2010 2015 2020 2025 2030

Forest-Based Sector
Technology Platform

A Strategic Research Agenda

for Innovation, Competitiveness and Quality of Life

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 – An Initiative for Change

On 15 February 2005, the European forest-based sector launched Vision 2030 as part of its Technology Platform initiative. The aim is to drive the industry toward the continued sustainable development and innovation needed to nurture growth in the sector over the next 25 years.

The Forest-Based Sector Technology Platform (FTP) represents a bold step forward. For the first time, all major European stakeholders have joined forces to establish a vision for the future. With clear strategic objectives, the stakeholders have taken on the task of defining a Strategic Research Agenda (SRA) and making it happen.

Extensive work has gone into formulating this Strategic Research Agenda (SRA). Stakeholders from all areas including industry, forest owners, researchers and public bodies, have taken an active part in this process with representatives from the European Commission observing.

Effectively, more than 1,000 forest-based sector representatives in some 20 European countries have been actively engaged in the process, which has already generated a pool of more than 700 proposals. These proposals have been condensed into the SRA presented here, which is designed to help create a more efficient, competitive and sustainable sector.

In fact, the forest-based sector represents one of the few major industries in Europe that can actually become truly sustainable. By closing the so-called carbon cycle, the sector already helps to mitigate climate change drivers and it also boasts one of the best records of any in terms of recovery and recycling.

The backbone of the business though, is to make products and services that are attractive to customers and consumers. This means improving the performance in existing business segments and creating new ones that take advantage of our unique forest resources. Energy plays an important role here. Indeed, the forest-based sector is already one of the most advanced in terms of generating and using energy from renewable sources.

However, we need to ensure that forest-based products are competitive at a global level. Otherwise, the infrastructure and investment will simply not be available to ensure that Europe can enjoy the many other benefits that come from the sector such as economic growth, rural jobs and the sustainable forest management that will help secure all our futures.

This is really just the start though. Our vision for the future calls for continuous development of the sector and we urge everyone to play their part.

The High-Level Group of the FTP also expresses its thanks to all those who have contributed to realising this SRA. This includes members of the National Support Groups, the Advisory Committee, the Scientific Council, the Value-Chain Working Groups, the Impact Coordinators, the IT Task Force and, not least, the SRA writing-team.

Brussels, 31 January, 2006

Björn Hägglund
Chairman of High Level Group

Claes-Göran Beckeman
Project Director

Frits Beurskens
Chairman of CEPI
Smurfit Kappa Group

Mikael Eliasson
Chairman of CEI-Bois
Setra Group

Esa Härmälä
Chairman of CEPF
President MTK

Teresa Presas
Managing Director CEPI

Filip De Jaeger
Secretary General CEI-Bois

Natalie Hufnagl
Secretary General CEPF

Bo Borgström
Honorary Chairman
of CEI-Bois

Giuseppe Fedrigoni
Cartiere Fedrigoni

Tomasz Lucjan
Steico

Antti Sahi
MTK

Lars Gädda
Chairman of Advisory Committee
Senior Vice President R&D
M-real

Yves Birot
Chairman of Scientific Council
Senior Scientist INRA

Table of contents

Executive Summary - Meeting the Future

1. **Contributions and Benefits**

2. **Moving towards Common Goals with Research**

3. **Implementation - Bringing the Vision to Reality**

Annex: Extended Descriptions of Research Areas

Executive Summary - Meeting the Future

The Forest-based Sector Technology Platform (FTP) represents a step into a new era for the sector. An era that will build a more knowledge-based, more customer focused and more innovation oriented industry. At the same time, the sector aims at developing the economic and social benefits it provides today, while still seeking continuous improvement in terms of sustainability.

The Strategic Research Agenda (SRA) is aimed at increasing the competitiveness of Europe by developing innovative products and services. Competitiveness is the key objective of the platform, because without it there will be no capacity to deliver the economic, social and environmental goods and services for which the sector strives so hard. By contributing to all three pillars of sustainability, the sector walks hand in hand with the EU in reaching goals and strategies set out in Lisbon and Gothenburg.

The sector's prime asset is the renewable nature of its raw material – wood. Fabricated by nature using carbon dioxide and water, this resource can be used for a variety of products and services, as well as for energy.

The amazing properties of wood means that today there is probably no other major industry that positively influences the daily life of Europe's citizens as broadly as the forest-based sector. This situation is not guaranteed, however. On the contrary, the sector is subject to a variety of threats and challenges, mainly due to increased global competition, changes in the energy market and the concern for the effects of climate change.

The forest-based sector can turn these threats and challenges into opportunities though. This is precisely the goal of the FTP and its Strategic Research Agenda (SRA).

Society demands and deserves higher added-value products in existing product segments. However, there is also need for the development of entirely new uses for wood as a raw material and a more active engagement in the bio-energy field. Indeed, "green" chemicals, novel composites, and the non-wood values of European forests are already identified as product opportunities.

New concepts that use wood will further contribute to mitigate climate change as all wood products in essence 'lock up' carbon. Wood can contribute in other ways too, though, for example by providing substitutes for non-renewable materials in sectors such as packaging, fuels, chemicals and construction.

However, to take advantage of all these opportunities, secured wood supplies are obviously vital. This is helped by the fact that Europe's forest areas are increasing, but even more important is to mobilise already existing forest resources in a sustainable way. Efforts are also needed to increase the growth yield of forest biomass through various measures. In order to secure wood supplies, Europe must also create a supportive policy framework that allows the use of the potential existing in Europe's forests.

Furthermore, forests represent far more than a secure raw material supply base in today's Europe. For example, the forest provides a valuable resource in terms of recreation, tourism and other indirect 'non-wood' values.

The forest-based sector is well aware that it needs to develop open and effective communication channels with Europe's citizens on issues of stewardship. As a result, the SRA also outlines the need for a scientific approach that will generate a better understanding of the public's perceptions and concerns and provide effective responses.

Sustainability, product development, resource availability, multiple forest use, biodiversity, the production of bio-energy and energy efficiency – in tackling all these areas and more, the SRA is clearly an ambitious undertaking.

Successful implementation of the SRA depends on bold steps and innovative ideas. Here, the research society has to take the lead with industry, forest owners and public bodies to clear a path toward commercial or societal implementation.

A well-functioning innovation system, a strategic communication action plan, and activities in the field of education and training must support the drive to ensure that the sector's vision for the future becomes reality – for the benefit of all.

1. Contributions and Benefits

1.1 CONTRIBUTIONS TO SOCIETY

The forest-based sector has long contributed to society. Indeed, for many centuries now, forest products have driven economic growth and wealth creation, while supporting an untold number of livelihoods. The sector has been an indispensable source of shelter and fuel for millions. Indeed, since Gutenberg invented printing and wood-based paper emerged, paper has been the main carrier of culture and information, providing the very fabric for inspired works of art and architecture. Wood also helped build the railways and ships that fanned the flames of the industrial revolution, shaping almost every aspect of the society that we live in today.

As society changes, so the forest-based sector adapts. This Strategic Research Agenda (SRA) represents another step on this journey. The contribution will be significant in fields where the sector is already active, but the potential is there to add even more to a sustainable society at a local, national, European and global level.

> **"Society can benefit from the substitution of non-renewable materials with sustainable, forest-based products.**

Competitiveness of course, is essential to the well being of the sector and its continued contribution to society. The forest-based sector is well aware that growth will require creativity and investment, which will translate into new and higher value-added products and services for society. The industry will in turn become more knowledge-based, providing new, highly skilled jobs across the sector, often in rural areas. This SRA will drive the forest-based sector towards making ever more effective use of its natural resources.

The value of forest-based products will extend across consumer health and safety by utilising novel techniques from biomedical research, electronics and information technology, for example. Forest-based products will also help satisfy the ever developing needs of citizens to communicate, learn and keep informed in new ways.

The sector can also drive Europe towards a more sustainable energy profile, extending the use of forest-based biomass and delivering energy efficiencies in manufacturing. Perhaps the most challenging objective of EU energy policy is to substantially increase the use of bio-fuels for transportation, but the sector can even play a part here in reducing Europe's dependence on oil.

