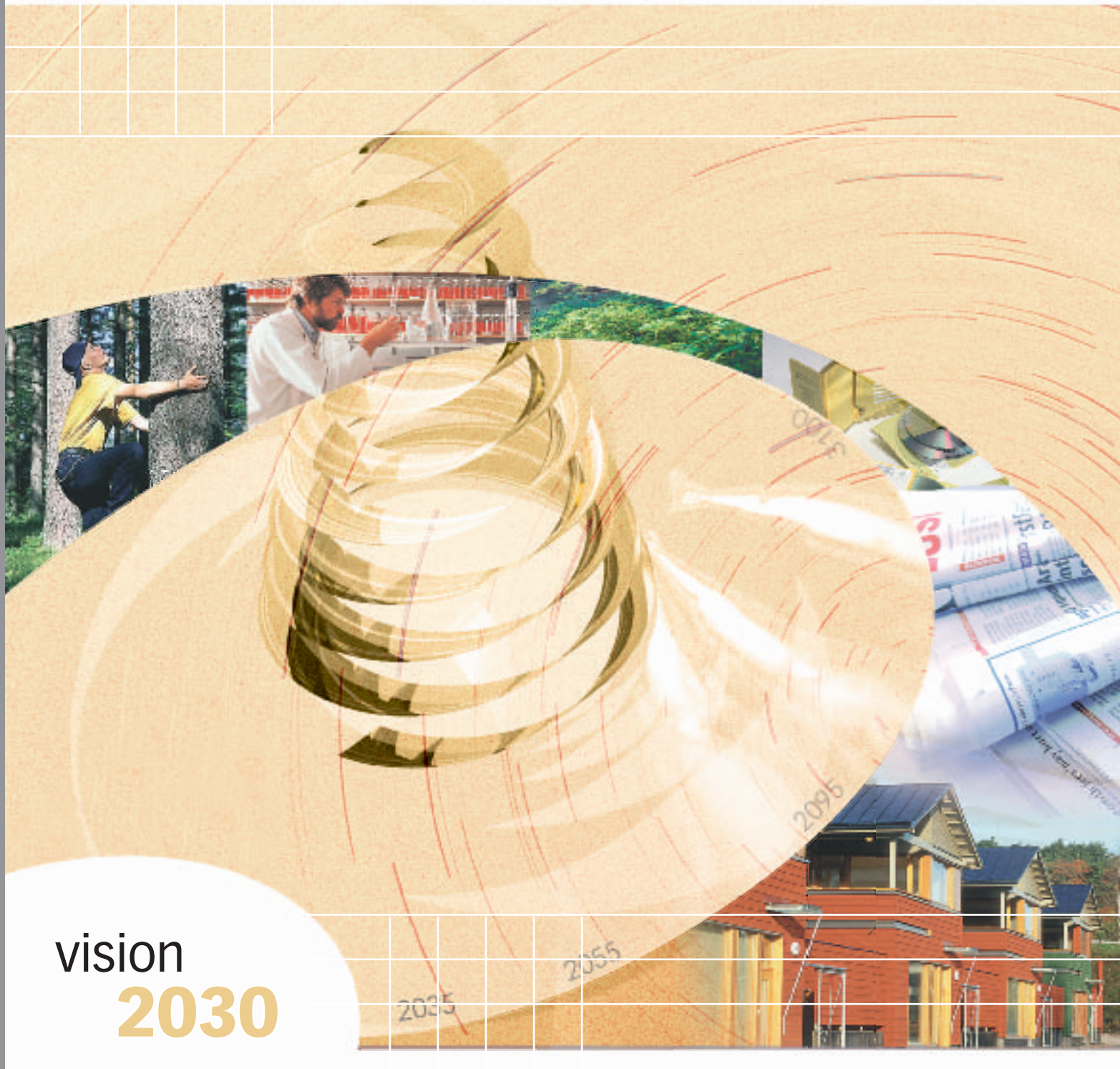
# INNOVATIVE AND SUSTAINABLE USE OF FOREST RESOURCES




vision
2030

A TECHNOLOGY PLATFORM INITIATIVE
BY THE EUROPEAN FOREST-BASED SECTOR

CEI-Bois

CEPF

cepi

EUROPEAN COMMISSION

## Vision 2030

*The European forest-based sector plays a key role in a sustainable society.*

*It comprises a competitive, knowledge-based industry that fosters the extended use of renewable forest resources.*

*It strives to ensure its societal contribution in the context of a bio-based, customer-driven and globally competitive European economy*

# Preface

The European Union has a major challenge ahead: to reconcile its goal for economic growth with the imperative of protecting the environment and enhancing the European social model. The forest-based sector, with its unique characteristics, can contribute significantly to creating a sustainable European society. As a starting point, the major stakeholders engaged have one important thing in common, namely the resource base: forests. This base provides a renewable raw material – wood – as well as several ecosystems and societal functions.

The way forward for our sector must be to increase competitiveness while continuing to build on our competence in providing services that enhance sustainability. New products and markets, together with smart applications, derived from societal needs will be the cornerstone of value creation. The development of new technologies will contribute to increased eco-efficiency. Innovation, research and knowledge must therefore underpin any approach that aims to drive the forest-based sector forward.

