

Green Rural Economy - Promoting Green Transition in the Rural Arctic

A presentation of results in the GRUDE project



Henna Kukkonen, Reeta Sipola & Tuuli Nivala (Edit.)

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Henna Kukkonen, Reeta Sipola & Tuuli Nivala,
Lapland University of Applied Sciences

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Appearance and Layout: Tuuli Nivala,

Lapland University of Applied Sciences
Lapland University of Applied Sciences
Jokiväylä 11 C
96300 Rovaniemi

Tel. 020 798 6000
www.lapinamk.fi/julkaisut

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Authors



Reeta Sipola, Master of Applied Sciences in Agriculture
Project manager at the University of Applied Sciences in Lapland

Working with RDI related to Arctic areas, background in sustainable use of natural resources, rural entrepreneurship and green care.



Henna Kukkonen, Master of Educational Sciences
Project specialist at the University of Applied Sciences in Lapland

Background in counseling, as well as English language and culture, currently working with project communications.



Kalle Santala, Master of Applied Sciences in Forestry
Project specialist at the University of Applied Sciences in Lapland

Working as a lecturer and in projects related to Arctic forestry and agriculture.



Sari Nisula, Master of Arts and Design in Media Studies
Lecturer and project specialist at the University of Applied Sciences in Lapland

Background in media studies and service design, currently working with sustainable tourism and entrepreneurship.



Maarit Timonen, Master of Science in Forestry and Agriculture
Senior lecturer at the University of Applied Sciences in Lapland

Working as a lecturer and in projects related to Arctic forestry and agriculture.



Satu Ervasti, Master of Science in Technology
Researcher at the Natural Resources Institute Finland

Research areas include the treatment and utilization of organic wastes and by-products, nutrient recycling, as well as biogas technology.



Seija Tuulentie, Doctor of Social Sciences, Docent
Research professor at the Natural Resources Institute Finland

Research areas include nature-based tourism, land use planning, as well as recreation issues in the Arctic.



Erika Winquist, Doctor of Science, Technology
Senior Scientist at the Natural Resources Institute Finland

Research areas include circular bioeconomy, biomass processing, economic and environmental sustainability.



Johanna Leppälä, Doctor of Philosophy
Senior researcher at the Natural Resources Institute Finland

Research areas include sustainable agriculture in Arctic conditions.



Amanda Mannervik, Bachelor of Science in Innovation Technology
Project Manager at Strukturum Jokkmokk Business Service

Background in Innovation Management, entrepreneurship in higher education and facilitation.



Kine Jakobsen, Master of Arts in Sociology
Researcher at Sintef Nord in Tromsø

Background in social sciences, currently working with projects related to circularity and sharing economy.



Grethe Lilleng, Master of Science in Fishery
Researcher at Sintef Nord in Tromsø

Background in aquaculture and fisheries, currently working with capacity building, transdisciplinary collaboration and innovation.

PART I – Introduction



Promoting Green Economy in the Arctic through International Co-operation

Reeta Sipola

This article collection has been prepared by the Interreg Nord project Green Rural Economy – GRUDE. The objective of the publication is to provide information about green economy and promote the transition towards circularity in the Arctic. To concretize the concept and enhance the applicability of the information in different contexts, the topics are elaborated with examples of green practices from different sectors of society in the North of Sweden, Finland and Norway. The goal is to lower the threshold for adopting greener practices in business life, municipal decision-making and in the everyday life of the local people in northern societies.

Common regional development needs in the Nordics steer towards a green economy

The Northern parts of Norway, Sweden, and Finland have many common challenges, such as aging population, urbanization and the concentration of settlement in the southern parts of the countries. In addition, there is a change in the economic structure due to the decline of traditionally strong industries. Many regional and international strategies and development programs have identified these challenges and have also pointed out the strengths of the areas.

The Nordic societies are well equipped to meet the challenges of this changing operating environment and to move towards more sustainable societies. Green transition can generate innovation and growth and strengthen the attractiveness of the area. The availability of jobs and positive prospects for the future are essential for the vitality of the region.

The old linear economy has reached a dead end, but on many levels, the required capacity for green transition already exists. The Nordic countries are prosperous societies with high quality and equal educational systems, strong scientific expertise, good infrastructure, a wide range of renewable natural resources and competence in the development of bioeconomy. The area is inhabited by people who have a strong motivation to stay in the region and promote the development of the area, also in the future. The locals also have an extensive understanding of the special features of the Arctic, which helps to create solutions that are sustainable and tailored to the needs of the region.

As the economic structure and society services are thin in this wide and sparsely populated area, it is essential to build crossborder and cross-sectoral cooperation between public and private sectors, business, research and education, as well as other actors in society. Networking enhances the use of available resources and improves the region's competitiveness. For the emergence and dissemination of innovations, it is essential that the actors are willing to invest in cooperation and networking. Networking helps to bring the expertise and solutions more widely available and to solve climate and environmental challenges also on a global level.

The Nordic countries have a long history of successful cooperation and development. Solutions to common challenges have been sought through cross-border cooperation. The region has also had its own development program Interreg Nord 2014-2020. The program area covers the northern parts of Norway, Finland and Sweden, as well as Sápmi (which spreads over all three countries).

The goal of the program was to strengthen the competitiveness and attractiveness of the area, especially in cross-border cooperation for achieving synergies. Increasing cross-border cooperation is an important factor in the economically, socially and environmentally sustainable development of the region. Green Rural Economy or the GRUDE project (01.09.2019 – 30.09.2022) has met these goals in many ways, focusing on the specific program objective of increasing the knowledge and expertise on green growth and resource efficiency in the public sector.

The need for supporting green economy as a cause for the GRUDE project

Many regional and international strategies and development programs have recognized the need for green economy -related development. Finnish, Swedish and Norwegian governments highlight the green economy as a great potential for growth and wellbeing and as a precondition for increasing local business. Many sectoral strategies for energy, transportation, farming, and food production, construction, tourism, etc., as well as regional strategies, all highlight the need to invest in the green transition.

The GRUDE project has emerged from this background with the aim to raise the level of knowledge about circular economy in municipalities. Through the increase of green economy and resource efficiency in the public sector, the effects also transmit to enterprises and citizens. Building a critical mass in different areas of society can accelerate the green transition and make communities more sustainable.

The common problems, which were identified in the planning phase of GRUDE, are the lack of knowledge about the possibilities of green economy and the mechanisms for

exchanging know-how, lack of business support, cooperation models and technical and legal expertise. In addition, resource inefficiency and negative attitudes towards rural opportunities were raised as common challenges in the project area.

The vision of the GRUDE project was defined as creating an environment for new, green-growth-focused entrepreneurship, new employment and creating a green growth model for sparsely populated areas that can be applied to other similar areas. As the green economy is an extremely broad concept, the GRUDE project focused on three main themes: **Arctic Bioenergy, Sustainable Societies and Blue Economy.**

Goals of the project were to:

- raise the level of green economy knowledge in the municipalities by sharing good practices and models about the possibilities of green economy
- share information about the potential of green growth (to municipality representatives, decision-makers, students, entrepreneurs and public sector organizations) with participatory methods
- create operation model for clustering in sparsely populated areas, so that the best potential of all parties can be resource-efficiently harnessed into concrete actions

Communications and increased knowledge promote greener attitude, and resource efficiency accelerates transition to green economy. GRUDE has collected and shared knowledge in international, as well as local information campaigns, interactive Greenovation Camps and online workshops. The project has also filmed inspiring case interviews, as well as gathered a comprehensive library of good practices on the webpage and YouTube channel. In the project library there are, for example, event recordings, the State of Green Economy report series from the whole project area, infographics, and a blog with a large variety of inspiring topics.

The project has organized over 60 events that have engaged over 1200 participants from different sectors of society throughout Sweden, Finland and Norway. In addition to this, GRUDE has visited several Municipality Council meetings to share information about sustainable practices on the local level, as well as workshopped and educated in circular business modelling with local companies and business developers. The project has invited stakeholders to join the Nordic Circular Arena (NCA) network, which connects about 700 people from 140 different organizations. At the end of the project, the GRUDE group had over 70 members with the common mission of accelerating green transition in the northern areas.

As the result of GRUDE:

- Skills and knowledge about green growth and circular economy possibilities have increased in public sector, education and business sector
- New environmentally aware attitude has emerged and is focused on utilizing renewable natural resources
- More efficient cooperation and exchange of experiences and good practices is happening between different actors across sectors and borders
- The increase of knowledge and wide-range cooperation are promoting the green growth potential realization to business on the project area
- The understanding of the importance of value networks and the importance of public-private partnerships has increased through the promotion of co-operation

The GRUDE project partners, Lapland University of Applied Sciences, Natural Resources Institute Finland, Strukturum Business Service in Jokkmokk and SINTEF Nord, have followed the project plan and taken measures both for regional needs, and together internationally, to promote co-operation throughout the project area. The combination of RDI and business development made it possible to promote the green economy from many different perspectives, using the best expertise of the partners.

The Effects of Exceptional Circumstances in the GRUDE Project

Kalle Santala & Reeta Sipola

Spring 2020 brought with it a change, the duration and scope of which even experts could not have foreseen. A Finnish Innovation Fund Sitra, anticipating the forces of change in society and their effects, stated that COVID-19 is not a megatrend, but a black swan: coincidence that changes the world quickly and significantly.

COVID was encountered in the spring 2020, in a world where the megatrend of digitalization had begun to be present in all areas of society. Before COVID, digital platforms had increasingly become a part of peoples' lives but in the second half of March 2020, society became one hundred percent dependent on digital solutions as people were forced to isolate themselves.

From the outset, project funders outlined that projects should continue to operate despite the exceptional circumstances and strive to achieve their objectives where possible. This was also the guideline for the GRUDE project, where the measures were based on the collection of good practices of green economy, the dissemination of information gained through workshops and events, and the creation of a green economy network. Communication and networking events, originally planned as physical events, had to be transformed into an online format.

Event planning, execution and reporting

Despite the remote implementation, the planning of the communication events and workshops was guided by the same principles as the on-site events. The purpose and goal were defined separately for each event, in other words, what information was to be collected and shared during the event. Detailed planning steered marketing, implementation and reporting.

Effective, multiplatform marketing was seen as essential to gaining participants. Since, according to research, the final decision for participation in online events is made until the beginning of the event, communication had to be intensified until the last day and hour, both by e-mail and on social media channels. The number of pre-registrants was found to be much higher than the number of participants, so no direct conclusions could be drawn from the registrations for the event. However, the email address provided during pre-registration allowed a reminder to be sent just before the start of the event.

For the implementation of the events, manuscripts were prepared. These included speeches, practical examples and sections aimed at activating the audience, as well as discussion based on the theme of the event. Methods for achieving reciprocity had to be developed for networking and workshop events. The methods included, for example, Mentimeter surveys and Padlet workshop platforms.

The reporting requirements also set their own conditions for organizing events. The indicator monitored in GRUDE was the number of participants in the activities (with the overall target of 150 participants during the project). To verify this, events had to be organized on platforms that required a login from the participants. As a result, the events of the GRUDE project took place in Teams and Zoom environments, whereas, for example, a livestream event which would have been open to everyone on YouTube, was not possible.

Impact on the accessibility of events

Prior to the COVID-pandemic, GRUDE mainly had time to form up and plan future events according to the project plan. The actual implementation of the events did not start until the pandemic struck in April 2020. Therefore, no actual benchmark is available for the number of remote and live participants. An average of 37 people took part in the workshops in Finland, 40 in the information campaigns and 40 in the Greenovation Camps. An average of 48 people took part in the international communication events.

Although the change was radical and rapid, GRUDE was able to adapt to the new circumstances and succeeded in producing events that were in line with the project's objectives. Stakeholders in the project area generally have a high level of technological expertise, adequate equipment and telecommunications connections to participate in remote events. In fact, the project has reached a much wider number of participants than the target set in the original implementation.

This clearly indicates that participating in webinars is considered as an easy way for stakeholders to get involved, even from a distance, and despite other commitments. The online format has also ensured more equal possibilities for participation for sparsely populated areas with long distances. Due to remote participation, savings have been made not only in time but also in travel costs and emissions.

From the point of view of the project, a webinar as way of implementation, has opened completely new possibilities for the use of high-quality experts from a wide area. The best expertise has been brought to the events, even from abroad, if necessary. This would not have been possible, in terms of time and cost, if the experts had had to travel to the events on-site. The use of high-quality experts has increased the attractiveness

of the project events and provided participants with the latest information on a wide range of topics related to green economy.

The easiest events to turn into webinars are those that aim to share information. Transferring the workshops and networking events into remote format requires more planning and methodological investment from the organizer. The workshops and small group discussions have been arranged successfully with careful planning of themes, platforms and facilitation. Regarding remote networking, the challenges have been the greatest, as there is no way to completely replace the informal and free interaction that takes place at physical events.