Society can also benefit from the substitution of non-renewable materials with sustainable, forest-based products. But to achieve all this the forest-based sector must secure supplies of its main raw material – wood.

Luckily, it is possible to increase the availability of wood for industrial products and energy generation and deliver broader benefits to society at the same time. Improved methods of sustainable forest management will enhance the role of forests in protecting bio-diversity and clean water systems, while still providing opportunities for recreation and other indirect benefits such as tourism. Added to that, progress in recycling of used materials and the growth of wood consumption will even help combat climate change and its effects.

Indeed, the sector aims to enhance a wide variety of forest-based products and services that form part of citizens' everyday lives. Culture, communication, recreation, housing, sports, comfort, transport, safety, sanitation; these are all examples of areas where citizens will meet with improved forest-based products and services.

In short, realising the vision will result in major contributions to society in the following areas:

- *new and innovative products tailored to consumer needs*
- *maintaining sustainably managed forests*
- *reduced environmental impacts*
- *contributions to combat climate change and its effects*
- *lowering Europe's dependence on oil*
- *participate in Europe's strategy for growth and jobs*
- *sustaining employment, especially in rural areas.*

1.2 BENEFITS TO INDUSTRY AND FOREST OWNERS

Successful implementation of the Strategic Research Agenda (SRA) will boost competitiveness across many facets of the forest-based sector. The economic effects will be felt at company, national and European levels, but benefits will also accrue in terms of environmental and social contributions.

Global competition is unlikely to get any easier over the next 25 years. Fortunately, the SRA will help the sector to sustain global leadership in developing new businesses based on forest resources, as well as driving technological excellence in the European arena.

> **"The sector will enhance its role as a major producer of renewable energy in Europe**

The sector is looking to increase its position in most market segments by developing more customer and consumer oriented goods and services. More will also be achieved by bolstering innovation strategies, applying new manufacturing concepts, engaging the challenge of bio-energy, and through the application of emerging technologies.

The sector will enhance its role as a major producer of renewable energy in Europe, while bio-energy will emerge as a significant source of revenue for forest owners and industry. The industrial activities based on bio-energy conversion will form the third pillar of the sector – standing beside those of the paper industry and the wood-working industry.

Benefiting from the true potential of the forest and its biomass will additionally prompt the creation of products and services such as "green" chemicals, new types of composites and enhanced recreational use.

The forest-based sector is already to a large extent characterised by small and medium size enterprises. In some stakeholder circles, like the wood products and furniture, printing and packaging industries and within forestry, this is especially pronounced. With the changes foreseen in industry and with the emerging new business areas, the importance of small and medium sized enterprises will even be larger.

Incorporating these new profit centres will radically change the profile of the sector and increase profitability over time, but the changes will need to be supported by new business models linked to high performing innovation systems.

By developing methods for assessing its sustainability, the sector will be able to prove its superior performance in this respect.

Successful implementation of the SRA will create the conditions required to develop efficient research networks across Europe and beyond. Such networks will also extend to emerging scientific disciplines, as there is real potential to exploit evolving markets in diverse areas such as media, packaging, hygiene and housing.

The SRA will also generate slightly more intangible, but extremely valuable, benefits by investigating the perceptions that underpin the political framework the sector operates within. Research into the perceptions that influence the governance framework of the sector can also be combined with improved communications to derive real benefits for the sector.

Clearly, it is not possible to express the potential outcomes of the SRA in quantitative terms. However, significant benefits can be expected in the following areas:

- *increased revenues from new business areas. Bio-energy should feature prominently, but this also includes new businesses from forest services and current industrial segments*
- *strengthened positions in existing market segments through innovative, value-added manufacturing*
- *adequate and balanced supplies of forest raw materials for industrial products and energy. This includes new capacity building, hazard resistant forests and efficient systems for the recovery of used products*
- *recognized leadership in terms of sustainability as environmental impacts decrease and the credibility of the sector improves*
- *improved policy frameworks and regulations resulting from a more effective dialogue with the political sphere*
- *recognition that the sector is a responsible partner, facilitated through improved communication with society*
- *a structured and coordinated network of research expertise at institutes and universities*
- *an efficient, modern, innovative, forest-based sector.*

2. Moving towards Common Goals with Research

2.1 VISION 2030 AND STRATEGIC OBJECTIVES

The SRA is based on the forest-based sector's Vision 2030 document, which foresees the sector building on the following characteristics:

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

> **"The SRA aims at increasing the competitiveness of Europe's forest-based sector by developing innovative products and services.**

Vision 2030 is built on the awareness that the forest-based sector has a vital role to play in meeting the social, economic and environmental challenges of the 21st century. The SRA is designed to help transform the sector and adapt it to such challenges over the next 25 years.

We already know that Europe will be exposed to increased global competition, growing concern over climate change, an increasing need for sustainable materials and energy sources, continuous changes in the customer/consumer base and the shifting expectations of other stakeholders. As such, the sector has a duty to ensure that it responds in a positive and timely manner to these demands.

Luckily, the sector is based on a versatile and renewable raw material – wood – so many of these challenges also represent opportunities and realising the Vision 2030 means managing the balance between the two. After much consideration, eight Strategic Objectives were outlined in the original Vision document.

The first four refer to major areas for research in the SRA and are described in chapter 2.2 (more detailed in the Annex):

- *Development of innovative products for changing markets and customer needs.*
- *Development of intelligent and efficient manufacturing processes, including reduced energy consumption.*
- *Enhancing availability and use of forest biomass for products and energy.*
- *Meeting the multifunctional demands on forest resources and their sustainable management.*

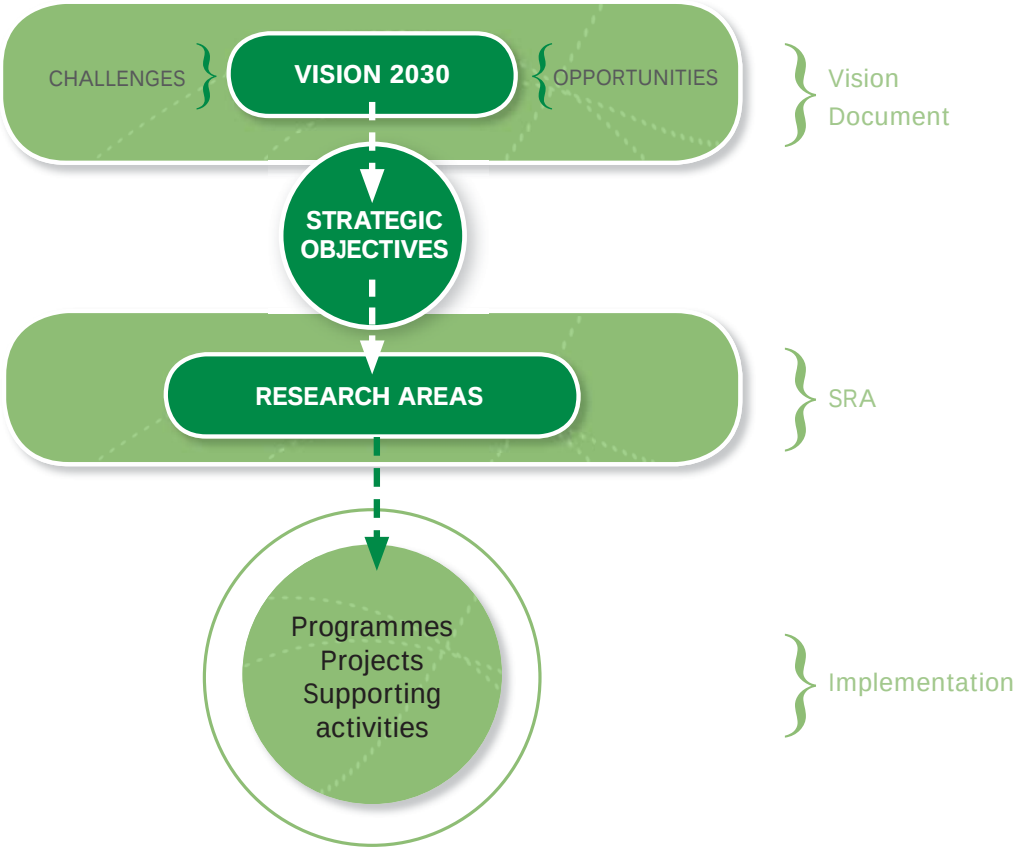
To complement these objectives, an additional Strategic Objective has since been added – "The sector in a societal perspective". This Strategic Objective points at such research that encompasses the sector as a whole.