The issues affecting today's economy are global and interconnected. As a result, they have to be addressed through an innovative, holistic approach, with knowledge and technology as essential components. We believe that the forest-based sector's Technology Platform, involving all stakeholders and supported by the European Commission, is a powerful instrument to maintain and enhance global industry leadership. To this end, the forest-based sector must operate in a regulatory framework in which competitiveness plays a vital role. We must also complement that framework with communications that aim to make society fully aware of the benefits the forest-based sector presents for current and future generations.

This document presents the comprehensive assessment that has been undertaken to codify the key factors, challenges and opportunities that will drive our sector. The result is the formulation of a vision for the next two decades. The next step will be to develop a Strategic Research Agenda inspired by that long-term vision. The dynamic process by which the Strategic Research Agenda will be defined will provide a solid basis for identifying the thematic priorities for future research to take us forward.

We would like to thank all those who have contributed to bringing to life our vision for the future. Up till the launching of the platform, the major consultations have been between the core stakeholders in the areas covered by the three European confederations CEPF, CEI-Bois and CEPI. Those organizations representing the research which will deliver breakthrough technologies, products and services for a world competitive, sustainable and consumer-friendly forest-based sector, have also participated extensively in the development of this document.

We also wish to acknowledge numerous consultations with the Commission services in developing our platform up to the present point.

We believe that realizing our vision will require an open and flexible approach. In launching this document we invite all interested parties to contribute to making that vision a reality.

Brussels, 15 February 2005

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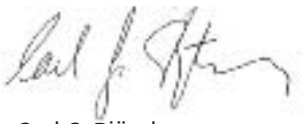

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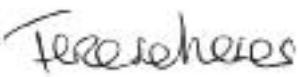

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# Executive summary: Investing in the future

The **forest-based sector** includes all stakeholders with major interests in forestry, forest-based materials and products. It provides essential products and services for a more sustainable society. Accounting for 8 % of manufacturing added value in the EU; using a renewable and continuously growing forest resource; counting 16 million private forest owners; providing between three and four million jobs in industry; and comprising world-leading companies, the sector clearly demonstrates its strong economic and social weight. Notably, it enjoys global technological leadership and occupies a leading research and business position at international level.

The vision of the forest-based sector is that by 2030, it will be a key contributor to a sustainable European society. It will operate a competitive, innovative and knowledge-based industry, fostering an extended use of renewable forest resources. In a new, bio-based and customer-driven European economy, it will make significant societal contributions.

The sector faces significant **challenges** to its *competitiveness*. A unique strength is derived from its *sustainability* and its role in mitigating climate change. But the issue is not simple: securing the availability of raw materials while respecting the varied uses of forests will continue to be a demanding task. A central factor for success lies in an economic and environmental balance of the use of forest biomass for products and energy. Substantially improving the industry's *energy* balance is another important element.

In working towards a more sustainable *society,* it is vital to pursue the development and design of products that meet present and future *customer needs*, whilst being recyclable. Process innovations will not only have to support sustainable development but also to improve flexibility in manufacturing whilst significantly decreasing capital costs. The challenges posed by new competition from other parts of the world must be met. When looking to the future, it is essential to secure the long-term competence base and the innovative lead of the sector, as well as actively participating in a single market for knowledge and succeeding in attracting young talent.

The sector will not only be able to meet these challenges, but more importantly, can take advantage of **opportunities** to provide significant social, economic, environmental and technological benefits. Through strategic investments, by fostering alliances and with political support, the forest-based sector will be in a position to significantly increase the use of forest-based materials whilst maintaining other important functions of forests such as biodiversity and recreation. Development of processes and high value added products, increased substitution of non-renewable materials with forest-based materials, as well as "green chemicals" and "green electricity" are major opportunities for the sector.

Meeting the challenges posed and taking advantage of the opportunities presented through the governance mechanism represented by a **Technology Platform** offers significant benefits in many areas. In the research and development field, it facilitates focused investments and fosters a more efficient approach to innovation, whilst stimulating coordination of European and national research agendas. A Technology Platform will also support the ongoing development of a relevant knowledge base for the sector and the application of emerging technologies. It allows for the engagement of all key stakeholders, including public ones, stimulates partnerships with other sectors and provides a basis for political dialogue.

The next step will be to focus on developing a Strategic Research Agenda, leading to an Implementation Plan. National support groups in the various EU countries will significantly contribute to this process.

The expectation is that this initiative will enhance the global competitive position of the European forest-based sector.

