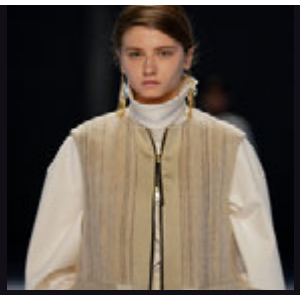
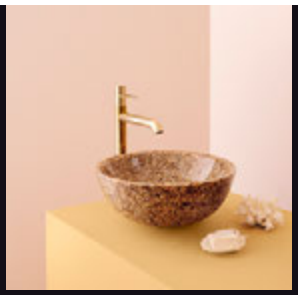
Success grows on trees

Wood-based innovations for a sustainable future





The forest industry solves the planet's greatest problems.

Concerns about climate change and environmental impacts are growing all over the world. The forest industry answers to these global challenges by making products from renewable, increasing and recyclable raw materials - wood and all its components. These products help mitigate climate change and respond to the problems caused by population growth.

We need new, more sustainable ways of production and consumption. New technologies, materials, products and business models as well as speedy measures to adopt these solutions in society on a wide scale are urgently called for. Forest industry products are already replacing products that cause more emissions and will only grow this role going forward. This is how the forest industry helps the world cut its ties with the fossil economy.

In addition to already existing products, the forest industry constantly develops new products and services based on the use of renewable wood. The advantages of wood as a raw material are its versatile properties, including recyclability, which offer interesting opportunities to product developers and material manufacturers.

Combining this renewable raw material with world-leading expertise creates new, profitable business opportunities and potential export products. Finnish wood-based solutions provide people with a climate- and environmentally friendly alternative to change their living and consumption habits.

The innovations of the forest industry are the trailblazers of a more sustainable future.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The forest industry is at the core of the circular bioeconomy.

Trees sequester carbon from the atmosphere as they grow. When wood is used to manufacture a product, the carbon is stored in it throughout its life cycle. Recycling products that have sequestered carbon from the atmosphere makes it possible to manufacture new products that, in turn, extend the natural cycle of carbon. This is circular economy at its best: carbon from the atmosphere circulates through trees to recyclable products and back into the atmosphere; only to start the cycle anew.

FORESTS AND TREES:

The availability of wood raw material is a prerequisite for the forest industry's existence and the development of wood-based innovations. Active and timely forest management supports the accumulation of forest resources and promotes the carbon sequestration of forests, all the while ensuring the availability of Finnish wood as an industrial raw material. About four new trees are planted for every tree felled and the number of new trees planted in Finland every year totals 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. Efficient equipment makes it possible to clean and recycle water in the same process. The waste and side streams generated in the process of manufacturing products are used to produce innovative secondary products and renewable energy. This energy can also be distributed outside the mill. The share of wood-based fuels of the total renewable energy in Finland is 74% (2019).

PRODUCTS:

When turning wood into innovative products, all the parts of a tree are used to create maximum value-add for the raw material. The thick lower trunk of the tree is used to produce e.g. sawn timber, laminated timber and sheets, that are typically used in construction and furniture-making. The thinner upper part of the tree is used to manufacture chips that are needed to produce pulp. Various wood-based products can be made from pulp, such as paper, paperboard, composites, packaging, hygiene products, food items, textiles and medical applications. Also, the production of pulp creates side streams that can be used e.g. in the production of biofuels, biochemicals, cosmetics and batteries.

CONSUMERS:

The public's general awareness of the environment and related demands towards consumer products have increased. The forest industry offers consumers a chance to choose sustainable, recyclable and renewable alternatives without compromising their environmental values.

RECYCLING:

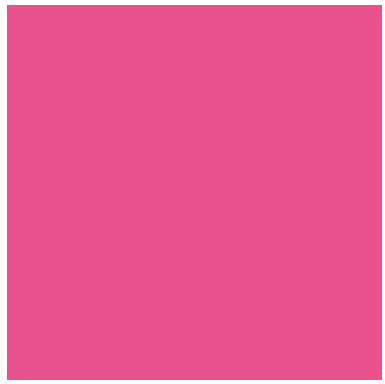
In the context of sustainable consumerism, it is ideal for a product to remain usable for as long as possible. When shorter life cycles are called for, as is the case with many hygiene and packaging products, for instance, their recyclability becomes paramount for their environmental and climate sustainability. Recycled wood-based products can be used to manufacture new products while cutting back on the use of primary fibres. Wood fibre can be recycled approximately 6 to 7 times.

