

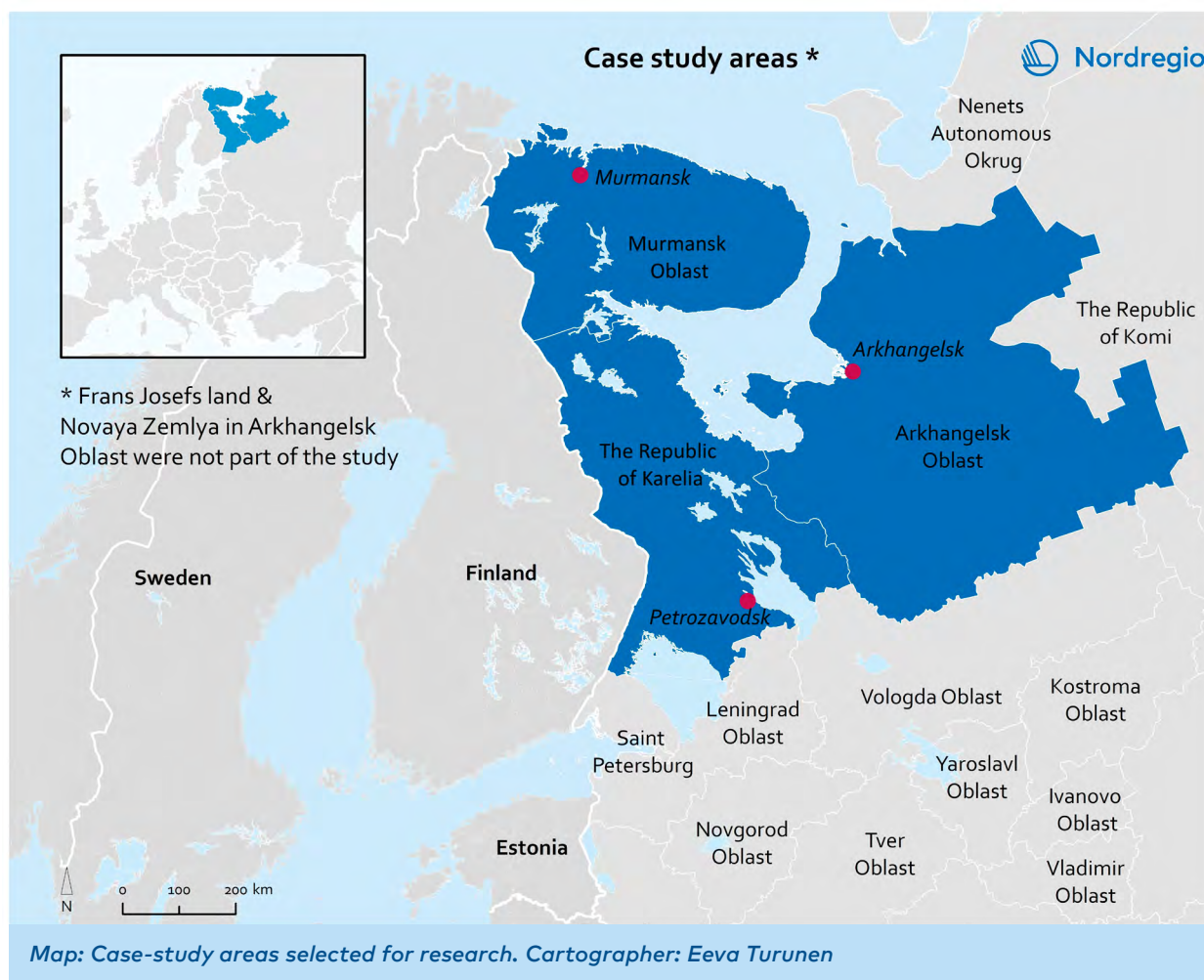
Transition to a bioeconomy in Northwest Russia – current potential and challenges

The development of a bioeconomy is at the forefront of the national and regional agendas of many European countries. Yet, little is known about the status and the institutional and policy frameworks for bioeconomy development in Northwest Russia. This policy brief aims at increasing the understanding of the opportunities and challenges for bioeconomy development in Northwest Russia by drawing upon lessons learned from bioeconomy case studies in the Republic of Karelia, Murmansk and Arkhangelsk oblasts.



