Success grows on trees

Innovations for a more sustainable future

The future is made today in the forest industry

The forest industry plays a key role in the accomplishment of climate goals and as a builder of general well-being. The foundation of success lies in healthy forests that increase their carbon storage as they grow, helping mitigate climate change. Products made of wood and wood-based materials also act as carbon storage throughout their life cycle.

Products made from wood direct consumption towards a more sustainable, carbon neutral future. They replace products made with fossil materials, now and in the future. In fact, the Finnish forest industry's activities and investments in product development, fossil-free processes and active forest management are a form of climate and environmental action.

A successful forest industry benefits Finland, bringing export, tax and stumpage price revenues into the country. It also enables new investments that enable the green transition. Active forest management and wood-based products strengthen Finland's economy in a sustainable way and provide jobs everywhere in Finland.

RDI activities bringing productivity and economic growth

The research, development and innovation (RDI) activities of the forest industry promote the productivity and economic growth of Finland in the long term. The Finnish forest industry creates a renewable, sustainable future by investing in research, the development of products, services and production processes, and the commercialisation of ground-breaking innovations.

Most (77%) of Finnish chemical forest industry businesses are engaged in innovative activities and more than half (54%) cooperate with research organisations (Community Innovation Survey CIS, 2020).

Finnish forest industry businesses are trailblazers in the development of renewable material, process and product innovations. In forest industry patents, for example, Finland ranks one of the top countries in the world in various branches of technology.

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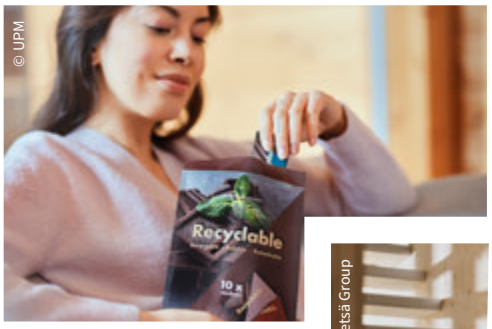
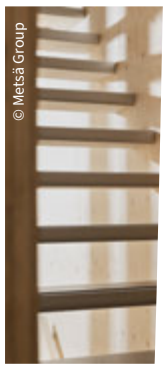
Forest industry innovations and everyday solutions help phase out the fossil economy

Concern about climate change and environmental impacts is growing all over the world. The forest industry meets global challenges by making products from a renewable and recyclable raw material: wood. In Finland, wood comes from sustainably managed, Finnish forests. Products made of wood help mitigate climate change and respond to various problems caused by population growth.

The world needs new, more sustainable ways of producing and consuming goods and services. Sustainable raw materials, process technologies, products, services and business models help us transition to a more sustainable way of life. We also need more agile measures to be able to extensively implement these solutions. By using Finnish, renewable raw materials and high-quality expertise, we can create new, profitable business opportunities in Finland as well as potential export products.

The forest industry helps the world phase out the fossil economy. Wood-based products can be used to replace more polluting products – now and in the future. Wood materials are constantly being developed into new products and services. In addition to their bio-based properties, the advantages of raw wood materials include adjustability, recyclability and versatility in terms of products. Wood offers versatile opportunities for product developers and material manufacturers.





PULPWOOD

- → pulp
- → paper
- → paperboard
- → other converted products

All parts of the tree are used

LOG

- → sawn timber
- → plywood

Skilled workforce is a guarantee for success

The forest sector is an important employer in Finland and its worker pool has a wide range of education and experience. The forest industry directly employs 38,400 people in our country. When taking into account indirect employment, such as timber harvesting, warehousing and transportation services, the employment impact increases to 82,800 people.

Jobs in the forest industry are consistently engaged with significant global challenges, including climate change and globalisation. The industry calls for STEM (Science, Technology, Engineering and Mathematics) skills as well as technical and financial expertise, not to mention the importance of cooperation and project skills. Nowadays, understanding the opportunities provided by digital applications and consumer behaviour is also important. Professionals working in the industry have the opportunity to constantly develop their skills and create an international career.

Skilled employees are a prerequisite for the success of the forest industry. Education must provide a basis that makes it possible to develop expertise, innovations and new export products in cooperation with employers. Forest companies also pay attention to the education of their employees and developing their skills. The industry offers a variety of summer jobs, internships and apprenticeships to support the employment of young people.

