

Forest-Based Sector
Technology Platform



*Developing the Strategic Research Agenda (SRA)
for the Forest-Based Sector Technology Platform (FTP)*

Collected themes: Wood products

May 12, 2005

Theme 1

Title: Wood is a choice of style & sustainability

Positioning:

- Customer: Expected response to future consumer needs.
- Society: Expected impact on prioritized social and general economic goals of the EU (employment in rural areas, development of SMEs, etc).

Challenges and Opportunities:

- Providing products and services that respond to changes in societal needs.
- Attracting young talent to the sector.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.

Description: Creative productized wooden solutions are developed based on personalisation and mass-customisation. Life style, image and identity of b2c and b2b are met by combining architecture and design expertise to wood technology, quality and processes. The business areas are wood at home, wood at work and wood on free time. Wooden interiors such as flooring, panelling and furniture are productized to different image segments. Wood outdoors such as wooden cities wooden buildings and wooden facades meet the identity and image needs of people living, working or spending free time.

Research approach: Future home concepts of living with wood. Health, comfort and well-being issues should be combined with energy and sustainability issues and architecture and design issues. Natural properties and appearance of wood combined with technology and design expertise is needed. Marketing sustainable modern life-style and personalised solutions needs good ICT systems to combine customer interphase and production chain.

Theme 2

Title: Creating new functionalities for wood products by using cost-competitive, eco-efficient manufacturing methods

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.

Description: The proposed research theme is one of the sub-areas in the WoodWisdom-Net ERA Net project under Third generation of engineered wood products area

Research approach:

Theme 3

Title: Combining and joining wood and fibres with other materials (e.g. wood composites)

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: The proposed research theme is one of the sub-areas in the WoodWisdom-Net ERA Net project under area Third generation of engineered wood products

Research approach:

Theme 4

Title: Creating new innovative wood and fibre structures for different end-uses

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- Providing products and services that respond to changes in societal needs.
- Meeting the growing impact of large retailers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: The proposed research theme is one of the sub-areas in the WoodWisdom-Net ERA Net project under area Third generation of engineered wood products

Research approach:

Theme 5

Title: Durable and health-promoting biomaterials

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Developing and designing products that can be recycled, reused and finally converted to bio-energy.
- 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.
- Developing new industrial activities based on “green chemicals” from wood.

Description: Developing treatment materials against fungi, insects and fire for wood. Same applies for adhesives for wood based engineered products.

Research approach: Research work to be based on biomaterials enabling nanotechnologies

Theme 6

Title: Renewable products for everyday life and consumption

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- Providing products and services that respond to changes in societal needs.
- Responding to new competition from other regions.
- Attracting young talent to the sector.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: Research to be directed to respond the future needs in home decoration inside and outside.

Research approach: Designing of the products on systems needs a significant attention.

Theme 7

Title: environmental performance of wood products and construction

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- Helping society to mitigate climate change.
- 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.
- Balancing forests as a resource for renewable raw material with other important functions such as offering recreation and safeguarding biodiversity.
- Developing new industrial activities based on “green chemicals” from wood.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: Reliable LCA-analyses are needed. Decreasing the waste as a achievement a high yield ie. 0-waste

Research approach:

Theme 8

Title: Durable and health-promoting biomaterials

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.

Description: The main source of value-added of wood products is the removal of their bio-based handicaps by biomaterials that can be used as fire retardants, insect & fungal treatments, glues, in surface treatment etc. The applications nanotechnology for surface treatments and the development of new generation Engineered Wood Products is anticipated. An important aspect is the non-toxic and environmental friendly feature of the new substances and treatments. This is primarily meant by wording "health-promoting", not the medicine-like effect these products also can have.

Research approach: A multi-discipline approach will be needed with representatives of basic research in chemistry, biology, medicine, molecular physics, wood technology and nanotechnology. These groups must be in close connection with industry driven application groups to test and exploit the knowledge provided by the research teams. NGOs and social stakeholders will have a role as full-scale application test benches as soon as the laboratory tests indicate no harmful effects on human health.

