

## THE FOREST-BASED SECTOR IN EUROPE - STATUS, STRUCTURAL CHANGES AND FUTURE PROSPECTS - AS SEEN FROM THE NORTH

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The paper discusses issues relevant for forest-based products and their markets, and how recent, ongoing and anticipated future changes, will both challenge and provide new opportunities for the forest-based sector. Less emphasis is put on the forest resources and the provision of raw material and other ecosystem services from the forests. This reflects the view that, although the development of forests, the functioning of forest ecosystems and supply of wood is important, nevertheless the major driving forces to the sector comes from the forest products demand side.

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### 1. Background and introduction

This presentation is based on the report *Future of the European Forest-Based Sector* (Hetemäki, 2014) in the series *What Science Can Tell Us* (report 6) from the European Forest Institute. In addition, we point to some events from the policy-arena, on global and on European level, that has taken place after the report was finished. The European forest-based sector (FBS) is seen “from the north”, emphasizing the most relevant structural changes and drivers in the perspective of a region rich in boreal forests, with significant forest-based industries as well as bioenergy or bio-material potential based on forest biomass, and numerous private forest owners to whom forests generate income.

Our emphasis is on issues relevant for forest-based products and their markets, and how recent, ongoing and anticipated future changes, will both challenge and provide new opportunities for the forest-based sector (FBS). Less emphasis is put on the forest resources and the provision of raw material and other ecosystem services from the forests. This reflects the view that although the development of forests, the functioning of forest ecosystems and supply of wood is important, nevertheless the major driving forces to the sector comes from the forest products demand side. This is pronounced for the north-European countries with small population size and domestic markets, and their current and future forest based sector is very much dependent on the export markets. In short, we believe that if we want to understand changes in forests, or environmental sustainability, we have to consider also the products.

### 2. The forest-based sector in Europe-status

Forests cover about 44 percent of the European land-area and the forested area is increasing. Forest products are

still the biggest income and employment generator in the European FBS offering more than 2 million jobs. The value of European forest products sales in 2012 can be estimated to around € 200 billion, which is a bit more than the total turnover of European company giants like Nestlé, PSA Peugeot Citroen and Deutsche Telekom together. 379 mill. m<sup>3</sup> of industrial round wood was harvested from European forests (excluding Russia) in 2014 (FAOSTAT).

Based on a rough estimate this harvest generated € 15 billion in gross income to forest owners.

The current state of the European forest-based sector could be labelled as one of *creative destruction*. Joseph Schumpeter, who used it to describe the functioning of market economies, coined the concept in the early 1940s. By creative destruction, Schumpeter describes a “process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one”.

This continuous evolutionary process serves to maintain the vitality of capitalism, or market economy, as we would call it today. It highlights the fact that some economic activities or sectors will eventually decline and vanish, while at the same time, new technologies, products and business models are emerging.

Destructive processes include: i) Declining demand for communication paper products, and stagnating demand for a number of other forest products, ii) Very long economic slump in the EU since 2008 and its many impacts and iii) Move of some forest industry investments to fast-growing markets in Asia, or low-cost production regions like South America.

The European forest products output have been declining by 10-15 %, since the financial crisis started 2007/2008, see Figure 1.

For the first time in history, the output from the European paper industry have been stagnating and falling.

Also the output of sawnwood has been falling over the same period, mainly due to the economic downturn, and it's likely that the long economic slump will also cause structural impacts.

For the first time in history, the graphics paper production has started to decline in many European countries, mainly because of new digital media platforms replacing the need for it. On the other hand, the production of some of the other traditional forest products (packaging products in aggregate and sawnwood) has been either low compared to past decades, or even stagnating in the early years of 21<sup>st</sup> Century. The major factor behind this has been the increasing role of the emerging countries as forest products producers. The world manufacturing powerhouse of China, and the fast growth forest plantation super-powers in Latin America, are especially significant producers (Fig. 2). In relation to these overall trends in forest products output in Europe, there is naturally variation depending on the particular product and country. In addition, the economic slump since 2008 has had a significant negative impact on European forest products markets. However, it is difficult to quantify to what extent these trends have been the result of the slump and to what extent they have been due to structural changes that will last also once the economic upturn starts.