Key figures of the forest industry

82,800 people

Employment impact of the forest industry

1.9 billion euro

Annual overall investment impact of the forest industry

45 billion euro

Turnover of the forest industry

11 billion euro

Value added of the forest industry

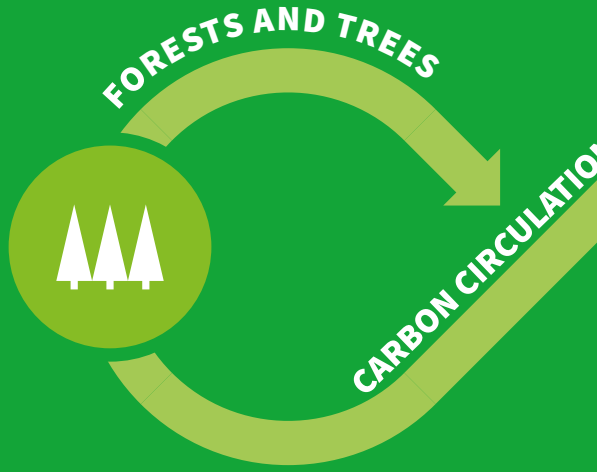
3.1 billion euro

Tax revenues of the forest industry

EY Advisory Oy: Forest industry's economic impact in Finland (2023)

The forest industry is at the core of circular bioeconomy

The circular bioeconomy uses renewable raw materials efficiently. In the forest industry, the goal is to produce wood-based products with as high a quality grade as possible. Wood fibre-based products can be recycled and, finally, used in bioenergy production.



FORESTS AND TREES

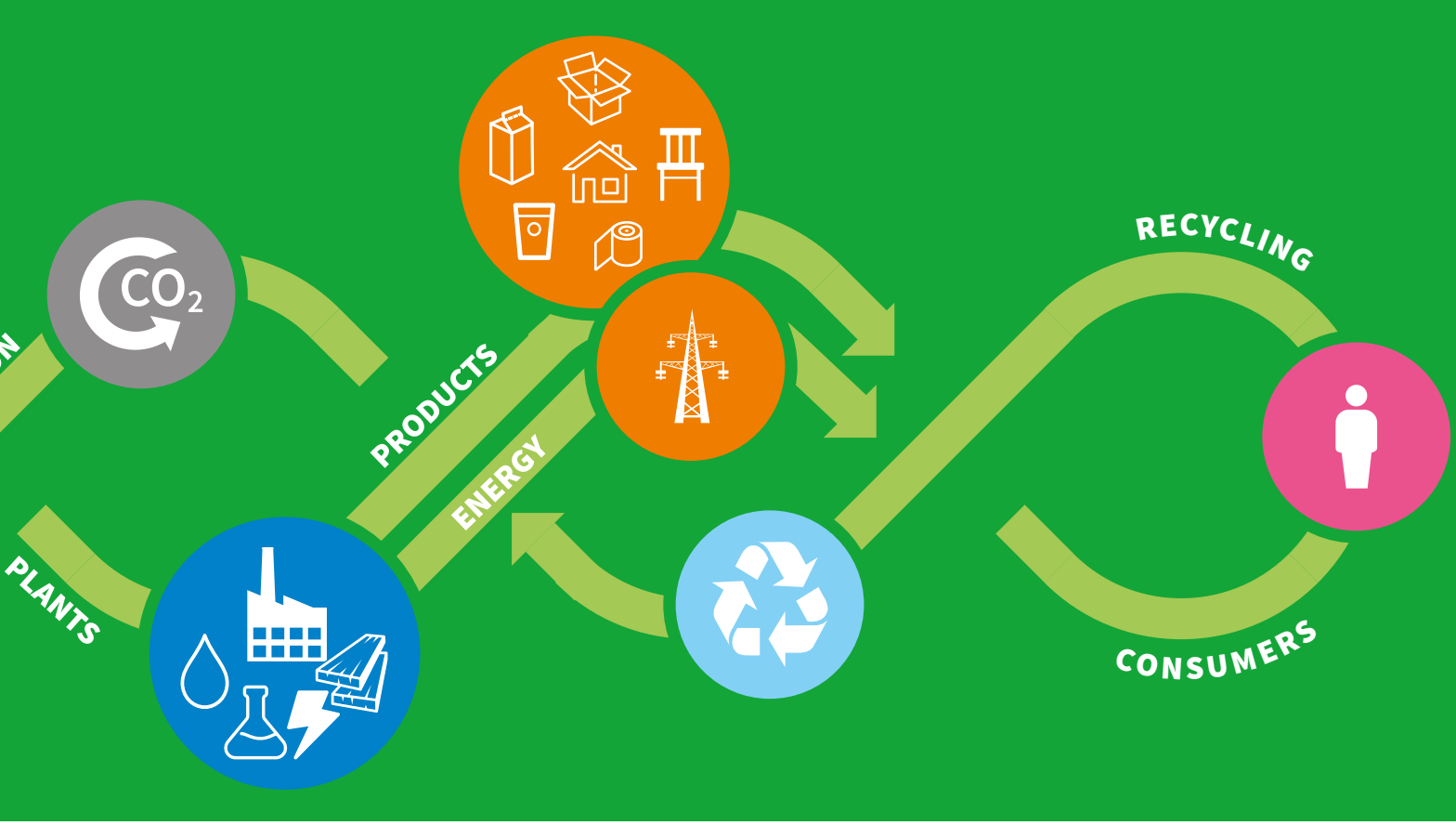
Healthy forests and the availability of raw wood materials are the basic prerequisites for the forest industry's existence. Active and timely forest management supports the accumulation of forest resources and maintains the carbon sequestration of forests, all the while ensuring the availability of Finnish wood as a raw material. About four new seedlings are planted for every tree felled. The total number of new trees planted in Finland every year is about 150,000,000.