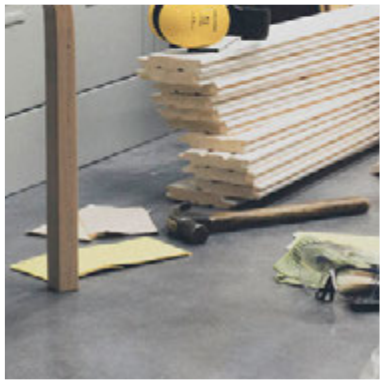
CARBON CIRCULATION:

The sequestered carbon returns to its natural cycle once the product has been used one final time, for example, as a renewable fuel in energy production.

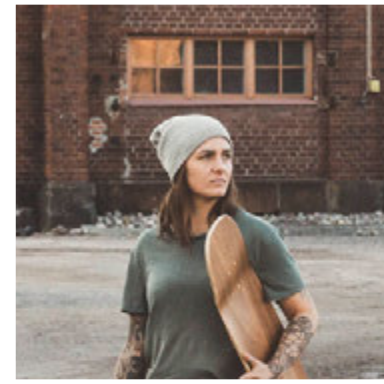
Wood-based products are part of climate-friendly everyday life.

Most people in Finland use products made from wood every day. Products made from wood can be used to replace products made from non-renewable raw materials. Using renewable and recyclable raw materials instead of fossil materials reduces emissions and extends the life cycle of products.





The climate benefit of products made from Finnish-grown wood stands at over 16 million tonnes of CO_2 abated per year. This has been achieved by replacing products that cause more fossil emissions with wood-based alternatives. To put the figure in its proper context, the abated amount of carbon is equal to more than one-third of all current CO_2 emissions in Finland, and about five times the amount of fossil CO_2 emitted by Finnish forest industry mills.



Wood construction is a climate-smart choice.

The use of wood reduces the carbon footprint of construction when taking into account the entire life cycle of a building from material production to construction, its use and recycling.

Wood products are made from renewable raw materials and sequester carbon throughout their life cycle. For example, one kilogram of cross-laminated timber (CLT) sequesters 1.6 kilograms of carbon dioxide from the atmosphere (VTT, Technical Research Centre of Finland). In addition to selecting appropriate materials, the carbon footprint of construction can be made smaller by enhancing the efficiency of processes. In industrial wood construction, pre-manufactured solid wood elements make the construction process faster and more efficient, as the construction site personnel only need to attach the elements to each other. This improves both the quality and cost-efficiency of construction.

Using wood in construction is one way to reduce carbon dioxide emissions and mitigate global warming. Furthermore, the side streams generated in manufacturing wood products can be used in energy production, reducing the need for fossil fuels.

The aim of the national Wood Building Programme is to increase the use of wood in urban development, public construction and major wood structures, which offer the greatest potentials for growth related to the use of wood. Wood construction is slowly becoming a new trend that emphasises urban architecture and environmental awareness. In addition, the use of wood has been shown to positively affect indoor air quality. Wood is hygroscopic, i.e. it can control humidity and balance variations in indoor air humidity. Furthermore, wood has antibacterial properties that prevent the growth of harmful microbes on its surface.

Wood-based textiles setting the trend.

More and more clothes can be made from wood in the future. Long-term research and development on using cellulose-based textile fibres has been carried out in Finland. The aim is to develop a replacement for cotton and fossil fibres such as polyester, which have great environmental impacts. 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 sustainably and responsibly.

The ecological textile fibres can be made from materials that contain cellulose, such as discarded clothes, paper and paperboard waste or excess straw material of crop production. These textile fibres are made either mechanically or chemically without any harmful chemicals. Their manufacturing process involves only moderate water consumption as the involved liquids can be recycled. Furthermore, the textiles can be recycled in the same process again or together with other textile waste after use.

Finland is a world leader in the development of ecological textile fibres. Finland boasts both the technology and expertise required to manufacture sustainable textile fibres now and in the future.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Well-being and aesthetics from wood.

Finnish forests and their trees provide inspiration to various wellness, cosmetics and decorative products made in Finland.