As production of forest products have been falling, also the demand for and production of roundwood has declined. The period from 2007-2013 (six years) has been the longest consecutive decline in roundwood production in Europe over the last 50 years (Fig. 3).

### 3. Future outlook

The creative destruction has also a positive - creative - side. One example of this is that structural changes, discussed above, are acting also as enforcing drivers for the European forest products industry to renew itself. It simply has to develop new businesses in order to sustain and grow. Furthermore, there are enabling drivers that are helping the creation of these new businesses. Technological development and advances in utilization of forest biomass for various new purposes has been active in the past decade. In addition, an even more important driver, which is also partly behind the technological development, is the need to tackle climate change.

The Kyoto Protocol, the EU emission trading scheme, and the 20-20-20 targets of the EU have been important means to start to address the problem. However, due to the economic crises and other reasons, the political measures to change current trends to mitigate climate change have been somewhat lukewarm. Yet, there are recent promising signs pointing to potentially more significant steps in combating climate change. Perhaps the most important one was the fact that for the first time, China and USA (at the federal level) announced willingness to implement measures to reduce CO<sub>2</sub>-emissions. This could be a turning point in global climate negotiations, and is giving more hopes for these negotiations in Paris December 2015. Furthermore, there have been important declarations and pleas for more significant actions. For example, in November 2014,

IPCC launched its fifth assessment synthesis report (IPCC, 2014). In it, is also addressed measures needed in the FBS, such as:

*“Depending on the level of overshoot, overshoot scenarios typically rely on the availability and widespread deployment of bioenergy with carbon capture and storage (BECCS) and afforestation in the second half of the century.”* (page 15)

*“Many models could not limit likely warming to below 2°C if bioenergy, CCS, and their combination (BECCS) are limited (high confidence).”* (page 17)

*“The most cost-effective mitigation options in forestry are afforestation, sustainable forest management and reducing deforestation, with large differences in their relative importance across regions; (medium evidence, high agreement).”* (page 19).

In addition, EU leaders agreed in October 2014 on the new 2030 greenhouse gas reduction target of at least 40% compared to 1990 (EU 2030 Climate Action, 2014). The sectors covered by the EU emissions trading system (EU ETS) should reduce their emissions by 43% compared to 2005. Emissions from sectors outside the EU ETS need to be cut by 30% below the 2005 level. The policy aims to make the European Union's economy and energy system more competitive, secure and sustainable. It sets a target of at least 27% for renewable energy and energy savings by 2030.

These pleas, evidence, and political commitments are promising signs that more significant steps will be taken to address the build-up of greenhouse gases in the atmosphere. Most likely they would also mean a higher CO<sub>2</sub>-price in the future. This would be an important and necessary means (enabling factor) for the European FBS to launch new bio-economy businesses, and also help to replace the fossil-based businesses. Below, we discuss some new opportunities likely to benefit from these developments. New opportunities have emerged for the European FBS in the past decade. Forest industry is changing strategies and business models, and investing in new products, such as 2<sup>nd</sup> and 3<sup>rd</sup> generation biofuels, biochemicals and engineered wood products. Moreover, the changes in markets are also creating new demand for some old products, such as dissolving pulp and tall oil. Demand for dissolving pulp has globally been growing around 10% annually in recent years, especially driven by the need to substitute cotton by other raw materials in the textile industry. On the other hand, tall oil has started to be used also as a raw material for liquid biofuels, not only for chemicals or for direct combustion as in the past. The forest-based sector is also becoming more cross-sectoral, as other industry sectors and investment groups are starting to produce new products and services based on forest biomass. Thus, forest industry companies are diversifying their business strategies and product portfolios by developing new products and services based on forest biomass.

