Environmental Report
Kolarctic Programme 2021-2027

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Kolarctic Programme 2021-2027
Environmental Assessment Report

Maria Hammar, Efstathia Vlassopoulou and Salla Hossi

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NON-TECHNICAL SUMMARY

This environmental report is part of the Strategic Environmental Assessment of the Kolarctic Programme 2021-2027. A strategic environmental assessment is required for all Structural Funds programs in accordance with EU Directive 2001/42 / EC. The purpose of the environmental assessment is to integrate environmental aspects into the planning and decision-making of the program so that sustainable development is promoted. This is done in practice by the environmental assessment being an interactive process that adds an external assessor group's views, advice, and recommendations in parallel with the development of the programs.

The SEA process includes the following step:

A	Defining the scope of the SEA	Completed
B	Assessing the effects of the programme, preparation of the environmental report	In progress
C	Consultation of the Environmental Report	August 2021
D	Writing the SEA report	September 2021
E	Implementation	Starting Q4 -2021

This programme has defined the following objective areas for 2021-2027:

- A smarter Europe by promoting innovative and smart economic transformation - A skilled, smart and innovative Kolarctic region (PO1)
- Greener, low-carbon transitioning towards a net zero carbon economy and resilient Europe - A green, responsible and resilient Kolarctic region (PO2)
- A more social Europe implementing the European Pillar of Social Rights – An attractive, vibrant and culturally diverse Kolarctic area (PO3)
- Interreg Specific Objectives (ISO): Better governance - Governance and planning for connected and inclusive societies OR Connected and inclusive societies for dynamic development of the Kolarctic region

Strategic environmental assessment aims to investigate the environmental consequences of what is possible to implement within the border region. The environmental assessment will publicly be consulted together with the proposed program so that the processes are coordinated as far as possible. The method for environmental assessments includes the steps of identification of significant environmental and sustainability problems addressed by the programme, prediction of the effects of the programme, evaluation of the programme's effects. It also includes proposal of indicators and measures to prevent, reduce or offset adverse environmental effects, presentation of the results of the SEA up to this point in an Environmental Report, and lastly, after consultation with stakeholders, preparation of the final SEA report. The final report will show how the results of the assessment processes are considered when finalising the programme, investigation of significant environmental impact, delimitation, analysis, preparation of environmental impact assessment, adoption, and follow-up.

For analysis of different possible scenarios, the execution of the program is compared with a zero alternative and an alternative design of the execution of the program. Within the environmental assessment of the Kolarctic Programme 2021-2027, a zero alternative and an environmental alternative are proposed to compare the program proposal with. We have based our assessment on the draft programme version from May 2021 and the Territorial Analysis draft from April, which set out the challenges, priorities and actions contained in the proposed operational programme.

An overall assessment points to generally positive effects on environmental goals:

Policy Objectives and Interreg Specific Objectives	Specific Objectives	Environmental Impacts	Climate Impact	Marine environment (incl. the sea, groundwater and freshwater system)	Soil & land use	Pollution & waste (incl. chemicals)	Resource effieciency (incl. Circular Economy)	Ecosystems (incl. Flora, fauna biodiversity)	Population and health (incl. social inclusion and culture)
PO1 - A smarter Europe by promoting innovative and smart economic transformation	1:1 Enhancing research and innovation capacities and the uptake of advanced technologies		Yellow				Green		Green
	1:2 Reaping the benefits of digitisation for citizens, companies and governments					Green	Yellow		Yellow
PO2 - Greener low-carbon transitioning towards a net zero carbon economy and resilient Europe	2:4 Promoting climate change adaptation and disaster risk prevention, resilience, taking into account eco-system-based approaches		Green	Green			Green		
	2:7 Enhancing protection and preservation of nature, biodiversity and green infrastructure, including urban areas, and reducing all forms of pollution		Green	Green	Green				Yellow
PO4 - A more social Europe implementing the European Pillar of Social Rights	4:6 Enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation		Yellow	Yellow	Yellow	Green	Yellow		Green
ISO 1: Better Governance	ISO 1:3: People-to people action for increased trust				Yellow		Yellow		Green

Positive impact	(green)
Risk for negative impact	(yellow)
Negative impact	(red)
Hard to judge/no impact	(white)

It should be ensured that e.g. increased travel or increased transport is not done in a way that is negative for the environment, just as increased business activity does not create conflicts linked to natural environments. Development of the cross-border activities is generally considered to be positively linked to human health and well-being. The ambitions are linked to regional goals and to the Agenda 2030 goals.

Recommendations for development of the programme:

- Secure the set of requirements and criteria for project support. It is the focus of the individual projects that determines the environmental effect. The requirements should be noted in the description of the program, so that these are integrated in the support criteria. This means that the criteria must also capture consequences in the longer term than the program period.

- Prioritization of funds in the program between PO1, 2, 4, ISO and SO also influences whether environmental goals can be reached or not. Even if there is quite a lot of money in the program, it should be considered whether there is time to carry out all the different activities included in the program. There are four areas with somewhat different types of actors. The opportunity to create positive effects on the environment also depends on the size of the effort and the time available. Is there enough time? Is the money enough for everything to be achieved?

- Ensure a structured and continuous follow-up of the program and its projects, to avoid negative cumulative environmental effects of the program.

CONTENT

1. Introduction

The Kolarctic Programme 2021-2027 is assumed to have a significant environmental effect and a strategic environmental assessment (SEA) will be produced for the programme. This document, environmental report, gives an analysis of how the new program can affect the environment - positively and negatively - and how environmental considerations can be optimized in the program.

1.1 The SEA Process

A strategic environmental assessment is required for all Structural Funds programs in accordance with EU Directive 2001/42 / EC. The purpose of the environmental assessment is to integrate environmental aspects into the planning and decision-making of the program so that sustainable development is promoted. This is done in practice by the environmental assessment being an interactive process that adds an external assessor group's views, advice, and recommendations in parallel with the development of the programs.

The main objective of SEA is to ensure that the environmental implications of decisions are considered before the decisions are finally made. Consultation of competent authorities and the general public is an integral part of the SEA procedure.

In this way, the environmental assessment will contribute to sustainable development and to controlling the implementation of the program so that negative effects are minimized, and positive effects are optimized.

The strategic environmental assessment is carried out according to the following steps:

A. Defining the scope of the SEA
- Identify geographical area, time scale and relevant environmental objectives   - Identify other relevant EU plans and programmes, and state their relation to the programme   - Identify reasonable alternatives to the programme   - Consult authorities regarding the scope of the SEA

B. Assessing the effects of the programme, preparation of the environmental report
- Collect baseline data, including data on likely future trends   - Identify significant environmental and sustainability problems addressed by the programme   - Predict the effects of the programme   - Evaluate the programme's effects   - Propose indicators and measures to prevent, reduce or offset adverse environmental effects   - Present the results of the SEA up to this point in an Environmental Report

C. Consultation of the Environmental Report
- Seek inputs from the public and authorities   - The environmental report must be accessible for the public as base for the consultations with the public and the authorities with environmental responsibilities.

D. Writing the SEA report
- The report on environmental effects and the results of consultations shall be considered before the programme is adopted.   - The final SEA report will show how the results of the assessment processes considered when finalising the programme

E. Implementation
- In order to determine any unforeseen adverse effects as early as possible, it is necessary to ensure that the significant environmental effects of the programme are monitored   - Once the programme is final and the environmental report is adopted into the programme, the authorities with environmental responsibilities and the public shall be informed and the relevant information made available to them

The environmental report shall - as far as relevant and reasonable - identify, describe and assess the significant environmental impact that may arise for, for example, human health, biodiversity, landscape, culture, climate and material assets. This applies to both negative and positive consequences. In order for the environmental impact statement not to be unnecessarily comprehensive, the assessment is limited to the environmental consequences that can be assumed to have a significant environmental impact.

1.2 Scope of the Environmental Assessment

The purpose of defining the scope of the SEA is to concentrate the work on the environmental effects that are the most relevant for the program. Scoping concerns the geographical area and time scale for the assessment. The scope shall also propose reasonable alternatives to the proposed programme that will be assessed in the environmental report. This scope for the SEA of Kolarctic Programme 2021-2027 has been prepared through a review of existing documentation and the draft programme.

Geographical boundary and time scale

Geographically, the environmental assessment is limited to the program area given by figure 1 – i.e. the Programme area. For climate impact, the environmental assessment has applied a global perspective because the climate system is a global issue.