Theme 9

Title: Renewable products for everyday life and consumption

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- Providing products and services that respond to changes in societal needs.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.

Description: This is a Living with Wood case. A huge amount of houses shall be renovated and refurbished in Europe in the 25 years to come. When this is added to the potential of interiors in new buildings, wood products will have an access to an enormous potential provided that the value-added they give to customers is high enough, i.e. (a) the handicaps mentioned at point 1 above are removed in an environmental friendly way and (b) the wood products can prove and articulate their environmental performance. The furniture in house and garden will also be a remarkable segment to use wood products.

Research approach: The research is connected to application of the Theme 1 above, but also provides a platform for social and "soft" sciences. The complex interrelationship between image, marketing and media must be studied. The theory of product systems specialised in wood products and theory of business models containing products, services and value chain management with help of IT tools shall be developed.

Theme 10

Title: Environmental performance of wood products & constructions

Positioning:

- Environment: Expected impact on main environmental drivers (water consumption, wastes, emissions/effluents, climate, chain issues etc).
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- Helping society to mitigate climate change.
- Providing products and services that respond to changes in societal needs.
- Substituting non-renewable materials through innovative solutions from forest-based materials.

Description: There will be a battle between various approaches to prove the environmental performance of different products. This, again, is connected to marketing investments made by each material and based on picking the raisins from the cakes of separate research disciplines. In this context, a determined and persistent research programme incorporating various approaches and linking to different sciences and technologies will be needed. Issues like Life Cycle analyses (LCA), Service Life Planning (SLP), Life Cycle Cost (LCC), total energy use of buildings high yield, zero-waste must be considered.

Research approach: In this combat between scientific approaches and material images a special effort must be put on substitution research, i.e. on manifestation of the fact that if wood is utilised in building, living, packaging etc. – instead of concrete, steel, plastics or metals – the environmental effects due to this substitution are fundamentally positive. Additionally, the globe will get the advantage of carbon sinks.

Theme 11

Title: Future Timber Building

Positioning:

- Society: Expected impact on prioritized social and general economic goals of the EU (employment in rural areas, development of SMEs, etc).
- Environment: Expected impact on main environmental drivers (water consumption, wastes, emissions/effluents, climate, chain issues etc).

Challenges and Opportunities:

- Helping society to mitigate climate change.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.

Description: Current market share is very low. Different systems compete, industrialisation is not well developed and standardisation is not business oriented. Wood is a good alternative and offer competitive solutions and excellent opportunities to mitigate climate problems and use renewable materials instead of steel, concrete and plastics.

Research approach: Benchmarking best existing systems, make innovative improvements, develop industrial energy efficient products, streamline the production/delivery process, develop standardised components, elements, interfaces and system rules.

Theme 12

Title: modern sustainable wooden cities and areas

Positioning:

- Customer: Expected response to future consumer needs.
- Environment: Expected impact on main environmental drivers (water consumption, wastes, emissions/effluents, climate, chain issues etc).

Challenges and Opportunities:

- 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.
- Attracting young talent to the sector.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: modern sustainable wooden cities and areas is the major market of wood products. Different building types in modern cities should be "productized" to concept level. Office buildings, schools, public buildings, sport and recreation buildings apartment buildings of medium rise and low rise. Potential to build higher in city centres. Main areas are in the medium rise business and living zones of growing cities in Europe and Asia.

Research approach: Important research themes are fire issues, durability issues, regional/city planning issues. Combining the expertise of timber engineering and architecture to different wooden building types, wooden structural systems, wooden structural subsystems and non-structural subsystems is needed.

Theme 13

Title: Glueing technology

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- Providing products and services that respond to changes in societal needs.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Developing new industrial activities based on “green chemicals” from wood.

Description: All industrial glues (for plywood, particleboard etc) are based on formaldehyde and non renewable resources. For health reasons the carcinogenic component should be replaced. Glueing process is slow and requires heating to high temperatures which makes the production process slow and capital intensive.