It seems evident, that the European forest industry will break up into several segments that are specialized in a variety of products in the future. A number of new products are likely to be based on high value-added products rather than bulk products. Due to this diversification, it less appropriate to talk anymore about the “forest industry”

or “forest sector” in the sense that has been traditionally accustomed. The FBS is increasing singly in transition into the new bioeconomy, which is more extensive and diversified than the current “forest sector”. In summary, the European FBS will be in a major transition period in the coming decade.

The development within the wood products sector is central. In many ways, the solid wood products constitute the “economic engine” of the forest-based value-chains. This part of the FBS is much older than the pulp and paper industry, and in this way also even more mature. Over the last couple of decades, there has been a number of technological, process and business developments in wood construction and building opening up new opportunities for the whole FBS. Combined with possible political climate change motivated targets stimulating the use of wood building materials over concrete and steel, this may give large opportunities for increased activity. Wood-based construction systems have quite recently been technically proven and legally accepted for multi-storey buildings, and not only limited to small-scale buildings or family houses. This also opens up for the use of prefabricated engineered wood-products (EWP) on a large scale. One promising technology is the cross-laminated timber (CLT) elements or modules. The CLT and prefabricated element- or module-industry is closer to the construction and building sector than to traditional “two by four” sawmilling.

A CLT-module consists of a number of value-added services such as engineering, architecture and design, technical work and installations (plumbing, electrical wiring). Wooden-based building modules also have advantages in transportation and logistics, being relatively lightweight.

An interesting concept is the forest bio-refinery and the closely related concept of the “bio-product mill”. What this means, can be understood through an example. In Finland, a major traditional forest industry company investing €1.1 billion to build a bio-product mill that starts operating in 2017. Although the mill’s major product would still in the early phase is pulp for paper, it has some important novel features.

First, the forest biomass will be refined into bio-materials, bioenergy, bio-chemicals and fertilizers, using no fossil fuels at all. That is, it will be 100% based on renewable raw materials and side streams of the production process. Secondly, the operating model will be based on an efficient partner network with other companies also operating at the mill site. Thus, new products will be created in a collaborative network, which creates opportunities especially for small and medium-sized enterprises (SME) to produce innovative bio-products with high added value. The global big, and often multinational, companies may concentrate more on the large volume and very capital intensive products, whereas the SMEs may operate on the niche product markets. This could be one option to better utilize the opportunities and synergies that the bioproduct mill concept offers, and also become more resource-efficient. Another development that creates new possibilities for many European forest-based op-

rators, but which so far has been very much neglected, is the services related to forest-based products.

The FBS is likely to follow the trend in other manufacturing sectors in OECD-countries, in that increasingly the value added and employment in the sector comes from different types of services related to the products.

The digitalisation, or the industrial internet, has made it possible to develop new services related to the products (e.g. monitoring, remote servicing), and disaggregate the product value chains to tasks, that may be produced in many different geographical locations, and by a number of different enterprises. It may be the case, that increasingly in the future, the high-cost Western European countries focus their activities in services related to the new products rather than the actual manufacturing.

However, this possibility and its implications on the European forest-based sector have hardly been addressed in research, neither in EU forest or bio-economy strategies, national forest policy documents, and industry vision papers, nor has there been published any outlook for the services development.

These shortcomings should be addressed in research as well as by decision makers. Especially in Finland, Norway and Sweden there is a long history of large pulp and paper industry companies, and these companies have become increasingly multinational since around 1990. On the other hand, there are large numbers of SME companies in the wood products sector. Given the strong role these companies still have in the countries, it is expected that the new business will develop to a significant degree along the existing forest businesses. That is, the transformation to new products and services in the coming decade(s) is likely to be financed to a major degree from the turnover of the current forest products. There are already, and will increasingly be in the future, also other operators utilising forest biomass for products, such as energy, chemicals and food industry, and private investment groups. However, at least in the coming 5-10 years, the current forest industry companies will most likely be still in a major role in the process of transforming the sector to new products and services. Therefore, it will be important for their current activities to stay competitive and profitable. It is through the turnover generated by these activities that the transformation to new products mainly will be financed.