In terms of time scale, the assessment is limited to 2030 because the Sustainable Development Goals, Agenda 2030, continue until then and that projects carried out during the program can have an impact even after the program period has ended. The climate impact is estimated for the period up to 2050 because of its global scale and mitigation often take long time before effects can be measured.

Environmental issues to be covered

The structure of the environmental assessment is set up according to the overall goals (Policy objectives, Interreg Specific Objectives and specific objectives) of the operational programme. Environmental and sustainability issues that will be predicted and evaluated are:

- o Climate change (incl. renewable energy)
- o Ecosystems (incl. flora, fauna, biodiversity and ecosystem services)
- o Soil and land use
- o Marine environment (incl. the sea, freshwater and groundwater system)
- o Pollution and waste (incl. chemicals and radioactive pollution)
- o Resource efficiency (incl. Circular Economy CE)
- o Population and health (incl. social inclusion, participation and cultural heritage)

In addition to environmental issues, the programme's consideration of relevant environmental goals will be highlighted.

The environmental objectives that are considered relevant are related to the following programmes:

- Sustainable Development Goals (Agenda 2030),

- European Green Deal

- European framework for achieving climate neutrality and amending Regulation

- European Biodiversity strategy for 2030

- The Joint Communication on an integrated EU policy for the Arctic

- National and regional strategies

1.3 Methodology

Strategic environmental assessment aims to investigate the environmental consequences of what is possible to implement within the border region. The environmental assessment will be consulted together with the proposed program so that the processes are coordinated as far as possible.

The method for environmental assessments includes the steps of investigation of significant environmental impact, scope, analysis, preparation of environmental impact assessment, adoption and follow-up.

In the work, great emphasis has been placed on capturing the major features of the program's impact and consequences. The assessment has therefore been focused on the consequences of the strategic choices that can significantly influence the regions. Many issues are of such a nature that it is better or more appropriate to handle and analyse them in future decision-making processes or through permit processes linked to the authorities of each country. The amount of detailed reasoning has therefore generally been kept to a minimum in the text.

Knowledge gathering for the environmental assessment has been done by analysing available proposals for programs, planning documents from other regional programs as well as proposals for policy areas and initiatives that are planned to be implemented during the program period. In order for the environmental report not to become unnecessarily extensive, it was limited to the environmental consequences that can be assumed to have a significant environmental impact.

Following recommendations provided by environmental authorities during consultation of the scope of the SEA process, several environmental objectives and policies were incorporated into the environmental report. The assessment has been carried out in a step-by-step process. First, the regions identified the conditions that the Programme creates for long-term sustainable development for the policy areas (PO) and prioritized various initiatives under specific objectives. In the next step, the environmental consequences of the programme are assessed. The consequences depend partly on the development of the regional structure (results from the first analysis, for example: where it is built, which innovations contribute to the development of business, biofuel production, how parts of the region are connected to the transport system through transport corridors, etc.), partly on the programme's other positions towards other goals and sub-goals, such as regional environmental goals and priorities according to Agenda 2030.

Finally, risks for negative and positive environmental impact associated with the implementation of the programme are assessed. Measures that are required for it to become a reality, as well as mitigation strategies needed to be taken care of, in order to avoid or minimize the negative consequences, are also assessed. Finally, the environmental report contains an overall assessment of the programmes' contribution to sustainable development.

The assessment has been made for the policy objectives (PO)/ Interreg specific objective (ISO) and the related specific objectives (SO). The assessment has been performed by marking the effects of each specific target on each environmental target in green (positive impact), yellow (risk of negative impact), red (negative impact) or no colour (no significant impact or not possible to evaluate impact). In addition, proposed initiatives have been linked to environmental effects on a scale with the same colour scale, but where a weighting of positive consequences and negative risks has been made on a scale from "+5" to "-5". Efforts can have both negative and positive effects (or risk of…), which means that it can be both green and red / yellow. More explanation can be found in the chapter "Consequences of the proposed program".

1.4 Notes on uncertainties in assessment and compilation of data

The uncertainty in the assessments lies partly in the fact that the program description has not been determined, and partly in what priorities the program will make during the implementation. Environmental effects are directly linked to the future projects that will receive funding. With regard to the Policy Objectives and initiatives proposed, the investment profile and action proposals will be different within the proposed areas (PO1, 2, 4, ISO and SO). If you re-allocate the investment profile, the consequence will be that investments end up in other projects with other environmental effects. On the other hand, future priorities on supported projects are more decisive in the uncertainty in the assessment. Project prioritization is dependent on other policy goals, such as employment and regional development, which affects the choice of project - with consequent altered effect on the environment.

The assessment in this document must be seen in relation to these uncertainties, and we have therefore chosen to look at the main features of the program regarding the risk of negative effects on the environment and contributions to positive environmental effects.

2. STRUCTURE OF THE KOLARCTIC PROGRAMME

2.1 Brief description of the programme

The EU Territorial Cooperation Program (Interreg) is the instrument of cohesion policy designed to address problems and challenges that transcend national boundaries and require common solutions.
The programs are funded by the European Regional Development Fund (ERDF). European territorial cooperation has been part of the EU's cohesion policy since 1990. The overarching objectives are to increase competitiveness and reduce the impact of borders to promote harmonized economic, social, and cultural development within the Union as a whole.

Common beneficiaries within the programme area are citizens within the region, Public authorities / organizations - local, regional, and national, Universities and colleges / research institutions, Business organizations / private companies and Interest organizations / non-profit organizations.

The programme includes the following geographical area, incl. the sea and coastal area, see figure 1:

- **Norway**; Nordland county, Troms and Finnmark county
- **Sweden**; Norrbotten county
- **Finland**; Lapland region
- **Russia**; Murmansk region, Arkhangelsk region and Nenets autonomous district

Figure 1: The geographical area, including the sea, covered by the Kolarctic Programme.

Based on the European Commission's framework for the new Interreg programs, which define several policy objectives (PO), Interreg Specific Objectives (ISO) and specific objectives (SO), the programme work has focused on further developing the areas:

PO1 – A smarter Europe by promoting innovative and smart economic transformation
    SO (i) Enhancing research and innovation capacities and the uptake of advanced technologies,
    SO (ii) Reaping the benefits of digitisation for citizens, companies and governments

PO2 – Greener low-carbon transitioning towards a net zero carbon economy and resilient Europe
    SO (iv) Promoting climate change adaptation and disaster risk prevention, resilience, taking into account eco-system-based approaches,
    SO (vii) Enhancing protection and preservation of nature, biodiversity and green infrastructure, including urban areas, and reducing all forms of pollution

PO4 – A more social Europe implementing the European Pillar of Social Rights
    SO (vi) Enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation

ISO1 – Better governance
    SO (iii) People-to-people action for increased trust

The program proposal is summarized in the table below[1]

Policy objectives / Interreg specific objective	Specific objectives	Proposed share of financial resources.
1. A smarter Europe by promoting innovative and smart economic transformation	SO (i) Enhancing research and innovation capacities and the uptake of advanced technologies, SO (ii) Reaping the benefits of digitisation for citizens, companies and governments	Not clear
2. Greener low-carbon transitioning towards a net zero carbon economy and resilient Europe	SO (iv) Promoting climate change adaptation, and disaster risk prevention, resilience, taking into account eco-system-based approaches, SO (vii) Enhancing protection and preservation of nature, biodiversity, and green infrastructure, including in urban areas, and reducing all forms of pollution	Not clear
4. A more social Europe implementing the European Pillar of Social Rights	SO (vi) Enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation	Not clear
Better governance (ISO1)	SO (iii) People-to-people action for increased trust	Not clear

The Kolarctic Programme 2021-2027 will have great opportunities to contribute to new innovations, a better adaptation to climate issues, preservation of nature and biodiversity, increased tourism while preserving and enhancing cultural heritage and a labour market that is permissive at the border between the countries. All investments can have both negative and positive effects on the environment, and this is the focus of the strategic environmental assessment.

The PO1 activities will focus on enhancing growth and competitiveness of SMEs, as well as enhancing research and innovations capacities and the uptake of advanced technologies. The economies of the countries included in the Kolarctic Programme are dominated by SME's and microenterprises. There is great unused potential, but it is challenging to access new markets and develop products. Because of the small size of the companies, it is difficult to participate in the global competition where big companies dominate. The cooperation between companies is currently weak, and it would be useful and beneficial for the companies to work together for example to enter new markets. The R&D investments are rather low in small enterprises. This makes product development and other developmental tasks difficult and slows down opportunities for fully using the existing potential. In the programme area there is a need for increasing innovation capacity in order to increase productivity. The area has all the prerequisites to contribute to advanced technologies and development of digitalisation due to the high-level institutions that it comprises of. Promoting internationalisation and digitalisation of enterprises can lead to creation of job opportunities, increased export and business adaptation into low carbon businesses. One of the greatest challenges of the Programme area is related to its rural and remote characteristics, creating service provision- related problems (health, education, etc.) as well as high infrastructure costs. This makes improvement of digitalisation services a high priority for the Kolarctic Programme.

