Nature of North Oy
Rovaniemi - Lapland

STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)

FOR KOLARCTIC CROSS BORDER COOPERATION (CBC) 2014-2020 PROGRAMME

SEA is a comprehensive analysis aimed at identifying and evaluating the environmental consequences of the actions of the proposed programme, and it is intended to ensure that they are fully included and appropriately addressed in the early stage of decision-making, together with economic and social considerations.

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CONTENTS

1. Introduction: the purpose of the SEA

The requirement to carry out a Strategic Environmental Assessment (SEA) is based on the Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment adopted by the Council of the European Union on 27th of June 2001 (further in the text – SEA Directive). The purpose of the SEA Directive is to "provide for a higher level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development" (INTERACT ENPI, 2014). SEA is a legally enforced assessment procedure which aims at introducing systematic assessment of the environmental effects of strategic land use related plans and programs.

The idea underlying SEA is to compile an environmental report that reviews the facts related to the environment in the region, and improves the environmental dimension of the Kolarctic CBC 2014-2020 Programme. The Programme continues and strengthens cross border cooperation between the countries in the North Calotte and northwest Russia. The Programme is mainly built on the experiences gained in long-term cooperation between the participating countries. Cooperation has been based on both bilateral agreements and on multilateral Programmes. The Programme is partly funded by the European Union from the European Neighbourhood Instrument (ENI CBC). Each participating country co-finances the programme with its national and regional financing.

The Kolarctic CBC 2014-2020 Programme complements national cross border activities by focusing on cooperation between the European Union Member States and Partner Countries. Within the Programme context, Norway as an EEA and Schengen country has equal status with the EU Member States of Finland and Sweden. The strategic base of the programme lies in the dimensions of the Lisbon Strategy, which focus is in economical, social and environmental issues, and on the Gothenburg Strategy. The programme strategy is thus based on the sustainable development approach.

Description of the Barents Co-operation is based on the Kirkenes Declaration of 1993. During the summit on the occasion of the 20th anniversary in June 2013, a new declaration was signed by the prime ministers of the Barents Region. The new declaration forms the framework for future cooperation. The Kolarctic CBC 2014-2020 Programme contributes to fulfilling the objectives of the Northern Dimension, the new Kirkenes Declaration and to the objectives of the EU-Russia Common Spaces (Kolartic CBC Programme 2014-2020 document, 2014). The aim is to turn the regional and cross-border challenges into new opportunities to grow and create more jobs in the programme area. The Kolarctic CBC 2014-2020 Programme supports the implementation of the chosen strategies by emphasizing activities that increase know-how and lifelong learning, co-operation between the business and research sectors, and knowledge of environmental and cross-border issues.

The purpose of strategic environmental assessments (SEA) is to ensure that environmental impacts are assessed and duly considered during the preparation and approval of plans and programmes. It focuses on the improvement of information availability, and provides more

opportunities for public participation in planning in order to further promote sustainable development. The aim is to ensure that the environmental consequences of specific plans and programmes are identified and assessed during their preparation, and especially before their adoption. The loss of unique nature and culture, major accidents and cumulative and indirect effects on the environment and human society, are the risks that can potentially be avoided through effective SEA and environmental impact assessment (EIA).

SEA is a comprehensive analysis aimed at identifying and evaluating the environmental consequences of the actions of a proposed programme, and it is intended to ensure that they are fully included and appropriately addressed in the early stage of decision-making, together with economic and social considerations. Strategic environmental assessment covers a wider range of activities or a wider area, and often extends over a longer time span than the environmental impact assessment of projects. Strategic environmental assessment can be applied to a geographical area in the context of regional development. Effective SEA works within a structured and tiered decision framework, supporting more effective and efficient decision-making for sustainable development and improved governance by providing for a substantive focus regarding questions, issues and alternatives to be considered in policy, plan and programme (PPP) making.

SEA is a useful tool along the path towards attaining sustainable development because it takes place in a much earlier phase of decision-making than EIA. This SEA report provides decision makers a strategic framework that takes into account international treaties and legislation. The regional baseline is described shortly in the context of environment and natural values, socially central issues, and industrial activities. This will be linked to the threats to the environment, and the potential risks arising from different actions and development that take place in the region. At the end the report includes some suggestions about how negative impacts could be avoided or mitigated.

Reader must be aware that understanding the possible multitude of complex environmental impacts need detailed analysis. The complexity increases when the social and economic viewpoints related to indigenous people and traditional ways of life are added. Thus, attaining real sustainable development of the programme area is an ambitious challenge. This is the reason why the SEA does not replace or reduce the need for a plan and project -level EIAs. However, the SEA will help to streamline the incorporation of environmental concerns into the decision-making process, and increase the effectiveness of further project -level EIA processes.

2. The Kolarctic CBC 2014-2020 Programme

2.1. Description of the programme area and regional baseline

The area targeted by the Kolarctic CBC 2014-2020 Programme covers the Region of Lapland in Finland, the Province of Norrbotten in Sweden, the Counties of Nordland, Troms and Finnmark in Norway, and the Murmansk, Arkhangelsk Oblasts and Nenets Autonomous Okrug in Russia. Regions adjoining the core programme region are Northern Ostrobothnia in Finland, Västerbotten in Sweden and Republic of Karelia and Republic of Komi in Russia. Programme area and the location of the adjoining regions in relation to the core programme region is presented in figure 1 below. The area encompasses almost two million square kilometres in the boreal taiga and tundra zones. The Southern region belongs to the temperate conifer zone, whereas northern Scandinavia and the northern parts of the Kola Peninsula, the Nenets Area and Novaja Zemlja represent the Arctic tundra.

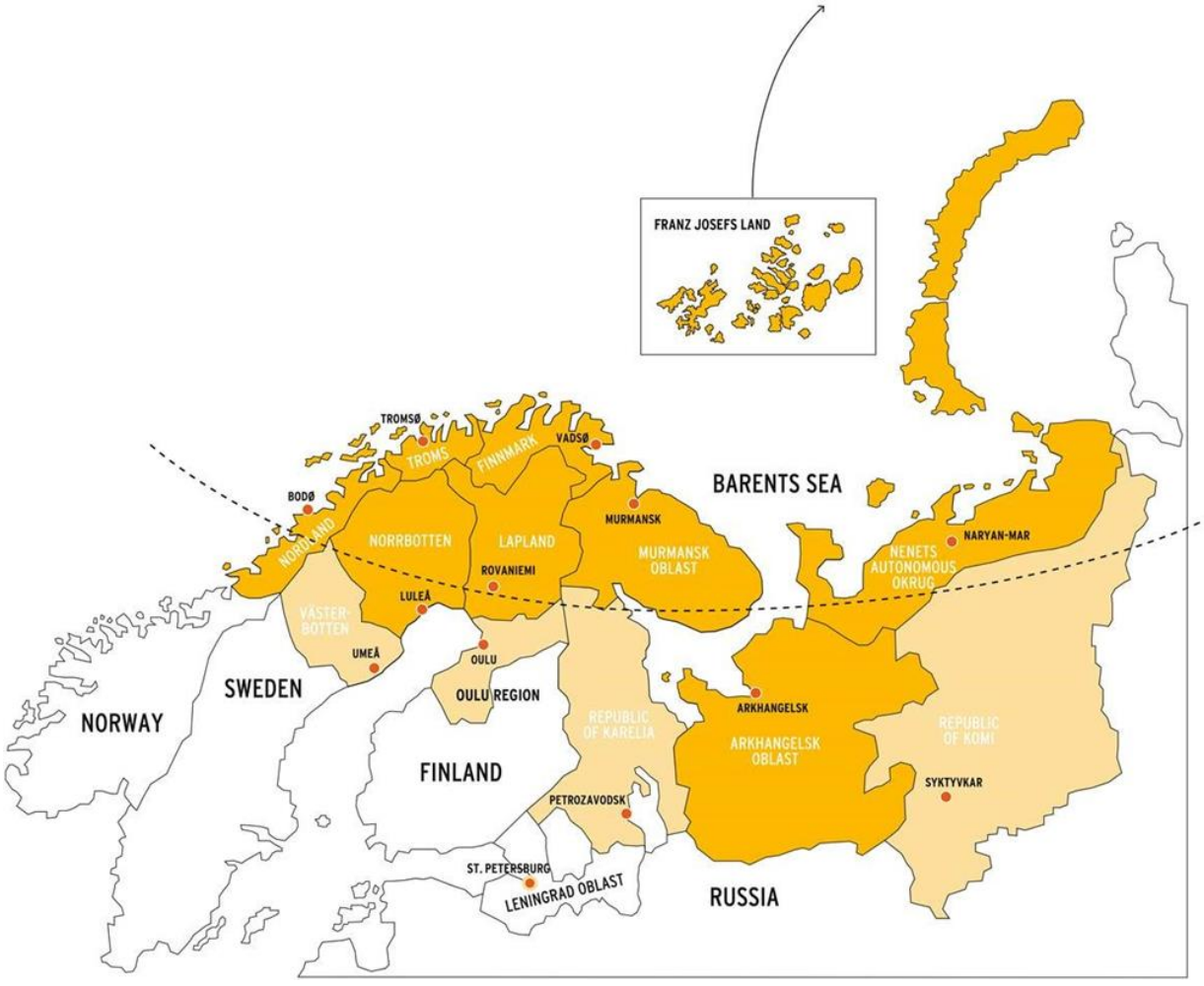

FIGURE 1: LOCATION OF THE PROGRAMME AREA AND THE ADJOINING REGIONS

The vast area contains outstanding biodiversity and biological resources, as well as enormous variation in economic and social conditions. It is enormously rich in natural resources, like forests, fish stocks, minerals, oil and gas. The figures for both unexploited and exploited minerals, gas and oil deposits are significant. The programme area mostly belongs to the same forest belt.

In the Kolarctic CBC Programme area approximately 13 % (230 000 km2) of the terrestrial area is protected for biodiversity conservation. Countries and regions of the area are in the process of implementing nature conservation plans which include establishing 59 400 km2 as protected areas. If all planned protected areas were established as statutory protected areas, the level of protection would increase to cover 16,6% of the total area. However, as some of these areas are not planned to be established by 2020, the current pace of implementation of nature conservation plans is inadequate for the attempts of the Region to achieve the Aichi Target 11. (Kobyakov, K. & Jakolev, J., 2013).

Swedish Norrbotten has deposits of iron ore of international significance. The Kiruna mine is the largest and most modern underground iron ore mine in the world (LKABa, 2010).The mine has an annual production capacity of over 26 million tonnes of iron ore (LKAB, 2010). In 2008 the mine produced 27.5 million tonnes of iron ore. Arkhangelsk has important bauxite and fluorite deposits, as well as valuable diamond deposits. Finnish Lapland has deposits of e.g. gold and nickel. The Norwegian Sea, the Barents Sea and the Arkhangelsk and Nenets regions are rich in oil and gas. Arkhangelsk has considerable reserves of coal. The Republic of Karelia has vast mineral resources and significant potential for development. There are large reserves of ferrous, non-ferrous and rare metals, including gold and platinum, as well as non-metallic minerals and energy resources (Kobyakov, K. & Jakolev, J., 2013).

All the natural resources have not yet been exploited, and international companies are putting considerable effort into the search for new possibilities. The long distances increase the need for development of safe and sustainable transportation and logistics. Although the natural resources offer economic potential for the future, their unsustainable use can be considered as environmental risk. Many of the ore deposits locate in areas naturally rich in biodiversity and valuable habitat types. This can cause problems; nature protection and mining industry are usually exclusive practices.

Since 2003, six environmental hot spots (polluted environmental sites) have been excluded from the list published by the Nordic Environment Finance Corporation (NEFCO) and the Arctic Monitoring and Assessment Programme (AMAP). The first three were hot spots were the storage of obsolete pesticides in Karelia and Arkhangelsk and of mercury-containing wastes in Murmansk. In 2013 three more hot spots were excluded — Arkhangelsk heat and power plant, air emissions of the Kondopoga pulp and paper plant in Karelia, and mercury-containing wastes in Nenets (Barents Euro-Arctic Council, 2014).

Most of the regional energy production comes from hydroelectric power stations, especially in Norway. Most of the electricity in the Murmansk region is supplied by the Kola nuclear power plant. Discharges of warm water by the Kola nuclear power plant into Lake Imandra have caused alterations in the aquatic ecosystems in White Bay of the White Sea (Kobyakov, K. & Jakolev, J.,

2013). Murmansk Region has also 17 hydro power stations and 3 thermal power stations. Construction of the hydro power stations led to the creations of a number of artificial reservoirs and caused extensive flooding, producing large dead forest areas as well as eliminating many salmon spawning grounds (Kobyakov, K. & Jakolev, J., 2013).

Alternative energy forms like wind power and bioenergy are increasing in the area. There are already several wind power plants along the Norwegian coast and in the Kolartic CBC programme areas of Sweden and Finland. For instance the Swedish Government decided to permit Markbygden Vind AB to build 1101 wind turbines in the Markbygden area of Piteå Municipality in Norrbotten. Fully built, the wind farm will produce up to 12 TWh of electricity per year, which is four times more than Sweden's present wind power production and equivalent to the average of what two Ringhals nuclear power reactors produced in 2005-2008.

Exotic and unique tourism areas such as the Solovetsky Islands, the Arctic landscape and the North Cape in Finnmark, Dundret, Riksgränsen and Björkliden in Norrbotten and the Ylläs, Pallas and Levi skiing centres in Lapland characterize the Kolarctic programme area. Tourism is one of the fastest developing business sectors. International interest towards Northern areas has grown substantially in recent years. The North is viewed as one of the few, unspoiled natural regions left in the world. Especially different tourism sectors, such as adventure travelling, nature, eco- and aboriginal tourism, represent real opportunities for the local communities.

The Arctic Ocean is predicted to melt during summers by the year 2030. It could be possible to use the North-East passage as a transportation route for business and commercial traffic. The Northeast Passage would shorten the transportation distance between Asia and Europe approximately by one third. The melting of the Arctic Ocean also allows traveling along the Northwest Passage. Northwest Passage is a sea route between North America and Europe and Asia. The shipping traffic has been low, but global warming has changed the situation during last few years easier for navigation. The first freighter which passed through the Northwest Passage was the Nordic Orion which arrived in Europe in October 2013.

In addition, the opening up of the Northeast Passage for increased ship traffic may also lead to the transport of nuclear materials from European reprocessing facilities through the Kolarctic CBC Programme area and the whole Barents Region. Concern has also been raised about the possibility of a new transport route for spent nuclear fuel to the Russian north and along the Norwegian coastline. In Norway, large economical and cultural interests are connected to production and export of marine food products, and past experiences have shown that only rumours of radioactive contamination in seafood can lead to economical consequences for producers. (Stiansen et al, 2009).

Arctic and sub-arctic indigenous peoples (Sami and Nenets) live in the Kolarctic CBC programme area. Sami culture is closely connected to reindeer herding and other livelihoods related to nature and natural resources like fish and game animals. Besides reindeer herding, there are a variety of small, local businesses, which all originate from close connection to the environment, culture and industry. Arctic reindeer pastoralists, the Nenets, travel great distances up and down the peninsula,

moving from northern tundra pastures in the summer to the more protected sub-arctic taiga in the winter. A major problem facing the people and the administration is how to ensure a sustainable future for the Nenets and Sami peoples - culturally as well as environmentally.

The rights of the indigenous people in the countries of the Kolarctic CBC Programme area vary. However, their rights are based on national legislation, international treaties and conventions. For instance Akwé: Kon guidelines are followed in Norway and Sweden. These voluntary guidelines are for the conduct of cultural, environmental and social impact assessments regarding developments proposed to take place on, or which are likely to impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities.

The link between global environmental change and the rights of indigenous populations results from the close relationship between the cultural and economic conditions of the indigenous peoples and their environmental settings. This sensitive relationship was recognized in Agenda 21 of the 1992 Rio Earth Summit, which identifies a variety of ways that indigenous peoples, national governments, and UN agencies can strengthen the role of indigenous communities in sustainable development. The legislative status of indigenous people in some areas may be unclear, thereby further hindering the development of impact assessment methods. In such circumstances, questions related to the sustainable use of gas, oil and ore reserves require efforts in impact estimation, information dissemination, participation and probably compensation.

2.2. Environmental threats in the Kolarctic CBC programme area

The most serious environmental threats of the Kolarctic CBC programme area are presented in the following. The aim is to draw attention to environmental concerns and existing disasters in order to avoid the provision of environmentally hazardous economic incentives through the programme, and to promote environmentally positive or indirectly positive incentives.