Studies on the current status and main support mechanisms, as well as the enabling and hindering factors for bioeconomy development in the Republic of Karelia and Murmansk and

Arkhangelsk oblasts are among the outcomes of two projects financed by the Nordic Council of Ministers in 2017–2018 and 2018–2019. This policy brief is based on the findings of those studies.



WHAT CONSTITUTES A BIOECONOMY?

With the growing realisation of resource depletion, climate change and environmental degradation, the sustainable utilisation of resources and the reduced use of fossil resources are becoming increasingly important for society as a whole. Bioeconomy development provides one of the pathways to address these

challenges while providing unique opportunities for local economic development with added local value by creating jobs and new economic activities in and around rural regions. The transition to a bioeconomy challenges existing linear thinking in relation to production and consumption by fostering circularity and creating more value from scarce resources.

BIOECONOMY DEFINITION

The bioeconomy is conceived as an economy based on land and marine-based natural resources including biowaste. It produces vital goods and services: food, drinking water, fresh air and energy as well as a range of ecosystem services including climate regulation. Bioeconomy can also replace many goods and services currently produced from fossil-fuels, including a range of biofuels, bioplastics and biopharmaceuticals. (Refsgaard et al. 2018)

The Nordic Council of Ministers (2017) defines the bioeconomy as the "responsible use of renewable biological resources from the land and water for the mutual benefit of business, society and nature". The transformation to a bioeconomy encompasses a transition from a fossil fuel-based to a more resource-efficient economy based on increased value-added for biomass materials and a reduction in energy consumption. Renewable biological resources may be converted into food, feed, biofuels, bioplastics and biopharmaceuticals.

Overgang til en bioøkonomi i Nordvestrusland. Regionale casestudier i regionerne Karelien og Murmansk

Bioøkonomien er på forsiden af regionale og nationale dagsordener i mange europæiske lande både potentialet for at møde klimaændringer gennem at erstatte fossilbaserede varer og tjenester med biobaserede, men også fordi der den bidrager med økonomiske muligheder for landdistrikter og regioner. Nordvestrusland er i så henseende interessant med lignende bioressourcer, men kundskaben om de institutionelle og politiske rammebetingelser er begrænsede. I dette policy-notat bidrager til at forstå muligheder og udfordringer for bioøkonomiens udvikling i Nordvest Rusland fra et studie i Arkhangelsk regionen og et andet studie i regionerne Murmansk og Karelien. Studiet identificerer nogen grundlæggende støttemekanismer og incitamenter så vel som potentiale og udfordringer for udviklingen af bioøkonomien i disse regioner i dag og i fremtiden. Hovedkonklusionerne er primært er rettet mod offentlige myndigheder og andre interesserede aktører som arbejder med bioøkonomi-relaterede emner på forskellige styringsniveauer, de inkluderer:

- Støtte iværksætteraktiviteter for unge professionelle og studerende gennem at fremme erhvervs- og højere uddannelser og knytte den unge generation sammen med mulighederne indenfor bioøkonomien.
- Sørge for klare investeringsstrategier i forhold til at katalysere udviklingen og tiltrække kapital for startups og SMV-ere i regionen.
 - Overveje at styrke mulighederne for initiativer på lokalt niveau.
 - Skabe strategier for og forbindelse mellem lokalproduktion og lokale markeder.
 - Bioraffinering kan bidrage til at skabe merværdi fra biomasse.
 - Opmuntre til samarbejde mellem industri, uddannelses- og forskningsinstitutioner på alle niveauer i livscyklus for at bidrage til øget relevans af forskning og uddannelse for industrien og dermed booste attraktiviteten i bioøkonomi-relaterede jobs og uddannelser.
- Adressere miljøudfordringer indenfor akvakultur for at sikre bæredygtige aktiviteter og undgå konflikter med lokalbefolkningen.
- Konstruktion af træhuse er i hurtig udvikling i skovrige regioner i Rusland. Det kan bidrage til jobskabning, til bedre udnyttelse af lokale ressourcer og til bedre boliger. Den øgede efterspørgsel efter trækonstruktioner kan overføres til investeringer i mere bæredygtig skovforvaltning og udvikling af skovveje.
- Udvikling af en offentlig politik som skaber aktiviteter og som har målrettet offentlig støtte for lokale fornybare energi ressourcer over fossile ressourcer kan bidrage til at udvikle resiliente energisystemer i udkantkommuner.
- Samarbejde og udviklingspotentiale i området mellem lokal mad, rekreation og naturbaseret turisme kan undersøges yderligere.

