



NORDREGIO
Nordic Centre for Spatial Development

Sustainable Business Development in the Nordic Arctic

Lise Smed Olsen, Anna Berlina, Leneisja Jungsberg, Nelli Mikkola,
Johanna Roto, Rasmus Ole Rasmussen, Anna Karlsdottir

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Nordregio

P.O. Box 1658

SE-111 86 Stockholm, Sweden

nordregio@nordregio.se

www.nordregio.se

www.norden.org

Editors: Lise Smed Olsen, Anna Berlina

Maps: Johanna Roto and Linus Rispling

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Stockholm, Sweden, 2016

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Preface

This publication has been produced as part of the project Foresight Analysis for Sustainable Regional Development in the Nordic Arctic, commissioned by the Nordic Working Group for Sustainable Regional Development in the Arctic.

The purpose of the project is to assess opportunities and challenges for sustainable regional development in the Nordic Arctic and to identify future development perspectives. This provides more comprehensive knowledge, and input for development of the Nordic Arctic policy. The work is commissioned by the Nordic Council of Ministers, and the Committee of Senior Officials for Regional Policy (EK-R).

The foresight analysis is carried out in three stages, where communities, regions and national authorities contribute with their perspectives on the potentials and challenges for future, through a series of workshops on sustainable regional development in the Nordic Arctic. Foresight analysis is a method that is used in the development of local economic and social development strategies, based on a structured dialogue between relevant actors and with input from local, regional and national actors. The objective of this process is to create a foundation for action, focusing on the opportunities that become evident from the analyses.

The Working Group places emphasis on identifying the opportunities and challenges for business development and the perspectives of young people on their own future opportunities in the Nordic Arctic.

The Nordic Working Group for Sustainable Regional Development in the Arctic has defined three key questions for this foresight analysis:

What social and resource conditions - both natural and human-related - can be expected to have a decisive influence on regional development in the Arctic over the next ten, twenty, and thirty years?

How will the management of these conditions affect the living standards and future prospects for the regions?

What are the implications of the identified challenges for future planning and regional policy?

An investigation of social sustainability involves questions about attracting and/or keeping young people and women in peripheral communities. A significant part of the foresight analysis comprises a workshop series of three steps: the vision phase, the realism phase, and the implementation phase. First, in the vision phase, local workshops are organised in two selected local communities in each region of the Nordic Arctic with the participation of local inhabitants (a total of 12 workshops). Second, in the realism phase, dialogue is conducted at the community level with a workshop that also includes municipal, regional and national representatives (a total of six workshops). Finally, in the implementation phase, two transnational workshops are organised: one for the West Nordic region and one for the North Calotte region.

The Working Group has been established by the Nordic Committee of Senior Officials for Regional Policy for the period 2013-2016. It comprises representatives from the Norwegian Ministry of Local Government and Modernisation (chairmanship), the Norwegian Ministry of Climate and Environment, the Icelandic Regional Development Institute, the Prime Minister's Office of the Faroe Islands, the Greenlandic Ministry of Industry, Labour and Trade, the County Administrative Board of Norrbotten in Sweden, and the North Calotte Council in Finland.

This publication Sustainable Business Development in the Nordic Arctic contributes with insight into the key areas of private business activities in the Nordic Arctic of large-scale industries, the bioeconomy, tourism, and the field of creative industries in an Arctic context. Focus is placed on the opportunities and challenges for sustainable regional development, including practical examples from the Nordic Arctic region.

Lisbeth Nylund
Chairman, the Nordic
Working Group
Oslo, January 2016

Kjell Nilsson
Director, Nordregio
Stockholm, January 2016

1. Introduction

The purpose of this publication is to contribute to an understanding of the opportunities and challenges for sustainable regional development with a focus on key private sector business activities in the Nordic Arctic. The Nordic Arctic comprises all of Greenland, the Faroe Islands and Iceland, and the northernmost counties of Norway (Nordland, Finnmark, Troms), Sweden (Norrbotten) and Finland (Lapland). The report will shed light on today's role of the selected industries in the economy of the Nordic Arctic region and consider future development options. Furthermore, the study aims to identify the main challenges associated with the development of economic activities from the perspective of social, environmental and economic sustainable development.

Sustainable development has been defined as “development that meets the needs of the present without compromising the ability of future generations to meet their needs” (WCED, 1987:43), which is the definition used in this report.

Throughout this publication, the North Calotte region denotes the counties of Nordland, Finnmark, Troms, Norrbotten and Finnish Lapland. The West Nordic countries will be used in reference to Greenland, the Faroe Islands and Iceland, and the West Nordic region, in addition to these three countries, includes the coastal areas of Northern Norway. These are common constellations for cross-border/transnational collaboration in the Nordic Arctic.

The report *Growth from the North* (Prime Minister's Office, 2015), a co-production of an expert group set up by the Prime Ministers of Norway, Sweden and Finland in April 2014, highlights four key drivers of growth where the three countries share common economic, environmental and social interests in the North Calotte region. The identified drivers are: 1) liquefied natural gas and renewables, 2) greener mining solutions, 3) increased tourism, and 4) ice and cold climate solutions.

In 2011, an OECD Territorial Review of the NORA Region (OECD, 2011a), the West Nordic region, was published. The Review highlighted that 1) sustainable development of fisheries will be essential for the region's long-term competitiveness, 2) further develop-

ment of the mining and oil sectors would benefit from stabilization measures, but would have to be carried out under the strictest environmental regulations, 3) the territories could gain from diversifying their productive base—ecological tourism, research related to climate change, ice, water and Arctic and sub-Arctic products—and further development of renewable energy sources and 4) higher value added and niche products from the marine sector could be further developed; e.g., with opportunities for expanding natural tourism and cruise tourism.

After an introduction to the employment structure in the Nordic Arctic supported by maps, the four business development areas of large-scale industries (the bioeconomy, tourism and cultural and creative industries) are examined in this publication. Literature reviews are carried out for each chapter, including academic and policy documents with a focus on sustainable regional development.

Large-scale industries have had an impact on several local communities of the Nordic Arctic. As part of the foresight workshops, the socio-economic consequences have been evident both in places where large-scale projects have been run and then closed down, and in places where the projects are still running. In some cases, new business opportunities have developed following the establishment of large-scale industry projects. The chapter on large-scale industries in the Nordic Arctic explores the main drivers of new large-scale projects including factors such as investment drivers, socio-economic impacts, education and inclusion of a local workforce, price fluctuations and volatility in relation to development planning for surrounding communities.

The bioeconomy is mainly concerned with local processing of natural resources as important opportunities for future development, which was highlighted at most of the foresight workshops. This involves the production/processing and sale of forestry, fisheries, aquaculture and agriculture resources (in some cases also mineral resources, which in this report are included as a large-scale industry). This chapter thus focuses on the primary sector and new business opportunities of the bioeconomy.

Tourism was emphasized as an opportunity for future development at all local foresight workshops, although the extent to which it is a source of jobs and economic growth varies across the local communities. In most cases, tourism was referred to as being interlinked with the bioeconomy. For this chapter, responsible destination management organizations for the Nordic Arctic regions were interviewed to obtain a better understanding of the most important development challenges and development trends of the tourism industry. Cruise, Sami, food and wildlife tourism were identified as key development trends to be further explored.

Cultural and creative industries were highlighted

at some foresight workshops; e.g., in connection with Sami culture. This chapter will include a literature review on the topic of cultural and creative industries in Arctic and other peripheral regions, and will explore current trends in the Nordic Arctic. Four key areas in which potential development was identified are reviewed in this chapter including film production, music, design and handicrafts, and Sami culture and creative industries.

Each chapter concludes by outlining discussion points that are relevant to consider in discussions on future strategies for sustainable regional development in the Nordic Arctic.

2. Employment in the Nordic Arctic

Corresponding author: Johanna Roto

There are regional variations in the Nordic Arctic reflecting the extent to which the regional economies are dependent upon natural resource exploitation and/or services and the public sector. While the economic output of certain industries, like mining and offshore industries, represent a substantial share of GDP, labour demand in these industries is less significant. This is true for many of the Arctic regions in the Nordic countries. While Finland, Norway and Sweden are diversified in terms of jobs, some areas in the North are more mono-dependent in terms of what jobs are available. In Greenland, central islands of the Faroe Islands, parts of Northern Norway and Northern Finland, dependence on public sector jobs is significant, along with jobs in primary industries.

The Arctic economy has been maturing while it grows and comprises not only small villages and resource enclaves but also towns and cities of significant size. These urban economies now provide the trade, personnel, government, business services and product manufacturing that were historically supplied from outside the North. The growth of these agglomerations has resulted in the growth of businesses that replace imports.

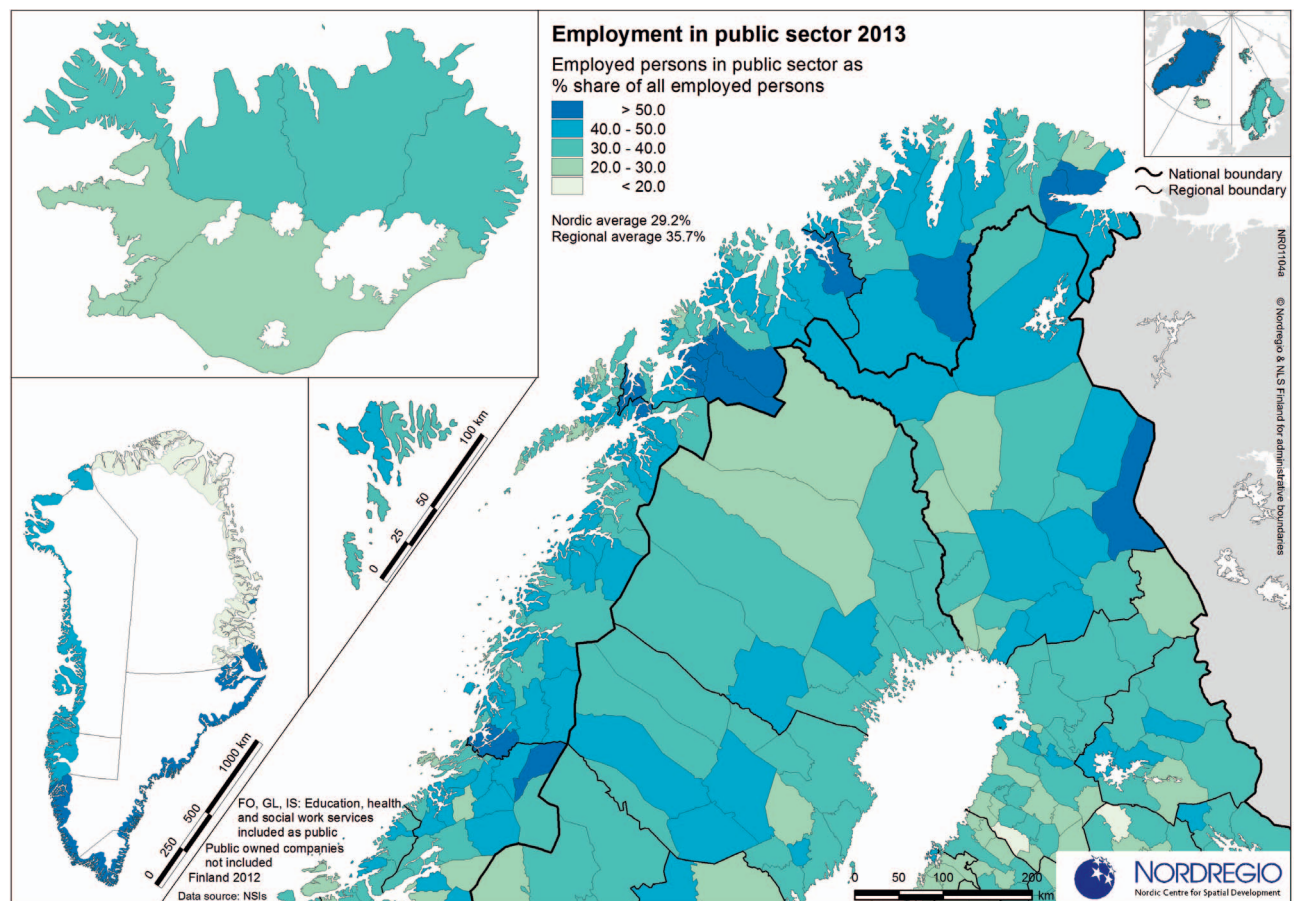
The rise of northern industries with no direct connection to extractive resources may be partly a result of the existence of these urban areas. Some of these new industries are connected to the region's resource base. The Arctic's natural beauty supports a growing tourism industry, and the aluminium smelting industry in Iceland benefits from the low-cost energy that the country offers.

Table 1: Employment in the Nordic Arctic region 2013.

Employment in 2013*					
	Total nr of employed persons in region	Share of employment in public sector	Sector of employment, %		
			Primary	Secondary	Tertiary
Faroe Islands	23 600	40,1	10 ,0	1 8 , 8	71,2
Finland					
Kainuu	29 700	35,7	7,6	17,8	74,6
Lappi	70 400	36,3	5,3	20,3	74,4
Pohjois-Pohjanmaa	157700	31,7	5,3	23,4	71,3
Greenland	25500	50,5	14,3	10,6	75,2
Iceland	174900	28,9	9,0	17,9	73,1
Norway					
Finnmark	37700	39,7	6,6	18,7	74,8
Nordland	116300	39,0	5,2	19,2	75,6
Troms	82900	42,4	3,5	14,3	82,2
Sweden					
Norrbotten	122700	35,0	3,8	23,9	72,4
Vasterbotten	126900	38,0	3,9	21,3	74,7
Nordic-Arctic region	968000	35,7	5,9	19,9	74,2
Nordic Countries, total	12425 000	29,7	2,7	20,0	77,3
*finland 2012					
FO, GI, IS: Education, health and social work services included as public					
Secondary sector including: Extraction of raw materials, Industry, Electricitv and water supply and Construction					

Source: National statistics institutes

Map 1: Public and private sector employment in 2013



The electronics manufacturing industry in Northern Finland is another important non-traditional industry. Furthermore, a similar number of people are employed in the culture sector in Iceland as in the fisheries sector or the hotel and restaurant sector (AHDR, 2014).

Employment in the Nordic Arctic region is characterized by a relatively large public sector and a large share of employment in primary production (see Table 1).

The map above shows the share of employment in the public sector. Generally, employment in the public sector is higher in the northernmost regions compared with the national average. In Finland, Norway and Sweden, the highest values at both the municipal and regional (Lappi, Troms and Norrbotten) levels can be found in the Nordic Arctic region. In the Faroe Islands (40.1%) and Greenland (50.5%), the public sector in general is employing a large share of people, a fact that is related partly to the small size of the countries and limited possibilities for industrial activities. In Iceland, the public sector is small compared with other Nordic countries.

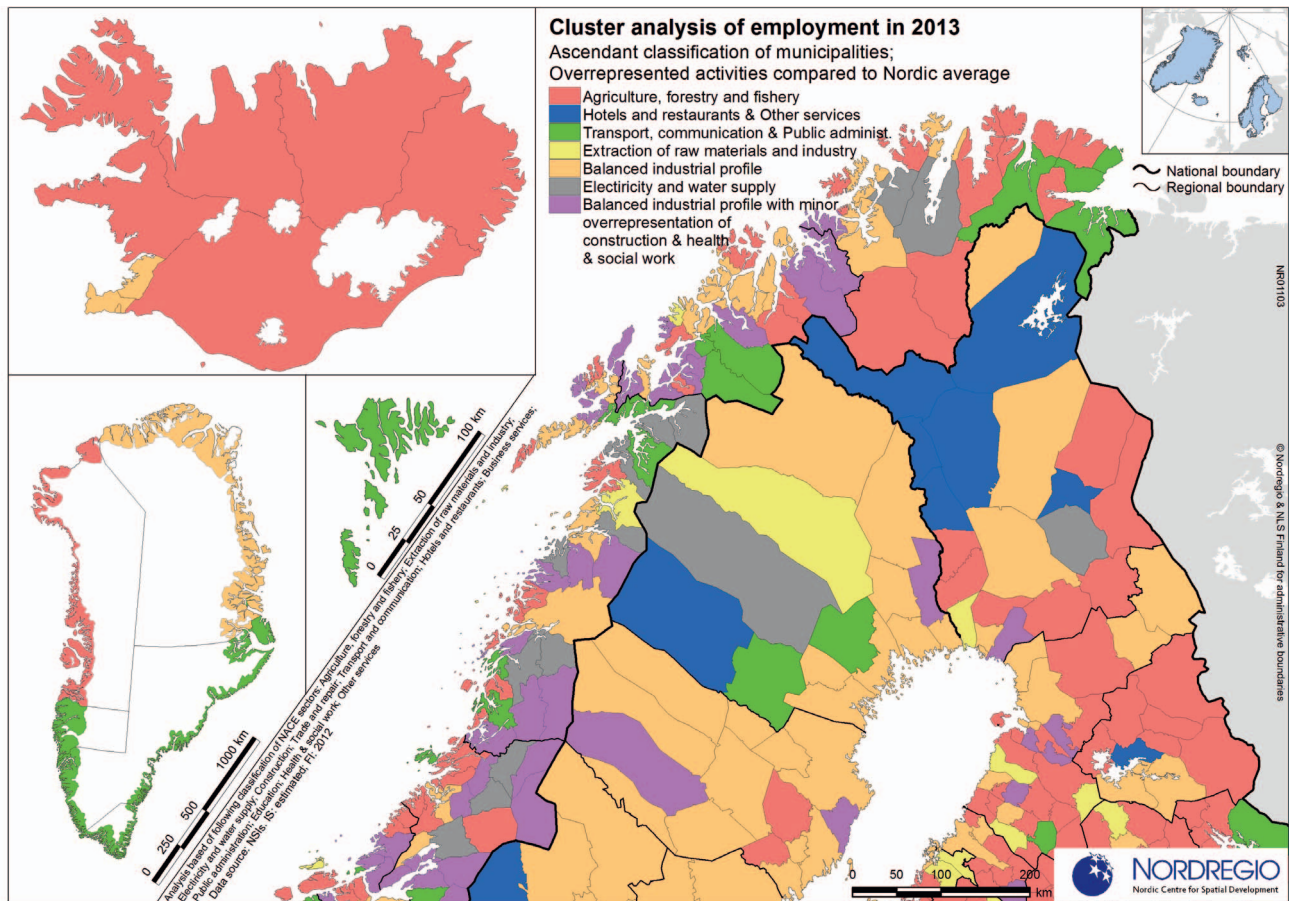
The role of cities varies. In a number of cities, the share of public employment is relatively large, as a remarkable share of public services, such as regional administration, hospitals and universities, are located in

the municipality (e.g., Vadsø and Tromsø in Norway). In contrast, there are cities such as Kiruna (Sweden) and Kemi-Tornio (Finland) where larger industries are the main employers. However, there are a number of large state- and/or publicly owned companies in the Nordic Arctic region, such as LKAB in Kiruna. Employment in the Nordic Arctic region, therefore, is not “private” to the extent illustrated on the map.

The lowest shares of public employment can be found in small municipalities with a large number of business services, especially within the tourism industry, or with a large share of employment in primary production.

However, business ownership structures and state policies vary between the countries. In Northern Sweden, where the share of employment in the public sector is smaller than in other Nordic Arctic regions, the share of employment in publicly owned companies is much larger than in other Nordic countries. Publicly owned companies are especially important for employment in Norrbotten, where they employ 9.4% of the labour force. The state-owned mining company LKAB in Kiruna is a good example of this. Furthermore, in Norrland and Finnmark, employment in publicly owned companies is higher than the Norwegian national aver-

Map 2: Dominant branch of employment in the Nordic Arctic region 2013



age. In total, publicly owned companies employ some 3.7% of the labour force in the Nordic Arctic region.

Taken as a region, the employment structure in the Nordic Arctic is characterized by a relatively large share of employment in primary production compared with the Nordic average, but when looking at the economic profiles of the municipalities, a generic “Arctic” profile does not seem to exist (Map 2).

A cluster analysis on employment in different NACE 1-digit level categories (12 classes) shows a variety of employment profiles in the Nordic Arctic municipalities. First, it is important to point out that a remarkable number of “Arctic” municipalities are close to the Nordic average profile (‘balanced industrial profile’). These “balanced municipalities” are often larger in size, in terms of either being a regional centre or having an above-average number of inhabitants and geographical size, which is the case for many Swedish municipalities.

The second significant group is the municipalities that are characterized by larger proportions of people working in the primary sector. These municipalities are often small rural municipalities. National differences should be noted in this regard. In Northern Finland,

forestry is the main primary industry, whereas in Norway, Iceland and Greenland, it is fisheries. Together, these two cluster categories represent over half of the Nordic Arctic municipalities.

Other common employers are “transport, communication and public administration” and “balanced municipalities with minor overrepresentation of health and social work services”, both employing some 15% of people in the Nordic Arctic municipalities. The overrepresentation of public administration and the transport sector is visible in small regional centres, such as Vadsø (Norway) and in the Faroe Islands and Greenland, whereas the minor overrepresentation of health and social-work services seems to be most frequent in Norway. In addition, Finnish Lapland has a remarkably large share of employment in the tourism sector, partly related to the location of the country’s largest tourism resorts of Levi, Ylläs and Saariselkä.

Fly-in-fly-out workers are becoming common in remote areas, such as the Nordic Arctic, and are discussed in more detail in Chapter 3 in relation to the mining industries.

3. Large-Scale Industries

Corresponding author: Leneisja Jungsberg

Large-scale activities have the potential to contribute significantly to economic growth; however, because of the scale of these activities, they can also have an impact on the physical environment, land use and societies. This section reviews the literature and provides examples of ongoing, potential and finalized large-scale activities in the Nordic Arctic. In a Nordic Arctic context, the understanding of what constitutes a large-scale industry differs (see Box 1).

The most dominant large-scale industries are mineral extraction (Finland, Sweden, Norway, Greenland), extraction of gas and oil resources (Norway, the Faroe Islands) and aluminium production (Iceland, Norway). The impact of these activities depends on the type of industry, the institutional framework in the region, the physical area where the industrial activities are taking place and the social resources residing there (Poulton et al., 2013; Rasmussen, 2013; Tonts, Plummer, & Lawrie, 2012).

The majority of large-scale activities in the Arctic are based on resource extraction rather than on renewable energy production. These resource deposits are by definition not renewable, and their extraction has a substantial environmental impact, which will be discussed later in this chapter.

In addition to the environmental impact, the following sections consider in detail the main drivers of new large-scale projects, including factors such as investment, socio-economic impacts, education and inclusion of a local workforce, price fluctuations and volatility in relation to development planning for surrounding communities.

3.1 Key drivers of new large-scale projects

The Nordic Arctic contains a vast amount of resources, but challenges such as a harsh climate creating difficult work conditions, the need for a skilled workforce, long distances and a lack of infrastructure are common challenges that need to be solved. Nonetheless, some key factors are driving an international focus on resource extraction in the Arctic.

Box 1: Defining a Large-scale Industry

Some common traits of a large-scale industry are as follows.

- High influx of capital assets.
- Requires comprehensive infrastructure (roads, wires, power station).
- Number of employees e.g. 3000–5000 in the construction phase and a minimum of 1500 in the operation phase.

Scale is a measure of production, where “large-scale” indicates that production is higher than average industry production. Thus, any industry that is large scale produces at high volume.

Because scale differs depending on country size and population, this section of the report broadens the definition of large-scale industries to include also medium-scale industries in the Nordic Arctic regions.

■ *Global demand and prices:* Economic trends such as a growing middle class in China and India have increased the global demand for minerals. Thereby, extraction in remote areas such as the Nordic Arctic has become more profitable than previously (EU information sheet, 2014).

■ *Technological advancement:* Development of new technologies that allow higher extraction rates are extremely important for minerals in various types of deposits (tunnel/open pit, etc.) (Prior et al., 2012).

■ *Geology:* Exploration and mapping of new and existing mineral deposits is essential prior to extraction. International mining companies often invest in exploration for new opportunities knowing that their current deposits will eventually be depleted.

■ *Climate change:* Physical changes such as increased accessibility because of the withdrawal of land-based ice in Greenland and opportunities for new sea routes have created interest in mining activities in the Nordic Arctic.

■ *Legal and institutional framework:* The political framework for handling applications for mining projects is central to the realization of large-scale projects. Conducive regulatory frameworks and co-operative and smooth administration processes are important

aspects of this. The political and regulatory framework has in general been supportive for such development in the Nordic Arctic, and the Nordic countries are ranked well in terms of the mining companies' perception of political attractiveness. Sweden had the highest score, Finland the second highest, Norway is at number eight, and Greenland is at number 20 (EU information sheet, 2014; Fraser Institute, 2014; Poulton et al., 2013).

3.2 Ongoing and potential industrial activities in the Nordic Arctic

As illustrated by Map 3 and Map 4, the Nordic Arctic region has a long tradition in mining and related industries, but the potential of the region is still underexplored. This subsection discusses ongoing and potential industrial activities by natural resource type.

The Fennoscandian Shield, comprising Finland, Sweden and Norway, is the largest exposed area of Precambrian rocks in Europe, geologically similar to the famous mining regions in Canada and Australia. It has significant ore reserves and potential as a metal-producing region on a world scale. It contains multiple commodities such as base metals, ferrous metals, gold, platinum metals, high-tech metals, industrial minerals, diamonds, etc. (GTK, 2014a).

Just like nearly all regions across the globe with ore-producing potential, Fennoscandia and Greenland in particular have seen an unprecedented increase in exploration activity during the first decade of the 21st century because of increased demand for metals and minerals. Furthermore, the region includes sub-areas where the degree of industrial development remains low, but the mineral-production potential is exceptionally high (GTK, 2014b). However, the activities in the region are highly dependent on global market prices, and therefore many of the existing mines, development projects and exploration projects have faced economic challenges in this decade.

3.2.1 Mineral mines and deposits in the Nordic Arctic

Map 3 shows mineral mines and deposits¹ in the Nordic Arctic region. Based on data gathered from the national geological institutions and some private companies, there are almost 600 significant metal ore deposits in the Nordic Arctic Region, and at the beginning of

2015, 29 of those were open mines. The sizes² of the open mines vary. There are five very large (Kiruna, Malmberget, Aitik, Kemi, Talvivaara (Ni)), 12 large, seven medium-sized and five small mines.

In particular, the production of iron ore is remarkable. At present, almost 90% of the European production of iron ore comes from Northern Sweden, with LKAB in Kiruna and Malmberget in Gällivare being the largest producers. Northern Sweden and Finland account for a substantial share of the EU's production of gold, silver, zinc and copper (Aitik). Furthermore, chrome production in Kemi in Northern Finland is important for the production of stainless steel.