PO2 will focus on promoting climate change adaptation, risk prevention and disaster resilience, and enhancing protection and preservation of nature, biodiversity, and green infrastructure, including in urban areas, and reducing all forms of pollution. The growing importance of services in the economy reduces the demand for natural resources, and digitalisation facilitates leasing, sharing, and renting. The economic potential of the area depends to a large extent on increased tourism, which strongly depends on the diversity of the natural

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[1] *According to the proposed programme version of May 2021*

environment in the Arctic areas. This, together with climate change challenges is why special attention should be paid to the preservation of nature and restoration of biodiversity. Growing traffic and toxic substances and spills from industry and agriculture remain a problem both for the marine environment and for air pollution. Reducing GHG emissions, adopting renewable energy methods, protecting natural resources, restoring damaged ecosystems and using indigenous knowledge and digital tools are crucial for the programme area. Natural resources are crucial for the regional economy of the Programme area. Raw minerals and forestry play an important role in the economy and reindeer husbandry is one of the most significant – both economically and culturally – sectors in the area which has strongly been affected by climate change. The basic industry demands in the Programme area require high energy use, which account for a significant part of the emissions in the area, which is why the potential of fossil-free energy use is crucial. Climate change consequences are already obvious in the Programme area (changes in animal habitats and plant growth, discomfort for the population, new diseases and pests' appearance, decreased snow and ice cover, extreme phenomena such as floods and droughts) and the effects are foreseen to cause even more severe problems in the future. Lastly, there is a large number of protected nature areas in the Programme area and protection of ecosystems and biodiversity plays a significant role.

The Barents Sea is one of the marginal seas that form the Arctic Ocean. The fact that the Barents Sea is ice-free has facilitated many activities – mainly commercial and touristic. Its environment though has been challenged by decades of nuclear activities and threatened marine resources, which create depletion of fish stocks and biodiversity due to climate change and other human activities. Norway and Russia are working together to tackle especially issues relating to the regional maritime ecosystem, fisheries and nuclear safety in the Barents Sea area.

PO4 will focus on enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation. The goal is to create a vibrant and culturally diverse Kolarctic region which will attract tourists by increasing cross-border mobility, promoting the diverse natural environments of the area and the cultural heritage. Moreover, PO4 includes developing of innovative digital solutions to deliver high-quality experiences for tourists, a further development of the cultural and creative industry, including boosting of indigenous activities, knowledge and endangered indigenous languages and promoting cultural heritage.

Finally, the ISO focuses on enhancing people-to-people action for increased trust. The ISO together with other Policy Objectives would develop cross-border collaboration and projects resulting in increased trust. Increased trust would facilitate and benefit the implementation of the other Policy Objectives of the programme. The Economy of Wellbeing and trust can be enhanced by increasing understanding and respecting of each other's culture and language and by increased cooperation between civil societies, groups, and NGOs. The participatory processes taking place when designing the improved solutions and services are also supported, and also digital solutions would be harnessed for the benefit of the programme area.

2.2 Relations to other relevant programmes and strategies

The forthcoming **regional fund programs** in the regions involved in the Kolarctic programme for the 2021-2027 period have thematic orientations that complement the Cross-Border Cooperation Programme. These regional fund programs focus primarily on Policy Objectives 1 and 2. Within Kolarctic Programme, however, the focus is on cross-border regional investments, which will complement regional investments in regional programs in the countries.

Another program with some overlap is the **European Social Fund** (ESF). The possibilities that the new EU ENI Cross-Border Cooperation Programme will invest in skills supply in areas for smart specialization will complement the Social Fund's broader efforts for entrepreneurs and employees in small and medium-sized companies in each region. The ESF can contribute to promoting both increased social sustainability, as well as a more carbon-efficient and circular economy, where different target groups (companies, employed, unemployed or young / foreign-born) are included.

In the area of research and innovation, there is good potential to develop collaboration within several so-called missions in the new research program **Horizon Europe**, for example on climate-neutral and smart cities, as well as investments in the sea. The region's ambitions regarding environmental and climate issues are also well in line with the EU Commission's ambitions within the so-called **Green Deal** and **LIFE +.**

The **EU Common Agricultural Policy (CAP)** implements a system of agricultural subsidies and other programmes. The next programme period 2021-2027 is under negotiation and The Commission's proposals aim to foster a sustainable and competitive agricultural sector that can contribute significantly to the European Green Deal, especially regarding the farm to fork strategy and biodiversity strategy. In particular, the proposals focus on securing a fair deal and a stable economic future for farmers, setting higher ambitions for environmental and climate action and safeguarding agriculture's position at the heart of Europe's society.

The table below gives a list of EU programmes that link to the Kolarctic Programme:

Links to Structural Funds programmes:	Links to other EU programmes
• Regional Development Funds • European Social Fund • ESPON • INTERACT • Interreg Europe • Common Agricultural Policy • Just Transition fund • International Barents Secretariat (IBS) • Arctic Council (AC) • Nordic Council of Ministers (NCM) • Interreg Nord	• Horizon Europe - EU Framework Program for Research and Innovation. • Connecting Europe Facility - The program will connect Europe's infrastructure by contributing to infrastructure investments to address missing links. • COSME - The program will strengthen the competitiveness of small and medium-sized enterprises • The Erasmus + program will promote international cooperation in education, youth and sport • LIFE - The program is the EU's financial instrument for environmental and climate action. • EASI - The program will support employment, social policy and labour market mobility within the EU. • COST - (European Cooperation in Science and Technology) is a funding organization for research and innovation networks. • The Natura 2000 network • The Barents Program for 2019–2023

3. RELEVANT ENVIRONMENTAL OBJECTIVES

The structure of the environmental assessment is set up according to the overall goals (Policy objectives, Interreg Specific Objectives, and specific objectives) of the operational programme. Environmental and sustainability issues that will be predicted and evaluated are:

- o Climate change (incl. renewable energy)
- o Ecosystems (incl. flora, fauna, biodiversity and ecosystem services)
- o Soil and land use
- o Marine environment (incl. the sea, groundwater and freshwater system)
- o Pollution and waste (incl. chemicals and radioactive pollution)
- o Resource efficiency (incl. Circular Economy CE)
- o Population and health (incl. social inclusion, participation and cultural heritage)

In addition to environmental issues, the programme's consideration of relevant environmental goals will be highlighted.

The environmental objectives that are considered relevant are the Sustainable Development Goals (Agenda 2030), the European Green Deal, European framework for achieving climate neutrality and amending Regulation, European Biodiversity strategy for 2030, EU Strategy for the Baltic Sea Region, The Joint Communication on an integrated EU policy for the Arctic, as well as national strategies and regional plans.

o **Sustainable Development Goals**[2]

Agenda 2030, with 17 global goals for sustainable development, aims to eradicate poverty and hunger, realize human rights for all, achieve equality and empowerment for all women and girls, and ensure lasting protection for the planet and its natural resources. Global goals are integrated and indivisible and balance the three dimensions of sustainable development: the economic, the social and the environmental.

o **European Green Deal**[3]

The overall aim of European Green Deal is to enhance resource efficiency, by moving to a clean, circular economy, as well as to restore biodiversity and cut the net emissions of greenhouse gases. At the same time, it aims to protect the health and well-being of citizens and to boost the EU's natural habitat. EU environmental strategies and action plans that contribute to the objectives of the European Green Deal are:

- Biodiversity strategy for 2030 – concrete actions
- Chemicals strategy
- Circular economy action plan
- Environmental action programme to 2030
- Plastics strategy
- Zero pollution action plan

o **European framework for achieving climate neutrality and amending Regulation** (EU) 2018/1999 (European Climate Law)[4]

o **European Biodiversity strategy for 2030**[5]
The EU's biodiversity strategy for 2030 is a comprehensive, ambitious and long-term plan to protect nature and reverse the degradation of ecosystems. The strategy aims to put Europe's biodiversity on a path to recovery by 2030 and contains specific actions and commitments.