Climate Change will accelerate and cause major physical, ecological, social and economic changes, some of which have already started to appear. Climate change in northern areas will take place much more rapidly and violently than anywhere else in the world. The global mean surface air temperature increased by almost one degree Celsius during the 20th century (United States Global Change Research Program, 2009). Global warming is primarily attributed to the increase in greenhouse gas concentrations in the atmosphere. Most climate scientists agree the main cause of the current global warming trend is human expansion of the "greenhouse effect" - warming which results when the atmosphere traps heat radiating from Earth toward space (IPCC, 2007).

Certain gases in the atmosphere block heat from escaping. Long-lived gases that remain semi-permanently in the atmosphere and do not respond physically or chemically to changes in temperature are described as "forcing" climate change (Oreskes, 2004). Gases, such as water vapor, which respond physically or chemically to changes in temperature, are seen as "feedbacks." Human activities are the major reason for climate change. Over the last century the burning of fossil fuels like coal and oil has increased the concentration of atmospheric carbon dioxide (CO_2).

This happens because the coal or oil burning process combines carbon with oxygen in the air to make CO_2 (Lean, 2010). To a lesser extent, the clearing of land for agriculture, industry, and other human activities have increased concentrations of greenhouse gases (Lockwood, 2009).

Climate change will make a considerable contribution to natural hazards by speeding up warming of the oceans, melting of permafrost and glaciers, increasing sea level and the flow of rivers and incidence of severe weather events and acidification. It is estimated that the flow of rivers will increase by 10 – 25 %, especially in winter and in spring. This can result in increased damage caused by erosion, mudslides and storms. The amount of precipitation, mean annual temperature, and growth and production of the vegetation will change, inevitably appearing as a deterioration of ecosystem services. The impacts are targeted at biodiversity, habitats and plant and animal populations. They also cause reduced snow cover and can have effects on winter tourism. These impacts will first become evident in the northernmost, i.e. Arctic and sub-arctic, areas. The ecological corridors and connections are essentially important also because the vegetation zones are moving north- and upward.

Climate change and ocean acidification

There has been growing awareness of the impacts of climate change on the marine environments. The predicted impacts include changes in sea temperature, ocean currents and sea level. Furthermore, as the atmospheric CO_2 concentration rises, more CO_2 is taken up by sea water, making the oceans more acidic. It is very uncertain how rapidly and in which ways climate change will affect the Sea environments. Furthermore, changes may be camouflaged by large natural fluctuations in the period up to 2025. The impacts of ocean acidification are expected to become apparent more quickly, and adverse impacts may be felt before 2025. Calcifying phyto- and zooplankton species, corals and cephalopods are some of the most vulnerable organisms. (Ministry of Climate and Environment, 2009).

Studies assessing the potential impacts of international shipping on climate and air pollution demonstrate that ships contribute significantly to global climate change and health impacts through emission of GHGs (for example, carbon dioxide [CO2], methane [CH4], chlorofluorocarbons [CFC]), aerosols, nitrogen oxides (NOx), sulphur oxides (SOx), carbon monoxide (CO) and particulate matter (PM). Air quality impacts may result from the chemical processing and atmospheric transport of ship emissions. For example, NOx emissions from ships can combine with hydrocarbons in the presence of sunlight to produce ozone pollution, which can potentially affect visibility through haze, human and environmental health and has been associated with climate change effects (Arctic Council, 2009).

Fragmentation and habitat loss

Many of the habitats of the area are highly fragmented and at risk of further fragmentation due to ongoing land use changes and commercial practices of the Kolarctic CBC Programme area. Some of these practices (mining, building, forestry, hydropower etc.) are even located in the Natura 2000 areas or other valuable and protected areas. Eventually this fragmentation results in habitat loss and degradation. It constrains movements of species between habitats. Due to scattered existence of protection sites there is a threat of restricting reproduction of species and loosing the gene flow.

Habitat fragmentation is a primary threat to populations and species. In a fragmented landscape, isolated subpopulations are expected to experience reduced population viability and greater risk of extinction. Colonization and gene flow between habitat patches can mitigate these effects. Corridors are a popular strategy to conserve biodiversity, facilitate movements of individuals, and promote gene flow in fragmented landscapes.

To secure the spreading possibilities of species and habitats and prevent the further fragmentation of important habitats concrete activities are needed to mitigate the adaptation to the climate change and increasing pressures caused by different land use. Forestry practice, building, mining and peat industry are the major land use threats in the area.

Clearly, fragmentation and the added impacts of climate change are major threats to biodiversity. These threats also have broader implications, as they can ultimately jeopardise the provision of ecosystem services and the related socio-economic benefits. Furthermore, fragmentation reduces the capacity of habitats and species to adapt to the climate change. By improving the ecological connections and green infrastructures between habitats, including the protected areas, the negative effects of fragmentation can be reduced.

Several researches emphasize that in general 30 % coverage with suitable habitats is the critical minimum for most species. A reduction of suitable habitats to less than 30 % leads to patch isolation and a decrease in population sizes. Loosing habitats outside protected sites would likely lead to isolation of protected habitats and species populations. Further on, isolation will gradually lead to extinction of subpopulation. Several decades may lapse between the period when the critical level of fragmentation has been exceeded and when the final extinction of subpopulation will take place. The isolation of subpopulations is perhaps the most worrying issue in stopping the loss of biodiversity.

Acidification is a major concern in northern areas with their sensitive geology and ecosystems. Sulphur (i.e. sulphur dioxide and sulphate) is the most important acidifying substance in deposition in the programme area, with nitrogen of minor importance (Law, K. & Stohl, A., 2007).

The major source of sulphur emissions is the non- ferrous metal smelters in Nikel and Montsegorsk on the Kola Peninsula. All the smelters are operated by the MMC Norilsik Nicel consortium, which is the largest producer of Russian nonferrous metal and one of the largest producers of nickel, palladium, platinum, cobalt and copper in the world. Energy production and transport in and around urban centres are responsible for reduced air quality. In addition, long-range transported air pollutants contribute to the reduction in air quality. Clear evidence of serious, direct and indirect effects on terrestrial and freshwater ecosystems has been reported (AMAP, 2006).

The Barents Sea is particularly vulnerable to acidification because it holds some of the largest fish stocks in the world, and since its waters have low temperatures, it can absorb higher amounts of CO2. The Barents Sea doesn’t have ice caps to serve as a natural barrier from the airborne gas

and to help reduce the rate of acidification. At the 2010 Trondheim Conference on Biodiversity, hosted by the Government of Norway and the United Nations Environment Program among others, a call for ocean acidification reduction was documented. Also, Nordic ministers on the Arctic Council have requested one of their working groups, the Arctic Monitoring and Assessment Programme, to complete a study on the threats of increasing acid levels in the Arctic region. (Cappa, M., 2010).

Sulphur dioxide emissions have direct adverse effects on trees, dwarf shrubs and lichens.

Reindeer lichens, which obtain all their nutrients directly from rainfall and hence readily accumulate pollutants, have almost completely disappeared over extensive areas near the smelters. Many sensitive plants that would normally occur in the border areas of Norway and Russia have also declined. Animals are mainly affected indirectly through changes in their habitats. Habitat destruction and possible changes in food availability and quality are affecting their reproduction success, thereby reducing biodiversity in the long term.

Hazardous substances and contaminated areas represent one of the major environmental threats in northern areas. The pollutants consist of a wide range of contaminants, including persistent organic pollutants (POPs), heavy metals, radio nuclides, acidifying substances, and petroleum hydrocarbons. In addition hey include other industrial chemicals, such as polychlorinated biphenyls, and pesticides, such as dichlorodiphenyltrichloroethane. POPs are produced by human activities that are resistant to environmental degradation Owing to their persistence in the environment, POPs are transported long distances in the atmosphere, accumulating in regions such as the Arctic, where low temperatures induce their deposition. Contaminants have been detected in all compartments of the Arctic and sub-arctic environment and its ecosystems: air, soils and sediments, snow and ice, seawater and freshwater, birds and animals and, not the least, in humans. Most of these contaminants are derived from sources outside the Arctic, in particular the industrialized areas of Europe, North America, and Asia. Some volatile and semi- volatile contaminants, including mercury from coal-burning sources, and pesticides used in agriculture in the mid- latitudes and for pest control in the tropics, reach the Arctic from as far away as Southeast Asia.

For POPs in particular, the contamination found in the Arctic cannot be related to any known use and/or release in the region, and can only be explained by long-range transport from lower latitudes. POPs are deposited on surfaces and revolatilize when, for example, the temperature increases. The risk of revolatilization is further increased by climate change. Contaminants can be taken up in the lipid-rich food chains of the Arctic, in particular the marine food chains. Contaminants such as persistent organic pollutants, or metals including mercury, cadmium and organic tin, are known to have a range of effects on biota, including humans. These effects include neurotoxin, immunologic, hormonal and neonatal effects, and some of the compounds are carcinogenic. (AMAP, 2009). There are thousands of heavily contaminated areas in the programme area: in Norrbotten alone, there are about 4000 identified contaminated areas.

Environmental hot spots are polluted environmental sites that pose a health risk to those who live near them or regionally, either because of direct impacts or the potential to pollute the atmosphere, drinking water or other parts of the food chain. According to the Assessment of the Barents Hot

Spot Report (publ. 2013), certain measures aimed at solving environmental problems have been launched at 42 out of 42 hot spots, though not all environmental problems have been solved yet. (Bambulyak et al, 2013).

During the last years, significant environmental improvements have been achieved at several hot spots. Completed and ongoing activities include environmental modernisation in the pulp and paper sector and in municipal wastewater treatment in some major towns. There are also towns where the heating systems have been converted from fuel oil or coal to natural gas. The first steps in addressing waste management in a comprehensive manner have been taken in many regions and, in many places, people's exposure to hazardous substances such as mercury, obsolete pesticides and dioxins has been reduced. Special attention should be paid to transboundary impacts, such as air pollution from the smelters in the Kola Peninsula. (International Barents Secreteriat, 2013).

Radioactive pollution and the risk of accidents are environmental threats especially in the Murmansk region and along the coasts of the Arctic seas. In the early 1990's it became known that the Soviet Union had dumped considerable amounts of radioactive materials in the Barents and Kara seas. Substantial amounts of radioactive waste were released from nuclear plants and directed out into the rivers and ocean, causing severe pollution of the environment. Today, the storage of radioactive waste at plants with poor security is a major problem.

The concentration of nuclear installations and the accumulation of radioactive waste and nuclear fuel in Northwest Russia represent a potential risk of radioactive pollution in the region, including the Barents Sea area and even in neighbouring countries. Significant national and international actions have been undertaken to reduce the risks of radioactive contamination in Northwest Russia, but still much remains to be done. Presently, priority areas are the removal of radioactive sources from radioisotope thermoelectric generators (RTGs), safe decommissioning and dismantling of nuclear submarines and rehabilitation of facilities used as temporary storage for radioactive material (Stiansen et al, 2009).

The Kola nuclear power plant, which opened in 1973, was the first nuclear power plant to be built above the Arctic Circle. It is the main electricity supplier for industry and towns in the Murmansk region. The nuclear waste is transported by rail to the re-processing plant. An accident at the Kola nuclear power plant could result in the release of large amounts of radioactivity into the atmosphere. The Norwegian authorities consider that the effects of accidental releases from nuclear installations in neighbouring countries to be among the greatest environmental threats in the coming years. The unsatisfactory safety situation at the Kola nuclear power plant has been of major concern.

The removal and safe disposal of RTG and their replacements with solar panel technology in Northwest Russia is a priority area under the Norwegian action plan. RTGs have been used for powering various devices, such as lighthouses, in remote areas of the Arctic. The remaining 11 devices, located in the Archangelsk and Nenets regions were removed in 2009 (AMAP Assessment, 2009). The work on safe decommissioning of nuclear submarines is in progress. As of 2008 164 of the 198 obsolete nuclear submarines of the Russian Northern fleet had been

defueled and dismantled. Of the remaining 34, 9 nuclear submarines in northwest are waiting to be decommissioned (AMAP Assessment, 2009).

A major potential risk of radioactive pollution for the local and regional environment represent facilities used as temporary storage sites for radioactive wastes, spent fuel and reactors from decommissioned submarines such as temporary storage at Andreev Bay and Gremikha (on the Kola Peninsula), and Lepse storage vessel (in the Kola Bay). Transport of spent fuel and radioactive wastes form these facilities to safer storage sites represents another risk. The present plan suggests that transport of spent nuclear fuel and radioactive waste from Andreev Bay could start in 2013-2014. From Gremikha the removal of fuel to the Russian reprocessing plant in Mayak was scheduled to start at the end of 2008 (Olseng et al, 2009). Further activities will also include defueling and decommissioning of the Lepse Floating Maintenance Base, which has been used for storing spent nuclear fuel and radioactive waste and which is in a very poor condition (AMAP Assessment, 2009). It is also expected to relocate the Lepse from the Atomflot site to the Nerpa Shipyard. There are also several other issues that present a potential risk of radioactive contamination in the region that could affect the Barents Sea area as well.

Oil and hydrocarbon pollution and the risk of accidents have become a real threat owing to the increasing global demand for oil and gas, which has led to an expansion of the oil and hydrocarbon industry and transportation activities in the Kolarctic CBC Programme area, both on land and at sea. The Arctic area is estimated to contain about one fourth of the world's undiscovered petroleum resources. If the planning and realization of this expansion of the industry and transportation are not carried out with sufficient regard to the environment, the growing volumes will pose severe threats to the environment and traditional means of livelihood. In 2004, some 12 million tons of oil were shipped from northwest Russia through the Arctic waters of the Barents Sea and down along the Norwegian coastline towards Europe. Marine transportation is expected to nearly double this year and, by 2010, it could be as much as 200 million tons (WWF, 2014).

Any increase in oil and gas related activities is likely to result in increased pollutant emissions, Arctic waters are home to the world’s largest cod and herring stocks, as well as pods of sperm and killer whales, and large puffin and cormorant populations. The largest cold-water coral reef was recently discovered on the Norwegian coast. Bioaccumulation of pollutants in fish is a problem, and with current knowledge it is not possible to say what all kind of effects increased amounts of pollutants would have on individuals and stocks. The environmental impacts of any spills and other accidents are additional to those of normal activities and releases of pollutants. In the event of a large oil spill from a blow-out or shipwreck, seabirds and the shoreline are expected to be most seriously affected, while impacts on earlier stages of fish life cycles and coastal seals are likely to be less serious (Ministry of Climate and Environment, 2009). But it is obvious that an oil spill could severely damage the nature for years to come, and also have a disastrous effect on part of the local economy, which is based on tourism and fishing.

There is a large volume of shipping in the Barents Sea and considerably less in the Kara Sea. The main shipping route into the area is along the coast of Norway. The main shipping lane goes through inshore waters, and much of the traffic to and from ports in northern Norway follows this route. Traffic to and from Russia follows an offshore route in the open sea to ports in Murmansk,

the White Sea and other areas. Transport of oil from Russia is from ports in the White Sea, Murmansk, Pechora Sea (i.e., Kolguev and Varandey), and Ob' and Yenisei estuaries in the Kara Sea. There is also year round shipping of nickel ore by Norilsk Nickel from a port in the Yenisei estuary. In the western Barents Sea, there is a shipping route to Svalbard with seasonal traffic of cargo ships supplying the communities, bulk carriers transporting coal and cruise ships. There is also a substantial number of fishing vessels that operate year round in the ice-free part of the southern and central Barents Sea, while there is little fishing activity in the Kara Sea. (Arctic Council, 2009).

In 2006, Norway adopted an integrated management plan for the Norwegian part of the Barents Sea and adjacent waters off the Lofoten Islands. In the preparatory work for this plan, an assessment of environmental impacts from shipping was carried out and valuable and vulnerable areas were identified (Arctic Council, 2009).

The Arctic Council Working Group on Protection of the Arctic Marine Environment

Arctic Council (PAME) has prepared in 2002 an overview of the potential impacts of offshore oil and gas activities. The activities will cause considerable inputs of a range of gases into the atmosphere from power generation, flaring well testing, leakage and transportation. A comprehensive assessment of the oil and gas activities in the Arctic was carried out in 2007 by the Arctic Council under the leadership of the Arctic Monitoring and Assessment Programme working group. This assessment summarized information on the history, current and projected oil and gas activities in the Arctic, and examined socioeconomic and environmental effects associated with these activities. The assessment included a detailed description of the main features and species of the Arctic ecosystems and their vulnerability to oil spills and disturbances from oil and gas activities. An illustrative circumpolar map of vulnerable areas based on aggregations of mammals, birds, and fish was produced as an outcome.