# 1. The Starting Point: The role and contribution of the forest-based sector in Europe

**TODAY'S EUROPEAN FOREST-BASED SECTOR:**

- **Provides essential products and services contributing to social well-being and sustainable development.**
- **Is an important sector, delivering 8 % of EU manufacturing added value.**
- **Comprises a renewable and continuously expanding forest resource, covering one third of Europe's land area.**
- **Incorporates some 16 million forest owners and provides between 3 and 4 million jobs in industry, to a large extent in rural areas and in SMEs.**
- **Comprises world-leading companies among forest-products producers, suppliers and consultancies.**
- **Enjoys global technological leadership and occupies a leading research position at international level.**

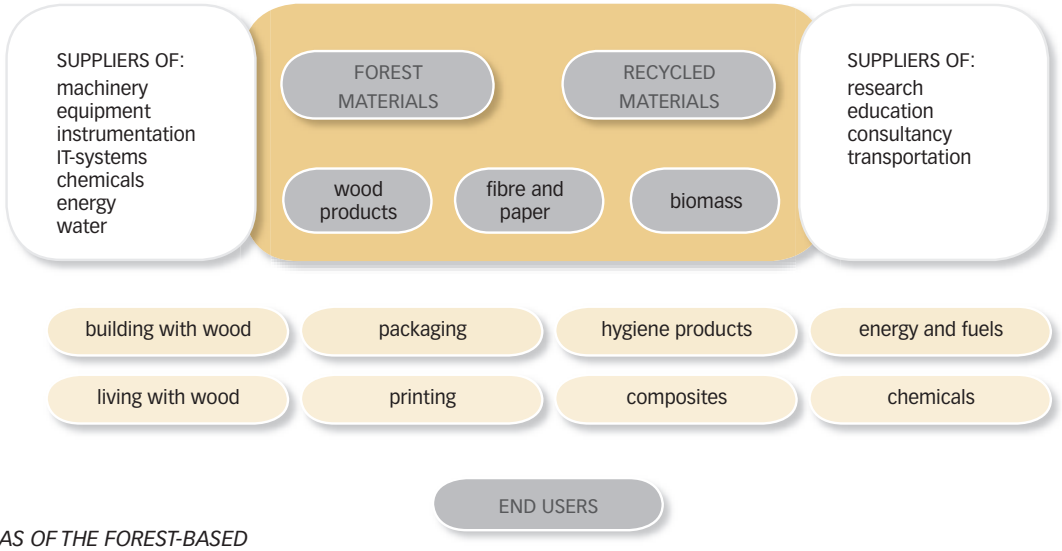
## CHARACTERISTICS OF THE FOREST-BASED SECTOR

The European forest-based sector is extremely multifunctional providing a range of materials and products, energy, recreational activities and other services arising from the forests. It provides economic, environmental and societal benefits all based on a renewable resource. Forest-based products are recyclable and reusable for new products and energy. They are biodegradable and able to substitute for products and energy from non-renewable sources. Few sectors have such multidisciplinary competences as the forest-based sector.

The core of the sector is, in addition to the actual forests, formed by a set of major value chains namely:

- services and non-wood products from forests;
- the wood products chain (including furniture and recycling of wood);
- the paper chain (including pulp making and paper recycling);
- the bio-energy chain;
- the wood-based chemicals chain.

When moving along these chains towards the consumer, they diversify into a range of products and applications.




*AREAS OF THE FOREST-BASED SECTOR*

All stakeholders whose major business relies on forest-related materials, services or forest-based products are considered part of the forest-based sector (cf. figure above). This definition encompasses many categories of stakeholders, which can be grouped as core stakeholders, dedicated customers, dedicated suppliers, dedicated service providers, dedicated research institutions and other stakeholders. The word "dedicated" refers to those that have their main businesses within the forest-based sector. "Other stakeholders" include authorities, the scientific community, NGOs, funding bodies and other connected industries.

Forests occupy about one-third of Europe's surface area with large variations between countries from 71 % in Finland to 1 % in Cyprus. The forestland area in Europe is continuously growing by some 0.5 million hectares per year. On average, around two-thirds of the forest volume growth in the EU is utilized for products and energy. It should be pointed out that forests and the forest-based industry have very different roles and focuses in various parts of Europe.

With an annual production value in EU-25 of some 550-600 BEUR, the forest-based industries account for about 8 % of the total value added in the manufacturing industry in the EU. Additionally, there are some 16 million private forest owners in Europe owning more than 60 % of the forestland. The sector additionally provides between 3 and 4 million jobs in the EU-industry, to a large extent in rural areas and in SMEs. In many regions this bio-based economy often represents the main source of livelihood.

Transportation by road, rail and sea is a major aspect of the forest-based sector and constitutes a major flow of industrial materials in Europe.

The enlargement of the EU is of specific importance to the forest-based sector. Commercial forests in the new member states amount to around a quarter of current commercial forests in the EU. The consumption of forest-based products is on average at a much lower level in the new member states, which means that there is a considerable base for market growth within the EU itself.

Cycle times for industrially used trees vary from over 200 years down to 10-15 years in eucalyptus plantations. Some of the process equipment used in the sector is extremely capital intensive with the consequence that machinery must often be used for up to 25 years in order not to incur a capital loss. As a result although gradual adaptations in machinery can be made, it normally takes considerable time for new technologies to be introduced in a large part of the sector's production facilities. A further delaying factor is that new equipment must be part of an often interconnected and complex process system.

## THE GLOBAL CONTEXT

The forest-based industry has in a few decades moved from being mainly a national industry to being firstly European and now gradually global. European forests have, for a long time, been managed in a sustainable manner and they are, unlike on other continents, mostly accessible. It can therefore be concluded that the EU will continue to have an important forest-based industry.

The global position of EU-25 as producer and exporter of forest-based industry products is reflected in the table below, giving rounded figures representative of recent years.