#### 4. Concluding remarks

The structural changes that are going through the European FBS seem to be even more striking in Nordic Countries region, where there has been heavy concentration on paper industry, and particularly the graphics paper industry (Finland, Norway).

That is, some of the traditional forest industry products are likely to be stagnating or declining, rather than increasing. Yet, at the same time, the renewal of the FBS is perhaps stronger in this region than anywhere else in Europe. Given the above developments, industrial roundwood demand in Western Europe for the traditional forest products may decline in the coming decades.

There is a need for an updated and more detailed assessment of the impacts of recent trends from forest products markets to forest biomass markets.

The changes in traditional forest industries production have also various implications on bioenergy markets due to many dependencies and feed-back loops. There is a need to reassess these dependencies and their impacts on bioenergy production and forest biomass flows in light of the recent trends in forest products markets. Also, at an EU level, it may be better to focus on general strategies and policies, and follow the subsidiarity principle, rather than impose uniform, detailed and inflexible directives.

In terms of *forest resources* and *what forests mean for the societies*, the regions and countries in Europe differ significantly, much more so than e.g. with respect to agricultural resources. For example, in Finland forests cover about 78% of the land area, while less than 9% in the Netherlands. Or in Poland, over 80% of the forest area is owned by the state, whereas in Portugal private owners control more than 90% of the forest area. These simple statistics illustrate just some of the important differences in forest sector issues in Europe. The operating environment is many-sided, complex and continuously evolving, and there are specific regional characteristics and differences within Europe. The European FBS is unlikely to be successfully supported by one overarching simple strategy or policy, although we might like it to be that way. Certainly, simplicity and consistency are virtues that should be pursued. However, under the surface of a simple policy goal is often a more complex reality. For example, a catching 20-20-20 type of target efficiently is in principle simple, but the policies needed to achieve this type of target are unlikely to be so. In summary, when providing the outlook for the European FBS and designing the policies, it is essential to bear in mind the regional diversity. Thus, there are many forest-related issues for which it may not make sense to try to impose *one size fits all* policies. But exactly for this reason the situation also very much stresses the need for a systematic and informed coordination of different policies at the European level.

In summary, some of the main challenges and opportunities for the FBS in Europe will be the following:

- How to successfully transform and renew the forest businesses within the next decade? How to keep the current businesses still profitable, while at the same time launch the new businesses gradually?

- How to respond to the increasing global competition from the emerging economies (e.g., China, South-America, Russia)? Possible options: Move to new higher value added products and services, enhance even more the sustainability approach and branding to differentiate from competitors, increase productivity.

- How to cope with the graphics paper capacity? Possible options: Disinvest graphics paper capacity, or increase market shares in order to better control pricing.

Status quo option is not likely to be successful in the long-run.

- In many North-European countries, at least before 2020, it is not likely that the biomass supply is going to be the main bottleneck, but rather the innovation of new competitive products and services, for the future development and renewing of the industry.

A major question is also; to what extent will the North-European region in the future be a raw material processor of forest biomass to new products, and to what extent a service provider for these products? Where can we expect the competitive advantages of European industries to be in the future? Most likely, the services part will increase its relative importance.

Services are considered to have a significant and growing role in the new bio-economy value chains. Increasing the service-intensiveness of the products and immaterial value creation are clear trends that will open up new business opportunities, in particular for SMEs, and encourage cooperation and partnerships between companies.

To promote bioeconomy competitiveness and growth it is important to utilize regional specialization based on local or regional strengths and resources, as well as internal EU and global market opportunities. The idea of having large industry-“locomotives” networking with more specialised SMEs producing niche-products from side-streams of a biorefinery or bioproduct mill, appears promising.

