste, for re-use and recycling. Member-State initiatives to help achieve this could include appropriate staff and consumer training, incentive schemes and fiscal penalties (e.g. modulating land-fill taxes applied to wood).

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<sup>27</sup> Indufor Oy (2013). *Wood raw material Supply & Demand for the EU Wood-processing Industries*.

<sup>28</sup> UNECE-FAO JFSQ (Joint Forest Sector Questionnaire) definition



As a framework for such work, it is suggested that the private sector consider leading the formation of a European Wood Recovery Council (EWRC), to be established as a public-private partnership, for the purpose of improving wood recovery, re-use and recycling. Such an EWRC could for example, together with Member States, carry out monitoring of wood waste, including its disposal in land-fill and the land-fill taxes so engendered, and compile a comparative report each year.

All actors are urged – in any case - to contribute to developing good-practice guidelines for wood recovery, including the “cascade” principle, ideally in co-operation with a European Wood Recovery Council, as above. As appropriate, the Commission could help facilitate this process.

Given the positive experience in the EU printing sector with group energy purchase and also long-term, fixed-price contracts, including for the purchase and sale of energy, other F-BI sub-sectors could explore, together with the energy supply industries, the scope for similar arrangements. In this connection, industry is invited to collect, exchange and monitor statistics of F-BI energy prices across the EU, as a basis for analysing energy-price gaps between the EU and its competitors, especially with the USA.

### **Raw materials, their sources and flows**

EU domestically harvested industrial wood (about 345 Mm<sup>3</sup><sup>29</sup>) accounts for about 90% of the wood processed by the EU F-BI. This is equivalent to only 45% of the annual EU wood growth, with up to another 17.5% going directly outside the F-BI as fuelwood. EU forests offer a bigger potential and could provide even more wood. However, supplies from Europe are constrained by:

- insufficient information on forest resources (species, qualities, dimensions) available for informed decision-making in the value chains;
- diminishing: quality, dimensions and accessibility of uncut wood;
- fragmented forest ownerships; part-time owners unmotivated to produce wood;
- the EU & MS regulatory frameworks (e.g. Natura 2000; biomass sustainability criteria - not all of which are imposed on other materials);
- costs of harvesting machinery and of roundwood, compounded by competition from subsidised non-EU buyers.

To help address these and other difficulties, forest-based sector stakeholders and Member States need sound sectoral knowledge bases and regulatory frameworks. In this context, it could be worthwhile to update, expand and widely disseminate the wood mobilisation guidance<sup>30</sup>, so as to make it available to a broader range of sectoral stakeholders in a number

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<sup>29</sup> This is the indicative average volume of wood harvested annually from EU forests (e.g. 2011: 345 Mm<sup>3</sup>). However, because of partial cascade use, higher total volumes are processed by the EU F-BI.

<sup>30</sup> European Commission (DG Agriculture and Rural Development), UNECE/FAO and MCPFE (2010). *Good practice guidance on the sustainable mobilisation of wood in Europe*.

of EU languages, whilst linking it to the sets of downstream guidance on efficient wood processing and recovered wood (see above).

Furthermore, sustained dialogue between forest owners, civil society and the F-BI, based on their inter-dependency and to enhance their scope for co-operation could further help address the mismatch of the forest wood resource with market needs, as well as the worsening state of the EU's wood-harvesting capacity. In particular, the needs of micro and small wood-harvesting firms could be tackled through public and private-sector (national authorities, firms, chambers of commerce) support for adequate, updateable and transferable training modules (e.g. for machine operation & maintenance; health & safety; social inclusion) and the facilitation of finance for new entrants & re-equipping.