The future potential for Greenland is remarkable. It is estimated that 58% of the world's rare earth elements (REE) outside China and 65% of the heavy REE are located in Greenland (Naalakkersuisut, 2015).

3.2.2 Industrial mineral mines and deposits

Map 4 below shows the most significant industrial mineral deposits³ in the Nordic Arctic region and includes active mines and quarries and potential deposits. About 10–20% of all registered industrial mineral deposits in each country's national database are plotted on the map for the Fennoscandian shield. The locations are based primarily on the Fennoscandian Ore Deposit Database (GTK 2014b). In total, there are over 160 significant industrial mineral deposits in the Nordic Arctic region, and at the beginning of 2015, 33 of these were open mines (GEUS, 2013; GTK, 2014b; IINH, 2015).

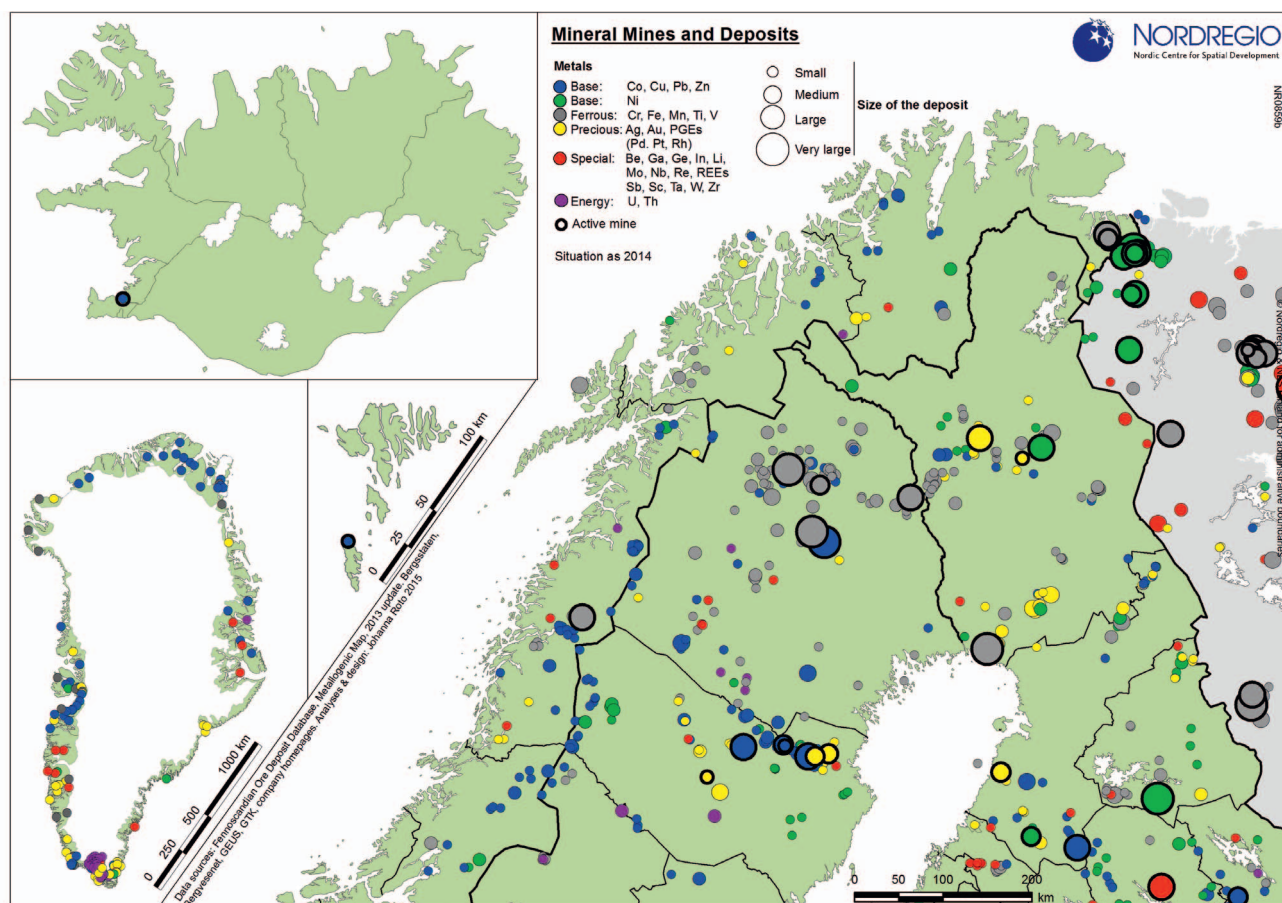
The deposits illustrate the variation in type and distribution of industrial mineral deposits in the Nordic Arctic region. Almost 40 different types of commodities exist, of which the eight most common commodities are plotted on the map individually.

² Based on the definitions and classes used in the Fennoscandian Ore Deposit Database (FOOD) (Eilu et al., 2007; GTK, 2014a), a deposit classification has been used. In order to compare the economic significance of metal deposits, the value of a deposit has been estimated. As the standards for calculating the sizes of the deposits vary between the countries, an "in situ" value for the deposits has been used. The method simply multiplies the tonnage, grade and metal price, and does not consider all the potential obstacles to extracting the ore. The obtained "in situ" value for a deposit has then been used to classify the deposits into six size categories: "Very large", "Large", "Medium", "Small", "Showing" and "Potentially large".

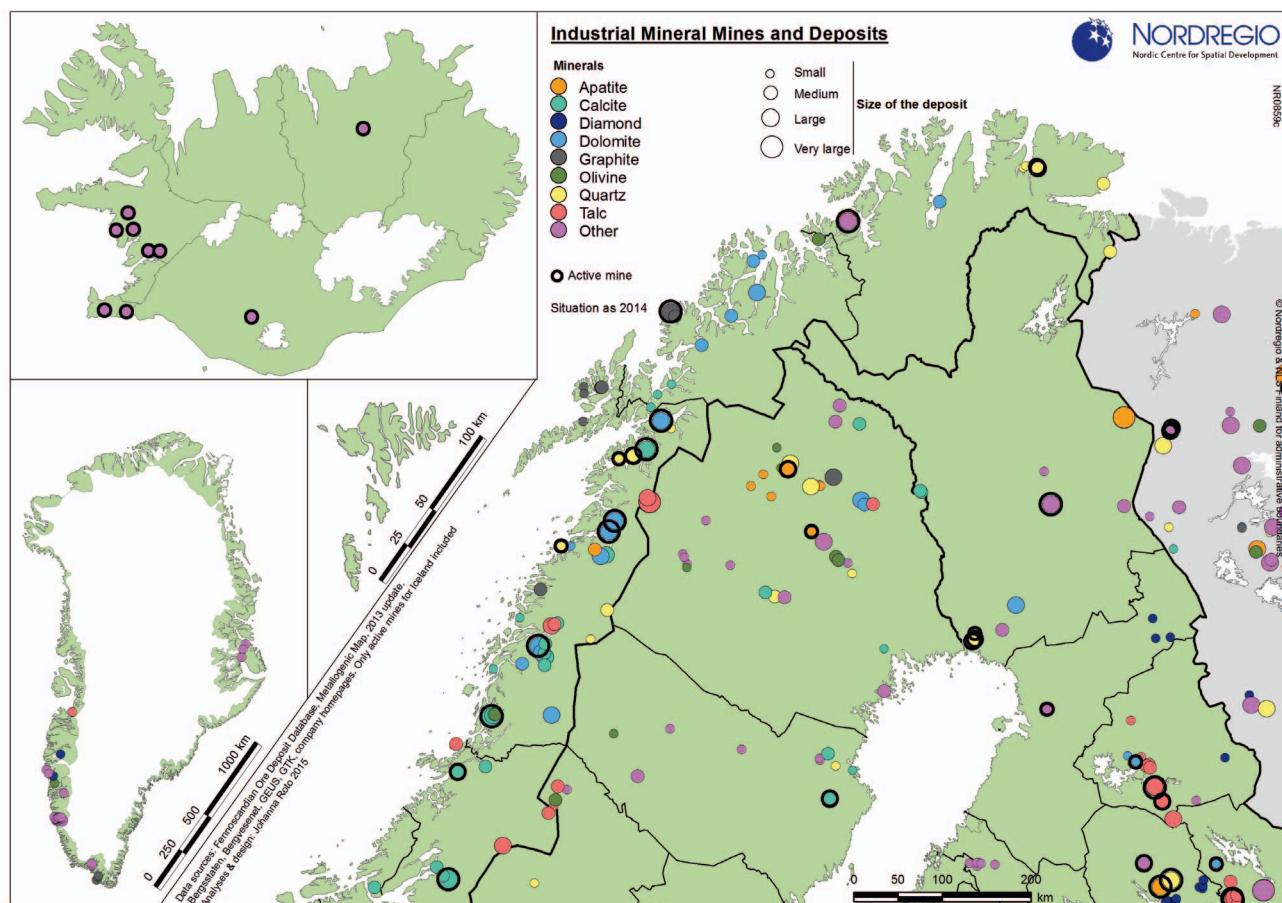
³ Significant mineral deposits displayed on the map include apatite, calcite, diamond, dolomite, graphite, olivine, quartz and talc, and the remaining ones are grouped in the category "Other".

¹ Included in this overview are base metals (which are non-precious metals such as lead, zinc, copper or nickel), ferrous metals (i.e., metals not containing any iron), precious metals (i.e., gems and gold) and special metals (i.e. rare earth elements, etc.).

Map 3: Mineral mines and deposits in the Nordic Arctic



Map 4: Industrial mineral mines and deposits in the Nordic Arctic



3.2.3 Oil and gas blocks in the Nordic Arctic

Norway possesses large oil and gas reserves. The petroleum resources on the Norwegian continental shelf have been estimated at just over 14 billion standard cubic metres of oil equivalent. This means that approximately 45% of the total expected (discovered and undiscovered) petroleum resources on the Norwegian shelf have so far been extracted (Norwegian Ministry of Petroleum and Energy, 2015).

Since production started in 1971, oil and gas have been produced from a total of 96 fields on the Norwegian shelf. At the end of 2014, 78 fields were in production. Overall production from these fields in 2014 was about 217 million saleable standard cubic metres of oil equivalent (Sm³ oe). This makes Norway the 15th largest oil producer in the world, and the 6th largest gas producer (International energy and data analysis, 2015; Norwegian Ministry of Petroleum and Energy, 2015). Exports of oil and gas have contributed significantly to economic growth in Norway and to the financing of the Norwegian welfare state.

All the Nordic Arctic countries with Atlantic coastlines (Norway, Greenland and Iceland, the Faroe Islands) are conducting ongoing oil and gas exploration activities. For Norway, the intention is to continue regular production activities in the immediate future. The Norwegian Petroleum Directorate has estimated that around 37% of all remaining resources on the shelf are undiscovered and that they are located in the following areas: 28% in the North Sea, 29% in the Norwegian Sea and 43% in the Barents Sea.

Map 5 shows oil and gas fields under active production and those that received an exploration license in the West Nordic region. No commercially viable discoveries have been made in the Faroe Islands, Greenland or Iceland, but expectations of financial gain from oil extraction are high in all the countries. Since the first exploration took place on the Faroese continental shelf in 2001, nine wells have been drilled, and hydrocarbons have been discovered but not in commercial quantities (Jardfeingi, 2015).

Greenland is believed to have substantial oil resources. Oil and gas exploration is today being carried out in many parts of Greenland, and it has a long history of oil production back to the 1970s. A number of licensing rounds and open door procedures have been held. In 2015, there were 18 exploration licenses in force, and 15 exploration wells have been drilled (Naalakkersuisut, 2015).

Two areas on the Icelandic Continental Shelf are thought to have commercial-grade reserves of oil and gas. They are Dreki east and northeast of Iceland and

Gammur on the northern insular shelf of Iceland. Orkustofnun has granted three licences for exploration and production of hydrocarbons in the Dreki Area (Iceland National Energy Authority, 2015).

3.3 Impact assessments of large-scale industries

An impact assessment can be defined as: "... the process of identifying the future consequences of a current or proposed action" (iaia.org). Box 2 below presents a brief overview of the potential environmental, economic and social impacts of large-scale activities together with the potential policy responses that may be relevant. Most commonly, impact assessments consist of an environmental and socio-economic assessment, and therefore these two will be described in more detail from a local development perspective.

All EU members (and Greenland) are required to comply with the Strategic Impact Assessment principles, while Norway and the Faroe Islands, as non-EU members, are following less-restrictive conditions of the Environmental and Social Impact Assessments (EIA and SIA) (see Section 3.3.3).

3.3.1 Environmental impact assessment

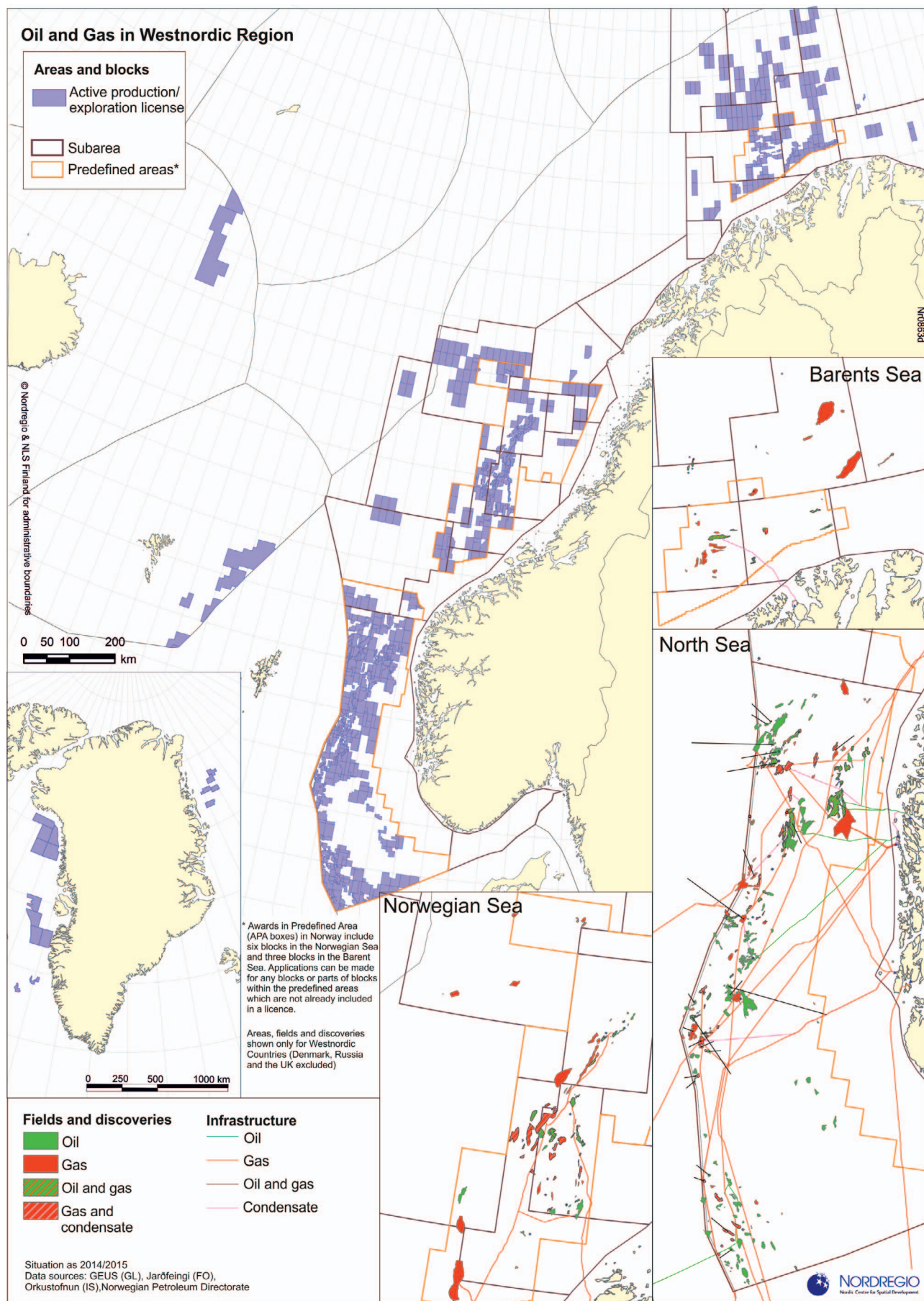
Environmental impact assessment (EIA) is a commonly applied tool for identifying, evaluating and mitigating the potential environmental damage associated with a proposed project. The purpose of an EIA is to ensure that decision makers consider environmental changes caused by constructing and operating large-scale activities.

EIAs are part of the legislative framework in the Nordic countries, meaning that companies cannot obtain an exploration license without conducting an EIA.

The results of the EIA are to be taken into account by the authorities in making their decision on whether a development should proceed or not.

Despite an EIA being a useful tool for project planning, the extent to which the results of the EIA are taken into account in decision-making differs. When constructing Alcoa production facilities in East Iceland, for example, the preliminary EIAs described a number of problems that were difficult to manage (Rasmussen, 2013). Furthermore, several environmental and societal organizations pointed out a number of issues that they believed were not given adequate consideration by Alcoa during the construction work (see Box 3) (ibid:12). This example shows that in undertaking a project, it can be a challenge to satisfy all interest groups.

Map 5: Oil and gas in the West Nordic region



Box 2: Potential impacts of large-scale activities and potential policy responses

Environmental impacts

- Changes in land, ecosystem, water and landscape
- Potential pollution of land and water
- Waste
- Risk of accidents
- Biodiversity, habitat, migratory paths, wildlife changes
- Conflict with other activities

Social impacts

- New job opportunities
- Increased services provision
- Transfer of skills
- Increased educational opportunities
- Demographic change
- Health and well-being
- Change in other activities such as hunting patterns, reindeer herding, and tourism

Economic impacts

- Diversification of supply
- Local employment and increased spending
- Investment by government and company
- Revenues for public budget
- Increased local expenditure for public facilities
- Opportunity costs (i.e., the cost of not investing in infrastructure or competence development of the workforce in relation to large-scale activities).
- Boom and bust cycles

Potential policy responses

- Identify regional drivers (e.g., catering companies) to retain local value
- Review of sector-specific policies; e.g., energy supply, import of foreign labour, tax regulations of the exported commodities (processed or unprocessed), etc.
- Environmental requirements as a follow-up to the impact assessments
- Funding of research aiming to mitigate possible negative impacts

Source: (EU information sheet, 2014).

3.3.2 Social impact assessment

Social impact assessment (SIA) is a component of EIA and focuses on how large-scale activities may affect population groups and settlements. In most countries, the requirement to perform an SIA is included in the legislation on EIAs. Therefore, an SIA is usually carried out as part of, or in addition to, an EIA.

The development of mines in the North Calotte region has conflicted with the historically and culturally

anchored land claims of the indigenous Sami people (Engström & Boluk, 2012). Thus, an SIA is a requirement in areas where large-scale industries will have an impact on reindeer husbandry or other activities such as fishery and hunting. The planning of new mines is for many perceived as a threat to the traditional and current livelihood of reindeer-herding Sami.

Greenland's government has developed specific guidelines for SIAs where a social baseline study of the current status of the community is included. The SIAs can also serve as a tool for negotiations about impact benefit agreements (IBA) where employment of local contractors is negotiated to be part of the large-scale activities. Such agreements ensure that local communities will benefit from the large-scale activities taking place and, in some cases, reduce unemployment rates and help establish new companies providing services to the industrial operations.

International companies have experienced pressure to perform beyond making profits and are expected to integrate social and environmental concerns in their business operations. There are a number of requirements associated with justifying their operations and documenting social and environmental performance; e.g., by supporting the local football team and providing information about their environmental protection measures (Christiansen, 2013; Colclough, 2013; Jenkins & Yakovleva, 2006).

In Australia, mining companies have in some cases established social partnerships by providing resources to local government institutions, thereby obtaining a stake in future decision-making at the remote locations with regards to mining activity. Critiques have been made that this is not socially sustainable because the mining companies, after having extracted all the resources, will stop providing local government support (Cheshire, 2010). Moreover, critiques of the industry argue that international companies use the concept of sustainability as a term covering economic development and co-operation with communities without a thorough examination of negative environmental impacts after project closure (Hansen et al. 2013; Heber 2005:253; Kirsch 2009).

3.3.3 Strategic environmental impact assessment

Strategic impact assessment (SIA), also known as strategic environmental assessment (SEA or just EIA in the EU terminology) has been discussed in the European Union since 1996 and was approved in 2001 by the EU Council by its Directive 2001/42EC. It became binding for EU member countries in 2004. The SEA is officially defined as a process aimed at assessing the possible ef-

Box 3. Brief overview: Alcoa in East Iceland

- The decision to construct the Fjardaál aluminium smelter was made in 2002 by the government of Iceland, Landsvirkjun (the national power company) and Alcoa.
- Alcoa is the second largest producer of aluminium in the world when all production facilities are included.
- The entire project constitutes the largest ever investment in Iceland.
- The EIA revealed that the establishment of the hydropower plant would damage bird breeding grounds.
- The hydro power plant has created debate because of the conflict between the construction of a sustainable energy source and protection of a large area of wetland used for breeding by many bird species.

fects of sector policy, policy planning, action programs and other strategic documents and regulations upon the environment. This process analyses what direct or indirect changes to the environment could emerge and how they would affect the human environment, natural environment, biodiversity and climate, as well as landscape and material values. A strategic EIA provides an opportunity, at an early stage of planning and elaboration of strategic documents, to examine the possible effects of implementation of solutions included in the document, as well as to select the best alternative (Gjertsen, Ivanova, & Rasmussen, 2016).

The integration of the EU approaches to SIA into the Nordic SEA frameworks has several implications. First, while the Nordic approach to EIA used to have a tendency towards limited community participant intervention, the SIA has been more of a policy instrument also involving community participation, which has been an important issue in relation to SIA. Second, the assessment requires the involvement and collaboration of the private sector, non-governmental organizations (NGOs), citizens' groups and other non-institutional organizations or individuals interested in, or affected by, the management of the specific activity. Third, the structures to achieve participation may, but do not always, include core steering groups of key stakeholders, general forums that meet regularly, technical panels, newsletters and various topic or issue groups as required (Gjertsen et al., 2016).

An EU directive sets the minimum requirements for carrying out strategic assessment of the effects on the environment, as well as defines a wide range of public plans and programmes to for which strategic assessment is a compulsory demand. This affects the Nordic EU members Sweden, Finland and Denmark. They, however, also influence Greenland, not as a member of the EU (because Greenland followed Denmark into the

EU when Denmark became a member in 1972, and left the EU in 1985), but by committing to the Danish signing of the EU protocol on a strategic EIA. The strategic EIA approach is supposed to assist in implementing the principles of sustainability, including: (1) provide an opportunity for public involvement in policy formulation, (2) ensure systematic appraisal of choices, (3) make it possible to analyse cumulative effects, (4) provide consideration to more diverse alternatives, (5) facilitate more continuous communication between different actors and (6) deal with problems where system boundaries may occur (Gjertsen et al., 2016).

3.3.4 Socio-economic involvement

The physical location of large-scale activities is important from a local development perspective in terms of co-operation between communities and companies, and economic benefits including taxes and employment opportunities for communities. Below is an overview of three types of locations that entail different types of regional involvement (Rasmussen & Koroleva, 2003).

Enclave economies are characterized by mining activities that are located in remote areas with a fly-in-fly-out workforce. For mining activity taking place in isolated locations, the main link to society often becomes the payment of taxes or fees and, if relevant, the recruitment of labour. If a mine has a certain capacity, the established mine-camp/city can continue to exist after mining activities have ceased. This was the case with the Montagnais and Naskapi mines in Canada, which today are important centres for tourism.

Adjacent activities refer to situations where the operation of a mine to some extent is based on co-operation with adjacent communities; e.g., food catering, mine workers spending leisure time in the community or office administration of the mine located in the adjacent community. Examples of this type of location for large-scale activities are numerous and include Nanisivik in Canada, Alcoa in East Iceland and Maamorilik, Black Angel and Nalunaq Goldmine in Greenland.

Integrated activities occur when the mine creates the majority of the employment in a community but where shops, schools, leisure activity unions and other industries also exist in the community. Integrated mining activities are not common, particularly for remotely located mineral deposits that have a short production life, because the community will not be able to survive when mining production ceases. The former Greenlandic city of Qullissat is an example of a city where mineral production was integrated. Furthermore, in the Norwegian city of Longyearbyen, coal mining used to be an integrated activity, but today research is the

primary activity of the city.

The most common type of large-scale activity in the Nordic Arctic regions is the enclave economy and associated activities. The more the large-scale activities are integrated into the adjacent communities, the greater is the dependence of these activities.

3.4 Connecting a local labour market to large-scale industries

From a local development perspective, a central benefit of establishing large-scale activities is the potential for job creation. It is, therefore, essential to integrate the local labour force. In order to benefit from new jobs in emerging industrial sectors, it is also crucial to improve the local workforce's education and skills (OECD, 2011c). Often, labour is imported as a fly-in-fly-out workforce because the educational requirements do not match the local workforce.

An example of this can be found in Canada where the worker unions have been central in skill development within the extractive industries. They have, furthermore, been part of the recruitment processes by managing employment contracts and participating in defining the framework for the upgrading of qualifications and continuing training (Rasmussen, 2013).

Generally, it is of mutual benefit to include as many local employees as possible, given the additional costs of a commuting workforce. While Nalunaq Goldmine A/S was operating in Southern Greenland, the municipality co-operated with the mining company in terms of the recruitment of local employees. Additionally, basic mining courses were offered to unemployed people to provide them with new skills and a possible job at the goldmine. Overall, training was offered to more people than there were jobs at the goldmine. This illustrates the challenge of co-ordinating the upgrading of qualifications when the number of employees is to a large extent determined by external factors such as world market prices, supplier stability, and weather conditions (Jungsberg, 2014).

Possible synergies in relation to competence development and education exist within the contracting industries where employees often work with, e.g., heavy machinery. Therefore, it is relevant when investing in education to outline other employment opportunities that could be relevant in case the large-scale industrial activity is fully staffed or in an employment down-turn.

Experiences from the Austurbrú-Fjardal Industrial School in Iceland illustrate how large-scale activities can generate new educational opportunities. When Alcoa began production it became clear that in order

to benefit from the production further training was necessary. In 2011, the Austurbrú-Fjardal Industrial School began facilitating education for adults through distance learning. Many of the enrolled students at Austurbrú are adults who are already part of the Icelandic workforce but who wish to enhance their skills and in the future carry out more advanced tasks. The curriculum is inspired by other education and training centres in Iceland, and the subjects available are mainly in the areas of computer science, informatics, mathematics, physics, environmental examinations, health and security, mechanical engineering and quality assessments (Rasmussen & Jungsberg).