Based on the experiences in the GRUDE project, it can be anticipated that the awareness of event goals will become increasingly important when choosing between remote and physical execution of events. During COVID times, people have become used to webinars and the ease and flexibility of online events. The remote and online options have become default ways of participation, and are often asked for, even if an event is designed to be held in a physical space.

This has been seen in practice towards the end of the GRUDE project, when the pandemic subsided, and it became possible to hold physical events again. What was discovered was that the content of the physical events had to be reassessed. People were no longer motivated to sit and listen to lectures, but instead, wanted to make sure that a participation in an event would be a truly valuable use of their time.

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Promoting Green Economy through Information Sharing

Henna Kukkonen

The goal of the GRUDE project has been to achieve increased awareness of the possibilities within circular economy and resource efficiency in the North, in order to gain green growth. The program area has identified the need to increase the level of information on resource efficiency, environmental-friendly procedures and circular economy. In fact, the knowledge gaps in these areas have been recognized as the main obstacle hindering green transition in the rural Arctic.

To increase the knowledge-level, especially in the communities, the GRUDE project's main aim has been to involve key stakeholders, especially the public sector, to the project activities and transfer the knowledge of the project outcomes around the Arctic region. Successful communication and dissemination also ensure the continuation and impressiveness of the project outcomes. The project has gained knowledge, shared cases and practices, while coordinating this within a transnational network in the project area.

Communication channels and results

To raise the level of knowledge and competence in the North, GRUDE has been collecting cases and practices related to the potential of green growth, within the selected three thematic areas: blue economy, arctic bioenergy and sustainable societies. The inspiring cases from research, education, public organizations and companies have been uncovered and disseminated to the communities, students and entrepreneurs through various channels during the project lifetime. These examples will be presented in more detail in chapters 5, 6 and 7.

The use of different communication channels has been necessary in order to reach the target groups efficiently and ensure the flow of information and the visibility of the project with stakeholders. The interactive information model, created during the project, is mainly based on the use of the Nordic Circular Arena platform, as well as the social media channels. The interaction is supported by various events, traditional print media and other media utilizations. The reports, videos and other project material that will be available after the project's lifetime are made sure to meet the requirements of the EU Accessibility Directive.

Webpage

The GRUDE webpage provides information in English, as well as, in all the regional languages. The webpage serves as a wide online databank for green economy including, for example, materials from our events, research reports and knowledge about the aforementioned project themes. In addition, the webpage functions as a showcase of the project activity with our exclusive visual brand and current information about the project events and news.

One of the main channels for information sharing is the project blog which functions as a platform for expert articles about green economy, guest articles, cases of green entrepreneurship etc. Due to the exchange of knowledge and cooperation in producing the articles the blog has also become a way of networking with expert organizations and other projects. In addition to our own online platforms, the blog articles have been shared on different organizations' social media channels.

Social media

Social media applications work as a part of the interactive information model in the project, the main channels being the official project page and regional groups on Facebook, as well as the project YouTube channel. The Facebook channels have been growing steadily throughout the project, reaching the target groups widely. The Facebook page and groups have also been the main channels for promoting the GRUDE workshops, Greenovation Camps, webinars and other events, as well as any current green economy related initiatives and practices from municipalities, organizations and companies.

The examples and cases collected during the project have also been disseminated through our YouTube channel. There are, for example, several case videos about how green and circular economy have already been implemented by different stakeholders in the project area. These videos have English subtitles and are suitable for international sharing. In addition, the YouTube channel functions as an archive for the webinar recordings.

Newsletters and other publications

International newsletters, as well as national newsletters in Finnish and Swedish, have been distributed regularly via email throughout the project lifetime. The newsletters have been spread to an extensive list of the main stakeholders and target groups within the public and private sector. The Finnish mailing list alone includes close to 500 names covering key decision-makers in the municipalities, professional organizations and

companies in Lapland.

In addition to the newsletters, information about green economy has been shared through LUAS professional online publication LUMEN in Finland, as well as other media such as traditional press articles and research reports that are available on [the project website](#).

Conclusions and evaluation

As presented earlier in this chapter, the information gathered during the GRUDE project has been communicated to the stakeholders through multiple different channels. The success of project communication has also been evaluated and developed throughout the project lifetime. Below is a list of factors which enhanced effective information sharing in the project.

- Producing material in English, as well as, in the regional languages (Finnish, Swedish and Norwegian)
- Extensive listing of relevant target groups
- Multichannel communication
- Active promotion of social media channels and project materials in the GRUDE events
- Regular posting on all the different communication channels
- High quality in visual branding and content
- Reaching more people through online events

Even though the goals for project communication were mostly achieved, there were, nevertheless, challenges which have affected the efficiency of information sharing. One of the most significant changes early in the project was the breakout of COVID-19 pandemic which prevented all face-to-face events and moved project workshops, Greenovation Camps etc. online.

While helping the project to reach more people, fully digital events also complicated networking and active two-way interaction with the stakeholders. In the efforts to tackle the problem, the project team did its best to activate participants in the events through, for example, meditation/relaxation exercises or easy office-workouts. In the events, people were also divided into smaller groups, in order to create space for conversation. Another way to support networking was to actively collaborate with other projects and stakeholders.

One more challenge for communication was to find enough time to create content for all our communication channels in all the different languages. As the efficiency of the

communication was evaluated during the project, it was decided to narrow down the number of platforms, and in that way, rationalize the workload in content creation.

All in all, the project communication succeeded well considering the altered circumstances caused by the global pandemic. The project was able to reach its target groups and stakeholders in the project area and effectively disseminate information about green economy in different ways. Through internal development, the project was also able to maintain high quality in communication.

PART II – Green Transition in the Arctic



Accelerating Green Transition by Sharing Good Practices

Satu Ervasti & Reeta Sipola

One of the main tasks of the GRUDE (Green Rural Economy) project was to collect actual cases and good practices related to the potential of green economy. Presenting practical examples is generally considered as an effective tool for increasing understanding and knowledge. When it comes to green economy, it is essential to reach the critical mass of people who have sufficient understanding and are ready to act. In other words, the transition requires awareness about how the green economy practices can be implemented in real life.

Undoubtedly, there are also regional practices and projects that are unknown to the public, but which could benefit people and organizations on the local level, as well as in the other Nordic countries. Too often, these inspiring cases and valuable examples remain in the regions instead of being communicated, utilized and developed further.

In GRUDE, the green economy practices have been uncovered from the field of research and education, as well as public organizations and private companies. The practices have been listed and disseminated to the project stakeholders that include local policy-makers, students, entrepreneurs and officeholders. In order to collect the best practices, GRUDE arranged several workshops, conducted interviews, used expert consultants and compiled analysis about the status of green economy in the project area. (Fig. 1)

In addition to the search of good practices, the project team sought information about the bottlenecks and barriers preventing the realization of green transition. This information was then used in the planning and tailoring of events and activities, so that they would be as helpful as possible for the project target groups.

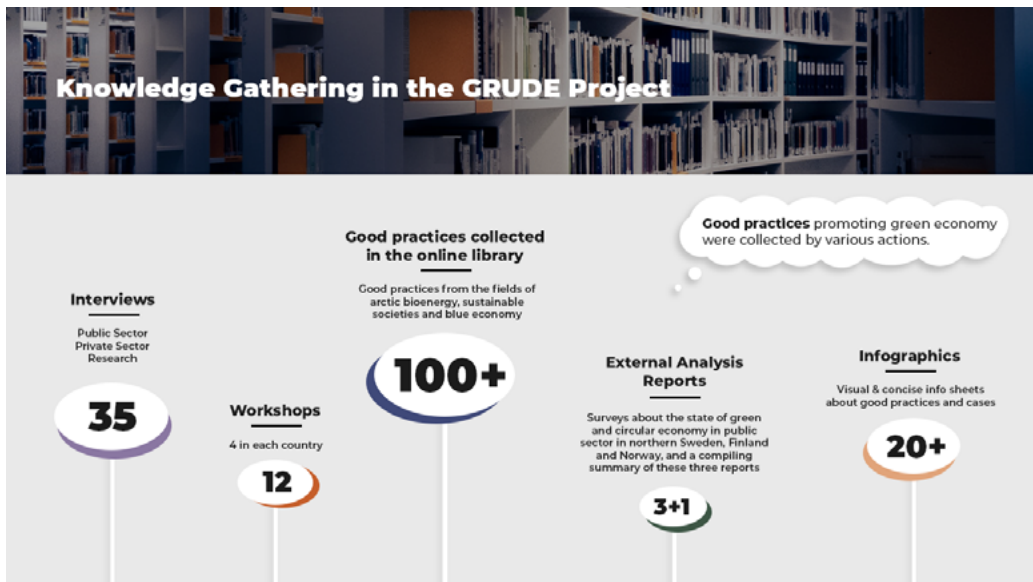


Figure 1. GRUDE's knowledge gathering actions and outcomes.

Good practices and examples are proven to be a good way to encourage stakeholders towards a new course of action. A plain presentation of research results is often considered too theoretical and perhaps too risky, in terms of whether the results would be adaptable to the northern, sparsely populated areas. When someone has already tested and successfully implemented circular practices, however, it offers hands-on experience and makes the presentation more convincing. There is no one-size-fits-all solution, but by providing inspiration, tools and examples, and by bringing people together, innovative solutions are more likely to emerge, and good practices be adapted to use.

Green economy is a vast entity, which makes gathering good practices a large and demanding assignment. In GRUDE, the focus has, therefore, been on three main themes: **Arctic Bioenergy, Blue Economy, and Sustainable Societies**. The following three articles present some of the most interesting examples from these themes.

Arctic Bioenergy Strengthens the Regional Economy

Kalle Santala, Reeta Sipola & Satu Ervasti

Arctic bioenergy is one of the three main themes of the GRUDE (Green Rural Economy) project. Local bioenergy production means that it is based on Arctic renewable biomasses. The sources of bioenergy are forests, fields, agriculture and bio-based industrial side streams and wastes. The aim is to maximize the value of raw materials at every stage and create new value chains to utilize biomasses. Bioenergy has a positive impact on the regional economy, as processing locally produced raw materials creates jobs and improves regional self-sufficiency. In Finland and Sweden, biomass is the most important source of renewable energy. In Norway, on the other hand, hydropower is by far the largest source of energy.

According to the Green Deal strategy published by the EU Commission, the EU aims for climate neutrality by 2050. Achieving this goal requires increasing use of bioenergy, which requires creating new value chains, improving cooperation and processing new and traditional products to produce energy in accordance with environmental standards. This extensive change in practices requires multidisciplinary cooperation in different sectors of society. New products and practices must emerge, and existing ones must be developed to be more sustainable.

The GRUDE project has identified good practices from enterprises and municipalities on how to increase and develop the sustainable use of bioenergy. A few examples of good practices from different sectors have been selected for this article. The aim is to present what kinds of innovations are available in circular economy and processing industry for increasing the use of Arctic bioenergy. The good practices and innovations presented here may not be widely exploited yet, but they have potential and their value for the whole may become significant in the future.

Decentralized energy production based on local forest biomass

Energy production is one of the most important factors influencing climate change. In addition to climate issues, the transition from fossil fuels to renewable energy is also important for the security of supply, self-sufficiency, and employment. The utilization of decentralized energy production solutions using local bioenergy resources supports the local economy and creates security for the provision of uninterrupted energy supply even in exceptional circumstances. The reduction comes from the fossil energy raw material purchased from abroad and the emissions resulting from its use.

[Mikkone Oy](#) is an example of a company that offers complete heat production solutions for larger properties based on the use of wood chips. Mikkone Oy builds wood chip heating plants in connection with the properties, supply them with fuel and maintain the plant's operations. In most properties, wood chips have replaced the previous heating system, which has been fueled by fuel oil.

[A district heat emissions calculator](#) has been announced for both district heating producers and its users at the beginning of 2022 in Finland. The tool calculates and presents accurately and uniformly district heating's carbon dioxide emissions specific to the location and district heating network. The calculator can be used to examine what kind of emission reductions a company or municipality can achieve by changing the energy raw material of its heat production to a renewable form.

Alternative fuels for heavy-duty vehicles

In addition to electricity, biogas is an alternative energy source for low-carbon mobility. However, the network of (bio)methane filling stations in Finland, Norway, and Sweden is centered in the southern parts of the countries. This hinders the establishment of biogas driven vehicles, both trucks and passenger cars, and reduces the attractiveness of biogas from the point of view of motorists. Logistics accounts for 7 percent of Finland's carbon footprint. In sparsely populated areas of the Arctic, the distances are long, and traffic will remain necessary also in the future. The development of sustainable solutions is, therefore, essential.