o **The Joint Communication on an integrated EU policy for the Arctic**[6]
The EU is committed to working with the Arctic States, local communities, and other stakeholders to address these environmental challenges. In 2016, the Commission and the High Representative published a Joint Communication on an integrated EU policy for the Arctic structured around three priorities, namely:

- Climate Change and safeguarding the Arctic environment
- Sustainable Development in and around the Arctic
- International Cooperation on Arctic issues

o **National and regional strategies and plans** such as:

- Energy and Climate strategy
- National regulation on biodiversity
- Roadmap for circular economy
- Strategies for Sustainable Regional Development in the Arctic
- National / regional smart specialisation strategies (Finnmark's smart specialisation strategy (2019), Nordland's smart specialisation strategy, Lapland's Smart specialisation strategy and Norrbotten's smart specialisation strategy)

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[2] https://sdgs.un.org/goals

[3] https://ec.europa.eu/environment/strategy_en

[4] https://ec.europa.eu/clima/sites/clima/files/eu-climate-action/docs/prop_reg_ecl_en.pdf

[5] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380

[6] https://eeas.europa.eu/archives/docs/arctic_region/docs/160427_joint-communication-an-integrated-european-union-policy-for-the-arctic_en.pdf

- Strategy of socio-economic development of the Murmansk region until 2025, of the Arkhangelsk region until 2035 and of the Nenets Autonomous Okrug until 2030
- Regional Program in the Arkhangelsk region on production and consumption waste management (2018-2027)
- Regional concept of the Arkhangelsk region for the development of specially protected natural areas and plan for the implementation until 2028.
- National Swedish strategy for converting the society to a circular economy
- National Finish Roadmap (compiled 2016) for promoting circular economy. Industrial Circular Economy Innovation Platform in Lapland is one of Roadmap's key projects
- Regional Russian programmes aiming at conservation of biological diversity through implementation of restoration and reintroduction of rare animal species and development of ecosystem services
- Norrbotten Regional Development Strategy 2030
- Russian Federation Strategy for developing the Arctic Zone and Ensuring National Security until 2035 and Basics of the State Policy of the RF in the Arctic for the period until 2035
- Troms' Business development strategy SNU (Strategisk næringsutvikling) 2018-2025

Policy objectives (PO) / Interreg specific objective (ISO)	Specific objectives (SO)	Main contribution to the related objectives	Environmental risk/conflict associated with SO
1. A smarter Europe by promoting innovative and smart economic transformation	1:1 Enhancing research and innovation capacities and the uptake of advanced technologies	SDG 4, 8, 9, 16	Risk for increased energy consumption.
	1:2 Reaping the benefits of digitisation for citizens, companies and governments	SDG 3, 8, 9	Risk for increased energy consumption and social segregation.
2. Greener low-carbon transitioning towards a net zero carbon economy and resilient Europe	2:4 Promoting climate change adaptation, and disaster risk prevention, resilience, taking into account eco-system-based approaches	SDG 6, 12, 13, 15 EU Water Directive	
	2:7 Enhancing protection and preservation of nature, biodiversity, and green infrastructure, including in urban areas, and reducing all forms of pollution	SDG 6, 7, 9, 11, 12, 14, 15 EU Water Directive	If solutions are not agile, there is a risk of adapting to infrastructure solutions that are not possible to change for long time.
4. A more social Europe implementing the European Pillar of Social Rights	4:6 Enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation	SDG 8	Risk for increased emissions from tourism and industry
Better governance (ISO1)	SO (iii) People-to-people action for increased trust		

The defined policy objectives (and ISO) correlate strongly to important policy and programs of the region and support the overall environmental objectives. Explicitly objectives 2.4 and 2.7 are the two SO that have the strongest bearing on improving the environmental performance and resource efficiency. By tackling those topics several other environmental issues are considered, which are directly or indirectly linked to these overarching issues. Together with the other specific objectives, a sustainable development is incorporated in the Draft Programme as a common theme.

However, the linkage to combating climate change is somewhat week. This provides a recommendation to prioritise climate related issues in the realisation of activities within PO1 and PO2.

4. EXISTING ENVIRONMENTAL PROBLEMS AND TRENDS

The arctic region is particularly vulnerable to climate change due to its high sensitivity and low tolerance against environmental changes. The negative effects of climate change include extreme weather such as heavy rainfall, droughts, strong winds etc. negatively affecting water systems and habitats. The effects of climate change on water systems may cause difficulties for the agricultural and marine transport sectors. Additionally, the increasing temperatures enable migration of new animal and plant species that could be harmful to the native species due to increased winter temperatures and longer growth periods and decrease in snow and ice cover affecting the traditional livelihoods and wildlife. The risk of severe flooding due to climate change is increased in the entire Barents area. Furthermore, river valleys particularly affected by flooding are traditional places for settlement within the entire programme area. Consequently, climate change is anticipated to have significant effects on the well-being of the local population as well as wildlife.

Furthermore, climate change is expected to affect e.g. the infrastructure, transportation, agriculture and hospitality sectors

In addition to the signs of climate change, signs of global pollution are clearly visible in the arctic area. Industrial pollution and poorly managed use of natural resources threaten the entire programme area. Contaminants may spread due to landslides and collapses. The related risks are currently not managed and identified on regional and local levels.

The arctic region is home to many species that are rarely encountered elsewhere. Furthermore, in the programme area there are sensitive biotopes and cultural landscapes that are included on the World Conservation Union (IUCN) Red List of threatened species. The rich local biodiversity is significant for the survival and development of traditional economic activities of the indigenous people as well as the hospitality sector in the area. Biodiversity is threatened by different projects destroying and scattering the habitats of animals and plants. Arctic wildfires have become increasingly widespread and persistent in recent years. In addition to damaging the local ecosystems and livelihoods, wildfires can thaw permafrost and peat contained by it. The process of thawing permafrost and peat can result in large amounts of carbon being released into the atmosphere creating feedback loops accelerating global warming.

The basic industry within the programme area is energy intensive. Energy in the programme area is produced from a wide range of sources consisting of fossil, renewable (mainly hydro and wind) and nuclear energy. Many of the regions within the programme area are however starting to focus on green transformation, which includes increasing resource and energy efficient methods for nature preservation. Replacement of fossil fuels is an important perspective for energy production. Furthermore, some geographical areas require improvements of electricity generation efficiency. The potential of wind power has been widely recognized within the programme areas. However, issues are related to the local population's acceptance toward wind power parks.

UN Sustainable Development Goals

The UN Sustainable Development Report is ranking countries in relation to their status in reaching the Agenda 2030[7]. The involved countries in the Programme are ranked as follows: Finland - number 1, Sweden – number 2, Norway – number 7 and Russian federation number 46. The summary of the sustainable development report is listed below per country:

FINLAND

SWEDEN

NORWAY

RUSSIAN FEDERATION

Based on the images above, we can state that all countries have major challenges in areas linked to climate actions, sustainable production and consumption, as well as biodiversity.

5. ENVIRONMENTAL IMPACT OF THE PROGRAMME

5.1 Discussion of alternatives

For analysis of different possible scenarios, the execution of the program is compared with a zero alternative and an alternative design of the execution of the program.

One purpose of developing alternatives within the framework of the environmental assessment is that strategic choices can be made and justified at an early stage, before decisions are made at project level. By developing alternatives, one can find ways to reduce or avoid that significant negative environmental impact arises as a result of the implementation of programs. The alternatives must form an important basis for consultation as well as participation and influence in the program process. A well-executed alternative management means a kind of assurance for decision-makers that no significantly better alternative has been overlooked.

Within the environmental assessment of The Kolarctic Programme 2021-2027, a zero alternative and an environmental alternative are proposed to compare the programme proposal.

Zero alternative

The zero alternative describes environmental conditions and the probable development of the environment in a given future, if no program is implemented. The zero option will also describe the actions and the change that can be expected to be implemented even if no new program is adopted. Under this alternative, it will be assessed how Agenda 2030 will be achieved and what it would look like for the environment 2030/2050 without the program.

Environmental alternative

The environmental alternative means that the program is implemented, but that priorities in financing and investment are based on the policy objectives and specific goals that will have best possible environmental effects, with respects to increase positive effects and/or minimise negative effects. This means that, for example, business development issues may be given a lower priority. In this alternative, we will reason about how the choices affect the various environmental areas among themselves and how they relate to other political goals.