Achieving alignment between employment, educational skills and regional development policy is becoming more and more crucial (OECD, 2014). As the examples above illustrate, opportunities for the local workforce to be included are to a large extent dependent on local upgrading of qualifications and skills. For many of the regions that have facilitated upgrading of qualifications and skills among the local habitants, the result has been a positive increase in the size of the local workforce.

3.4.1 Indirect employment opportunities

Indirect employment refers to the suppliers or supporting activities of the large-scale activities. Indirect employment can thus be defined as jobs created by suppliers in the provision of, for example, new equipment, replacement of items, repair work, transport assistance, consultancy and auditor services, catering, etc. (Business Dictionary, 2015).

Indirect employment can vary from approximately a 1:1 ratio to 1:6 ratio between number of new workplaces in a mine and number of workplaces created elsewhere. A number of factors influence the estimated socio-economic effects from a particular mine, but some of the main principles are (Ejdemo & Söderholm, 2009):

- the location of the mine,
- the scale of operations, and
- the methodological and geographical scope of the economic analysis.

In Kiruna in Northern Sweden, approximately half of the population are directly or indirectly employed by the iron ore mine (Avnish, 2015). Kiirunavaara Aktie Bolag (LKAB) mining company was founded in 1890, and today it is the world's biggest underground iron ore mine. Additionally, indirect employment such as construction work is likely to be required, as underground production has expanded to the extent where it is nec-

essary to plan a relocation of Kiruna city because of the mining-related cracks in the ground.

In East Iceland, six local companies merged to create Launafl, which supplies the large-scale industrial production of Alcoa and Karahnjúka. The creation of Launafl from six individual companies has made it easier to provide services to industrial producers. Launafl can be considered to be a one-stop-shop in terms of providing services regardless of whether the need is for an electrician, a tradesman or a temporary contract worker.

To support these large-scale industries, there is also the need for a knowledge-intensive labour-force including engineering consultancies, technology services and heavy machinery maintenance. Knowledge-intensive industries contribute a number of services in the preparation and operation phases of large-scale activities. Experiences from Australia illustrate how their mining technology services companies have helped to transform Australia's mining industry towards also being a knowledge economy (Martinez-Fernandez, 2010). Consultancy and knowledge-based companies are present in many Nordic industry clusters.

3.4.2 The role of industry clusters

The role of clusters is relevant because it illustrates why location matters in the global economy. The concept emphasizes the importance of sharing knowledge and experiences among actors in the same types of industries. The interactive element of co-production of knowledge in an atmosphere of mutual trust stimulates individual organizations to grow and innovate (Isaksen & Karlsen, 2012). The establishment of clusters can be a result of the initiative of private and/or public actors. Thus, clusters can occur as a network organized by the companies themselves, but in some cases, there are also public authorities involved in facilitating the knowledge exchange.

Typically, regional clusters consist of companies, research institutions and local authorities that form alliances based on co-operation as well as competition. The companies compete in some areas, e.g., output markets, but co-operate in other ways, e.g., joint training programs. Often, the most successful clusters are characterized not only by strong linkages between firms but also by co-operation with the public sector (The Economic Competitiveness Group, 2015).

CASE: Mineral cluster in Northern Norway

The mineral cluster in Northern Norway is a network of actors engaged in mineral extraction, and the members are companies, suppliers, researchers, educational institutions, etc. They facilitate co-operation

in the mineral industry to ensure an improved competitiveness and value creation. The participants define different projects where they can acquire knowledge through courses, conferences and network events. Through the relations formed among the actors in the extractive mineral industry in Norway, the objective is to strengthen the industry in general. The members are actors from different parts of the value chain.

Activities initiated by the members are as follows.

- Development of the member's company
- Development of more relevant education for the industry
- Co-operation among several research and competence-development institutes domestically and abroad
- Mapping of competence needs and market options
- Internationalization through joint study trips and trade fairs
- Working to improve visibility, communication and reputation

The mineral cluster in Northern Norway combines open knowledge environments with inter-organizational activities. By organizing seminars for the cluster members, the members access the overall knowledge pool of global experiences. At the same time, experiences from Norway illustrate how face-to-face meetings offer good opportunities for knowledge sharing between the companies (Nærings- og fiskeridepartementet, 2014, p. 118).

3.4.3 Transnational and cross-border co-operation

Cross-border co-operation in large-scale industries can be an enabling factor when initiating activities. The co-operation can be related to infrastructure development, services and labour, as well as knowledge exchange. The research previously done in the field of cross-border co-operation with a focus on large-scale activities is limited.

Infrastructure development is a fundamental necessity for large-scale activities. In some cases this development requires cross-border co-operation. This was the case for the Kiruna mine, where Sweden and Norway co-operated on establishing a railway between Kiruna and Narvik in 1902. The new railway made it possible to transport iron ore to Narvik, which has the nearest ice-free harbour. Thus, the railway enabled the mining production, and both Kiruna and Narvik developed from rural communities to industrial towns (Berlina, Hörnström, & Diş, 2015a, p. 8).

Transnational co-operation with regard to services

and labour has occurred for mining activities in Greenland, where mining workers have been brought in from Iceland, Canada and the United Kingdom. However, it can also be seen in the context of an imported fly-in-fly-out labour force, which is often associated with losses of workplaces for local population. In cases where the foreign labour force engage in competence development and co-operate with the local workers, there can be an educational spillover effect if the management provide “on the job training” and this is supplemented with theory training at vocational schools.

Regarding knowledge exchange, several reports have been produced with the aim of providing an overview of processes and the impacts of large-scale activities (Rasmussen, 2013)—e.g., the Kearl oil sands near Wood Buffalo, in Alberta, Canada, and the Kárahnjúkar hydro project and the Alcoa aluminium smelter in East Iceland (Robaey & Roo, 2011)—but more knowledge could be gained by focusing on co-operation between countries in terms of factors that influence start-up production, the workforce and education, as well as social and environmental impacts.

3.5 The global market’s connection to large-scale industries

The dependence on international financing is particularly distinct in large-scale industries. Huge capital assets are needed during the prospecting and construction phases of large-scale activities. Furthermore, investments from the municipalities are common in terms of infrastructure and supporting the inclusion of a local workforce. Investments in large-scale activities are sensitive to world market price fluctuations. The majority of the companies engaged in large-scale industries are highly dependent on investors exerting pressure to produce a profit in the short term by selling minerals in the global market while prices are high. This can also mean that some mining projects only exist for a very short period, which can have important consequences from a local development perspective. One recent example is the Pajala iron ore mine, where high expectations led to disappointment for the people in the region (see Box 4).

The potential benefits of large-scale industries are connected to their activities, and therefore the benefits are mainly short term. This is also the case for the Nunavut region in Canada, where studies show that according to government officials and community members, the two lead-zinc mines Polaris and Nanisivik mainly had positive short-term impacts. When the mines closed after 20 years of operation, the surround-

Box 4: Pajala mine in Northern Sweden

The expectations concerning economic growth and job opportunities in relation to large-scale activities are often very high. This was the case for the Pajala mine, where many people moved to the region to work, but after the closure approximately 1½ years later in 2014, the newcomers moved away again.

- Construction of the Pajala mine began in 2010
- Production began in October 2012
- Low revenues meant the mine was operating at a loss from the start
- The continued fall in iron ore prices made it impossible to attract investors
- Expectations had been high in terms of local employment

The Pajala iron ore mine was expected to change the negative population trend in the municipality. The continuing decline in iron ore prices made it extremely difficult for the mine to raise the required financing, and thus the mine made losses from the start of production in 2012.

The local community suffered from the decline in iron ore production, and many initiatives in Pajala city were terminated. The local population is declining, with approximately

ing environment had changed, and the economic benefits from employment and catering opportunities to the mine disappeared (Richards, 2009).

Examples from Finland illustrate how regional qualifications can be exported as a service. Finnish military fleets are ice reinforced, and the crews are skilled in navigating in ice conditions, and this has led to Finnish Arctic navigation skills being exported to North America. When activities increase in the extractive industry in Northern Finland, a number of engineering firms in Finland assist by providing maritime offshore technology and solutions to winter navigation problems (Government of Finland, 2013; Hätönen, 2012).

The Nordic countries also market themselves to attract global investors. The government of Greenland has participated in trade fairs to promote the opportunities in Greenland’s extractive minerals industry. In the last 10 years or so, substantial interest has been shown in mineral exploration in Greenland (Braden, 2010; Nuttall, 2013; Research Markets, 2012). Currently, the companies investing in exploration in Greenland are existing mining companies, particularly from Australia and Canada. Despite the large number of prospecting licenses, not many new mines have come into operation. This illustrates the gap between exploration financing and the commencement of mine operations.

3.5.1 Large-scale industries and sustainable regional development

Managing large-scale activities in the Arctic regions can be a challenge because of the harsh cold climate and in many cases the lack of basic infrastructure and power. Expansive large-scale activities can cause severe damage in cases where sustainability is not taken into consideration. Three aspects of sustainability are relevant in the Nordic case: environmental, social and economic issues contribute to a holistic sustainability of industrial activities (Nordisk Ministerråd, 2015).

Because large-scale industries to a large extent are driven by international investments, volatility within these industries is extremely high. This constitutes a challenge for municipalities and regional planners when their investments in infrastructure, housing and education become obsolete in cases where the large-scale activities have to close down. Therefore, ensuring environmental and social sustainability could also benefit from providing support to management in crisis situations involving significant market fluctuations or other economic challenges.

Consideration for developing a sustainable approach to large-scale activities in the Arctic regions could therefore benefit from a structured review focusing on these three aspects.

Environmental impacts

- How can construction and operation of large-scale activities be adjusted in order to protect the surrounding landscape and environment?
- What obstacles could exist for the environmental protection?
- Which landscape changes are likely to take place because of the large-scale activities?

Socio-economic impact, labour market and local business development

- How can the existing labour market be connected to the large-scale activities?
- How does the regional education and training system need to develop in order to facilitate local employment?
- How can the firms running the large-scale activities co-operate with local authorities to facilitate growth of local suppliers, consultants and subcontractors?
- What is the potential for co-operation between community representatives and regional and national authorities to facilitate local involvement in the large-scale activities?

Regional economic stability

- How can the risks of global market fluctuations be taken into account?
- How can economic profits be supported without compromising environmental and social sustainability?
- Which economic factors are the most important for the large-scale activities to become ongoing and to provide economic stability and employment in the region?
- How can strengthened cross-border collaboration facilitate sustainable large-scale industries, and what should be the main focus of the collaboration?

4. Bioeconomy

Corresponding author: Anna Berlina

This chapter describes the bioeconomy in the Nordic Arctic by giving an overview of the development of the main bioeconomy sectors, including forestry, fisheries, aquaculture and related activities. It describes not only traditional activities, such as reindeer husbandry, but also new and emerging bioeconomic opportunities, which have a greater focus on research and innovation. This chapter contains some concrete examples of the bioeconomic activities in the Nordic Arctic and in other northern Nordic regions with similar conditions. The chapter is divided into several sections. It begins by introducing the bioeconomy concept and putting it into a Nordic Arctic context. The chapter continues with an overview of the Nordic Arctic bioeconomy, which makes use of marine resources, followed by bioeconomic activities on land, including forestry, agriculture and reindeer husbandry. Finally, this chapter sheds light on the opportunities and challenges in the transition to a bioeconomy in the Nordic Arctic context.

4.1 What is a bioeconomy?

With the growing realization of resource depletion and climate change, sustainable utilization of resources and reducing the use of fossil resources are becoming increasingly important for society as a whole. The bioeconomy has been attracting increasing political, public, business and scientific attention. This is exemplified by the OECD's policy agenda *The Bioeconomy to 2030* (2009) and the *Strategy for Innovating for Sustainable Growth: A Bioeconomy for Europe* (European Commission, 2012b). The EU has chosen the bioeconomy as a key area in its new Horizon 2020 programme (the EU Framework Programme for Research & Innovation).

There is no single definition of the bioeconomy. In a broad interpretation, a bioeconomy can be defined as an economy where the basic building blocks for materials, chemicals and energy are derived from renewable biological resources, such as forestry, agricultural and marine biomass, organic waste, etc. (Lindberg et al., 2015).

Through production and conversion of renewable biological resources into food, feed, bio-based products and bioenergy, the bioeconomy contributes to tackling

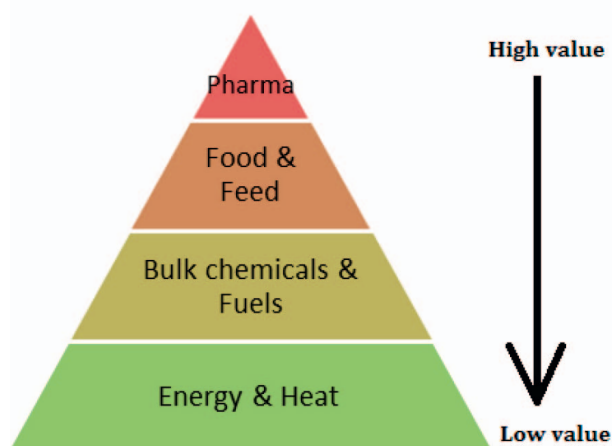
several environmental and socio-economic challenges, including food security, fossil fuel dependence and climate change. The bioeconomy is increasingly being promoted for its potential to contribute to rural development by providing employment, contribution to business growth and security of energy supply, and societal impacts (see Box 5).

At the core of the bioeconomy is sustainable utilization of bio-based raw materials and capturing the maximum value from the exploitation of the bioresources by increasing recovery, upcycling and recycling instead of increasing the consumption of raw materials.

Chemicals and medicines are examples of products with high added value and the lowest volume of biomass. Transport fuels and bioenergy are examples of products with the lowest added value and highest volumes of biomass (Figure 1). The transition to the bioeconomy requires a holistic and innovative approach, a combination of different technologies, and co-operation across sectors, including chemistry, technology, construction, energy and forestry.

The bioeconomy is concerned with both primary and secondary activities. Other sectors that provide services to bioeconomy activities may also be linked to the bioeconomy (Stefánsdóttir, 2014). The bioeconomy includes all industries and economic sectors that produce, manage and otherwise exploit biological resources (Kitchen & Lawrence, 2011). According to the Nordic Innovation Report (Rönnlund et al., 2014), the

Figure 1 High and low value added products in the bioeconomy



sectors that can be assumed to belong entirely to the bioeconomy are:

- agriculture,
- fisheries and aquaculture,
- forest and forestry industry,
- food industry, and
- bioenergy and biofuels.

There are also several additional industries that can be classified as bioeconomy-associated sectors (Rönnlund et al., 2014):

- chemicals and plastic industry (e.g., bio-based chemicals and plastics that substitute for petroleum-based bulk chemicals),
- building and construction industry (e.g., bio-based materials used in construction of buildings, such as wood products, bio-based insulation materials, bio-based adhesives, paints),
- pharmaceutical industry (e.g., bio-based compounds that replace petroleum-based compounds),
- textile industry (e.g., using bio-based raw materials, such as wool, flax and hemp, but also cellulose-based ones),
- tourism and other services (e.g., recreational activity services, food services related to ecotourism), and
- wastewater treatment (e.g., recycling and utilization of the bio-based materials in the wastewater and waste streams for heat and electricity production).

A greater focus on research and innovation is at the core of the bioeconomy. There are a number of opportunities for smarter use of bio-based raw materials for producing new and enhanced value-added products within a number of different sectors of society.

In recent years, the concept of the “blue” bioeconomy has developed, as distinct from the land-based bioeconomy, to emphasize the contribution of marine resources to the bioeconomy. The blue bioeconomy promotes the optimized utilization of already exploited marine resources and the innovative use of underutilized resources and residual biomass, as well as innovation across value chains, such as fisheries and tourism (Norden, 2015). As in the case of the land-based bioeconomy, transformation towards a blue bioeconomy calls for a change of mindset in the entire industry. It will, among other things, require significant changes to the fishing fleet, which is today highly dependent on fossil fuel, and processing facilities. According to the communication from the Commission: Blue Growth opportunities for marine and maritime sustainable growth, the sectors that have a substantial potential for

sustainable jobs and growth within the marine bioeconomy are aquaculture, maritime, coastal and cruise tourism, marine biotechnology, ocean energy and seabed mining (European Commission, 2012a).

4.1.1 Sustainability of the bioeconomy

The bioeconomy has a potential to contribute to economically more robust and sustainable local communities and rural areas, as well as to maintain existing jobs and to create new ones (European Commission, 2012; Nita et al., 2013). Despite clear links between the bioeconomy and sustainability, the bioeconomy is not always sustainable.

It is important to keep in mind that although biomass is a renewable resource, it is also a finite resource that is used as a raw material in a range of different products. Many national strategies and policies aiming to increase the size of the bioeconomy often neglect to consider the sustainable use of biomass, potential land use conflicts and the global perspective (Kemp Stefánsdóttir 2014).

Bioeconomy development can entail conflicts because of competing claims on limited resources such as land and water. To ensure sustainability of the bioeconomy, a variety of sometimes competing interests have to be reconciled, in different ways to suit different situations (European Commission, 2013a). Conflicts and competition can emerge between multi-use interests (e.g., reindeer husbandry vs intensified forestry activities and tourism) and between alternative uses of natural resources (e.g., land use for food vs fuel, biomass for chemical industry vs for biofuels). This may result in a negative impact on the environment, people and rural economies, and may have social and ethical

Box 5. Contribution of local bioenergy production to regional development (Lindblom & Rasmussen 2008).

Social aspects of bioenergy development relate to an increased standard of living (household income through better employment opportunities, as well as cultural values and health) and increased social cohesion (regional development and rural diversification).

The macroeconomic effects of bioenergy systems relate to contributions to the main elements of regional development, such as economic growth through business expansion, employment, economic effects on GDP and security of energy supply.

The supply side effects result in improvements in the competitive position of the region, including attractiveness to inward investment.

The demand side effects refer to the extent and direction of capital flows on employment and regional income.

implications.

Conflicts between the different uses of forestry resources in the peripheral areas may also appear in connection with tourism and second-home owners. As tourists and second-home owners in the Nordic Arctic region are mainly attracted by the pristine nature, increased deforestation for energy purposes could lead to a loss in the recreational value of forest areas, which could affect the tourism industry and the economic activities dependent on the servicing of second homes. Increased renewable energy production—for instance, through the expansion of the land area used for energy crops—may be met with objections from these groups (Lindblom & Rasmussen, 2008).

Finding trade-offs between the bioeconomy sectors, economic activities and nature, as well as developing new approaches to multifunctional land uses, presents opportunities in the bioeconomy. Local food production, for instance, can have a positive effect on tourism, while the agricultural residues and manures can be used for bioenergy production.

In a study by Lindblom & Rasmussen (2008), the socio-economic benefits associated with local bioenergy production and its contribution to regional development were presented, which can also apply to the bioeconomy in general (see Box 5).

4.1.2 Policy support for the bioeconomy in the Nordic countries

Being rich in natural resources, the Nordic Arctic region already has substantial experience in some of the bioeconomy sectors, forestry and fisheries in particular. Today, the bioeconomy has become an important component of regional, national and Nordic policy discourse in the Nordic countries. For instance, the bioeconomy was chosen as one of the main focus areas of the Icelandic chairmanship of the Nordic Council of Ministers (NCM) in 2014. The circular bioeconomy based on marine resources was chosen as one of the themes for the Danish Presidency of the NCM in 2015. The Faroe Islands are chairing the Nordic fisheries and aquaculture co-operation in 2015 under the Danish Presidency (Norden, 2015).

In 2014, the bioeconomy of the West Nordic region was studied extensively by Mátis in Iceland (Smáradóttir, Johannessen, & Paulsen, 2014). In 2014, a few other important developments took place in the Nordic countries; namely, Finland launched a national bioeconomy strategy, and Denmark established a Bioeconomy Panel Denmark, designed to have an impact on the national bioeconomy policy (Nordregio, 2014). These initiatives indicate that with increased focus on a transition from a fossil-fuel-based economy to a more

resource-efficient economy, bioeconomy development also opens up new opportunities for the Nordic Arctic region (NKJ NordForsk, 2013).

4.2 Bioeconomy in the Nordic Arctic: current status and future potential

The different bioeconomy sectors in the Nordic Arctic are of varying importance. Because of the long coastline and access to the sea, the marine sector naturally plays a crucial role in the bioeconomies of Iceland, Greenland, the Faroe Islands and the Arctic regions of Norway. There is a high demand for Arctic seafood particularly because of the clean Arctic waters and the high quality of the catch. The sub-Arctic marine regions host some of the world's most productive fisheries. In addition to fisheries and aquaculture, the Arctic blue economy includes a variety of activities, including whaling in Norway, Greenland and Iceland, and seal hunting in Norway and Greenland (ACCESS, 2014).

The potential for a land-based bioeconomy (especially forestry) is higher in the Arctic areas of Sweden and Finland. Other traditional subsistence activities, such as reindeer herding, gathering and family/small-scale resource production continue to play an important role in some of the regions. Although the indigenous communities no longer depend entirely on these activities, they provide an important contribution to economic well-being and may provide additional opportunities in the bioeconomy.

This chapter provides an overview of the main bioeconomic activities and future potential of the Nordic Arctic. It begins with an overview of marine-related activities and continues with the land-based bioeconomy.

4.3 Blue bioeconomy

4.3.1 Fisheries

Currently, the marine-based bioeconomy mainly involves the food industry in the coastal areas of the Nordic Arctic. Today, fisheries are the most important export sector in the West Nordic region. The main markets for Arctic seafood products are Japan, South Korea, the US and Europe (Arctic Catch, 2015). Exports of fish and other marine products account for about 93% of total exports in Greenland, about 91% in the Faroe Islands, about 37% in Iceland and about 34% in Nordland County in Norway (Nordland County Council, 2014; Smáradóttir et al., 2014; SSB, 2014). The fisheries sector has a greater impact on the economy than the national accounts indicate when all multiplier

effects are considered. There are several industries that are connected indirectly to the fishing sector that provide the sector with resources or further process its production (Iceland Ocean Cluster, 2011).

Map 6 shows that fisheries play an important role in employment in the West Nordic region. In some parts of the northernmost regions of Norway and some areas in the Faroe Islands and Greenland, the fishing sector accounts for more than 15% of jobs. The northernmost county in Norway, Finnmark, had the highest number of registered fishermen in Norway in 2013 (Norwegian Directorate of Fisheries, 2014). In some of the coastal communities in Iceland, the importance of fisheries in employment is close to that of the Faroe Islands. In the Westfjords region, for instance, the largest number of jobs is within the food industry and almost exclusively in fish processing within that sector (Lindberg et al., 2015). Traditionally, the fisheries sector has provided employment for local people, but over the years, it has become a large-scale industry with a large share of foreign workers.

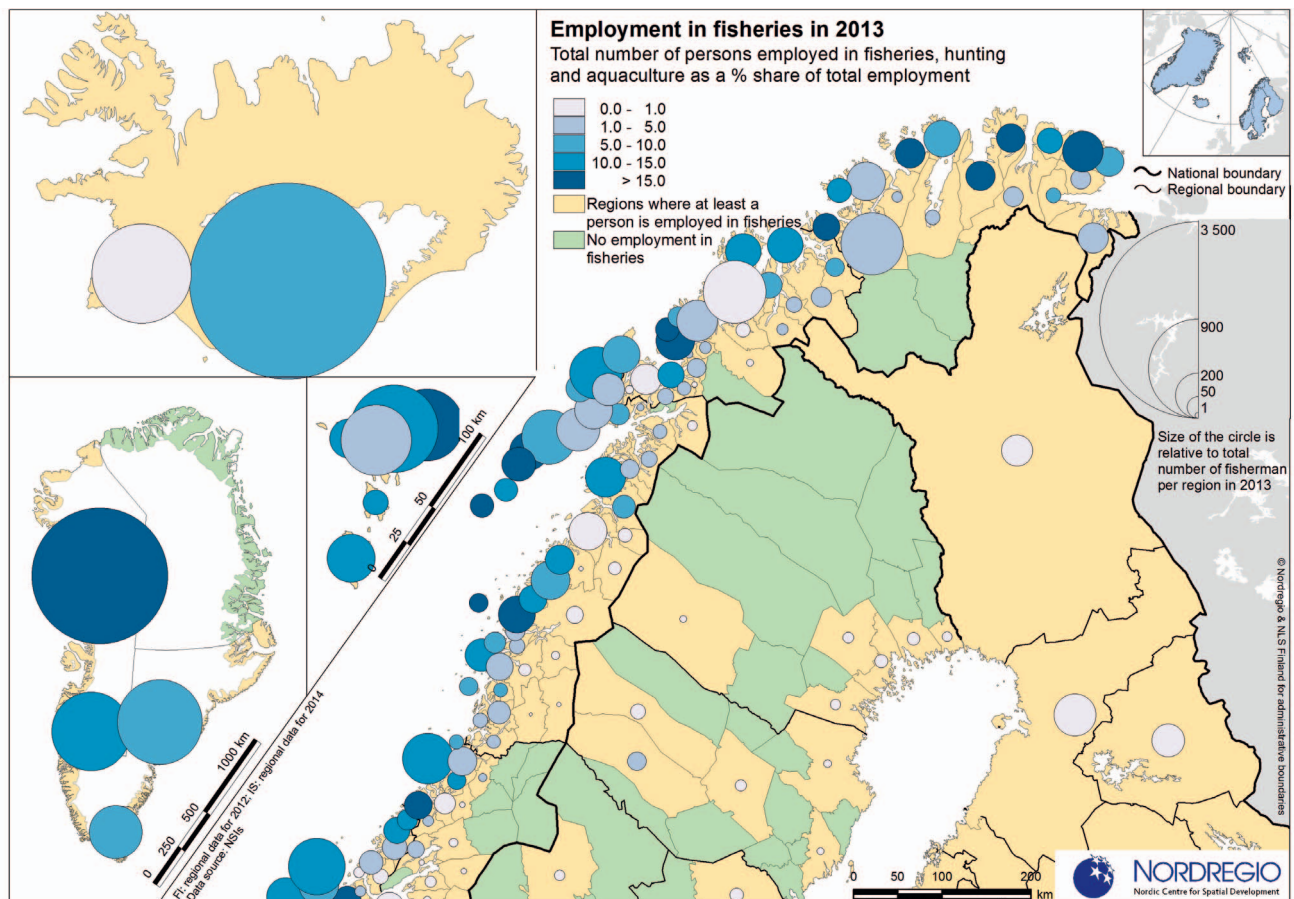
Striving to create higher value products is among the objectives of the bioeconomy. Today, a large amount of marine biomass is used in the fish oil and meal industries, which produce fairly low-value products. By us-

ing guts and entrails as a raw material for the chemical industry, for instance, it is possible to create a higher value per unit of biomass. Other examples of increasing the value of products include refining fish oil and meal products, which have undergone significant development in recent decades (Nordic Marine Think Tank, 2014). Such development has already taken place in the Nordic Arctic, and some examples are given in Subsection 4.3.4.