For **secondary raw materials**, much has already been achieved for paper. Its recycling rates reach around 70% on average for the EU, close to the economic optimum. There is still some scope for improvement e.g. by avoiding co-mingled waste collection, or by innovative sorting and treatment systems. For wood, the situation is different since recovery rates are generally very low, notably because of physical limitations (e.g. contamination) and logistical ones (dispersal; inadequate collection and sorting systems). So, much used wood remains uncollected or ends up in land-fill, triggering costs (e.g. non-reimbursable recovery charges and landfill taxes). Improving wood recovery rates, supported by the effective implementation of the Directives on the landfill of waste<sup>31</sup> and waste<sup>32</sup>, would thus avoid penalties and provide valuable secondary raw material to the market (see above).

Globally, prices of non-EU wood supplies to the EU are increased by export taxes (Russia) and increasing domestic demand in exporting countries. The exports of sawlogs and paper for recycling, particularly towards Asian countries, such as China, are increasing, thus posing a risk for sustainable supply of this raw material at competitive prices to the EU industry. For the latter, the scope for possible action may result from the follow up of the feasibility study of applying a global certification scheme for recycling treatment facilities to the export of waste streams<sup>33</sup>, which would build on environmentally-sound management criteria.

Similarly, monitoring the developments of recovered paper and roundwood exports, especially sawlogs, from the EU could be considered, with attention being paid to their consequences for the EU industry. In any case, amongst the issues which need to be taken into account regarding the trade in wood and wood-based raw materials are that they originate from sustainable forest management, that they are legally harvested and marketed, that they comply with phytosanitary requirements, such as de-barking, and are shipped in conditions not liable to give rise to the culture of harmful organisms.

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<sup>31</sup> Council Directive of 26 April 1999 on the landfill of waste (1999/31/EC)

<sup>32</sup> Directive of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (2008/98/EC)

<sup>33</sup> Risk & Policy Analysts (2012). *The feasibility of introducing a certification scheme/standard for recycling treatment facilities*. Study for DG Enterprise and Industry.

Bilateral trade agreements could be useful to facilitate access to non-EU primary wood supplies and to address import subsidies for and export taxes from non-EU partners and examine possible EU tariff reduction or elimination for imported secondary wood raw materials.

In view of the above and other challenges linked to raw materials supply, the Commission has launched the European Innovation Partnership (EIP) on Raw Materials<sup>34</sup>. An active involvement of all stakeholders concerned is crucial for the successful implementation of the Strategic Implementing Plan (SIP) and achieving the EIP goals.

**Other raw materials** include: resins, adhesives, coatings (woodworking); latex, starch (paper); textiles, metals, etc. (furniture); inks (printing). The costs of resins and coatings, although of a lower order than wood or energy, are nonetheless significant and not only generally increasing but also subject to volatility caused by supply-demand imbalances and/or currency fluctuations, since they often come from outside the EU.

In the face of cheaper product imports, increased raw material costs for the EU F-BI are difficult to recoup by increasing their product prices.

### **Logistics (wood harvesting, infrastructures and transport)**

Economic wood harvesting requires sophisticated equipment and skilled operators. The high costs of equipment and operators are compounded by many forests being fragmented and having poor access. Outside the forest, infrastructures and transport systems pose constraints, such as restrictions in and variability between Member States for lorry dimensions and weight limits, as well as non-integrated transport systems.

With a view to overcoming some of these constraints, relevant EU and Member-State instruments, including the Rural Development Regulation<sup>35</sup>, the European Regional Development Fund (ERDF)<sup>36</sup>, the Strategic Framework for European Cooperation in Education and Training ("ET 2020")<sup>37</sup> – if the relevant operational programmes provide for it and where appropriate – can assist in the development of:

- forest infrastructures (tracks, roads, drains, bridges, loading bays, etc.);
- wood harvesters' training & skills – including for health and safety (H&S);
- improved communications (mobile phone networks, broadband internet access, etc.) for and co-operation between small and micro wood-harvesting firms to support logistics and health & safety in rural, especially remote, areas;

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<sup>34</sup> Commission Communication: *Making raw materials available for Europe's future well-being: Proposal for a European Innovation Partnership on Raw Materials* (COM(2012)82 of 29.2.2012).