Research approach: Green chemicals suitable to glue manufacturing. Develop fast curing in low temperatures maybe with two component approach to avoid heating.

Theme 14

Title: Termite resistant wood

Positioning:

- Customer: Expected response to future consumer needs.
- Society: Expected impact on prioritized social and general economic goals of the EU (employment in rural areas, development of SMEs, etc).

Challenges and Opportunities:

- Helping society to mitigate climate change.
- Providing products and services that respond to changes in societal needs.
- Increasing the share of high value added products offered to consumers.

Description: Termites and other insects are a big constraint to timber building in some geographical areas. Hazardous chemicals should not be used/are banned and green alternatives are needed to enable the wood building systems to be used also in warm and southern areas of Europe.

Research approach: Metabolism and behaviour of termites, natural antagonists, develop application and fixing methods, testing of effectiveness, develop approval documents

Theme 15

Title: Ecological, metal free treatment for wood protection

Positioning:

- Customer: Expected response to future consumer needs.
- Environment: Expected impact on main environmental drivers (water consumption, wastes, emissions/effluents, climate, chain issues etc).

Challenges and Opportunities:

- 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.
- Developing new industrial activities based on “green chemicals” from wood.

Description: Wood treatments against termites and for better durability have been essential part of wood industry around the world. However, the chemical treatment of wood has been one of the most important pollutants of heavy metals, because the active substances has traditionally based on copper, chromium, arsenic or creosote. It is also well known, there is a strong need for more environmental wood treatments and treatment methods on a market at the moment and also in the future.

Research approach: From experience it is known, the task is going to be difficult and a lot of resources is needed for final breakthrough. Development of eco-friendly treatments needs high quality knowledge and equipments of wood chemistry and also some practical development and testing environment with experienced people. For the task, the best available resources should be searched and employed from any place and organisation available.

Theme 16

Title: Testing and quality control for modified wood products

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.

Description: Testing process as well as quality control was originally planned for CCA or comparable chemicals and it is noticed to have some drawbacks (Especially drawbacks have noticed in laboratory testing), when new modified wood products has developed and tested. The testing and the quality control methods should be reliable, fast and reasonable priced and methods used should take into consideration direct (wood species, modification) and indirect factors (climate, construction) concerning the whole service life of wooden components.

Research approach: Extensive international co-operation is needed for harmonising methods used in different districts (Europe, U.S.A, Canada and Asia, New Zealand and Australia) for decay and termite resistance as well as methods used in quality control.

Theme 17

Title: Increasing the utilization and adding the value of mechanical wood processing by products in energy purposes

Positioning:

- Energy: Expected impact on energy production and use (energy from forest biomass, energy efficiency etc).
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- Helping society to mitigate climate change.
- Obtaining an economic and environmental balance in using forest biomass for products and energy, as well as substantially improving the industry's energy efficiency.
- Becoming a major producer of "green electricity", biofuels and other bio-energy products.

Description: In the EU most of the harvested raw wood is used as a raw material of forest products industry. The wood raw material flow, including forest residues, used in forest industry comprises the most significant bio-mass fuel flow in EU. About half of the utilised raw wood volume can be converted to final products, and the rest of the volume ends up to by-products that are utilised in energy purposes. In addition forest based products itself end up to energy production after their departing of primary use or recycling. Most of the by products are used in heat production, some part of the flow is used electricity production and only a tiny part of it is utilised in the production of the refined biomass fuels. Emphasising the production of more valuable energy products instead of heat is a key element aspiring to add the value of by products. Forest industry is able to integrate the round wood and forest fuel procurement, this enables the industry to grow the procurement volumes of forest residue based raw material that are needed in the production of more refined energy products. One of the most interesting ways to grow the value add, is to increase the electricity production, especially in small-scale CHP plants. The biomass stream through the mills and existing infrastructure of forest industry comprises good conditions for the development of wood based refined energy products, such as briquets, pellets and liquid fuels. To achieving the targets set for the use of bioenergy a vital international biofuels markets are needed. Well functioning biomass markets help securing the raw material supply for energy production and refining purposes and marketing the refined products for end users.