INDUSTRIAL MILLS

The mills operated by the forest industry are resource-efficient. The raw materials used to manufacture products are used as efficiently as possible. With the right equipment, water purification and recycling can be accomplished during the same process. The side streams generated in the process of manufacturing products are also used efficiently. Some end up as new products and derived products, such as fertilisers and materials for earthworks, whereas some are used for energy production. The energy produced can also be distributed outside the mill. In 2019, the share of wood-based fuels in the total renewable energy of Finland amounted to 74%.

PRODUCTS

Different parts of a tree are carefully used for products that provide the highest added value. The trunk of the tree (log) is used to produce sawn timber, laminated timber and sheets that are typically used in construction and furniture-making. The thinner part of the tree, also known as pulpwood, is used to manufacture chips for pulp production. Pulp can be used for various wood-based products, such as paper, paperboard, hygiene products and textiles. Pulp production also creates side streams that can be used in the production of goods such as biofuels, cosmetics and batteries.



CONSUMERS

The public's general awareness of the environment and demands for consumer products have increased. Forest industry offers consumers a chance to select sustainable, recyclable and renewable products without compromising their environmental values. Wood-based products are already an integral part of our everyday lives, but the new innovations of the forest industry promise even more alternatives for the future.

RECYCLING

In the context of sustainable consumerism, it is ideal that a product remains usable as long as possible. If a wood-based product has a short life cycle, it is sustainable for the environment and the climate that the product is recycled once it has been used. Recycled wood-based products can be used to manufacture new products while cutting back the use of primary fibre. Wood fibre can be recycled about 5 to 7 times.

CARBON CIRCULATION

Growing trees absorb carbon dioxide from the atmosphere. The carbon remains sequestered in the wood even when the tree is felled and turned into various products. In other words, wood-based products act as carbon storage. After use and recycling, the sequestered carbon is released back into its natural circulation as the product is industrially burned for bioenergy.

Wood-based products are part of climate-friendly everyday life

We use products made from wood every day. Wood as a material helps us phase out non-renewable raw materials. By using renewable and recyclable raw materials, we can reduce emissions in our everyday lives and extend the life cycle of the products we use.

The climate benefit of wood-based products is created by using them to replace products that cause more fossil emissions. In Finland, this climate benefit amounts to more than 16 million tonnes of CO_2-eq every year (VTT Technical Research Centre of Finland, 2020). When set in proportion, the figure corresponds to one third of all current carbon dioxide emissions in Finland. The climate benefit is also about fivefold compared to the current emissions of Finnish forest industry mills.