Eventually, emissions and accidental leakages are threats to the air, and fragile aquatic and terrestrial ecosystems. For example, there are no known effective methods for containing a spill in icy conditions as the ice impedes the booms that usually hold an oil slick in place. The emissions will contribute to climate change because a powerful greenhouse gas, methane, is also released into the atmosphere. The critical deposition and emission loads for terrestrial ecosystems in the Arctic are not well studied. It is important to focus on ways to prevent accidents and adverse environmental effects and to develop early warning systems. Planning and developing tankers, harbours and transportation networks of high environmental quality are urgently needed to prevent environmental catastrophes.

Even a single environmental accident can endanger the permanence of adequate conservation status of the species and habitats especially in or close to a protected area.

Risk management

Most human activities inevitably cause pressure on the environment. Activities like transport, energy consumption and industrial production lead to various releases, including greenhouse

gases and toxic chemicals. This can have negative consequences for both human health and the natural environment. For instance, the number of incidents of allergies, asthma, certain types of cancer, and reproductive disorders in Europe is increasing. It is suspected that chemicals emitted to the environment are contributing to this trend.

For 99% of the chemical substances, there is not enough information about effects on health and the environment, and how chemicals need to be handled to be safe. To reduce this lack of knowledge, there is an increasing need of qualified experts in the area of human and environmental risk assessment.

All human activities carry a certain risk of unforeseen incidents. The level of risk associated with an activity is a combination of the probability of an event occurring and the consequences of the event. Risk analyses should be always conducted and preventive measures taken to minimize the risk that commercial activities in the Kolarctic CBC programme area will have adverse environmental impacts. (Ministry of climate and environment, 2009).

Unsustainable use of natural resources decreases the economic, social and ecological value of nature in the north. The use of natural resources, e.g. construction, tourism, reindeer herding, mining, forestry, agriculture, industry, and fishing and hunting, should be carried in such a way that sustainability is maintained. The sustainability of the environment is also under strong pressure due to climate change. This means that we need to take special care when estimating the sustainability of different forms of natural resource utilization.

In some parts of the programme area, there are important winter tourism areas and strong pressure to develop summertime tourism. Some areas want to concentrate on developing wintertime tourism. Developing winter tourism is likely to be more sustainable, while the short summer is a critical reproduction time for most species and disturbance can easily destroy the year's reproduction. This can be a severe threat for endangered species. Furthermore, an increase in the number of tourists means more wear and tear in nature. It will be important to find ways of directing tourism to less vulnerable areas and ensuring that the aims of sustainability can be reached while, at the same time, facilitating the growth of tourism. This needs research, careful planning and follow- up of the ecological outcomes. Nature in the north can be seen as an ecosystem service that can be sold in the form of tourism services. Thus, it is necessary to improve our understanding of the functioning of ecosystems and ecological interactions in order to ensure that the ecosystems can withstand the coming changes.

Old-growth forests are today the subject of a hot, worldwide debate between "greens", administrators and the forest industries. In the Kolarctic programme area in Finland and in Russia, campaigns against the logging of old- growth forests are having a considerable influence on policies and practices. In Russia, it may even be associated with criminal activities (illegal logging, financial misuse, abuse of local peoples, law violation) and lack of law enforcement. In Finland, there have been confrontations between state forestry policy, local reindeer herders, local tourism entrepreneurs and Greenpeace. The problem is wide and finding a solution requires multidiscipline expertise. The multiple uses of forests, like recreational use, tourism, reindeer herding, non-wood

forest products and other aspects as well as forestry, are the main activities to be integrated in northern forest areas.

Reindeer husbandry is an economic activity in the programme area that has a particular cultural dimension and importance for indigenous peoples. Reindeer husbandry is suffering a decline in Fennoscandia and in most parts of Russia. In Russia, the reasons for the decline are mainly economic. In Fennoscandia, there are problems in certain areas due to overexploitation and multiuse of pastures, which has forced the authorities to decrease the permitted number of reindeer. However, in Norway the number of reindeer has not decreased. Changes in traditional reindeer herding have caused 'double use of pastures', resulting in winter consumption and summer trampling of the lichen fields (Forbes et al, 2004). When assessing the sustainability of reindeer pastures it should be noted that, in addition to herding, several other factors (e.g. climate change, pollution, motorized wheeled vehicles) increase the pressures on pasture sustainability.

The fish stocks in all the commercially exploited sea areas have decreased sharply during the last few decades. For example, populations of cod and whitefish have declined seriously due to the unsustainably heavy commercial use of fish stocks. In Norway, a precautionary approach in fishery management has been pursued since the late 1980s, and recent efforts have focussed on implementing an ecosystem approach to stock management. Coordinated, ecosystem-based management of the Barents Sea – Lofoten area is a continuous process, which will require interaction between the competent authorities, the scientific community and the stakeholders. Norway has decided that the first integrated management plan should be drawn up for the Barents

Sea – Lofoten area. The plan is being prepared in accordance with the ecosystem approach, and is based on high- level political decisions and is widely participatory. In co-operation with Russia and the EU, Norway has already implemented such management plans for several fish stocks in the North Sea and in the Barents Sea. However, illegal and unreported fishing are serious problems currently facing the management of marine fish stocks.

Loss of biodiversity is globally a major concern. Changes in habitats and their use have a strong effect on biodiversity through population decreases of some species and increases in others. Such changes usually decrease the biodiversity of habitats. This also makes room for exotic species, often arriving from southern regions. The threatened species in the Kolarctic programme area include vertebrates, invertebrates, vascular plants, cryptogams, fungi, lichens and, most probably, even more primitive species. In Fennoscandia, most of the threatened species are primarily associated with forest habitats, particularly herb-rich woodland and old growth forest.

The other large group comprises the species typically living in traditional farmland habitats. The main factors that threaten species or lead to their extinction include the overgrowing of open habitats no longer used for traditional forms of agriculture, and changes in forest structure caused by modern silvicultural methods. In coastal areas, marine habitats and species are threatened. For example, the number of sea birds in Norway has decreased markedly during the last decade.

In the northern programme areas, the risk of biodiversity loss arises from the increased use of natural resources, in addition to climate change. It seems likely that some species will expand their

habitats northwards and, in places, the tundra will entirely disappear (ACIA, 2007). Even today, the northern wilderness areas, which seem to be unaffected by pollution and in a natural state, are under strong pressure due to global and regional economic development and climate change. The loss of biodiversity is proceeding at a fast rate. However, the EU Member States must implement the EU Biodiversity Strategy and its global dimensions based on the Convention on Biological Diversity. This means taking measures to identify and implement priority actions to achieve the objective of halting the loss of biodiversity by 2010 and beyond.

The key lies in fostering high ecosystem biodiversity by maintaining an extensive conservation area network and applying nature-oriented forestry practices. Safeguarding the species and genetic diversity ensures the health and viability of the natural environment and its ability to react flexibly to change. The key to the habitat's ability to recover from disturbances lies in its biodiversity. Many endangered species, and thus biodiversity itself, are wholly dependent on the continuity of their biotopes. A coherent, comprehensive Natura 2000 network and sufficient amount of protection areas serve as ecological connections, green infrastructures, as climate change speeds up, different land use practises changes the surroundings and favourable conditions for the vegetation zones shift.

Waste management is a widespread problem in the Kolarctic area. The amount of waste is increasing rapidly, and small municipalities have no resources for managing the problem. Simply, there may be no dumps, no sorting and no recycling. The authorities try to support waste projects aimed at minimizing the amount of waste and improving the treatment of waste by e.g. sorting, recycling and/or re-use. By establishing modern waste handling systems, more and more waste could end up as new products. For instance a commercial waste company is established in Arkhangelsk for businesses to deliver sorted fractions of solid waste. This waste is mainly paper, cardboard, plastic and metal cans. The waste company packs and stores these fractions. There is not any kind of recycling of these fractions and waste is placed on landfill.

An important objective is also to ensure that chemical emissions are minimised in all stages of a product's life cycle, from the raw materials used in manufacturing until the product is discarded and ends up as waste. This approach is known as integrated product policy. It will only be successful if business and industry play an active role.

The scrap-heaps of solid radioactive waste on Russia’s Kola Peninsula are nowadays eliminated by a top-modern facility for conditioning and long-term storage in the Saida Bay. The storage contains equipment for dealing the whole cycle of radioactive waste management which is taking shape on the coast to the Barents Sea. The complex in the Saida Bay can handle all kinds of radioactive scrap from the huge reactor compartments of decommissioned nuclear submarines to contaminated metal parts from both the navy and Russia’s fleet of nuclear powered icebreakers. Also Nenets has managed to organize a collection and treatment system for wasted luminescent lamps.

Pollution of drinking water is a serious problem for the inhabitants of many parts of the Russian region. Poor state of water supply systems, shortage of water purification facilities and disinfection

systems, low quality of drinking water generally in Russia and particularly in the regions of the Russian Arctic, Siberia and Far East have been defined in the literature. Drinking water is mainly taken from surface waters that are threatened by industrial pollutants or waste waters. A comprehensive approach aimed at avoiding the pollution of surface waters must be a driving principle also in the implementation of the Kolarctic CBC programme. There is a need for training and capacity building in the sphere of local water management, and a need for local administrations to control it. Environmental management should aim towards continuous improvements. Companies have set targets on emission and discharge reductions. In addition, further efforts are needed, for example, to improve the quality of drinking water, and to develop waste management and environmentally sound treatment and final destruction of hazardous wastes.

According to a study published 2013 in International Journal of Circumpolar Health, non-centralized water sources are highly contaminated (both chemically and biologically) in 32–90% of samples analyzed. Very high levels of chemical contamination of drinking water (up to 51%) were detected in many Russian regions, mainly in the Northwestern part of the Russian Arctic. Biological contamination of drinking water was generally much lower (2.5–12%) everywhere except Evenki AO (27%), and general and thermotolerant coliform bacteria predominated in drinking water samples from all regions (up to 17.5 and 12.5%, correspondingly). The presence of other agents was much lower: Coliphages – 0.2–2.7%, Clostridia spores, Giardia cysts, pathogenic bacteria, Rotavirus – up to 0.8%. Of a total of 56 chemical pollutants analyzed in water samples from centralized water supply systems, 32 pollutants were found to be in excess of hygienic limits, with the predominant pollutants being Fe (up to 55%), Cl (up to 57%), Al (up to 43%) and Mn (up to 45%). (Dudarev et al, 2013).

2.3. Summary of contents of the Kolarctic CBC Programme

The Kolarctic Cross Border Cooperation 2014-2020 Programme complements national cross-border activities by focusing on cooperation between the European Union Member States and Partner Countries. Within the Kolarctic Cross Border Cooperation 2014-2020 Programme context, Norway as an EEA and Schengen country has equal status with the EU Member States of Finland and Sweden. Description of the Barents Co-operation is based on the Kirkenes Declaration of 1993. During the summit on the occasion of the 20th anniversary in June 2013, a new declaration was signed by the prime ministers of the Barents Region.

The basis of the joint cross-border development strategy of the Programme is the geographical position of the Programme area and the well-established cooperation between the regions. The strategy responds to the development needs and opportunities identified in the analysis of the Programme area, as well as in the consultations with the regional stakeholders. The joint cross-border development strategy can be seen as a plan to reach the goals in terms of systematic actions and activities to be taken under the key themes of the programme. The implementation of the strategy shall take into account the principals of EU regulations concerning partnership, equality, sustainable development as well as the information society. The common focus of any action carried out with the support of the Kolarctic CBC Programme is on cross-border cooperation.

Kolarctic CBC 2014-2020 programme contributes to the identified regional needs by financing actions within priority areas. Priority areas represent the translation of the selected thematic objectives into the programme reality, the specification and refining of the topics addressed by the selected thematic objectives to suit the common needs of the programme area. The SEA has been implemented on the basis of the selected thematic objectives. No alternative reviews have been included into the report.

Priority areas are:

1. Viability of Arctic economy, nature and environment

2. Fluent mobility of people, goods and knowledge

3. Environmental baseline and trends

3.1. Description of environmental distinctiveness in the core eligible regions:

Nordland is located next to the border with Sweden, and is dominated by the Scandinavian mountains (Kjölen). Norway's second largest glacier, Svartisen, is located in Nordland. The Saltfjellet mountain range forms a natural border between Helgeland and Salten, and is where the Arctic Circle cuts through the county. The western part of this mountain range is dominated by steep mountains and fjords, with glaciers stretching towards the sea. Forests represent the Scandinavian temperate boreal forest belt, with Norway spruce (*Picea abies*) as the dominant tree species. There are five large national parks: Junkerdal, Rago, Börgefjell, Möysalen and Saltfjellet-Svartisen.

In addition, there is Vega the Unesco Word Heritage Site. The key industries are fishing and offshore oil and gas exploration. Nordland is well known for the fishing of cod and for salmon hydroponic farming. There is some mining, in particular of limestone, construction material and tungsten ore. The port of Narvik has a direct rail connection to the Kiruna-Gällivare iron ore mines in Sweden. The area has many hydroelectric power stations.

Troms has a border with Norrbotten in Sweden and, further to the southeast, a shorter border with Lapland in Finland. There are mountains in all parts of Troms; the most alpine and striking being the Lyngen Alps (*Lyngsalpene*), with several small glaciers. The sheltered valleys in the interior of Troms have the highest treeline, with downy birch (*Betula pubescens*) reaching 700 m. In Troms birch forms the treeline, often 200 m above other tree species. Scots pine (*Pinus sylvestris*) reaches an elevation of almost 400 m in Dividalen, where some of the largest trees are 500 years old.

There are three large national parks: Reise, Aanderdalen and Övre Dividalen. Along the coast, fishing is the dominant industry. There is also some agriculture, especially in the southern part, which has a longer growing season. The world's northernmost university is located in Troms. The Sami have lived in the Troms region for at least 2000 years. Tysfjord is a centre for the Luleå Sami culture.

Finnmark is the northern- and easternmost county of Norway, with a border with the Murmansk region in Russian and Lapland in Finland. The nature ranges from barren coastal areas facing the Barents Sea, to more sheltered fjord areas and river valleys with a tree cover. About half of the county is above the tree line, and large parts of the other half are covered with downy birch (*Betula pubescens sp*.). The lushest areas are the Alta and the Tana River valleys, and in the east the Pasvik valley, where Scots pine (*Pinus sylvestris*) and Siberian spruce (*Picea abies sp. obovata)* forest is considered as a part of the Russian taiga. Furthermore, elevations exceeding approximately 100 - 200 m in coastal areas in western Finnmark and 300-500 m in the interior result in an alpine tundra climate, and in the northeast this merges with the Arctic tundra climate. The largest national parks are Övre Anarjohkas, Övre Pasvik, Stabbursdalen and Varanger halvöya. Fishing has traditionally been the most important livelihood along the coast, The red king crab, originally from the northern Pacific Ocean and introduced in the Barents sea by the Russians, has invaded from the east and is commercially exploited today, but it also causes many problems.

The Norwegian Sea is Norway's largest sea area, and is about three times the size of mainland Norway. The Norwegian Sea has a rich and varied natural environment that supports high biological production. There are substantial fisheries throughout the year, the most important of which are for Norwegian spring-spawning herring, blue whiting, Northeast Arctic saithe and Northeast Atlantic mackerel. Norwegian Sea is also an important area for tourism and for recreational fishing.

The state of the Norwegian Sea environment is generally good. However, management of the area poses considerable challenges, particularly as regards the impacts of climate change and ocean acidification, overfishing of certain fish stocks, the risk of acute pollution, the decline of seabird populations and the need for protection of coral habitats. The Government considers it important to safeguard the ecosystems of the Norwegian Sea over the long term, so that they continue to be clean, rich and productive. Special caution is needed in particularly valuable and vulnerable areas. (Ministry of Climate and Environment, 2009).

Facilitating the coexistence of different industries

Direct conflicts of interests can arise between competing uses of the same area, for example by the fishing industry and the oil and gas industry. Future developments, such as using parts of the Norwegian Sea for wind power production might also cause conflicts of interests.

Norwegian environmental administration

The political administration takes place at three levels. The Kingdom covers Norway and its insular possessions Svalbard and Jan Mayen. Svalbard is also subject to international treaties and is

administered separately. Jan Mayen is integrated into Nordland County. The County Governor is the chief representative of the King and Government in the county, and works to implement the decisions of the Storting (Parliament) and central government. The most important administrative level consists of the municipality and local government. They are responsible for the implementation of environmental policies at the local and regional level. The County Governor interprets central policy documents in the local context, taking into account the ability of each municipality to provide necessary administrational services. Experts from the County Governor's office supervise local activities, and advise and instruct in accordance with the political judgement of the local government. Important sectors are environment protection, agriculture, planning and construction.