There are many examples of promising plans and projects, such as, Metsä Group bioproduct mill at Äänekoski, Finland, BorregaardSarpsborg demo biorefinery (BALI), Statkraft/Södra biodiesel planning project at Tofte, Norway, UPM Lapeenranta second generation biodiesel production from tall oil, and Moelven or Stora Enso engineered wood products for multi storey buildings (e.g. CLT modules). This is in no way an exhaustive list, there are a large number of other interesting plans and projects that have in recent years been launched. In addition to forest industry, private investment groups' and energy companies plans to produce heat, power and biofuels from forest biomass with new and more resource-efficient technologies appear promising. Increasing added value of bio-based products and services and increased appeal for customers can be obtained by investing in brand management, intellectual property rights and design, while also achieving competitive advantages that are difficult to imitate.

Traditionally the FBS has been dominated by two industries in North-European region: the pulp and paper industry, and the wood products industry.

In the future, it seems to become much more diversified and less homogenous. This is likely to have many new implications. For example, new companies coming from energy industry, chemicals industry and private investment companies can also bring much needed financing as well as other competencies, know-hows and skills of great value for the transformation of the FBS.

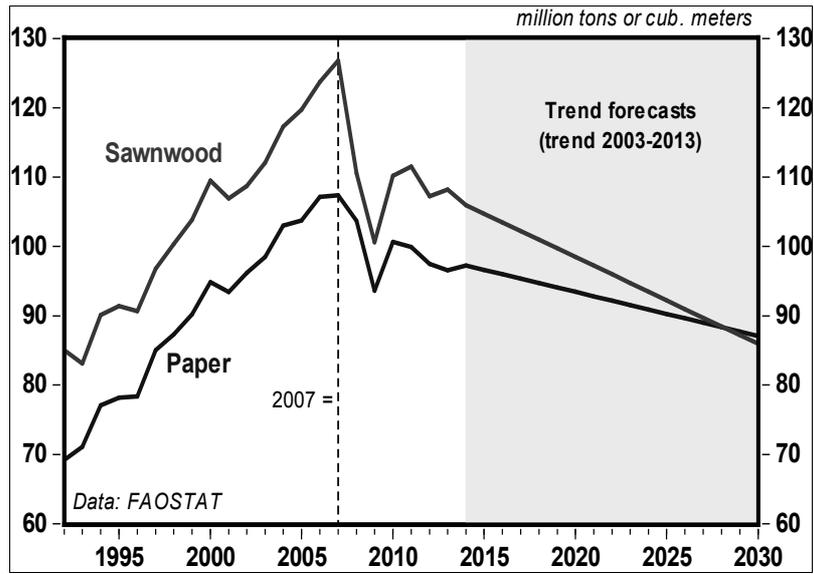


Figure 1. Production of paper and paperboard (million ton) and sawnwood (million m<sup>3</sup>) in Europe 1992-2013, and trend forecasts to 2030.

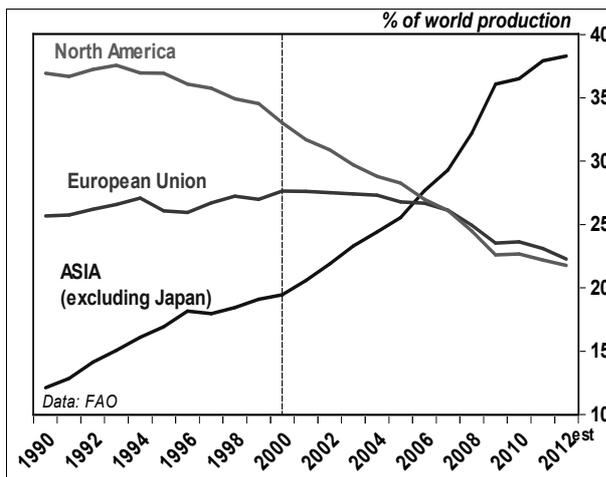


Figure 2. The Market shares of world paper and paperboard production 1990-2012.