For example, Lidl, an international food retail chain operating in Finland and Sweden, has introduced a truck using liquefied biogas. Biogas for truck fuel is produced from the store chain's own waste in cooperation with Gasum. According to Lidl, a biogas truck will reduce greenhouse gas emissions by up to 193 tonnes per year, equivalent to the emissions of three average passenger cars over their entire life cycle. As another example, Metsähallitus, a Finnish state-owned enterprise that manages natural resources, like state-owned forests, is also developing sustainable solutions for harvesting and transporting timber together with its partners. In the spring 2022, Metsähallitus' logistic partner enterprise Kuljetusliike Eskola has started timber transportations in the Oulu region with Europe's first liquefied biogas (LBG) full trailer combination for timber transport.

Biogas tool for planning investments

Biogas production is a well-known technology and suitable for decentralized energy production. In farm scale, biogas production offers advantages such as improved

nutrient and energy self-sufficiency. Biogas tool is a free planning tool for estimating the methane production potential and digestate quality from different feedstocks (Fig. 1). With the biogas tool it is possible to accomplish preliminary estimates of investment's size and its profitability. The tool includes three different processing technologies covering processing of all raw material types, and is available in three languages: in Finnish, Swedish and English.



Figure 1. Main functions of the Biogas tool.

Hurtigruten replacing fossil fuel with liquefied biogas (LBG)

Hurtigruten AS, the well-known and the largest cruise operator and expedition company in polar waters, is working together with Biokraft to operate its sea vessels to run on biogas. Biokraft has the world's largest site for liquified biogas production, located in Norway. Fishery and forestry produce a constant side-stream of organic waste suitable for biogas production. In addition to biogas, the process produces also renewable biofertilizer to contribute to more sustainable food production. Hurtigruten is also investing on battery solutions and hybrid technology to reduce emissions on its fleet.

This collaboration is groundbreaking when it comes to the application of renewable and bioenergy at sea. There are more than 300 cruise ships in the world, and majority of them is still using fossil heavy fuel oil. One mega size cruise ship can have daily emissions that are equivalent to one million cars, so the pressure to find more sustainable solutions is obvious.

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Sustainable Societies are Built on Respect for the Environment and Local People

Seija Tuulentie, Amanda Mannervik & Sari Nisula

Sustainable Societies has been one of the three focus areas of the GRUDE – Green Rural Economy project. It is a wide concept that covers all dimensions of sustainability. The concept of sustainable societies refers to community development that is based on initiatives and innovations focused on providing sustainable solutions for the everyday life of the local people in municipalities and villages. Solutions are needed especially for sustainability of movement, energy sources, food supply, waste management and tourism industry – not forgetting the quality of life.

The aim of the GRUDE (Green Rural Economy) project has been to collect and share the best green practices applied in municipalities, SMEs, NGOs and local communities. This has been done by bringing together experts, authorities and residents to share well tried practices and innovate more sustainable local communities.

During the GRUDE project, plenty of sustainable practices were identified in northern societies. The examples vary from horse logging and electric snowmobile safaris to producing wood fiber from microfibrillated cellulose. A few of the most potential innovations will be presented in this article in more detail. Even though these innovations are not used widely yet, they have the potential of becoming significant solutions in the future.

Green economy and circular thinking are important concepts when building sustainable societies. Circular thinking entails adopting a circular view on how communities, society and business work. It recognizes possibilities for implementing circular principles, even across stakeholders and networks. Circular principles aim for keeping materials in the loop instead of linearly using and discarding them as waste (Fig. 1). Circular thinking also helps recognize the loops of other stakeholders, thus enhancing the circulation of excess resources. Businesses may even co-operate in creating industrial symbiosis, where the by-products of one industry become valuable resources for another.

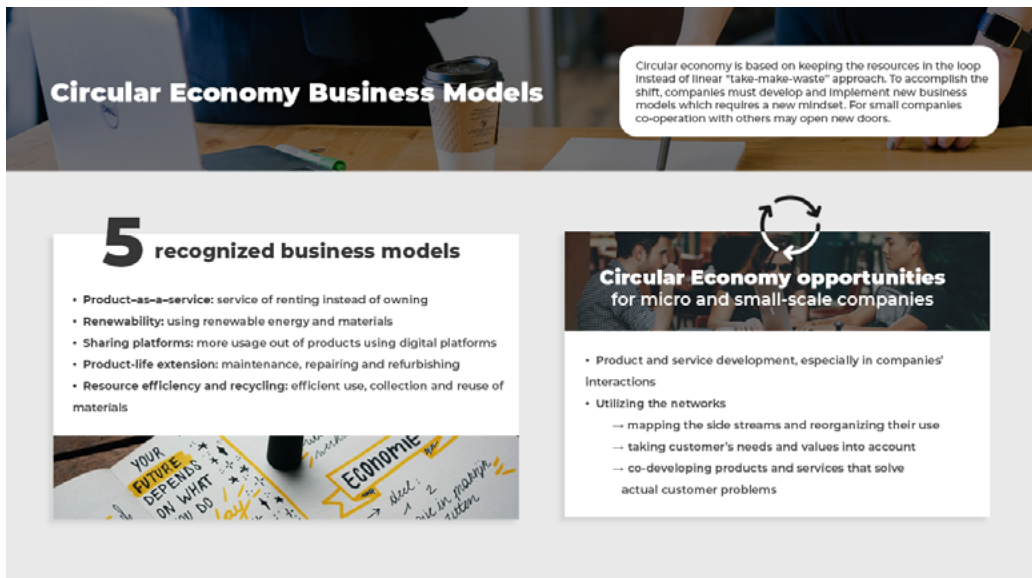


Figure 1. Circular Economy requires a shift of mindset in the whole society.

The town of Ii, Finland

The town of Ii in North Ostrobothnia, Finland, has taken holistic sustainability and climate actions seriously by concentrating on “Sustainable everyday life”. With its 10 000 inhabitants, Ii is committed to reducing carbon emissions, recycling and avoiding waste and using common resources within the limits of the Earth's carrying capacity.

The energy and climate work brings economic savings, diversifies the regional economy and promotes the well-being of residents and visitors. In addition to circular economy and energy solutions, the need to decrease consumption is emphasized. For example, all the cars owned by the municipality of Ii are electric, and heating in the municipal properties is done by renewable energy sources.

The municipality is also engaging the citizens in the process, and even school-children are thought how to measure water, heat and electricity consumption. The schools get to keep 50 percent of the money they save on electricity and water bills, and use the money for something the children choose, like equipment for physical education and outdoor games.

Hawkhill Resort, Nuuksio, Finland

Hawkhill Resort works on renting cottages in Nuuksio national park near Helsinki. Hawkhill is a family company in third generation and has an extensive “Environment and Sustainability Program”. The goal is to show their guests, partners and competitors that it is imperative to consider the environment and climate when traveling. For Hawkhill, this means, for example, CO2-free electricity and heating, fully electric logistics, building cottages that will last over 100 years, recycling everything possible and minimizing water consumption. They follow and minimize their CO2 emissions yearly and compensate for the part that they cannot remove.

The company has several green certificates but regards their standards only as a starting point. At Hawkhill, they also consider traveling to the destination as one the biggest risks for the environment. Therefore, Hawkhill encourages their customers to rely on land-based travel whenever it is possible. They have also decided not to market their services for customers that would require long-haul flights to arrive.

Recycling Center Återvinsten, Jokkmokk, Sweden

The Recycling Center Återvinsten is operated by the municipality of Jokkmokk. The recycling center and recycling shop work towards the goal of extending products’ life span by repairing and refurbishing them. They receive products are old but still in usable condition and fix them so that they do not need to be discarded but can be sold again.

All the items are donated by people for recycling. After receiving them, the staff checks and grades them and makes necessary repairs. Afterwards, the products are sold in the recycling shop for not more than a symbolic price. The vision of Återvinsten is that people would rather choose to buy old high good quality products instead of new ones that might not be as durable or even repairable after breaking down.

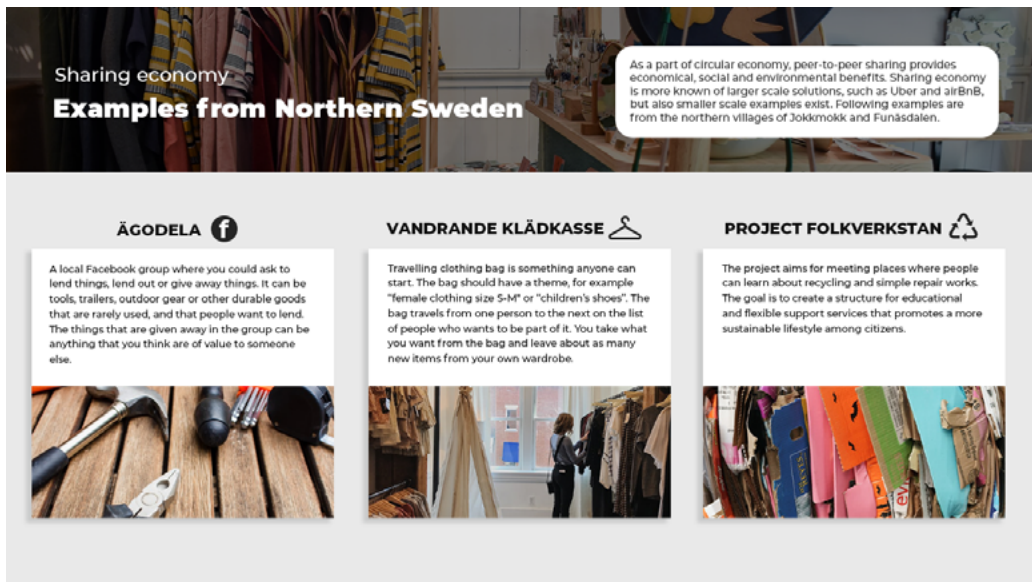


Figure 2. Sharing economy is a part of sustainable lifestyle. Here are a few examples from the north of Sweden.

Young entrepreneurship, Norway

Young entrepreneurship (Ungt Entreprenørskap) is a nation-wide non-profit organisation in Norway, that aims for building connections between all school levels and the working life, as well as developing young people’s creativity and self-belief. The organisation offers programs, that address, not only entrepreneurship, but families, jobs and communities, as well as the whole society. They have set creating viable local communities and contributing to global sustainable development as their core values.

Young people participating in the program have taken part in competitions for young entrepreneurs and have been successful in creating environmentally and socially friendly businesses. Participation in the programs shows the young people how communities and businesses work and presents them with an active role in the community. Moreover, they get the idea of how they can affect the future with their own decisions, creativity and actions.

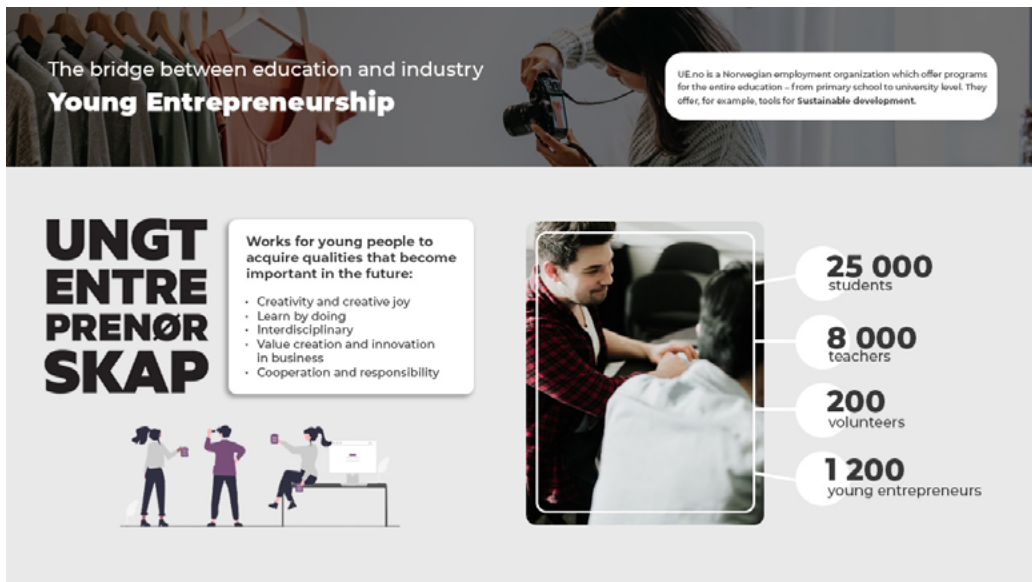


Figure 3. Ungt Entreprenørskap engages young people to local communities and business life.

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Blue Economy has Great Potential for Green Development

Grethe Lilleng & Kalle Santala

Blue economy was chosen as one of the focus areas of the GRUDE (Green Rural Economy) project, because of its significant – and mostly untapped – potential for the establishment of green economy in the Arctic areas. Blue economy is also an umbrella term which involves several industries and different sectors of society. This article explores the state of blue economy in the north of Norway, Finland and Sweden, as well as presents a few examples of the sustainable use of marine and inland water resources from the project area.