EIA and SIA are compulsory under the ETA convention in Norway. This is laid down by Royal Decree of 1 April 2005 pursuant to section 33-5 of the Act of 24 September 2004 No. 72 on amendments to the Planning and Building Act (EIAs) cf. the EEA Agreement. The authorities responsible vary on the basis of the pursuant. Most often the authority is the County Municipality or the Norwegian Directorate for Nature Conservation.

Norrbotten is Sweden's largest and northernmost county. The geographic position, natural resources, cultural diversity and sharp contrasts give the county its own unique character. Norrbotten borders the counties of Nordland and Troms in Norway, and Lapland in Finland. Norrbotten is rich in nature. The highest mountains, the deepest lakes, the mightiest rivers and the remotest forests of Sweden are located in Norrbotten. The county three world heritage sites, eight national parks and nearly two hundred nature reserves and conservation areas.

The government authorises the institution of National Parks. The land in a national park is always state-owned. The Swedish National Environment Protection Board lays down regulations for all national parks. The largest national parks are in the mountain areas. There are 267 Natura 2000 areas belonging to the European network of valuable nature areas (www.naturvardsverket.se). The largest rivers in a natural state, the Torne, Kalix, Pite and Laisäl- Vinde, also belong to the Natura 2000 network. The River Torne (Tornio) forms the border between Sweden and Finland. The Border River Commission is an administrational bilateral unit that takes care of the environmental permits and enforcement of common water policy in the border area.

Norrbotten also has a rich industrial and commercial sector. The primary industries - mining, steel, forestry and hydropower - are important for both the county and for Sweden. But the commercial and industrial sector is much broader. Exporting manufacturing industries, a growing service sector and successful small enterprises in many different areas are now ever more important components of Norrbotten's economy.

Swedish environmental administration

The County Administrative Board fulfils the goals set in national policies by the Parliament and the Government, coordinates the interests of the county, promotes its development, establishes regional goals, and safeguards the due process of law in the handling of each case. The County Administrative Board is nominally a government agency headed by a Governor.

In January 2002 the Swedish Government established the Environmental Objectives Council to promote consultation and co-operation in implementing the environmental quality objectives adopted by Parliament. The Council consists of representatives of central government agencies, county administrative boards, local authorities, nongovernmental organizations and the business sector. Sweden's 21 county administrative boards have overall responsibility for defining and monitoring regional goals relating to the environmental quality objectives. The county administrative boards support the municipalities, which have overall responsibility for local adaptation of the national objectives. The Swedish Parliament has established 16 environmental quality objectives (miljömål), to guide Sweden towards a sustainable society. The 16 environmental objectives will function as benchmarks for all environment-related development in Sweden, regardless of where it is implemented and by whom. The overriding aim is to solve all the major environmental problems within one generation.

With its overall generational goal for 2020, Sweden’s environment policy is based on 16 environmental quality objectives (EQOs) sanctioned by the Government and Riksdag (parliament). The goals are: Reduced climate impact, clean air, natural acidification only, a non-toxic environment, a protective ozone layer, a safe radiation environment, zero eutrophication, flourishing lakes and streams, good-quality groundwater, a balanced marine environment, flourishing coastal areas and archipelagoes, thriving wetlands, sustainable forests, a varied agricultural landscape and a magnificent mountain landscape

The Swedish Environmental Protection Agency coordinates and follows up the efforts to reach the EQOs nowadays.

Sweden has been a member of the EU since 1995. An EIA directive is in force under national legislation (1999), and is written in the Environmental Code Chapter 6. The implementation of SEA (2005) takes place in accordance with the Environmental Code and Planning and Building Act. The responsible authority is the County Administrative Board.

Lapland The climate in Lapland is a mixture of maritime and continental. Lapland is Finland’s largest county and has the lowest population density. Lapland is covered by Scots pine (*Pinus sylvestris*), Norway spruce (*Picea abies*) and birch (*Betula pubescens*) forests and wide mire areas. Lapland is characterized by fells, covered by mountain birch and, in the northernmost areas, bare felltops. The River Tornio (Torne) forms the border between Finland and Sweden, and the River Teno (Tana) between Finland and Norway. In the east the River Paz, originating from Lake Inari, runs along the border between Norway and Russia into the Barents Sea. There are strict nature reserves, national parks, wilderness areas and Natura 2000 programme areas. The Tornio, Ounas and Simo rivers belong to the Natura 2000 network.

Lapland's protected areas are mostly situated on state-owned land and waters. Metsähallitus, natural heritage services manages almost all of the state-owned protected areas. Centre for Economic Development, Transport and the Environment for Lapland (ELY) is one of the 13 regional level authorities in Finland. Northern Ostrobothnia has its own ELY. ELY is the regional

authority responsible for safeguarding and implementing environmental legislation in northern Finland.

Finland has been a member of EU since 1995. The EIA of projects is regulated by the Act on Environmental Impact Assessment Procedure (1994). Environmental assessment of plans, programmes and policies is regulated by the Act on the Assessment of the Impacts of the Authorities Plans, Programmes and Policies on the Environment (the SEA act), which entered into force in 2006. The ELY-Centre is the responsible authority in EIA and SEA procedures. However, if the project has significant effects on other countries, the authority responsible is the Ministry of the Environment.

Murmansk Oblast is located on the Kola Peninsula in the north-western part of European Russia. The region has coastlines on the Barents and White seas and borders on Norway and Finland. The region's geographic location determines the characteristics of its climate, weather, landscapes, and plant and animal life. The climate is temperate maritime in the south and relatively mild sub-arctic in the north due to the influence of winds from the warm Gulf Stream. The vegetation consists of mosslichen tundra in the north and of forest tundra and northern taiga (pine, spruce, and birch) in the south. The soils are predominantly podzolic and peatland, with tundra soils in the north.

The economy of the Murmansk region is oriented towards the exploitation of natural resources. The region produces all the apatite in Russia, as well as iron, copper and nickel. The fishing industry is considerable. The Murmansk Region has its own agricultural sector, which partially solves the problem of providing the northern inhabitants with fresh foodstuffs. However, the climatic conditions in this polar region limit the potential of local agriculture.

Arkhangelsk Oblast is a federal subject of Russia. It includes the islands of Franz Josef Land and Novaya Zemlya. The Arkhangelsk region is situated between the Karelia region and Nenets. Its coast, which extends for 3 000 km, is washed by the cold waters of three Arctic seas: the White, Barents and Kara. The proximity of the seas and oceans notably affects the climate of the region, which is transitional between maritime and continental. The influence of the Arctic Ocean and the Barents Sea raises the temperature in winter, while the spring and summer are cool. The region has abundant water resources and there are thousands of large and small rivers running into the Arctic seas. Protected areas are distributed throughout Arkhangelsk Region very unevenly (Kobyakov, K. & Jakolev, J., 2013).

In Northwest Russia, many planned protected areas are leased for forestry companies with rights to conduct loggings. The status of planned protected area does not provide regulations for land use. Moratoriums are concluded between nature conservation NGOs and forestry companies to agree on excluding areas of high conservation values from loggings.

A unique natural area such as the planned Dvina-Pinega nature reserve, 480,000 ha, is one of the largest remaining intact boreal forests in Europe with many rare habitats and endangered species. Dvina-Pinega watershed should be protected according to the requirements of Russian legislation

as well as standards of the voluntary forest certification FSC. Currently, the entire area is leased by several logging companies and without establishment of a legally binding protected area the forest will be cut down in a few years. Ecologists have managed to sign a moratorium agreement excluding loggings with almost all companies having leased areas within the boundaries of the proposed nature reserve. The establishment of the Dvina-Pinega nature reserve will depend on the decision of the Government of the Arkhangelsk Region.

Nenets Autonomous Okrug or **Nenets**, belongs to the North-Western Russian Federal district (an autonomous okrug of Arkhangelsk Oblast). The area has frozen ground (permafrost) and tundra, forest tundra, and taiga vegetation. There are deposits of iron ore, coal, na tural gas, and peat in the region. Nenets has been one of the first regions to accommodate international companies. Companies from the USA, France and Finland have been active in oil development for many years. Activities at the oil and gas fields have damaged reindeer pastures and destroyed fishing, threatening the longstanding self-sufficiency of the Nenets people, whose traditional occupations have been reindeer herding, fishing, and hunting. Most of the territory is classified as reindeer pasture. Almost all the life in the communities is connected to reindeer herding, since most villages were founded as centres for herding enterprises.

The herders from Komi migrate through Nenets to the summer pastures on the coast. Reindeer herding is mostly nomadic. The reindeer migration routes cross the extensive oil fields. In Nenets, there is no railway and therefore oil and gas are transported by pipeline or shipped along the coast of the Barents and Kara seas. There are plans to develop the production and transportation via the Northern Sea Route. (Stammler & Forbes, 2006).

The autonomous area is primarily situated in three climatic zones: the Arctic and sub-arctic zones and the northern taiga belt of the West Siberian Plain. Permafrost, the proximity to the cold Kara Sea, coastal inlets penetrating far inland, and an abundance of bogs, lakes and rivers all influence the climate. The climate is severely continental. Tundra-gley and boggy soils predominate in the northern part of the area, and gley-podzolic and podzolic-boggy soils, in the south. The vegetation is typically tundra and forest tundra. The main rivers are the Ob, Taz, Pur, and Nadym. There are a large number of bogs and thousands of lakes.

Extreme cold temperatures, ice and strong seasonal variability characterize the Arctic areas. These extremes have resulted in a range of adaptations among Arctic animals including the ability to store energy when food is plentiful and fast when it is not; highly insulating outer layers such as feather, fur or blubber to keep warm; and a high degree of seasonal migration to and from the region, especially among marine mammals and birds.

The extensive seasonal migrations of marine mammals and birds into and out of the Arctic are key features that determine the vulnerability of Arctic ecosystems. Seabirds, shorebirds and waterfowl move north to breed and feed during the short Arctic summer, exploiting the burst of productivity in the northern ecosystems. Whales and seals have similar migrations to northern feeding areas. Many species aggregate throughout the circumpolar north in very large numbers to feed, mate, give birth, nurture their young and molt. During the periods when Arctic species gather and in the

areas where they do so, they are particularly vulnerable to potential environmental stresses, such as accidental discharges from ships and various types of disturbances that ships can cause. Disturbance during critical stages could disrupt the short feeding season for Arctic species, causing some animals to not get enough food to provide the energy needed for the long migrations they face and for breeding and raising their young. (Arctic Council, 2009).

Russian environmental administration

The territory of the Russian Federation is divided into regional administrative units of different political and juridical status. There are different types of administrative unit, like republics, oblasts and okrugs. The Oblasts have a Regional Government, led by the Governor, and a separate Regional Duma or Parliament. The Autonomous Okrugs enjoy some extra privileges, granted both in the Constitution of the Russian Federation and by special Decrees given by the Russian President. For instance, the rights of the Nenets Autonomous Okrug are relatively similar to those of the Arkhangelsk Oblast, to whose area it actually belongs. The administration of the Oblasts consists of a Governor and First Deputy Governor, other Deputy Governors, several departments and various committees in the main fields of administration. The Oblasts of north-west Russia have regional departments of environmental monitoring and hydrometeorology.

Authority

Special state agencies responsible for ICZM in the Russian Federation are absent. Definition of a structure and authorities of state institutions is still a problem for the control of coastal areas.

On the federal level of jurisdiction, several agencies are responsible for nature conservation. Main administrative body for that task is Ministry for nature resources with its departments of Protected areas and Biodiversity conservation. These two departments are responsible to supervise and manage all the activities on the federal level protected areas (strict scientific protected areas - "zapovedniki", and national parks) and all the activities related to rare and threatened species. The department of ecological expertise is responsible to organise the evaluation for any environment impact assessment. According to the delineation of rights between federal and regional competence, all the projects in coastal waters are under the federal jurisdiction and have to pass the ecological expertise on federal level.

Protection of marine resources in coastal and exclusive economical zones is a responsibility of Marine Boundary Forces, the special department of Federal Boundary Guard. Wise-use and protection of resources for fishery (including invertebrates and marine mammals) are under the supervision of State Committee for Fishery which is responsible to adopt the Rules for Fishery and estimate the available stock for each area and species. Department of Hunting and Game belongs to Ministry of Agriculture. This department is responsible for management and protection of game species.

On the regional level regional branches of correspondent ministries have to co-ordinate their activities with regional administration. Regional administration is responsible to create and manage regional level protected areas, such as nature parks, nature monuments and reserves. Regional administration is also responsible to adopt the Regional rules for fishery and regional rules for game and hunting in frame of federal documents. Regional lists of protected and threatened species are also compiled signed by regional authorities.

There is a legal framework for SEA in Russia. However, there are no co-ordinated, large-scale plans for the development of the oil and gas industry and transportation, or any assessments for the overall impacts on the environment, society or evaluation of the soundest alternatives. EIA

focussing on specific industrial projects came into use in the early 2000s. It is based on the federal law “On the Ecological Expert Review”. The project planner has the responsibility of preparing documents for the EIA. After a public hearing, it will be evaluated by state ecological expert review. Approval of the statement will be issued by the supervising authority. (Spiridonov, 2006). This Act was reformulated in the beginning of 2007, but it is still slightly unclear how it will be put into practice.

Identification of the environmental authorities

Murmansk:

Ministry of Natural Resources and Environment of the Murmansk Region

Министерство природных ресурсов и экологии Мурманской области

Arkhangelsk:

Ministry of Natural Resources and forest industry complex of the Arkhangelsk Region

Министерство природных ресурсов и лесопромышленного комплекса Архангельской области

NAO:

Natural Resources and Environment Administration of the Nenets Autonomous Okrug

Управление природных ресурсов и экологии Ненецкого Автономного Округа

All above mentioned authorities are under the Ministry of Natural Resources and Environment of the Russian Federation (Министерство Природных Ресурсов и Экологии РФ).

Environmental legislation in Russia

The existing system of the national legislation of the Russian Federation does not cover coastal protection or ICZM as a special issue.

The protection of biotopes of the coastal zone of the Baltic Sea is regulated by:

- Law on Environmental Protection (2002)
- Law on Environment Impact Assessment (1995)
- Law on Fauna (1995)
- Water Code (1995)
- Land-use Code (2001)
- Forest Code (1997)
- The rules for prevention of coastal seawater pollution (1983)

- Sanitary rules and norms for prevention of coastal seawater pollution at the regions of public water consumption (1988)
- Resolution of the USSR Council of Ministers about establishing boundaries and regime for sanitary protection of recreation areas (1982)
- Regulations on the National park Kurshskaya kosa.

(*Extraction from the document prepared for HELCOM, 2014*).

International Regulation:

- Convention on Biological Diversity (1983)
- Vienna Convention for the Protection of the Ozone Layer (1985)
- Montreal Protocol on Substances Depleting the Ozone Layer (1987)
- Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989)
- Convention on the Transboundary Effects of Industrial Accidents (1991)
- Kyoto Protocol on climate change (2004)

(Spalding, 2014).

International environmental agreements between Russia/Finland:

- Agreement between the Government of the Republic of Finland and the Government of the Russian Federation on Cooperation in the Field of Environmental Protection (1992)
- Agreement between the Government of the Republic of Finland and the Government of the Russian Federation on Co-operation in Combating Pollution of the Baltic Sea in Accidents Involving Oil and other Harmful Substances (1989)
- Action Programme for the Purpose of Limiting and Reducing the Deposition and Harmful Effects of Air Pollutants Emanating from Areas Near the Common Border of Finland and Russia (1989)
- Agreement between the Government of the Republic of Finland and the Government of the Russian Federation on the Establishment of a Mutual Friendship Conservation Area (1989)
- Action Programme on the Reduction of Pollution and the Implementation of the Protection of the Marine Environment in the Baltic Sea and in other Areas close to the Common Border of the Republic of Finland and the Russian Federation (1992)
- Agreement between the Government of the Republic of Finland and the Government of the Russian Federation on the Implementation of Environmental Projects in the Republic of Karelia, in the Regions of Leningrad, Novgorod and Piskov, and in St. Petersburg (1993)

(Ympäristöministeriö, 2014)

3.2. Description of environmental distinctiveness in the adjoining regions:

Northern Ostrobothnia

Northern Ostrobothnia is a Finnish region, which is located in the central part of Finland, on the coast of Gulf of Bothnia. The region has an area of 44 088.45 km², of which the land covers 35 507.45 km² and inland waters 1 907.93 km². It also has 6 673.07 km² of marine areas. It is the second largest region in Finland. Population of Northern Ostrobothnia is approximately 404 000 people. Northern Ostrobothnia is one of the fastest growing regions in terms of population in Finland. The region's capital and largest city of the area is Oulu.

