Policy Brief

Role of the bioeconomy in long-term decarbonisation pathways in Russia

Key messages

- Increased resource efficiency of production processes and increased utilisation of industrial side streams would add to the Russian Federation's vast resource potential to develop its forest-based circular bioeconomy.
- The phasing out of old oil boiler stations presents a growth opportunity for the production and domestic consumption of bioenergy.
- With regulation and technology in place, wood-based residential high-rise buildings may demonstrate fast growth in Russia. While projected scenarios for the annual wood-based housing construction needs by 2050 vary greatly, they show that avoided emissions from using wood instead of steel or concrete would be in a range between 11 and 63 mill. tons of CO_2 equivalent.
- As major growth is expected in the global demand for clothing textiles, and as global cotton production is reaching its limits, there is a significant growth potential expected for wood-based textiles, which could offer growth opportunities also to Russia.

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Cross-laminated timber (CLT) has been successfully used in residential, commercial and industrial buildings.

Forest-based bioeconomy has a lot of growth potential

Climate change adaptation and mitigation objectives were adopted by the Russian Federation in several high-level political commitments, including the acceptance of the Paris Climate Agreement in September 2019.[1] The UNFCCC Paris Agreement amplified widespread discussions about opportunities for deep decarbonization of the world economy.

Two major objectives are essential for Russian forests to support ambitious mitigation policies:

1) To increase carbon sequestration by forest ecosystems;
2) To increase the consumption of biofuels, wood construction materials and other bio-based products that could substitute fossil fuels and emission-intensive products.

This brief goes further into detail on the possibilities offered in the second objective.

Russian forests represent a vast carbon stock and sink. To reduce Russia's net carbon emissions, wood-based products could be utilized more, as it is possible to account for the carbon stored in them.

The output of basic wood products in the Russian Federation has been steadily increasing for the past thirty years. The dominant branches of the Russian forest industry are logging, pulp and paper, plywood, furniture, biofuels, wooden house construction and non-wood forest products, such as resin and tall oil. The total revenue of the forest industry in Russia in 2016 amounted to nearly 20 bill. USD, the contribution to the GDP was 0.5%, the share in industrial production was about 4%, and in export, the revenue was 2.4%, the number of employed people was 500 thousand (0.8% of the total).

Currently, the contribution of the forest sector to the Russian economy is significantly lower than the estimated potential. This situation was a result from the orientation of domestic producers mainly to low-margin segments – roundwood, sawn wood and plywood, as well as underutilization of export potential.

A bigger industrial output from the forest sector will of course require more woody resources. Additional biomass to supply the forest-based bioeconomy could be gained by increasing the harvesting levels but also by increasing efficiency in forest management and by increasing industrial resource efficiency, including the utilisation of industrial side streams.

1 Other high-level commitments include: The Climate Doctrine of the Russian Federation (Government of the Russian Federation, 2009); The Presidential Decree on reducing greenhouse gases emissions (Government of the Russian Federation, 2013) and its Implementation Plan (Government of the Russian Federation, 2014); The National Adaptation Plan (2019), and other sectoral and industrial plans and programs

The concept of bioeconomy is relatively new in Russia and it is mostly associated with biotechnology. We show that a more inclusively defined forest-based bioeconomy has a lot of economic growth potential that can as well offer important benefits to Russia in the ambitious global transition towards net zero emissions by 2050. Increasing the use of wood for example in energy generation, construction and textile production can bring significant climate change mitigation benefits when replacing fossil counterparts such as concrete, steel, polyester and nylon. The more durable the products are, the longer lasting their carbon storage function will be. Also, a net carbon reduction could be achieved by replacing fossil-based materials with bio-based, renewable materials.

The forest sector experiences a number of problems, such as lack of skilled workers due to low wages in the sector, lack of legislative mechanisms to stimulate the construction and operation of forest roads, low investment attractiveness of new industries for processing of wood, and e.g. poor consolidation of logging industry. Therefore, when the Russian Federation wants to achieve the full potential of its forest sector, then these issues will need be urgently addressed.

Enabling the development of bioeconomy and its adoption by society would require an enabling environment, through strong political support, suitable legislation, new investments to forest-based industries, and increased awareness of consumers. A comprehensive logical legislative framework needs to be developed by means of a circular forest-based bioeconomy strategy. Clarifying objectives, policy instruments, roles and responsibilities for all actors in such a strategy, will facilitate the development of complementary legislation, in avoidance of legislative gaps or overlaps.

Bioenergy and wood-based products can help to reduce greenhouse gas emissions

Scenarios aiming at 85% greenhouse gas emission reductions show that significant efforts are needed in reducing energy consumption and in decoupling the energy production from the use of fossil fuels. These scenarios do, however, not yet include the potential that would come from developing bioeconomy sectors such as wood construction or wood-based textiles. While bioenergy and wood-based products can make a significant contribution, they cannot solve the challenge alone.

To better understand the sectoral level potential of the forest bioeconomy, we analysed forest bioenergy and wood construction, as well as textiles as an example of emerging products.

Gas is currently the main fuel in the Russian energy sector with a share of 74%. The share of solid fuels is 22%, consisting mainly of fossil coal. The overall share of energy from biomass is low leaving room for increasing its share in the energy mix.

New wood-based fibres are more environmentally friendly and produce less CO_2 emissions than cotton and synthetic fibres.

Rami Saarikorpi

The tallest wooden apartment building in Finland, rising to almost 50 metres at 14 storeys functions as a carbon storage and avoids emissions over its life cycle in an amount equivalent to the emissions of approximately 700 passenger cars per year.

Wood pellets have been produced in Russia since 2000, but most of the production is currently exported, mainly to Europe. While foreign demand is expected to still increase, replacing old fossil-fuel based boilers in Russia offers an opportunity to switch to bio-based energy solutions. Therefore, large growth potential in production as well as domestic consumption for wood pellets, wood-based briquettes and fuel wood chips is expected.

Volumes of residential construction in Russia have declined to some extent since 2015 and currently the total amount of residential construction is about 76 mill. m^2 per year. The overall volume of wooden construction is small, and the production of prefabricated wooden buildings has not shown significant increase during recent years. Despite this, the Russian government has adopted a series of measures to increase overall construction volumes so that the total amount of residential construction in 2030 would reach 170 mill. m^2 per year. This can provide major growth potential for modern wood construction technologies such as cross-laminated timber (CLT). It is expected that a first test batch of CLT elements will be produced in Russia in late 2020, to become fully operational shortly thereafter. According to the optimistic scenario, annual wood-based construction could by 2050 be at level of 183 m^2. When taking into account differences between construction techniques, the roundwood required to achieve this would be up to 164 mill. m^3. The avoided CO_2 emissions would correspond to 63 mill. tons.

New and emerging products that could bring added value to Russia in the future include also wood-based textiles. The current textile industry in Russia is mostly based on the production of synthetic fibres, due to the country's large reserves of oil and the well-developed chemical industry. Even though synthetic fibres like polyester are still preferred by the industry for their price and more uniform characteristics, there is an interest to reintroduce certain natural fibres to produce textiles. In the 1980s Russia was a leading country in the production of dissolving pulp for viscose, but currently produces only about 1% of the global dissolving pulp. In this context, wood-based textiles would be a major scale opportunity, since global production volumes of textiles for clothing is about 53 mill. tons per year, and it is expected to increase significantly. By 2030, global demand for human-made cellulosic fibres may be around 19 mill. tons, with a resource efficient production technology requiring about 44 mill. m^3 of roundwood and the amount of avoided CO_2 emissions amounting to around 65 mill. tons. By 2050, these numbers would nearly double compared to those for 2030.

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