THE REPUBLIC OF KARELIA

The Republic of Karelia covers a territory of 180,500 km², of which, some 85% is covered with forest. Its economy relies on natural and resource-based industries, such as traditional timber, woodworking and pulp and paper. Local fuels (mainly firewood) provide some 11% of the heating for residential and public buildings. There is limited production of pellets and fuel briquettes in the region, largely export-oriented. The construction of wooden houses is gaining popularity in Karelia, and in Russia as a whole, primarily triggered by the low cost and the high demand for new housing; this is primarily oriented to the domestic market. There is a strong culture of wild berry and mushroom gathering in Russia. These activities have the potential to make an important contribution to the development of a regional bioeconomy in the Republic of Karelia, and the construction of a biorefinery for the advanced processing of berries into extracts is in the pipeline.

In recent years, aquaculture in the region has experienced major growth. The Republic of Karelia produces about 65–70% of all trout farmed in Russia, and aquaculture production has almost doubled since 2010, reaching 27,000 tons in 2018. The development of a fish breeding centre and a fish feed production plant are in development, and this will gradually enable the region to reduce imports and boost the development of aquaculture along the entire value chain. Currently, the utilisation of fish wastes in the region is marginal, but is expected to increase with the construction of a new facility for fish waste processing into fish flour and different types of fat. The potential environmental hazards associated with aquaculture expansion are among the threats.

MURMANSK OBLAST

Murmansk oblast is an industrialised region with a dominance of mining industries extracting apatite, nickel and other minerals. It covers an area of 144,900 km² and borders the Barents and White Seas, both of which are richly endowed fisheries. Murmansk's ice-free harbour enables year-round navigation and fishing activities. The total catch of fish and seafood (including king crabs) amounted to 702,000 tons in 2017; however, most of the oceanic catch is landed abroad and there is limited access to fresh raw material at affordable prices for the coastal fishing and processing companies. Knowledge and expertise in the processing of fish resources and algae for the production of advanced products and ingredients (e.g. collagen) is

available in the region, but the commercialisation of the research is low. Among the key challenges are the poor utilisation of fish wastes, the low processing and low value-added of fish products, the old fishing fleet and outdated fish processing techniques.

Owing to its Arctic location, the productivity of forests is also low and the contribution of forest-based industries to the regional economy is rather insignificant compared with other forest-rich regions. Peat and wood-based residues are used for heating in several villages, but the high dependency on fossil resources (fuel oil and coal) in the local heating supply remains a challenge.

ARKHANGELSK OBLAST

Arkhangelsk is a forest-rich region that covers an area of 587,400 km². The timber industry in Arkhangelsk oblast is the largest in Northwest Russia and is the dominant sector in the regional economy. Arkhangelsk is regarded among the forerunners in Russia when it comes to the adoption of environmentally-friendly practices in the forestry industry, including Forest Stewardship Council certification, and is ahead of many other regions in Russia in terms of bioenergy production. The successful industries in the region have adapted 'green' thinking to some extent, not the least because of its clear competitive advantage in EU markets. At the same time, the majority of regional companies are traditional forestry industries. The region holds great potential for bioenergy production given the large volumes of wastes generated from timber industry activities (over 5 million m³ annually). Wood wastes are seen as a cheap and locally available alternative energy source that could potentially substitute for imported fuels. The goal set by the regional government is to increase bioenergy consumption from 14% in 2014 to 44% by 2030. However, the high costs of new technologies and the lack of investment are among the factors hindering the realisation of this goal.

Among the large-scale investment projects in the region currently being implemented are the processing of wood-based residues (mainly pellet production) and the setting up of facilities for wood waste disposal and management (e.g. bio-boilers that provide energy for the needs of industry and local residents). As an outcome of these investment projects, pellet production capacity in the region is expected to increase from 400,000 to 700,000 tons of pellets per year by 2022.

MAIN ENABLERS AND BARRIERS TO BIOECONOMY DEVELOPMENT IN NORTHWEST RUSSIA

The Northwest Russian region contains a vast amount of resources from the sea, land and forest that are currently being managed and exploited in a rather traditional way, but may have a large potential for development-beneficial areas. Increasingly, different actors in Northwest Russia are paying attention to the bioeconomy, leading to new models and practices for economic activities. Nonetheless, **the lack of knowledge and insights into the bioeconomy** and the **absence of a sustainability-based mindset** are among the barriers to exploiting fully the potential of a bioeconomy in Northwest Russia.