Natural landscape of the region is characterized by the rivers flowing through the flat coastal area. Barren wetlands and rugged highland area in the Northeast are also typical features for the region. Northern Ostrobothnia belongs to semiboreal coniferous forest zone, which is a transition between south and north. The Northeastern part of the region, however, belongs to the northern boreal zone. The region's forests locate in the East, where the forests cover 60-70% of the land area. Elsewhere in region the coverage is 50-60%. The growth of trees is weaker than the average of the country because of the soil, and for climatic reasons. The predominant tree is pine. Lush vegetation areas are located in river valleys and in northeastern parts of the region.

There are some ore reserves in the bedrock and four mines have been established in the region. The companies are mining vanadium, zinc, nickel, pyrite and copper. Two of the mines have been closed due to weak profitability. Today, Northern Ostrobothnia has two active mines: in Hitura and in Pyhäsalmi. The Pyhäjärvi mine is the deepest (1.4 km) mine in Europe, as well as the most modern metal mine. Pyhäjärvi mine has been established for zinc and copper. About 620 000 tonnes of ore is processed in the Hitura mine each year.

Tourism is one of the most significant livelihoods of the region and the importance of it has been increasing lately. There is also some peat industry in the area.

Västerbotten

Västerbotten is a Swedish county. It is located south from Norrbotten region. Västerbotten County comprises the province of Västerbotten and the southern area of Lapland, as well as a minor part of Ångermanland. The county is the second largest in Sweden and covers just over one-eighth of the total area of Sweden with an area of 15 097.6 km ². There are approximately 260 000 inhabitants. It borders the counties of Västernorrland, Jämtland, and Norrbotten, as well as the Norwegian county of Nordland and the Gulf of Bothnia. Business in the county is based largely on solid basic industries such as gold, wood and hydropower.

Västerbotten is a county of diversity and contrast. One of its communities – Umeå – is among the most expansive in Sweden, and is of major importance to the development of the entire county and is the European Capital of Culture 2014. Umeå is the largest city of the county. Skellefteå in the north has strong industrial traditions and Lycksele is the commercial centre of the inland region.

The highest mountain peaks in the county are Storfjället, 1,767 m and Marsfjället, 1,590 m. Västerbotten is known also for its hiking trails. 450 km long - Kungsleden, passes through the Vindel Mountain's high alpine centre with its jagged peaks and rolling landscape. The county of Västerbotten is a region with vast forest lands. Europe's largest nature reserve, Vindelfjällen, is in the northwestern part of Västerbotten. The River Vindel, which runs through the county, is one of

Sweden's four National Rivers. Municipal settlements, industries and power plants are concentrated along the coast line of the Gulf of Bothnia. Mining, farming, forestry and tourism are present and have at least partly competing and overlapping resource and landuse interests.

There are deposits of copper, lead, gold, silver, and bismuth in the county. Refined lead ingots are produced from lead concentrate at the primary copper and lead smelter Rönnskär, located in Skellefteå. Copper, lead, zinc, silver and gold are mined in seven mines in the Skellefteå field, which is one of the richest in Europe. With roots primarily in the mining industry, Skellefteå is an engineering industry centre. It has grown within the entrepreneurial culture which also produces new companies in areas such as IT and the Web-based experience industry.

Forestry is also an important livelihood in the county. Even in the past much timber was floated down rivers to coastal milling centers like Umeå and Skellefteå. The export value for the 14 percent of Sweden's forests is almost 100 billion Swedish kronor. The forestry industry gets over two-thirds of its income from sawn timber for building and residential purposes. Hydroelectric power from three large rivers is a major source of energy for the rest of the Sweden. Västerbotten is also an area of Sámi culture and reindeer husbandry. The Forest Sami village of Malå covers the region from Sorsele municipality (Fjällnäs) to Skellefteå and Robertsfors at the coast.

New technologies that through diligent research and development work are growing and prospering here include optoelectronics, hyperpressure technology, IT and biotechnics. SMEs dominate the county, but there are also world-famous companies such as Boliden Mineral AB and Volvo Lastvagnar (trucks). Development work is aimed to create good possibilities for people to live and work in the county. Through co-operation between different interests in the county, many development projects are run, often with support from EU structural funds. The Bothnia Line, which opens for traffic between Örnsköldsvik and Umeå in August 2010, will facilitate the transport of people and goods.

With Swedish membership in the EU, the international commitments of the county have increased in importance. Relations with Finland's Pohjanmaa region and Norwegian Helgeland have long been good. County twinning agreements have been signed with Lorraine in France, Wielkopolska in Poland, with Russian Karelia and with Heilongjiang in China. The county has also developed good relations with Brescia in Italy and Häme in Finland. Västerbotten County is an active participant in a number of different international networks and alliances.

The County Administrative Board coordinates the regional effort to adapt society to a changing climate. The focus of their work is to increase knowledge about climate change and its consequences and through dialogue encourage measures to prevent future problems.

Republic of Karelia

The Republic of Karelia is a federal subject of Russia. Its´ capital is the city of Petrozavodsk. Population of the area is approximately 650 000 inhabitants. The republic is located in the northwestern part of Russia, taking intervening position between the basins of White and Baltic Seas. The White Sea has a shore line of 630 kilometers. The western border of the Reoublic runs along the state border with Finland, while in the south it borders on the Leningrad and Vologda Regions, in the north on Murmansk Region and in the east on Arkhangelsk Region (Kobyakov, K. & Jakolev, J., 2013). Karelia belongs to continental climate zone and lies entirely in the boreal forest zone. The surface area of the Republic is 180 500 km^2. There are about 27 000 rivers and 60 000 lakes in Karelia. Lake Ladoga and Lake Onega are the largest lakes in Europe. In the Republic of Karelia a ridge-hilly denudation-tectonic landform is represented by abrasion and accumulation glacial and glacifluvial deposits which may take various forms, such as moraine hills, kames and eskers (Kobyakov, K. & Jakolev, J., 2013).

The most part of the republic's territory (approximately 85%) is composed of state forest stock. The total growing stock of timber resources in the forests of all categories and ages is 807 million m^3. The mature and over mature tree stock amounts to 411.8 million m^3, of which 375.2 million m^3 is coniferous. Fifty useful minerals are found in Karelia, located in more than 800 deposits and ore bearing layers. Natural resources of the republic include iron ore, diamonds, vanadium, molybdenum, and others. In recent years, the mining complex has become one the most promising sectors for the development of the economy (Kobyakov, K. & Jakolev, J., 2013).

Industrial activity in Karelia is dominated by the forest and wood processing sector. Timber logging is carried out by a large number of small enterprises whereas pulp and paper production is concentrated in five large enterprises, which produce about a quarter of Russia's total output of paper (Helsinki School of Economics, 2007).

In 2007, extractive industries (including extraction of metal ores) amounted to 30% of the republic's industrial output. There are over 50 mining companies in Karelia, employing more than 10,000 people. One of the most important companies in the sector is OAO Karelian Pellet, which is the 5th largest of Russia's 25 mining and ore dressing enterprises involved in ore extraction and iron ore concentrate production. Other large companies in the sector were OAO Karelnerud, Mosavtorod State Unitary Enterprise and Pitkjaranta Mining Directorate State Unitary Enterprise.

Processing industries contributed 56,4% of the overall production in 2007. The latter figure includes pulp-and-paper (23.6%), metals and metal-working (7.9%), woodworking (7.1%), foodstuffs (5.8%) and machine-building (3.9%). Production and distribution of electricity, natural gas and water made up 13.6% of the region's output. The main sources of air pollution in Karelia are pulp and paper mills, metallurgical plants, the mining industry and the energy sector (Kobyakov, K. & Jakolev, J., 2013).

Few years ago there were only 95 plants for waste water treatment in operation in Karelia. There is urgent need for more, because at some cities waste water is discharged directly into water bodies, which are also a source of water supply for the settlements.

Republic of Komi

The Komi Republic is a federal subject of Russia, and the capital is the city of Syktyvkar. Population is approximately 900 000 inhabitants. The population consists of about one hundred nationalities including 23% of native Komi people. The surface area is 415 900 km^2. The republic is situated to the west of the Ural Mountains, in the Northeast of the East European Plain. Forests cover over 70% of the territory and wetlands approximately 15%. Tundra vegetation like mosses, lichens, and dwarf shrubs occurs in the extreme northeast; southward, stunted trees are changing to dense taiga, or coniferous forest. There are also extensive marshes and peat bogs. Soils are generally low in fertility.

The republic's natural resources include coal, oil, natural gas, gold, diamonds and timber. Native reindeer have been bred by the indigenous population. Around 32,800 km² of mostly boreal forest (as well as some alpine tundra and meadows) in the Republic's Northern Ural Mountains have been recognized in 1995 as a UNESCO World Heritage site, Virgin Komi Forests. It is the first natural UNESCO World Heritage site in Russia and the largest expanse of virgin forests in Europe. The site includes two pre-existing protected areas: Pechora-Ilych Nature Reserve (created in 1930) and Yugyd Va National Park (created in 1994).

Komi Republic has unique stocks of mineral resources represented by combustible minerals, oil and natural gas, metal ores, minerals and balneological resources. The fuel resources are represented by oil and natural gas of Timano-Pechorsky oil field, coke and energetic coals of Pechorsky coal deposits, peat and timber resources. About half of oil and gas stock of the Russian European North is concentrated here (geological potential of oil and gas stocks exceeds 6 billion tons). The total coal stock is estimated to be more than 213 billion tons. Titan deposits are the largest in Russia and neighbouring countries.

Nowadays, Komi Republic is becoming one of the biggest and important suppliers of bauxite and manganese ores. Industrial supplies of sulfur, diamonds, rubies and amethysts can be found and explored on the territory of the region. The Komi Republic's major industries include also oil processing, timber, woodworking, natural gas and electric power industries. Major industrial centers are Syktyvkar, Inta, Pechora, Sosnogorsk, Ukhta, and Vorkuta. Natural gas transportation and distribution is conducted by Komigaz.

3.3. Description of environmental distinctiveness in a major social, economic and cultural centre:

St. Petersburg

St. Petersburg is a major metropolis of the Russian Federation, the northernmost city in Russia with a population of over one million. It is the second largest city in Russia, politically incorporated as a federal subject (a federal city). St. Petersburg lies on the Gulf of Finland at the mouth of the River Neva. On its mainland side the city is surrounded by Leningrad Region. The total area of the city is 1439 km^2 (Kobyakov, K. & Jakolev, J., 2013).

The elevation of Saint Petersburg ranges from the sea level to its highest point of 175.9 meters at the Orekhovaya Hill in the Duderhof Heights in the south. Part of the city's territory west of Liteyny Prospekt is no higher than 4 meters above the sea level, and has suffered from numerous floods. Floods in Saint Petersburg are triggered by a long wave in the Baltic Sea, caused by meteorological conditions, winds and shallowness of the Neva Bay.

Saint Petersburg is a major trade gateway, financial and industrial centre of Russia specializing in oil and gas trade, shipbuilding yards, aerospace industry, radio and electronics, software and computers; machine building, heavy machinery and transport, including tanks and other military equipment, mining, instrument manufacture, ferrous and nonferrous metallurgy (production of aluminum alloys), chemicals, pharmaceuticals, medical equipment, publishing and printing, food and catering, wholesale and retail, textile and apparel industries, and many other businesses.

The results of the first independent environmental ratings of Russian cities conducted in 2008 gave St. Petersburg ranking to be in 85th place among cities. This made it one of the most polluted cities of the country. St. Petersburg fell to the bottom because of its high levels of air pollution and its poor abilities to maintain fragile ecosystems. Anyhow, St. Petersburg was designated as the first city in the state to become a "Green City" by the Florida Green Building Coalition (FGBC). St. Petersburg was awarded the distinction for its renowned environmental initiatives, some of which include: one of the country's largest reclaimed water systems; recycling program and a successful yard waste-to-mulch program; preservation of environmentally sensitive land and habitat restorations; an extensive parks system; more than 50 miles of bicycle trails; water conservation education; programs to protect surface waters; tree planting programs; environmental education at such places as the, Boyd Hill Nature Preserve, Sunken Gardens and Weedon Island; and even more (City of St. Petersburg, 2014).

3.4. Synergy with Environmental Policies, Strategies and Programmes

There are a number of different environmental policies, strategies and programmes which concentrate to the Kolarctic CBC programme area. The ones with larger international impacts and aims are viewed shortly in here. The reason for omitting the national ones is because the national policies and strategies are derived straight from the international treaties, conventions, policies and strategies. Thus, they share a common ideology. However, national programmes may differ considerably between the countries of the programme area, and are intended for attaining the national targets of each country. In the international programme, it is logical to survey the environmental impacts within the framework of international undertakings.

The Lisbon Strategy is an action and development plan for the European Union. It was set out by the European Council in Lisbon in March 2000. The main fields are economic, social, and environmental renewal and sustainability. The Lisbon Strategy is heavily based on the economic concepts of innovation as the motor for economic change, learning economy and social and environmental renewal. In 2005, the Council modified the strategy to focus primarily on creating growth and jobs. The strategy is designed to help Europe address the challenges of an ageing

population, the need to increase productivity and the competitive pressures of a globalised economy. Economic modernisation is at the heart of the strategy for growth and jobs, as a key to maintaining Europe's unique social model in the face of increasingly global markets, technological change, environmental concerns and demographic pressures. To unlock existing resources in Europe, the following actions are needed: investing more in young people, education, research and innovation to generate wealth and provide security for every citizen, opening up markets, cutting red tape, investing in modern infrastructure to help enterprises grow, innovate and create jobs, developing a skilled entrepreneurial workforce, ensuring a society with high levels of employment, social protection and a healthy environment (European Commission, 2005).

The strategy rests on three pillars. An economic development prepares the ground for the transition to a competitive, dynamic, knowledge-based economy. Emphasis is placed on the need to adapt constantly to changes in the information society and to boost research and development. A social development is designed to modernize the European social model by investing in human resources and combating social exclusion. The Member States are expected to invest in education and training, and to conduct an active policy for employment, making it easier to move to a knowledge economy. An environmental development draws attention to the fact that economic growth must be decoupled from the use of natural resources.

The worldwide commitment on sustainable development was formulated in 2002 in Johannesburg (United Nations, 2006). At the World Summit on Sustainable Development, the leaders of the world agreed to achieve by 2010 a significant reduction in the current rate of biodiversity loss at the global, regional and national levels as a contribution to poverty alleviation and to the benefit of all life on earth. In March 2003 the European Council defined a set of priorities for EU action in order to implement the political ambitions agreed in Johannesburg and strengthen the EU Sustainable Development Strategy. These include promoting sustainable and fair trade, implementing the EU's "Water for Life" and "Energy for Poverty Eradication and Sustainable Development" initiatives, the sustainable management of natural resources, the promotion of sustainable patterns of consumption and production methods, and international environmental governance. The main targets adopted by the international community at the Johannesburg Summit in September 2002 were: reducing the proportion of people without access to safe drinking water and basic sanitation; increasing access to energy services, energy efficiency and the use of renewable energy; reversing the current trend in natural resource degradation; reducing biodiversity loss; minimizing the harmful effects of chemicals; promoting sustainable patterns of production and consumption and promoting the implementation of national sustainable development strategies.

The Gothenburg strategy, 2001 (renewed in 2005) provides an EU-wide policy framework to deliver sustainable development, i.e. to meet the needs of the present without compromising the ability of future generations to meet their own needs. It rests on four separate pillars – economic, social, environmental and global governance – which need to reinforce one another. The economic, social and environmental consequences of all policies thus need to be examined in a coordinated manner and taken into account when those policies are being drawn up and adopted. The EU also needs to assume its international responsibilities with regard to sustainable development, whose various aspects – including democracy, peace, security and liberty – need to be promoted beyond EU borders (European Commission, 2005a).

The Gothenburg Strategy states that sustainable development stands for meeting the needs of present generations without jeopardizing the needs of future generations. Sustainable development will not be brought about by policies alone: it must be taken up by society as a principle guiding the many choices each citizen makes every day, as well as the major political and economic decisions that have ramifications for many. Realizing this vision requires changes in thinking, in economic and social structures, and in consumption and production patterns.

Over the past decades the European Union has put in place a broad range of environmental legislation. As a result, air, water and soil pollution has significantly been reduced. Chemicals legislation has been modernized and the use of many toxic or hazardous substances has been restricted. Today, EU citizens enjoy some of the best water quality in the world and over 18% of EU's territory has been designated as protected areas for nature.