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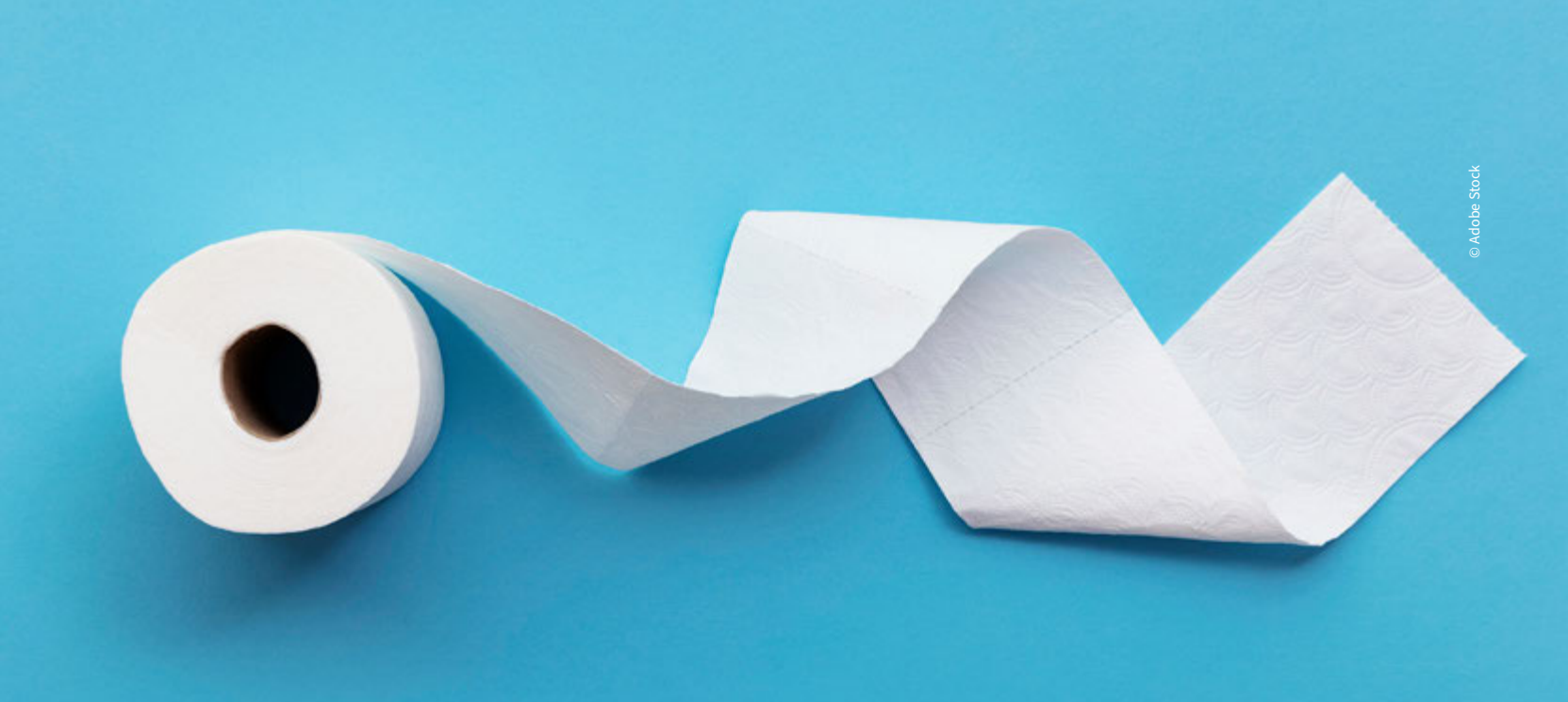
Forest industry innovations, right from the start

The forest industry actively cooperates with various industries and sectors. Thanks to evolving technological methods, we are able to produce more precise forest data which can be used in forestry planning, for example.

Innovations related to forest management, timber harvesting and logistics increase the efficiency, quality and safety of the work. A great example of technological innovation is the laser scanner installed in more and more drones and harvesters, offering precise tree stand data. Artificial intelligence will also become more common in the future in offering solutions for forest analysis.



Paper has its place—Not everything can be digitalised!

Despite digitalisation, paper remains a necessity in our daily lives. Due to population growth, urbanisation and the higher standard of living, the demand of some paper products, such as tissue, will only increase in the future. We also use a wide range of other paper products in our daily lives.

Paper is made of pulp, which is an incredibly versatile material. We need tissue papers, such as toilet paper and tissues, to fulfil our basic daily needs. They promote hygiene and health while offering comfort and well-being. On the other hand, various greaseproof papers, such as baking sheets and wax paper, are important home supplies. In a more peculiar form, wood can also be found in sausage skins.

We still need various printed and graphic papers alongside the digital alternatives. Magazines, books, cards, posters, advertisements and labels are just some examples of this wide variety of necessary paper products.