There is substantial innovation in fisheries in Iceland today, but much of it has taken place not in the fishing towns but elsewhere, mostly close to Reykjavík. While cod landings have fallen by 60% over the past 25 years in Iceland, the total export value of cod products has tripled over the same period. This is attributable to increased raw material utilization, product diversification and innovation (Lindberg et al., 2015). In Greenland, on the contrary, the fishing industry generates large quantities of waste, of which only 20% is currently utilized (Smáradóttir et al., 2014).

The fisheries sector in the Nordic Arctic has been evolving from traditional fishing and fish processing practised locally into a large-scale industry involving a variety of fields such as technology, logistics and marketing (Keskitalo, 2013).

Map 6: Employment in fisheries in 2013



With regard to the bioeconomy, the Nordic Arctic region could capitalize on further development of the sector, particularly of high value-added food and non-food products from the marine sector. It has a strong knowledge base acquired through traditional fishing and fish-processing activities, which would facilitate such development (OECD, 2011b). There is therefore a substantial potential for increasing the degree of local processing, linked to the development of enhanced and new products from fisheries, which would have a positive effect on employment and the economy.

4.3.2 Aquaculture

Fish farming is an important complement to the traditional fishing activities in the Nordic Arctic region. Small coastal communities in Norway and the Faroe Islands are especially well suited for fish farming because of the clean water, remote location, comparatively high sea temperatures and sheltered locations within the long and deep fjords. These conditions allow low-cost technology to be employed (ACCESS, 2014).

Norway and the Faroe Islands were early adopters of marine aquaculture and during the past 10 years have more than doubled their fish farm production. There are also good natural environment preconditions for aquaculture in Iceland, especially in the Westfjords and East Iceland regions (Smáradóttir et al., 2014).

During the last two decades, the industry has developed from small, locally based family businesses to a modern, capital-intensive, globalized industry dominated by large corporations (Nordland County Council, 2014).

Among the current challenges associated with fish farming is its large energy consumption in producing fodder for aquaculture. To address this challenge, attempts are being made to develop new types of fodder that are much more energy efficient, and land-based proteins are replacing fish that could otherwise be used for human consumption (GREECO, 2014).

4.3.3 Seaweed

Seaweed (macroalgae) farming has been practised for several decades in Canada, Ireland and other European countries for producing starch and other edible products. Nordic countries have been rather slow in exploiting this biomass resource because of their rich fish stocks but are now catching up to other countries with longer traditions of seaweed production.

Seaweed can be used as biorefinery feedstock for sustainable production of food, feed, fertilizers, biofuel and electricity. Macroalgae are mainly harvested, but they can also be farmed. Cultivation of macroalgae is attractive for third-generation biofuel production. The

Box 6. Small innovative business examples

Harvesting seaweed in Iceland

Seaweed Iceland is a small family-owned business based in Grindavík. Sustainably harvested seaweed is sold as a food ingredient in selected specialty stores and online. The electricity for the seaweed drying process originates from a geothermal plant (Seaweed Iceland, 2015).

Diving for sea urchins in Nordskot, Northern Norway

Diving for urchins (a shellfish used as a culinary ingredient) in the icy fjord has become a full-time job and a good source of income for Roderick Sloan, a Scotsman based near Bodø, Norway. Sea urchins are not a traditional catch in Northern Norway, and this is an inspiring example of a niche business. Roderick Sloan supplies urchins to dozens of the most exclusive restaurants in Europe, including Noma in Copenhagen and the 12-seat Fäviken in the wilds of Northern Sweden (Jenkins, 2013).

Nordic Arctic region has good opportunities for seaweed cultivation and processing, and also because of its strong competence within aquaculture, for offshore construction and biotechnology. Among the main European producers today are Norway and Iceland. On a global scale, their share is, however, less than 1%.

An example of seaweed production on an industrial scale is the Ocean Rainforest company in the Faroe Islands. The company has been producing marine biomass from macroalgae in open ocean cultivation facilities since 2007 (Ocean Rainforest, 2015).

Seaweed production has also taken place on a small scale (see Box 6) (Gregersen, 2015; SINTEF Fisheries and Aquaculture, 2014).

Although cultivation and harvesting are being practised in the Nordic Arctic region, processing of macroalgae into high value-added products has not yet been developed to an industrial scale. This provides unique commercial opportunities for the region. For future growth of the industry, there is a need for developing appropriate cost-effective pre-processing technologies but also political action on spatial planning and licensing, as well as investment support (Gregersen, 2015; Smáradóttir et al., 2014).

4.3.4 Biotechnology related to marine products

The application of biotechnology enables an increase in the value of biomass production or the production of higher valued products from biomass, including waste streams and underutilized biomass, such as macroalgae. The main areas of application of marine biotechnology today are in the health sector (nutritional supplements, vitamins, etc.). Biotechnology is also

increasingly being applied to improve aquaculture production and energy production from photosynthetically generated biomass, as well as in the production of enzymes and proteins.

In Northern Norway, an increasing number of companies and R&D organizations are involved in the production of enzymes, bioactive compounds, biochemicals and special products (oils, proteins, DNA, etc.) from Arctic marine resources for the nutrients, food, cosmetics, medicines and biotechnology markets. There are over 30 enterprises engaged in these activities in Tromsø city alone that are members of the BioTech North marine biotechnology cluster.⁴

Iceland has been involved in biotechnological R&D since the 1980s. In recent years, creating greater value for existing resources such as fish by-products has been an important R&D priority in Iceland. A number of small companies that utilize genetic and bio resources have been established within the cosmetics, folk medicine and food supplements industries (Lindberg et al., 2015). Among the interesting examples of recent biotechnological inventions from Iceland is the production of fish skin transplants for skin and tissue repair used for medical purposes. According to Iceland Ocean Cluster (2013), the companies working with by-products and/or biotechnology related to marine products in Iceland had a turn-over of about EUR 150 million in 2012, which is 17% higher than in 2011.

Iceland has important preconditions for building a dynamic biotechnology sector because of restricted access to human capital and natural resources (Lindberg & Teräs, 2014). According to Iceland Ocean Cluster (2015), the biotech industry in Iceland is an attractive sector for foreign investors. At the same time, there are still a number of barriers to developing the biotech industries in Iceland that need to be overcome, including the lack of specialized marketing support, lack of support regarding registration of products in foreign markets and an unclear regulatory system. The emergence of new companies as well as increased foreign and domestic investment in biotech are very important for giving the biotech industry a boost (Lindberg & Teräs, 2014).

4.4 Land-based bioeconomy

4.4.1 Forestry

Many people's livelihoods depend on forests, which have multiple functions in Northern Finland and Sweden, from gathering, game hunting and tourism to the

forestry industry and bioenergy production (Lindholt, 2008). Map 7 shows that Northern Finland and Sweden possess large forestry resources. The forestry sector's share of regional gross value added (GVA) in the Arctic regions of Sweden and Finland is about 4–6%. Forestry accounts for about 6–9% of regional GVA in Kainuu region and about 1.5–3% in the North Ostrobothnia region in Northern Finland (Map 8). The largest number of jobs is in forestry and logging, as well as manufacturing of wood and wood products (Norrbotten, Västernorrland and Northern Ostrobothnia) and manufacturing of paper and paper products (Lapland and Norrbotten) (Map 8). The forestry and agriculture sector in the Kainuu region in Northern Finland provides employment to about 11% of males in Kainuu (2009), which is twice the national average (Regional Council of Kainuu, 2014).

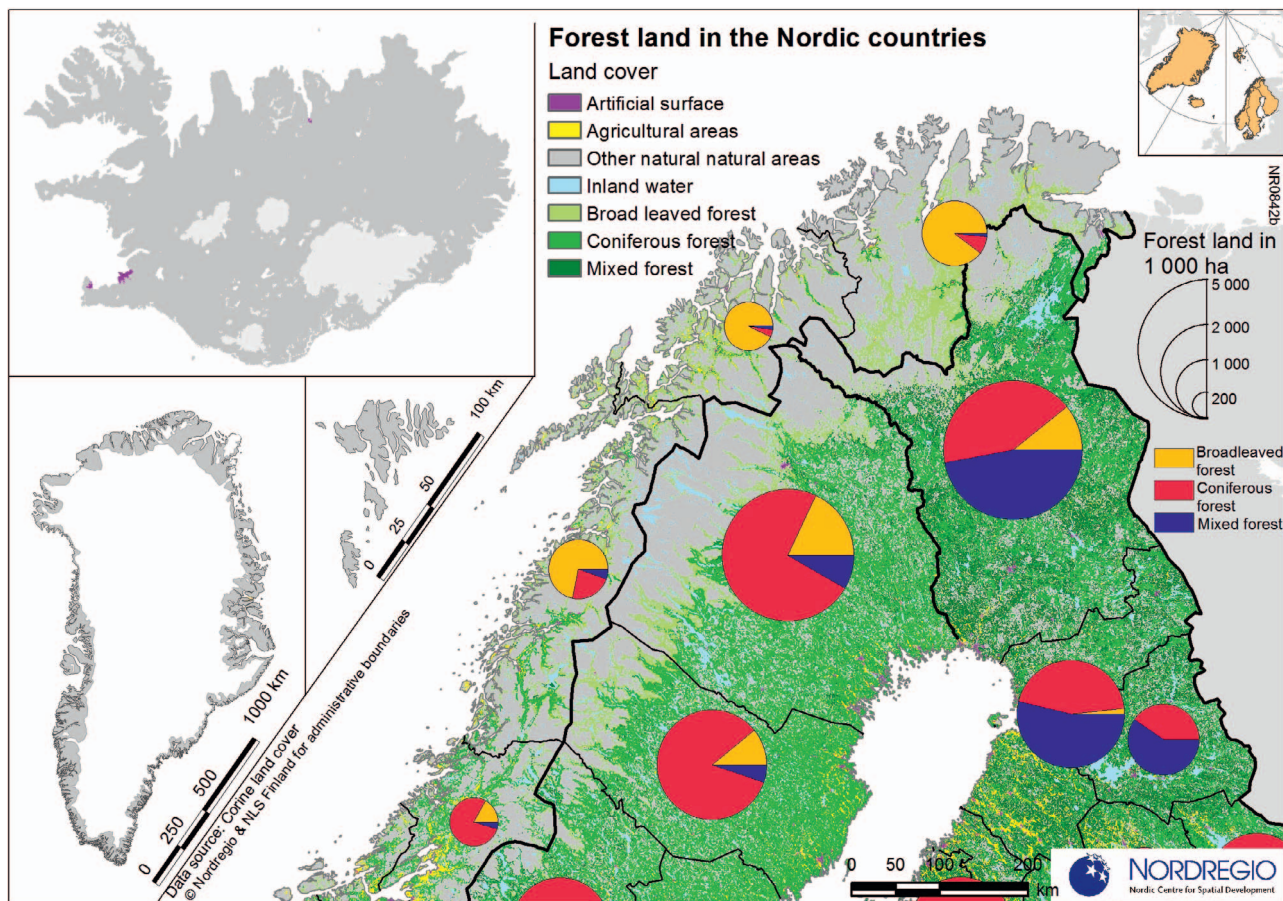
The forestry and wood processing industries have been the corner-stones of the economies in these regions for a long time (Lindholt, 2008). The main forestry industries are sawmills and pulp and paper. The paper industry, however, has been in decline in Finland and Sweden, and many paper mills in the region have been closed. To help further advance growth in the wood industry, the application of modern technologies and increased co-operation between companies and research organizations are crucial.

As noted above, forestry has a strong economic and historical importance in these regions. In Northern Sweden, forest owners include the state, large multinational corporations and a number of small-scale private owners. These actors own land, while the practitioners of reindeer husbandry possess parallel user rights. In Northern Finland, the forestry companies also have specific benefits compared with other land uses, such as reindeer husbandry. Forestry has been historically supported here as a favoured form of land use because of its role as an employer. With a decline in employment in the forestry sector over time from increased use of technology, discussions on how to develop other land uses that also provide local income, such as tourism, have emerged (Keskitalo, 2013).

Northern Finland and Sweden possess an array of expertise, knowledge and research on wood processing and wood products and other aspects of using forestry resources. The University of Oulu, Northern Ostrobothnia region, has substantial expertise in wood-related research. It has been an important actor for accelerating the growth of the wood and forestry industries in the Northern Ostrobothnia and Kainuu regions (Kainuun Etu, 2010). Maintaining and further developing this expertise creates opportunities, in particular for small- and medium-sized enterprises

⁴ Read more about the BioTech North cluster and its member companies at <http://biotechnorth.no/about-us>.

Map 7: Forestry land in the North Calotte region



(SMEs) (Prime Minister's Office, 2013). The opportunities for SMEs are related to finding new business niches and clients (OECD, 2012).

Over the past decade, forestry growth has accelerated in the Arctic Finland and Sweden, as in the rest of Europe (The Finnish forest industries, 2010). This allows for wood use to be increased in the future. It is emphasized in Finland's Strategy for the Arctic Region (2013) that "greater local demand needs to be created and new uses found for the growing volumes of timber." The strategy promotes improving the competitiveness and profitability of forestry while at the same time stressing the importance of giving consideration to other forms of land use and the reconciliation of the conflicting needs (Prime Minister's Office, 2013). From producing raw materials in the past, the future possibilities involve the processing of wood to create finished products and developing new biomass-based products, materials, services and forms of energy.

4.4.2 Bioenergy production

The energy sector in the Arctic Sweden and Finland uses large quantities of local wood fuels, peat and waste products from the forestry industry for heat and electricity production (Map 9) (Aresta et al., 2012; Bergström, Matisons, & Eds, 2014). This reflects a long tra-

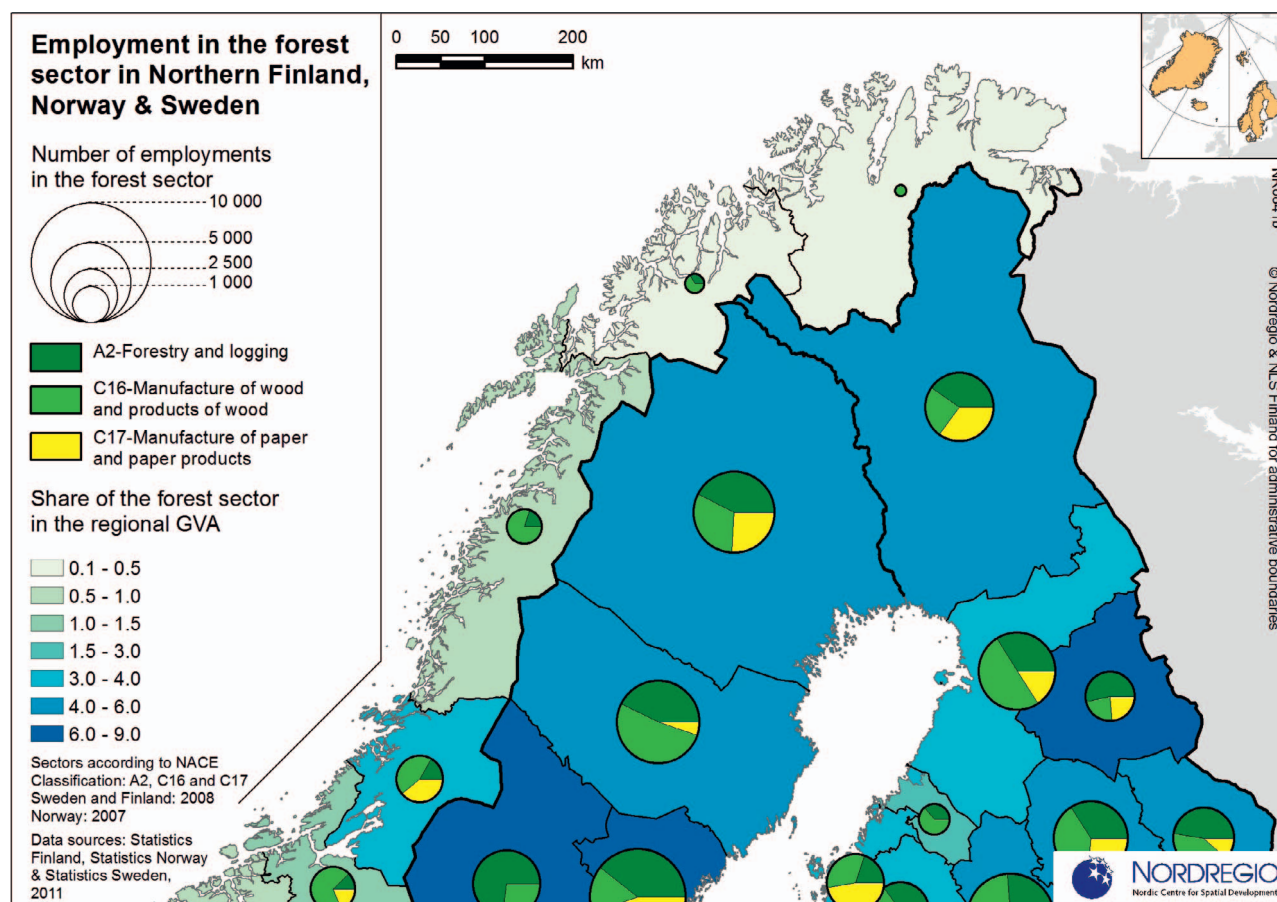
dition of using wood as a fuel source for heating, which accelerated in response to the oil crisis in the early 1970s.

District heating systems represent a large market for biomass in Sweden and Finland. Local utilities are in many cases fed with locally collected forestry residues provided by small forest owners. Local utilities provide cheap energy for rural industries and supply heat to the municipalities, which often results in a reduction of the cost of heating for locals.

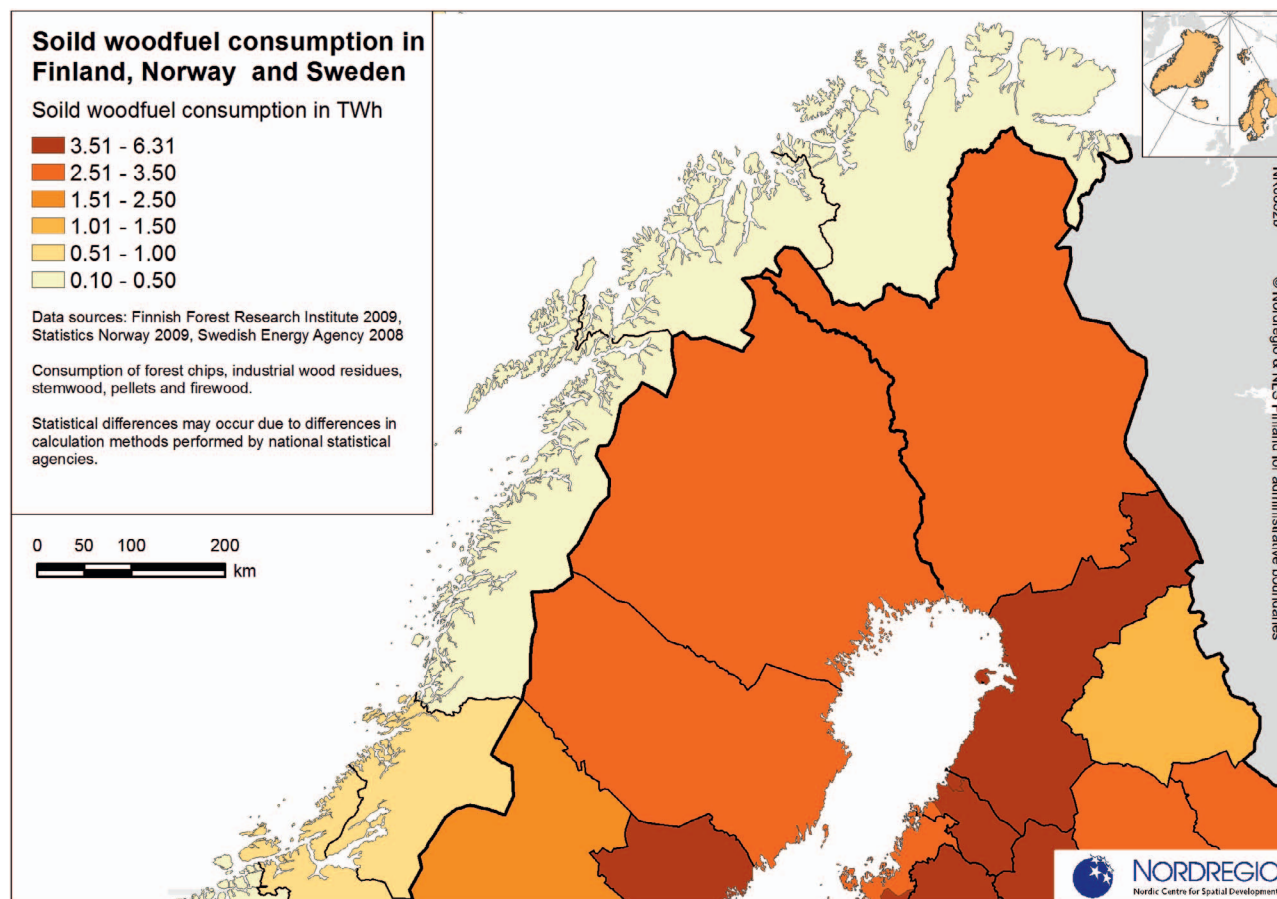
As shown on Map 10 and Map 11, there is substantial potential for bioenergy production from forestry residues, including stumps, in Finland and Sweden. Forestry residues such as branches and tops are a cheap energy source but are expensive to collect and transport. Therefore, the best alternative is to use them locally.

Local energy production has a positive effect on rural and regional development. The expansion of the bioenergy market, specifically through first- and second-generation biofuels, is viewed as a means of stimulating regional economic growth and providing additional income for farmers and forest owners (Lindblom & Rasmussen, 2008). According to Lapland's Energy Strategy (Finland), the use of forestry chips and peat for local energy production could create a direct

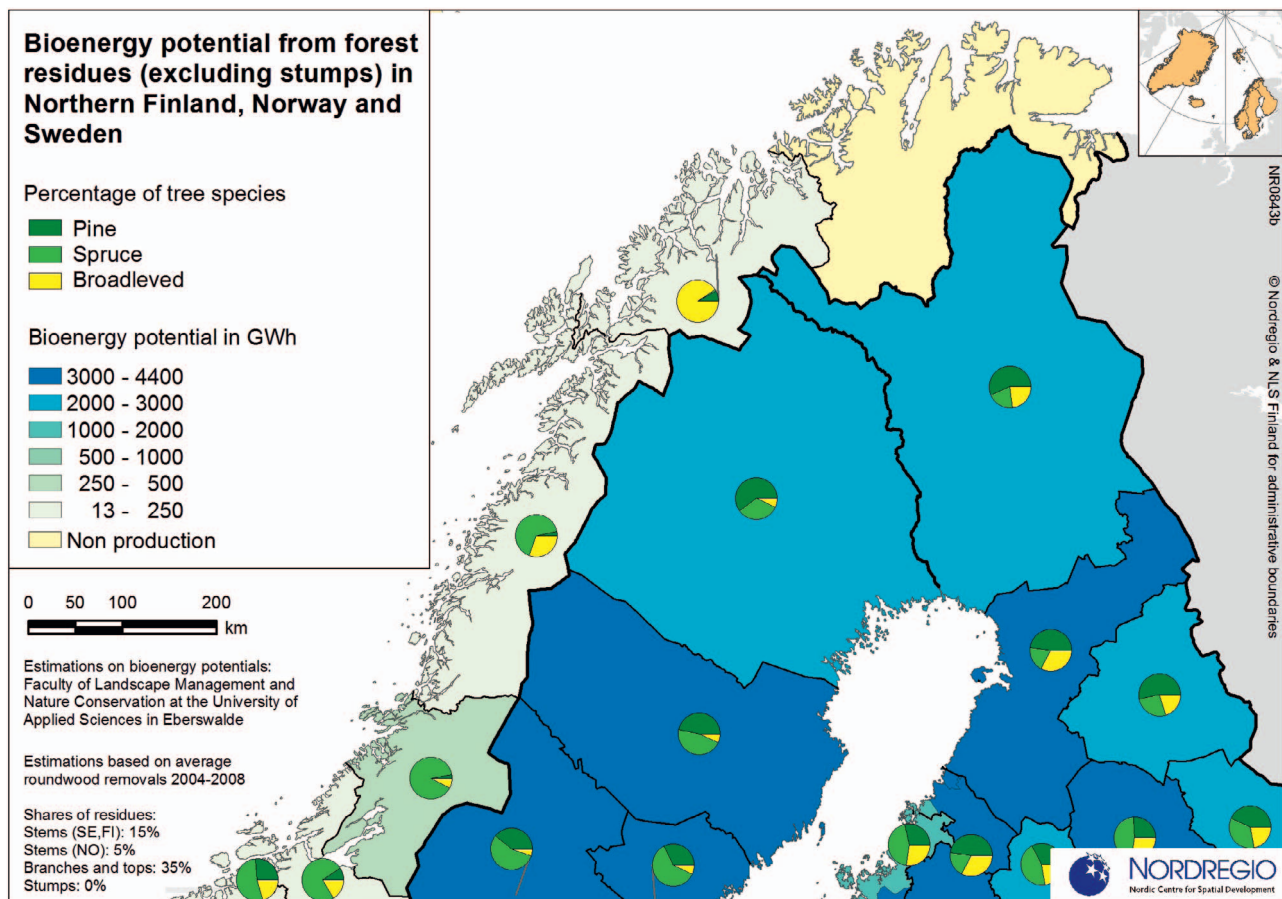
Map 8: Share of the forest sector in regional GVA; Employment in the forest sector in Northern Finland, Norway and Sweden



Map 9: Solid wood fuel consumption in the North Calotte region



Map 10: Bioenergy potential from forestry residues including stumps in the North Calotte region



increase in annual employment figures by 1000 man-years in relation to the building of a new biofuelled combined heat and power (CHP) plant in the city of Rovaniemi and a biodiesel refinery in the city of Kemi (Regional Council of Lapland, 2008a).

There is an increasing demand for local energy production in connection with the development of new mining areas, and bioenergy can play an important role in this. The Talvivaara mining area in the Kainuu region is a good example of the growing demand for CHP (Kainuun Etu, 2010).

4.4.3 Biofuels

Long distances and sparse settlement in the Arctic make the region highly vehicle dependent. As a consequence, the region has a high consumption of vehicle fuel and among the longest average distances travelled per person.