5.2 Overall environmental impact of the programme

The programme will have great opportunities to contribute to new innovations, integration of digitisation, better adaptation to climate issues, enhanced role of culture and tourism to social and economic sustainability and to a more integrated labour market in the borders region. All investments can have both negative and positive effects on the environment, and this is the focus of the work with the strategic environmental assessment.

This report is based on a draft operational program from May 2021. In the table below, a summary of the impact assessment of the proposed program is made. Explanations:

> **GREEN: Positive environmental impact:** The assessment is that the positive environmental effects are significantly greater than the negative environmental effects.
> **YELLOW: Risk for negative environmental impact**: The assessment is that there is a risk of negative environmental effects.
> **RED: Negative environmental impact**: The assessment is that the negative environmental effects are significantly greater than the positive environmental effects.
> **NO COLOUR**: The assessment is that there is no significant impact on the environment, or, that it is not possible to assess the environmental impact due to too little data.

Overall analysis provides the following picture of the proposed program for Kolarctic Programme 2021-2027:

Policy Objectives and Interreg Specific Objectives	Specific Objectives	Environmental Impacts	Climate Impact	Marine environment (incl. the sea, groundwater and freshwater system)	Soil & land use	Pollution & waste (incl. chemicals)	Resource efficiency (incl. Circular Economy)	Ecosystems (incl. flora, fauna, biodiversity)	Population and health (incl. social inclusion and culture)
PO1 - A smarter Europe by promoting innovative and smart economic transformation	1:1 Enhancing research and innovation capacities and the uptake of advanced technologies		Yellow			Green		Green	
	1:2 Reaping the benefits of digitisation for citizens, companies and governments			Yellow		Green	Yellow		
PO2 - Greener low-carbon transitioning towards a net zero carbon economy and resilient Europe	2:4 Promoting climate change adaptation and disaster risk prevention, resilience, taking into account eco-system-based approaches		Green	Green		Green		Green	
	2:7 Enhancing protection and preservation of nature, biodiversity and green infrastructure, including urban areas, and reducing all forms of pollution		Green	Green		Green		Yellow	
PO4 - A more social Europe implementing the European Pillar of Social Rights	4:6 Enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation		Yellow	Yellow	Yellow	Green		Green	
ISO 1: Better Governance	ISO 1:3: People-to people action for increased trust				Yellow		Yellow	Green	

Positive impact
Risk for negative impact
Negative impact
Hard to judge/no impact

Below there is a more detailed analysis and comments to the assessment of each policy objective. Please note that the environmental assessment of the program does not apply to individual projects.

PO1 – A smarter Europe by promoting innovative and smart economic transformation

SO (i) Developing and enhancing research and innovation capacities and the uptake of advanced technologies,
SO (ii) Reaping the benefits of digitisation for citizens, companies and governments

The specific objectives under PO1 focus on an innovative and competitive economy. The programme aims at two areas: developing and enhancing research and innovation capacities and the uptake of advanced technologies; and reaping the benefits of digitisation for citizens, companies and governments. The key challenges in this context for the area relate to[8]:

- Regional economies and labour force are sensitive to fluctuations in the international economy, since there are a few large industries and a low-level of local and regional investors
- Local workforce not included in large industrial labour markets – long distances to industrial clusters and R&D institutions from many localities
- Lack of knowledge-intensive business service (KIBS) companies
- Linkage of the main industries in the region to extraction and utilisation of natural resources
- Not fully utilised available digital possibilities – digitalisation as an innovation enabler for the SMEs
- Sparse population and long distances to rural areas, long winters and arctic terrain – challenging to maintain good and stable infrastructure
- Economies of the countries within the Programme area are dominated by SME-s and microenterprises – limited sales market
- Larger percentage of older people than youth in the Programme area
- Difficulties in entrepreneurship development (including training for personnel and managers) due to financial investments that it requires

The assessment of direct and indirect environmental effects is done based on the proposed related types of actions in the programme:

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[8] *According the proposed programme version of May 2021 and the Territorial Analysis version of April 2021*

- Enabling interregional research and development collaboration – industrial hubs and different technological clusters, e.g. arctic construction, modernization of the transportation sector (on land and sea) and space-related development environments.
- Using of shared regional research infrastructures. Examples of cross border areas of R&D: circular economy, performance of materials in Arctic conditions, making the process industry more sustainable, renewable energy sources and distribution, industrial symbiosis, energy efficiency, developing space cross-border monitoring technologies (ice, sea routes, bio etc.), energy storing solutions (hydrogen, batteries etc) and digital solutions.
- Stimulate the creation of a critical mass in the region to develop a labour force with relevant Arctic related skills for the development and implementation of advanced technologies. Establishment of joint field research/expeditions to collect data and create cross border monitoring systems
- Enhance of life-long learning, as a tool in the uptake of advanced technologies. Provision of flexible education programs which will be in accordance with the needs of the business sector.
- Involve and attract young researchers in cross-border activities, as a response to depopulation
- Development of cross-border networks that join business owners and business developers, together with research and innovation institutions. Strengthen the exploitation of applied research in SMEs and/or public sector
- Enhance of cooperation and collaboration to ensure that synergies are reached and that regional priorities on e.g. energy, mining, forestry, fishing and other land use issues are managed efficiently.
- Strengthen and develop indigenous peoples' research, innovation and support systems through cross border and cross sectoral activities.
- Development of methods to keep indigenous and threatened languages and cultural specifities
- Develop modern industries based on local resources (thus diversifying the regional economies) through the uptake of advanced technologies in traditional economic activities (for example reindeer husbandry and fishing)
- Further development of the following R&D areas in the higher education institutes to ensure that natural resources within the Programme area can be utilized in a sustainable way: nature-based economies, responsible tourism and green transformation including smart use of natural resources, and the development of new businesses and entrepreneurship, smart societies.
- Create good remote working possibilities for citizens – especially for remote and small communities
- Encouraging of smart transportation solutions
- Increase of innovation modelling (e.g. remote and e-learning products, modelling of work/living place hybrid solutions)
- Improvement of quality and access to digital public services in health and education, especially in the remote and hard to reach territories (e.g. clusters, VR, usage of virtual twins)
- Develop cross-border collaboration to drive the public sector's digital capacity by using ICT solutions and e-services. Cross border and cross sectoral cooperation between small actors for developing digital platforms, such as VR.
- Support the uptake of new digital tools and solutions for cross-border cooperation (e.g. in e-commerce, e-business, digital innovation hubs), especially for enhancing the competitiveness of the micro, small and medium sized enterprises (MSME). Enhancing of B2B cross-border cooperation for the uptake of technologies related to robotics, Internet of Things (IoT), open data, cyber security, 3D printing, data-analytics.
- Implementation of digital initiatives which will support inclusion of all population groups by both eliminating barriers to access and use and by improving digital skills on individual level, e.g through development of digital hubs.

The assessment of PO1 is given according to the definition given above regarding the colours:

	Climate change		Marine environment (incl. the sea and freshwater system)		Soil and land use		Pollution and waste (incl. chemicals)		Resource efficiency (incl. circular economy - CE)		Ecosystems (incl. flora, fauna, biodiversity and ecosystem services)		Population and health (incl. social inclusion & culture)	
Specific objectives	+	-	+	-	+	-	+	-	+	-	+	-	+	-
1:1 Enhancing research and innovation capacities and the uptake of advanced technologies														
1:2 Reaping the benefits of digitisation for citizens, companies and governments														

Comments to the assessment:

The environmental impacts of the activities regarding **SO1 (i)** - enhancing research and innovation capacities and the uptake of advanced technologies, are highly dependent on the choice of the specific projects that are going to be implemented. The indicative activities proposed are assessed as entailing both risks and positive impacts for the climate. Positive impacts will arise by providing financial support for increased cross-border collaboration between R&D institutions focusing on green technology, and public-private partnerships. The programme will provide financial support for further research and development in areas related to nature-based economies, responsible tourism and smart use of natural resources, and it will contribute to using shared regional research infrastructures to promote circular economy, use of renewable energy sources, energy storing and digital solutions, sustainable materials - specifically for the Arctic area -, etc. The uptake of advanced technologies and the development of skills in arctic issues can create benefits in the form of developing climate change mitigation methods, and implementation of cold technologies (technologies to address challenges and to utilize advantages of cold climate) and sustainable agriculture, etc. all of which create positive climate impacts. However, the climate effects of the program depend on the impact from installing all the necessary infrastructure for the program, and in the way it will operate, as well as the products that will be created by it. There can be an increased energy use for the installation and operation of infrastructure (hubs, equipment for digital solutions), such as the increased energy use for the operation of high-tech computers needed for creation of digital solutions, a possible use of carbon intensive materials for development of energy storage solutions or increased emissions from space-related development. It is therefore important to ensure that the overall possible increase of energy use by all those activities does not exceed the energy savings coming from the smart solutions - the benefits should overweigh the drawbacks. It is though possible that developing energy efficient and smart solutions, as for example smart energy grids, will support the Green transition and significantly reduce GHG emissions. If the programme chooses the right activities and follows up on their climate impact with indicators, the risks of a possible increased energy use from installation and operation of the systems would be minimized, thus the specific objective's impact on climate would be positive. It is important to consider the balance between energy savings from the new technology and the related energy consumption.