The 7th Environment Action Programme (EAP) is guiding European environment policy until 2020. In order to give more long-term direction it sets out a vision beyond that, of where it wants the Union to be by 2050: "In 2050, we live well, within the planet's ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society's resilience. Our low-carbon growth has long been decoupled from resource use, setting the pace for a safe and sustainable global society."

EAP identifies three key objectives: to protect, conserve and enhance the Union's natural capital; to turn the Union into a resource-efficient, green, and competitive low-carbon economy and to safeguard the Union's citizens from environment-related pressures and risks to health and wellbeing. Four so called "enablers" will help Europe deliver on these goals: better implementation of legislation, better information by improving the knowledge base, more and wiser investment for environment and climate policy and full integration of environmental requirements and considerations into other policies. Two additional horizontal priority objectives complete the programme: to make the Union's cities more sustainable and to help the Union address international environmental and climate challenges more effectively.

The programme entered into force in January 2014. It is now up to the EU institutions and the Member States to ensure it is implemented, and that priority objectives set out are met by 2020. (European Commission, 2013).

The Nordic Strategy for Sustainable development is the overarching framework for the cross-sectoral work on sustainable development within the Nordic Council of Ministers. It complements the national SD strategies of the Nordic countries and serves as a basis for common input to international negotiations on sustainable development. The current Nordic strategy for sustainable development is called "Sustainable Development – New Bearings for the Nordic Countries".

It sets long-term development goals for the Nordic region for the period up to 2020, and describes the goals and initiatives to which the region is committed between 2009 and 2012. A new strategy is currently being developed under the steering of the Nordic Co-operation Ministers. (Nordic Council of Ministers, 2001).

The Northern Dimension policy covers a broad geographic area, from the European Arctic and Sub-Arctic to the southern shores of the Baltic Sea, countries in the vicinity and from north-west Russia in the east, to Iceland and Greenland in the west. The joint policy of the Northern Dimension was initiated in 1999 and renewed in 2006. The policy aims at providing a framework to: promoting dialogue and concrete cooperation; strengthening stability, well-being and intensified economic cooperation and also promoting economic integration, competitiveness and sustainable development in Northern Europe. The Northern Dimension also focuses on issues of specific relevance in the North, such as its fragile environment, public health and social issues, culture and indigenous peoples' issues. Cross-border cooperation is a cross-cutting Northern Dimension theme, producing added value at the sub-regional and translational level.

The Barents Co-operation, established in 1993, has been organized to work on two levels. The Barents Euro-Arctic Council (BEAC) operates at the governmental level and the Regional Council at the regional level. The area of Barents co-operation covers the whole Kolarctic CBC Programme area. The purpose of the co-operation is to strengthen east-west infrastructure, establish people-to-people contacts and thereby contribute to the development of the region. The Barents Co-operation is regarded as an integral part of creating a stable, democratic and prosperous Europe. The environmental co-operation of the Barents Euro-Arctic Council began in 1994, when the environment ministers adopted the Barents Environment Action Programme. The Working Group on Environment (WGE) has been established to advise the Barents Euro-Arctic Council on objectives, priorities and actions for environmental cooperation in the Barents Region (Lundvall, 2007). There are a number of different working groups under Barents Euro-Arctic Council. Each group has their own responsibilities in furthering different activities and drawing up strategies for the area.

The next Barents Rescue exercise will take place in Finland in the second half of 2015. The planning and preparations start at the Initial Planning Conference in Rovaniemi, already in September 2014 (Barents Euro-Arctic Council, 2014).

According to *Convention on Biological Diversity*, TARGET 11 - Technical Rationale extended (provided in document COP/10/INF/12/Rev.1); By 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.

Convention on Biological Diversity also includes the Akwé: Kon Voluntary Guidelines for the Conduct of Cultural, Environmental and Social Impact Assessments Regarding Developments Proposed to Take Place on, or which are Likely to Impact on, Sacred Sites and on Lands and Waters Traditionally Occupied or Used by Indigenous and Local Communities were developed pursuant to task 9 of the programme of work on Article 8(j) and related provisions adopted by the Conference of the Parties of the Convention on Biological Diversity at its fifth meeting, in May 2000. The programme of work was, itself, adopted on the basis of recommendations from the Ad Hoc Open-ended Working Group on Article 8(j) and Related Provisions established at the fourth

meeting of the Conference of the Parties, in 1998 (Secretariat of the Convention on Biological Diversity, 2004).

The Kolarctic CBC Programme 2014-2020 objectives are mainly in synergy with the aims of above mentioned environmental policies, strategies, programmes and guidelines. Each project has to be viewed separately; actions and practices should support the aims of common international environmental objectives. In addition the projects should be implemented with respect to indigenous people's rights and in a way that possible conflicts could be avoided.

3.5. International treaties and legislation concerning the SEA for Kolartic CBC 2014-2020 Programme

The framework for actions that can be financed through the Kolarctic ENPI CBC programme is given through the international environmental and social legislation. Legitimacy is the only effective tool to prevent environmentally and socially risky actions. However, often the stakeholders do not know or consider as significant issue as the international legislation. Even the authorities have difficulties with the implementation of international legislation and treaties, though the national legislation is usually well known and applied in practice. Always when surveying the strategic impact assessment of a multinational programme the focus must be on the requirements of international legislation, as it provides the only legal system that applies to all the four countries. Project holder should always make a review of the most important and binding international environmental legislation and rights protecting the traditional livelihoods of indigenous people, as well as their rights to participate in decision-making.

The reason for omitting the national legislation is that the national legislation is partly rived from international treaties and conventions. National legislations and Acts also differ considerably between the countries, and conducting a survey of them all would have been impossible in the timeframe. It is reasonable to concentrate primarily on the international legislation because Kolarctic CBC Programme is an international programme. Conforming to national legitimacy is the duty of the national and regional members of the steering committees and project stakeholders.

3.6. Nature Conservation

Some parts of the programme area are under restricted use. Such areas include also nature conservation areas. Their conservational status of these areas may vary considerably according to the conservational basis.

In Finland and Sweden, most of the conservation areas belong to the European Natura 2000 network. In Finnish Lapland, there are 161 Natura 2000 areas with a total area of 3,2 million hectares (including large water areas, e.g. Lake Inari, and the Tornio and Ounasjoki rivers). Northern Ostrobothnia in Finland includes 223 Natura 2000 areas with total coverage of 301 520 hectares. In Sweden, there are 267 Natura 2000 areas in Norrbotten. Their total area is 3,07

million hectares (including 7 rivers). The seven rivers contribute 279 978 hectares to the network in Norrbotten. Västerbotten County contains 249 Natura 2000 areas with a total area of approximately 1,4 million hectares. Vindelfjällen Nature Reserve in the municipalities of Sorsele and Storuman, with its 560 000 hectares, is the largest nature reserve in northern Europe. In Västerbotten about 93 per cent of the protected area lies above the limit for Alpine Forest. The most important and typical Natura 2000 habitat types in Lapland, Northern Ostrobothnia and Norrbotten are e.g. aapa mires, palsa mires, Fennoscandian natural rivers, alpine rivers and the herbaceous vegetation along their banks, western taiga and natural forests of primary succession stages of the land upheaval coast.

The aim of the Natura 2000 Network is to protect vulnerable habitats and species across their natural range in Europe and ensure that they are restored to, or maintained at, a favourable conservation status. Natura 2000 is however not merely a system of strict nature reserves where human activities are systematically excluded. It adopts a different approach - Natura 2000 fully recognizes that man is an integral part of nature and the two work best in partnership with one another. Indeed, many sites in the Natura 2000 Network are valuable precisely because of the way they have been managed up to now.

According to the Habitats Directive (Article 6), any plan or project not directly connected with or necessary to the management of the site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. The authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the public. This has been implemented through the national legislation of Finland and Sweden. Thus, the actions of the Kolarctic CBC programme must also be planned and implemented in sustainable way and causing no threats to Natura 2000 areas. The impact assessment in Natura 2000 areas must be carried out in the form of detailed planning within the separate projects if practicing in or nearby the Natura 2000 sites.

In the Kolarctic CBC programme area there are a number of sites having extremely significant natural and cultural values and which include to UNESCO’s World Heritage list, for example the Solovetski Islands, the petroglyphs in the Alta Fjord, the Vega archipelago and the church village in Gammelstad. Some protected territories have the status of a UNESCO Biosphere Reserve, like the Lapponia area in Sweden and the virgin Komi forests adjoining the programme area. (UNESCO, 2014).

Several wetlands have a worldwide significance and represent areas of the Ramsar Convention on Wetlands. In Norway, there are eight Ramsar areas in the Kolarctic programme area: Pasvik Nature Reserve, Tanamunningen, Slettnes, Stabbursneset, Balsfjord-Wetland system, Skogvoll, Karlsovvaer and Bliksvaer. In Norrbotten, there are seven areas: Tauvavuoma, Sjaunja, Laisdalen, Tjålmejaure, Tamasjön, Pesöfjärden and Gammelstadsviken. There are two bird sanctuaries in the Västerbotten county: Röbäcksslätten and Lessejaure. In addition, there are nine nature reserves with restricted access during part of the year. Nine Ramsar areas locate in Finnish Lapland: Martimoaapa-Lumiaapa-Penikat, Koitelainen, Kainuunkylä, Lemmenjoki, Riisitunturi, Luiromires, Sammuttijänkä-Vaijoenjänkä, Sotkavuoma and Teuravuoma- Kivijärvenvuoma. The most significant bay areas in Finland are Liminganlahti and the coastal meadows and bays of Hailuoto in Northern Ostrobothnia. The first Ramsar Wetland Centre in Finland was opened in 2012 at

Liminganlahti. Veneneva-Pelso and Olvassuo represent typical mire complex areas among the Ramsar areas of Northern Ostrobothnia. On the Russian side there are Kandalaksha Bay in Murmansk Oblast, Islands of Onega Bay in Karelia and Lower Dvuobje in Khanty–Mansi and Yamalo-Nenetsia (The Ramsar Convention Secretariat, 2014).

The evaluation of threatened species is based on the categories and criteria developed and approved by the World Conservation Union (IUCN) in 1994. The IUCN Red List of Threatened Species acts as a wakeup call to the world by focusing attention on the state of our natural environment. It has become an increasingly powerful tool for conservation planning, management, monitoring and decision-making. Species of especially wide public are interested in are whales, large predators and a number of bird species.

Several areas are also important as breeding, moulting or wintering areas for seabird populations of international importance, such as the lesser black-backed gull, Steller's eider and the Atlantic puffin. Seabirds forage up to 100 km beyond the baseline. Many of the islands along this stretch of coastline provide important nesting sites for seabirds. The seabird colonies in the Barents Sea are among the largest in the world on account of its large production of plankton and fish. In summer the birds use food from the sea to produce eggs and young birds, while simultaneously carrying important nourishment from the sea to the land. Some nesting birds leave the Barents Sea in the winter months, while other species come here to overwinter. 40 species of seabirds are registered in the Barents Sea area, but only a few of these are important in the sense that they are found in large numbers and are responsible for the greatest food consumption.

Some examples of important species are Briinnich's guillemot *(Uria lomvia),* common guillemot *(Uria aalge),* puffin *(Fratercula arctica)* razorbill (*Alca torda*), common guillemot *(Uria aalge)*, black-legged kittiwake *(Rissa tridactyla)*, the European shag *(Phalacrocorax aristotelis)* and black guillemot *(Cepphus grylle).* In the Norwegian sector of the Barents Sea the numbers of all these species except the Briinnich's guillemot are decreasing and they are included on the Norwegian Red List of threatened species. Today guillemot numbers in some areas are 95% lower than in the mid-1960s, while puffin numbers on the Røst Islands are only 27% of 1979 levels. There are also many indications that Norwegian numbers of black guillemot have decreased significantly in recent years. The reasons for this are uncertain, but a lack of capelin and herring as well as entanglement in fishing nets and predation are important factors.

The Barents Sea is also an overwintering site for rare high Arctic seabirds such as the king eider *(Somateria spectabilis)* and Steller's eider *(Polysticta stelleri).* A significant proportion of the total numbers of king eider and Steller's eider overwinter on the coast of Norway, especially in the two most northern counties. Both species are defined as Norwegian responsibility species in the national Red List.

Marine species have proved to be just as much at risk of extinction as their land-based counterparts. Therefore, it is necessary to improve management practices and implement conservation measures, such as agreements on non-fishing areas, enforced mesh-size regulations and international catching limits. (Lundvall, 2007).

Numerous high conservation areas in the Kolarctic CBC Programme area are still unprotected. New recommendations for expanding the protected area network were presented at the meeting of the Barents Euro-Arctic Council's Ministers of the Environment organized in 2013. The meeting also adopted the Action Plan on Climate Change for the Barents Cooperation. Special attention should be paid to the protection of natural forests and wetlands, especially concerning rare habitats, so the internationally agreed upon Aichi Biodiversity Targets for halting biodiversity loss could be reached by 2020. The Green Belt area of Fennoscandia with Lapland form ecological connection for species from the Gulf of Finland to the Arctic Ocean and from the Kola Peninsula to the fells of Sweden and Norway. The ecological connections between protected areas should be safeguarded and connectivity of the protected sites increased. The connectivity between protected areas is significantly important because of the climate change, as species must be able to migrate and spread in order to follow changing climate zones.

The Barents Protected Area Network (BPAN) project has involved an analysis of the current status of and gaps in the network of protected areas in the Barents Region, which covers the whole Kolarctic CBC programme area. Based on the project's results, a set of joint recommendations has been drawn up for the Region on how the protected area network should be developed in order to secure boreal biodiversity and ecosystem services, and adaptation to climate change. These jointly created recommendations concern the northern areas of Finland, Sweden, Norway and Northwest Russia.

The European Landscape Convention has been ratified in all three Nordic countries. The landscape plays an important public interest role in the cultural, ecological, environmental and social fields and is a valuable resource conducive to tourism. Thus, the landscape has a special value from the point of view of regional development. The public authorities have a duty to define the general framework for ensuring this quality.

The Landscape Convention establishes the general legal principles, which should serve as a basis for adopting national landscape policies and establishing international co-operation in such matters. A demonstrative way for experiencing landscape values could be a common transboundary landscape area. Landscape values are recognised quite differently in the individual countries in the Kolarctic CBC Programme area.

The mainstream of Russia's conservation policy is in accordance to international agreements and conventions signed by country. The milestones have been determined by global *Convention on Biodiversity, Ramsar Convention on the protection of wetlands and regional conventions and agreements such as Helsinki Convention on protection of the Baltic Sea.*

On the federal level several documents determine the conservation strategy. General guidelines for conservation policy are provided by the Concept of sustainable development (2002) mentioned above. The approaches to further development of federal network of the protected areas are identified in General Scheme of Protected Areas. Territories proposed for zapovedniki and national parks are listed there. Wetlands, which have to be protected under the Ramsar convention, are listed in the List of the Ramsar Sites and proposed areas are included in periodically updated List of Proposed Ramsar Sites. The Red Data Book of Russian Federation includes species under threat, which could not be taken off without special permission. The habitats of those species are

under the protection and any type of activity, which could destroy the object of protection, are prohibited.

On the regional level the regional development plans could include special parts on natural and biodiversity conservation. The urgent measures for conservation of any territory or species can be adopted by regional administration.

4. Environmental Assessment

The Kolarctic CBC Programme 2014-2020 has been drawn up in accordance with the Instructions for the programming of the European Neighbourhood Instrument (ENI), the proposal for a "Regulation of the European Parliament and of the Council establishing a European Neighbourhood Instrument" and the Implementing rules of the CBC Programmes financed within the Framework of the legal basis of the Neighbourhood Instrument. The Programme is in conformity with the European Neighbourhood Policy (European Neighbourhood Policy Strategy Paper, COM (2004). The framework highlights economical, social and ecological developmental actions. The spirit of the framework is that the most important issue is to develop cross border cooperation and all the other aims are equal. The joint cross border development strategy can be seen as a plan to reach these goals.

The programme is in conformity with the EU Sustainable Development Strategy (SDS). The main themes of the SDS are socioeconomic development, sustainable consumption and production, social inclusion, demographic changes, public health, climate change and energy, sustainable transport, natural resources, global partnership and good governance. The focus is based on international treaties and policies involving Russia and Norway as well.