European Commission defines blue economy as "All economic activities related to oceans, seas and coasts. It covers a wide range of interlinked established and emerging sectors". Thus, blue economy is linking economic exploitation of the ocean to sustainable and environmental ecosystem. It involves many industries such as oil and gas, fisheries, aquaculture, shipping, tourism, offshore wind power, seabed minerals and marine biotechnology.

Further, several novel businesses, industries and species have emerged as a result of the developing blue economy. For instance, algae production, aquaponics, renewable energy and blue biotechnology offer promising possibilities for creating more jobs, increasing economic growth and transitioning to a more sustainable society in the future.

Global challenges, such as the climate change and loss of biodiversity cause unpredictability and constantly changing circumstances. Global population growth will also require a significant increase in food production and energy supply in the years ahead. These issues further complicate the transition to sustainable employment and low-emission society.

Despite the global challenges, the ocean offers almost unlimited opportunities. The ocean is the largest existing ecosystem, and numerous industries rely on it. OECD states that the ocean will be a key contributor to future prosperity and growth. Thus, transdisciplinary research, cooperation and networks are necessary for better understanding the complex mechanisms and maintaining a healthy and sustainable blue economy.

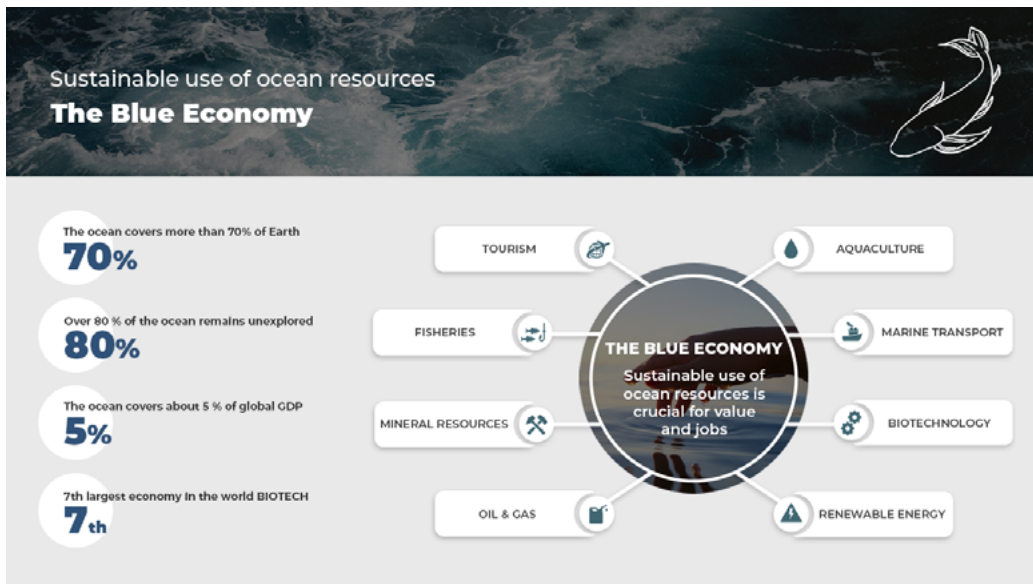


Figure 1. The potential of blue economy is still largely untapped.

State of blue economy in Norway, Sweden and Finland

Over 70 percent of the Norwegian export income originates from the ocean, and the blue economy is accounted for a quarter of total gross investment in real capital in 2021. With its many natural advantages, such as, oil, fish, minerals, agriculture and forestry, Norway is one of the wealthiest seaside nations. In addition, Norwegian coastline is one of the longest in the world, and the country has over five times more sea than land area.

Sweden imports about 75 percent of the fish it needs, although there is plenty of potential for exploiting local lake fish. Increasing the exploitation of domestic fish would reduce the pressure of fishing for certain fish species, promote a better use of natural resources and reduce dependence on imports. Regarding farmed fish, Sweden is looking for greener solutions for feed production which would, at the same time, reduce the amount of food waste and the nutrient load on the Baltic Sea.

In Finnish Lapland, commercial fishing takes place in a few large lakes, such as Mieköjärvi, Kemijärvi, Inarinjärvi and the artificial lakes of Porttipahta and Lokka. The most significant prey fish are vendace, whitefish and pike. Currently, less than 20 percent of the Finnish fish consumption is domestic. The waters in Finnish Lapland have also underutilized fish stocks that offer potential for commercial fishing well into the future. The Finnish government has outlined that the utilization of domestic fish should be doubled by the year 2035. In addition to professional fishing, water tourism offers economically significant possibilities which benefit from the cleanliness of water resources.

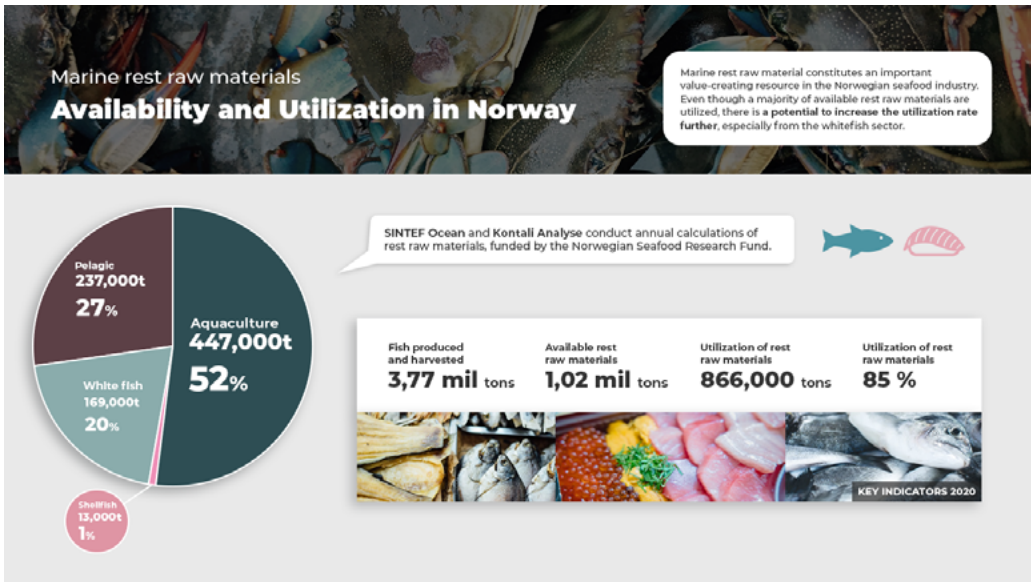


Figure 2. The utilization of marine resources in Norway.

Aquaponics maximize the circulation of nutrients

One of the key issues in salmon aquaculture is the management of waste. However, there is a growing interest in aquaponics systems to find sustainable production methods that could reduce non-renewable resources and combat climate change. Aquaponics is the combination of aquaculture and hydroponics. In land-based recirculating aquaculture systems (RAS) nutrient-rich compounds from fish effluent can be extracted in order to make better use of lost nutrients and assimilate them back into the production cycle through aquaponics. (Fig. 3.) In [the BlueCycling project](#), SINTEF Nord and its partners are now working on optimizing this technology and giving optimal growing conditions for both fish and plants.

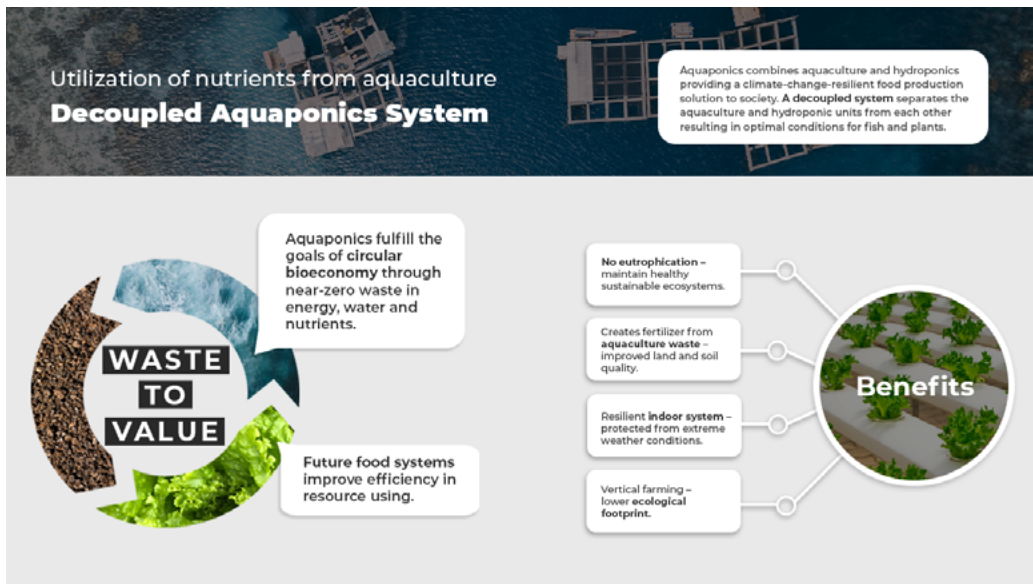


Figure 3. Aquaponics offers a sustainable way for food production.

Sustainable fish farming with recycled nutrients

Instead of using imported wild-caught fish or soy as feed for farmed fish, it is possible to circulate food waste for this use. Project Fem ton grön fisk, run by the Ax foundation and Sveriges Lantbruksuniversitet (SLU) in Sweden, has shown that plant-based food waste, such as, husks, grain and bread waste from the food industry can be used to feed insects. The project has built a network of actors from the production and distribution for upcycling waste to protein feed for animals, such as, rainbow trout and other farmed fish. The feed can also be produced from farmed mussels and sea urchins grown on phytoplankton. This reduces the eutrophication of the seas when nutrients are removed from the sea for productive use.

Finding new entrepreneurs to the fishing community in Lokka

Lokka artificial lake is one of the main locations for commercial fishing in Lapland. The original fisher community was growing old, as in the 2000's there has not been young fishermen to start their business and keep the livelihood vital. To prevent the decline of the profession, the fisher community started a project Kalastajanpolku (= fisherman's trail) for marketing and recruiting new fishers to join the Lokka fishing cooperative. The project provided a variety of support from the community for those interested in starting their business: help for finding accommodation, teaching of fishing techniques, showing prey areas, navigating in the waters, refining the prey and selling the products.

As the result of the project, the community grew from 11 to 22 fishermen, and they have a continuous concept for training new fishermen also in the future.

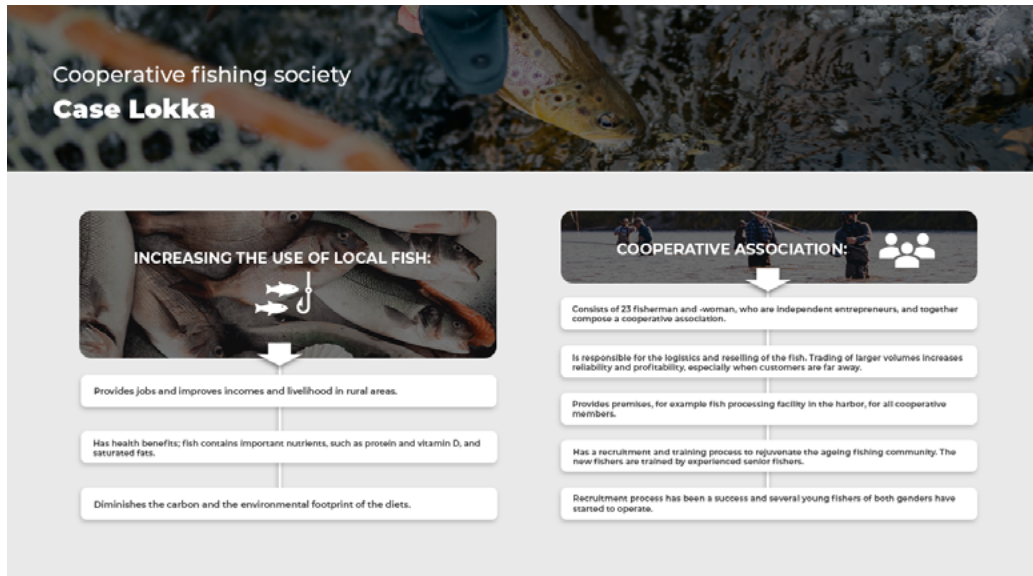


Figure 4. The Fishing Cooperative in Lokka, Finland, have actively recruited new fishermen to the area.

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PART III – Concrete Actions for Promoting Green and Circular Economy



Interactive Knowledge Gathering and Sharing in Workshops

Satu Ervasti

Exchange of good practices is an important tool for promoting green transition. In addition, planning of information sharing activities must be based on the needs and interests of the target groups. To meet these challenges, a total of 12 interactive workshops were arranged during GRUDE (Green Rural Economy) project. The primary goal of the workshops was to gather knowledge with an interactive and participatory approach. In addition, knowledge-sharing and networking were encouraged, and stakeholders were engaged to identify challenges and important topics and to share their successful green economy related experiences. In GRUDE workshops, there were 325 participants in total, from which 199 (61 percent) were women.