At the same time, there is clear evidence showing that the transition to a bioeconomy in Northwest Russia has already begun. Among the positive examples of this has been the increased attention to the utilisation of **waste products and residues from the fishery and forestry industries, as well as the increased processing of raw materials** (Arkhangelsk Oblast & Republic of Karelia). Targeted support to private investors who are willing to make use of local waste streams and develop advanced and higher value-added products fishery and forestry resources has been provided by the Federal Government.

Customs policy & clusters are other mechanisms used to stimulate the increased processing and utilisation of local raw materials. Higher export tariffs are applied on low-processed and low value-added products and vice versa. The effects of these policies and measures on triggering bioeconomy development are yet to be seen, as these are rather recent incentives. At the regional level, increased support for the bioeconomy is also evident. 'The Concept for Creating a Biotechnological Cluster in the Republic of Karelia' was developed in 2017. Among the strategic priorities outlined in this concept are the processing of wild plants and medicinal raw materials, and the increased processing and utilisation of aquatic bioresources and forest and wood industry wastes in the Republic of Karelia.

Economic sanctions have played an important role in boosting local production and an overall positive impact on the bioeconomic sectors. As for the aquaculture, it has been poorly incentivised and even neglected in Russia until an import-replacing policy was introduced in 2014 as a response to these sanctions. The Federal Government has allocated funding support to help businesses ease the burden of loans for the purchase of feed, modern equipment and investment into building local production capacity for aquaculture. In the Republic of Karelia, substantial investment support has recently been channelled into developing the entire value chain of aquaculture activities, including the local production of fish feed and fish breeding facilities, which are both currently highly dependent on imports.

DOMESTIC POLICY FOSTERING BIOECONOMY DEVELOPMENT

The import substitution policy pursued by the Federal Government and a customs policy that supports the export of advanced, processed and high value-added products have had a positive influence on boosting local production and local processing industries, as well as the development of high-value added products. Although the effects of domestic policy development can be seen, substantial potential remains to increase value-added and job creation in the regional economy. The bioeconomy has the characteristics needed to catalyse the increased development of the local/regional economy.

Insufficient attention to environmental aspects in developing a bioeconomy may undermine its positive outcomes. A bioeconomy is not sustainable per se; it requires a balanced approach considering economic, social and environmental objectives. In the regions studied, the rapid development of aquaculture has resulted in environmental pressure and degradation, as well as conflicts with local populations. In planning the further expansion of aquaculture activities, actions to secure the surrounding environment should be carefully considered.

Some initiatives have though been seen. Adoption of environmentally friendly practices in the forest industry, including FSC certification has been initiated by some timber industries in Arkhangelsk Oblast giving it a clear competitive advantage in EU markets. Also regional emphasis on increasing bioenergy consumption has implied investments in pellet production.