Research approach: The processes of forest industry need both heat and electricity. This is a prerequisite for applying com-bined heat and power production (CHP) technologies. CHP technologies are widely successfully utilised in big, more than 10 MWe, scale. Future prospects to increase CHP production lie in smaller scale, espe-cially in mechanical wood processing industry. Thus developing resources should be allocated to the de-velopment and commercialise of new cheaper small-scale power plant concepts. The prize can be de-created through serial production and standardisation of the power plant products. Also piloting and dem-onstrating of new power plant technologies as, Organic Rankine Cycle (ORC) and gasification + gas mo-tor, in small scale is important.

Forest industry mills offer good opportunities to integrate new by products refinery processes to existing mill infrastructure. Especially the production technologies of bio-oil and ethanol still have to be further developed before demonstrating them in a large scale. Vital biomass markets are essential to link the forest industry biomass flow, other biomass sources and the end-users needs. Producing and delivering market information of bioenergy markets to market participants, are required procedures, as well as recognising and removing the economical, legislative and technological barriers hindering the development of bioenergy trade. The development of the bioenergy markets needs both scientific research and practical promotion projects.

Theme 18

Title: Smart Wood

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Increasing the share of high value added products offered to consumers.

Description: Product can be sawn, veneer or fiber based end product. At the beginning it is a durable customized product with the minor need of the maintenance. Later it will be extended as a product family. The whole chain from the forest, to production, end use and recycling is taken cognizance. The project will increase the knowledge of wood as a renewable raw material over different science segments.

Research approach: Biological, physical and chemical characteristics of wood in function of the process stages from the forest to the end product are clarified in form of state of art using modern statistical models. Starting with some pilot projects including product's business idea, innovation structure and operating system the first version of the product will be created (cf. dissertation of Kairi). Next step is an industrial stage, where the production will be developed; technology push step will be prepared. In breakthrough stage partnering in marketing is needed for marketing pull effect. The research is a co-operation with Metla and Otawood group.

Theme 19

Title: New chance of wood

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Increasing the share of high value added products offered to consumers.

Description: The development work starts from the identification of needs and when needed to analyse them. The work focus to collect all R&A work in the whole production chain in the same package, not divide them with basic, applied and development research. The results are effectual control and development of the whole forestry- wood chain; forest -production - product development - sales - end-use of products. Only the manufacturer is able to do this, not the customers.

Research approach: The demand research area is WOOD CHEMISTRY with WOOD BIOLOGY Detailed research areas consist of: durability / service life functionality recycling human

Theme 20

Title: Development of new business concepts

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- Providing products and services that respond to changes in societal needs.
- Meeting the growing impact of large retailers.
- Responding to new competition from other regions.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: Generation of in-depth understanding towards customer needs and consuming context from the perspective of consumer behaviour, perceived purchasing contexts and final customer satisfaction

Research approach: Requires conventional both qualitative and quantitative business research in terms of combining industry analysis and large scale consumer surveys in a holistic settings. Development of new context sensitive measuring instruments may become necessary

Theme 21

Title: Management of new product dynamics

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: As to SMEs a key issue is how to manage the increasing new product development cycle given quick change of consumer taste, search of personal identity and managing the speed of business processes in value-creating way?

Research approach: Conventional business research methodologies can be applied to focus the whole business process chains, the formation of value creating patterns and their management and control. When possible action research should be applied to understand the change of processes.

Theme 22

Title: Environmental competence, long-term durability of wood materials and wood products, and the relationships with the quality of life of people

Positioning:

- Customer: Expected response to future consumer needs.
- Environment: Expected impact on main environmental drivers (water consumption, wastes, emissions/effluents, climate, chain issues etc).