<sup>35</sup> Council Regulation of 21.10.2005 on support for rural development by the European Agricultural Fund for Rural Development (1698/2005).

<sup>36</sup> European Regional Development Fund. Available on: [http://ec.europa.eu/regional\\_policy/thefunds/regional/index\\_en.cfm](http://ec.europa.eu/regional_policy/thefunds/regional/index_en.cfm).

<sup>37</sup> Lifelong Learning Policy. Available on: [http://ec.europa.eu/education/lifelong-learning-policy/policy-framework\\_en.htm](http://ec.europa.eu/education/lifelong-learning-policy/policy-framework_en.htm).

- finance for wood-harvesting machinery through specialised financial engineering, in the form of e.g. lease-back, loan guarantees, group purchasing, etc.

In addition, the Commission and Member States could examine the scope for: facilitating the development of multi-modal transport systems; as well as the long-term harmonisation of transport legislation on the weight, axle weights & dimensions of lorries - with convergence towards higher capacity modules and vehicle combinations within the EU, and short & medium-term modulation of the same on appropriate routes.

Moreover, the Sulphur Directive<sup>38</sup> impact on fuel costs, especially for bunker fuel which is used in the ships transporting EU F-BI goods by sea and canal, needs to be further examined.

### **Structural adaptation**

As can be seen from the summary in Table 3, above, SMEs and moreover micro enterprises are the norm throughout most of the F-BI, large firms being limited to the pulp and paper manufacturing industries and parts of the wood-based panel and sawnwood sub-sectors.

Individually, small EU firms cannot benefit from the economies of scale enjoyed by their larger rivals or the substantial subsidies provided to some overseas competitors by their governments. Thus, they typically suffer from relatively high unit costs. To compound this fact, they also face high costs for finance, both for raising capital investment and for operational liquidity. Nonetheless, companies of all sizes and in different parts of the value chains can benefit from networking, especially as sectoral or regional clusters. For example, firms specialising in the same product area could co-operate to reduce upstream supply costs, whilst sharing the benefits of bigger orders downstream.

Societal changes, such as shifting to digital media, combined with the economic and financial crisis, have negative impacts on the demand for certain F-BI products, creating structural over-capacities. Thus firms require significant restructuring and/or changes in the sectoral supply of products, with a corresponding adaptation in skills. To this end, the pioneering work done by the printing sector on socially responsible restructuring may be transferable to other sub-sectors. All the F-BI stakeholders are thus encouraged to continue to collect and disseminate data and other information as a basis for decision-making on company restructuring. In this context, the four F-BI sub-sectoral social dialogues may have a key role in facilitating this transformation.

The restructuring, especially for small and micro firms, can be facilitated also at the Member States' level, through for example: co-ordination (co-operatives, networking, clusters); implementation of the EU Small Business Act (SBA)<sup>39</sup> and other relevant SME schemes;

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<sup>38</sup> Directive of the European Parliament and of the Council of 6 July 2005 amending Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels (2005/33/EC).

<sup>39</sup> Commission Communications: *“Think Small First” - A “Small Business Act” for Europe* (COM(2008)394 of 25.6.2008) and *Review of the “Small Business Act” for Europe* (COM(2011)78 of 23.2.2011).

promotion of and training on how to use the European Social Fund (ESF)<sup>40</sup> and European Globalisation Adjustment Fund (EGF)<sup>41</sup>, including for retraining & re-skilling of employees in industries undergoing severe structural adaptation; and providing an access to finance at competitive rates.

### **Innovation & RTD**

The EU is a high-cost producer of wood-based and related products. So, in addition to providing technological advances, RTD and innovation are needed for resource- and energy-efficient processes and new innovative products, which will contribute to reducing production cost and increase added value.

Beyond incremental improvements, breakthrough technologies, together with new cross-sectorial business models are needed for the F-BI's transition to Europe 2050, supporting more added value and jobs. "Bio-based" products, as outlined in Horizon 2020<sup>42</sup>, offer important scope for this within the fourth F-BI value chain.

