Swedish Forest Sector Research Agenda
The Swedish Forest Sector Research Agenda

• Identify research necessary for Sweden to keep the position on the world market

• Is developed jointly by the industry and the research community

• Constitute the basis for Swedish participation in the technology platform (FTP) through the National Support Group Sweden (NSG-Sweden)

• Is monitored by a secretariat from industry and research, national research financiers participating as observers
NSG-Sweden and the Reference Groups

• Task: to develop the agenda and work for the realisation of the agenda

• Three reference groups:
  • Pulp, Paper & Bio-refining
  • Timber processes & products
  • Forests & forest products

• Reference Group members: trade, industry, universities and research institutes.

• In total more than 100 experts
Sweden = forest

73 % forest

The forest Sweden’s most important raw material

80 % cultivated forest
€ 12,000,000,000

70%    90%

€ 420,000,000
Products & Processes

New bio-based materials

New products for new fields of utilization

Optimized products with existing and new functions

Pulp, Paper, Board & Sawn Timber

Bioenergy
Biobased Materials, Products, Services

- Industrial Fittings
- Hygiene
- Packaging
- Functional products
- Bearers of medicines
- Buildings
- Furniture
- Furnishing
- Consumer products
- Wood
- Fiber and pulp
- Textile
- Paper and board
- Chemistry
- Composites
  - Plastics
  - Pharmaceuticals
  - Foodstuffs
  - platform-chemicals
- Energy
- Building materials
- Vehicles
- Consumer products
- Composites
  - Biofuels
  - Biogas
  - Wood/Pellets
  - Bioenergy

SkogsIndustriema
The Research Agenda
- in 4 points -

1. Strengthen bio-based competitiveness
2. Increase access to forest raw material
3. Develop (new) biobased products
4. Stimulate growth for industrial timber constructions
The Forest Sector Research Agenda
Four research areas

• Fundamental research
The Forest Sector Research Agenda
Four research areas

• Fundamental research
• Forests and forest raw material
The Forest Sector Research Agenda
Four research areas

• Fundamental research
• Forests and forest raw material
• Pulp, Paper and Biorefinery
The Forest Sector Research Agenda
Four research areas

• Fundamental research

• Forests and forest raw material

• Pulp, Paper and Biorefinery

• Timber processes and products
The Forest Sector Research Agenda
Fundamental Research

- Important to understand and use the forest raw material
- Increase the understanding of cellulose
- Expand knowledge of separation methods
- Develop new forming processes
The Forest Sector Research Agenda
Fundamental Areas of Research

- Important to understand and use raw materials
- Increase in understanding of cellulose
- Knowledge and know-how about separation methods
- New forming processes

- Competition from fast growing raw materials and developing demands on sustainability require systematic research efforts to increase the utilization of value.
- Understanding of interaction between cellulose and water are totally central to be able to engender conditions for new products and processes.
- To extract the greatest possible value from all the building blocks in biomass requires developments of separation processes.
- Expanding the utilization of cellulose demands new knowledge about the effects of various forming processes and plasticization.
The Forest Sector Research Agenda

Areas of Research
Forests and Forest Raw Materials
• Sustainable utilization of forests and forest land
• Knowledge of forest eco-systems
• Artificial regeneration and forest production
• Forest raw materials – access and properties
• Harvest, enrichment and transportation
• Other ecosystem services and benefits for forest land
The Forest Sector Research Agenda
Forest and Forest Raw Materials

- Sustainable utilization of forests
- Knowledge of forest ecosystems
- Other ecosystem services

➢ Knowledge-based assistance, decision support and idea inspiring tools, comprehensive consequence analyses of various forms of management. Social scientific research.
➢ Deepening of knowledge in fundamental subjects such as plant physiology, genetics, pedology, hydrology, ecology, system ecology, biometry, climate research and ethology. Long-term field trials and reference areas. Sustainable methods to create and maintain forests with special recreational value close to populated centres.
➢ Analyses of different possibilities and consequences of new infrastructures, energy systems, water supplies and other social structures from the perspectives of land ownership, society and industry.
The Forest Sector Research Agenda
Forest and Forest Raw Materials