Challenges and Opportunities:

- Securing the availability of renewable raw materials, while supporting the varied uses of forests and safeguarding biodiversity, through sustainable forest management.
- Providing products and services that respond to changes in societal needs.
- Meeting the growing impact of large retailers.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description:

Research approach:

Theme 23

Title: Parallel success and mutual sustainable development of the manufacture and use of wood products and renewable energy sources (esp. wood energy)

Positioning:

- Energy: Expected impact on energy production and use (energy from forest biomass, energy efficiency etc).
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Developing and designing products that can be recycled, reused and finally converted to bio-energy.
- 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.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Becoming a major producer of “green electricity”, biofuels and other bio-energy products.

Description:

Research approach:

Theme 24

Title: Mutual strategic and operational functions, working practices and partnerships of large companies and SMEs in the different value chains of wood product sector

Positioning:

- Society: Expected impact on prioritized social and general economic goals of the EU (employment in rural areas, development of SMEs, etc).
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description:

Research approach:

Theme 25

Title: Material Science of Wood

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Responding to new competition from other regions.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: The main areas of interest are: 1. The chemistry of wood and its applications to following areas 2. The gluing and surface treatment of wood 3. The structural behaviour of wood and wood constructions 4. The durability of wood and wood products 5. Development of new methods for measuring properties of wood

Research approach: The specification and development of research methods should be based on following ideas: 1. The specification of research topics based on value chain and practical requirements of the products 2. Development of the necessary new knowledge based on Key Technology model, which secures the fast application of the results of research. 3. Development of the necessary innovation structure for the customised application of the results.

Theme 26

Title: The application of new ITC- technologies for development of process technologies of wood

Positioning:

- Society: Expected impact on prioritized social and general economic goals of the EU (employment in rural areas, development of SMEs, etc).
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- 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.
- Responding to new competition from other regions.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: The main areas of interest are: 1. Development of new cost effective production processes for basic and further processed products 2. Management and modelling of process and product chains from customer to forest 3. Development of new products and product systems

Research approach: The specification and development of research methods should be based on following ideas: 1. The specification of research topics based on value chain and practical requirements of the products 2. Development of the necessary new knowledge based on Key Technology model, which secures the fast application of the results of research. 3. Development of the necessary innovation structure for the customised application of the results.

Theme 27

Title: Development of new product systems of wood construction and sustainable living with wood

Positioning:

- Customer: Expected response to future consumer needs.
- Environment: Expected impact on main environmental drivers (water consumption, wastes, emissions/effluents, climate, chain issues etc).

Challenges and Opportunities:

- Securing the availability of renewable raw materials, while supporting the varied uses of forests and safeguarding biodiversity, through sustainable forest management.
- 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.
- Increasing the share of high value added products offered to consumers.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: The main areas of interest are: 1. Development of Wood based design systems and standardisation of wood products and product systems for wood construction 2. Development wood products and for sustainable urban development (new housing areas and renovation of old buildings)

Research approach: The main actions are: 1. Development of Interdisciplinary European University of Forest products technology by combining research and education skills in Wood technology, Wood construction and Wood architecture (PRA- model of TKK) 2. Development of international Post graduate and doctoral School of Modern Wooden City 3. Securing european financing for leading Universities and research Institutions operating in these areas

Theme 28

Title: dry&fast wooden construction

Positioning:

- Customer: Expected response to future consumer needs.
- Competitiveness: Expected impact on the competitiveness of European industry/companies in global competition.

Challenges and Opportunities:

- Providing products and services that respond to changes in societal needs.
- Achieving a significant decrease in capital intensity and increased production flexibility through process innovations.
- Responding to new competition from other regions.
- Substituting non-renewable materials through innovative solutions from forest-based materials.
- Taking advantage in process and product developments of alliances with other sectors and of exploiting emerging technologies.

Description: Fast&dry wooden construction is the key to competitive building site. Moisture control during fast&dry production leads to better quality of the completed building. Fast process and optimization of logistics saves invested capital and maximizes cash flow. Fast&dry process enables a larger market share to wood construction and substitution of in-situ cast concrete. Fast&dry wooden construction is competitive with steel frame buildings in the low and medium rise buildings.

Research approach: Research need are building physics, weather sheltering systems, dry component manufacturing, clean building site assembly systems. ICT in construction is a key issue in optimization of design-manufacture-logistics-build.