The workshops in the GRUDE project were organized as national events, and in local languages, to ensure a low threshold for participation. Each country or project partner (Finland, Sweden, and Norway) organized their workshops twice a year in 2020 and 2021. Due to the COVID-19 pandemic, most of the workshops were held as virtual events. The events were targeted for both public and private sector. Representatives from education, research, development etc. were welcome as well.

Topics

Topics of the workshops varied from general themes of green economy (e.g., circular economy or regional EU Green week events) to more specific topics, covering issues such as sustainable procurements (FI), sustainable construction (NO) and promoting local recycling opportunities (SE). Topics arose from the needs gathered from the feedbacks of earlier events, discussions with stakeholders and experiences from the field.

In addition, GRUDE also held an international workshop in the European Rural Entrepreneurship Voices Forum in September 2021. The topic of the workshop was Circular Economy – Envisioning the Future of Rural European Countryside (Fig. 1).

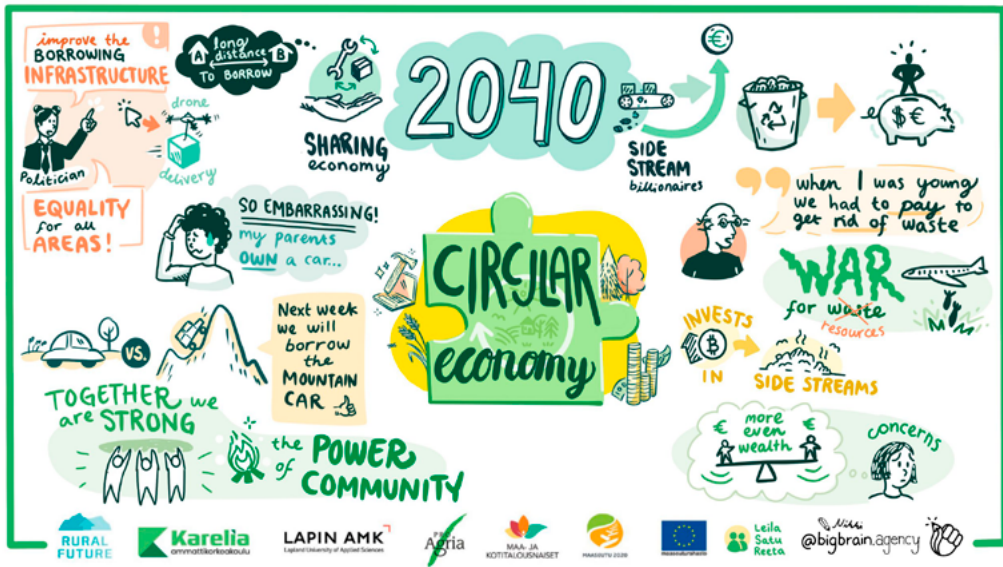


Figure 1. Visualized summary of GRUDE’s international workshop in the European Rural Entrepreneurship Voices Forum 2021.

Concept

The structure of the workshops was simple. Firstly, experts gave inspiring introductions to the topic, and after that the workshop was continued in more interactive ways. The expert speakers were recruited from other organizations to gain more in-depth understanding about the theme. For the interactive part, different participatory methods, such as, Mentimeter, Padlet walls and/or breakout rooms were utilized to collect information and to keep the group work focused. Each workshop was about 2 hours long.

Most of the workshops were arranged in co-operation with other projects or organizations. Collaboration gave several advantages, such as, enabling more efficient marketing and better visibility, having more resources during organizing, and most importantly, gathering relevant stakeholders in one well-planned event instead of having several competing events with overlapping topics.

Outcomes

The concept of workshops developed throughout the project timespan, and the project staff established a good routine of organizing online events. The arrangements included, for example, recruiting keynotes and participants, and targeting the events (topics, structure and occasions) to specific target groups. In addition, the project internal practices evolved so that summaries and outcomes of national workshops

were regularly and transnationally shared to the other project partners.

Some challenges were also met in engaging different sectors to participate in the workshops. In Finland, enterprises and entrepreneurs were challenging to get onboard, even though the events were carefully planned and were based on the wishes and needs of the target groups. In Sweden, entrepreneurs were the largest group of participants while public sector representatives were harder to engage. This emphasizes the fact that the organizers must formulate events in a way that the participants really feel is benefitting them. Participants need to be committed to use their time for workshopping.

The workshops also gave input to other events and actions in the project. Both keynotes, group working sessions and discussion offered information which triggered ideas for, for example, new regional information sharing events. This kind of learning-and-reacting type of organic development was very typical in the GRUDE project and served well the aims of raising the knowledge level and engaging people in green transition.

The participants' attitudes towards green economy were followed by collecting feedback and comments from the workshops. The participants were asked their general opinion about the workshop, and whether they had learned anything new about green economy. The open-ended questions provided, unsurprisingly, a large variety of answers. The participants especially appreciated concrete case examples and hoped to hear more of them in future events. They were also interested in public and private sector perspectives and environmental issues.

In Finland, the workshop participants were also asked to evaluate whether the information they had received was useful for them in practice. 62 percent of the respondents answered yes, and 38 percent felt that utilization possibilities were moderate. None of the respondents felt that there would be no use for the information.

In some of the feedback surveys participants were asked to evaluate how much the workshop had increased their knowledge and competence about green and circular economy, and if they thought green economy and the topic of the workshop were important. Data of these answers showed high ratings (knowledge increase 3.8/5 and attitudes 4.2/5) which indicates successful selection of workshop contents, but also that the participants were already aware and interested in the chosen topics.

The workshops provided many good practices and a lot of useful information. The concrete cases, manuals etc. are available in GRUDE's [Good Practices Library](#), and most of the workshops are summarized in the [project blog](#). Materials of the Finnish workshops can be found from the [Resources section](#) on the GRUDE webpage.

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The Greennovation Camp Concept

Amanda Mannervik & Sari Nisula

Greennovation Camp is an event format created during the Green Rural Economy project. Greennovation is a made-up word which combines the meaning of green and innovation. Hence, the goal of Greennovation Camps is to promote new ideas and offer innovative and adaptable space where green innovations can grow. The event format encourages trans-sectoral and international co-operation and networking. It connects people who would not normally meet each another, but who would benefit from collaboration.

Behind every business, service and livelihood there are people and communities. The new demands of sustainability pose challenges, but on the other hand, greener choices offer possibilities for all sectors. In green and circular economy, another person's problem might offer a solution for someone else. Greennovation Camps are designed for exploring and recognizing these existing opportunities. There is also plenty of room for development, and by bringing together people from different sectors, it is possible to ideate something green and new.

Methods and activities

Every Greennovation Camp should have a theme related to circular economy and some defined problems or opportunities to explore and ideate around. The event is designed to be sector-crossing, involving representatives from various fields. A Greennovation Camp can be arranged by one or multiple organizations, but preferably one organization will have the main responsibility and set a project manager for the event. The organizer can be anyone who is interested in deepening knowledge, networking and brainstorming around the themes of green economy.

In the process of arranging a Greennovation Camp, there are many opportunities for co-operation between different types of organizations. Firstly, all the parties need to be active in the preparation and planning of the event. Secondly, the stakeholders should actively participate in the event itself and bring their viewpoints into discussion.

Networking is one of the core goals of Greennovation Camps, and every camp should also have a specific theme. The organizers can start looking for ideas and networks in the most relevant topics they are working on at the time, whether it be sustainable tourism, energy production, digitalisation, or something else. The concrete results of a Greennovation Camp can be, for example:

- knowledge and discussion about the best practises in the area, or good examples from elsewhere
- new business ideas or partners
- new project ideas
- new type of collaboration between regions and sectors
- What makes the Greenovation Camp concept special?

How does the Greenovation Camp concept differ from other workshops and hackathons?

A Greenovation Camp is an event that provides information, inspiration and interaction for all stakeholders interested in the chosen topic. Workshops and even hackathons can be a part of the program, but in addition to creating new innovations, it is equally important to find inspiration from the knowledge and experiences of others. This kind of interactive and innovation focused approach makes the Greenovation Camp concept unique.

Individual people and many organizations have adopted sustainable values and wish to use products and services that support them in taking care of their environment. In rural areas with sparse population and long distances this can, however, prove challenging. Greenovation Camps can offer an arena for all stakeholders to invent solutions for these needs.

Events during the Green Rural Economy project

In the GRUDE project, Greenovation Camps have been organized by the project team members from different organizations in all the three participating countries: Finland, Sweden and Norway. A total of six unique Greenovation Camps have been carried out during the project lifetime. All the camps were arranged digitally, due to the Covid-19 pandemic.

The topics of Greenovation Camps carried out during GRUDE project were:

1. The Future of Bioenergy and Arctic Megatrends
2. Sustainable Arctic Societies – Towards a Circular Economy
3. More from Less – Making Arctic Rural Sidestreams More Profitable
4. Sustainable Arctic Tourism
5. Sustainable Blue Economy – Fishing, Food Industry and Cross-border Cooperation
6. Green Transition – Promoting Circular Entrepreneurship in the Rural North

In the final Greenovation Camp of the project, the interactive workshop part focused on the future of green economy in the Arctic. During the workshop research questions were formulated for possible new projects after GRUDE. The questions that were worked on had appeared continuously throughout the project in workshops, surveys and in our State of Green Economy report series. The results from the workshop session were brought forward to a stakeholder collaboration session that led up to the Final Networking Conference of the GRUDE project.

Video material and illustrations

To make it easy to spread the material further, the project decided to make short summarizing videos of each Greenovation Camp. The full-length recordings of the keynote speakers were also available after the events. All six events were also live illustrated by professional live scribes to capture the key points of each presentation. All illustrations and a few recordings with English subtitles can be found in the [Resources section](#) on the GRUDE webpage.

Evaluation and feedback

As the Greenovation Camps were amongst the largest events organized in GRUDE project, the project team wanted to make sure that the outcome was what was hoped for. Therefore, a participant survey was made after each camp, measuring several questions crucial to the overall project goals.

The participants had to rate on a scale from 1 (not at all) to 5 (very much), how well these two claims represented their thoughts after participating in the event:

1. My knowledge and competence about green growth and the circular economy has increased today. Median: 4
2. The Greenovation Camp was inspiring and influenced my own attitude about green growth / circular economy. Median: 4

In the survey there were also a couple of other questions to give the planning team a useful insight for the upcoming project activities and events.

This is what I bring home:



A few examples of the feedback that was given in the free-text field:

First of all, the way this webinar was built and arranged was super!

How people were keen to express their views, and it was interesting that rural areas came as being a part of the solution for negative mega-trends.

I got to know about other projects and look forward to making contacts with people at the right time.

The Greenovation Camp manual

One of the project deliverables in GRUDE, was to create a manual for the Greenovation Camp concept. The manual describes the process of arranging these special events in a way that makes it easy for anyone to do the same. The Greenovation Camp Manual presents the event concept in detail and gives handy tips for the organizer. [Download the manual from the project website.](#)

An Overview of the State of Green and Circular Economy in the Project Area

Satu Ervasti

The goal of the Green Rural Economy project has been to spread knowledge about green economy. In order to achieve that, it was important to find out the current status of green economy in the project area. For this, GRUDE examined national circular economy strategies and collected information with various methods. This article summarizes these findings and gives a short summary of relevant roadmaps for actualizing green transition in the North.

National and regional strategies in Finland

Finland launched a national circular economy roadmap in 2016, as the first country in the world. The roadmap was subsequently updated in 2019, but the goals remained the same: “The circular economy will be a cornerstone for the Finnish economy and competitiveness” and “Everyday decisions act as catalysts for change”. For the municipalities, circular economy can provide new sources of livelihood and novel foundations for industrial policy and public procurement, as well as for education and teaching. Circular economy also helps finding solutions for smarter land use.

In the Finnish Lapland, a regional Green Deal roadmap was compiled during spring 2021. It was developed in collaboration with various actors operating in the region. Green Deal roadmap of Lapland is a voluntary agreement on green development that sets common goals and encourages different sectors and industries to action for more sustainable future. The roadmap highlights relevant themes to the Lapland region, such as, carbon neutrality, circular economy thinking and a revolution in the production of energy and Arctic food.

National and regional strategies in Sweden

In Sweden, national circular economy strategy was published in 2020. The strategy has a vision about a society in which resources are used efficiently in non-toxic circular flows, replacing virgin materials. The transition to a circular economy will contribute to achieving the environmental and climate objectives, as well as the UN Sustainable Development Goals set in the Agenda 2030.