The Forest-based Sector Technology Platform (FTP) is a key independent instrument for coordinating sectoral RTD and innovation strategy, such as the Strategic Research Agenda (SRA) and its 2030 Vision, and participation in EU frameworks like Horizon 2020 & COSME<sup>43</sup>. European Innovation Partnerships (EIPs) and SPIRE<sup>44</sup> also offer potential. Even so, access to projects still remains difficult for small and micro firms, for which development is often expensive, e.g. re-tooling costs, and it also represents a high risk.

In addition to the EU Programmes - COSME and Horizon 2020, Member States and the F-BI may identify and develop means, for small and micro firms to participate in RTD & innovation (including design) and facilitate their access to R&D funding. In appropriate cases, they could then catalogue and spread such good practices, also sharing them at EU level, including with linguistic translations. In this context, the Commission may have a coordinating role to play.

Furthermore, the European Structural and Investment Funds (in particular the ERDF, the European Agricultural Fund for Rural Development (EAFRD) and the ESF) may be invested into research and innovation in the area of forestry, wood-based and related products, provided such investments form part of the relevant national or regional smart specialisation strategies.

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<sup>40</sup> European Social Fund. Available on: <http://ec.europa.eu/esf/home.jsp>.

<sup>41</sup> European Globalisation Adjustment Fund. Available on: <http://ec.europa.eu/social/main.jsp?catId=326&langId=en>.

<sup>42</sup> Commission Communication: *Horizon 2020 - The Framework Programme for Research and Innovation* (COM(2011)808 of 30.11.2011).

<sup>43</sup> Programme for the Competitiveness of Enterprises and SMEs (COSME) 2014-2020. Available on: <http://ec.europa.eu/cip/cosme>.

<sup>44</sup> Sustainable Process Industry through Resource and Energy Efficiency. Available on: [www.spire2030.eu](http://www.spire2030.eu).

## **Education, training and skills, including shortages; ageing workforce**

Needs for education, training and skills, including to maintain high labour productivity, span all F-BI sub-sectors, but their lack is starkest in small and micro firms in: wood harvesting, woodworking, furniture and printing. New F-BI entrants need not only qualifications but must also gain sectoral knowledge, such as artisanal crafts, from experienced staff. Combined with their own experience, these build their skills. All staff also need life-long learning to enhance skills, improve productivity and supply new markets.

Ageing workforces persist across all the F-BI, often partly because of a negative sectoral image and modest pay deterring young entrants, who may be more attracted to other, more tempting careers. Decent work, fair pay and working practices, flexible to evolving technical and social needs, are essential to attract and retain staff. Moreover, shrinking workforce due to an ageing population in the EU and urbanisation also concern forest owners and thus negatively impact on the wood mobilisation. With regard to the latter, the ageing and urbanisation of forest owners raises the need for them to have access to relevant education, training and skills development. This issue is addressed in the new EU Forest Strategy: for forests and the forest-based sector, which this Blueprint accompanies.

In this context, it would be worthwhile for employers and trade unions, vocational and educational institutes and other bodies involved in education and training systems and other stakeholders, as appropriate, to work together, especially within the relevant EU Sectoral Social Dialogue Committees and European Skills Alliances, to identify needs and provisions for education, training and skills development throughout the F-BI and wood harvesting. The scope could include: mapping of F-BI & related sub-sectors, so as to match tasks with qualifications; development and use of training courses and skills standards; exchange programmes between students and professionals; skills transfer between experienced craftsmen and new entrants; development of work-based learning and apprenticeship systems (within the European Alliance for Apprenticeships); life-long learning (LLL) to adapt to new technology and markets, and adapting work patterns to evolving societal needs.

In addition, the deployment of new and advanced technologies in the F-BI sectors could lead to the generation of new knowledge intensive and high-tech jobs, which could be appealing to the new generations and help to rejuvenate the sector workforce.