The other four Strategic Objectives in the original Vision document relate to areas of action that are important to gain the maximum impact from the FTP initiative. These Strategic Objectives are highlighted in chapter 3 and include:

- *Establishing a more efficient innovation system, creating a better structure for the research community with higher operating efficiency.*
- *Deepening the sector's scientific foundations, including taking advantage of emerging sciences.*
- *Establishing education and training schemes that meet high requirements.*
- *Improving communication with policy makers and the wider public.*

In short, the SRA serves as an instrument for achieving the Strategic Objectives of the Vision 2030 document by coordinating and focusing research activities and by stimulating financing of research among all stakeholders – private and public.

FTP STEPS



2.2 THE RESEARCH CONTENT

The aim of the Vision 2030 document is to help provide the forest-based sector with a roadmap to a competitive, sustainable future. There are clear challenges, but there are also major opportunities.

The European forest-based sector is already under strong competition from parts of the world where forests grow faster, production costs are lower and markets are expanding faster. Yet Europe boasts global leadership across many technological aspects of the sector. There are threats due to increasing costs for energy in manufacturing, but the sector is also well placed to exploit opportunities in the field of renewable energy. Climate change will increase the risk of extreme events (drought, floods, fire) and the emergence of pests, but will also increase forest growth in various regions of Europe.

In such an environment, research is one of the most important tools the sector can use to ensure that opportunities grow faster than threats. It is also why the Vision 2030 document represents such an important milestone in transforming the forest-based industries and ensuring that knowledge and innovation become fundamental to the future of the sector.

In order to realize the vision, and meet the Strategic Objectives a set of Research Areas have been identified. It will be with the help of this framework for the future that the forest-based sector will prepare to meet the challenges ahead.

Note: The Strategic Objectives and Research Areas are not presented in any order of importance. More extensive descriptions of the Research Areas presented in this chapter are included in the Annex and an overview of all Research Areas can be found in the following table.

> **"Research is one of the most important tools to ensure that opportunities grow faster than threats**

Strategic Objectives	Forest-Based Value Chains				
	Forestry	**Wood Products**	**Pulp & Paper Products**	**Bio-energy**	**Specialities**
1. Development of innovative products for changing markets and customer needs	1-6: Commercialising soft forest values	1-1: *A new generation of functional packaging* 1-4: Living with wood 1-5: Building with wood 1-10: *New generation of composites*	1-1: *A new generation of functional packaging* 1-2: Paper as a partner in communication, education and learning 1-3: Advancing hygiene and health care 1-8: *Pulp, energy and chemicals from wood bio-refinery* 1-10: *New generation of composites*	1-7: Moving Europe with the help of bio-fuels 1-8: *Pulp, energy and chemicals from wood bio-refinery*	1-8: *Pulp, energy and chemicals from wood bio-refinery* 1-9: *"Green" specialty chemicals* 1-10: *New generation of composites*
2. Development of intelligent and efficient manufacturing processes, including reduced energy consumption		2-4: Advanced technologies for primary wood processing 2-5: New manufacturing technologies for wood products	2-1: Reengineering the fibre-based value-chain 2-2: More performance from less inputs in paper products 2-3: *Reducing energy consumption in pulp and paper mills*	2-3: *Reducing energy consumption in pulp and paper mills* 2-6: Technologies to boost heat and power output	
3. Enhancing availability and use of forest biomass for products and energy	3-1: Trees for the future 3-2: *"Tailor-made" wood supply*	3-2: *"Tailor-made" wood supply* 3-4: Recycling wood products - a new material resource	3-2: *"Tailor-made" wood supply* 3-3: Streamlined paper recycling	3-2: *"Tailor-made" wood supply*	3-2: *"Tailor-made" wood supply*
4. Meeting the multifunctional demands on forest resources and their sustainable management	4-1: Forests for multiple needs 4-2: Advancing knowledge on forest ecosystems 4-3: Adapting forestry to climate change				
5. The sector in a societal perspective	5-1: Assessing the overall performance of the sector 5-2: Instruments for good forest-sector governance 5-3: Citizens' perceptions				

Italic = addressing more than one Value Chain

Strategic Objective 1: Development of innovative products for changing markets and customer needs

> "Development of products and services must be based on a sound understanding of customer and consumer needs

The forest-based sector can only continue to play a key role in a sustainable Europe if it maintains and enhances its competitiveness in the face of global competition. However, there are abundant opportunities to ensure that this proves to be the case.

One key element for success is to base the development of products and services on a sound understanding of customer and consumer needs. There are ample opportunities in existing market segments. For example, packaging systems that provide safe protection, easy handling, efficient distribution and which are easily recyclable will be increasingly important, especially in the food packaging area.

The learning society will need information carriers that are adapted to human perception and fulfil sustainability criteria. Printed paper does both. Use of Information and Communi-

cation Technologies (ICT) and nanotechnology will offer new dimensions for innovation.

Dynamic changes in consumers' habits and demographic changes present opportunities for the hygiene sector too. In the future, products will be characterised by in-built diagnostics and by new functionalities developed through the use of biotechnology, nanotechnology and electronics.

Families of variable sizes and with changing needs will require novel solutions for living. Attention must be given to more flexible solutions for interior applications of wood such as furniture, flooring and wall cladding, as well as lifestyle products. Novel building concepts need to be developed where wood is combined with other building materials.

Research Areas under Strategic Objective 1

Research Area	
1-1	A new generation of functional packaging
1-2	Paper as a partner in communication, education and learning
1-3	Advancing hygiene and healthcare
1-4	Living with wood
1-5	Building with wood
1-6	Commercialising soft forest values
1-7	Moving Europe with the help of bio-fuels
1-8	Pulp, energy and chemicals from wood bio-refinery
1-9	"Green" specialty chemicals
1-10	New generation of composites

However, the sector is determined to go much further. By making even better use of the unique resource represented by the forests, the sector can move into entirely new industrial areas, generating sustainable economic growth in an increasingly competitive global market. It can also generate new services. As an example, forests provide a range of goods and services besides supplying wood for industrial use. Many of these offerings have not yet been put in a business context.

Today, for example, the chemical pulp production process generates a significant amount of energy. That is why the sector is now one of Europe's leading generators and users of renewable energy. However, with the appropriate research and investment, the industry could develop a new product mix from so-called wood bio-refineries where the raw material would be converted into fibre materials, bio-fuels and chemicals.

Adding to this the direct conversion of certain fractions of forest biomass to energy, the European forest-based sector has the potential to become the major player in bio-energy production.

Research Area 1-1:
A new generation of functional packaging

Vision: Competitive packaging solutions that offer novel functionalities for protection and communication and improve the sustainability of distribution systems

The opportunities to use wood and fibre for packaging are vast. Emerging material technologies advances in our knowledge of toxicology, as well as the utilization of active ingredients, will help generate a host of new packaging materials and systems. These will provide superb durability and protection capabilities, enhancing consumer safety and extend the shelf life of packaged, perishable goods.

Embedded Information and Communication Technologies (ICT) will be used to create new functionalities. Smart features such as displays, indicators, sensors, interactive electronic components and biometric components can be added to packaging materials using printing technologies that allow for low production costs. Consumer safety can be improved by providing protection against counterfeit and tampering.

New converting technologies, flexible production concepts and new distribution models will enable on-demand production and tailoring of packaging solutions for consumer needs.

Research Area 1-2:
Paper as a partner in communication, education and learning

Vision: Printed products that add new dimensions to communication, education and learning

Progress in this area will be underpinned by a deeper understanding of human perception, consumer trends and customer needs. But advances will also be prompted by exploiting new enabling technologies.