Regionally, Norbotten has set out clear goals for promoting a circular economy. The

goals are stated in the regional development strategy which emphasizes, for example, holistic approach to sustainability, supporting initiatives of sustainable consumption, sustainable transport and accessibility.

National and regional strategies in Norway

Norway's strategy for circular economy emphasizes local value creation. In addition, achieving the UN Sustainable Development Goals and Norway's own climate and environmental policy targets are strongly included. The strategy expresses strong support from the government and municipalities, as well as businesses and the research sector. Counties and municipalities are highly acknowledged as their task is to act as coordinators between various stakeholders.

External analyses

The state of green and circular economy in the northernmost parts of Finland, Sweden and Norway, was studied in detail during the GRUDE project. The study covered the circular economy related skills and attitudes of individual public sector representatives. On the organizational level, it was examined whether circular practices were implemented in the municipalities, and whether they had included the transition to green economy in their regional strategies.

The status of green economy on an individual level

The data about the attitudes towards green economy was collected with an online survey that was sent to public sector employees in each country. The questions considered circular economy skills and personal readiness to learn more about green economy. In general, the public sector officers appeared to have reasonably good knowledge about the basics of circular economy. Most respondents associated circular economy with recycling, reuse, reduced emissions and sorting. Broader concepts, such as, new business models and industrial symbiosis, were mentioned in a few answers.

Nevertheless, there are still needs for more information sharing and capacity building, since some structural approaches, like Product-as-a-Service, value chains and the design phase were not mentioned at all. Respondents evaluated their own knowledge of circular economy to be relatively high. Interestingly, they evaluated the knowledge level of colleagues and stakeholders to be lower than their own. The respondents felt they needed more information about circular business models, circular solutions for public procurements and renewable energy.

The status of green economy on the strategic level

The data collection about the strategic level was based on analyzing literature, municipalities' webpages, strategies, etc. The analysis revealed many good examples of circular economy already existing in the project area. Useful tools for promoting the green shift are, for example, sustainable public procurements, green goals set in municipal strategies, business development and community planning.

In Finland, the green shift has already been implemented in many ways, but the state of green economy differs significantly between municipalities. In some of the municipalities the concept has, however, been put to concrete action and the plans to increase circularity can easily be found in their development strategies. Good practices in the day-to-day operations of municipalities were found both in Lapland and in other regions. As an illustration, solutions for increasing the use of local food in the central kitchens and making sustainable public procurements, were named as strategic goals in the region.

The Swedish analysis highlighted the role of municipalities in promoting circular economy. Community planning has, indeed, a central role when it comes to supporting the development of circular solutions. It also helps creating favorable conditions for sustainable activities in the business sector, as well as in the lives of individual consumers. The analysis exposed several ongoing cases where municipalities were leading inventories of underutilized resources, for example, by finding new potential ways to utilize abandoned houses. The analysis also revealed good practices related to sustainable public procurements in Sweden. For instance, purchasing used and repaired IT-goods provides a fine example of a circular mindset.

In northern Norway, several municipalities have adopted an energy and climate plan. In addition, there are already municipalities that have made strategies for green growth and sustainable development. Still, allocating resources for doing sustainability work is a major issue – especially in many of the smaller municipalities. It is important that organizations, both public and private, have a clear vision and actively support the development of circular solutions. However, the survey revealed several exemplary business cases. One of them was a seafood company that is utilizing seaweed and kelp as raw materials and making efforts for secure sustainable local production.

More information

The analysis reports have been made separately for each of the three countries. Moreover, a general summary of the national reports was released in the Nordic Circular Summit in November 2021, in a session hosted by the GRUDE project. All national reports and their summary are available on [the project website](#).

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Information Campaign about Green Economy for Municipalities

Maarit Timonen & Kalle Santala

The GRUDE project carried out a green economy tour to municipalities in Finnish Lapland during Spring 2022. The goal was to participate in municipal council meetings or internal planning meetings and awaken the decision-makers to green economy, its possibilities and goals. The green economy is a great opportunity for northern, sparsely populated areas to utilize local natural resources and the skills of the residents while reducing the burden on the environment.

Using this opportunity requires commitment and competence at the decision-making level and choices that consider the overall economic profitability. Decision-making that promotes the green transition requires information about emission reduction goals and their calculation bases, as well as knowledge of municipality-specific opportunities and new technological solutions. As municipalities benefit from the green economy it is also their responsibility to promote the green transition. During the GRUDE project it was discovered that even if the municipalities have received plenty of information, there is still need for more knowledge and support for implementing the information into practice.

Municipalities that were not yet members of the Hinku, a Finnish carbon neutral municipality network were selected as the target municipalities of the municipal tour. At the beginning of the meetings, there was a 30-45-minute introduction containing questions, such as, what Finland, as a country, is committed to at the European level, and how Lapland, should implement the global climate and environmental goals. After the introduction, councilors were encouraged to an open discussion about the topic.

The main features of the European Green Deal program were presented to the municipal councilors. At the county level, operations are guided by the Lapland Agreement, based on the Green Deal, and the action plan derived from it. The action plan is a free-form agreement of goals and actions that promote green development. It is made with a large participant base consisting of various actors in the region. In order to increase the knowledge about the commitments and goals in the Lapland Agreement, the available funding models were presented, and the principles of a fair transition were explained during the meetings.

Concrete information for municipal decision-makers was presented in statistical graphs prepared by the Ministry of the Environment regarding Finland's emission reduction targets. The statistics show what kind of figures will be reached in Finland by 2035,

if the current development continues and how much additional measures are required to achieve the carbon neutrality goal. Municipalities can use the website maintained by the Finnish Environment Institute (SYKE) on [the statistics of municipality-specific greenhouse gas emissions](#). The calculations on the webpage present the amount and development of climate emissions for all Finnish municipalities.

The goal of the municipal tour was, in cooperation with the local councilors, to find municipality-specific targets that the municipalities can work for to reduce their greenhouse gas emissions. These emission reduction targets were presented with the help of [the scenario tool for municipal greenhouse gas emissions](#) prepared by SYKE. With the scenario tool, future paths for the development of greenhouse gas emissions can be easily visualized for municipalities. The tool can be used to assess what kind of changes are required to reduce emissions and reach emission reduction targets per municipality.

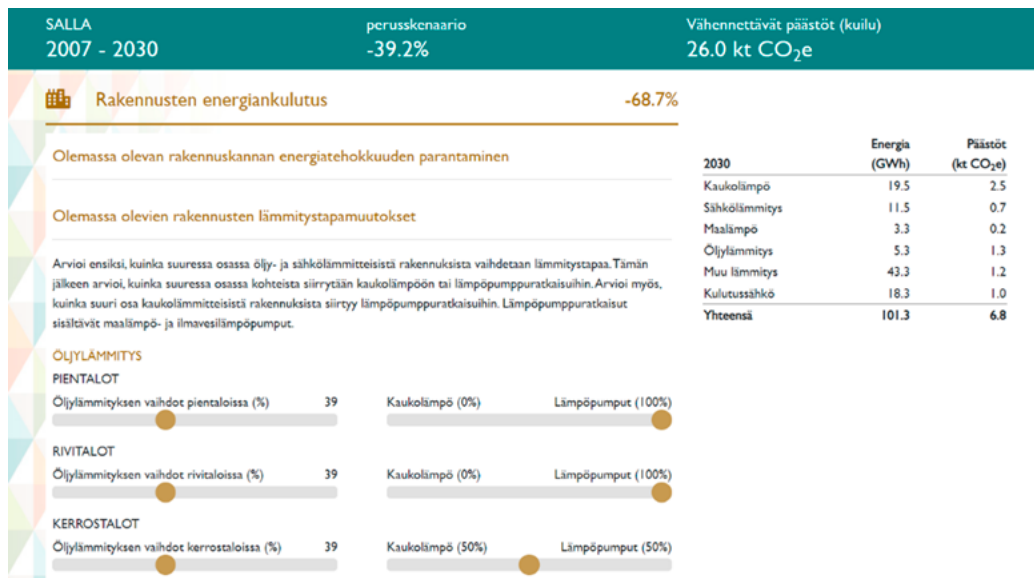


Figure 1. Screenshot of the municipality-specific scenario tool, showing the tab “Energy efficiency of buildings”.

At the end of the introduction, the municipal decision-makers were motivated by showing the benefits of working towards green transition. The incentives for green economy are, for example, the improvement of the municipality's attractiveness, the development of new business opportunities and jobs, efficient utilization of natural resources, energy efficiency and positive changes in the state of the environment. A video about the actions in the city of Lahti was also shown as positive example. Lahti was chosen as the European Environmental Capital in 2021, because of its persistent environmental work benefitting, not only the state of environment, but also the everyday life of the citizens.



Figure 2. Jukka Lokka, a specialist from The Natural Resources Institute, Finland, giving a presentation about the funding of green transition in the EU. The presentation was keenly followed by the local councilors in Sodankylä.

Discussion and future prospects for municipalities

In the discussions that took place after the introduction, many views and comments were exchanged regarding the green transition. The municipal decision-makers repeatedly pointed out that they need real-time information on climate protection, diversity and issues related to the use of various new energy solutions, as well as concrete actions to support decision-making. One of the key issues that came up in the discussions was the acquisition of financing for large investments, which are required in municipalities, if they are to achieve the aforementioned environmental goals. The municipal decision-makers also brought up concerns that the transition to green economy would only increase the municipality's expenses, and they had trouble seeing the actual benefits of the transition.

Concerns about the fairness of the green transition were also expressed, especially in terms of securing mobility and the production of heating energy due to long distances and the cold climate. Local food and energy were acknowledged as ways to increase the municipalities' self-sufficiency rate and security of supply, which is why there was a willingness to increase the use of local foodstuffs in public food services and to switch to local, renewable energy solutions.

Cooperation between municipalities was found necessary to achieve the green transition, because the problems and solutions are similar in throughout the municipalities in

Lapland. The need for cooperation projects and joint studies was expressed in order to understand the possibilities of the green economy. The municipal decision-makers also highlighted the need for concrete examples to support decision-making.

The threshold for implementing new operation models in municipalities is significantly lowered, if the models can be copied from somewhere else, where they have already been well tried. The examples should be from similar areas so that they are easily applicable and relatable. Cooperation with higher education institutions and research organizations was also considered necessary, to access the most recent knowledge and know-how available, and to integrate it into green economy decision-making and measures.

As a summary, the municipalities of Lapland have not yet completely realized that it will be on their responsibility to implement measures that are in accordance with the national commitments to reduce greenhouse gas emissions. On the other hand, Lapland's municipalities are rich in natural values and understand that the sustainable use of natural resources and climate friendly production can boost their image and attractiveness, add job opportunities as well as preserve biodiversity. To help municipalities see the green economy as an opportunity rather than a threat to northern sparsely populated areas, requires, above all, efficient spreading of information.

Circular Study Trip – Learning and Networking in the North of Sweden

Amanda Mannervik

1500 kilometers in a bus, 20 participants and around 20 visited organizations. In August 2022 the GRUDE project carried out a study trip in the North of Sweden, going through four counties. The goal was to inspire the local entrepreneurs and officials to learn more about Circular Economy, business symbiosis and to support their networking.

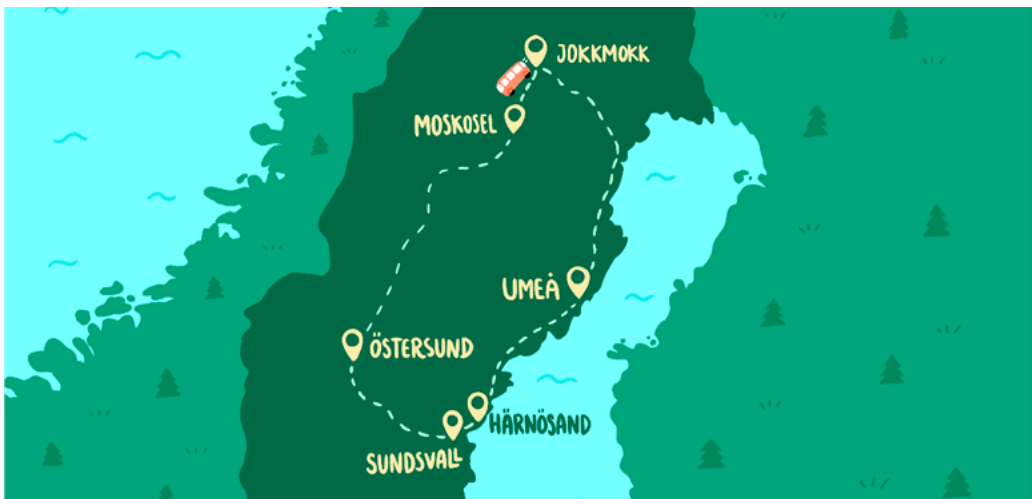


Figure 1. The study trip route. Illustration by Nikki Schmidh, Big Brain Agency

The summarizing report of the State of Circular Economy analyses that were conducted during the project, states that one of the preferred ways for our stakeholders to learn more about circular economy would be to participate on a study trip. After three years of mainly digital events the opportunity to make physical study visits was a welcome change.

