

from Nordic Forest Research SNS



The cases selected by the Nordic Bioeconomy Panel show how wood can be transformed to fuel, houses, drugs, textiles and be part of a circular economy. Photos: Nasa, public domain (map), Pixabay and Wikipedia commons.

Towards a Nordic bioeconomy strategy

In 2017, a joint Nordic bioeconomy strategy will be drafted. The first output is a catalogue of cases, aiming to inspire and raise awareness of the potential for the bioeconomy.

The Nordic Bioeconomy Panel was launched in 2015 as an initiative of the Icelandic chair of the Nordic Council. The panel's task was to develop a proposal for a joint Nordic bioeconomy strategy, which will be presented to the Nordic Council of Ministers. Its purpose is to stimulate innovation and support a sustainable transition from the traditional economy to bioeconomy in the Nordic countries.

Currently, the bioeconomy accounts for more than 10% of the overall Nordic economy, and in some countries almost 20%.

25 cases of Nordic bioeconomy

The first step in the strategy process was to present a framework for the bioeconomy, identifying criteria for sustainable development. These criteria were used to evaluate 25 selected cases representing the Nordic bioeconomy, all based on existing networks or business activities. They can also be described as examples of success stories in bioeconomy development.

The cases are examples of Nordic solutions. They are grouped according to four positions of strength: Replace, Upgrade, Circulate, Collaborate. Since bioeconomy includes several sectors besides forestry, cases were taken from a wide range of businesses in aquaculture, waste handling and agriculture, in addition to the forest-based examples. Some of the latter cases are listed below.

Criteria for a sustainable and innovative bioeconomy

1. Sustainable use of natural resources
2. Technological innovation
3. Environmental benefits
4. Societal benefits
5. Business model innovation

The criteria were used to evaluate the 25 cases.

Sustainable building solutions

The Norwegian network *Trefokus* gathers together a wide range of stakeholders in the building sector, with the aim of facilitating mass-production of building materials and buildings made from wood. The case delivers criteria 3-5 well. For example, wood-based solutions in construction can reduce CO₂ emissions by 50% compared to other building materials, according to Trefokus.



Bioeconomy, cont.

From petroleum-based to bio-based additives

The Norwegian *Borregaard* group launched one of the examples described, in which the biorefinery plant *Exilva* will make adhesives, coatings, chemicals and cosmetics from bio-based materials, mainly wood cellulose. The *Exilva* plant has the capacity to produce 1000 tonnes per year of microfibrillated cellulose. This case satisfies criteria 3-5. The raw material will be entirely derived from Scandinavian forests.

Wood-based pharmaceuticals

UPM Biochemicals in Finland has developed the product *GrowDex*, a wood nanocellulose hydrogel, which can be used by the pharmaceutical industry. The material is biocompatible with human cells and tissues, and can replace animal testing as well as assist in the development of cell-based drugs. The case satisfies criteria 1, 4 and 5. For example, *GrowDex* opens up new business opportunities for a wood pulp producer, as well as for other SME companies working in the pharmaceutical industry.

Renewable diesel from wood

UPM Biofuels has developed a commercial-scale renewable diesel based on residues (crude tall oil) from pulp production. With full production capacity, *UPM BioVerno* diesel will reduce CO₂ emissions by around 250,000 tonnes annually when used to replace fossil diesel, according to the company. The case will satisfy criteria 1, 3 and 5.

Fly away on wood pulp

The Swedish company *Innventia* is running the *LignoJet* project, aiming to produce jet fuel from forest raw materials. *LignoJet* is a Swedish–Brazilian collaboration based on the use of lignin, a by-product of the pulp industry. The project involves a Brazilian pulp producer (*Fibria*) and the Swedish airport in Karlstad. The *LignoBoost* demonstration facility is also close to Karlstad.

The case satisfies criteria 1, 3 and 5. The long-term production of lignin in Brazil and Sweden is estimated at 12 million tonnes per year. Converting this to biofuel would reduce fossil fuel emissions by 20 million tonnes of CO₂ annually.

li in Finland, a small town with a short name, towards carbon neutrality. Photo Wikipedia commons.