Concerning resource efficiency, specific objective 1(i) is assessed to have a positive impact on resource use by promoting circular economy, clean energy, and construction with sustainable materials, suitable for the Arctic area. However, the effects of the programme depend on the impact from the necessary infrastructure for the programme, and on the way it will operate. Promoting innovative businesses for sustainable growth (modern industries based on local resources) will help reduce the extraction and utilisation of natural resources aiding in resource efficiency. The possible increased energy use for the installation and operation of infrastructure can though have negative impacts for energy efficiency but these are considered as minimal in relation to the positive impacts of the programme on resource efficiency.

As far as population and health is concerned, specific objective 1.(i) is assessed to have a positive impact on peoples' health, mainly through the creation of new jobs and enhancing social contacts. The programme will aid in creating value in the area through developing a labour force with knowledge in Arctic related issues. Promoting lifelong learning and involving young researchers will help tackle the depopulation problem in the area and it can lead to increased well-being of the residents in the area. Increased research can provide the foundations for a smarter and greener socio-economic development and creation and use of smart

technologies, approaches that enhance well-being. Financial safety issues can also be named here, as the exposure to shifts in the international market can be minimized through strengthening the collaboration between public-private and R&D sectors in the Programme area.

Another positive impact of this SO is that national economies can be diversified and the indigenous communities' quality of life can be improved in a sustainable way, by developing their research and innovation systems through cross border and cross sectoral activities, and by developing methods for maintaining their languages and cultural heritage. This can be achieved through SO1(i) by promoting innovative methods for reindeer husbandry, which is very important for the whole livelihood of the Saami and is the basis for further developing many other industries, such as food, handicrafts, art and design. However, there are some risks, such as boosting of segregation, if for example, clusters of new environmental technologies are mainly used in the wealthiest urban parts and not in rural areas. Therefore, attention should be paid to the place where activities take place so that everyone has the same opportunities. However, in general, developing and enhancing research and innovation capacities and the uptake of advanced technologies can create multiple advantages for people and their living conditions across the programme area.

Regarding the marine environment, soil and land-use, pollution and waste and ecosystems, the effect of the Programme on those categories cannot easily be defined, because this depends on the specific projects that are going to be applied. An increase in fishing activities and aquaculture could result in a decrease in marine fish resources. The same applies to an increase of agricultural activities, such as dairy breeding, deer breeding and crop production, which could result in unwanted substances entering the marine environment. However, by implementing innovative projects in these areas and by using advanced technologies as the Programme proposes, these problems could be left out. If new infrastructure or new facilities are established in the program's framework, then this can negatively impact soil and land-use consumption and they can cause pollution and waste, depending on whether there are concrete exploitation requirements and concrete requirements for choice of materials and management of spills. On the other hand, research specifically aiming to mitigate climate change, to improve construction techniques, to develop waste management strategies and to enhance the circular economy concept could positively impact soil and land-use, by providing tools for better assessment and management and it could contribute to a reduction of waste through recycling and reusing. However, if the program was to support a project that is subject to review according to Environmental legislation, then an individual review would be required. The environmental assessment of the programme does not apply to individual projects.

The environmental impacts of the activities regarding **SO (ii)** - reaping the benefits of digitisation, are assessed to entail both positive and negative impacts on the climate. The programme area includes many remote and hard to reach areas which are sparsely populated. If efficient and high-quality digital services are provided, transportation needs (and related emissions) for health, education, work, social services etc. can be significantly reduced. Development of smart transportation systems will also help in the reduction of transport-related climate impact. However, the energy demand from digital infrastructure systems needed for the support of block chain technologies, artificial intelligence and virtual reality technologies could create adverse impacts with increased risks for excessive energy use. The climate effects of the programme highly depend on which projects will receive funding within the programme and on how they are going to be implemented. To ensure a positive climate effect, it is important to set requirements for assessing the balance between energy demand for the digital equipment and energy savings of specific projects.

Regarding resource efficiency, amelioration of digital services in the region is assessed to have both positive and negative impacts. Transport needs are going to be reduced and the decreased traffic is going to result in reduced needs for fuels. Achieving a twin (green and digital) transition through the uptake of digitisation will aid in reducing waste and to a transition from linear to circular industrial value chains. However, broadening the sales market for goods and services (with the help of digital tools and solutions) can possibly create an increase in production, which will result in consumption of more resources, if special attention is not paid to resource efficiency and to alternative methods. What is more, the energy demand from digital infrastructure systems needed for the support of block chain technologies, artificial intelligence and virtual reality technologies could result in high energy use. It is therefore important to create an efficient and sustainable

management strategy of the possibly increased production rates after the broadening of SMEs sales market and to assess the balance of energy demand and energy savings of specific projects.

Concerning pollution and waste, amelioration of digital services in the region is assessed to have positive impacts. Transport needs are going to be reduced and the decreased traffic is going to result in fewer particles to the air and pollution in the area. Achieving a twin (green and digital) transition through the uptake of digitisation will aid in reducing waste through provision of modelling services and through an efficient collaboration between sectors, which will prevent excessive waste generation. Digitisation can also aid in creating a tracking system for waste which would improve waste management and would facilitate the identification of harmful substances.

As far as population and health are considered, amelioration of digital services in the region is assessed to have mainly positive impacts on population and health. It includes, however, some threats. One of the main challenges of the Programme area is related to its rural and remote characteristics. Digitisation can aid tackle the problem of isolation of those areas by enriching the social life of the small communities through e.g. online concerts, cultural life and cinemas; by providing e-services for the residents of those remote areas, as for example eHealth, telemedicine, online/distance learning etc.; and by preventing younger generations from migrating to urban areas - thus preventing further depopulation and dominating of aging population in the Programme area. Another aspect that digitisation could impact is the effective integration of indigenous people of the Programme area, who live as nomads - the traditional livelihood can possibly be combined with a modern lifestyle with the help of digital tools as digitisation is the tool that can help re-create traditional processes, in modern ways. Lastly, the economic boost that digitisation could bring with it will ameliorate the quality of life of the people and will create the conditions for further development. However, digitisation entails risks related to personal and cyber security and there is also a risk that some social groups will experience social exclusion as a result of lack of knowledge in digital solutions. Another risk identified is the possible creation of communities that totally operate with digital solutions resulting in a sense of isolation due to lack of physical contacts. There is therefore the need for education and developing understanding on those issues for all societal groups. Special attention should be paid to social inclusion of all groups and to provision of high-quality education for digital services so that all can take part. Provision of physical services apart from digital services should also be ensured in order to create more physical and secure environments.

Regarding the marine environment and soil and land-use, amelioration of digitisation services in the region is assessed to have limited direct consequences on the programme area.

When it comes to ecosystems, it is possible that boosting of the sales market of SMEs through digitisation will create increased industrial activities, which could possibly result in increased risk for emission of pollutants to both the air and the water and which may harm an already bad situation related to biodiversity. The effects depend on the investments made. However, changing industrial activities from traditional processes to innovative digital processes are assessed to create benefits for the ecosystems. Moreover, creating the conditions for people to avoid unsustainable transportation from all remote/rural areas can create significant benefits for the ecosystems. It should, however, be noted that recent research[9] indicates that there is currently sufficient evidence that electromagnetic radiation used e.g. by telecommunication networks causes damage to the biodiversity of insects. Consequently, the infrastructure required for increased digitisation could have negative impacts on insects and consequently entire ecosystems. The proposed activities are assessed to entail risks for ecosystems; therefore, a warning is set up not to impose actions that could impact on the biodiversity or any other environmental goal in the long-term (including cumulative effects). .