Information and Communication Technologies (ICT) will offer dramatic new functionalities for printed communication, for example. This includes the integration of conventional fibre-based printed products and digital media into so-called hybrid media, which will introduce a host of novel features to newspapers, periodicals and educational materials.

Products and services will also exploit a new generation of printing substrates that incorporate developments in the field of nanotechnology, for instance. In addition, research will improve the performance of printed communication by shortening delivery times, allowing for small-scale, on-demand production, lowering costs and enabling efficient information transfer.

Research Area 1-3: Advancing hygiene and healthcare

Vision: Hygiene products expand across new market segments by applying nano-, bio- and ICT-technologies

Nanotechnology, biotechnology, sensor technology and information and communication technologies (ICT) will all contribute toward dramatic new developments in this area.

New material functionalities will help create hygiene products that are carriers for diagnostics or novel fibre-based antibacterial surfaces that are not harmful to the environment. New types of tissue and personal care products will be fashioned with improved properties to retain liquids and produced using less raw material.

The new hygiene products will also be characterised by innovative design, specifically tailored to meet new and emerging demands due to changes in social habits and social systems, for example within elderly care. And of course, research on perception and behaviour linked to product performance will be vital in this consumer-oriented area.

Research Area 1-4: Living with wood

Vision: Wood consumption increases via a substantial expansion in the everyday use of high quality wood products

Wood is a natural material, which boasts some excellent environmental properties. In terms of human safety and well being, noise reduction, clean air properties and humidity regulation, these are all natural benefits that should be promoted widely for this highly versatile material.

The sector can also benefit from the development of novel wood-based systems that allow for easier maintenance of house interiors or office or garden furniture. Highly flexible, multi-functional materials and product systems will offer a route to more efficient and lower-cost renovation and modernisation for buildings. And with the appropriate solutions, wood and wood-based systems can even take into account that owners' and users' expectations can change over the lifespan of the product.

However, future solutions can also enhance this material by creating new composites, focusing on industrial hygiene areas and even developing the potential of the natural antiseptic properties of wood.

Research Area 1-5: Building with wood

Vision: The proportion of wood-based materials used in construction and building increases, leading to a more sustainable living environment

Tackling concerns in areas such as sound and thermal insulation, fire protection and hazard safety will lead to the development of novel building concepts that will increase the amount of wood used for the construction of single and multi-storey houses, dwellings and office buildings. After all, it is already widely recognized that greater wood use can reduce the energy consumption of buildings for example.

However, more can be done to promote wood. For instance, enhancing construction methods in the areas of pre-fabrication, refining gluing and joining techniques, or developing new system solutions can all speed up the building process and help reduce costs. Multi-material solutions can also deliver wood-based building products with attractive properties in terms of strength, shape stability, durability and hydrophobicity, while self-cleaning and anti-static characteristics can also be incorporated.

Research Area 1-6: Commercialising soft forest values

Vision: Forest owners generate substantial income from products and services that are not directly related to wood-based products

Trees are a precious resource and no-one knows better than the sector itself that the value of the forest cannot simply be measured in cubic metres of wood.

This Research Area aims to identify a scientific basis for calculating so-called 'soft forest values' to be found in the contribution from indirect goods and services such as recreation, tourism, health and the environment. Using this knowledge, the sector can aid growth across a wide range of non-wood forest resources that are perhaps under-utilized today.

The research will inform policymaking. However, it will also serve to transform the marketing of non-wood forest goods and services, helping to develop sustainable economic activities that are vital for rural areas in particular.

Research Area 1-7:
Moving Europe with the help of bio-fuels

Vision: Europe reduces its dependence on oil with the production of advanced transportation bio-fuels that form an integral part of the forest-based sector and create significant new business opportunities

Research in this area deals with the direct conversion of forest derived raw materials into advanced bio-fuels.

Feed stock will mainly come in the form of biomass obtained directly from forests, tree plantations and manufacturing residues. Fibre and wood containing feed streams will also be derived from waste sorting and recovery operations, although recovered materials generally generate higher added value when used for new products. Bio-fuels may also be produced from an isolated fraction of wood, for example from lignin, as part of a wood bio-refinery.

In many cases, the overall efficiency of bio-fuel production from forest biomass will be enhanced by integrating the energy system of the conversion process with that of other industrial processes of which there are several options in the forest-based industries.

Research Area 1-8:
Pulp, energy and chemicals from wood bio-refinery

Vision: Fully integrated production of pulp, energy and chemicals from wood makes a substantial contribution to a bio-based economy

The SRA envisages entirely new forest-based value chains based on the 'bio-refinery' concept. A key element here is the close integration of chemical pulp manufacture and the optimised production of bio-fuels and different base or platform chemicals.

Developments in this area will correspond to demands for the increased production of bio-fuels and overall use of renewable raw materials.

The main outcome will be an advanced, zero-waste and wood-based bio-refinery concept. To this end, new systems will be developed for the separation and refining of organic substances and fibres from wood and pulping waste streams. The integrated production of clean bio-fuels from pulping spent liquors will also be an important outcome. Similar processes will be developed and demonstrated for the handling of different forest residues, bark and other materials not integrated with pulp production.

The bio-refinery concept will help drive the development of value-added chemical and fibrous products.

Research Area 1-9:
"Green" specialty chemicals

Vision: The production of specialty chemicals from forest resources provides new business opportunities

The base or platform chemicals isolated or produced in bio-refineries from wood, pulping liquors and different types of forest residues can be upgraded to specialty chemicals. This will form the basis for a new forest-based value chain and significantly reduce industry's dependence on oil-derived chemicals.

To fully utilise the opportunities offered by wood-derived base or platform chemicals, advanced chemistry will be available to promote conversion to high value-added specialty chemicals. The most promising areas will be identified for further product development.

Commercial success will also involve developing efficient processes and specific product portfolios for specialty chemicals, which will be derived from various European non-wood goods and herbs.

Research Area 1-10:
New generation of composites

Vision: The full potential of wood-based composites and materials is exploited across a variety of new technical and life science applications

The unique physical and chemical characteristics of wood and its components will be exploited to produce a large number of differentiated materials.

A new generation of composite materials will be manufactured exclusively or partially from wood particles, fibres, fibre fragments, cellulose or hemicelluloses. High or low-volume products with specific, tailor-made properties and functionalities will be available.

Application areas will cover the medical, health, pharmaceutical, electronics and food sectors, as well as the fields of construction, insulation, furniture, packaging, specialty papers, vehicles, textiles and beyond.

Strategic Objective 2:
Development of intelligent and efficient manufacturing processes, including reduced energy consumption

The European forest-based sector is currently a global leader in related process technologies, but if that advantage is to be maintained, the development of technologically advanced, highly efficient manufacturing processes is a must, along with reduced specific energy consumption.

As it stands, production costs cannot be brought down much further without radical breakthroughs. This requires creative solutions that make more efficient use of resources while attaining the same or better product performance.

> **"The development of technologically advanced, highly efficient manufacturing processes is a must.**

Future manufacturing processes will also have to be based on dynamic and flexible business models that respond to shifting market needs. More knowledge-based and value-added products means that the sector will diversify from low margin, high volume products toward smaller production units and plants that offer a high degree of flexibility. Combined with more efficient logistics systems, this will drive major changes in the forest-based sector.

The business will certainly expand in the area of forest-based bio-energy as new and improved processes for converting bio-energy to heat and electricity are developed. Such improvements are necessary for the EU to meet its goal of increasing the overall rate of renewable energy to 12% by 2010. The forest-based sector will play a leading role in achieving this target.

Society also demands that the forest-based sector uses its natural resource in a sustainable manner. It will become increasingly important to continue to create economic growth without increasing environmental impacts across energy, water and chemical use. The introduction of more efficient technologies and "green" chemicals will help realise this aim.

Research Area 2-1: Re-engineering the fibre-based value chain

Vision: Europe's paper industry maintains its position as global technology leader through advanced production concepts

The industry is already a global leader in technology terms, but more can be done to drive new manufacturing concepts and facilitate product innovation.

Success in this area will require re-engineering and new production concepts throughout the value chains, from pulp and papermaking through to converting and end-use. The sector will also have to take full advantage of the opportunities offered by new Information and Communication Technologies (ICT) and seek to minimize environmental impacts across the value chain, including the logistics area.