Maximum value from residues

One of the cases consists of a cluster of companies in the *Kemi-Tornio region* in Finland. Within the area, mining, steel-, chemical- and forest industries generate a total of 1.7 million tonnes of by-products and residues. The companies now work cross-sectorally to create maximum value from residues. One example includes biofuel production from forest waste products. The case satisfies criteria 1, 4 and 5, and has the potential to provide 500 new jobs in the region.

Town transition to a carbon-neutral society

Ii is a small Finnish municipality with 10,000 inhabitants that has committed to produce zero waste and zero carbon, and utilise only local and renewable resources for energy, transportation and production. The city already has bioenergy as its primary energy source. Combined with solar panels, wind turbines and hydropower, it produces nine times the energy it uses. Waste is collected to produce biogas.

The case satisfies criteria 1, 3 and 4. For example, bioenergy production from wood chips and wind power alone has created more than 50 new jobs since 2012.

From technology park to biorefinery cluster

SP Processum in Sweden has launched a technology park housing companies working in development, upscaling and commercialisation of biorefinery processes. The park has evolved into a cluster, where companies cooperate with other biorefinery initiatives and academic institutions.

The cluster is a good example of collaboration between areas such as organic chemistry, biofuels and other biotechnologies. The case meets criteria 1, 2 and 3. For example, the production of textiles from cellulose is a sustainable alternative to the ecologically more harmful cotton production.



Innovation program for Swedish bioeconomy in 2050

BioInnovation is a strategic innovation programme which started in 2014 and will run until 2026. Sixty partners are involved so far, and its aim is to increase the value creation and competitiveness of bio-based materials, products and services. The case meets criteria 1, 3 and 4.

One example of outputs is a model car with a roof and battery made from renewable wood-based carbon fibre, developed by KTH Royal Institute of Technology.



“Taken together, the 25 cases illustrate that the development of the new Nordic bioeconomy is driven by a wide range of stakeholders – institutions, small companies, big companies, clusters, civil society, local authorities, academia, governments and individuals.”

Read more: www.norden.org (search for Nordic bioeconomy - 25 cases)

Nordic Forest Solutions

– strengthening the Nordic voice



Photo Mats Hammer

A new Nordic strategy for the forestry sector was adopted in June 2016 by the Council of Ministers for Fisheries and Aquaculture, Agriculture, Food and Forestry (MR-FJLS). The strategy, called “Nordic Forest Solutions” is a follow up to the 2008 Selfoss Declaration.

SNS has taken an active role in the work, with the secretary Jonas Rönnberg as one of the working group members.

The strategy is presented in the form of a roadmap, and it identifies areas where the Nordic forest sector can co-operate to provide solutions. The document stresses the common history, culture and values, facilitating co-operation among the Nordic countries.

A stronger Nordic voice is needed to influence international and regional policy development. The international policy environment is complex and fragmented, and new policies may have a great effect on the Nordic forest sector. The strategy underlines that coordinated Nordic policy responses are more effective, and also that the Nordic countries have to raise awareness of the way forests are utilised within them.

Three important policy areas are identified in which the Nordic countries should aim to strengthen collaboration:

1. Increased use of sustainably produced wood – a drive towards bioeconomy
2. Reinforced social values
3. Increased use and conservation of biodiversity.

Read more and download the roadmap: www.norden.org, search for Nordic Forest Solutions Roadmap

“The forestry ministers of the Nordic countries agree that forests and the ecosystem services they provide are an important part of solutions to multiple global challenges, including the drive towards bioeconomy, increasing social benefits, and the use and conservation of biodiversity. Nordic Forest Solutions show the role of ecosystem services in the various policy areas, at both national and global level, by using the existing infrastructure and the Nordic distinction.” (from the document Nordic Forest Solutions)

Shortcuts

EFINORD

New head of regional office

Camilla Widmark has been appointed Head of Office of EFINORD as of January 2017. Camilla Widmark succeeds Sinnikka Västilä, who returns to Natural Resources Institute Finland (Luke). Camilla Widmark holds a PhD in economics and specialises in natural resource economics and forest policy. Her previous positions include an assistant professorship in forest policy at the Swedish University of Agricultural Sciences.

Read more: www.efinord.efi.int

Sweden

New pathogen threatens pine trees

The first major outbreak of the fungal pathogen *Diplodia pinea* has been discovered in central Sweden. SLU has received funding to investigate the pathogen, which has the potential to become a threat across northern Europe. The pathogen is currently common in southern Europe, but has spread northwards due to global warming.