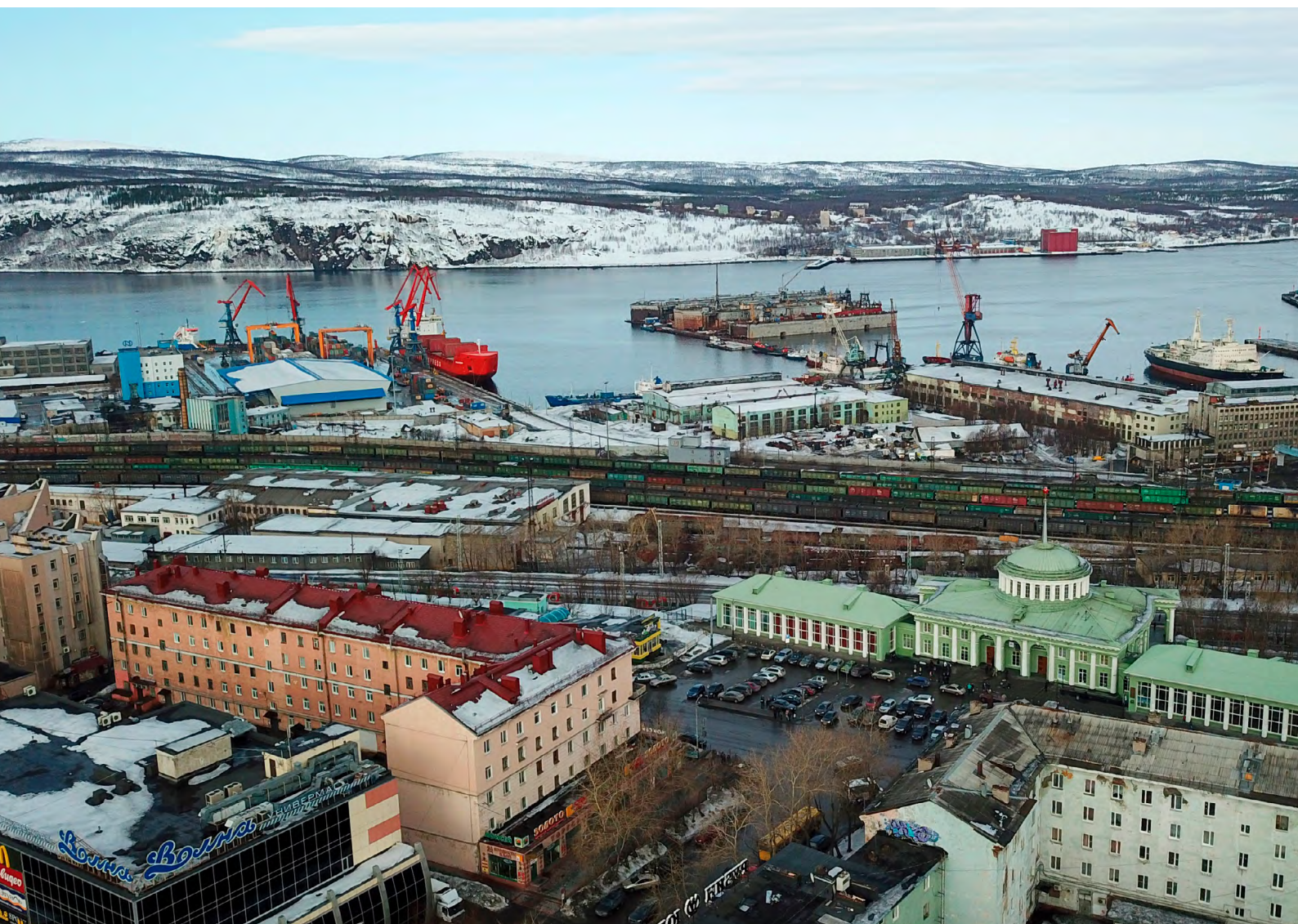
This study revealed that there is **a lack of development in new resilient energy systems for remote communities** that remain dependent on imported fossil fuels (fuel oil and coal). For high forest cover regions such as the Republic of Karelia, the utilisation of woodchips and fuel-wood for heating should be further promoted as a way to reduce the dependency on imported mineral fuel and achieve environmental benefits. Among the reasons for the low utilisation of locally-available energy sources are the **subsidisation of natural gas and its distribution networks** (in the case of the Republic of Karelia) and a lack of incentives for forestry companies and municipal authorities to increase biofuel utilisation. Despite being

a local resource, woodchips do not appear to be the cheapest option among other fuel alternatives. This calls for **the development of an enabling public policy and the targeting of public subsidies favouring local renewable fuel sources above imported fossil fuels.**

There is a rather strong **educational and research environment** in the regions and readily available knowledge and expertise in the biotechnology and fishery and forestry fields. Despite a number of innovations and patented technologies, the poor commercialisation of research remains a challenge. Improving business–academia co-operation and the **business-relevance of education and research** are crucial success factors for bioeconomy development, especially

as innovation and research lie at the core of the transition to a bioeconomy.

While the bioeconomy may create new jobs and economic activities, a **shortage of employees** (both low- and high-skilled) could become a challenge. There is an acute shortage of the economically active part of the population against the background of a constant outflow of young people, the low level of qualifications of existing workers and the uneven distribution of educational resources in the territory of the regions studied. Moreover, the quality and attractiveness of education in traditional forestry and fishery-related fields is low, which may also hinder bioeconomy development in the future.



CONSIDERATIONS FOR POLICY MAKERS:

How to boost the development of a bioeconomy in Northwest Russia?

These recommendations are based on findings from the study *Transition to a bioeconomy in Northwest Russia: regional cases of the Republic of Karelia and Murmansk oblast (2019)* and a Working Paper on *Forest- and waste-based bioeconomy in the Arkhangelsk region (2018)*. The recommendations are mainly targeted towards public authorities and other interested actors working with bioeconomy-related themes at different levels of governance.