PO2 – Greener low-carbon transitioning towards a net zero carbon economy and resilient Europe

SO (iv) Promoting climate change adaptation, and disaster risk prevention, resilience, taking into account eco-system-based approaches,
SO (vii) Enhancing protection and preservation of nature, biodiversity, and green infrastructure, including in urban areas, and reducing all forms of pollution

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[9] (Balmori, 2021) https://www.sciencedirect.com/science/article/abs/pii/S0048969720384461

The specific objectives under PO2 focus on environment. The programme aims at two areas: Promoting climate change adaptation, and disaster risk prevention, resilience, taking into account eco-system-based approaches, and enhancing protection and preservation of nature, biodiversity, and green infrastructure, including in urban areas, and reducing all forms of pollution. The key challenges in this context for the area relate to[10]

- Climate change has notable consequences in the Northern areas of the world
- Vast river systems and water areas exist within the programme area, extreme weather conditions are increased by climate change resulting in e.g. high rainfall and consequent flooding and landslides
- Climate change increases extreme weather conditions including drought resulting in forest fires
- Biodiversity affected by pollution of water, forests and subsoil
- Climate change affects the traditional livelihoods of indigenous people of the area
- River valleys particularly suffering from floods are traditional places for settlements in the programme area
- Permafrost thaw and increased wildfires resulting from climate change may cause coastal erosion, landslides and floods thus threatening Artcic communities, infrastructure and wildlife
- The combination of thawing permafrost and wildfires can release significant amounts of carbon dioxide into the atmosphere further intensifying climate change.
- Infrastructure, transportation, agriculture, hospitality and traditional livelihoods, among others, are sectors foreseen to be impacted by climate change

The assessment of direct and indirect environmental effects is done based on the proposed related type of actions in the programme:

- Supporting actions to minimize the risks of flooding and landslides (cross-border operation, exchange of knowledge and information, promoting innovations in the field of flood control, risk reduction methods for buildings and the society)
- Managing forest fire risks and investing in fire prevention (knowledge and innovation exchange, risk reduction methods and cross-border risk monitoring systems, development and sharing of best practices between regions, actors and countries, as well as development of systems for coordinate training relating to wildfires)
- Building resilience and methods to minimize the risks relating to climate change (developing joint methods that support traditional livelihoods and develop new ones such as tourism in the programme area, involving the youth, civil society, non-governmental organisations and the educational system)
- Developing new cross-border solutions and methods for search and rescue activities based on effective and reliable monitoring (using indigenous knowledge and new digital tools)
- Disaster risk management (mapping of contamination risks and erosion, oil spill preparedness and response, updates of routines to reduce the risk of infections and strategies providing support to vulnerable groups as well as spreading information relating to different risks, use of advanced technologies to predict and mitigate accidents)
- Monitoring, mapping and restoration of sites across the borders of the programme area (e.g. critically degraded sites tundra landscapes and Arctic rivers and islands)
- Joint monitoring, use, protection and management of natural resources (e.g. groundwater, fresh-water, forests and species, development and harmonisation of methods and innovations for ecologically sustainable use, protection and management of natural resources)
- Holistic restoration of damaged ecosystems (common methods and methodology)
- Increasing the knowledge, experience and engagement of communities and civil society regarding environmental awareness and sustainable ways of life (information and knowledge transfer through networking and exchange of best practises between different actors and organisations)
- Development of green infrastructure for contributing to preservation and resilience of biodiversity (development of e.g. fish ladders, wildlife overpasses, small-scale wind turbines, development of

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[10] *According the proposed programme version of May 2021 and the Territorial Analysis version of April 2021*

effective cross-border management and monitoring methods on e.g. decreasing the number and spreading of invasive species and conservation of native species, as well as raising the awareness and understanding of individual's responsibility in spreading of invasive species)

The assessment of PO2 is given according to the definition given above regarding the colours:

	Climate change		Marine environment (incl. the sea and freshwater system)		Soil and land use		Pollution and waste (incl. chemicals)		Resource efficiency (incl. circular economy - CE)		Ecosystems (incl. flora, fauna, biodiversity and ecosystem services)		Population and health (incl. social inclusion & culture)	
Specific objectives	+	-	+	-	+	-	+	-	+	-	+	-	+	-
2:4 Promoting climate change adaptation and disaster risk prevention, resilience, taking into account eco-system-based approaches	+		+		+		+		+		+		+	
2:7 Enhancing protection and preservation of nature, biodiversity and green infrastructure, including urban areas, and reducing all forms of pollution	+		+		+		+		+		+			-

Comments to the assessment:

The proposed programme focuses on key environmental challenges in the region, and from that perspective it has clearly positive impacts on majority of the environmental goals listed above.

Both specific objectives in the PO2 have positive direct impacts on climate and climate impact management. **SO2 (iv)** can positively impact the environment by developing knowledge and experience gained by testing solutions, systems and innovations in the Arctic environment to slow down climate change. This knowledge and experience would be exported to other locations. The programme would involve the youth, civil society, non-governmental organisations and the educational system in order to ensure that knowledge creation remains contemporary. Traditional, indigenous knowledge as well as modern digital tools can be used for developing methods and solutions of adapting society, individuals and enterprises to the changing climate. **SO2 (vii)** can help reduce the load in the stormwater management system, prevent future floods, reduce the urban-island effect and absorb carbon, through promoting green infrastructure. Specific objective 2 (vii) aims to promote an increased level of biodiversity, a better protected nature and contribute to reduced pollution by e.g. increasing the knowledge, experience and engagement of communities and civil society. The programme would further involve the youth, indigenous people and civil society in the exchange of best practices and networking. Therefore, it is assessed to have a positive impact on climate.

When it comes to the marine environment, the actions that will be taken for **SO2 (iv)** are assessed to have a positive impact. The development of strategies for the mitigation of the negative impacts of climate change and for risk prevention will contribute to a cleaner marine environment through the protection of water areas and improved water resource management. Furthermore, promoting climate change adaptation and disaster risk prevention is considered to positively impact the management of floods. Successful flood management can result in decreased pollution to the marine environment as flood waters do not flush pollutants from e.g. industrial sites to the nearby waterbodies or the pollutants are not infiltrated into the ground with flood waters and consequently reach groundwater. **SO2 (vii)** is also assessed to have positive impacts on the marine environment, by enhancing protection and preservation of nature and biodiversity. Green areas, green infrastructure and other ecosystems can store water and purify it from pollutants. Furthermore, the programme would promote joint monitoring of water systems (e.g. groundwater, fresh water) to enhance their protection and management.

Regarding soil and land-use, the consequences that **SO2 (iv) and SO2 (vii)** would have in this category are assessed as positive. The soil could be positively affected by the measures to promote climate change adaptation. Mapping of contamination risks and erosion and improving oil spill preparedness and response are considered to positively affect soil and land-use. However, in the case of new buildings that would

potentially operate as research centres or businesses that work with climate adaptation issues, the land-use could be affected negatively, but this is not directly referred to in the programme. However, if specific projects were to be implemented, conduction of an Environmental Impact Assessment (EIA) would be crucial to avoid adverse environmental consequences. Protection of the nature and biodiversity and enhancing the green infrastructure are also assessed to have positive impacts on soil and land-use. Protection of nature and biodiversity entails reduced land use for other uses and increased land use for green areas. Landscape restoration can be performed as a cross-border activity as sustainable management.

Regarding pollution and waste, by promoting climate change adaptation, risk prevention and disaster resilience, **SO2 (iv)** will most probably have a positive impact on the pollution and waste sector. The development of strategies for the mitigation of the negative impacts of climate change and for risk prevention will contribute to decreased pollution, reduced possibilities for accidents involving hazardous substances and well-timed actions to prevent negative impacts. Moreover, waste will be reduced through measures to optimize resource efficiency in order to better adapt to climate change mitigation measures. Protection of the nature and biodiversity and enhancing the green infrastructure - **SO2 (vii)** - are also assessed to have positive impacts on pollution and waste. Developing green infrastructure and environmental monitoring, mapping and restoration of areas have positive impacts on the level of existing pollution and even larger advantages appear, as green infrastructure has the ability to filter pollution.

When it comes to resource efficiency, **SO2 (iv)** will most probably have a positive impact. The actions of SO2(iv) aim to increase awareness of the climate change impacts and facilitate best practices to mitigate them and prevent risks. Facilitation of actions to mitigate climate change effects and preventing adverse risks could facilitate the shift towards circular economy, by boosting sustainable production and reuse of waste. Furthermore, the programme suggests that water management issues would be addressed as cross-border cooperation. For **SO2 (vii)**, jointly monitoring resources such as groundwater, fresh water, forests and species, and creating methods and innovations for ecologically sustainable use, protection and management of natural resources and their harmonization in e.g. mining, agriculture, forestry and fishing industries are considered to be beneficial for resource efficiency. Consequently, **SO2(vii)** is assessed to have a direct positive impact on resource efficiency.