During the three-year GRUDE project the network of people and organizations working with circular economy in the North has grown exponentially and the list of potential places to visit was long. Finally, the organizations visited were municipalities, creative labs and coworking spaces, local projects and initiatives, recycling malls, property owners and entrepreneurs.

The restaurants and cafés along the way were chosen because of their efforts for increasing sustainability and the use of local food, as well as their goals for reducing food waste. Long hours in the bus were also used for learning as the participants themselves

got the opportunity to present their sustainability journey. Additionally, the bus drives gave a chance for lectures and workshopping on business- and industrial symbiosis.

The study trip engaged people from a wide spectrum of ages. Participants came from different positions and from all sectors of society. Most of them were from the municipality of Jokkmokk, but there were also people from Luleå and Gällivare. The dialogue was often lively and questions ranged from practical solutions of logistics, construction and payment to more philosophical issues such as change of general attitudes and behavior.

In the evaluation of the study trip, the participants stated that the trip had

- opened the door for them to contact key actors in other municipalities as well as in the areas they live
- increased their knowledge on circular economy, business symbiosis and circular design
- inspired them to integrate circular economy in their everyday life at work

A more detailed description about the study trip can be found from the GRUDE blog. In addition, pictures and a summarizing video have been published in the Resources section of the GRUDE webpage.

Spin-offs from the study trip

After coming home from the study trip, some of the participants were visiting each other's organizations to learn more and to develop new concepts together. The trip inspired social media activity as the companies were inviting others to explore opportunities for local business symbiosis. One of the local funders of the GRUDE project, Sparbanksstiftelsen (Sparbanken Nord) also had representation on the study trip and encouraged the participants to apply for financing for any new sustainability projects.

Many of the organizations visited on the study trip are new, under transformation or have ongoing circularity projects. For some of them, this was the first time hosting a study trip – though most likely not the last. The participants even gave feedback to many of the hosting organizations that they could make business out of these kinds of study visits, tours or lectures. This was welcome feedback, considering the time and effort it had taken for the hosts to prepare everything for the guests.

All in all, based on the experience of the study trip, it seems important to arrange similar opportunities for informal encounters between like-minded people across different sectors. Investing in people who are already motivated for change, will help accelerate the green transition in the whole society.



Gallery 1. Photos from the Circular Field trip in the North of Sweden arranged by GRUDE in August 2022.
All photos by Carl-Johan Utsi

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PART IV – Sector- and Border-crossing Collaboration



Multilevel Networking in the Rural Arctic

Kine Jakobsen & Reeta Sipola

One of the main goals of the GRUDE (Green Rural Economy) project has been to create a border- and sector-crossing infrastructure for networking and cooperation. The aim of this activity has been to connect people, businesses and municipalities to each other, as well as to find relevant resources and research communities, reaching across borders and sectors. This kind of integration of different stakeholders is crucial for the success of green transition in the rural Arctic.

The goal of this chapter is to present the networking concept which evolved during the project, as well as the activities through which the project involved its key stakeholders and inspired collaboration to enhance green economy.

The GRUDE networking concept

Networking has been a central activity in the GRUDE project, closely related to the exchange of knowledge and ideas. Networking has, therefore, been integrated into all project activities:

The GRUDE network was to fulfill two main objectives:

1. Facilitate networking, collaboration and ideation across sectors and borders.
2. Highlight and bring together potential new business ideas, jobs and Greentrepreneurs, new green projects and R&D topics, as well as possibilities for cluster establishment, etc. (green matchmaking).

The goals were based on an idea to create “a network of networks” which would work as an agile and responsive constellation constituted by micro-, meso- and macrostructures. These could be participants in the events, businesses mobilized in workshops, municipalities engaged or regional networks and initiatives that the project collaborated with. Another aspect of this was that the project wanted to connect to other initiatives in order to create network nodes that would last beyond the project. As a part of developing the GRUDE networking concept, the project wrote an article [Arctic Networking to Make the Green Shift Happen in Lapland](#), which was published in Lapland UAS Journal Lumen on 26 October 2022.

The GRUDE networking activities have been carried out on multiple levels as a part of all other project activities. The networking included grassroot-level collaboration on events, higher-level border- and sector-crossing networking (NCA), as well as facilitating green initiatives and development ideas.

Networking tools and activities during GRUDE project

Events

- 12 Workshops
- 6 Greenovation Camps
- Regional information sharing campaigns
- Collaboration with other projects/networks – e.g., Workshops at Nordic Circular Summit (Nov 2021) and Rural Entrepreneurship Voices Forum (Sept 2021).
- Final Networking conference

Online platforms

- Project webpage
- Facebook page and groups
- Nordic Circular Arena (Nordic Circular Hotspot's newly established online platform)

Other tools

- “Networking Padlets” in Greenovation Camps: Padlets are online boards where event participants could share business cards and contact information.
- The process of facilitating green networking and development ideas, engaging stakeholders to use project planning tools.

Meetings with key stakeholders

As a part identifying and mobilizing key stakeholders into the network, the GRUDE project invited them for two workshops, to investigate the potential and needs for a cross-sector and cross-border cooperation. The selection of existing networks and organizations invited to these meetings was based on an initial screening of stakeholders and constellations working with the green transition. They were representing different levels and business sectors across the project area. Organizations participating these workshops were:

- Hinku (Finland)
- Arctic Smartness/Arctic Smart Rural Community (Finland)
- Klimanettverk Nord-Norge (Norway)
- Klimapartner Troms og Finnmark (Norway)
- Seanorth Tech Cluster (Norway)
- Cradlenet (Sweden)
- Energikontor Norr (Sweden)
- Nordic Circular Hotspot (International)

The main output from these meetings was the confirmation of the importance and relevance of collaboration and networking across borders in order to accelerate the green transition. However, there is still a need to explore how this could be done in the most efficient way. One trail that was chosen by GRUDE was to join an online green networking platform, Nordic Circular Arena, which was presented at one of these pilot meetings. The collaboration with Nordic Circular Hotspot, resulted in:

- GRUDE engaging in the piloting and launch of Nordic Circular Arena
- Exchange of expert knowledge e.g., on GRUDE Greenovation Camps, where Nordic Circular Hotspot has contributed with a keynote speaker
- GRUDE participation on Nordic Circular Summit, where the project arranged a workshop session called Circular solutions for rural areas

GRUDE Network on Nordic Circular Arena

During the networking meetings, GRUDE established a collaboration with Nordic Circular Hotspot (NCH). While GRUDE was working to formulate its network, NCH was about to launch their own online platform for green/circular networking in the Nordics: Nordic Circular Arena (NCA). To reach synergies, GRUDE joined NCA, established a GRUDE Network on the online platform and became a partner in the NCH Partner Program. This co-operation saved GRUDE's resources significantly from creating the platform structures and enabled the project to focus more on connecting stakeholders to the international community and co-developing the platform.

NCA has a wide range of participants. There are currently about 700 members on the platform that represent 140 different organizations and companies. For GRUDE stakeholders, participating in the partner program offered a great opportunity to enter the international community. Through the Partner Program, GRUDE has also joined partner meetings and workshops. These meetings have provided a platform for collaboration with the other partnering projects, as well as a possibility to develop the NCA network. By the end of the project, the GRUDE group on NCA has 75 members.

[Read more about Nordic Circular Hotspot](#)

[Read more about Nordic Circular Arena](#)

[Read more about the collaboration between GRUDE and Nordic Circular Hotspot/Arena](#)

Networking Conference – Green Transition in the Rural Arctic

The GRUDE project's final event, an international online networking conference Green Transition in the Rural Arctic, was strongly oriented towards future development. During its operating time, the project has gathered and shared knowledge about the possibilities of the green shift in the northern regions. The main question in the final conference was: What is next? What needs to be done to accelerate the green shift in the rural Arctic? To discuss this, project invited keynotes to present promising avenues for future initiatives, and give thoughts on how we can work together, across businesses and sectors, to leverage the potential that our regions hold.

[Find out more about the event in this blogpost](#)



Figure 1. Live scribe illustration from the Final Networking Conference, by Big Brain Agency. More illustrations are available on the project webpage.



Figure 2. The workshop session was divided in two groups: 1) Public sector challenges and 2) Private sector challenges. Big Brain Agency life scribes summarized the outcomes of the stakeholder discussions.

After the first workshop, GRUDE project team continued to process the information together with the project consultant, in order to refine the ideas into new initiatives for green transition. This process included three workshops:

1. Network building and idea development meeting with the Norwegian and Finnish partners. Summarizing the workshop information together with the consultant, selecting ideas for further processing.
2. Open collaboration event where all interested and relevant stakeholders from the project area were invited to discuss the selected ideas and to build networks that would enable developing the ideas further.
3. Project development follow-up workshop organized for the stakeholders that were engaged in the process. Goals: learning more about how to specify the ideas into a project plan, offering support for partner search, specifying key development points and giving instructions for future.

As a result of the GRUDE collaboration process, three ideas were brought up by the stakeholders. These were: 1) Sustainable fish feed (Norwegian-led), 2) Arena for sustainability (Swedish-led) and 3) Regional concept for food production (Finnish-led). These initiatives continue to build their partnerships and project plans independently after the GRUDE project.

In addition, the project consultant facilitating the collaboration process was asked to produce a concrete manual that offers tools for processing green initiatives. The idea development process is further described in the document *Facilitating and Processing Networking and Development Ideas – Process Summary Roadmap*.

Meetings with key stakeholders

One deliverable from the GRUDE networking is a *Networking Manual: Networking for Green Transition in the Rural Arctic*.

This document holds information about different models and methods for successful networking together with concrete experiences and recommendations. The intention of The Networking Manual is to support others who wish to facilitate similar processes of collaboration to enhance green transition.



Figure 3. Success factors for green networking.

Meetings with key stakeholders

Networking and collaboration are inherent in the circular economy, and therefore, also crucial for the success of green transition. The networking activities should include collaboration across sectors and regions. It is also important to find a common goal that motivates all partners inside the network.

There are several good networking initiatives that support the green transition in the rural Arctic, and the GRUDE project has worked for bringing these together by inviting them to join the project activities. GRUDE has also offered a platform for sharing different ideas and finding potential partners. The project has been active in utilizing the opportunities for sector- and border-crossing networking.

The COVID-19 pandemic boomed digitalization, resulting in the transition to digital forms of networking. While meeting on digital platforms can never fully replace meeting face-to-face, it had several positive effects to the networking in GRUDE. As an illustration, it enabled the project to reach a significantly higher number of people

and organizations than what would have been possible with merely physical events. It also made it possible to invite experts from a larger geographical area than would, otherwise, have been economically feasible.

Conclusions and learnings about Arctic green networking, and suggestions about the next steps:

- Networking will be even more important in the future
- There is a growing need for multi-level networking for target groups, such as decision-makers, local citizens and entrepreneurs
- The increase in remote ways of working and online meetings pose new kinds of challenges for networking
- It is important to effectively utilize the existing networks and develop them further

Education as a Way of Promoting Green Transition

Kalle Santala & Reeta Sipola

Education has a significant role in putting the green transition into practice, as well as in conducting applied research on the green and circular economy. The universities of applied sciences (UAS) educate professional experts in various sectors of society to adopt new practices.

Universities and secondary education also pursue this same goal in their respective areas of responsibility. In addition to providing relevant, up-to-date training, UAS's also contribute to reforming the economic structure of the regions by promoting working life and regional development as they carry out applied research, development and innovation activities.

Reaching systemic change requires the educational system to support development in various sectors of society. All the development needs may not even have been identified yet. The transition requires adopting new technologies, learning new approach to production and materials, developing new modes of operation for the service sector and reforming the entire economic structure. Implementing such significant changes in a socially sustainable way, is a crucial issue for a welfare state. By creating new jobs to replace old ones and investing in high-quality education, the society can ensure inclusive and sustainable work life. Lifelong learning plays an important role in carrying out the change.

The European Union has set ambitious goals for green transition and achieving carbon neutrality. The Council of the European Union has published a recommendation of learning for the green transition and sustainable development. The policy emphasizes the importance of education and practical training in reaching the goals of the European Green Deal. Learning for the green transition is not yet a systemic feature of the education and training policy in the EU, but the recommendation provides a roadmap for change for all phases of the educational system.

The EU Member States should prioritize the learning for the green transition and sustainable development and provide diverse learning opportunities both in formal education and in extra-curricular activities. Learning for sustainability covers learning environments, the involvement of students and staff, local authorities, youth organizations, as well as the research and innovation community.