New types of unit operations and simplified processes can be developed to increase the overall flexibility and cost competitiveness of the value chain. New manufacturing concepts will also facilitate the production of niche, fibre-based products that can meet changing market needs.

Research Area 2-2: More performance from less inputs in paper products

Vision: New technology ensures the continuous growth in products and services with less environmental impact

Research in this area is vital for the future of the pulp and paper industry and for Europe. A successful outcome will mean that an increase in the supply of products and services no longer directly equates to a rise in resource use.

However, progress cannot come at the expense of material or product performance. To provide more value for consumers with the use of significantly less fibre resources is a key issue.

Research Areas under Strategic Objective 2

Research Area	
2-1	Reengineering the fibre-based value chain
2-2	More performance from less inputs in paper products
2-3	Reducing energy consumption in pulp and paper mills
2-4	Advanced technologies for primary wood processing
2-5	New manufacturing technologies for wood products
2-6	Technologies to boost heat and power output

To reach this, a new generation of process operations for fibre-based materials and products will have to be developed. For example, use of new technologies in pulping, fibre engineering and for separating fibre flows, will open the way for new paper types, converting technologies and product designs.

Whatever the process though, they will have to provide improved end-use performance with a significantly more efficient use of not only wood resources but also, water, pigments and chemicals.

Research Area 2-3: Reducing energy consumption in pulp and paper mills

Vision: Energy savings and integrated approaches make the pulp and paper industry a net producer of bio-energy

Pulp and paper production requires large amounts of energy. Fortunately, the industry also generates a great deal of renewable energy and has made significant investments to reduce its specific energy usage over the past decades.

By doing even more in this area though, the sector can boost its cost-competitiveness and increase the industry's potential to provide bio-energy to external users.

This Research Area aims to deliver energy savings within current processes, but it will also drive the development of breakthrough technologies. They include the use of new biotechnologies and dry processes to replace today's energy intensive processes in mechanical pulping, mechanical fibre treatments and drying.

The use of energy recovery, advanced process control technology and strategic energy management tools can all combine to deliver the optimum integration of energy consumption, conversion and recovery.

Research Area 2-4: Advanced technologies for primary wood processing

Vision: The primary wood processing industry works with considerably increased material efficiency and lower energy consumption

Primary wood processing (sawing, cutting, slicing) is highly diverse. Further research in this area can deliver innovative and safe production processes across integrated production chains that will allow the flexible production of a wider range of wood products.

Advanced sorting and grading systems for roundwood, processed materials and final products will lead to optimised material efficiency and more reliable production. Technologies can also be developed to produce new panel-type products and three-dimensional materials. In addition, improved processing techniques can be adapted to the specific requirements of novel products, helping to enhance material efficiency.

The speed of production will also increase considerably and specific energy consumption can be reduced through the introduction of new concepts such as techniques to make wood drying faster and of higher quality.

Research Area 2-5: New manufacturing technologies for wood products

Vision: Advances in technology boost efficiency and help establish new markets for wood products

This Research Area will spawn a host of novel technologies as well as optimizing the performance of exiting products to boost overall wood consumption.

Several areas have already been identified as ripe for development – thermal smoothing, the application of specialized high performance cutting and planning tools, novel hardening and multi-functional protection techniques, innovative 3-D cutting and forming processes, improved gluing techniques and advanced processing of multi-composite materials.

Secondary wood processing also offers great potential in terms of integrating existing systems, as well as developing processes that incorporate advanced predictive tools in conjunction with novel quality assessment techniques.

These advances will lead to more efficient wood use, improved product characteristics and new functionalities created by re-engineering particles, flakes, veneers, sawn timber or by chemical, thermal or mechanical modification technologies.

Research Area 2-6: Technologies to boost heat and power output

Vision: The forest-based sector supplies a major part of Europe's bio-heat and bio-electricity and, at the same time, operates nearly independently of fossil fuel

Through major technological improvements in the conversion of forest-based biomass to heat and power, it will be possible to boost the output of these bio-commodities to levels far beyond those achievable by existing technologies.

Furthermore, in plants producing both heat and power, significant benefit will be derived from process improvements, which allow the ratio of power output to heat output to be increased without loss of overall efficiency. The new processes will also be able to cover a wide range of capacities – from small-scale household units to large-scale communal and industrial plants.

> "Wood availability must be based on efficiency and quality as much as volume

More advanced technologies will be required to make full use of the wide range of available forest-based fuels – extending from forest biomass, pulping black liquor and bark to waste wood and fibre that cannot be economically recycled. In addition, the competitiveness of bio-energy conversion chains that employ intermediate energy carriers such as pellets and fuel gas will be substantially improved.

Strategic Objective 3: Enhancing availability and use of forest biomass for products and energy

Everyone knows that the forest generates a rich variety of products and services. But to realize the full potential of the forest-based sector requires a balanced and stable supply of wood. Wood availability, therefore, is a key element in the process of creating the products, services and bio-energy that will benefit Europe and the environment.

Rapid developments in bioscience and biology will help increase the growth rates of forest-based biomass in Europe and even promote the production of specialised wood raw materials. But research will also be needed to manage the complex effects of climate change, fire hazards, pests and diseases. New land will also become available for increasing the forest area as the result of developments in agricultural policy and trade agreements.

Wood availability must be based on efficiency and quality as much as volume. A key element in achieving this goal involves establishing effective information flows about supply and demand. That means building up a picture of the true potential of all the useful properties of trees, as well as investigating potential demands on the product, service and energy side of the equation.

For example, increasing the supply of forest biomass will be instrumental in Europe's aim of substituting non-renewable raw materials for renewable ones in products. Such an expansion would also help drive the increased use of biomass as a source for energy.

Improved forest management models will be needed to deliver high quality raw materials, but the supply of forest-based biomass can also be influenced by more extensive recovery of used materials. Forest-based materials can effectively utilize the "cascading principle" where the structural properties of the wood are first used to create new products, recovered material is used for recycled products and eventually material that is not economically viable for recycling is used for energy recovery.

Research Areas under Strategic Objective 3

Research Area	
3-1	Trees for the future
3-2	"Tailor-made" wood supply
3-3	Streamlined paper recycling
3-4	Recycled wood products - a new material resource

Research Area 3-1:
Trees for the future

Vision: Europe leads the world in quantitative and bio-technological science related to the improvement of trees

Matching this vision demands that the forest-based sector fully understands how modern breeding techniques can be used to improve wood characteristics, fibre biomass, and indeed, all the properties of growing trees.

Research will help develop strategies on how best to utilise genetically superior trees in plantations and semi-natural forests under various growing conditions. Experience from agricultural breeding demonstrates that it is possible to significantly increase crop productivity or even create "precision raw materials".

Moreover, the resistance and tolerance of trees to a variety of biotic and abiotic constraints will be improved, which will allow the sector to significantly boost its efficiency and reduce forest losses.

The sector will also have to develop a deep understanding of all the factors related to economic performance, social acceptance and the environmental effects associated with the use of genetically improved trees.

Research Area 3-2:
"Tailor-made" wood supply

Vision: "Tailor-made" wood supplies substantially increase the productivity and value of forest products manufacturing

Forest management and wood supply systems will be developed to deliver materials that meet the specific needs of targeted downstream activities.

Research in this area will help the forest-based sector to provide raw materials that are adapted to a whole host of customer demands, including energy production. At the same time, the sector will strive to develop more efficient and environmentally friendly forest operations, transport systems and management models throughout the wood supply chain. This will allow the sector to improve integration along the whole supply chain from forest to mill site, shortening lead times and increasing capital turnover.

Novel quality assessment techniques on trees at harvesting and on wood at the mills will also facilitate the optimal allocation of raw materials to different industrial applications.

Research Area 3-3:
Streamlined paper recycling

Vision: Society gains the maximum benefit from paper products by optimising the life cycle of the material through balanced recycling systems

In Europe today, one of the main raw material sources for new paper products comes in the form of recycled paper. This very versatile and robust material can be used and reused throughout its life circle from production and collection, through to recycling and eventually energy recovery.