Read more: www.slu.se (News)

NordGen

Mixed forest management discussed in Sweden

NordGen, along with the Swedish Forest Agency and SLU, arranged a two-day excursion on the theme “Growing mixed forests – waste or value for the future” in September 2016. About 75 researchers and practitioners took part in the indoor sessions and the subsequent excursion at the Asa field station outside Växjö, southern Sweden.

Read more: www.nordgen.org

Finland

Changed winter climate can reduce forest growth

An experiment conducted by Luke shows that warmer winters with a denser snowpack or lack of snow may have a major impact on forest ecosystems. The experiment examined seedlings of Norway spruce and Scots pine, grown under different snow conditions. Lack of snow increases the depth of the soil frost, increases seedling mortality and reduces seedling growth the following summer.

Read more: www.luke.fi (News)

Shortcuts

Estonia

Insect feeding can alter climate

A warmer climate facilitates dispersal of many insect herbivores. Their feeding triggers trees to release stress-induced volatiles. These volatiles can, in turn, form organic aerosols that reduce solar transmission, thereby potentially cooling climate. The study, conducted on birch by Estonian and Finnish researchers, is the first that has demonstrated that herbivore feeding enhances secondary organic aerosols produced by plants.

Read more: www.emu.ee (News)

Finland

Tree species automatically recognised with laser scanning

Tampere University of Technology (TUT) and Luke have developed a new method of recognising tree species based on laser scanning measurements. A method previously developed by TUT is able to extract individual trees from the forest plot level point cloud data, and the structure of their crowns can be reconstructed in the form of 3D models. Tree species can be identified based on 15 classification features. In forests with three species – Norway spruce, Scots pine and birch, tree species can be recognised with more than 95% accuracy. Just 30 trees per species are sufficient to use as training data for the classification.

Read more: www.luke.fi (News)

Sweden

Depth-to-groundwater maps reduce soil damage

Groundwater maps are being rapidly introduced in Swedish forestry planning. Researchers have shown that the map is an efficient tool to identify where the terrain is stable enough for vehicles and which parts of a logging area are moist and should be avoided. An inventory in 2013 showed an average of 0.77 occurrences of serious soil damage per hectare. A follow-up study in 2016, after the introduction of the groundwater maps, found 0.15 occurrences. The researchers, together with the forestry managers, continue to improve the maps and introduce new routines to reduce the impact of logging on water and soils.

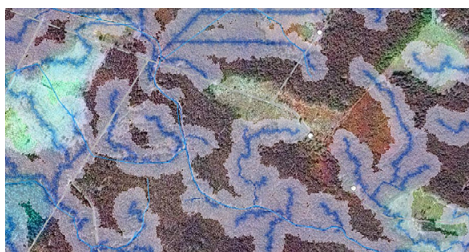
Read more: www.skogforsk.se

Norway

New centre for environmental friendly energy

Norwegian Centre for Sustainable Bio-based Fuels and Energy (FME, forskningscenteret for miljøvennlig energi) is a new centre hosted by the Norwegian University of Life Sciences. The centre will focus on biorefining, the production of biofuels in conjunction with the production of other high value products. It continues and expands the work by the existing CenBio.

Read more: www.nmbu.no (English news)



Depth-to-groundwater maps reduces soil damage. Map from Skogforsk.

Call for cross-sectoral networks



The call for joint NKJ-SNS networks in 2017 is now open. The Nordic Joint Committee for Agricultural and Food Research (NKJ) collaborates with SNS with the aim to promote international and cross-sectoral networking between researchers and stakeholders from the agricultural and forestry sectors.

The networks should cover topics emerging from the transition towards a bioeconomy and could for example include plant disease in a changing climate, the use of big data in a bio-economy and land-use for biomass production in the Nordic countries. The topics could also be wider, including for example invasive species and pests, the energy sector, food security, mitigating climate change, horticulture, aquaculture, apiculture or promoting of agroforestry systems.

Deadline for application is Monday, April 24th.

Read more: www.nordicforestresearch.org

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News & Views is a newsletter from SNS containing short, popularized articles covering Nordic forest research and forestry. Articles presenting SNS-supported activities are prioritized. The newsletter is published eight times per year, and is available for download from the SNS and Scandinavian Journal of Forest Research websites.



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