Students learned and implemented green communication in the GRUDE project

Through its activities, the GRUDE project has increased students' knowledge about green economy by offering them opportunities to participate in various information sharing and workshop events. The students have been practicing green communication by organizing these events and producing a variety of communication materials, such as blogs, podcasts and videos. The green economy is a broad concept which has allowed the students to consider various perspectives of sustainability according to their own interests.



Figure 1. Marketing image produced by Master's students about a webinar, which discussed the possibilities of utilizing domestic fish.

In order to produce pertinent communication materials and webinars, the students have had professional discussions about green economy with municipality representatives, stakeholders and other beneficiaries in the GRUDE project's operating area. The materials made by the students have been presented as a part of the project communication on social media, website and newsletters. The GRUDE project and the municipalities that commissioned the events have been very satisfied with the students' contribution.

The student assignments have been implemented in Lapland UAS's education programs, such as the Bachelor of Natural Resources (Forestry) and the Master of Sustainable Production Development. Especially the Master's degree student groups are multidisciplinary, including students from different backgrounds, such as Natural

Resources (Forestry and Agronomist), as well as Business Administration. Combining the students' different educational backgrounds and work experiences with the possibilities of green economy has produced high-quality and innovative communication materials. Diversity and cross-sectoral thinking support the progress of green economy and offer new opportunities for the students to develop their skills, while considering the needs of modern working life.

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Green Economy from a Research Perspective

Satu Ervasti & Johanna Leppälä & Erika Winquist

Green economy has a strong linkage to the research sector already from the launching of the concept, which was presented by environmental economists in the 1980s. The green economy concept is nowadays described as one that “improves human well-being and builds social equity while reducing environmental risks and scarcities”.

Climate change, the loss of biodiversity, over-consumption, environmental pollution, and inequality in the use of natural resources are all challenges which are hoped to be tackled by the green economy. These challenges were first identified and studied by scientists, after which the problems were risen to common concern. However, convincing the masses and decision-makers has taken decades.

While the research on climate change started already in the 1980’s, the Paris Agreement, which aims to limit global warming to well below 2 degrees Celsius, was introduced as late as in December 2015. Correspondingly, the Millennium Ecosystem Assessment concluded already in 2005 that changes to ecosystems due to human activities were more rapid in the past 50 years than at any time in human history. Yet, the Post-2020 Global Biodiversity Framework wasn’t adopted until the UN Biodiversity Conference which was organized in October 2021 in Kunming, China.

Research aims to better understand the surroundings and the state of the globe. Getting the decision-makers and the society to be aware of something, is done with the help of research-based knowledge. To cope with challenges of this scale, research and innovation across sectors is essential.

The European Union’s contribution to green economy research

The EU has its own strategy, Green Deal, which has many points of resemblance with the green economy concept. The EU Green Deal aims to “boost the efficient use of resources by moving to a clean, circular economy and stop climate change, revert biodiversity loss and cut pollution”. The goals for sustainable future, such as, achieving carbon neutrality by 2050 in EU, requires both research and innovation actions. Green transition – an EU driven systemic change to carry out Green Deal – creates an increasing need for scientifically tested information to support the decision-making process.

The role of research information in decision-making and public debate

Even though the main purpose of research is to produce better understanding of the world and its various phenomena, supporting the decision-making and participation in public debate is needed for social acceptance. While the justification for change is based on the recent research in the natural sciences, interdisciplinary approach is essential to enable green transition. A holistic approach is needed to have outcomes with real impacts to the multiple global challenges; to achieve a truly greener and fairer outcome.

Green transition also means decision-making about novel and complex issues. How to change the linear economy based on continuous growth to circular economy and even degrowth? Decision-makers do not have sufficient time to read and assimilate scientific literature, they need up-to-date information from the researchers about the use of natural resources, new technologies, state of biodiversity and how different factors affect economy. Similarly, researchers need to be engaged in the public discussion related to the green transition, as scientific knowledge plays such a large role in the transition, and people's attitudes and social structures are the slowest to change. For the green transition to succeed, it needs to be fair, just, and acceptable, and to achieve the inclusiveness, science must be open in its starting points, methods and results.

Research that is needed in the transition to green economy, needs to be engaging and interdisciplinary, because the challenges are global and multidimensional. Research on social sciences can provide further understanding on why changes in the societal level are so slow. It can also provide tools for making the transition fair and for reaching commitment from all the parties. Moreover, wide citizen participation is needed to reduce the amount of waste, reuse and share products, and recycle materials. Citizen activism is even needed to collect and share data enabling new circular economy business models.

The role of researchers as educators in the green transition

Researchers produce research results and discuss them with policymakers and the public. Furthermore, they train the next generation of experts who will help society to implement the green transition. The training is not only at the undergraduate level, but also in continuing education and courses with open access that increase the understanding of the green transition among experts and citizens.

Bottlenecks from research to green practices

While research provides tools and information for progress in the green transition, legislation is often complex and applying necessary permits is slow. For example, the use of industrial side streams requires permits and a lot of paperwork from the implementer. Additionally, taking research results from a small scale to the larger scale can be unpredictable and slow. To achieve interdisciplinary research results, it is necessary to provide platforms for different experts to meet, find funding for research projects, as well as bring the innovations to practice.

Role of research in the GRUDE project

Two research and expert organizations, the Natural Resources Institute Finland (Luke) and SINTEF Nord from Norway, have been partners in the GRUDE project. Luke and SINTEF Nord have provided the latest knowledge of a wide range of topics, such as, natural resources, bioeconomy and sustainable industry. The research results, that are often mostly used and spread within the scientific community, were in this project processed and disseminated to a wider target group including entrepreneurs, stakeholders and decision-makers.

The implementation was done in co-operation with all project partners, and knowledge-sharing was planned so that the information could be used for practical development activities. The participation of research organizations has enabled interaction between sectors and made it possible to direct the needs for further studies straight back to the research sector.

The research organizations provided the latest study results for the use of business sector and the regions. As an example, GRUDE arranged an information sharing webinar Harvests from Bioenergy Projects in autumn 2021, where the latest outcomes from research and development projects concerning local bioenergy production were disseminated.

In addition, interviews of external researchers were executed as a part of knowledge gathering in the project. The interviews were targeted at researchers from different fields, from chemistry to environmental policy. The interviews confirmed that researchers do not only produce knowledge but also play an important role in contributing to the public debate and educating experts on green transition. The interviews highlighted exciting prospects, such as, the use of wood lignin in battery industry, as well as pointed out, how the knowledge from social science can be used to accelerate the green transition.

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Circular Economy in Business Support

Amanda Mannervik & Sari Nisula

Promoting new circular business opportunities and business models has been one of the goals of the GRUDE (Green Rural Economy) project. Although, the project's main target group has been public sector, it was considered important to keep a balance between public and private sector representation, as they are highly interdependent. The private sector is also often the supplier of solutions to public sector needs. This article describes the important role of the business support system in enabling green transition, as well as presents concrete models and tools for circular business development.

The significance of business support

A business developer in the business support system meets a lot of entrepreneurs, and therefore, has a great opportunity to influence. The way consultants coach and support the entrepreneurs sets the standard for business development and reproduces norms and values. Several entrepreneurs who were engaged in the GRUDE project, however, described how they had been bounced around between financiers and national agencies, since no one knew how to categorize their business idea. For the same reason, no one wanted to offer them financial support.

It is, therefore, of primary importance that the innovation support system would recognize the innovative and circular new businesses and their special needs for support. As for the micro- and small entrepreneur, it can be hard to find time for development when one person alone manages all the different positions of a company. Learning about new circular concepts and approaches, improves the chances for entrepreneurs to follow the principles of green economy in a way that is beneficial for their business.

Another way to influence the private sector, are programs for young entrepreneurs that have a link to the educational system. These kind of entrepreneurship programs have become increasingly popular in Sweden, Norway and Finland. The programs educate and engage thousands of youngsters every year, and thus, offer a great opportunity to impact future entrepreneurs and the way they view business opportunities and business model design.

The circular principles and business models and their financing

Circular economy is an economical system designed to use and regenerate resources again and again. Already when designing new products, the business developers and

entrepreneurs should have the following three principles of circular economy in mind:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

There are five circular business models that help companies work on a more sustainable basis. To each of these business models there are several variations and examples to apply. The business models of Circular Economy are:

- Product-as-a-Service which is a system where the customer pays for the function and not for the product itself
- Product Life Extension which aims for extending the product lifetime by repairing, upgrading and reselling
- Resource recovery recovers useful resources and energy from by-products and disposed products
- Sharing platforms which aim for increasing products' utilization rate, and
- Circular Supplies which mean preferring renewables and fully recyclable materials, instead of single use.

RISE, the Research Institute of Sweden, recently released a guide [Financing PaaS – Solutions for Financiers](#) that dives deeper into the business models of Product-as-a-Service. Industrial symbiosis, circular business systems and a symbiosis mindset are also important parts of the circular economy. One company's sidestream or byproduct could be of a great value for another, or they might even create completely new business opportunities. There are several examples of industrial symbiosis to be found in the project area. Moreover, the newly released book [Symbios](#) gives a thorough introduction to the field.

Trying out models and tools for circular business development

There are several good examples of models and tools that support the transition to green economy. Firstly, the State of Circular Economy analyses that were conducted during the GRUDE project, highlight the possibilities of circularity for private sector. Secondly, keynote speakers and experts have been called in to present different solutions, throughout the project time. In June 2020, GRUDE arranged digital education about the Circular Business Model Canvas together with one of the developers. The tool has been created by The Swedish Agency for Economic and Regional Growth. The participants in the workshop were business developers, coaches and entrepreneurs who wanted to develop their own business.

The workshop led one of the project partners, Strukturum in Sweden, to develop a workshop series called Bärkraftiga företag (= sustainable companies). The workshop series was based on the knowledge gathered during the GRUDE project, and Circular Business Model Canvas was used as a development tool for the companies. During spring 2022 Strukturum held a first pilot version of this workshop series with four participating micro companies (less than 10 employees) with two representants from each company.

Before the first meeting, all the companies got to meet an expert who helped them to investigate under-utilized resources in their organizations. During the five workshop sessions the companies worked with their own business development, focusing on new circular business ideas. As a result of the workshop series, one of the companies, for instance, is now seeking ways to sell their residual flow as a raw material for new products, instead of seeing it as waste and paying for its disposal.

Finally, Circula is another useful tool for educating and inspiring the use of circular business models. The tool was developed in Finland and is now being used also in Sweden, with Swedish case examples. It is a gamified way of exploring the principles of circular economy and circular business models. The game also leads the players through an innovation process from business idea to pitch. The SYKLI project, one of the developers of the game, also run a workshop for high school students on an entrepreneurship course. The students described the game as fun and informative.

Circularity and sustainability in Sami entrepreneurial tradition and economy

There are many Sami entrepreneurs in the GRUDE project area. One of them, who has a new, innovative and circular business model, explains what kind of difficulties the company has experienced in communicating their new business model to financiers:

Few of the financiers have the competence to evaluate the potential in ideas and business models within the Sami economy. As an entrepreneur in that field, you have to understand that you first have to educate the decision-makers and administrators which all too often leads up to no funding anyway. From my perspective, that knowledge gap is most definitely a barrier in the development of destinations with Sami economy.

Sami tradition of entrepreneurship appears to have a very holistic view on sustainability. This is evident in the GRUDE interview of Karolina Sevä, who is a Sami craftswoman. The ecological mindset is also present in the GRUDE blog series written by a Sami entrepreneur Jannie Staffansson.

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Erika Unnes, Business Developer and Project Manager at the Development Office Ávki in Jokkmokk, agrees that the holistic viewpoint is indeed part of the Sami entrepreneurial culture by tradition which is strongly connected to the nature and wildlife. Nevertheless, sustainability is not necessarily something that entrepreneurs talk about or express – it is just the way they have always worked. Erika has managed [a social media information campaign in Ávki](#), with the goal to highlight the principles that many Sami entrepreneurs have as a backbone of their business. She hopes that the business support system would improve their knowledge on Sami entrepreneurship, as well as the foundation and values many Sami entrepreneurs have in their business.

Unnes emphasizes the unique value that the Sami entrepreneurs bring to the business ecosystem, and underlines the importance of benefitting from it together with them, instead of at the expense of them. She also recognizes the sometimes conflicting interests of the publicly supported initiatives. For example, some of the initiatives that are aiming for green transition might not be compatible with reindeer herding, which is a traditional and important primary source of food.

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The objective of this article collection is to present green economy in an Arctic context. The publication gives an overview of how the green and circular economy are currently implemented in the North of Sweden, Finland and Norway. It also shares concrete tools and examples that help realizing the green transition in the northern societies in the future.

By informing different stakeholders about the possibilities of green growth through strong communication, knowledge dissemination and sharing best practices between the Nordic regions, it is possible to gain greener attitude and resource efficiency to the northern areas to advance the transition to greener economy. This article collection has been prepared by the Interreg Nord project **Green Rural Economy – GRUDE**.



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