Wood construction is a climate-smart choice

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Carbon sequestering, sustainable construction and timeless interior design

Like other wood-based products, wooden buildings act as carbon storage throughout their lifespan. The use of wood reduces the carbon footprint of construction when taking into account the entire life cycle of the building from the manufacture of the building materials to the construction and use of the building and recycling of the materials. For example, one kilogramme of cross-laminated timber (CLT) sequesters 1.6 kilogrammes of carbon dioxide from the atmosphere (VTT Technical Research Centre of Finland). Buildings can keep carbon sequestered for up to centuries.

In addition to the choice of materials, the carbon footprint of construction can be reduced by process efficiency. In industrial wood construction, pre-manufactured solid wood elements enhance and develop the construction process as the construction site personnel only need to attach the elements to each other. Furthermore, the side streams generated in manufacturing wood products can be used in energy production, reducing the need for fossil fuels.

The greatest opportunities for increasing the use of wood lie in construction. The use of wood is increasing in cities, public sector as well as major structures e.g. in infrastructure. Wood construction is slowly becoming a new trend that emphasises urban architecture and environmental awareness.

The trend of wood construction is also driven by the fact that wood has been shown to affect indoor air quality positively. Wood is hygroscopic, meaning that it can control humidity and balance variations in indoor air humidity. Furthermore, wood has antibacterial properties that prevent the growth of harmful microbes on surfaces.

Wood can be seen as a decorative element in formats other than traditional purposes as well. For example, wood composite made of wood chips can be easily made into waterproof bathroom or terrace fixtures. Acoustic panels made from wood-based biofibres can be customised for all sorts of surfaces. Wood is very versatile!

Wood fibre-based textiles are gentle on the skin and the environment

In the future, more and more clothes can be made from wood. The goal is to use wood-based textile fibres to replace materials that have a major negative impact on the environment and consume a great deal of water, such as cotton and polyester, which is made of fossil materials.

Finland is a world leader in the development of ecological textile fibres as we have both the technology and the skills to manufacture durable textile fibres. The development of cellulose-based textile fibres has been a long-term effort, and the results of this research have attracted widespread international interest. The ecological textile fibre innovations developed in Finland offer a more environmentally friendly way to produce textile fibres in which the raw materials are used in a sustainable and responsible way.

Beauty and wellness with wood

Finnish forests and trees inspire cosmetics and wellness products made in Finland. Wood is used in health supporting biomedical products.

Various wood-based solutions are already a part of the everyday activities of health care centres and hospitals. For example, traditional white hospital casts can also be partially replaced with a wood-based alternative that does not need to removed for X-ray scans and can be recycled.

In addition, cellulose and wood extractives can be used as a preservative and binder. Nanocellulose, for example, has a high cell and tissue compatibility and water retention capacity, making it a great cell culture medium for cancer research. It can also be used as a material in wound dressings to expedite healing.

Wood-based ingredients are also used in cosmetics. For example, birch bark, one of the side streams of the forest industry, is an excellent ingredient for cosmetics. In addition, bio-based aromas derived from wood are utilised in many fragrances and flavourings.

Woody power—Energy and mobility from renewable natural resources

One way to reduce the emissions of traffic is to replace fossil fuels with biofuels. Tall oil, a side stream of pulp production, can be used to make a renewable fuel, the use of which reduces its life cycle emissions by more than 80% (UPM). The biofuels produced from the side streams of the forest industry do not compete with food production.

Wood-based biochemicals offer a sustainable and competitive alternative to fossil fuels in various applications. The new technologies developed by the forest industry make it possible to split fibres into sugars and lignin. They can be used as components in the production of bottles, packaging, textiles, washing agents and detergents and cosmetic products, for example. Sugar and lignin are also needed in industrial applications, such as glues and resins, batteries, plasticising cement and energy storage.

Bio-based packaging drives everyday life

Packaging protects products. In the future, we will need more and more bio-based packaging with the increased replacing of plastics, global e-commerce and food delivery services.

Most packaging made from fossil raw materials can already be replaced with wood-based alternatives. Food packaging, for example, can be 100% wood-based. It can even be used for liquid products if the paperboard is covered with a layer of bioplastic made of tall oil.

Wood is a functional, aesthetic and safe material for packaging and labels. Alongside wooden and paperboard packaging, there is wood composite packaging made of recyclable wood fibres and natural binders.

Wood-based solutions increase the recyclability of packaging and reduce the carbon footprint of products. They also cut down the amount of microplastics. The raw materials come from sustainably managed Finnish forests.

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