With a view to adapting knowledge and skills, the F-BI stakeholders may engage in a network of Research, Education and Training Centres on sustainable raw materials management. There could be scope to include such an initiative into the Knowledge and Innovation Community (KIC)<sup>45</sup> on Raw Materials.

Specific elements that cannot be addressed through existing EU or national programmes, could be further explored by the Commission, together with the above actors, to find solutions.

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<sup>45</sup> European Institute of Innovation & Technology. Available on: <http://eit.europa.eu>.

### **Coherence of EU legislation and costs arising**

Real or potential inconsistencies within and between both EU and Member State policies affecting the sector, may have unintended consequences with related administrative burden and costs.

In this context, a cumulative cost assessment of the EU legislation affecting the EU F-BI value chains might provide a valuable feed-back for future policy making, including “smart regulation”<sup>46</sup>. The results could contribute to a wider analysis of impacts, including costs, benefits, and coherence, of policies and legislation.

Furthermore, as part of a review foreseen for 2015 of the functioning and effectiveness of EU "Timber Regulation" (EU TR)<sup>47</sup> in preventing illegal wood and wood-based products from being placed on the EU market, the Commission will look at the administrative consequences of the Regulation, in particular for small and medium-sized firms. The impacts on micro enterprises could also be considered, ideally hand-in-hand with overall cost-efficiency. As regards the product coverage outlined in its annex, this will also be reviewed and, if appropriate, be revised via delegated acts. Specific consideration will be given to Ch. 49 (Printed goods) of the EU Combined Nomenclature, taking into account the competitiveness of the sectors concerned.

Means may also be examined to improve the coherence, efficiency, cost-effectiveness and traceability of providing and accessing technical information (e.g. phytosanitary; legality & sustainability; standards; product safety, etc.) required to place wood and wood-based goods on the EU and other markets, as well as in procurement processes, labelling schemes and other contexts.

In this context, it would be also important to avoid having different sustainability criteria for different wood assortments, depending on respective end uses.

### **Implementation of EU climate policy, including beyond 2020**

The climate change mitigation potential and contribution of the F-BI is explicit in the carbon-accounting rules for land use, land-use change and forestry (LULUCF)<sup>48</sup>. The international rules for reporting and accounting of the so-called harvested wood products (HWP), e.g. sawnwood, panels and paper, were developed at the 2011 Durban climate conference and now allows for recognition of the storage of carbon in wood products. The EU rules for applying for the Greenhouse Gas reporting and accounting of Member States (and other parties to the Kyoto Protocol) but not the individual enterprises.

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<sup>46</sup> Commission Communication: *Smart Regulation in the European Union* (COM(2010)543 of 8.10.2010).

<sup>47</sup> Regulation 995/2010.

<sup>48</sup> Proposal for a Decision of the European Parliament and of the Council on accounting rules and action plans on greenhouse gas emissions and removals resulting from activities related to land use, land use change and forestry (COM(2012)93 of 12.3.2012).

Production and energy emissions of energy-intensive F-BI sub-sectors, specifically of wood-based panels and pulp & paper, are subject to the Emissions Trading System (ETS)<sup>49</sup>. These are on the list of sectors liable to "carbon leakage"<sup>50</sup> (relocation outside the EU due to high carbon price), being revised for 2014. It is important that the revision of the list is performed in an open and transparent manner, in accordance with the requirements of the ETS Directive, taking fully into account the specific features of industries and preserving the competitiveness of the industries, including energy costs.

### **International competition, trade and co-operation**

The EU F-BI provide high-quality goods and services to high technical, social and environmental standards. Global competitors, availing of similar technology levels but not subject to the same discipline, produce and export at lower costs. Moreover, they often benefit from production and/or export subsidies from their governments, and in some cases abuse EU intellectual property rights (IPR), e.g. for designs, whilst corresponding EU exports often face tariff barriers on other markets.