Europe has about 5 % of the global forest area but accounts for as much as 25-30 % of world production of forest-based products. Russia and South / Central America each have more than 25 % of the world's forest area. Competition from forest-products industries in regions with larger forest resources than those in Europe is continuously growing as a consequence of the increasing production capacities in these areas.

At company level, three EU-based forest-industry companies rank among the top ten worldwide in pulp and paper production. This is also the case in the saw-milling sector. Most big wood-based panels companies are European. Additionally, EU-based companies supplying machinery, control systems and chemicals to the sector are among the global leaders. The largest consultancy company in the sector is also based in the EU.

## TECHNOLOGICAL STANDING AND RESEARCH POSITION

***Technological standing:***

The EU is today the overall technological leader in the forest-based sector, although this does not mean that there is leadership in all technological areas. This strength has allowed the European forest-based sector to take the lead in environmental adaptation. New technological developments, e.g. in the areas of machinery and application of chemicals, are often first tested at full scale in Europe.

The forest-based sector's technological standing has two dimensions. One is the development of machinery, chemicals, instrumentation etc. necessary to deliver wood and to produce products. This technology is mainly represented by supplier industries. The other dimension is the technological skills needed to manage forests and deliver wood for industrial use, to build up production sites, operate them and develop products.

***Research position:***

Research in Europe's forest-based sector is to a large extent carried out at institutes and universities, particularly with regard to the more basic research. Company-based research is mainly directed towards product development. With some exceptions, the public research structure is rather fragmented. Nevertheless, Europe is today in a better position in this context than its competitors. A better integration of research capabilities along the forestry-wood chain would certainly strengthen this position.

| | World production | Of which in Europe | Net export |
|---|---|---|---|
| **Industrial round wood** | 1600 $Mm^3$ | 20 % | - 25.0 $Mm^3$ |
| **Pulp** | 185 Mtons | 25 % | - 6.5 Mtons |
| **Recovered paper** | 200 Mtons | 30 % | 2.5 Mtons |
| **Paper** | 340 Mtons | 30 % | 8.5 Mtons |
| **Sawn-goods** | 405 $Mm^3$ | 25 % | 5.5 $Mm^3$ |
| **Wood-based panels** | 200 $Mm^3$ | 30 % | 0.5 $Mm^3$ |

# 2. Moving Forward: The future challenges

**KEY CHALLENGES FACING TODAY'S FOREST-BASED SECTOR:**

- **Helping society to mitigate climate change.**
- **Securing the availability of renewable raw materials, while supporting the varied uses of forests and safeguarding biodiversity, through sustainable forest management.**
- **Obtaining an economic and environmental balance in using forest biomass for products and energy, as well as substantially improving the industry's energy efficiency.**
- **Providing products and services that respond to changes in societal needs.**
- **Developing and designing products that can be recycled, reused and finally converted to bio-energy.**
- **Achieving a significant decrease in capital intensity and increased production flexibility through process innovations.**
- **Meeting the growing impact of large retailers.**
- **Responding to new competition from other regions.**
- **Attracting young talent to the sector.**

As a result of the United Nations Conference on the Environment and Development in Rio (1992), the sustainable management of forests is high on the political agenda. With the Lisbon, Gothenburg and Barcelona Councils, the EU has set out important goals. Three goals of the Lisbon strategy (extended in Gothenburg) have a key meaning for this platform: economic growth, social cohesion and leadership in environmental technologies. The mid-term review of the Lisbon strategy, carried out by a High Level Group headed by Mr. Wim Kok and reported in 2004, concludes that the Lisbon strategy is even more urgent today as the growth gap between Europe and its competing regions has widened. Based mainly on renewable resources, the forest-based sector has to be a key actor in meeting the goals set up in Lisbon, Gothenburg and Barcelona.

The sector must also assist the process of simplifying legislation and introducing impact assessments in order to provide a simpler and clearer legal framework with a long time perspective. The coherence and consistency of different policy areas must be ensured, and unnecessary burdens for industry removed. EU industry is now at a disadvantage relative to its main competitors.

## SOCIETY, CONSUMER NEEDS AND COMPETITIVENESS

Globalization, urbanization and demographic changes are general drivers in society that affect the forest-based sector in a number of ways. They mainly affect markets and products but also the roles and public perceptions of forests.

New technologies will continue to influence habits and fashion to a very large extent and in particular those of the young generation.

The global consumer base is both extremely diversified and dynamic. The high standard of living in developed societies continuously creates new consumer needs. Con-

sumers and consumer organizations are strong drivers as they form opinions and attitudes, and exercise those as buyers.

With the development of the post-industrial society, access to goods in Europe has become more or less unlimited. Retailers have taken a more and more dominant position in the value chain. This has meant increased competition among producers, increased imports to the EU of goods from low-cost countries and lower prices for European consumers. This trend has already affected some product segments in the forest-based sector, such as tissue paper and furniture, and will, in the next 5 to 10 years, affect more or less all consumer-oriented products. As a consequence, cost pressure will increase all along the value-chain.

The sector is facing increasing competition from competing material sectors and the electronic media, as well as from countries with lower raw material, energy and labour costs, and where business is much less regulated, in particular from an environmental perspective.

Since part of the forest-based sector is commodity oriented, meaning that several producers have to fulfill the same customer specifications or regulatory requirements, standardization is an important element of its trade relations.