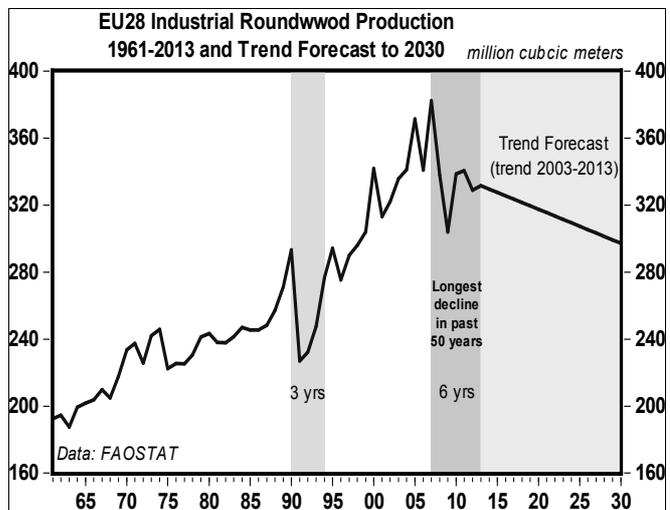


Figure 3. Industrial roundwood production (million m<sup>3</sup>) in Europe 1961-2013 and trend forecast to 2030.

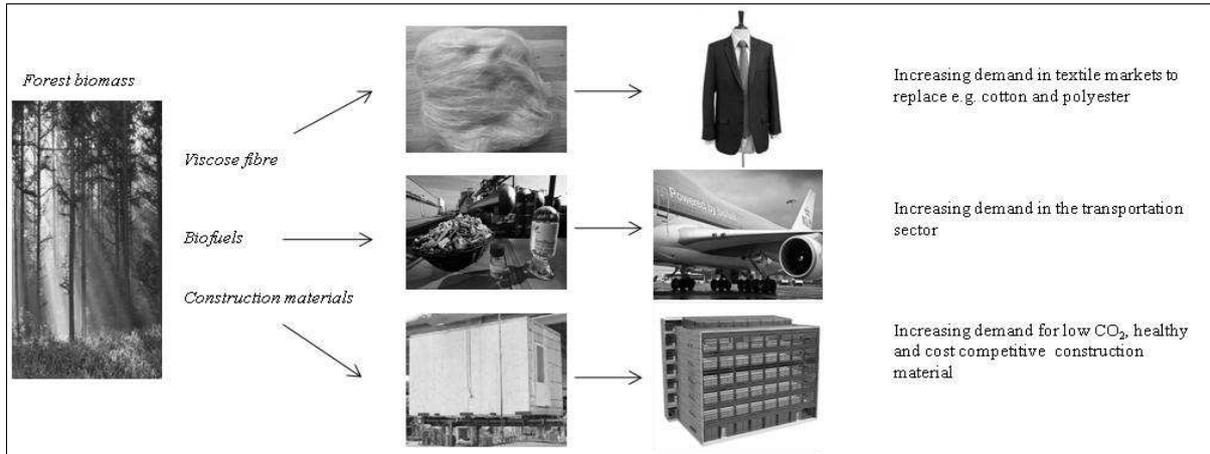


Figure 4 Examples of product categories based on forest biomass, with promising future markets.



Figure 5. Left: 8-storey CLT-blocks for student-housing, Ås, Norway, finished 2013 (Photo: HåkonSparre, NMBU). Right: 14-storey combined CLT-modules and gluelam-frame, Bergen, Norway. Under construction 2014-2015 (Animation: 3Seksti/Artec/Sweco).

## RIASSUNTO

### Il settore forestale in Europa: stato, cambiamenti strutturali e prospettive future da una prospettiva nord-europea

Il contributo prende in considerazione le tematiche relative ai prodotti di origine forestale e a i loro mercati. Vengono analizzati in particolare gli sviluppi recenti e i cambiamenti previsti nell'economia del settore forestale, evidenziando le sfide e le nuove opportunità del mercato. Minore enfasi è posta sulle risorse forestali e sull'offerta di materie prime e di altri servizi eco-sistemici delle foreste dal momento che, sebbene lo sviluppo delle foreste, il funzionamento degli ecosistemi forestali e la fornitura di legno siano aspetti importanti, le principali forze trainanti del settore sono collegate alla dinamica della domanda di prodotti forestali.

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