While renewable energy accounts for a significant share of energy consumption in Sweden and Finland, the transport sector is the main challenge. The transport sector is lagging behind in terms of renewable fuel use and is still highly dependent on fossil fuels. In order to reach the targets of the EU's Renewable Energy Directive, there is an increased demand for the produc-

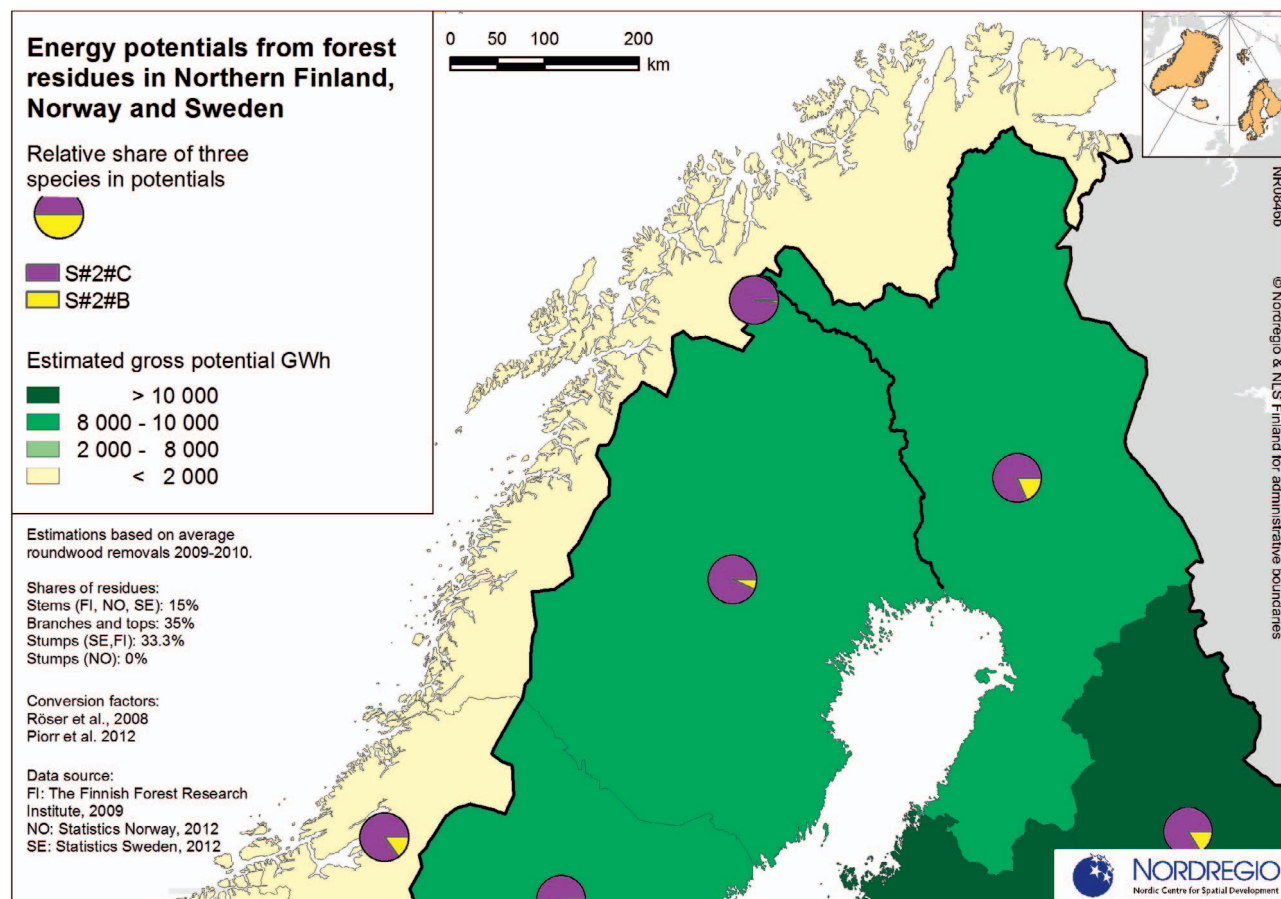
tion of transport fuels from renewable sources.

Biogas is likely to play an important role as one of the energy solutions that contribute to replacing fossil fuels in the transport sector (Bernström & Burgman, 2014). Biogas production is more common and has greater potential in the southern regions of the Nordic countries. This can be explained by the availability of more substrate for biogas production in areas with a higher level of livestock farming.

Map 12 shows a regional overview of the labour market effects of bioenergy production in the Nordic Arctic. The map shows that among different types of bioenergy, the largest number of full-time jobs is within biogas production from manure and straw. It can be seen from the map that in Northern Ostrobothnia County in Finland the labour market effects of bioenergy production are particularly high and the bioenergy production is diverse, including biogas, bioethanol from grain and bioethanol from straw.

In Northern Sweden and Finland, biomass use in the transport sector is promoted through several initiatives, of which the most visible and well known is the Green Highway (GH). GH is a cross-border initiative aimed at reducing the dependence on fossil fuels in transportation and boosting investments in green

Map 11: Energy potential from forestry residues in the North Calotte region



technology. The GH transport corridor is 450 km long and connects Östersund and Sundsvall in Sweden and Trondheim in Norway (Figure 3). Although GH is beyond the focus of this study geographically, it is still a relevant example, as it bypasses peripheral and sparsely

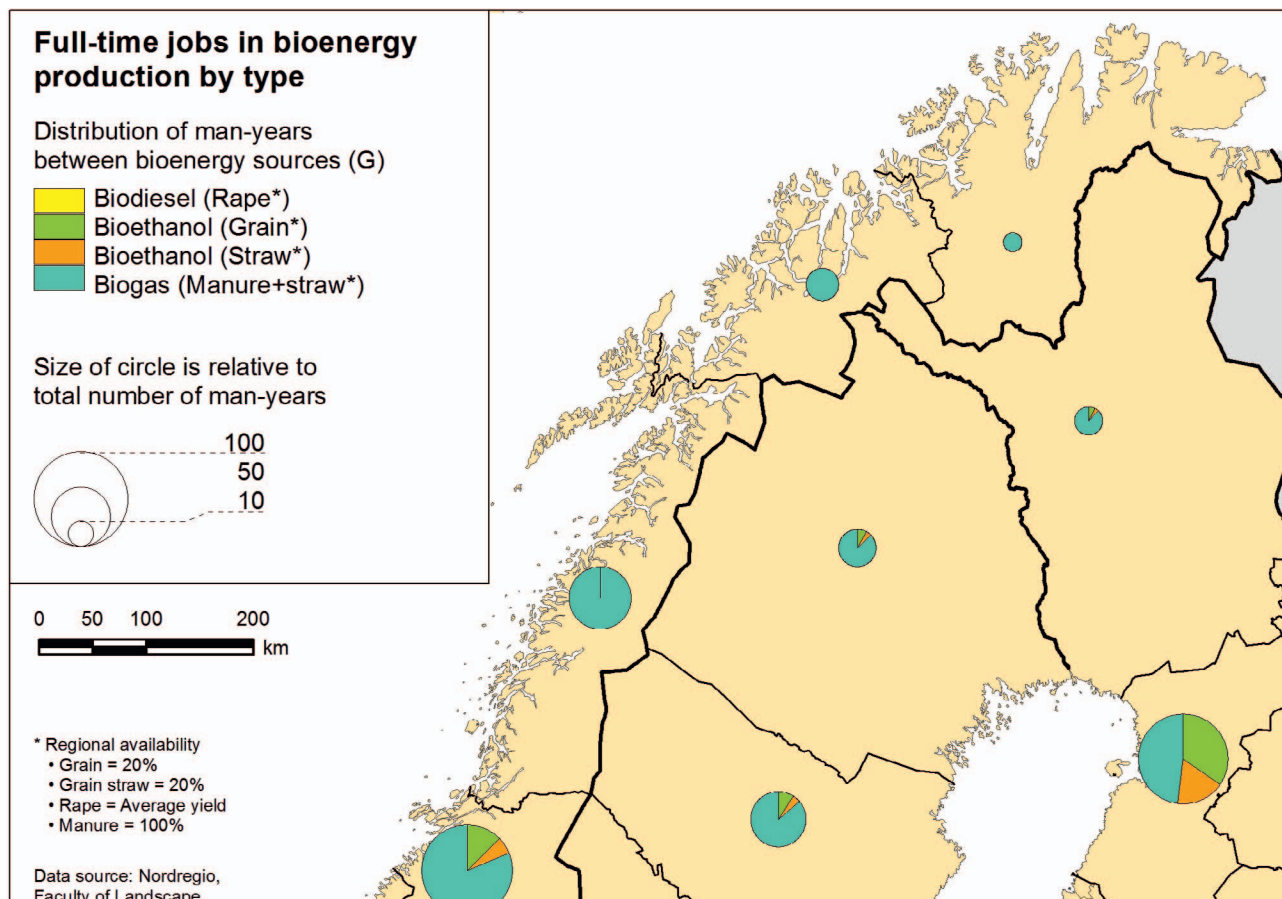
populated counties in central Sweden and Norway. The highway is specifically designed for “green vehicles” with a number of charging stations for electric cars and renewable fuels along the route (OECD, 2012). The project is driven by the municipality of Östersund together

Figure 2: Green Highway transport corridor



Source: www.greenhighway.nu/

Map 12: Full-time jobs in bioenergy production by type in the North Calotte region



with Sundsvall and Trondheim. Energy companies and research organizations are also among the partners. In the next phase of the project (2015–2018), the focus will be on liquefied biogas (LBG).

Cross-border co-operation is central for the development of sustainable and integrated transport solutions, and the GH initiative is a good example of such co-operation. The GH contributes to improved infrastructure, reduction of emissions and dependence on fossil fuels in both Sweden and Norway (North Sweden, 2014).

The BioFuel Region is a network that brings together actors from academia and the business sector to promote increased biogas production and use in the transport sector in Norrbotten, Västerbotten, Jämtland and Västernorrland counties (BioFuel Region, 2015). The network is involved in several projects.⁵ One of them is aimed at accelerating biomethane and LNG development in the North of Sweden (BioGaC), which is one of the EU's TEN-T projects. During the project, two new compressed natural gas (CNG) filling stations will be built in Northern Sweden (European Commission, 2013b).

SunPine is the first company in the world to extract

biodiesel from the pulp mill waste product, tall oil. The company is located in Piteå, in Arctic Sweden, and is a good example of developing innovative green technology and creating new jobs. The raw material used in a biorefinery comes from Swedish forests and forestry industries. The cost of investment was around SEK 350 million, and the construction was completed in 2010. The production of rosin from tall oil will start in 2015 in co-operation with the chemical company Lawter. Increased use of tall diesel is in the national interest, because it contributes to the objective of having a fossil-free vehicle fleet by 2030 (Svebio, 2013). The next subsection provides a more detailed overview of the biorefining activities in the Nordic Arctic.

4.4.4. Biorefineries

Refining of biomass, or biorefining, can be defined as the processing of biomass raw material into more useful and valuable forms. This processing is different from conventional biomass processing undertaken by the agricultural, food or forestry industries. It focuses on value chains containing steps involving the decomposition of the raw materials at a chemical level, and not on value chains containing only mechanical processing (Joelsson & Tuuttila, 2012; Lindblom & Rasmussen, 2008).

⁵ For details, see: <http://biofuelregion.se/>.

Today, the Nordic countries are increasingly focusing on upgrading bioresources to produce, for example, feed and food ingredients, biomaterials and biofuel (Norden, 2015). Biorefining contributes to the renewal of existing forestry industries and is seen as a mechanism to support regional development and to achieve environmental goals (Aresta et al., 2012). There are several biorefinery projects under way or planned in Northern Finland and Northern Sweden (see Box 7).

Today, many biorefineries use existing pulp and paper mills and infrastructure because it is less costly to convert existing utilities into biorefineries. From this perspective, biorefining can improve existing mills and create more value, new chemicals and materials, and increase both economic efficiency and the efficiency of feedstock usage (Lindberg & Teräs, 2014). The majority of large pulp and paper companies in Sweden and Finland are already working on biorefining and are mainly focusing on the production of liquid biofuels for the transport sector (Bergström et al., 2014; Lindberg & Teräs, 2014) the pulp industry (and other players).

Örnsköldsvik, Sweden, is among the most well-known success stories of bioeconomic development based on a biorefinery cluster. The region experienced an industrial down-turn in the 1990s, and there was a “sense of urgency” to create new industries and jobs, which paved the way for the biorefinery initiative. The cluster today consists of 21 member companies mainly connected with the forestry, chemical or energy industries (Lindberg & Teräs, 2014). The SP Biorefinery Demo Plant for development and demonstration of cellulosic ethanol production (second-generation biofuel) was inaugurated in Örnsköldsvik in 2004 (Joelsson & Tuuttila, 2012). The plant is the largest of its kind and Sweden’s only demonstration unit for bioethanol production. It is already capable of competing with similar plants located in Norway, which have more experience in this industry (Cooke, 2013; OECD, 2012).

For Örnsköldsvik and similar small regions with usually less diversified economies, development of biorefineries could be a good alternative to already existing traditional industries. Today’s challenge is to bridge the gap from R&D projects to larger-scale projects and commercialization. The obstacles are related to insufficient demand for green solutions, large capital investments and insufficient political support (Lindberg & Teräs, 2014). Cellulose-based ethanol is a big political uncertainty today. There is an ongoing discussion in the EU on whether forestry resources can be classified as renewable and thus whether biofuels produced from forestry biomass can be considered to be renewable (SEKAB interview, 2015).

In recent years, there have been many large research

Box 8. Bio4Energy research platform

Umeå University in Västerbotten is the lead partner in the Bio4Energy research platform for developing sustainable biorefinery processes. The academic cluster co-operates with the industrial sector to develop advanced biofuels, “green” chemicals and new bio-based materials from biomass based on woody raw materials or organic waste. This research programme is leading efforts to develop one of Sweden’s “strategic areas for research” from 2010 to 2015, based on a €20 million grant from the Swedish government. Bio4Energy is aiming to develop technologies for converting forest-sourced biomass into biofuels and other bio-based products (Joelsson & Tuuttila, 2012).

projects targeting the biorefinery area that utilizes forestry biomass in the northern regions (see Box 8). Furthermore, several clusters have emerged as a means to improve co-operation, to synchronize efforts and to attract funding.

4.4.5 Agriculture

With regard to agriculture, most parts of the Nordic Arctic region, with the exception of some areas of Sweden and Finland, are constrained by the size and quality of the land available, as well as difficult weather conditions. These constraints limit the production of crops and livestock breeding. The land in the Faroe Islands, Southern Greenland and Iceland is suitable for sheep farming, where it makes an important contribution to the local economy.

Maintaining and developing agricultural activities offers an array of opportunities and is crucial from a food security perspective in the Nordic Arctic region. Such factors as remote location, limited transport infrastructure, harsh climate and high global prices for food commodities and oil make the cost of food and its distribution challenging in the North. Therefore local agricultural production, gathering and hunting are vital for the Arctic inhabitants for health and dietary reasons.

Despite the limitations, there are a number of opportunities to increase agricultural production in the future related to research on new crop variants that are more adaptable to harsh environments, as well as using greenhouses to produce local vegetables. The Nordic Arctic region could also benefit from using smaller amounts of pesticides, as pest infestations are currently limited because of the cold climate (Smáradóttir et al., 2014). In addition, in the light of the changing climate, there is a potential for an extended growing season and a larger variety of crops (UArctic, 2013).

Many agricultural and food producers are small companies that have managed to establish niche busi-

nesses (see Boxes 6 and 9). In the case of Iceland, a public R&D institute Matis played an important role in facilitating the development of innovative niche products. It provided support for co-operation between farmers or food processing companies; for instance, by matching people with innovative food development ideas with those who have access to the necessary materials (Teräs et al., 2014).

Agricultural production is also important in connection with the multifunctionality aspect, as agricultural residual products and livestock manure could be used for biogas production, as fertilizer or as inputs into other industries. Biogas can be used for CHP and district heating, and also in transportation after being refined and compressed (Lindblom & Rasmussen, 2008). There is a growing interest in biogas production from agricultural residues and by-products such as manure and haulm, straw and crops in some Nordic Arctic regions like Norrbotten. A recent study (Bernström & Burgman, 2014) shows that biogas production through thermal gasification appears to be a good solution for energy supply in Norrbotten.

Agriculture has strong links with the tourism sector, as tourists are generally interested in local traditional foods. Meat, game, fish and a rich variety of berries and mushrooms are among the ingredients used in everyday meals in the Arctic food culture. Visitors to the region greatly appreciate the purity and high quality of the food ingredients.

Ipiutaq guest sheep farm in Southern Greenland is a good example of such a collaboration. The guest farm offers vacation packages that include a combination of experience tourism (fishing, hiking and other outdoor activities), agriculture (working on a farm), a comfortable homestay and a French–Greenlandic gourmet gastronomy based on local and traditional products (Ipiutaq, 2015).

4.4.6 Reindeer husbandry

In Northern Norway, Sweden and Finland, reindeer husbandry is an economic activity that is strongly linked to the Sami indigenous population. Reindeer herding is seen as central to Sami livelihood and is viewed as a fundamental part of Sami culture—even though only some 10–15% of the Sami people are today economically involved in such practices. The Reindeer herding area—from the highlands of Oppland to the east coast of the Kola Peninsula covers a land area of over 500 000 km². In each of the Nordic countries, this equates to approximately 30–40% of the total land area (Roto, 2015). Map 13 provides an illustration of reindeer herding areas and districts across Sápmi in 2014, including the number of domesticated reindeer.

Box 9. Niche industries in the field of food, agriculture and fisheries in Iceland.

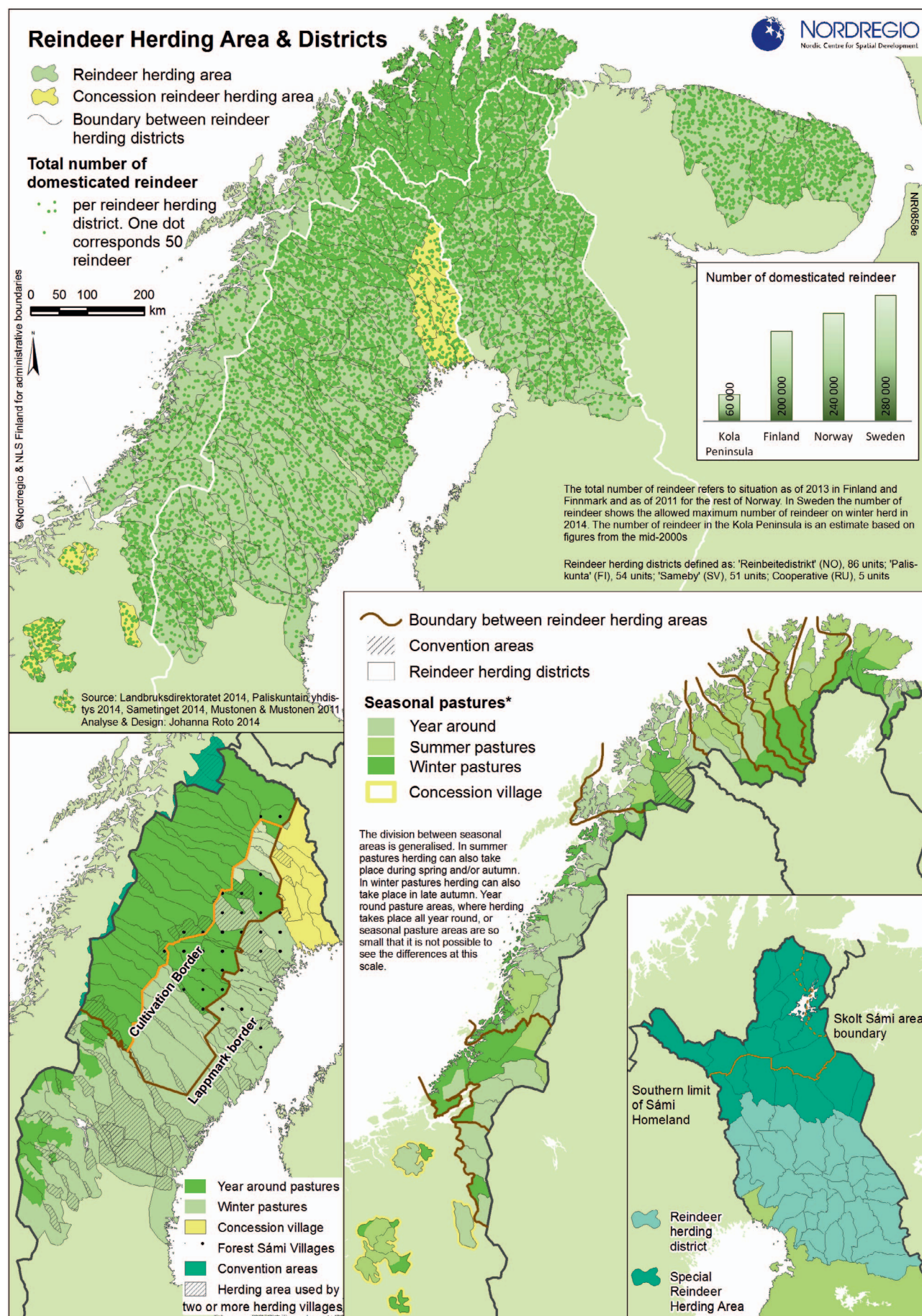
In the South Iceland region, several small-scale innovation activities have been developed in the food innovation centres of Matis. These include developing ways to export cod liver, developing green “kale snacks”, “potato chocolate”, dried fish products as souvenirs, raw goat sausages and the development of hot smoked mackerel products (Teräs et al., 2014). Another example is fish skin leather produced in North Iceland from different fish species in Iceland. The fish leather is used as a material for high fashion, clothes design, furniture or anything else (“Atlantic Leather”, 2015).

In some parts of the Nordic countries, only people designated as Sami can practise reindeer herding. Norway and Sweden have passed a law allowing the Sami population to engage in reindeer husbandry, although there are exceptions to this law in both countries. The exceptions include concession reindeer husbandry in Sweden (koncessionsrenskötsel) and tame reindeer husbandry (tamreinlag) in Norway (Jernsletten, 2007).

In Finland, in principle, all citizens of the European Economic Area (EEA) living permanently within the defined area for reindeer herding can engage in the industry. In practice, however, it is more complicated because reindeer husbandry is organized at the district level (Paliskunnat), and two important preconditions have to be met: the reindeer owner must reside within the borders of the district, and the board of the district needs to approve membership. Membership automatically releases grazing rights. The reindeer herding area is divided into three reindeer herding areas: the Sami reindeer herding area, the special reindeer herding area and the reindeer herding area. The difference between them is that reindeer herding in the Sami reindeer herding area should be prioritized and given special attention in issues related to encroachment. Reindeer herding in the special reindeer herding area should also receive some attention in this regard. The borders between the districts are decided by the provincial government. Reindeer husbandry is organized in 54 districts in the reindeer husbandry area. The 13 northernmost districts are so-called Sami districts (Jernsletten, 2007).

In each district, an upper limit on the number of reindeer and an upper limit on the number of reindeer that one person can own is set. The Ministry of Agriculture and Forestry set these limits for a 10-year period. In 2010, the maximum number of reindeer per person was set to 500 livestock in the special reindeer herding area and to 300 in the southern districts. The number of reindeers per district varies from 500 to

Map 13: Reindeer herding areas and districts in Sápmi 2014



12 000 (FINLEX, 2010). The upper limits per district are set to help operators cope with both a lack of good pastures and excessively large herds of reindeer.

In Sweden, reindeer husbandry is regulated by the Swedish Reindeer Husbandry Act of 1971. According to this Act, the right to engage in reindeer herding belongs to the Sami people. The reindeer herding area in Sweden is divided into 51 Sami co-operatives. The co-operatives are further divided into 33 mountain Sami co-operatives, 10 forestry Sami co-operatives and eight concession Sami co-operatives. In the mountain Sami co-operatives, the herding is characterized by long migratory routes between summer and winter pastures, whereas in the forestry Sami reindeer herding villages, herding is more static and is conducted in forested areas. Eight of the herding villages in the Torne Valley are so-called concession Sami co-operatives. Within each Sami co-operative, there are a number of reindeer herding enterprises. An enterprise is defined as the reindeer owner and his/her household, and thus comprises the family. The sizes of the Sami co-operatives range from a few active reindeer owners to several hundred (Jernsletten, 2007; Sametinget, 2015).

Only financial activities associated with the reindeer are part of the Sami co-operatives. It is required that the main income (more than 51%) of the members of the Sami co-operatives be generated from reindeer herding. Additional income should be derived from other employment. During the last decade, national authorities have focused increasingly on Sami co-operatives' being able to benefit from other economic opportunities. If such changes are implemented, not everyone in a co-operative would have to engage in reindeer herding; rather, some members could produce and sell handicrafts, work in tourism, or process and sell fish and berries within the co-operative framework (Jernsletten, 2007).

In Norway, according to the Norwegian Reindeer Herding Act of 2007, only those who have the right to a reindeer earmark can conduct reindeer husbandry in the Sami reindeer herding area. The right to a reindeer earmark requires that the person be Sami and that they, their parents or their grandparents have or had reindeer herding as their primary occupation. Reindeer husbandry is conducted primarily in the Sami reindeer herding area, which is divided into six regional reindeer herding areas. The areas are further divided into 89 districts. Some of these districts are only used seasonally, although most practise the use of seasonal pastures, such as spring, summer, autumn and winter grazing. In addition, there are four so-called concession areas in Southern Norway, where both Sami and non-Sami people are engaged in reindeer herding (In-

ternational Centre for Reindeer Husbandry, 2015).

A Sami reindeer husbandry district is an administrative unit that includes a specific geographical area and whose main task is to organize reindeer husbandry within the district. The Act of 2007 has retained the system of districts but has incorporated some parts of the traditional Siida system. In the Act, the Siida is understood as one or several groups of reindeer owners within a district engaged to carry out the practical work with reindeer in a given area. The Siida unit is a family or individual who represents a unit within the district and is engaged in reindeer herding in a Siida managed by an individual, a married couple or a couple living together. The system of Siida units, or operational units as they were named until 2007, was introduced in order to monitor the industry and to control reindeer numbers. In order to lead a unit, a person is required to have reindeer husbandry as his or her main profession (International Centre for Reindeer Husbandry, 2015).

Today, reindeer husbandry is facing similar challenges across the North Calotte region. Land-use conflicts between reindeer husbandry and resource extractive industries, such as mining and forestry, remain an issue. Low profitability is a key challenge, which also complicates generational succession by raising a barrier against young people engaging in reindeer herding. Predation is another issue that has a negative impact on reindeer herding. In Sweden, predators have been estimated to consume 15–20% of the reindeer, and there is an upward trend. It has been highlighted that reindeer herding has significant indirect economic impacts on maintaining the service level in rural communities. The reindeer are an attraction and an important symbol used in branding the North Calotte region. Furthermore, reindeer meat is an important element in the regional cuisine (Eriksson, 2014).