Detailed programme planning has been the duty of the Joint Task Force group (JTF), comprising the local, regional and national representatives of each country within the programme area. The JTF has formulated two priorities of the programme and four thematic objectives. The three strategic programme objectives set by the CBC Strategy/programming document 2014-2020 are: A. promote economic and social development in regions on both sides of common border, B. Address common challenges in environment, public health, safety and security, and C. promote better conditions and modalities for facilitating the mobility of persons, goods and capital.

Two priorities of the Kolarctic CBC programme are 1. Viability of Arctic economy, nature and environment, and 2. Fluent mobility of people, goods and knowledge. The needs of the Programme area have been considered through following thematic objectives:

- Business and SME development (Strategic objective A)
- Environmental protection, climate change mitigation and adaptation (Strategic objective B)
- Improvement of accessibility to the regions, development of sustainable and climate-proof transport and communication networks and systems (Strategic objective C)

- Promotion of border management and border security, mobility and migration management (Strategic objective C)

The practices and actions implemented through projects financed by the Kolarctic CBC programme should aim at long lasting, sustainable results. Each project should be considered in more detailed during the evaluation. The criteria for financing should always include sufficient consideration of the environmental threats and risks for the programme area with respect to treaties and related policies. The thematic objectives thus aim at avoiding any negative environmental impacts and promoting sustainable regional development, environmental protection and cross-border co-operation.

The Kolarctic CBC Programme 2014-2020 promotes achieving the aims of the Lisbon Strategy and SDS. Programme is targeted to northern areas including remote and sparsely populated areas with valuable and vulnerable nature. Programme creates possibilities to develop these areas, policies and practices aiming for better environment and neighbourhood in a sustainable way. It also supports the aims of many of the other environmental strategies and conventions. The worst option for the area and its people would be not to implement the Kolarctic CBC programme at all.

4.1. Assessment of the Programme elements

In order to assess the strategic environmental impacts, the program's priorities are reflected in the most important environmental treaties and conventions, the EU Sustainable Development Strategy, and possible environmental impacts.

It is impossible to assess all the impacts of the programme before concrete actions and projects are implemented. Although, theoretical descriptions, and some examples giving an indication of the possible effects of programme's implementation on the environment and society has been given in the programme document. In all the cases, the environmental impacts are clearly dependent on the strength of the activities and different practices to be used. The impacts are also highly depended on which areas they are targeted. The impacts can turn out to be either positive or negative in all the possible actions. The programme and project activities can result to positive characteristics and sustainable development in certain area. All the projects applied should be evaluated individually and carefully to avoid activities and their impacts on environment from spiralling out of control.

The overall risks associated with regional development are not simply the impacts of individual projects. They have to be considered in the context of all the projects and activities in the development of a specific area, as well as the risks that have accumulated in the environment during the past. In addition, there are always indirect impacts that are usually difficult to quantify (Lundvall, 2007). The difficulty in predicting indirect, cumulative and combined effects is increased because of the high spatial and temporal variation in nature. In order to minimise this, a mathematical modelling structure with a capacity to exploit diverse sources of information should be used in estimating and assessing the effects of large, long-term projects. For example,

Bayesian inference could provide a tool for constructing a summarized model of all the available information in order to gain a better understanding of ecosystem processes (Ellison, 2004).

Pollution and human development are major human disasters that effect especially coastal regions. There are two main categories related to pollution, point source pollution, and nonpoint source pollution. Point source pollution is when there is an exact location such as a pipeline or a body of water that leads into the rivers and oceans. Known dumping into the ocean is also another point source of pollution. Nonpoint source pollution would pertain more to fertilizer runoff, and industrial waste. Examples of pollution that effect the coastal regions are but are not limited to; fertilizer runoff, oil spills, and dumping of hazardous materials into the oceans. More human acts that hurt the coastline are as follows; waste discharge, fishing, dredging, mining, and drilling (Inman, 1994).

Oil spills are one of the most hazardous dangers towards coastal communities. They are hard to contain, difficult to clean up, and devastate everything. The fish, animals such as birds, the water, and especially the coastline near the spill. Overall, the greatest and most far-reaching risks arise from oil and hydrocarbon spills. It is becoming likely that an accident will take place in an area with harsh climatic and difficult geographical conditions and active coastal dynamics. For the sensitive Arctic nature and human populations dependent on natural economies, even the smallest spill can be hazardous and thus completely unjustifiable. A major tanker or oil rig accident in the coastal programme area would destroy the feeding grounds of whales, breeding areas of sea birds, and have long-term effects on food chains and webs and a wide range of ecological processes. The existing and proposed shipping and transportation routes in the White Sea and Barents Sea locate close to almost all of the most important ornithological territories in Russian and Norwegian coastal areas. The funding that is directed to these areas, or developing transportation and logistics, should take these facts into account and require sufficient environmental impact assessments.

The programme funding will be directed to environmental protection, climate change adaptation and the prevention and management of accidents and environmental risks, which is also in accordance with the Northern Dimension Policy. Improvement of accessibility to the regions, development of transport and communication networks and systems are also beneficial for the environment and for better risk prevention.

The rapid development of industry in the Kolarctic CBC programme area has forced an increasing number of species into smaller areas. The fragmentation of natural environments is continuing even more rapidly than before. The strong development of industry is clearly deteriorating the natural environment of the programme area. The combination of many different actions, practices and projects are causing changes that will lead to deterioration of habitats, undesired changes in ecological processes and the loss of species and biodiversity. This is a poor result from both the economic and social points of view. It would be a disaster for many of the human populations of the area not be able to advertise the pure, unspoilt nature of the North as a unique brand for tourism and/or for the use of natural resources in traditional livelihoods. Unique northern nature offers staggering framework and space for any kind of tourism as long as it will exist and remain viable.

Economic development that ignores environmental sustainability can seriously hinder the traditional livelihoods, such as reindeer herding, hunting and fishing. A serious decline in the quality and quantity of the areas suitable for reindeer pastures has been reported. In parts of the programme area the supplementary feeding of reindeer with hay has already become a routine, resulting in both economic and ecologically harmful consequences (Lundvall, 2007). One of the harmful indirect impacts is the appearance of alien species in the North. Invasive species, carried for example by shipping, represent a significant threat to marine and river ecosystems. Species of algae, bacteria and fungi, as well as parasites and predators, can change the whole ecosystem. This has happened, for example, in the Varager fjord, where king crab has completely colonized the sea bottom, and replaced most of the indigenous species. Similarly, invasive and alien species can cause ecological problems to local fish stocks (especially salmon), which would have considerable consequences for local people and their economy.

Ecosystem services are the benefits that people obtain from natural ecosystems. Ecosystem services are indispensable to the wellbeing of all people, everywhere in the world. They include provisioning, regulating, and cultural services that directly affect people, and supporting services needed to maintain the other services. From the availability of adequate food and water, to disease regulation of vectors, pests, and pathogens, human health and well-being depends on these services and conditions from the natural environment. Biodiversity underlies all ecosystem services.

The causal links between environmental change and human health are complex because they are often indirect, displaced in space and time, and dependent on a number of modifying forces. Human health ultimately depends upon ecosystem products and services (such as availability of fresh water, food and fuel sources) which are requisite for good human health and productive livelihoods. Significant direct human health impacts can occur if ecosystem services are no longer adequate to meet social needs. Indirectly, changes in ecosystem services affect livelihoods, income, local migration and, on occasion, may even cause political conflict. The resultant impacts on economic and physical security, freedom, choice and social relations have wide-ranging impacts on well-being and health, and the availability and access to health services and medicines. (World Health Organization, 2014). Evaluation on which ecosystem services will be lost when implementing a particular project should be always evaluated when considering admitting funding. Most of the ecosystem services are more valuable economically when they exist and produce for instance fresh and clean air or water naturally in the environment, than the service would cost if it would be produced artificially.

The programme priorities and thematic objectives support the idea and aims to having a good and healthy environment. Even the programme period is from 2014 until 2020 the overall picture of the projects should be in their long-term impacts when it comes to nature and the environment. Six years is a short period in the nature and the environmental impacts of a particular project should be defined far more into the future. Some impacts are of course impossible to predict, and in these cases where the impacts might be negative, the precautionary principles should be complied. Each project and the impacts of the actions have to be estimated and evaluated separately. The joint impact assessment of the projects should be also in responsibility of the regional authorities.

4.2. Social Impacts of the Programme elements (SIA)

Regardless of economic development, it is necessary to maintain social sustainability. Social impact assessment should be carried out in the Kolarctic CBC programme area even though there may be some legal shortcomings. In the programme area, in addition to the indigenous Sámi and Nenets people, there is a considerable population of Norwegian, Swedish, Finnish and Russian people. Currently the development in industry and trade is bringing a new people and nationalities to the area. Thus, the programme area is very multicultural, with multiple forms of environment use. The legislative framework for clarifying (indigenous) people's rights to land and resources is deficient especially in some parts of the programme area. In Russia, indigenous people have achieved some gains in terms of territorial rights to their original homelands. In Norway, the Finnmark Law increased the influence of the Sami people over land use in Finnmark County. Akwé: Kon guidelines are applied in Norway and Sweden, and partly in Finland. However, the pressures set by international investors, exploration and exploitation of natural resources and international investors strongly affect the traditional livelihoods of the North. These factors make SIA procedures complicated in in-depth analyses, and legal shortcomings may hinder the regulation and integration of activities and traditional livelihood.

In general, indigenous people have a specific connection to land that they have inhabited. Other features, for example distinct language, culture and traditional livelihoods such as reindeer herding, fishing and hunting are characteristics of indigenous people in the Arctic. Industrialization, social change and environmental problems such as climate change, however, present threats to the continuity of these livelihoods and culture. Recently, political organization of indigenous peoples has led to international recognition and clarification of human and political rights concerning indigenous populations. Rights to land and natural resources are an important part of the culture and survival of indigenous peoples in the Arctic.

Local people receive benefits from regional development. One obvious direct benefit for local residents is the employment support provided by the programme. However, it might be that local residents do not have the required education and knowledge to apply for and work in the projects. It is possible, through programme financing and partnerships, to encourage and support educational institutions to raise the local level of knowledge. This can also take place in co-operation with international companies by offering first education and then, later on, work for locals. Local people also benefit from regional development through the presence of industry by improving the infrastructure and access to markets and goods. However, in some cases it is possible that the social and environmental costs outweigh the economic benefits. The ongoing industrialization process and opening up of northern areas (especially in Russia) to world markets has created a debate about indigenous rights and the utilization of natural resources. Rapid development will raise new concerns among the local communities about the potential impacts on their livelihood. Fortunately, most of the major international companies have their own politics, which include sustainable development principles. Most of the international banks and funds require social impact estimation before making funding decisions. (Lundvall, 2007)

The natural pastures of the Kolarctic area have been used by reindeer herders from ancient times. The pastures have been common property for herding irrespective of the land ownership. In Russia, oil and gas extraction has removed significant territories from indigenous use and long

distance transportation causes many social and economic concerns to local people. Transportation accidents or spills are common and affect traditional land- and water-based activities. The development of industry may also threaten local entrepreneurs and municipalities that derive income from small-scale tourism. Furthermore, it may cause a lack of credibility in marketing the pure, unspoilt nature of the North. Such impacts will, in turn, affect the livelihood and incomes of local entrepreneurs. To achieve socially sustainable regional development, the reindeer herders, industry, entrepreneurs and authorities must work together to build a strong, local identity based on a combination of diverse economies and social structures.

The social and environmental consequences of gas and oil activities to the reindeer herding Nenets in northern Russia were studied in the Environmental and Social Impacts of Industrialization in Northern Russia (ENSINOR) research project during 2004-2007. According to the results of the project the nomadic Nenets have always needed to adapt to the changing conditions in the tundra and that there are ways how the Nenets can continue to coexist with the increasing gas production and changing climate. Here a free access to open space is the key to success. Declaration on coexistence of oil & gas activities and indigenous communities on Nenets and other territories in the Russian North addresses principles of fruitful coexistence in northern Russian oil and gas development. (Arctic Centre, 2014).

Broad involvement of local people in all stages of the implementation of the programme increases its sustainability. This is in good accordance with the *European Landscape Convention* and *Aarhus Convention* on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (1998). Transparency is a particularly crucial aspect in the development of relationships of trust in international co-operation between the authorities, NGOs, local people and businesses.

4.3. Assessment of significant impacts of thematic objectives selected for the Kolarctic CBC 2014-2020 Programme

It is impossible to assess all the impacts of the programme before concrete actions and projects are implemented. Although, theoretical descriptions, and some examples giving an indication of the possible effects of programme's implementation on the environment and society has been given in the programme document. In all the cases, the environmental impacts are clearly dependent on the strength of the activities and different practices to be used. The impacts are also highly depended on which areas they are targeted. The impacts can turn out to be either positive or negative in all the possible actions. The programme and project activities can result to positive characteristics and sustainable development in certain area. All the projects applied should be evaluated individually and carefully to avoid activities and their impacts on environment from spiralling out of control, and when necessary on legal grounds, within the projects according to the EIA, SEA or EIA-SEER (in Russia) processes.

The programme supports the aim of sustainable development. However, there are uncertainties in terms of the form and significance of subsequent impacts when it comes to economical development. How the programme and projects funded will be steered will determine its success.

The representatives of the Steering Committee should implement the programme in accordance with the SEA. In addition, representatives must take into account their own national environmental legislation, which is not treated in detail in the SEA.

The framework of the four different thematic objectives has been used in following assessment of possible environmental impacts:

1. Business and SME development

The increased economic activities will bring cumulative effects involving, for example, greater emissions, increased waste generation, fragmentation of nature, pollution and loss of biodiversity. This presupposes awareness rising, careful management and control.

The orientation of the priorities underlines the viability of Arctic economy, nature and environment, and also the fluent mobility of people, goods and knowledge. This also highlights all the environmental hazards described in the chapter 2.2 on environmental threats, and on the forthcoming environmental risks. At the same time, the orientation underlines actions, which enhance viable economy and good quality of life by increasing the attractiveness of the region, as well as maintain the biodiversity and use of natural resources in a sustainable way. There is some inconsistency which, however, can be avoidable if the environmental sustainability element is included and highlighted in each project selection procedures and according to the priorities of the programme.

There may be disagreement between the countries over what can be called sustainable development. These national differences can produce environmental and social risks by directing support to certain industry, energy and trade-connected projects. Education, research, innovations, technology development and the exchange of best practices may, at their best, increase the level of environmental knowledge and have clearly positive environmental impacts. Technology development and the exchange of best practices can, potentially, have strong and even international impacts. Especially, the development of techniques reducing industrial emissions and identifying the best available technology (BAT) has impacts that can be global and slow down climate change. However, if the targets of the projects would be only economic, then ignoring environmental and social sustainability would have precisely the opposite impacts. (Lundvall, 2007)

Actions supporting business and SME development, predictably, will have at least some local environmental and social impacts. In some cases there might be a risk that economic benefit is interpreted as a basis to cut environmental cost by ignoring legislative obligations or by seeking minimum observance in environmental aims. Development in clustering capacity and competence development are supportable forms of actions. Depending on the practices, they might have even strong and even global impacts if the environmental aspects are not properly taken into account already in the early stage of planning processes. Wide negative impacts might occur if funding is given to a project promoting international investments on industry or tourism and the environmental and social impact assessments have been made incorrectly. Even in small scale there might be

great impacts to local communities and nature. Mainly the environmental impacts of this thematic objective can be expected to be positive. It is clear that an effort has been made to promote for instance cleaner techniques, increase in knowledge and education, development in sustainable and best environmental practices, and supporting cross-border co-operation and partnership.

2. Environmental protection, climate change mitigation and adaptation

This thematic objective can be considered to have only positive impacts on the environment and nature. A number of different practices and actions can be supported to provide and support environmental education, research, innovations, clean technologies and services. There are also several actions to be supported by the programme concerning capacity building activities in the field of ecological disaster prevention and response. Among the others, the joint activities on developing sustainable management of Arctic natural resources, and concrete actions on preserving biodiversity and creating networks of protected areas are essential for sustainable development and also to avoid environmental threats mentioned in chapter 2.2. The cultural aspects have been risen up also in this thematic objective.

3. Improvement of accessibility to the regions, development of climate-proof transport and communication networks and systems

The development in transportation, logistics and communication networks and systems will have strong impacts on the environment, air quality and climate change. Air quality can be improved through projects aiming for instance at improving technology. Developing ICT infrastructure will decrease the need for traditional transportation and the amount of waste, and the environmental impacts can be expected to be mainly positive, especially in the long run. Some negative impacts might occur due to the building of the necessary infrastructure for the ICT networks. Transportation and logistics can be associated with severe environmental risks, the impacts of which can even extend out of the programme area. For example, oil tanker shipping oil from the Kolarctic CBC Programme area may suffer a catastrophic accident somewhere else in the Atlantic, as was the case in January 2007 on the coast of Bergen. Any project concerning accessibility to the Arctic Ocean, or into other natural/protected areas, or is facilitating transportation for instance through new traffic lanes should include sufficient environmental and social impact assessments.