In this context, trade agreements and relevant trade-defence instruments are essential tools for addressing these challenges, in order to provide a more level global playing field. Nevertheless, the differences in the countries' competitive advantage will remain. In addition, the Commission could continue to pursue sectoral dialogues with major F-BI trading partners such as Russia, Canada and Japan on wood-based and related products. It may also convene meetings at appropriate levels, on sectorally relevant issues (e.g. competitiveness, market access, standards, FLEGT) in the form of a public-private sector round table, including when necessary with the F-BI of key partner countries.

### **Information, communications and image**

Information of all kinds (data, legislation, etc.) is the life-blood of the F-BI, flowing within and between sub-sectors and beyond. One resultant of this information is the set of sectoral images perceived by the F-BI itself, EU and Member State institutions and the public. Accordingly, improved information and its better communication within, to and from the EU F-BI, would improve the efficiency of sectoral functioning and hence contribute to cost reduction.

In this context, the industry's "Two Sides" initiative, which aims to promote the responsible production and use of print and paper and to dispel erroneous technological or environmental misconceptions pertaining to them, is helpful.

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<sup>49</sup> Directive of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community (2003/87/EC).

<sup>50</sup> Commission Decision of 24 December 2009 determining, pursuant to Directive 2003/87/EC of the European Parliament and of the Council, a list of sectors and subsectors which are deemed to be exposed to a significant risk of carbon leakage (2010/2/EU).



It is therefore essential that all stakeholders and other interested parties substantiate their statements and commitments, for example regarding the technological and/or environmental performance of the use of electronic media versus paper-based media. Distinguishing between these two formats could be by means of adequate *a priori* impact assessments based on life-cycle analyses (LCA). To this end, comparative LCAs by F-BI stakeholders on the technological advantages and environmental impacts of digital and paper media could be valuable.

More widely, the F-BI stakeholders could also engage in raising their awareness of sub-sectoral issues having impacts along their overall value chains.

With an aim of increasing sectoral awareness, knowledge and visibility among EU and Member State bodies and the public, the F-BI are encouraged to carry out information campaigns, including on-site visits. Such actions could ideally include: presenting the F-BI to young people, e.g. school visits; providing knowledge exchanges between the Commission and Member States' services and the F-BI on each other's activities; increasing public interest in and knowledge of the legal and sustainable sourcing of wood, wooden materials and wood-based products, together with their other sustainable aspects, all on an LCA basis, including for making informed consumer choices.

Member States and F-BI stakeholders, in addition to existing and planned actions, may also identify and develop events for sectoral visibility and help improve the sectoral image, such as initiatives rewarding innovation in the sector, a European Annual F-BI Communication Day - with site visits to F-BI plants throughout the EU, annual joint F-BI sectoral events (including EU institutions et al.), annual college & university days for prospective F-BI students.

## **VI. Conclusions**

Given the above steps needed to make this transition and the accompanying need for sectoral restructuring to achieve it, a radical change in mind-set is also needed amongst all the F-BI's stakeholders (employers, trades unions, public authorities, academia, customers, etc.) and other interested parties. This is especially vital in industries dominated by SMES and micro firms, many of which are family-owned businesses.

The Commission's role will be to inspire, co-ordinate and facilitate sectoral involvement to carry out these activities and will be assisted by the Advisory Committee on Community Policy regarding Forestry & Forest-based Industries and its working groups, one of which has already assisted during 2012 in helping to identify the challenges and activities developed here. To assist in overseeing the implementation of this Blueprint, the updated AC F-BI, the EU Expert Group on Forest-based & Related Industries, could set up a working group and hold a minimum of a meeting every year to monitor and assess sectoral progress and report to the Commission. Where appropriate, the implementation will be in cooperation with the Standing Forestry Committee and with the Advisory Group on Forestry and Cork. AC F-BI will remain platform for issues related to industrial value chains.