4.5 Future opportunities and challenges in the bioeconomy

This chapter sheds light on the opportunities and challenges in the transition to a bioeconomy in the Nordic Arctic context. Despite being rich in natural resources, the opportunities for development are constrained by several factors, including weather conditions, demographic change, peripherality and distance from the market. Some of the enabling and hindering factors for bioeconomy development are discussed in this section, and suggestions on how to tap the full potential of the bioeconomic activities are given.

4.5.1 Labour-market effects

In the process of technological development and effi-

ciency improvement, many traditional jobs in the primary sector have been lost. Despite increasing the volumes of production, the primary sector employs significantly fewer people than before. Development of bioeconomy, therefore, is unlikely to contribute significantly to growth in employment. However, it can contribute to maintaining and creating valuable jobs in regions where there are otherwise limited employment opportunities (OECD, 2011b, 2012; Smáradóttir et al., 2014). Moreover, in addition to the direct jobs related to the establishment and maintenance of a production facility, most of the long-term jobs are indirectly related to the bioeconomy sectors and are created along the supply chain, including R&D, manufacturing and transportation (OECD, 2012).

In the Nordic Arctic context, the lack of human capital is among the limiting factors for development of the bioeconomy. Harnessing the full potential of the bioeconomy requires a mix of existing skills and traditional occupations (e.g., farming and fishing), but also new high- and low-tech skills in a range of biorefining and bioprocessing technologies. Young people today are less interested in taking on traditional primary occupations such as fishing and farming, and an increasing number of youth see themselves residing permanently in urban areas in the future (Karlsdóttir & Jungsberg, 2015). Therefore, a lack of adequately trained or educated young people represents a significant challenge for future development of the bioeconomy in the Nordic Arctic.

Increasing the attractiveness of jobs in the primary sector to youth and making them want to live in rural areas remains a challenge. One of the possible solutions is related to further developing educational and vocational training opportunities (including distance learning) in the Arctic region, thereby providing more incentives for the youth to stay. Creating new and attractive employment opportunities within the bioeconomy sectors as well as supporting entrepreneurship and innovation in this field may also limit outmigration of young people from the region or may even attract new residents.

Migrant workers may be a solution for employment in the primary industries in the Nordic Arctic. Already today, the fishing industry in the Nordic Arctic region relies on foreign workers willing to settle in remote areas along the coast and on unskilled seasonal migrant labour. Many jobs in the fisheries sector are taken by foreign labour, as the native-born workers prefer to work in the secondary and tertiary sectors (Wojtyńska, 2012). In Norway, one-third of employees in the fish processing industry are foreigners. In remote coastal communities, even small changes in the population

dynamics can reshape the community. Such a development has positive economic effects on the local community but at the same time has created concern over integration of workers into the local communities (ACCESS, 2014).

4.5.2 Increasing local processing

The economies of some regions in the Nordic Arctic, in particular the West Nordic region, are based on raw material production. Until today, processing prior to transportation from the area has rarely taken place, although it creates additional positive local and regional impacts and diversifies the economy. Due to requirements for high capital, R&D and other knowledge-intensive stages of production, further processing of resources often remains outside the Arctic region. High capital requirements are associated with, for instance, harsh weather conditions and higher energy consumption.

Future opportunities are clearly linked to increasing secondary production and local processing of the raw materials (Smáradóttir et al., 2014). Such development could contribute to regional economic growth and job creation within innovation, research, distribution, retailing and catering. Availability of cheap locally produced energy could play a facilitating role in increasing local processing.

Some regions have made increased local processing a regional priority. The county plan for Nordland, Norway, involves promoting increased value creation in fisheries and aquaculture through a greater degree of local processing. It is stated in the county plan that such development would contribute to greater competitive advantages for Nordland's marine business communities by facilitating collaboration, the accumulation of knowledge, the exchange of experience and industry-related research (Nordland County Council, 2008).

4.5.3 New bio-based businesses

Developing the bioeconomy does not necessarily require high technology and advanced large-scale solutions. Future opportunities within bioeconomy might be within small-scale innovations developed using the local knowledge and competence of the local people (e.g., food innovation) (Teräs et al., 2014) (e.g., see Boxes 7 and 10). Good opportunities exist within small-scale developments that are based on cross-sectoral collaboration. Combining coastal fisheries, agriculture, the food industry and tourism could be one of the alternative development paths for local communities (Teräs et al., 2014).

Development of niche industries has been suggested as an alternative path in Rönnlund et al., 2014;

Smáradóttir et al., 2014). Some good examples of niche industries have been presented in the previous sections (see Section 4.4.5). In this regard, an increased involvement of small- and medium-sized enterprises (SMEs) in the value chain could be further strengthened. It is stated in the Blue Growth in the North East Atlantic and Arctic report by Nordic Marine Think Tank that the business models involving co-operation between an SME that only controls a small part of the value chain and multinational companies should be investigated and promoted. An illustrative example of this is the co-operative arrangement between Chitinor AS (Norway), which is a manufacturer of high-quality biopolymers from raw materials from the fisheries and aquaculture sector in biomedical, cosmetic and life-science applications, and DuPont Nutrition Biosciences Ltd. (Denmark), which is a multinational company in the field of functional ingredients that has the ability to control the entire value chain.

In Northern Finland, the *Bioeconomy Development Strategy of Oulu Region 2015–2020* emphasizes the role of the SME sector in all value chains. According to this strategy, the annual turn-over of the region's bioeconomy will increase by EUR 2 billion, and 4 000 new jobs will be created by 2030 (Council of Oulu Region, 2015).

The challenges in some of the regions in the Nordic Arctic are related to the underdeveloped culture of entrepreneurship because of the dominance of old large industries. Forestry industries are often conservative businesses that have been hesitant to try something new and uncertain. The main focus of the forestry industries has been on cost reduction and improving efficiency and little attention has been paid to innovation and new product development. As a result, new businesses have had problems entering the market. Moreover, there has not been any pressure on SMEs, as they can easily survive as suppliers to a few customers (e.g., LKAB in Kiruna) (based on interviews). To address this challenge, there is a need to improve the culture of entrepreneurship and collaboration, and to facilitate the emergence of new bio-based businesses through empowerment, developing good practices, building confidence, etc.

4.5.4 The role of cross-border collaboration

In the context of the bioeconomy, cross-border collaboration may, among other things, contribute to greater cost-effectiveness in public investment, strengthening economic complementarities and providing more direct and effective solutions to environmental problems (Hörnström, Berlina, & Tepecik Diş, 2015).

A practical example of cross-border activities in the Nordic Arctic region is co-operation in the field of

waste management in the Kiruna–Narvik border area. Since 1998, a waste management company on the Norwegian side of the border (HRS Miljø) has been selling waste to an energy company in Kiruna (Tekniska Verken) for district heating production. Today, about 60% of all waste at HRS Miljø is exported across the border. The waste trade between the two companies has been both economically and environmentally sustainable (Berlina, Hörnström, & Diş, 2015b). Another good example of cross-border collaboration is the Green Highway initiative mentioned in Subsection 4.4.3.

4.5.5 Political support

Above all, the transition to the bioeconomy is influenced by political decisions. Political commitment and long-term political support are crucial for any investment and development to take place. This issue is highly relevant regardless of the geographical context. There is currently insufficient demand for green solutions and substantial political uncertainty regarding cellulose-based ethanol (Lindberg & Teräs, 2014). There is an ongoing debate in the EU about whether forestry resources can be classified as renewable and thus whether biofuels produced from forestry biomass can be considered to be renewable (SEKAB interview, 2015). The actors involved in the forestry industries and energy producers unanimously agree that there is a need for long-term demand-increasing measures (e.g., green certificates, taxation) in taking the next step in developing the bioeconomy. The low price on fossil fuels is another factor that hinders the transition to greener alternatives (based on interviews).

4.6 Bioeconomy in the Nordic Arctic and sustainable regional development

Bioeconomic activities have traditionally played an extremely important role in the regional economies in the Nordic Arctic, ranging from forestry and wood processing to fisheries and reindeer husbandry. The Nordic Arctic region has good preconditions, in terms of its natural conditions and traditional industry, for converting to a bioeconomy. There is a substantial amount of valuable knowledge and experience existing in the region today in activities associated with the primary industries. If this knowledge is combined with R&D, technological change, an innovative approach and political support, the Nordic Arctic region could benefit from a transition to a bioeconomy and could achieve important environmental, economic and societal benefits.

Bioeconomy development has a significant contribution to make to sustainable regional development through diversifying the local economy, creating new jobs and increasing energy security by using locally produced bioenergy, among other possibilities. In developing the bioeconomy, it is crucial to consider the sustainable use of biomass, potential land use conflicts and the global perspective. Some questions that may be addressed in the development of regional and local initiatives for the bioeconomy in the Nordic Arctic are the following.

- How do we ensure that bioeconomy development is environmentally, socially and economically sustainable?
- As the forestry, agriculture and tourism sectors are interlinked, a mutually beneficial co-operation can be fostered between the sectors. Local food production, for instance, can have a positive effect on tourism, while the agricultural residues and manure could be used for bioenergy production. What potential exists for co-operation across different sectors in the bioeconomy, and how can such collaboration be strengthened?
- How do we address labour market shortages in the Nordic Arctic region? How do we increase the attractiveness of jobs in the primary sector among young people?

- Where is the largest growth potential within the bioeconomy in terms of maintaining and creating jobs and regional added value? Should we prioritize the development of large-scale or small-scale bioeconomy activities?
- The role of SMEs in the bioeconomy has been emphasized in connection with finding business niches and participating in the value chains. What role do SMEs play in the region today? How do we facilitate growth of SMEs and support small-scale innovations?
- Are there any conflicts of interest between different uses of natural resources (e.g., land use for food vs fuel, biomass for chemical industry vs for biofuels) or between multi-use interests (e.g., reindeer husbandry vs forestry activities and tourism) in your region? How could such competing interests be reconciled? How do we address the potential conflicts that could emerge in the future?
- What are the main challenges for further development of the bioeconomy and how can they be overcome?

5. Tourism

Corresponding author: Lise Smed Olsen

In the Arctic, tourism is increasingly highlighted in regional development policy as an opportunity for job creation. Arctic tourism covers a range of activities that vary between destinations, but generally, nature is the underpinning attraction. With a few exceptions such as Finnish Lapland, summer tourism is generally the most popular in Arctic destinations. Arctic tourism involves nature-based, culture-based and sports activities (Grenier, 2011). In the context of tourism development policy and practice, the concepts of sustainable tourism development and ecotourism are frequently referred to.

5.1 Tourism development

5.1.1 Sustainable tourism development

Sustainable tourism development has emerged as a subset of sustainable development. As has been the case with the broad concept of sustainable development, sustainable tourism development has been interpreted and adopted in many different ways. As part of the Earth Summit in Rio in 1992, ecotourism was promoted as an approach to enhancing sustainable forestry management and planning. Since then, new forms of tourism such as ecotourism and responsible tourism have emerged as “environmentally conscious” approaches to tourism (Saarinen, 2014). The overall definition of sustainable tourism as presented by the UNEP and UNWTO in 2005 is as follows.

“Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities.”

Management practices for sustainable tourism development are applicable to all forms of tourism in all types of destinations, including mass tourism and the various niche tourism segments. Sustainability principles refer to the environmental, economic and socio-cultural aspects of tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability. Thus, sustainable tourism should achieve the following aims.

- Make optimal use of environmental resources that

constitute a key element in tourism development, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity.

- Respect the socio-cultural authenticity of host communities, conserve their built and living cultural heritage and traditional values, and contribute to intercultural understanding and tolerance.

- Ensure viable, long-term economic operations, providing socio-economic benefits to all stakeholders that are fairly distributed, including stable employment and income-earning opportunities and social services to host communities, and contributing to poverty alleviation.

Sustainable tourism development requires the informed participation of all relevant stakeholders, as well as strong political leadership to ensure wide participation and consensus building. It is important to acknowledge that the three pillars of sustainable tourism development are mutually reinforcing and in competition, and the means to achieving sustainable development is to ensure balance between them (UNEP and UNWTO, 2012:1).

5.1.2 Ecotourism

The concept of ecotourism has been adopted by the industry itself as a marketing tool. Broadly, ecotourism is defined as sustainable tourism in natural areas (Diedrich, 2010; Pforr, 2001). The International Ecotourism Society (TIES) defines ecotourism as “responsible travel to natural areas that conserves the environment and improves the well-being of local people” (TIES, 2015). TIES has developed a number of guidelines for assessing the effectiveness of ecotourism in meeting conservation and development objectives.

- Minimize impact.
- Build environmental and cultural awareness and respect.
- Provide positive experiences for both visitors and hosts.
- Provide direct financial benefits for conservation.
- Provide financial benefits and empowerment for local people.

- Raise sensitivity to host countries' political, environmental and social climate.
- Support international human rights and labour agreements.

Ecotourism has also been pushed by governments through the development of policies and strategies, based on its potential for job creation in local communities.

This chapter identifies current approaches to destination management and development trends in the Nordic Arctic. Then, development trends, selected from a literature review and interviews, are further explored from the perspective of sustainable tourism development. These themes include innovation and knowledge in tourism, cruise tourism, Sami tourism, and food and wildlife tourism.

5.2 Management and development trends in the Nordic Arctic

The following is based on interviews with representatives of national tourist boards in the Faroe Islands, Greenland and Iceland, and with representatives of regional tourist boards/authorities in Norway, Sweden and Finland. The interviews were conducted in order to identify the way in which destination management is organized, which tourism segments are being targeted, what are the key development trends and what are the key strategic development priorities.

5.2.1 Destination management

Visit Faroe Islands is the national tourist board of the Faroe Islands and a government-owned agency. It has existed in its current form since 2012, and the main focus of the organization is the branding and marketing of tourism in the Faroe Islands. Visit Faroe Islands collaborates with the local tourist information offices that are funded by the municipalities.

Visit Greenland is the national tourist board of Greenland and a government-owned agency for the development of tourism in Greenland. It has existed in its current form since 2010. Visit Greenland presents six regional destinations on its website. There are differences in the ways that the destinations are being managed across the country. In most cases, municipalities finance a tourist information office.

Promote Iceland is a public-private partnership established to improve the competitiveness of Icelandic companies in foreign markets. Its department of Tourism and Creative Industries aims to attract tourists to the country with co-ordinated promotion and market-

ing efforts for the Icelandic tourism industry and promotes Icelandic culture abroad. The Icelandic Tourist Board is an independent authority under the Ministry of Industries and Innovation, which is responsible for destination development and domestic marketing of tourism. The Tourist Board collaborates with the regional marketing agencies, tourist information offices and tourist business associations across the country. There are 11 tourist information centres and seven regional marketing offices in Iceland that are managed in similar ways with some funding allocated from the Icelandic Tourist Board, some from the municipalities, and some from the tourism industry.

The Regional Council of Lapland and local destination management organizations (DMOs) are responsible for destination management in Finnish Lapland. There are 10 local destination management organizations active in Finnish Lapland, such as Levi and Ylläs and Marine-Lapland. The DMOs focus on common marketing strategies and more practical activities such as managing joint booking systems, maintenance tasks, etc. The Regional Council of Lapland serves as an intermediate organization and is the strategic partner of the actors in Lapland, while it also collaborates with the Finnish Ministry of Employment and the Economy and the Ministry of Transport and Communications. Based on this co-operation, a tourism strategy for Lapland has been formulated and is revised every four years.

Visit Northern Norway was established in 2010 after a merger of separate destination management organizations of the three counties of Northern Norway. This was part of the national policy implemented by the previous government to reduce the number of destination management organizations, with funding provided to the merged organizations for a three-year period. Innovation Norway has the role of a national tourist board. Five regional DMOs were established in Norway, and the intention was to establish five to eight local organizations below each regional DMO. In Northern Norway, the local destinations are organized differently: some have an industry association that is either funded or co-funded by the municipalities, some have only a tourist information office funded by the municipality, and in the destination of Lofoten, a local DMO is run and fully financed by local companies. It has not been possible to merge and develop local DMOs, because funds are not allocated for the process. Today Visit Northern Norway is funded by the three county councils, and the tourist board is becoming a more active partner in tourism development projects.

Swedish Lapland Visitors Board is partly funded by the County Council of Norrbotten and 10 lo-

cal destination management organizations. The regional tourist board manages marketing, sales and destination development. The local DMOs⁶ pay membership fees to Swedish Lapland Visitors Board and are in turn funded by municipalities and the tourism industry. With the ongoing project Local destinations—from words to action, Swedish Lapland Visitors Board is collaborating with the local DMOs to identify better ways to organize destination management. The project has three focus areas—destination development, marketing and communication—and is a dynamic knowledge organization. The idea is to use resources in a better way. The County Council of Norrbotten and the County Administrative Board of Norrbotten are important co-financiers of development projects undertaken within the framework of the regional DMO.

Local organization and marketing initiatives for cruise tourism are organized differently across the Nordic Arctic. Only in Greenland is the tourist board, in this case Visit Greenland, responsible for marketing both land-based and cruise tourism. In the Faroe Islands, marketing is managed locally by the two key cruise destinations, Thorshavn and Klaksvík. The organization Cruise Iceland has been established to co-ordinate the promotion of Iceland as a cruise ship destination with harbour offices that manage the promotion of local destinations. Similarly, in Norway, the organization Cruise Northern Norway and Svalbard has been established to promote cruise tourism.

5.2.2 Tourists: target groups, facts and figures

The representatives from the destination management organizations have different ways of defining their key target groups. However, “globetrotters” who are interested in nature and culture is the most common way of describing tourists travelling to the Arctic. The key attractions can be summarized as nature, culture and adventure experiences. Some of the DMOs are focusing on target groups as defined by market segmentation studies. Swedish Lapland Visitors Board operates using the definitions of the national tourist board Visit Sweden in three key segments: Double Income, No Kids; Wealthy, Healthy Older People; and Active Families (Visit Sweden, 2015). Visit Greenland has undertaken a study to clarify the key tourism segments. Eleven segments were identified, which are being used in marketing promotion activities (Visit Greenland, 2015). A study conducted by the national tourist board Visit Finland defines the typical tourist travelling to Finnish

Lapland as a “modern humanist” (Visit Finland, 2014). In the marketing of the Faroe Islands, the interest groups of fishing, hiking and dining are being targeted. In Northern Norway, the development of a value-based segmentation model is under way, which will also address different interest groups. The key purpose of this process, which has not yet been initiated, is to incorporate the role of the tourists as key promoters of Northern Norway; e.g., through social media.

Map 14 provides an overview of the number of overnight stays in all types of accommodation in 2014. In 2014, Lapland, Norrbotten and the Reykjavík region were the most visited regions in the Nordic Arctic, all with some two million stays. The origin of the visitors varies. In the North Calotte, over 70% of the visitors were domestic, whereas in the West Nordic countries, only 23% were nationals of those countries.

Map 15 provides an overview of overnight stays by foreign citizens in 2014. The Reykjavík region and the Lapland region were the most popular destinations for international tourists. From the total number of overnight stays by foreign visitors in the Nordic Arctic, 23% of the visitors came from another Nordic country, 16% from Germany and 13% from the UK. National differences exist. In the Faroe Islands, Greenland and Northern Sweden, the majority of visitors came from the other Nordic countries. In Finland, the largest groups of visitors were from Russia and the UK, while Germans were the largest group visiting Northern Norway. Iceland received the largest range of visitors, with visitors from the UK, the US, Germany, France and other Nordic countries being the most prominent.

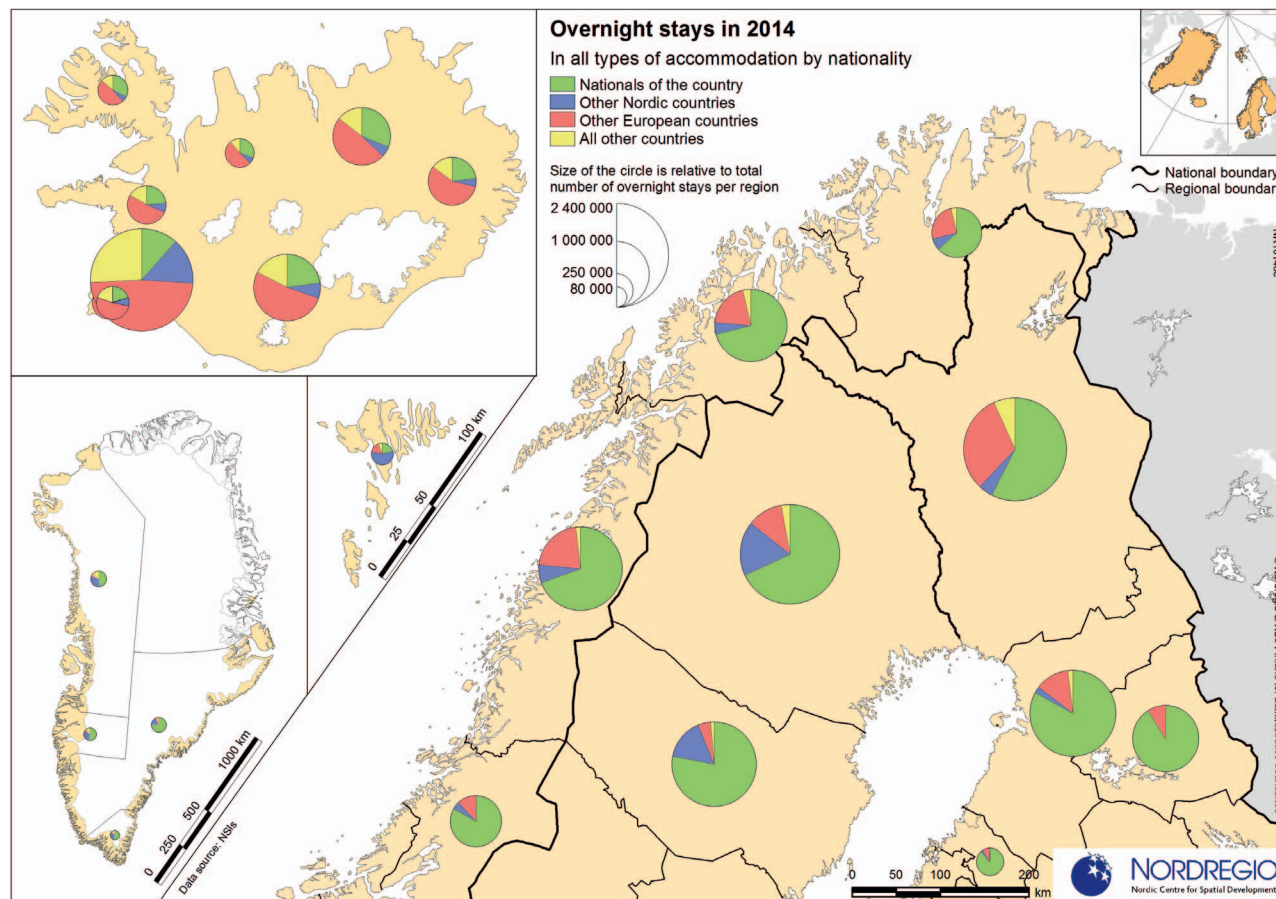
Cruise tourism is another type of tourism that has gained prominence in the past two decades in Iceland, Greenland, Norway and the Faroe Islands. Map 16 shows the number of cruise ship calls to Nordic Arctic ports in 2014 and the annual average change in passenger numbers from 2011 to 2014 (with the exception of Greenland, where only data from 2015 are available). The map only includes international cruise ship passengers and calls. It does not show regular, scheduled ferry connections such as Hurtigruten in Norway.

In Northern Norway, cruise ship tourism is centred on a few ports; in particular, Nordkapp (122 000 passengers from 109 ports of call) and Tromsø (112 000 passengers), followed by Leknes (60 000 passengers) have large passenger numbers. Longyearbyen received 37 100 passengers from 36 cruise calls in 2014 and is another destination with a clear upward trend in passenger numbers of 17% in the period 2011–2014.

In Iceland, the largest cruise ports in 2014 in terms of passengers were Reykjavík (105 000 passengers), Akureyri (73 000 passengers), and Ísafjörður (40 000

6 Including Skellefteå based in the county of Västerbotten.

Map 14: Overnight stays in 2014



passengers). An upward trend can be observed for all three destinations in the period 2011–2014. A number of other cruise tourism destinations exist across the Icelandic coastline, and most have seen increasing visitor numbers.

In the Faroe Islands, Torshavn is the primary destination for cruise ships, with 35 calls in 2014. In comparison, Klaksvík had eight calls and Kollafjørður had four calls in 2014. Passenger data for the Faroe Islands are only available at the national level. There has been an average increase in passenger numbers of more than 10% during the period 2011–2014.

Cruise ships embarked in almost 20 cruise destinations across Greenland in 2015. The major ports in terms of number of calls (above 40) in 2015 were Ilulisat, Maniitsoq and Kangerlussuaq. In addition, Uummannaq, Qeqertarsuaq, Qaqortoq and Nuuk had more than 20 calls each. Notably, Qaqortoq had the most passengers, almost 14 000 from 23 calls, while Ilulisat had the highest number of calls (51 calls) but only received 8600 passengers. This indicates that Qaqortoq receives more of the large cruise ships.

As will be further elaborated in Section 5.3, a distinction can be made between larger cruise ships and expedition cruise ships. For example, from the tourism segment study in Greenland, it was found that expedi-

tion tourists are similar to “adventure” tourists, who generally prioritize experiences over comfort. This is reflected in the work that is currently being undertaken to develop a separate site on Greenland.com to target expedition cruises where many of the same features that attract adventure tourists can be used.