To do this, the industry will develop even more sophisticated collection systems to boost the availability of recovered paper further. New processing technologies, and a more prominent role for recyclability criteria in product design will facilitate the use of recycled fibre for high value-added paper grades.

New applications outside the pulp and paper industry will be developed for recovered inorganic materials that can not be used for paper. All organic waste will be used for energy generation and energy products. These applications will help minimize the amount of residual waste and make a major contribution towards a sustainable European society.

Research Area 3-4:
Recycled wood products - a new material resource

Vision: Recovered wood provides a high volume resource for recycled products and new advanced materials, further enhancing the environmental profile of wood

Developing recycling channels can provide access to a new raw material resource based on used wood products. Not only would this contribute to the overall sustainability of the European woodworking and furniture industry, it will also help reduce greenhouse gas emissions by prolonging the carbon fixation benefits inherent in wood.

The substitution of materials produced from non-renewable resources will provide additional environmental benefits, but all this will require infrastructure development. Logistics for the collection, sorting and cleaning of used wood materials will have to be improved, for example, while easily applicable identification and detection methods for chemical compounds in wood products will be needed.

Strategic Objective 4:
Meeting the multifunctional demands on forest resources and their sustainable management

Forests cover about one-third of Europe's surface and form a variety of ecosystems from the Nordic tundra to the Mediterranean coastline. And like the diversity of climates and cultures across Europe, there are plenty of local and national differences in terms of how forests are viewed and used .

Clearly, the availability of wood as a raw material is of vital importance for the success of the forest-based sector. However, forest owners and forest managers recognize that they must also accommodate the ambitions of other stakeholders if forest management strategies are to fulfil the multiple needs of all parties. This includes systems to support decisions regarding the balance in using forests for biomass production and for other purposes.

Environmental conditions are constantly changing as climate change and other effects impact Europe's forests. Analysing and modelling the consequences of these changes will require

assessment of the response of forest ecosystems and the impact on biodiversity, for example.

Climate change may also prompt the more frequent occurrence of natural hazards. As a result, forest management strategies and silvicultural regimes must be able to take into account uncertainties, risks and opportunities under different environmental scenarios.

> **"Uncertainties, risks and opportunities under different environmental scenarios must be taken into account in forest management strategies**

Research Areas under Strategic Objective 4

Research Area	
4-1	Forests for multiple needs
4-2	Advancing knowledge on forest ecosystems
4-3	Adapting forestry to climate change

Research Area 4-1:
Forests for multiple needs

Vision: Europe's forests fulfil the multiple needs of forest owners, industry, society and environment

Forest owners need to do more than ever to balance commercial forest management and sustainable land use strategies with the demands of global competition, society, public authorities and other stakeholders.

As such, the goal will be to strive toward multifunctional forestry. This would match the sector's desire for economically viable and sustainable forest management with outcomes that are politically, environmentally and socially acceptable. For example, wood raw material would be available for industrial and bioenergy use, but alternative forest benefits, such as recreation or water protection, will be accommodated as well.

Finding optimal solutions will require improved decision-support tools that allow forest owners to consider when it is better to separate production areas from areas providing other services, and when integrating multiple functions in the same forest.

Research Area 4-2:
Advancing knowledge on forest ecosystems

Vision: Profound insights are gained into how forest ecosystems function in areas such as biodiversity, as well as understanding responses to environmental change

This Research Area will help the sector understand the dynamics and responsiveness of forest ecosystems at landscape, species and gene levels. The insights gained will help the sector assure biodiversity, for example, by assessing the buffering capacities of species.

In this way, the SRA will help the forest-based sector to develop sound strategies for safeguarding forest functions in relation to future changes.

Improving the infrastructure for long-term forest and environmental monitoring will also help forest owners and managers predict the impact of environmental changes. For example, how such changes will affect the distribution of plant species and their communities.

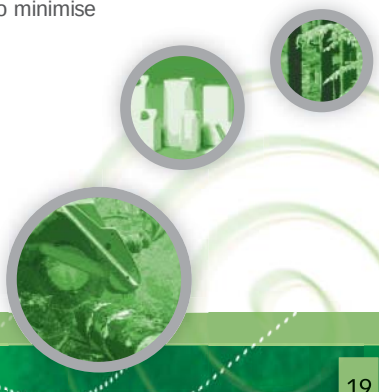
Research Area 4-3:
Adapting forestry to climate change

Vision: Forest-based biomass production is adapted to optimise the benefits and reduce the risks related to climate change and other environmental changes

Within this Research Area, new approaches to forest management and improved silvicultural regimes will be developed to enable forest biomass production to adapt to climate change and other associated environmental changes.

Decision-support tools will be designed to help manage risk and uncertainty. Meanwhile, new methods will be developed to plan for the optimal selection of tree species and silvicultural concepts in future climate regimes.

Forest fires, storms, droughts, snow, pests and diseases are forecast to become a more frequent threat to Europe's forests over time. As a result, risk assessment systems and silvicultural risk control mechanisms will be created to minimise the consequences of natural disasters.



Strategic Objective 5:
The sector in a societal perspective

For a successful future, it is vital that the forest-based sector is accepted and supported by society in its broadest context. On the face of it, achieving this goal does not appear to be such a difficult task for a sector that offers so many positive elements. But the sector is also highly complex. As a result, it is a demanding task to assess the sector as a whole from a sustainability point of view. Considering the weight society puts on the concept of sustainability, it is absolutely necessary that adequate instruments are developed.

> **"It is vital that the forest-based sector is accepted and supported by society in its broadest context**

Society also places a deep emotional value on forests, which means a high level of societal acceptance must be the basis for the sector's philosophy behind its operations. Therefore, understanding societal values, perceptions and underlying drivers is of the utmost importance for the long-term future of the sector.

Stakeholders' concerns span a wide range of issues – sustainable forest management, biodiversity, deforestation, waste, emissions, use of chemicals and the recycling of materials. Perceptions of the sector's performance in these areas strongly influence people's attitudes toward the industry and in turn inform the public policies that govern forest-based companies. So clearly it is vital that stakeholders' perceptions are shaped by accurate and scientifically sound information.

Progress in this area can also help legislators to develop coordinated public policy frameworks that address core issues and head off regulations that may only succeed in moving problems from one part of a highly complex supply chain to another.

Overall then, research in this area seeks to engage social science as a major means of supporting other research areas, as well as feeding into the SRA's strategic objective of "Improving communication with the public and policymakers".

Research Areas under Strategic Objective 5

Research Area	
5-1	Assessing the overall performance of the sector
5-2	Instruments for good forest sector governance
5-3	Citizens' perceptions

Research Area 5-1:
Assessing the overall performance of the sector

Vision: Decision makers in the private and public sector are able to assess the impacts of their own and outside activities on the sustainability of the forest-based sector

Wood is a sustainable raw material. In this one fundamental fact, the forest-based sector has a clear and obvious competitive advantage compared to many rival sectors.

Developing our understanding of sustainability is therefore vital. Criteria and indicators for the integration of economic, social and environmental dimensions of sustainability need to be available and methodologies and relevant data will be needed to assess the sector's performance in this area.

The sustainability of alternative and competitive production concepts and technologies will also have to be assessed against specific criteria and indicators. This will help the sector to direct its activities towards sustainable production and provide a performance benchmark for products manufactured from materials such as steel, aluminium or plastic.

Research Area 5-2:
Instruments for good forest-sector governance

Vision: Effective, coherent and efficient governance arrangements combine with holistic policy frameworks across the forest-based sector

The management of policy issues is of growing relevance to the forest-based sector. On the one hand, issues such as the sustainable use of natural resources or privatisation (e.g. changing ownership) are legitimate matters of concern for society. But on the other hand, the broad scope of the forest-based sector means that it is often affected with policies, directives and regulations that emanate from outside the forest sector.

As a result, governance can sometimes be fragmented, short-term and inconsistent, as institutions and policies tend to focus on single topics rather than tackling issues in a broader context. This represents a serious impediment to the development of the sector.

Governance arrangements, policy frameworks and policy instruments need to be based on reliable data, systematic decision-making, coherent implementation and evaluation analysis. Reaching this goal requires research support. Additionally, better

science-policy-practise interface arrangements will improve policy making across the European forest-based sector.