■ **Support entrepreneurship activities for young professionals and students** pursuing vocational and higher education and link the younger generation with opportunities in the bioeconomy.

■ **Make clear investment strategies** regarding how to catalyse development and attract venture capital for startups and small and medium enterprises (SMEs) in the region. Establish a support program for startups and SMEs to strengthen the skills needed to become attractive to venture capital.

■ **Consider strengthening the possibilities of taking action at the local level.** Provide support for strategising, framework for investment and marketing and market access.

■ **Remember the market, make strategies for and create links between local production and the local market,** i.e. devise strategies to connect the increased need for construction and retrofitting with the capabilities of local forestry companies to provide sustainable products for the construction industry. Devise strategies to increase the demand for local food produce by kitchens in public institutions. Examine the tourist industry and its potential to demand a higher level of local food produce.

■ **Biorefining can help to create additional value from biomass.** Concepts for biorefineries could be developed based on multiple sources (e.g. fish waste, wood input, organic household waste, manure), resulting in better use of local waste streams, development of new products, production of feed for aquaculture and husbandry production, energy, job creation, etc.

■ **Encouraging interaction between industry, education and research institutions** at all stages of the life cycle could help to increase the relevance of research and education to the needs of industry and boost the attractiveness of bioeconomy-related jobs and education.

■ Considering its rapid expansion, it is important to **address the environmental threats associated with aquaculture** to ensure the sustainability of the activities and avoid conflicts with local populations.

■ **The construction of wooden houses is a rapidly developing field** in forest-rich regions of Russia, including the Republic of Karelia. This can create new jobs, contribute to the better utilisation of local resources and provide better housing. The growing demand for wooden construction can be transferred into investment in more sustainable forest management and the development of forest roads. Focus should be on both single-family and summer homes, as well as on multilevel houses, using the newest technologies and methods, e.g. cross-laminated timber.

■ **Developing an enabling public policy and targeting public subsidies favouring local renewable fuel sources** above imported fossil fuels may help to develop resilient energy systems in remote communities.

■ **Linkages and collaboration between local food, culture and recreational and nature-based tourism** could be explored further in the emerging bioeconomy in Northwest Russia.



ABOUT THIS POLICY BRIEF

This policy brief is based on the Nordic Working Paper: Berlina, A. & Trubin, A. (2018). *Bioeconomy in Northwest Russian region: Forest- and waste-based bioeconomy in the Arkhangelsk region, Russia*. Nordic Working Paper 2018:904. Nordic Council of Ministers, Copenhagen.

The publication is an outcome of the project Kicking off Bioeconomy in the North which focuses on the bioeconomy network analysis in Murmansk oblast and the Republic of Karelia. The project is funded by the Nordic Council of Ministers.

References

Nordic Council of Ministers. (2017). *Nordic Bioeconomy. 25 cases for sustainable change*. Copenhagen: Nordic Council of Ministers. <http://dx.doi.org/10.6027/ANP2016-782>

Refsgaard, K., Teräs, J., Kull, M., Oddson, G., Johannesson, T., Kristensen, I., Rispling, L. & Turunen, E. (2018). *The rapidly developing bioeconomy*. Copenhagen: Nordic Council of Ministers. ISBN 978-92-893-5444-8 (EPUB). <http://dx.doi.org/10.6027/ANP2018-730>

Berlina, A. & Trubin, A. (2019). Transition to a bioeconomy in Northwest Russia: regional cases of the Republic of Karelia and Murmansk oblast. Nordregio Report 2019:10. Nordregio, Stockholm.

Berlina, A. & Trubin, A. (2018). *Bioeconomy in Northwest Russian region: Forest- and waste-based bioeconomy in the Arkhangelsk region, Russia*. Nordic Working Paper 2018:904. Nordic Council of Ministers, Copenhagen.

Research contacts

Anna Berlina
Research Fellow
anna.berlina@nordregio.org

Karen Refsgaard
Research Director
karen.refsgaard@nordregio.org

Mads Randbøll Wolff
Bæredygtighed 2030 (Sustainability 2030)
mads@wolff.dk

Photos:

Frontpage: Artem Maltsev / Unsplash
Pages 6 & 8: Pixabay

ISSN 2001-3876
URL: <http://doi.org/10.30689/PB2019:11.2001-3876>
www.nordregio.org