### *Challenges*

The overriding challenge is to maintain and improve the competitiveness of the sector, which is a net contributor to the EU's trade balance.

A competitive forest-based industry is a prerequisite for maintaining a multifunctional forest base.

The sector has to provide products and services that respond to changes in society and in the customer base. It must be responsive to demographic shifts and closely follow the effects of changing habits in society amongst the young, middle-aged and elderly. For example, it has to meet the demands of the elderly and thus needs to develop flexible and convertible housing solutions, ergonomical and multifunctional furniture as well as packaging solutions designed for easy use. Additionally, there are demands for educational and communication materials, and new needs for hygiene products.

To fully develop its products and services, the sector must improve its understanding of areas such as perception, social behaviour and social changes (which will be different around the world). As part of this, it will need to build internally the appropriate competences as well as intensify cooperation with its direct customers.

The sector needs to communicate to society the unique, sustainable and renewable nature of forests and forest-based products. To be successful, any such approach needs to be supported by reliable evidence and to be able to illustrate the links between the sustainable use of forests, its products and the environment. Here, research plays an important role.

In order to manage the increasing power of retailers, the sector has to adopt more market and customer driven business models in order to be able to maintain and develop its business.

The development of standards needs to be supported by prenormative research, particularly concerning building with wood. The sector must actively take part in standardization activities in order to guard its commercial interests.

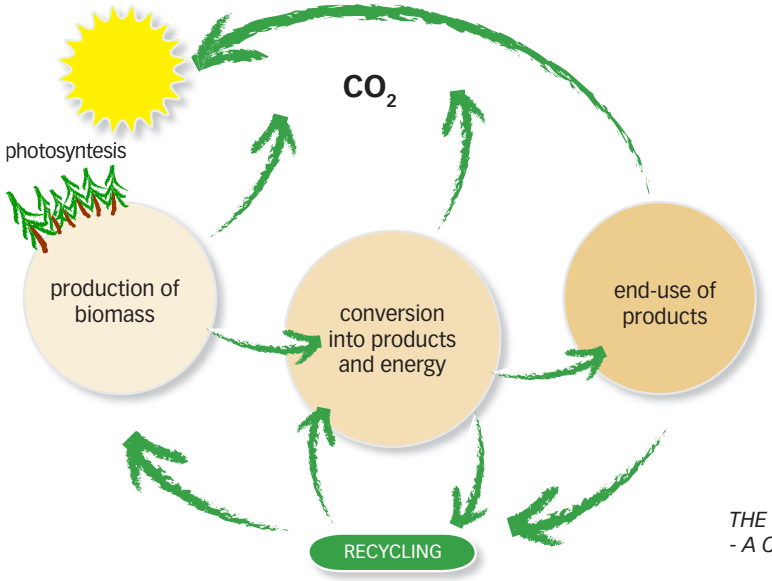
To compensate for the fact that the European fibre-based sector will gradually lose market share as regards "bulk commodities", a new range of knowledge-demanding and high value added products must evolve. A new, smaller-scale and specialized industry must be developed, often using today's industry as a provider of materials.

## SUSTAINABILITY

The Brundtland Report from 1987 defines sustainable development as: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." In the EU sustainable development strategy, sustainability is defined as the ability to provide multiple economic, environmental and social benefits today without compromising the needs of future generations. As a political aim, sustainability is indeed a key driver for the sector, as evidenced by various political initiatives and public concerns. Society will increasingly have sustainability as a value.

Awareness among customers and consumers about environmental and social responsibilities is already a driving force and will gain in importance. The use of renewable and $CO_2$ neutral raw materials, the "more from less" concept and the recycling of materials, typical of the forest-based sector, are other important elements. This growing awareness will certainly influence the sector.

Activities in society have caused and will also in the future cause environmental impacts. The most critical issue, together with the supply of clean water, is climate change caused by green house gases. The forest-based sector is a significant and integrated part of the global




*THE FOREST-BASED SECTOR - A CLOSED CARBON CYCLE*

carbon flows. Forests grow from carbon dioxide through photosynthesis and bind carbon. Many forest-based products, like timber in buildings, have very long lifetimes and represent carbon sinks. By substituting oil and coal with forest-based sources for products and energy, the sector helps to meet Kyoto ambitions.

Voluntary certification systems aim to secure sustainable management of forests. Excess agricultural land in Europe will be afforested and support the increased need for forest biomass for products and energy. Land use is in general becoming an increasingly important issue.

***Challenges***

Improving the already good standing of the forest-based sector as regards sustainability presents a range of challenges. An overall goal will be for all forest-based products and services to have eco-efficiency as a basic requirement. In this regard, improvements are needed in particular regarding energy generation and energy consumption, but also regarding recycling of products and handling of wastes. $CO_2$ emissions from production need to be further reduced and the use of renewable and $CO_2$-neutral forest-based materials needs to be increased.

Although forests have been managed in Europe for centuries, the increased weight given to environmental aspects at global and local levels (mitigation of $CO_2$, water regime, soil conservation, biodiversity), calls for diversified forest management approaches. The forest-based sector's most demanding challenge will be to meet these demands and provide society with possibilities for recreation and other goods and services from the forests, provide the amount of forest raw materials needed for an increasing number of applications and products, including energy production.