Various components of wood are used in wellness and health products due to their antibacterial and healing properties. For example, nanocellulose can be used in cancer research as a cell culture platform and in suturing wounds to speed up their healing. Traditional white hospital casts can also be replaced with a wood-based alternative that does not need to be removed for X-ray scans and can be recycled. In addition, wood extractives are used as protective and binding agents in industrial chemicals.

Wood is also considered an aesthetic and safe material, especially so in cosmetics products. Natural compounds of wood, such as extractives and other oils are used as ingredients in these products. In addition, wood has also been used in cans and jars in an unprocessed form, as a biocomposite or as a cellulose-based packaging material.

Wood can be seen as a decorative element in other forms than traditional wood as well. For example, wood composite material made from wood chips can be easily made into water-proof bathroom fixtures. Acoustic panels made from wood-based biofibres can be customised onto all sorts of surfaces. Wood is very versatile!

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In the future Coke is enjoyed from a bio-based bottle.

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Biofuels and biochemicals reduce emissions.

One way to reduce the fossil emissions of traffic is to replace fossil fuels with biofuels. Pulp production generates tall oil as a side stream that can be processed into completely renewable diesel. The use of renewable diesel reduces fossil emissions by 90% compared with traditional fossil diesel when considering the footprint of the fuel throughout its life cycle. The biofuels produced from the side streams of the forest industry in particular are sustainable and advanced—they do not compete with food production, for instance.

Wood-based biochemicals offer a sustainable and competitive alternative to fossil chemicals in various applications. The new technologies developed by the forest industry make it possible to split fibres into sugars and lignin that can be used as components in the production of bottles, packaging, textiles, washing agents and detergents and cosmetics or in industrial applications, such as glues and resins, automotive and electronic batteries and energy storage.

The era of bio-based packaging is here.

The future of bio-based packaging looks very bright. Less polluting and more sustainable solutions to replace fossil packaging materials are sought constantly, which creates demand for bio-based raw materials, especially wood. Wood can be made into recyclable, re-usable, compostable and biodegradable packaging products.

The global growth of e-commerce and take-away culture, an ageing population and the replacement of fossil plastics drive the growth of wood-based packaging materials. However, plastic has had an important role in the packaging materials of food and drink products, for example, by protecting the content of the products from liquids, humidity, fats and gases. Many wood-based paperboard products have been equipped with a thin protective plastic layer. Now, these protective layers can be replaced with bio-based raw materials, such as tall oil, and the packaging can be made entirely from wood-based, renewable raw materials.

Form follows function. In addition to functionalities, new round and multiangular shapes such as round paperboard cans and meal trays that represent new packaging technology solutions have been introduced to accompany traditional square paperboard packaging solutions.

Wood can also be processed into plastic-like packaging materials. The wood material itself and biocomposites made from bio-based binding agents can be processed like plastic into various consumer products, such as containers and jars with currently existing injection moulding and extrusion equipment. This makes it possible for the manufacturers of these products to start using the new material flexibly without any need for major investments. If packaging made of biocomposite material ends up in nature, it degrades naturally whenever micro-organisms are present, reducing the accumulation of microplastics in nature. Biocomposites are also used in car interior components and terrace boards that need to withstand various weather conditions.

Skilled workforce is a guarantee for success.

The forest industry and its value chains provide about 100,000 people in Finland with jobs. Professionals working in the industry have the possibility to constantly develop their skills and have an international career. Work in the forest industry addresses meaningful, global issues, such as climate change and globalisation.

The forest industry offers work for experts from a wide variety of fields. Important themes in the industry include mathematics and science, economic expertise, use of digital applications and cooperation and project skills. Education must provide a basis that makes it possible to develop expertise, innovations and new export products in cooperation with employers.

Skilled employees are a prerequisite for the success of the forest industry. Forest companies 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.

The future is made by the forest industry.

The forest industry plays a key role in the accomplishment of climate goals and as a provider of well-being. Healthy forests are the basis for the success of the forest industry. Growing forests sequester more carbon and help mitigate climate change.

A successful forest industry produces tax and export revenues for Finland and facilitates new environmentally friendly investments. Active forest management and wood-based products strengthen Finland's economy in a sustainable way and provide jobs throughout the country.

Forest industry products will replace products that cause more fossil emissions on an even more extensive scale in the future. Climate-friendly products made from wood direct consumption towards a more sustainable, carbon neutral society.

The operations of the Finnish forest industry and its investments in product development, fossil-free processes and active forestry are major climate actions both in the present and the future.

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