Research Area 5-3:
Citizens' perceptions

Vision: Citizens and consumers regard forest-based products and services as valuable and sustainable

Since society clearly places such a high emotional value on forests, the sector must operate at very high levels of societal acceptance. It follows then that the sector should attempt to understand society's perceptions and values, as well as identifying trends and underlying drivers.

Consumers' perceptions and needs often change more rapidly than long-term forest management and production techniques can respond. It is therefore important that the forest-based sector has hard facts and communication skills at hand that can inform stakeholders, increase their understanding and respond to concerns.

Research in this area will help identify how social and environmental policies, as well as market changes, influence citizens' perceptions of the sector and its products. Science-based communication strategies also need to be developed to provide appropriate information and assist in dialogues with stakeholders.

3. Implementation – Bringing the Vision to Reality

3.1 FROM PLANNING TO ACTION

The implementation of the Strategic Research Agenda (SRA) gets underway during 2006. A consistent and focused approach will help ensure that Vision 2030 becomes a reality, but as in all such processes, success depends on the commitment of stakeholders and the momentum created by the usefulness of results as they emerge.

The organisational structure during the implementation phase will reflect the different stakeholders – industry, forest owners, the research community and public bodies. Stakeholders' interests will be taken into account through the same type of bodies as in the development of the SRA: High-Level Group, Advisory Committee, Scientific Council and National Support Groups.

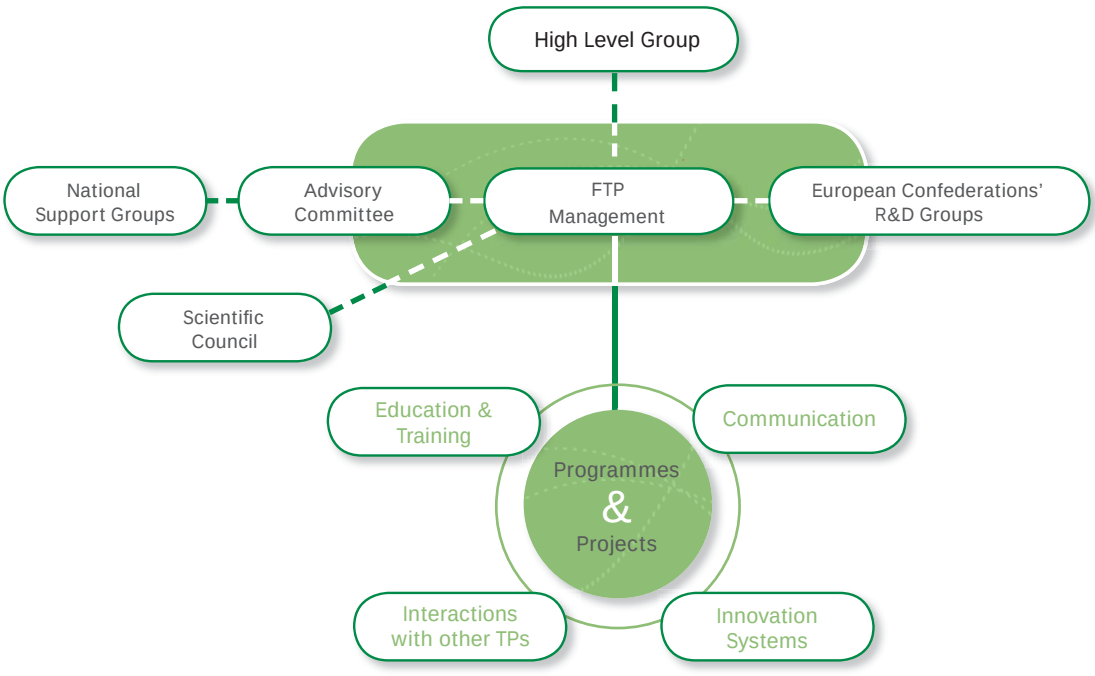
The coordinating body during implementation is the FTP Management, which reports to the High-Level Group. Management tasks include activities such as facilitating the conversion of the SRA into programmes and projects, coordinating the SRA with national research agendas, facilitating the creation of research networks and identifying funding opportunities.

Another important task will be to review progress on the SRA and disseminate information in a transparent manner to all stakeholders, including European bodies and the media.

> "The implementation of the SRA will generate a continuously changing portfolio of programmes and projects

The implementation of the SRA will generate a continuously changing portfolio of programmes and projects with different funding, researchers and beneficiaries. The main source of finance will obviously be from industry and forest owners, but this needs to be complemented by a variety of public financing mechanisms at national and European levels. The latter will involve utilising channels such as ERA-Net, COST actions, Eureka and Framework Programme collaborative projects. During the

Implementation Structure



'financial engineering' process, National Support Groups will play an active part in organising platform stakeholders such as national government organisations and regional industry. Clearly, implementation will build on existing knowledge and ongoing research. To avoid the risk of duplication, it is important to link ongoing activities to the implementation of the Research Areas. Examples of such activities are Framework Programme 6 projects, COST actions, and national programmes. In the Annex, references are made to some major ongoing activities under the relevant Research Areas.

> **"There is a need for the forest-based sector to engage scientists from essentially all fields**

Probably the most important prerequisite for reaching the objectives of the Forest-Based Sector Technology Platform (FTP) is an effective and significantly improved innovation system.

Also, education and training are significant elements required to achieve the FTP objectives. For example, education and training will be essential in delivering skill sets, linking into universities and training centres, attracting young talent to the sector, and using the results of the SRA in vocational training.

Structured communication and an effective support network will also play a significant role in achieving the FTP's goals and making outcomes known.

In daily operations, stakeholders interact with many other sectors and in a variety of functions and configurations. For this reason, links to other Technology Platforms will serve as an important vehicle for achieving the FTP objectives.

3.2 A NEED FOR A BROAD SPECTRUM OF SCIENCES

The forest-based sector spans an amazingly broad spectrum of scientific disciplines. This stems from the fact that the process starts with diverse, complex and evolving ecosystems, which produce a biological and heterogeneous material. This material is then converted into a wide range of products with different physical, mechanical, chemical, and sensory properties. On top of all that, the sector comprises a variety of other services.

From another perspective, very wide size and time scales characterize the sector. Trees are long-lived organisms and forests are persistent ecosystems, spread over large land areas and exposed to complex interactions with their biotic and abiotic environment. Basic processes range from the gene level to the whole tree, and then to the forest stand, landscape, region and even global levels.

As such, developments within bioscience (genomics, post-genomics, system biology) offer important applications to trees and forests. Additionally, biotechnology can provide strong input to the manufacturing and functionality of forest-based products.

Trees can be up to 100 meters high, but much of processing and property development is at the molecular scale. A modern paper machine continuously produces some 15,000 square meters of paper per minute and a good printing surface must be able to separate printing dots down to the micrometer scale. This large-scale production, combined with highest demands on evenness and quality, cannot be achieved without sophisticated use of material sciences and Information and Communication Technologies (ICT).

Nanoscience is also opening up new avenues for exploration. For example, investigating fibre cell wall nanostructures, utilisation of cellulose (nano) fibrils, surface treatments with nanoparticles, smart packaging and clothing, and even intelligent housing.

Due to the extensive interactions between the forest-based sector and society, social sciences are emerging as an increasingly important field for the sector. Examples include analysing perceptions on packaging and furniture design, the quality of printed images, wood harvesting issues, the role of printed information, environmental impacts, and the recreational value of the forest.

Political science studies have become increasingly important in interacting with national and international frameworks for promoting competitive and sustainable development.

These examples underline the need for the forest-based sector to engage scientists from essentially all fields, stretching from the natural and technical sciences to the social, economic and medical sciences. In the Vision 2030 document, this was formulated as the Strategic Objective: "Deepening the sector's scientific basis, including taking advantage of emerging sciences". In the Annex, major science fields to be engaged in implementation are indicated for each Research Area.

The formation of a European Research Council is currently being discussed as part of Framework Programme 7, which could help the forest-based sector to broaden its contacts with the wider scientific community.