In ensuring a sufficient supply of forest biomass, the slow dynamics of forest growth as opposed to the fast dynamics of market requirements poses a challenge.

An essential part of the drive towards high environmental performance is the need to develop and apply environmental technologies for the management of forests as well as for the manufacturing of products and generation of energy.

The forest-based industry already recycles a large part of its products (in particular paper). In this respect, the aim is to systematically develop easily recyclable products and efficient recovery systems, where the functionality of wood and fibres is first fully utilized after which the remaining material is used for energy. Achieving from environmental, economic and product quality/process efficiency points of view the best balance between the rate of recycling of forest products and their use for energy generation is key.

Progress towards closed-loop production with the help of further research must continue, including minimization and reuse of solid wastes and water.

Since the forest-based sector involves extensive transportation, decreasing the resulting environmental load must be addressed.

## ENERGY

Energy is one of the most important driving forces affecting the forest-based sector and will only increase in importance since the global demand for energy will continue to rise rapidly. Increasing energy prices is both the cause and the consequence of that impact. The interest in renewable energy sources, and in particular in bio-based energy, will therefore continue to grow, mainly driven by environmental arguments (the $CO_2$ issue), but also as a means of providing society with enough sources of energy in solid or liquid form (biofuels). The EU has committed itself to an adequate increase in the amount of energy produced from biomass.

The availability of energy, and in particular electricity, at competitive prices is very important for essential parts of the forest industries.

***Challenges***

A balance will have to be found between the increasing demand for forest biomass for energy production and an increasing demand for forest-based products. In this context, it should be taken into account that forest-based products can also be used to generate energy after their use.

The overall energy efficiency of the forest-based industry needs to be significantly improved. In many production stages, like refining and drying, the use of energy and in particular electricity must be decreased, measured as consumption per unit of product functionality.

Industry and society have to invest to utilize fully the potential for production and savings in the energy field.

## TECHNOLOGY AND KNOWLEDGE

Historically, enabling technologies have always been extremely strong drivers of development. This influence will not change. The forest-based sector must therefore be at the forefront in using opportunities offered by new technologies for the development of new processes and products. The forest-based sector was an early up-taker of IT-tools to improve process efficiency and product quality, and biotechnology was applied to clean effluents. The gate-keeping for new technologies and the transfer of technologies from other sectors must be enforced.

The role of forest-based materials in housing, packaging, hygiene, furniture, panels and the like has never been seriously challenged but printed information in the media sector has had to face the "electronic revolution". There is an emerging understanding that these two media for information exchange complement each other. Nevertheless, technological developments in the IT-sector will undoubtedly have a very significant impact on the forest-based sector in the future.

Knowledge is also a key driver for the forest-based sector and an essential value adding component. Many new products and services emerge from research-based knowledge, often from a combination of different scientific disciplines. As knowledge becomes more important, it also ages faster. This means that the forest-based sector must increase its knowledge base and as part of that invest more in research. The ownership of intellectual property rights (patents and brands) will also become more and more important.

Training, education and recruitment are essential elements in strengthening the knowledge base.

***Challenges***

The technological leadership that the sector presently enjoys must be maintained and even improved. Only then can the sector develop higher value added products, increase its role as an exporter and transform itself into a leader in a bio-based economy.

Research is the foundation of new technologies. Making an innovative, efficient and well structured research system available to the sector is therefore an essential venture. Further to this, the sector must reach a stage where forest management, process and product development are increasingly science based. In general terms, the sector is challenged, more than ever, to base its product developments both on a more scientific understanding of its basic materials and of how they interact with other materials.

Breakthroughs are needed in the processing area. One challenge is to develop more flexible and even smaller-size production processes, including units for niche-type products. Production efficiency remains a key challenge. Another important undertaking will be to minimize, through radical process changes, the consumption of energy in all relevant production stages. To develop new environmental technologies is another task. As with product developments, process developments must take advantage of technological advances in such fields as control technology and materials technology. Again, better links with the scientific community are necessary.

Speeding up the transition of the sector from being largely resource driven to being market and knowledge driven is integral to success. As a result, the sector needs to extend its knowledge base from being mainly technological to also include human sciences.

The forest-based sector has to take upon itself to fully engage in education and training programmes, including communicating with the public. It must be able to attract young talent in all relevant fields of education and work .

The development of new skills, both within higher education and within industry needs greater emphasis. Skills development needs to address future diversity and interdisciplinarity, providing the basis of knowledge development and entrepreneurship. The impact of the ageing workforce in Europe needs to be addressed, as well as the capability in industry to identify, absorb and manage technology and to serve a competitive global market.

# 3. 2030 - Towards a Sustainable Europe: The opportunities and vision for the forest-based sector

**KEY OPPORTUNITIES FOR TODAY'S FOREST-BASED SECTOR:**

- **Balancing forests as a resource for renewable raw material with other important functions such as offering recreation and safeguarding biodiversity.**
- **Increasing the availability of renewable resources, e.g. through afforestation, and extending their use in new and existing applications thus securing forest-based materials as the material of choice.**
- **Increasing the share of high value added products offered to consumers.**
- **Substituting non-renewable materials through innovative solutions from forest-based materials.**
- **Developing new industrial activities based on "green chemicals" from wood.**
- **Becoming a major producer of "green electricity", biofuels and other bio-energy products.**
- **Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.**

## OPPORTUNITIES

It is evident that the forest-based sector is faced with a number of challenges affecting it, from forestry to end products. Meeting these challenges requires substantial and focused efforts, including research and development.