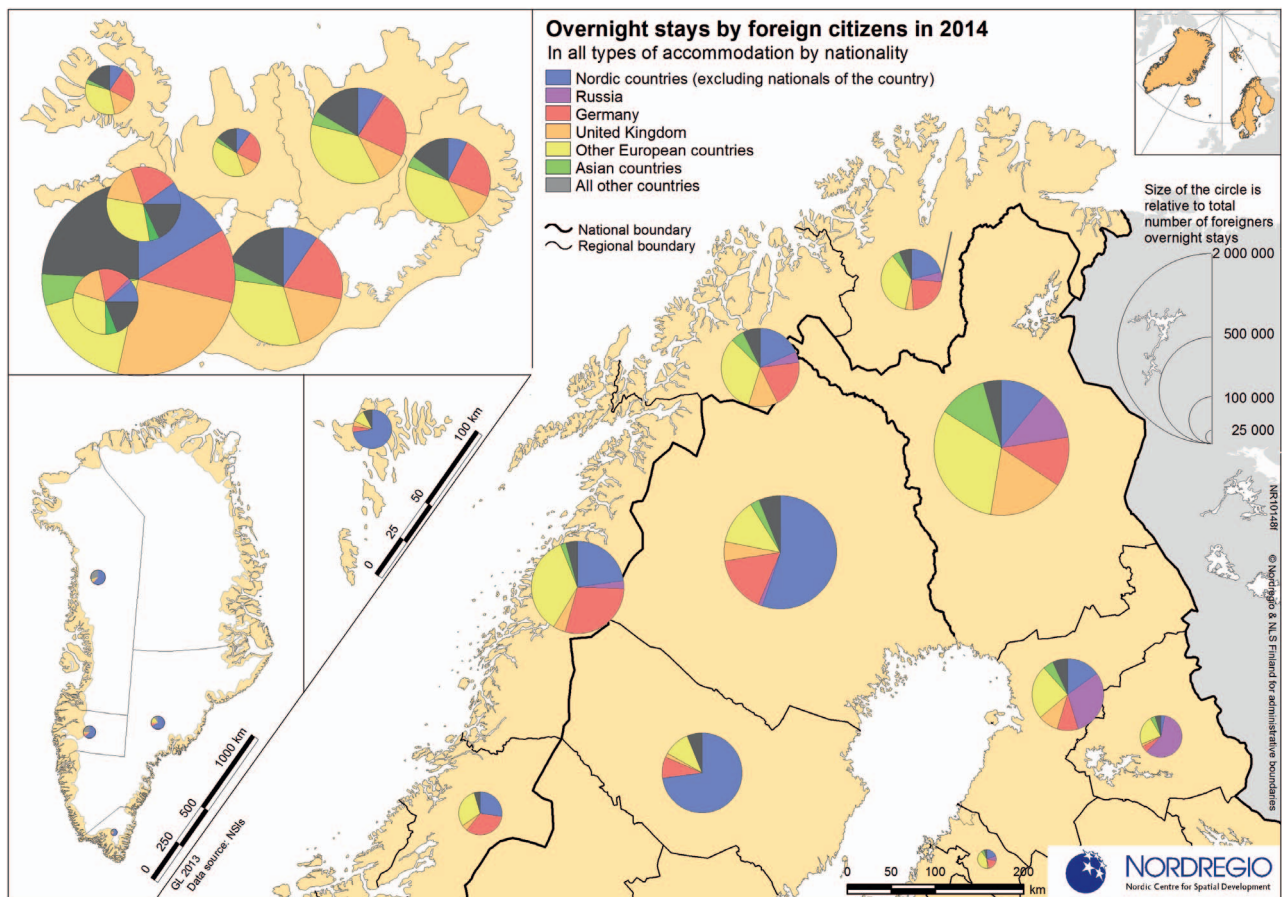
5.2.3 Development trends and transnational collaboration

The West Nordic countries

In recent years, there has been an upward trend in tourism in Greenland, facilitated by Air Iceland opening up routes to a number of locations. In Iceland, some of the larger tour operators are finding that tourists revisiting Iceland are requesting new activities. Because of the volume of tourists, there is also substantial pressure on some of the most popular destinations in Iceland. This provides an opportunity to deliver more “raw” adventure experiences in Greenland. Therefore, Icelandic and Danish tour operators have started offering combined tours to both countries.

A number of innovation and development projects have been run by the Icelandic Tourist Board in collaboration with Innovation Centre Iceland on the themes of cultural tourism, food tourism and health tourism services. Currently, there is an increasing awareness

Map 15: Overnight stays by foreign citizens in 2014



among tourism businesses of the need to enhance the quality of their products in order to be able to charge higher prices and to be more in control of who and how many they are targeting. Year-round tourism destinations are developing in Reykjavik and Southern Iceland as well as in the Akureyri area. The remaining destinations are still mainly summer destinations with a four month season.

Tourism experiences in the Faroe Islands are increasingly developed based on traditions of hospitality and knitting; e.g., home concerts and storytelling while knitting, and having dinner in private homes. Knitting is also associated with a number of Faroese-based designers, of which Gudrun & Gudrun are the most famous. Nature-based adventure experiences such as bungee jumping and climbing have started to develop. Furthermore, food culture is gaining prominence in Thorshavn, where a number of quality restaurants have opened up in recent years. There is an ongoing generation change in the tourism industry, with many new start-ups being founded by younger people, some of whom have higher education in tourism management.

In terms of transnational collaboration, the North Atlantic Travel Association (NATA) is an organization that has been established to promote and support tourism development for the West Nordic countries

through collaboration between Visit Greenland, Visit Faroe Islands, Promote Iceland and the Icelandic Tourist Board. Key activities of NATA involve organizing the annual West Norden Travel Mart, providing grants for tourism development and marketing projects, and travel support for school groups, sports organizations and cultural exchanges.

The North Calotte region

Finnish Lapland has in previous years experienced the growing phenomena of individuals traveling independently, rather than in traditional group trips and activities. Individual travellers often seek activities and experiences outside the mainstream attractions. Following this trend, the small-scale entrepreneurs and destinations have gained leverage in Lapland by offering tailor-made, exclusive services to predefined customer groups. Marketing often uses targeted strategies bound to certain markets, addressing, for instance, Japanese tourists via Japanese traveling blogs. Another distinctive trend is the wellness theme, consisting of different treatments focusing on detox and restoration, including the Finnish sauna tradition. This field is also strongly linked to the natural product theme, based on organic local resources.

In Northern Norway, nature-based activities are be-

Cruise tourism in 2014

Annual average change, passengers 2011-2014, in %:

- Increase (%)
 - 10.0 >
 - 2.5 - 10.0
- Balance (%)
 - 2.5 - 2.5
- Decrease (%)
 - 10.0 - -2.5
 - < -10.0
- No data
 - N/A

Size of the circle is relative to total number of cruise ship passengers in 2014:

- 122 000
- 100 000
- 50 000
- 10 000
- 1 000

Legend:

- Regional boundary
- National boundary
- No calls in 2014**

Scale bars:

- 0 250 500 1000 km
- 0 25 50 100 km
- 0 50 100 200 km

Source: Cruise Baltic, Cruise Europe, Cruise Norway, NCBs, Rantz (GB), Transportekonomisk Institut (NO), port authorities. GC, 2015 (no data per port for previous years). FO: Port data, passenger data (national level). ** Cruise ship port 2010-2015 but no calls in 2014.

Cruise ship calls* in 2014

109
100
50
10
1

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for administrative boundaries

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In Sweden also, there is a demand from tourists to experience the local food culture, and Swedish Lapland Visitors Board is using the brand “Taste of Swedish Lapland” to market the best restaurants serving locally produced food in the region. Furthermore, there is an increasing demand for Sami culture experiences by tourists. The area where Sami tourism is most developed is in Kiruna. This has been facilitated by the presence of the Ice Hotel, which for many is the primary attraction in the area. Abisko is another area that is experiencing increasing tourism, because of the national park, hiking opportunities in summer and the Northern Lights in winter.

Interreg co-funded project called Visit Arctic Europe was initiated between Visit Northern Norway, Swedish Lapland Visitors Board and the Finnish Lapland Tourist Board. The background to the project is the realization that the three regions are widely perceived as one destination by the tourism market. The purpose of the project is to develop new “product packaging solutions” across the borders and to develop approaches for more common marketing.

With the re-organization of Visit Faroe Islands in 2012, a new vision and strategy were developed that included the objective of doubling the size of the tourism industry in terms of the number of jobs and tourists by the year 2020. An improved approach to collecting data for the development of the industry was initiated from 2013, and recent data show that they are well on the way to meeting the target. A strategic priority is to prolong the tourism season, and one way in which this is approached is through more focused efforts to promote business tourism.

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refers to strengthening of distinct regional brands in collaboration with tourism co-ordinators and tourism actors at the local level in order to strengthen the link to the national brand. Attempts to extend tourism seasons differ between destinations. In Ilulissat, this involves extending into the shoulder seasons from February to October. In Southern Greenland and in the capital of Nuuk, it involves attracting more tourists during July and August, where there is substantial free capacity. A project, in collaboration with the airlines, is currently developing a brand for the capital as a summer destination.

Iceland has a tourism development strategy for 2011–2020. It is currently being revised to include an implementation plan. The Icelandic Tourist Board previously allocated funds to the regional marketing offices, tourist information offices and tourism associations separately, but starting in 2015, they will receive shared funds. They are being encouraged to develop a regional strategy for tourism development and to co-ordinate it with the wider regional development strategy. The approach to the increasing influx of tourists has been reactive from the side of both the local authorities and the tourism industry, and with the local strategic development work, the intention is to plan more proactively for tourism development and to strengthen collaboration between public and private actors.

The goals for tourism development in Northern Finland are outlined in Lapland's Tourism Strategy for 2015–2018. According to the document, Lapland strives to be a vital, international, easily accessible and year-around destination. It sets three strategic objectives related to accessibility, product development and marketing. These objectives are intended to tackle the current problem of decreasing numbers of tourists during the summer season.

Strategic priorities for Visit Northern Norway include becoming more involved in development projects in the region and improving marketing approaches. Increasingly the tourist board has become aware of the necessity for the marketing of the region to correspond with the experiences of the tourist. For example, images that include symbols of Sami culture, including the traditional costumes and reindeer, are being used to market the region. However, the supply of Sami experiences is limited in the region, it is rare to meet Sami people in their traditional costumes, and the reindeer migrate away from tourist destinations at certain times of the year. This has been approached in the development project Sami Tourism in Northern Norway. Continued strengthened collaboration with the local destinations is also prioritized.

One of the strategic priorities of Swedish Lapland

Visitors Board and the local DMOs is to work more consciously towards sustainable development; i.e., to consider not only the objective of economic sustainability but also that of social and environmental sustainability in development initiatives. A number of actors in the region have gained the certification of Nature's Best, which is a quality label for ecotourism firms (Nature's Best, 2015). Another priority is for more tourism actors to become professional businesses that can receive foreign tourists. Competence development is important, and there is a need for more tourism-related

Box 10: R&D projects to support product development in tourism in Northern Norway

Collaboration between knowledge institutions, businesses and public authorities in the area of tourism has gained momentum during the last decade in Nordland in Northern Norway. The key actors are Nordland Research Institute and University of Nordland, Nordland County, and a group of tourism firms and organizations in Lofoten, Salten, Narvik and Vesterålen, most of them delivering different types of nature-based experiences. Initially, the actors were brought together by the cluster initiative Arena Innovative Experiences. The businesses that participated in this cluster development project have been recruited by the regional office of Innovation Norway, based on an assessment of their ability to manage long-term development work. More than 30 businesses are part of the cluster initiative, most of them from Lofoten (Flatnes & Furre, 2012). The project, funded by the national Arena Programme for cluster development, was intertwined with a project funded by the national Programme for Regional R&D and Innovation (VRI). Today, the network Innovative Experiences is partly funded as a membership organization and is managed with the help of project funds from Nordland County. During the course of the project period, closer links between the tourism actors and the researchers have developed. Nordland Research Institute and University of Nordland have established the Norwegian Research Centre for Experience-based Tourism (NOVADIS) to provide an opportunity for tourism enterprises to discuss their R&D needs. They now host events such as monthly tourism lunches, where the industry is invited to discuss selected themes, and there is an opportunity for firms and researchers to meet. Currently, another major R&D project, Experiences in the North—Knowledge-based Value Creation, is being implemented, comprising a consortium of tourism research establishments in Northern Norway. This is funded by the Research Council of Norway's NORDSATSING initiative and involves a project period of eight years starting in 2009. The national programmes to support cluster development and regionally implemented R&D projects have been instrumental in the collaboration that has been initiated between knowledge institutions and the tourism industry.

education programmes. Swedish Lapland Tourism intends to strengthen collaboration in terms of research and education with knowledge and higher education institutions.

Establishing stronger links to knowledge institutions is the ambition for some of the destination management organizations in the Nordic Arctic. In Northern Norway, collaboration on R&D projects has been successfully initiated with a number of tourism firms. This is described further in the example below.

5.3 Cruise tourism

In the Nordic Arctic, cruise tourism has been a growing industry in Greenland, Iceland, Norway and the Faroe Islands since the 1990s. Cruise tourism is a form of mass tourism, and as such, it has a number of implications in terms of sustainable tourism development (Lück, Maher, & Stewart, 2010). Meanwhile, based on the interviews with destination management organizations, cruise tourism is considered to be an important source of local economic development in some local destinations in the Nordic Arctic.

Cruise tourism can be considered to be environmentally unsustainable because of the large groups of people visiting natural and cultural sites, which leads to crowding of remote peripheral communities. The ecological challenges of cruise ships include anchor damage to fragile marine ecosystems, illegal dumping of trash and pollutants, and impacts from dredging and building associated with the construction of new ship ports. Further issues include problems and pollution related to incidents and accidents, and the size of modern cruise liners working the polar waters (Diedrich, 2010; Lück et al., 2010).

Socio-cultural sustainability issues arise when local inhabitants are forced to deal with overcrowding and related problems. Cruise tourism involves short-term daily influxes of large numbers of people, whereas the land-based tourists are usually dispersed more broadly across a region. In some places, cruise tourism has started to have a negative impact on both local residents and land-based tourism (Brida & Zapata, 2010; Klein, 2011).

Research has found that cruise tourism is often economically unsustainable because the majority of economic benefits do not flow to local people. Instead, a large amount of the expenditure by cruise tourists is received by the cruise company (Brida & Zapata, 2010; Diedrich, 2010; Klein, 2011). During passenger shore excursions, cruise ships usually retain 50% or more of the tour fee paid by the passengers. The passengers thereby expect an experience equivalent to the amount

Box 11: Association of Arctic Expedition Cruise Operators—sustainability initiatives

The Association of Arctic Expedition Cruise Operators (AECO) is a membership organization for expedition cruise operators, tour operators, port agents and travel agencies. It was established in 2003 with the purpose of developing a common practice concerning environmental issues. Today, the organization is regulated by five sets of guidelines that all members are obliged to follow.

- Visitor guidelines
- Site guidelines
- Operational guidelines
- Wildlife guidelines
- Biosecurity guidelines

The visitor guidelines are developed for the expedition cruise tourists and describe to the tourists how they are expected to show consideration for the environment, safety and culture of communities visited. Site guidelines have been developed for specific places in Svalbard describing which considerations should be made in terms of the natural environment, culture, cultural remains, flora and fauna in each location (AECO, 2015). Site guidelines have also been developed for some local destinations in Greenland. Operational guidelines were developed for Svalbard in 2004 and were made applicable for Jan Meyen and Greenland in 2007 (general, not site specific). Parts of the guidelines have been developed for use in tour planning, preparation and operation by the tour operational office of AECO members, also including wildlife and biosecurity guidelines. In consideration of sustainable tourism development, the operational guidelines include the following four headlines.

- Before the visit: e.g., inform the local community contact person/office about your planned call well in advance, and give information on deviations from the schedule.
- Provide benefits: e.g., make local purchases, use local providers of sightseeing tours, shows and other activities.
- Cultural understanding: e.g., inform/educate guests about local history, contemporary culture, norms and values.
- When visiting: e.g., ask before you photograph—hesitation means NO; inform guests about restrictions, local customs and expected behaviour (AECO, 2013:21–22).

According to a representative of Visit Greenland, the work of AECO has been extremely important for their increasing calls in smaller settlements in the country. Previously, expedition cruises often showed up unannounced, which led to frustration among inhabitants, whereas today, collaboration with the local communities and codes of conduct for visitors have been improved. It is hoped that more local tourism firms will be established to benefit from expedition cruises.

that they have paid, although the shore excursion provider may only make a small profit. If passengers are unhappy, they will usually blame the shore provider, unaware that the cruise ship has retained most of the excursion fee (Klein, 2011). Cruise tourism in a sense is a competitor to land-based tourism because the cruise ships become a substitute for air travel, and they provide accommodation, food and activities. In some cases, passengers will choose to stay on board the vessel instead of disembarking because the ships are destinations in themselves. While cruise tourism brings in more visitors, the economic impact is relatively small and usually concentrated among a few actors (Brida & Zapata, 2010; Klein, 2011).

The following example introduces initiatives of the Association of Arctic Expedition Cruise Operators (AECO) to promote responsible expedition cruise tourism. Expedition cruises are in some ways defined as a separate sector within the cruise tourism industry, because the purpose of expedition cruises is to deliver adventure, wilderness, education and personal experiences. These ships do not travel on a direct route but rather focus on viewing landscapes at close range. "This involves accessing shore-locations, seeking wildlife and ice, venturing into new, different or challenging and sometimes uncharted waters, and interacting with local people." (Dawson, Johnston, & Stewart, 2014:89). Expedition vessels are smaller and commonly carry about 120 passengers. They offer an educational experience with environmental and cultural guides on board (Lück et al., 2010).

According to a representative of Visit Greenland, the work of AECO has been extremely important for their increasing calls in smaller settlements in the country. Previously, expedition cruises often showed up unannounced, which led to frustration among inhabitants, whereas today, collaboration with the local communities and codes of conduct for visitors have been improved. It is hoped that more local tourism firms will be established to benefit from expedition cruises.

5.4 Sami tourism development

In Sápmi, the indigenous Sami culture is considered to be an asset for a growing tourism industry. Sami tourism activities involve museums, cultural events, outdoor cultural sites and places where Sami handicrafts are sold (Müller & Huuva, 2009; Pettersson, 2006; Viken & Müller, 2006). Indigenous tourism has been defined as "tourism activities in which indigenous people are directly involved either through control and/or through their culture serving as the essence of the at-

traction." (Hinch & Butler, 2007:5). The indigenous activities appeal to an affluent global market, although the number of visitors is small, as the prices of these activities are high. More affordable indigenous tourism activities involve Easter festivals in Kautokeino and Karasjohka in Norway, and the winter markets in Jokkmokk, Sweden (Viken & Müller, 2006).

The risk of misrepresenting Sami culture in tourism promotion and in the development of tourism products exists. Examples of this type of development include traditional Sami attributes such as the Sami clothing and tents, and reindeer being used by non-indigenous tourism operators in marketing the destination and in interactions with tourists in a way that does not represent the way that they are used in everyday life. Furthermore, there is a tendency to create an exotic and exaggerated image of the Sami in the media and in marketing of the traditional culture, which causes some first-time visitors to arrive with unrealistic expectations (Pettersson, 2006; Pettersson & Viken, 2007; Viken, 2006).

The main constraints for Sami tourism development in Sápmi include how tourism may damage or influence Sami culture and how it may disturb the reindeer. Sami people themselves are divided; some stress the opportunities of indigenous tourism development, and some focus on the risks. Tourism development has been noted to be a balancing act between these opposing views (Pettersson, 2006). The following example of Visit Sápmi involves a project initiative implemented to address these issues.

5.5 Food and consumptive wildlife tourism

Food tourism refers to a form of tourism in which food is one of the motivating factors for travel. It can have different roles, from being the peak experience in gourmet tourism to being a complementary experience in rural tourism. Eating local food entails appropriating the nature, culture and identity of the specific area. In connection with this, urban food tourism commonly appeals to people seeking a sophisticated lifestyle, while food tourism in rural areas appeals to people seeking tradition (Bertella, 2011). Furthermore, food tourism in peripheral regions differs from more central locations in the sense that tourism demand and tourism industry support for northern cuisine is relatively new. In the Arctic as in other peripheral regions, there is a trend in the tourism industry to provide local experiences through food for visitors to Arctic regions (de la Barre & Brouder, 2013).

Box 12: Visit Sápmi—Quality assurance and collaboration

The project Visit Sápmi was initiated by the Swedish Sami Association (an NGO representing members of Sami co-operatives and Sami associations) as a response to the growing tourism industry. The purpose of the project is to help the Sami to profit from tourism and to influence tourism development. During the project period, collaboration was initiated between the project management and VisitSweden, which resulted in an “Agreement on guidelines for collaboration”. This concerned how the national tourist board would improve its use of Sami culture in its marketing initiatives, in order to ensure that this would be done in an ethical manner. Thus, the agreement states the following.

“When Sami culture is used by Visit Sweden it is done in agreement and collaboration with Visit Sápmi, another representative of the Sami people, or the Sami who are “portrayed”. If the Sami become involved they will also be able to offer outstanding first-class tourism experiences (...) Collaboration should therefore provide a more credible and more interesting image of Sami culture to the benefit of both Sweden and Sápmi.” (VisitSweden and Swedish Sami Association, 2012:2)

A key result of the project was the development of the certification system Sápmi Experience for Sami tourism enterprises. Building on Nature's Best, the certification of the Swedish Ecotourism Association, a set of ethical criteria was added for the certification process of Sami tourism enterprises. For example, criteria concerning respect of reindeer herding, including the requirement to make an agreement with the Sami co-operatives that tourists visit. A course was developed to understand the certification requirements, and during the project period, approximately 60 people attended the course. Seventeen firms have gained the certification, which is described as follows.

“Quality, sustainability, safety and credibility are key words for Sápmi Experience. Businesses that have got the Sápmi Experience certification have got a holistic approach to the Sápmi habitat. They can tell you about it, and they are professional in taking care of the visitor in this habitat. When you meet companies that have got the Sápmi Experience certification, you know that it is authentic Sami experiences with Sami hosts that are offered.” (Visit Sápmi, 2015)

Today, there are only approximately 25–30 firms in Sweden that might gain the certification, and almost all of them are micro firms. Future funding is uncertain, but it is the intention to establish Visit Sápmi as an interest organization with paying members from all of Sápmi. There has been interest in the initiative from Norway particularly. Furthermore, there has been interest in plans by Visit Sápmi to develop the certification Friends of Sápmi. This would include agreements with sponsors and with collaboration partners. Sponsorships may come from companies that wish to demonstrate that preservation of Sami culture is important. Friends of Sápmi is a certification that may be granted to non-indigenous people who make a collaboration agreement with Visit Sápmi to deliver Sami experiences. A course would then be developed for firms interested in gaining the certification.

The Sami Parliament will be in charge of approving sponsorships and certification of Friends of Sápmi. The Swedish Sami Association that initially owned the project has stated that they would like to see Visit Sápmi established as a membership organization and to be represented in the certification committee.

Arctic regions have been noted to have created advantages by promoting themselves in ways that associate the local geography with the slow food movement. A significant part of this movement is to embrace and recreate local values and traditions. Moreover, issues of food security are part of the slow food movement. Today, most food consumed in the Arctic regions is imported from southern domestic or international producers. The impacts of climate change are uncertain with the melting of permafrost; it may increase agricultural opportunities by creating more arable land, but it may also result in the loss of whole ecosystems, which may have a negative impact on agricultural opportunities. Furthermore, with people's increasing awareness of climate change, the amount of carbon emissions associated with travel to distant places and from traveling between places in the Arctic has been highlighted to add to the relevance of promoting slow food tourism (de la Barre & Brouder, 2013).

Food tourism in the Arctic is interlinked with indigenous culture in some places. For example, in Sweden, the regional tourism destination management organi-

zation Swedish Lapland Visitors Board has started advertising culinary tourism. Some of these culinary experiences are provided by Sami entrepreneurs and can include visits to a Sami tent with food prepared by a local guide. In Sweden, two food organizations have been created with a focus on Sami food: Renlycka, which is a quality trademark association for the Sami reindeer herders, and Slowfood Sápmi, which is the slow food organization for the Sami people. Other entrepreneurs combine serving of food with a dog sledge ride, or hiking tours with serving of local food, which may include specialties such as reindeer meat, associated with Sami culture (de la Barre & Brouder, 2013).

Consumptive wildlife tourism is a form of niche tourism that involves hunting or shooting game animals and fishing in natural sites or in areas created for these purposes. This form of tourism has commonalities with sports and ecotourism. It is also associated with cultural tourism, especially in cases where tourist activities are organized by indigenous people using traditional hunting or fishing practices. In most parts of the world, hunting and fishing are managed with

a view to the long-term sustainability of the fish and game populations. Most hunting organizations have similar codes and a requirement that hunters attend compulsory education and training sessions to ensure hunter safety and ethical hunting practices (Lovelock, 2008). In order to ensure sustainable fishing tourism, it has been suggested the amount of information given to fishing tourists should be increased. This includes information/training on how to handle the releasing of undersized fish, and providing tourists with GPS and maps to help them to avoid areas with small fish and instead to go to areas with bigger fish and sustainable stocks. Furthermore, attention should be paid to catching species that can endure exploitation, as well as to the joy of cooking and eating your own fish while on holiday (Normann, 2008).

Interactions between fishing tourism and other uses of coastal and marine environments can cause disputes over resource management. Areas of conflict between the fishing industry and the tourism industry can involve competition for space and different environmental views. In Norway, this debate is hampered by a lack of facts about the amount of fish that is caught by tourists. These types of conflicts between the tourism and commercial fishing industries have been noted to be less prevalent in the northern part of the country, partly because there are fewer people and more space available. Moreover, in cases where they are the two main local economic sectors, tourism and fishing are to a large extent interrelated. For example, in Lofoten, most people in the fishing industry look at tourism as a natural part of the coastal industries in Norway (Normann, 2008).

5.6 Tourism in the Nordic Arctic and sustainable regional development

Sustainable tourism has been defined as tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities. In the Nordic Arctic, various types of tourism activity exist, ranging from mass tourism, e.g., in the form of cruise tourism, to niche tourism, e.g., in the form of Sami tourism experiences and consumptive wildlife tourism. Maintaining a balanced development in terms of economic, socio-cultural and environmental sustainable development is challenging and poses a number of questions that must be addressed in the development of regional and local strategies and initiatives for tourism development. These questions include the following.

- What is the value of quality assurances; e.g., for eco-tourism, local food, and Sami tourism? Is this an area for collaboration across the Nordic Arctic?
- What is the potential for strengthening collaboration between public authorities, knowledge institutions and the tourism industry for education, research and innovation?
- How can sustainable development be promoted in connection with mass tourism (e.g., cruise tourism)? What is the usefulness of site guidelines or other approaches?
- How can Sami tourism development be supported in an ethical and sustainable way? How can “over-commercialization” of Sami culture be avoided?
- What is the potential for food tourism? How can collaboration between local food production and the tourism industry be strengthened?
- How can sustainable development of consumptive wildlife tourism (fishing and hunting) be ensured?

6 Creative Industries

Corresponding author: Nelli Mikkola

This chapter focuses on creative industries in the Nordic Arctic context. It outlines the definition of creative industries and its core concepts while also looking at recent research. It then moves to discuss creative industries' role in the Arctic and peripheral environments and considers the specific features and preconditions of these regions. Finally, it describes some examples of creative industry activities in the northernmost parts of the Nordic countries. The chapter concludes with issues for further discussion.