3.3 AN IMPROVED CLIMATE FOR INNOVATION

Innovation is a major factor in fostering economic growth. Stimulating innovation has therefore become a top priority for government, industry and research organisations.

Studies show that innovative companies achieve higher shareholder returns and market values. However, experience also shows that companies are only successful in this respect when top management drives the innovation process.

The FTP initiative puts innovation high on the sector's agenda. The starting point often involves gaining insights into customer and consumer needs, which provides inspiration and focus for the process. Here, the forest-based sector can improve and the FTP should serve as a catalyst.

> **"The FTP initiative puts innovation high on the forest-based sector's agenda**

There is also clear evidence that interactions between commercial actors and the research community generate knowledge and inspire innovations. Again, the implementation of the SRA will be important in fostering cooperation and interaction via joint projects between universities, institutes, industry and other commercial actors. Such projects provide for risk sharing, good leverage on resources and access to a wide range of competencies and emerging technologies. This interaction during the implementation phase will be an essential component in enhancing innovation in the sector.

The implementation of the SRA will be designed to facilitate rapid commercialisation of new ideas. This will be achieved by engaging industry early in the innovation process and by securing its continued involvement.

Not all innovation originates from research of course, but developments that do require substantial investment before they translate into products accepted in the marketplace. This means that the FTP must help to mobilise the necessary risk capital to develop and demonstrate the concepts.

All the activities indicated above will improve the climate for innovation within the sector.

3.4 STRENGTHENING EDUCATION AND TRAINING

Pursuing the challenges of Vision 2030 demands that the forest-based sector becomes more knowledge-based and derives benefits from previously untapped knowledge banks. For this reason, education and training are vital elements in implementing the Strategic Research Agenda (SRA).

For example, education can help the sector to recruit skilled people. The key is to ensure that the forest-based sector is perceived as attractive, particularly to young people. Indeed, a study carried out by the European Commission in 2002 pointed to the need for improvement in this area.

Education and training relates to the Forest-based Sector Technology Platform (FTP) in several ways:

- *university and research education*
- *training of practitioners, supported by strong participation from industry and forest owners*
- *exposure of the sector at kindergarten and school levels and help create the conditions for more education in all concerned subjects*
- *help to stimulate the younger generation to become more interested to work in industry and to advance their education in mathematical, technological and natural scientific fields*
- *raising awareness of the sector among the public at large*

> **"The key is to ensure that the forest-based sector is perceived as attractive, particularly to young people**

In order to meet the sector's strategic objectives, it must recruit talented researchers with high levels of competence. Among other things, this will involve developing close links between the forest-based sector and academic institutions to ensure that the appropriate education is available at graduate and post-graduate level.

The broad approach of the FTP also allows efforts to be co-ordinated on a European scale. And since the preparation of education and training activities is generally costly, benefits can be generated from joint efforts. Such activities will also help form beneficial European networks. EU-wide activities will be particularly meaningful in areas such as:

- *organizing mobility programs for young researchers*
- *developing MSc, BSc and Doctoral programmes*
- *setting up summer schools*
- *making educational material available on the web*
- *shaping opinions of the forest-based sector in schools*
- *educating decision makers on the forest-based sector.*

3.5 COMMUNICATING WITH SOCIETY

Effective communication is a critical success factor in the FTP initiative.

Communication connects people, involves actors, offers meaning and encourages action. This helps explain why the importance of communication was highlighted in the Vision 2030 document under the Strategic Objective "Improving communication with the public and policymakers".

While research can often be abstract, technical and long-term, sound communication concepts can spotlight the main messages. Apart from anything else, the reality of innovation can be inspiring. But both success and failures must be shared if the FTP is to benefit all those involved, from society at large and policymakers, to industry, forest owners, and scientists.

The FTP envisages a bottom-up communication approach, mirroring the platform's organisational structure during implementation. This is seen as vital in establishing a coherent network that includes the National Support Groups and which can both facilitate communication and deliver on communication objectives. This network will focus on key SRA messages to:

- *raise awareness of the role of the forest-based sector in the wider community by promoting the importance of research in advancing Europe*
- *assist in spreading information and knowledge of research results from the SRA*
- *stimulate industry and forest owners to mobilize research resources and invest in research.*

A Communication Action Plan will be developed covering internal and external activities and which includes using established networks within the sector and public media.

External communication efforts will be aimed at education, e.g. improving society's understanding of what the FTP is striving to achieve. Meanwhile, internal efforts are intended to mobilize the sector towards the implementation of the SRA and bridge gaps between stakeholders in an industry which is characterised by global players, medium sized companies and a myriad of small outlets.

3.6 SYNERGIES WITH OTHER TECHNOLOGY PLATFORMS

The broad nature of the Forest-based Sector Technology Platform (FTP) means that several other EU-level technology platforms are of definite or potential interest.

The general philosophy of the FTP has been to first define the most important research needs and then include them in the SRA. Based on these priorities, the initiative seeks to develop contacts with other technology platforms in order to find synergies or avoid duplication of efforts.

> **"The forest-based sector needs to develop open and effective communication channels with Europe's citizens**

Based on our current understanding, mutual benefits can be obtained for cooperation with at least the following technology platforms:

- *Plants for the future*
- *Water supply and sanitation*
- *Sustainable chemistry/white biotechnology*
- *European Construction*
- *Biofuels*

In all these cases, links have already been established.

Several other technology platforms are of potential interest, including Embedded systems, Future textiles and clothing, Manufuture, Industrial safety, Food for life and three platforms in the areas of road, rail and waterborne transport. Some contacts already exist, but these can be developed further once the respective SRAs become established.

Obviously, there are several other technology platforms bordering and perhaps even overlapping the FTP. Assuming a good dialogue can be established, this situation will serve as a means of creating synergies, e.g. in the form of joint projects and programmes.

THE FOREST-BASED SECTOR

The European Confederation of woodworking industries (CEI-Bois) has been the main body representing the European woodworking industries from the EU since its foundation in 1952. CEI-Bois includes national members, as well as European trade organizations representing the different sectors of the woodworking industry. CEI-Bois counts among its members 8 European (sub-sector) federations and 25 federations from 21 European countries.

The turnover of the EU 25 woodworking industries was 165 000 million in 2003. The woodworking sector includes more than 100 000 companies and provides jobs to more than 2.7 million people in the EU 25.

CEI-Bois
Allée Hof-ter-Vleest 5/4
B – 1070 Brussels
Belgium
www.cei-bois.org

The Confederation of European Forest Owners (CEPF) is the voice of 16 million family forest owners in Europe. It is the only umbrella organization of national forest owner organizations in the European Union and brings forest owners from 23 countries (20 EU) around one table. It represents the interests of family forest owners vis-à-vis the European Union Institutions. Over 60 % of the total forest area in the European Union is owned by families.

CEPF's main objective is to foster reliable political framework conditions that enable long-term responsible investment in sustainable forest management by family forest owners.

CEPF
Rue du Luxembourg 47-51
B- 1050 Brussels
www.cepf-eu.org

The Confederation of European Paper Industries (CEPI) champions the interests of the pulp and paper industry in Europe, representing those interests towards the European Institutions. It monitors, analyses and acts upon EU legislation and initiatives relevant to industry, communicating the industry's achievements and the benefits of its products. Through CEPI, the paper industry makes expert and constructive contributions to the official European consultation process with industry. CEPI directly represents the National Associations of the paper industry in 17 member countries across Europe.

Through its member associations, CEPI represents 850 pulp, paper and board producing companies across Europe, ranging from small and medium sized companies to multi-nationals, including a total of 1250 paper mills. Together, they represent 29% of world production.

CEPI
250 Avenue Louise, box 80
B-1050 Brussels
www.cepi.org

> ***Sustainability, development and manufacturing of innovative products, resource availability, multiple forest use, biodiversity, the production of bio-energy and energy efficiency – in tackling these areas and more, the Strategic Research Agenda is clearly an ambitious undertaking.***

KI-NA-21460-EN-C

For further information and detailed contact data, please visit our homepage

www.forestplatform.org

ISBN 92-79-01027-1

printed on ZANDERS ikono silk 170 (300g/m²)