But the sector also has a number of opportunities through which it can contribute to economic growth, a more sustainable society and well-being in Europe. Taking advantage of these would also lead to a necessary transformation of the forest-based sector into an active agent in a bio-based economy. Representative examples of these opportunities are illustrated below.

### *Society, consumer needs and competitiveness*

By developing new forest management practices and schemes, there is potential for better utilization of forests as a resource. Providing the forest-based industries with sufficient wood in such a way that tree properties are utilized optimally is one approach, alongside developing forests as a resource for recreation, amenities and well-being for an increasingly urbanized society whilst supporting biodiversity. This will help the subsistence of forest owners and develop business, e.g. in eco-tourism.

Afforestation of excess agricultural land will enhance the production of forest biomass for its different purposes.

By fully engaging itself in enhancing the role of wood products and wood-based panels as parts of building-systems, the wood products sector will be able to increase its market share.

In the building sector, the wood-products industry can provide easy to use and high quality system solutions with guaranteed service performance for new constructions and also for renovation or replacement of existing constructions.

The wood-products sector can also provide consumers with user-friendly and high-quality living solutions from the European furniture and furnishing sectors.

As a provider of an information product, the sector offers opportunities in many areas. One is to develop, together with the media industry, superb fibre-based means for efficient and user-friendly information transfer and communication. Another is to use paper as a carrier for printed electronic circuits at a cost that allows many new applications. A third is the development of new paper qualities for home printing from digital media such as cameras, mobile telephones and TV. Here, cooperations with the media, electronics, information and communication sectors can offer exciting new products.

Together with the packaging industry, fibre-based solutions can be developed which will provide excellent durability and protection capabilities, far above what currently exists. Adaption of such solutions to efficient distribution and logistics systems, could open markets for paper-based solutions in areas that today are dominated by tin and aluminium cans.

Paper-packaging solutions that incorporate smart features such as sensors and displays, will result in a range of product opportunities. Such solutions can for example provide information on storing conditions and product quality.

New fibre-based hygiene products can offer an improved quality of life for elderly people. Wood-based fibres provide excellent functions for almost all requirements concerning hygiene products, such as integrity, softness and liquid management. Requirements for health and ergonomic comfort will become increasingly important in the future.

Water-free cleaning with surface-treated dry paper towels would offer new features both for home and away-from-home use.

In today's industrial processes, the chemicals in wood that are dissolved during pulping are, with very limited exceptions, only used for energy production. Dissolved lignins, hemicelluloses, extractives such as sterols, abietic acids and other substances can after further processing be developed into families of functional chemicals - "green chemicals". They offer an array of opportunities for the development of completely new products, such as barrier polymers and strength agents, which can replace traditional fossil-based products. It is even possible to produce fragrances out of wood substances.

There is potential for increased use of wood-based fibres in bio-composites, e.g. together with "green chemicals and materials". These "green" components could also come from the agricultural field and the bio-composites could be used in a number of sectors.

There is potential to use wood-fibres in flexible composite structures, with applications e.g. in the packaging area.

By combining its technological leadership with obtaining intellectual property rights for systems, processes and products to a greater degree than at present, the sector can widen and secure its global markets.

***Sustainability***

The forest-based sector provides opportunities to combat environmental problems such as global warming and greenhouse gas emissions. The $CO_2$ sequestration in forests and forest-based products and, consequently, the effect of substituting other materials with wood or fibres, is very important in this respect. Sustainable and continuous use of forests secures the renewable basis of the $CO_2$ sequestration, prevents the over-ageing of forests and reduces vulnerability of forests to accidental damage.

New insights into the role of trees in the landscape will allow an active use of trees and forests to counter effects of climate changes in terms of preventing landslides, providing wind shelter and flood avoidance.

There is potential to produce and extract more forest biomass from the EU's forests. Different approaches can be used with different time horizons as to their effects. Afforestation is one approach. Mobilization of already existing forest resources is another, which requires technical and educational support.

Smart logistics systems offer a means to counteract the negative impacts of transportation. This will also affect positively the sector's competitiveness.

By utilizing its advanced position in the environmental field, the sector can increase its business, including outside the EU.

***Energy***

Forest biomass offers a source for "green" energy products, and provides a response to problems created by the use of fossil-energy sources, such as oil. In this context, forest biomass can in the future also be used as a significant source of biofuel. Therefore the forest-based sector will play an even more prominent role in supplying much-needed renewable energy to Europe, especially important in view of the EU's ambitious targets for promoting "green" energy resources in the region.

The forest-based industry provides a very effective platform for the generation of energy in combination with the production of fibres and "green chemicals". There is, as part of this, an emerging "bio-refinery" concept, which foresees a new balance in the use of wood for pulp, "green chemicals", biofuels and "green energy". In this context, the sector has the potential to deliver increased amounts of energy as a "by-product" of industrial processing, and for wider use than just as a source of local heat.