The financial support of the programme is targeted also at improving environmentally friendly logistics and safe transportation. This kind of projects can be expected to be having environmentally rewarding results.

4. Promotion of border management and border security, mobility and migration management

Examples given in the programme document include many different actions for promoting border management and border security. Co-operation between countries is a good method to increase efficiency and implement practices more economically and in a sustainable way. Using better technologies and developing web services for instance can have direct or indirect impacts on the environment. Techniques which save energy and are more efficient are having positive environmental impacts like as well increasing number of web services. Environmentally friendly solutions in logistics and common education for border crossing authorities can be expected to have positive impacts on the environment as well.

The security and efficiency at borders have also an important role in controlling of illegal international trade in wild animals, plants and hazardous substances (e.g. radioactive materials). The CITES Convention lists more than 30,000 plant and animal species that are threatened by international trade. However, the increase in cross border trade and freer border crossing can also increase the risk of illegal transportation of protected flora and fauna or hazardous materials. Funding actions that increase the prevention of this illegal trade, such as education and closer cross-border co-operation, are considered environmentally sustainable.

4.4. Mitigation of negative impacts

Paying attention to the combined effects of the projects, and especially those which are having impacts on climate change, increasing acidification and increasing use of natural resources is essential in avoiding environmental crisis. The countries targeted by the Kolarctic CBC programme need to strengthen their adherence to the provisions of existing international treaties and conventions, and to realise that there is a need for new instruments to reduce the negative environmental impacts of emissions. In addition to new techniques, education of environmental authorities and the implementation of international legislation and treaties through projects financed by the Kolarctic CBC programme should be further utilized and developed.

The Kolarctic CBC programme gives possibilities for developing environmentally friendly technical solutions, and recommends the safest alternatives with the lowest impacts to be used in designing the projects. Programme supports activities securing biodiversity and developing the protected area networks. These are essential practices in avoiding further fragmentation and halting the effects of climate change. In any case there is always a need to ensure that project decisions are made with sufficient amount of knowledge on environmental impacts and if necessary with an EIA supporting the proposals.

Further development of the EIA and SEA procedures is necessary in order to minimize the risk of environmental impacts. In addition, the methodology for SEA and EIA should be developed as a co-operative effort between the programme partners. It presupposes wide participation of regional administrations, scientific institutions, local inhabitants and NGO’s. The number of experts to be used for SEA and EIA procedures and other impact assessments is limited and there is a lack of mechanisms and practical experience. The cross-border co-operation of experts should be further developed and the knowledge level increased through joint seminars and educational events.

A long-term solution on how to minimize the risks of oil spills is a common challenge for Kolarctic CBC programme area. Monitoring of the shipping lanes in Arctic waters is highly important in evaluating environmental impacts and disaster prevention processes. PSSA (Particulary Sensitive Sea Areas) designation requires that ships take special care when navigating through areas of ecological, economic, cultural or scientific significance. The designation can be used to protect a variety of marine and coastal habitats and would for example give Norway the right to decide on the location of shipping lanes, as well as powers of traffic surveillance. PSSAs do not prevent shipping within the designated area, but rather place specific controls to limit potential damage. These can include avoiding certain areas, the use of compulsory routes, bans on discharging waste, and compulsory reporting of shipping activities.

The Barents Sea, which is Europe's last large, clean and relatively untouched marine ecosystem, should try to attain PSSA status. An effort should also be made to establish training programmes, aimed at enhancing oil spill contingency plans in regions vulnerable to oil accidents, by establishing voluntary oil spill response groups to assist in the cleanup operations after an oil spill (WWF, 2014).

Cooperation between regional authorities is important also in ensuring favourable conditions for indigenous communities, as well as enhancing their participation in decision-making. Active participation and the inputs of local and indigenous people, as well as of NGOs, are essential for achieving the programme's aims. The Working Group on Indigenous People (WGIP) and the Sámi Parliament are, for example, parties who should be closely involved. The year 2013 was marked by the 20th Anniversary of the establishment of the Barents Euro-Arctic Council (BEAC). According to the annual report issues of considerable significance distinctive for the Barents cooperation in 2013 were listed as follows: the major project of an Action Plan of Climate Change, the lack of East-West multimodal transport connections in the region and the need to reactivate economic cooperation. These issues are partly interconnected, not least because of sustainability. It is therefore understandable that several working groups touched upon them from different perspectives like education and research, tourism, the youth and the indigenous peoples' interests. (International Barents Secretariat, 2013).

Interaction between the projects, local people and the authorities can provide a forum for local people to express their opinions and share their knowledge about their living environment. People need to have a possibility to receive attention related their concerns. The Aarhus Convention and the EU's dissemination policy aim to equal participation possibilities of different stakeholders.

Many of the misunderstandings within projects are usually due to poor communication and management, and cultural differences. In order to achieve successful results during the programme period, it is socially important to ensure that the unique areas with special cultural values retain their own character and are able to highlight their own identity (Lundvall, 2007).

The mitigation of negative impacts concerning single projects has to be evaluated always separately. The impacts are dependent on what kind of actions and in which area they will be implemented.

4.5. Monitoring the environmental impacts and effectiveness

The SEA Directive applies to a wide range of public plans and programmes (e.g. on land use, transport, energy, waste, agriculture, etc). The SEA Directive does not refer to policies. The SEA Directive is in force since 2001. Under the SEA directive, there is a requirement to establish a monitoring programme to measure environmental effectiveness. Thus, an impact assessment a follow- up programme is needed for monitoring ecological and social sustainability during the programme period. The progress of the programme is evaluated, and achievements of its detailed aims are measured yearly by the Monitoring Committee. It would increase environmental sustainability if the environmental effectiveness and ecological sustainability would be evaluated also annually. Preventive measures could be implemented if unsustainable development or environmental risks had occurred during the year. The aims and actions could be redirected in a more environmentally and ecologically sustainable direction. The annual evaluation and measurement of more detailed aims will allow flexibility for improvements which are applicable to the situation prevailing at the time.

The following environmental indicators can be used to quantify the sustainable progress of the programme. The indicators are examples, and it is likely that also other indicators may be applicable.

Ecological sustainability:

- new environment-friendly technical solutions
- adopting the BAT techniques in industry
- actions decreasing green house gas emissions
- actions decreasing the risk of radioactive pollution
- actions decreasing the risk of oil and hydrocarbon accidents and spills
- evidence of energy saving
- sustainable solutions in developing transport and logistics
- actions developing sustainable tourism
- SMEs with new environmentally friendly techniques and products
- actions increasing environmental knowledge, education and dissemination
- number of different nature protection and management plans
- number of visitors in nature protection areas
- environmentally progressive changes in land use policies and plans
- actions encouraging new methodology for combining different forms of land use
- actions developing the sustainable use of boreal forests

- adaptation to climate change and development of sustainable reindeer herding
- actions developing sustainable fishery
- actions decreasing the loss of biodiversity
- actions increasing sustainable waste management
- actions aiming at the provision of clean drinking water
- number of new protected areas established
- actions securing ecosystem services
- actions mitigating fragmentation
- actions developing or increasing bio-economy
- introduction of renewable natural resources in stakeholders activity/business/industry
- number of habitats protected
- actions preventing the spreading of invasive species
- number of actions (seminars, events) in nature education
- number of published environmental materials
- actions establishing new nature protection area networks
- actions establishing new cross border co-operational networks
- actions preventing environmental catastrophes
- number of environmental monitoring actions
- actions preventing illegal trade of threatened species

Social sustainability:

- employment in jobs that respect environmental and social sustainability
- new multilevel and international, environmental and social networks
- actions developing methods promoting equal participation in decision making
- actions in developing the social and ecological legislation and their implementation
- actions contributing to social impact assessment in the SEA and EIA processes
- actions for adapting traditional livelihoods in changing conditions
- actions increasing equal access to markets
- actions to support the traditional livelihoods of indigenous people

5. Environmental significance of the Kolarctic CBC 2014-2020 Programme

The Kolarctic CBC Programme 2014-2020 promotes cross-border cooperation between the countries in the North Calotte and northwest Russia. The overall aim of the Programme is to reduce the periphery of the countries' border regions and problems related to the periphery as well as to promote multilateral cross-border cooperation. The Programme aims to help the regions within the Programme area to develop their cross-border economic, social and environmental potential, which shall be achieved by supporting innovative cross-border activities, accessibility, and the sustainable development of natural resources, communities and cultural heritage. The Kolarctic Cross Border Cooperation 2014-2020 Programme complements national cross-border activities by focusing on cooperation between the European Union Member States and Partner Countries. Within the Kolarctic Cross Border Cooperation 2014-2020 Programme context, Norway as an EEA and Schengen country has equal status with the EU Member States of Finland and Sweden.

Currently in the programme area there are number of major land use and industrial projects going on which have significant effects on the environment. Exploitation of natural resources is increasing and need for better and larger scale infrastructure is needed. Fragmentation and loss of biodiversity are great threats to the area and its ecological sustainability. Growing industry with its emissions and pollution creates major challenges on securing healthy and vibrant environment offering clean drinking water and air for people living in the area. Kolarctic CBC programme can offer possibilities through funding and by setting up objectives to answer these challenges. Programme can have significant meaning in preserving the fragile arctic and northern environment.

The socio-environmental issues of Russia will receive attention in every project because Russia is always involved into the projects as a partner. This will offer a possibility for the core and adjoining regions of Russia to develop in economically, socially and environmentally sustainable ways. Programme offers an excellent possibility to increase environmental knowledge, expertise and permanent networks. The environmental policies and practices are inherently social and national phenomena that gain new value from international legislation, policies and co-operation. By increasing international co-operation in the environmental field, it is possible to generate new points of view and to become familiar with new policies and implementation practices. The sustainability and resilience of ecosystems are directly connected to our wellbeing – people are dependent on ecosystems and ecosystem services. The coherent, multi-disciplinary based development of our societies can ensure a sustainable environment providing ecosystem services for future generations.

6. Summary

The purpose of strategic environmental assessments (SEA) is to ensure that environmental impacts are assessed and duly considered during the preparation and approval of plans and programmes. It focuses on the improvement of information availability, and provides more opportunities for public participation in planning in order to further promote sustainable development. The aim is to ensure that the environmental consequences of specific plans and programmes are identified and assessed during their preparation, and especially before their adoption. The loss of unique nature and culture, major accidents and cumulative and indirect effects on the environment and human society, are the risks that can potentially be avoided through effective SEA and environmental impact assessment (EIA). The idea underlying SEA was to compile an environmental report that reviews the facts related to the environment in the region, and improves the environmental dimension of the Kolarctic CBC 2014-2020 Programme.

The area targeted by the Kolarctic CBC 2014-2020 Programme covers the Region of Lapland in Finland, the Province of Norrbotten in Sweden, the Counties of Nordland, Troms and Finnmark in Norway, and the Murmansk, Arkhangelsk Oblasts and Nenets Autonomous Okrug in Russia. Regions adjoining the core programme region are Northern Ostrobothnia in Finland, Västerbotten in Sweden and Republic of Karelia and Republic of Komi in Russia. The vast area contains outstanding biodiversity and biological resources, as well as enormous variation in economic and social conditions. It is enormously rich in natural resources, like forests, fish stocks, minerals, oil and gas.

The report draws attention to environmental concerns and existing disasters in order to avoid the provision of environmentally hazardous economic incentives through the programme, and to promote environmentally positive or indirectly positive incentives. The most urgent environmental threats in the Kolarctic CBC programme area are climate change, fragmentation and habitat loss, acidification, radioactive pollution and the risk of accidents, oil and hydrocarbon pollution and the risk of spills, unsustainable use of natural resources, loss of biodiversity, increasing amounts of waste and the pollution of drinking water.

The core and adjoining regions are presented in the report. The main land uses of the areas are described as well as the state of nature and nature conservation are included. The major regional sources of pollutants and emissions, and possible environmental risks related to different actions and practices have been addressed. The evaluation and environmental impact assessment have been implemented through reflecting the overall objectives and priorities with their possible actions of the programme to the regions environment and its special characteristics including the vulnerability of Arctic and northern nature. The most important international environmental policies, strategies and programmes have been taken into account in the report. The Lisbon Strategy, the Sustainable Development Strategy, the 7th Environment Action Programme, the Nordic Strategy for Sustainable Development, the Northern Dimension Policy, and Convention on Biodiversity, Ramsar Convention, Barents Co-operation as well as Helsinki Convention on protection of the Baltic Sea are acknowledged. Also the most important international regulations in Russia have been considered when assessing the impacts of the programme. These regulations are;

Convention on Biological Diversity, Vienna Convention for the Protection of the Ozone Layer, Montreal Protocol on Substances Depleting the Ozone Layer, Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, Convention on the Transboundary Effects of Industrial Accidents and Kyoto Protocol.

The overall objective of the Programme is to promote viable economy and attractiveness of the region, where inhabitants and visitors are enjoying the arctic nature and where the natural resources are used in a sustainable way. The needs of the Programme area are considered through four thematic objectives: Business and SME development; environmental protection, climate change adaption and disasters prevention/management; improvement of accessibility to the regions, development of transport and communication networks and systems; and promotion of border management and border security.

The programme area is extremely multicultural, including indigenous Sámi and Nenets, and has a wide range of different forms of environmental use. The legislative framework in both the social and environmental sectors is variable, being the most similar in Sweden and Finland. The pressures set by international investors, exploration and exploitation of natural resources and markets strongly affect the traditional livelihoods of the North. These factors make the social impact assessment procedures necessary as well as very complicated. Legal shortcomings may hinder the regulation and adaptation of economic activities into traditional livelihoods. The need for EIA and SIA have to be assessed in more detailed when the project applications are evaluated. EIA and SIA have to be implemented in any case within the projects on which they are legally obligatory.

The practices and actions implemented through projects financed by the Kolarctic CBC programme should aim at long lasting, sustainable results. The criteria for financing should always include sufficient consideration of the environmental threats and risks for the programme area with respect to treaties and related policies. The thematic objectives thus aim at avoiding any negative environmental impacts and promoting sustainable regional development, environmental protection and cross border co-operation. It is impossible to assess all the impacts of the programme before concrete actions and projects are implemented. Although, theoretical descriptions, and some examples giving an indication of the possible effects of programme's implementation on the environment and society has been given in the programme document. In all the cases, the environmental impacts are clearly dependent on the strength of the activities and different practices to be used. The impacts are also highly depended on which areas they are targeted. The impacts can turn out to be either positive or negative in all the possible actions. The programme and project activities can result to positive characteristics and sustainable development in certain area. All the projects applied should be evaluated individually and carefully to avoid activities and their impacts on environment from spiralling out of control.

The programme priorities and thematic objectives support the idea and aims to having a good and healthy environment. Even the programme period is from 2014 until 2020 the overall picture of the projects should be in their long-term impacts when it comes to nature and the environment. Six years is a short period in the nature and the environmental impacts of a particular project should be defined far more into the future. Some impacts are of course impossible to predict, and in these cases where the impacts might be negative, the precautionary principles should be complied.

In order to achieve successful results during the programme period, it is environmentally and socially important that the unique areas with special cultural values retain their own character and are able to highlight their own identity. The progress of the programme and its detailed aims will be checked annually by the Monitoring Committee. It would be important to evaluate the ecological and social sustainability yearly also. This would ensure that the possible harmful actions for the environment could be avoided before larger scale catastrophes.

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Annex 1.

The Joint Programming Committee has identified the following **Large Infrastructure Projects (LIPs)** as potential LIPs to be implemented in the Programme (decision date 16.12.2014):

- Road Kola-Verhnetulomsky-Lotta
- Road Kandalaksha-Salla
- Road Salla Centre to Salla BCP
- Road Kaamanen-Neiden-Kirkenes
- BCP Lotta
- BCP Raja-Jooseppi
- Infrastructure development for cross-border maritime cruise products in the Barents Euro Arctic Region

In addition it was decided to include the LIP proposal *Development of independent power supply system in Nenets* on the list on basis of its importance as continuation of the Kolarctic ENPI CBC Project KO415 Polaris and the consistent development of remote areas.

These projects have not been assessed individually in the SEA report. The LIP -listing was done after the report was almost fully prepared. The requirements for project specific EIA must be confirmed from the regional environmental authorities.