- Cultivation and forest production
- Forest raw materials – access and properties
- Harvesting, enrichment and transportation

- Environmentally considerate and efficient land preparation methods and technology for mechanization of sowing, planting and clearing, long-range investments in genetic selection, long-term trials and fixed reference areas.
- Technology for remote analysis, laser scanning, 3D-photography, land-based scanning and sensor technology, scenario analysis, methods and tools for flexible evaluations of raw materials as support for explicit business contracts.
- High producing and low environmental impact forest operation systems, transportation and logistic. Novel measurement and calculation techniques for automation and increased use of value-added operator support. Digital information systems and efficient forms of cooperation for owners of small forest properties.
Forest Sector Research Agenda

Research Areas
Pulp / Paper / Biorefinery

Process leader
Kennert Johansson
The Forest Sector Research Agenda
Pulp, Paper and Biorefinery

• Biorefineries – new concept
• Production processes – pulp
• Production processes – paper, board and new solutions
• Packaging
• Hygienic and healthcare products
• Printed products and e-media
• Textile products
• Processes and tools for new bio-based products
The Forest Sector Research Agenda
Pulp/Paper/Biorefinery

- Biorefineries – new concepts
- Production processes – pulp
- Production processes – paper, board and new solutions

- Priority: side streams (Can 50% of raw materials be used better?), separation processes, mixed raw material flows, opportunities to upscale
- Priority: cellulose, new qualities for current and future products, understanding of water-interaction and supramolecular structures, matrix interaction with other organic materials, nanocellulose
- More efficient paper processes (energy, material consumption, flexibility), increased functionality of products, new products in existing infrastructures (e.g. textile-like paper), digitalisation of processes
The Forest Sector Research Agenda
Pulp/Paper/Biorefinery

- Packaging
- Hygienic and healthcare products
- Printed products and e-media

- Next generation packaging, totally biobased and degradable, increased functionality (clever solutions, freer forming), sustainability
- Developments of cellulose, solid basic selection, developments in healthcare, progress from paper products to a part of diagnostic work, controlled release, prostheses
- Surface knowledge for existing and future products, energy storage, intelligent e-paper products, hybrid paper/e-media, recycling
The Forest Sector Research Agenda
Pulp/Paper/Biorefinery

- Textile products
- Processes and tools for new biobased products

- Several areas of utilization for industry and consumers,
  Developments in cellulose and processes, developments in value chains (e.g. spinning), consumer needs must be met
- Understanding of the raw materials, their functional properties in side flows, characterization of raw materials and materials, processes for further developments, new business areas involve cooperation outside the industry
Forest Sector Research Agenda

Research Areas
Timber Processes and Products
The Forest Sector Research Agenda
Timber Processes and Products

- Sawmill processes
- Construction processes
- Processes in carpentry and the furniture industry
- Timber products for construction
- Visible Wood Products
The Forest Sector Research Agenda
Timber Processes & Products

- Sawmill processes
- Construction processes
- Processes in carpentry and the furniture industry

- Alternative cutting technologies, drying technology, measurement technology and new methods for customer order controlled sorting, test platforms for new processes, communication and business models for monitoring flow of information
- Construction information handling systems and BIM, inbuilt smart sensor systems for supervision of vital details concerning buildings (moisture, temperature, fire, durability), developments of new production methods for biobased materials, producing biobased glues and additives.
- Surface modifications for increased fire resistance, dirt resistance, colour durability, texture and structure, chemical and thermal modification in order to alter the properties of timber radically.
The Forest Sector Research Agenda
Timber Processes & Products

- Timber product for construction
- Visible timber

- New timber-based construction products, composites for structural buildings, high performance biobased heat insulation, timber products with improved properties when it comes to fire, fire-proofing, durability. New construction solutions and new product concepts.

- "Intelligent products" e.g. combining electronics with biobased products, developments of maintenance systems and possible services. Knowledge, know-how and skills for perception, design and communications with regulatory bodies and consumers.
Forest Sector Research Agenda