New timber building systems allow superior thermal insulation properties and require less energy in production than non-renewable building materials. This should lead to an extended use of wood.

***Technology and knowledge***

Extended cooperation and alliances with other materials, sectors and technologies offer opportunities for creating new, high added value products and services. These can be expected from a combination of wood and fibres with other materials.

Areas of research presenting opportunities, include, as examples, the use of genomics and/or genetic engineering for the development of functional trees (better adaptation to new environmental conditions, more durable wood, less lignin content, etc.); the use of nano-technology, bio-technology and micro-electronics to provide new product functionalities, e.g. surface properties; and the use of satellite imagery and modelling as a decision support tool in forest planning and management. Using research to ensure wood´s status as a more predictable engineering material will increase its market potential. A much better understanding of the structure and composition of wood fibres can provide a basis for better processes and more advanced products.

There is potential to work on a more European level as a means of improving the quality of knowledge and the efficiency of learning. Organizing mobility programmes for young researchers and streamlining PhD courses, opening up national training activities and organizing summer schools are examples of possible approaches.

## VISION FOR 2030

The forest-based sector has the following vision for 2030:

- **The European forest-based sector plays a key role in a sustainable society.**
- **It comprises a competitive, knowledge-based industry that fosters the extended use of renewable forest resources.**
- **It strives to ensure its societal contribution in the context of a bio-based, customer-driven and globally competitive European economy.**

The vision is based on the understanding that Europe's economy, society and environment will be continuously exposed to major challenges such as:

- a growing concern for climatic change;
- a need for more sustainable management and use of forest resources;
- a need for sustainable energy sources; and
- a continuous change in customer/consumer base and expectations.

The sector judges it possible to combine the three components of sustainability, i.e. economic growth, social benefits and environmental performance. It believes that as a sector based on a raw material created by nature, it is in a unique position to succeed in this.

Considering the political, economic, environmental and social uncertainties in the years ahead, the forest-based sector will undoubtedly be faced with a wide range of issues and challenges. Clearly, industry will have to employ its own skills and creativity to remain competitive and relevant and to exploit the potential opportunities, which also exist. But through strategic alliances and economic and practical support from public institutions, the industry can do much more in terms of innovation, job creation and economic growth.

Though 2030 is many years ahead, it was chosen for the vision as to transform the forest-based sector into something new. Establishing it as an important element of a bio-based economy will necessarily be a long-term and ongoing process.

## STRATEGIC OBJECTIVES

A number of strategic objectives must be reached in order to realize the vision. In brief, they include:

- Meeting the multifunctional demands on forest resources and their sustainable management.
- Enhancing availability and use of forest biomass for products and energy.
- Development of intelligent and efficient manufacturing processes, including reduced energy consumption.
- Development of innovative products for changing markets and customer needs.
- Establishing a more efficient innovation system, including a better-structured research community with higher efficiency.
- Deepening the sector's scientific basis, including taking advantage of emerging sciences.
- Establishing education and training schemes that meet high requirements.
- Improving communication with the public and policy makers.

# 4. Realizing the Vision: The Technology Platform as a governance mechanism

**KEY BENEFITS OF THE TECHNOLOGY PLATFORM:**

- **Engages all key stakeholders and provides a forum for public-private dialogue and partnership.**
- **Facilitates targeted investments in research and development.**
- **Mobilizes and focuses existing research and development capabilities, thereby fostering a more efficient approach to innovation.**
- **Stimulates coordination of European and national research agendas.**
- **Supports the ongoing development of a relevant knowledge base for the sector.**
- **Contributes to the overall growth of the EU economy.**

## BENEFITS

To fully realize the vision, taking advantage of the potential opportunities to strengthen the sector's competitiveness requires activities in many areas:

- business structures and models;
- policies and other political frameworks;
- technological developments and increased investments in research;
- education and training; and
- alliances.

The Technology Platform will serve as an important catalyst in all these areas, not least by bringing stakeholders together for common goals.

A Strategic Research Agenda, which is a key element of the platform, cannot be realized in an efficient way if implemented project by project. The platform will allow coordination of research activities and assist in structuring the European research community serving the sector. It will also stimulate investments in research.

## ORGANIZATION AND NEXT STEPS

The Technology Platform is managed as a project with a High Level Group (HLG) as the decision body. At present, the HLG comprises the secretary generals of CEPF, CEI-Bois and CEPI, one member of the board of each of these confederations, the chairman of the Advisory Committee and the chairman of the Scientific Council.

National Support Groups (NSG) are important elements of the organizational structure. NSGs exist or are under establishment in most EU-countries. The NSGs serve as coordinators for local business and research bodies, national authorities and funding agents. They will have a key role in securing national support for the platform.

The operation of the platform is carried out under the leadership of a Project Director assisted by a project team.

The development of a Strategic Research Agenda and an Implementation Plan follow as the next stages. The process of developing the Strategic Research Agenda will identify thematic priorities for the future research and development. The involvement of the European Commission in the development of the Strategic Research Agenda during 2005 is expected and welcomed.

**Up-dated information on the platform can be found at www.forestplatform.org**

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**For further information, please visit our internet-pages or contact the Project Management.**

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