6.1 What are the creative industries?

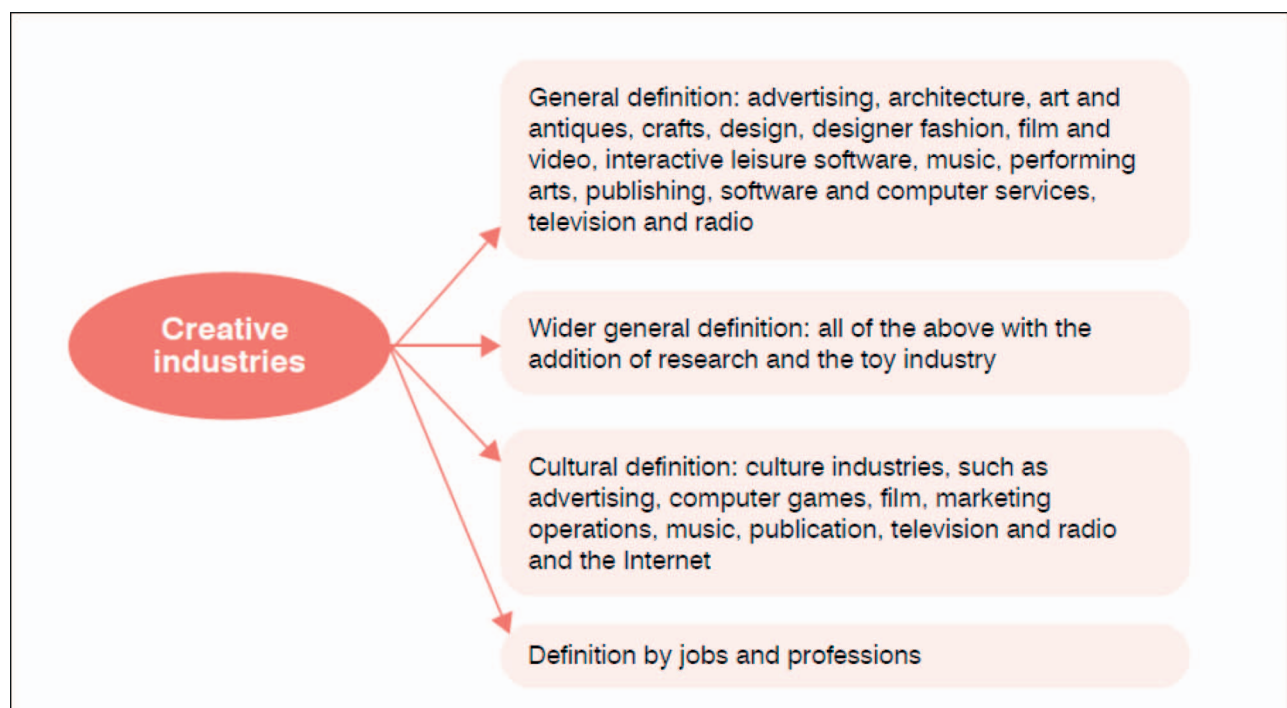
The widest definition of creative industries includes several key sectors such as: advertising, architecture, art and antiques, crafts, designer fashion, film, interactive computer games, music, the performing arts, publishing, software and television (Figure 3) (Nordic Innovation Centre, 2007). Another definitional approach is to look at individuals and their jobs and professions. In economics, production in the economy has tradi-

tionally been classified into three categories: primary production, industrial production and service production. It has been argued that the creative industries should be considered as a fourth category rather than falling under one of the three existing categories (Einarsson, 2014).

In light of the argument that human creativity is the ultimate economic resource, the creative industries are seen as increasingly important for economic well-being (Florida, 2002). It has been widely predicted that industries of the 21st century will to a greater extent depend on the generation of knowledge through creativity and innovation (Landry & Bianchini, 1995).

The development of successful creative industries is often linked with urban regions and wide, dense cultural networks characterized by a creative class. The creative class, which is the key form of human capital for creative industries, can be defined as a group of individuals with either a high level of education or an engagement in creative types of activities, including scientific, artistic or technological, that translate their creativity into economic returns. (Gibson, 2010)

Figure 3: Some definitions of creative industries.



Source: Einarsson, 2014.

The concept of creative industries is still being developed, and the distinction between the terms creative industry and cultural industry has been discussed widely. The question of how the economic and social value of culture should and could be manifested and measured is likely to remain as a debated issue, even though different categorizations have been made. The term “creative industry” encompasses a broader range of activities that include the cultural industries plus all cultural or artistic production. (UNESCO, 2006).

Today’s creative and cultural industries are undergoing considerable changes as a result of the recent economic crisis, increased use of digital technologies and the evolution of intellectual property rights. Following the shift of global investment and industrial production to developing countries, such as China and India, the post-industrial Western countries have been challenged increasingly to develop their services sector and to use their creative capital. This has posed both challenges and opportunities for the Nordic countries in particular, which have one of the most highly skilled and highly educated labour forces in the world (Hautamäki, Kainulainen, & Turkki, 2009).

Furthermore, the global economic down-turn has drawn international attention to the employment potential of creative industries. These industries provide opportunities for self-employment and engage numerous SMEs, entrepreneurs and freelancers. However, public sector support for the creative and cultural sectors has remained vital. Simultaneously, the cultural sector has traditionally been among the first public sectors to face cuts at the national level in times of economic down-turns (Hautamäki et al., 2009).

One of the core challenges related to the enhancement of creative industries stems from the lack of clear indicators and tools to measure and elaborate on the development of this sector. This in turn affects the creation of feasible strategies and the ability of financial actors to consider the potential of creative sectors. This problem has been worsened by certain legislative complications, such as intellectual property rights, varying tax regimes and mobility issues (European Commission, 2012c).

6.2 Creative industries in the Arctic

Creative capital and the potential of creative industries to foster economic development as an alternative or complement to recourse-based development has become a salient issue in the Arctic context. It has been argued that creative capital is critical for economic development and socio-economic transformation in the Arctic, as it holds potential for economic reinvention

and revitalization of the region.

The role of creative capital for economic well-being, sustainable living and overall human development in the Arctic region has become a prominent and researched topic. However, contemporary studies conducted on creative industries in the Arctic regions have focused mainly on the north of Canada and Alaska. The role of creative capital in the Nordic Arctic remains rather unstudied.

There is some evidence that the arts are currently booming in the North, and the production, marketing and consumption of northern art seem to be a growing market, both in terms of indigenous and non-indigenous art production. While music, literature and fine arts have been traditionally prominent in the North, Arctic film productions and different types of festivals are fairly new and successful phenomena (AHDR, 2014).

It has been emphasized that there is a need for new creativity in the Arctic in order to cope with the economic challenges with an emphasis on human creativity (Pelyasov & Unesco, 2009). For many small communities across the Arctic, the lack of job opportunities has led to population decline. However, there are also communities where a combination of local entrepreneurship, political leaders and government initiatives has created encouraging examples, where thriving businesses as well as cultural revival contribute to a meaningful way of life in a viable community.

6.2.1 Creative industries as drivers of regional development in the Arctic

Recent studies have indicated that creative capital, widely defined, is likely to play a defining role in the regional transformation of remote areas and that many Arctic regions have greater-than-expected creative resources. Nevertheless, it is difficult to argue that the creative capital in the peripheral northern communities could make them competitors for national and global innovation ventures, but it is plausible to suggest that creative industries in peripheral regions could improve the prospects for future economic transformation and development (Petrov, 2014).

One explanation for these substantial creative resources can be drawn from arguments suggesting that the less favourable social and business environment of the periphery highlights the importance of creativity and innovation, and requires even more creative effort, originality and ingenuity from actors to overcome barriers and capacity shortages compared with the core regions (Petrov, 2007).

The emphasis placed by smaller nations on cultural activities has also been linked to their fighting for their

cultural heritage in a world characterized by increasing globalization. Another reason for less populated countries to support cultural matters is to safeguard their independence and national characteristics (Einarsson, 2005).

6.2.2 Peculiarities of the creative class and capital in the Arctic

Overall, the role of the creative class in peripheral regions has been more widely reconsidered recently, as northern peripheral regions have encountered demographic and economic restructuring; for instance, in terms of outmigration and outflow or down-turn of large-scale industries. Arctic regions face several barriers in sustaining a local creative class and attracting talent to the region.

Creative capital in itself is not a guarantee of a successful and economically viable creative industry sector in peripheral regions and generally requires additional development incentives. The starting point for the regional development of creative industries occurs in the interface of strategic development policies and self-steering cultural activities. Successful regional development work contributes to new cultural activities and creates preconditions for the accumulation of creative activities and know-how in the regions, which consequently fosters regional competitiveness and stimulates economic gains. Among the existing examples is the Lapland Strategy for the Creative Industries, which served as a business-based development plan for the creative industry sector in Northern Finland between 2008 and 2013. Introduced by the Regional Council of Lapland, the Strategy and its toolbox aimed at improving business and employment in the creative industries, thereby enhancing the region's attractiveness and economy (Regional Council of Lapland, 2008b).

On the other hand, the creative industries are spontaneous and endogenous by definition, and therefore the role of calculative development and governmental steering is limited and can at worst turn into a constraining element (Ruokolainen, 2008).

One of the distinctive features of Arctic creative industries and development is the need to reconcile locally oriented sustainable development and the realities of globalization, including contemporary capitalism and international competition. In the Arctic regions, creative industries operate in an environment characterized by the many aspects of aboriginalism, identities, environmentalism and industrialism (Hayter, 2003; Petrov, 2007).

Arctic creative industries remain a subject of ongoing research, and much of the creative capital literature is devoted to developing measures to quantify the crea-

tive capital. According to Petrov (2014), a number of Arctic regions could become test sites for implementing alternative strategies of regional development based on creative capital, and knowledge-based and cultural economies.

6.3 Current trends in the Nordic Arctic

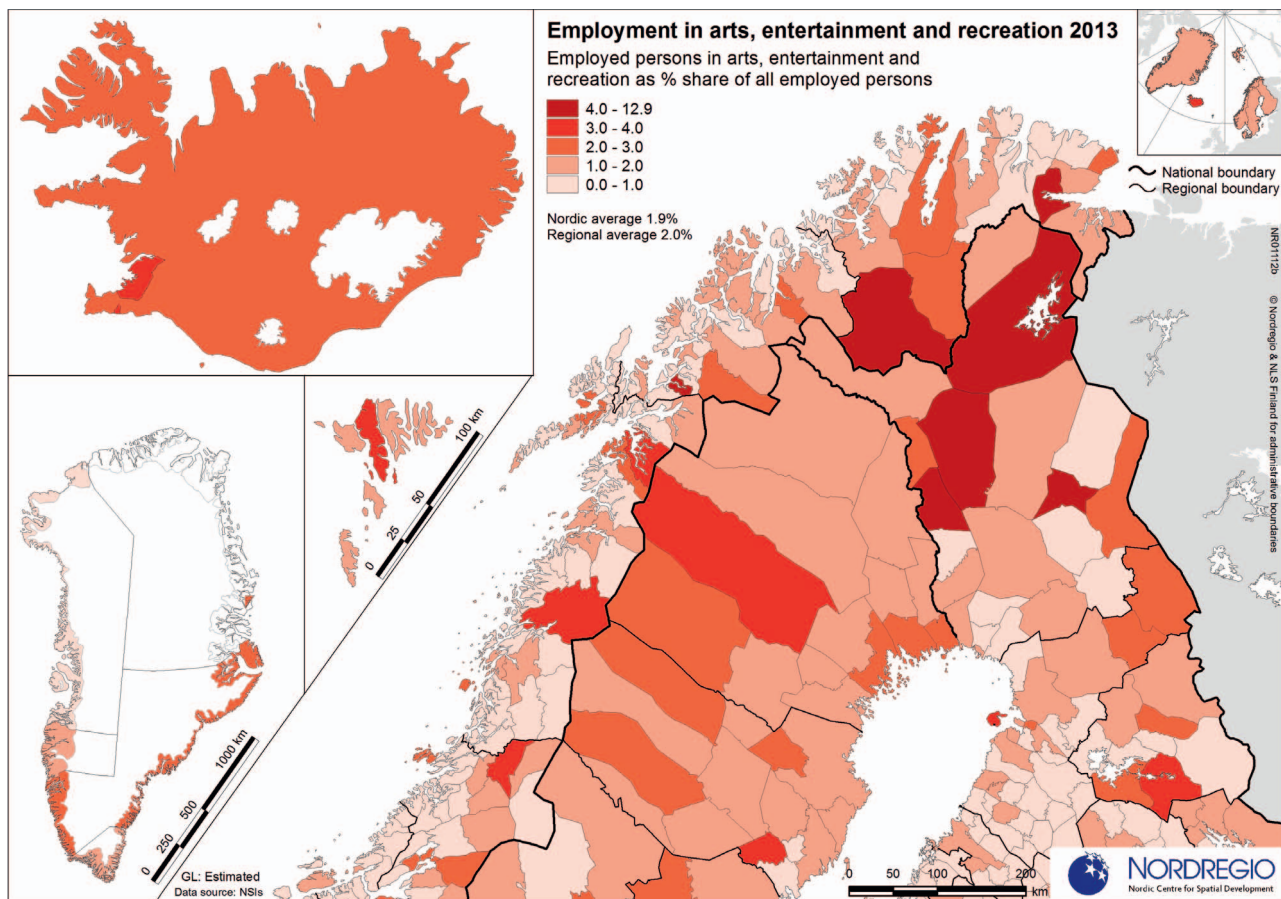
This chapter aims to focus primarily on the creative industries in the Arctic parts of the Nordic countries and to outline the current trends in the region. It also briefly provides selected, depictive examples of creative industry sectors and cultural management activities in the region.

There are three main groups of municipalities in the Nordic Arctic where employment in the arts, entertainment and recreation (as a percentage of employed people) is relatively high and above the Nordic average. The first group is municipalities with remarkable tourism activities, especially in the winter season, such as Kittilä and Kolari in Finland. The second group includes capitals and regional centres, such as Reykjavik in Iceland and Tórshavn in the Faroe Islands. The third group includes a group of municipalities with large proportions of Sami people, such as Guovdageaidnu-Kautokeino, Unjárga-Nesseby and Divtasvuodna-Tysfjord in Norway, Inari (Anár) in Finland and Jokkmokk in Sweden.

Employment in the arts, entertainment and recreation in the Nordic Arctic is presented in Map 17. Taking into consideration the fact that the content and definition of creative industries is a contested topic, statistical classifications of creative industry activities can be made in numerous ways. Map 17 looks at creative industries from a wide perspective including several subcategories of the arts, entertainment and recreation; namely, creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities; and sports activities and amusement and recreation activities.

In order for peripheries to become "hot spots" of innovation and economic growth, there has to be a connection to localized knowledge and a social setting that can be formed with building of institutions and formation of civic society (Aarsæther, 2004; Petrov, 2011). Creativity in peripheral regions is usually strongly interconnected to the local environment and based on understanding it. In the Nordic Arctic, inspiration is drawn especially from the rich cultural heritage and the natural environment. Strong sectors of creative industries in the Nordic Arctic are festivals, film and

Map 17: Employments in arts, entertainment and recreation in the Nordic Arctic



music, as well as design and handicrafts based on local raw materials. Local actors and entrepreneurs are often the first ones to recognize new opportunities requiring action (Finnish Ministry of Education 2009).

6.3.1 Festivals

Towns, villages and communities are increasingly keen to showcase their culture and environment and to share them with visitors in the form of festivals (O'Sullivan & Jackson, 2002). Festivals in peripheral regions rarely provide sufficient paid employment for the inhabitants, but they serve as rich opportunities to participate in creating cultural expressions. Entrance and ticket fees, sales of merchandise, sponsorship and public funding are the most important sources of financing. A wide range of themes are represented in these festivals in which culture and identity play roles as ideological bases and cultural framing of the events (Jaeger & Mykletun, 2009).

A depictive case for the thriving festival scene in the Nordic Arctic is Finnmark, a Norwegian peripheral Arctic region known for its large and versatile festivalscape, where most of the festivals identify themselves by ethnicity, culture, geographical location, place identity and nature. Some of the festivals are known outside the region and also abroad, and are used by the tourist in-

dustry for marketing of Finnmark. A minority of the festivals are based on commercial interest or private ownership. Even though not significant in terms of employment, the economic turn-over of the festivals gives them legitimacy as belonging to the cultural trade or experience economy (Jaeger & Mykletun, 2009).

Another major cultural festival in the Nordic Arctic hemisphere is Nordic Days in Murmansk. The festival is a joint initiative by the Norwegian Consulate General in Murmansk, the Consulate General of Finland in St. Petersburg, Murmansk Office, the Consulate General of Sweden in St. Petersburg and the Information Office of the Nordic Council of Ministers in St. Petersburg. Bringing together a wide range of Arctic actors, the Nordic Days include a wide range of exhibitions, concerts, films and discussions with a focus on vital and contemporary issues in the North.

6.3.2 Film

The film industry has become prominent in the Nordic Arctic. In addition to the creative industries' direct role in regional development and growth through employment in these industries, they can also generate additional effects. Film and other creative industries not only have a direct impact on regional development

Box 13. Nordic co-operation in the field of creative industries

With an ambition to create more intense and structured Nordic co-operation in the field of creative and cultural industries, the Nordic Council of Ministers launched an initiative called KreaNord in 2008. KreaNord was designed to improve the growth prospects for the cultural and creative industries in the Nordic region. It did not have a special Arctic focus, but its elements are also relevant for the Nordic Arctic.

KreaNord's mandate during 2008–2015 was:

- to continue to develop and create frameworks for the Nordic countries as pioneers in the creative industries,
- to create added value in the creative industries in the region, which will also contribute to growth and innovation in the arts and cultural life as well as in other industries,
- to be a strong Nordic platform and a meeting point for the exchange of experiences, knowledge and formation of strategic partnerships, and
- to provide the framework for co-operation between authorities in the Nordic countries, private companies, creative and cultural entrepreneurs and educational institutions.

In the European context, KreaNord serves as a unique example of cross-border and cross-sectoral policy co-operation in the field of creative industries. Its novel approach and pilot projects have since been copied and implemented elsewhere in Europe (Åstedt, Hallin, & Strömblad, 2015).

Co-operation concerning cultural and creative industries after KreaNord has continued through EntreNord, KreaNord's entrepreneurship project, and through the Lighthouse-project "Culture and Creativity for Growth" launched by Nordic Innovation in 2015. The aim of this lighthouse project is to develop Nordic co-operation between the cultural and creative industries and to promote activities in these industries.

For more information, see: <http://www.kulturkontakt-nord.org/en/grants/kreanord>
<http://www.entrenord.dk/da>

through growth and employment but also contribute to factors such as quality of life, personal development, learning and social inclusion. These factors then in turn can make a more indirect contribution to regional development in the long term. Film industries in the Arctic regions represent a successful example of how policy decisions and initiatives from governments, county councils and municipalities have a significant impact on regional development (Dahlström, 2005).

A case in point is the Icelandic film industry, which has gained a high profile in the international film industry in recent years and is backed by an incentive by

the Ministry of Industry, which allows producers to apply for reimbursements from the state treasury of the costs incurred in the production of films and television programmes in Iceland. Furthermore, Northern Norway has implemented incentives to attract film crews to the region through the National Film Commission of Norway. Combining film and festival, Sodankylä, a small town in Finnish Lapland, is the annual venue for the international Midnight Sun Film Festival. The 30th year of the festival in 2015 attracted around 30 000 international visitors.

6.3.3 Music

The Nordic music industry is in a stage of rapid growth, in terms of both employees and turn-over. The revenues of music industry and number of music festivals has increased in the northern parts of all Nordic countries and represents a significant element of the creative activities and cultural expression in the region. A growing type of creation of value in the music industry is a result of related industries, such as the production of music videos, software, distribution of digital material, etc. (Einarsson, 2005).

By international standards, the size of the music markets in the Nordic countries is small. However, despite certain limitations, some of the Nordic countries have been successful in exporting and branding their music. Sweden, for example, is the third largest exporter of music in the world. Music has a significant impact also on exports from Iceland, particularly by indirect means; e.g., through the tourist industry. A number of tourists come to Iceland as a result of the influence of famous performers, such as Björk, Sigur Rós and Of Monsters and Men. Revenues from foreign tourism have increased substantially in recent years, partly as a result of cultural activities, including musical activities, such as the numerous music festivals held in Iceland (Einarsson, 2005).

Especially in terms of music, the global, exogenous forms of culture have been adopted and adapted in the Arctic regions for local purposes—for local cultural revitalization and expression (AHDR, 2014).

This has been evident, for instance, in Greenland and the Faroe Islands. With help from funding agencies, these regions with limitations in terms of size and budget have created a lively and internationally known music sphere. For instance, the biggest Greenlandic record label, ULO, releases everything from Greenlandic rock bands, pop singers and hip hop music crews to Inuit folk music (AHDR, 2014).

The Faroe Islands are famous for their choirs. Oral tradition (quinces / ballads / chain dances and hymns) is deeply rooted in the Faroese society, which is

thought to be one of the reasons why music plays such an important role on the Faroe Islands today. TUTL is a record label and distributor of Faroese music. TUTL's catalogue today comprises over 500 releases of national as well as international acclaim (both ethnic, folk, jazz, pop, rock, heavy metal, classical, choral, children's music, country, gospel, etc).⁷

6.3.4 Design and handicrafts

Design has appeared as a novel and promising creative industry in the Nordic Arctic. It is undoubtedly an industry that has already demonstrated a sustained capacity to grow in the Nordic countries along with international demand. The role of design for the Nordic Arctic has been increasingly under scrutiny, in terms of both sustainability and economic gains. Under this umbrella, the northernmost design week in the world, Arctic Design Week, is being annually held in Rovaniemi in Finnish Lapland.⁸

Handicrafts are a traditional creative industry in the Nordic Arctic. They come in many forms and are usually based on traditions and distinctive local materials. As merchandise and souvenirs, they play a role in generating income via creativity, local production and skills specialization. At the same time, the local producers, and especially Sami products, have faced competition from similar items and copies produced in growing developing economies with lower manufacturing costs (World Intellectual Property Organization, 2015).

6.3.5 Sami culture and creative industries

Sami culture is seen as one of the most distinctive features of the Nordic Arctic, and it provides a basis for tourism and the creative and cultural industries. These opportunities are, however, tied to the preservation of Sami culture and knowledge, and their transfer from one generation to another, which as such is one of the main concerns regarding the indigenous population in the North Calotte region (AHDR, 2014).

Today, Sami culture is visible, for instance, through many annual festivals taking place in different Nordic countries. One of the largest international Sami festivals, entitled "Riddu Riđđu" (which in the Sami language means "Little storm by the coast"), has since 1991 taken place annually in Kåfjord in Northern Norway. The festival celebrates coastal Sami life and culture, encompassing music, performing arts, courses, seminars and movies, among other activities. The fes-

tival receives permanent support from the Norwegian Government, the Sami Parliament, Troms County and Kåfjord Municipality.⁹

Modern media also play a key role for creative Sami industries. The visibility of Sami culture, for instance, through Sami TV news has increased in recent years, and the (social) media have become an important tool for self-expression and for the realization of creative and entrepreneurial projects. A good example is Oddasat, a Sami television news programme broadcast in Norway, Sweden and Finland as a joint production by NRK, SVT and YLE (the public-service broadcasters in their respective countries).

Sami culture is addressed both by national legislation and regional activities, and also through cross-border initiatives. For instance, in Norway, the Sami Parliamentary Council has introduced a programme for Sami culture with the aim of assisting and encouraging cultural players to earn their living through their artistic and cultural expression. The programme also addresses the profitability aspect of creative industries by bringing together regional actors and investors who will work jointly on business development using competence mapping, idea development, business creation and development, and strategies (Sami Parliament of Norway, 2013).

The EU's Interreg North Programme for the facilitation and advancement of cross-border activities and joint ventures in the northern hemispheres of Norway, Sweden and Finland has a subprogramme called Sápmi. The programme supports and promotes projects focusing on the Sami culture industry and Sami cultural activities. The Sápmi programme also stimulates creative Sami industries through product, service and method development and marketing, and through the creation of mutual forums for commercial entrepreneurs (Interreg IV A North, 2007).

6.4 Creative industries and sustainable regional development

Creative industries have emerged as sustainable alternatives to economic development and socio-economic transformation in the Arctic. The role of creative industries and cultural capital bears significant potential for the demographic and economic restructuring of the Arctic regions, which are struggling with outmigration and a down-turn in traditional large-scale industries.

Arctic local culture with its distinctive characteristics, such as nature and the Sami tradition, has pro-

⁷ See more: <http://tutlrecords.com/about.php>

⁸ See more: <http://arcticdesignweek.fi/>

⁹ Festival website at: <http://riddu.no/>.

vided inspiration and content for creative industries in the Nordic Arctic. Strong sectors within the creative industries in the Nordic Arctic are festivals, film and music, as well as design and handicrafts from local raw materials.

The development of creative industries in the Nordic Arctic does, however, include certain barriers related to sustaining a local creative class, attracting talent to the region and making Arctic creative industries competitive. Moreover, the Arctic creative industries are inclined to achieve a balance between locally oriented sustainable development and the realities of globalization and international competition.

Within this context, regional development initiatives and funding opportunities can contribute to the emergence and expansion of creative Arctic industries, consequently fostering regional competitiveness, economic gains and viability of the local communities. However, the role of calculative development and governmental steering can only have a limited effect, as the creative industries are spontaneous and endogenous by their very nature.

- How can finance for creative Arctic industries in the Nordic countries be attracted?
- How can the Nordic Arctic region become an attractive location for competent creative actors?
- How can the demand for Arctic creativity be increased? What should be done in order to create a bigger market share for peripheral creative industries?
- What kind of role should the public sector (i.e., governments, regional councils, funding agencies, etc.) have in the development of creative industries in the Arctic?
- What are the key strengths of creative industries in the North Arctic? Which sectors have the most potential to become creative industries?
- Who has the right to benefit from local creative capital, and how should the indigenous aspects be taken into consideration?
- Creative economies in the Arctic may also create negative externalities,¹⁰ meaning that the activities of creative industries can also have a negative impact on third parties in terms of economic inequality, housing affordability, environmental impacts, over-consumption and political infighting. How should the issue of negative externalities be addressed?

¹⁰ A negative externality is a cost that is incurred by a third party as a result of an economic transaction. In a transaction, the producer and consumer are the first and second parties, and third parties include any individual, organization, property owner or resource that is affected indirectly.

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Satu Luiro, Regional Council of Lapland, May 2015

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Nordregio
P.O. Box 1658
SE-111 86 Stockholm, Sweden
nordregio@nordregio.se
www.nordregio.se
www.norden.org