Regarding ecosystems, preventing risks for pollution and disasters (like forest fire) creates a safe environment for flora and fauna, enhancing biodiversity. The **SO2 (iv)** is assessed to have positive impacts on ecosystems by prioritizing investing in fire prevention and management of risk of wildfires. Best practices on fire risk management could be developed and shared between regions, actors and countries to increase the spread of such best practices. Developing effectiveness of prevention, preparedness and response to wildfires is assessed to have a positive impact on ecosystems. Preventing risks for wildfires creates a safer environment for flora and fauna, enhancing biodiversity. In the case of new buildings that will operate as research or educational centres, ecosystems can be negatively affected through the destruction of natural habitats. However, these effects would need to be judged by the individual projects and not by the programme. For **SO2 (vii)**, a well-developed green infrastructure (e.g. fish ladders, wildlife overpasses, small-scale wind turbines) can have positive impacts on the preservation and resilience of biodiversity as different species have the possibility to spread and use the landscape unhindered. The programme aims to promote the restauration of damaged ecosystems with a holistic approach. Endangered, sensitive biotopes and cultural landscapes included on the World Conservation Union (IUCN) Red List of threatened species would be especially protected. Furthermore, the programme aims to raise awareness of e.g. invasive species and in-situ protection activities. Lastly, with **SO2 (vii)**, different species of fauna will have the possibility to spread and use the landscape unhindered, if a well-preserved green infrastructure is provided. Biodiversity thrives in well protected nature areas and in areas where nature is enhanced. Consequently, **SO2(vii)** is assessed to have an overall positive impact on ecosystems. However, any physical development project is likely to damage ecosystems located directly at the site of development, but these effects would need to be assessed by the individual projects through separate Environmental Impact Assessments and not by the programme. It should be ensured that where ecosystems are possibly affected, mitigation measures and/or compensation actions are in place, to avoid adverse impacts.

Finally, for population and health, it can be noted that while **SO2 (iv)** creates positive impacts to population and health, **SO2 (vii)** entails risks. These risks originate from the fact that nature conservation of large areas can entail an obstacle for strengthening tourism, through diminishing the land available for construction of touristic residencies and facilities. This would lead to financial losses for the area and for businesses, in

particular. However, there are also positive impacts, such as temperature control, absorbing of carbon emissions, purifying the air and helping in reducing noise from urban environments. All those create positive effects to people's health and to their social life, by giving them more opportunities for recreation and social interaction. A diversified and clean natural environment attracts tourists, contributes to enhancing the local identity and is a part of the culture heritage. It is therefore needed that a balance is created between the increase of tourism and the protection of nature. Conduction of environmental impact assessments that assess socioeconomic factors in addition to environmental factors could be very beneficial in this context.

As far as the positive impacts from the indicative actions of **SO2 (iv)** are concerned, risk prevention and disaster resilience measures can create a sense of safety among residents. Health and social problems are directly linked to environmental problems, including environmental pollution and physical disasters. Building resilience and methods for risks connected to climate change are particularly relevant to remote communities such as those located in the programme area. The programme develops joint methods that support traditional and new livelihoods in a sustainable way. Furthermore, the programme suggests developing search and rescue activities based on effective and reliable monitoring and supporting actions on minimizing the risks of flooding and landslides in the programme area. Exchange of knowledge and information, innovations in the field of flood control, risk reduction methods in buildings and in the society as a whole, as well as common risk monitoring systems are suggested. Consequently, **SO2(iv)** is assessed to have positive impacts on population and health. Low-carbon energy solutions combined with smart solutions for climate change mitigation will create the prerequisites for a healthier physical environment which will respect the ecosystems and thus people's health. Moreover, a turn to more sustainable agriculture and food production will provide residents with healthier food. Preservation of a safe natural environment creates also social benefits in the form of safety, but also by enhancing the area's cultural -historical value, by ensuring that cultural sites will be well maintained and that nature (which is a part of the area's legacy) will be kept safe and healthy.

PO4 – A more social Europe implementing the European Pillar of Social Rights

SO (vi) Enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation

The specific objective focuses on the facilitation of a more social Europe. The programme aims at enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation. The key challenges in this context for the area relate to[11]

- Re-establishing the relations, collaboration and communication across the borders within the tourism and culture sector in the aftermath of closed borders due to the global covid-19 pandemic. (Significant decrease in international tourism between 2020-2021)
- Keeping a balance between the economics of tourism and sustainability of business models – especially when it comes to nature-related tourism
- Demographic challenge – ageing population, depopulation in smaller communities and outmigration to cities
- Rural and remote conditions in the Programme area
- Obstacles in the tourism sector related to availability in transportation and visa handling procedures in the border crossings between Russia and Nordic countries.
- Lack of inclusion of vulnerable groups in working life (push of indigenous people – especially young ones- out of the traditional living areas in search for employment)
- Climate change's negative impact on reindeer husbandry

The assessment of direct and indirect environmental effects is done based on the proposed related types of actions in the programme:

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[11] *According the proposed programme version of May 2021 and the Territorial Analysis version of April 2021*

- Sustainable tourism development – recovery and re-establishing cross-border relationships – use of digital solutions to deliver high-quality experiences for tourists
- Cross-border and cross-sectorial actions to revitalise the intangible cultural heritage, and to make the Kolarctic region more viable and attractive. Priority in activities that promote innovation in the tourism sector and create new cross-border travel concepts and services.
- Increase and improve the cross-border mobility and accessibility of the area
- Cross-border and cross-sectoral collaboration, using digitalisation for recovery from Covid-19 and for further development of the cultural and creative industry (developing regional cultural attractiveness and readiness for internationalization).
- Develop new sustainable industries in the creative field (art/cultural production, festival industry), including an indigenous dimension and all intangible cultural heritage in the Programme area.
- Preserve, revitalise, and develop remote communities with a strong intangible cultural heritage, by using cross-border networking to increase tourism, support SMEs and increase involvement of local communities into cross-border activities.
- Creation of joint cultural products through cross-sectoral development, such as joint exhibitions, joint product development, joint art platforms and networks. Development of networks for dissemination, competence exchange and joint, cross-border promotion of the regional culture to the international arena.
- Protection and promotion of endangered indigenous languages, livelihoods and lifestyles and support their visibility and their contribution to local-economy in cross-border areas.

The assessment of PO4 is given according to the definition given above regarding the colours:

	Climate change		Marine environment (incl. the sea and freshwater system)		Soil and land use		Pollution and waste (incl. chemicals)		Resource efficiency (incl. circular economy - CE)		Ecosystems (incl. flora, fauna, biodiversity and ecosystem services)		Population and health (incl. social inclusion & culture)	
Specific objectives	+	-	+	-	+	-	+	-	+	-	+	-	+	-
4:6 Enhancing the role of culture and sustainable tourism in economic development, social inclusion and social innovation														

Comments to the assessment:

The impact on the environmental goals of this policy objective is mainly assessed as entailing risks for negative impacts. Specific objective 4(vi) will support the development of new industries in the creative field and it aims to attracting more tourists in the area. It will also contribute to an increase in cross-mobility and accessibility of the area. All these actions can result in rise of emissions for industry and infrastructure development and the attraction of more tourists can create needs for even higher mobility and respective emissions. On the other hand, the programme is promoting a sustainable and smart nature tourism, based on a diverse selection of products and services, which can reduce the threats to biodiversity from recreational activities. However, the impacts highly depend on the specific projects that are going to be implemented and therefore, overall, it can be said that there is a risk for negative impacts on the climate from the Programme's actions. It is therefore recommended that specific infrastructure projects that do not have environmental permit are not granted and that ways are considered to lower the greenhouse gas emissions related to the potential increased mobility due to tourism in the area.

Regarding soil and land-use as well as pollution and waste, the impacts of SO4(vi) highly depend on the specific projects that are going to be implemented. However, an increase in the touristic activity, the development of infrastructure for better mobility and for creative industries and any additional infrastructure needed for the increased number of visitors can result in increased land-use exploitation, growing traffic and increased toxic substances. Moreover, strengthening the agricultural and reindeer husbandry sectors to maintain cultural values can lead to adverse impacts for soil and land-use can result in increased chemicals use and spills from industry. Therefore, careful choice of implemented projects is required, as well as requirements for organic agricultural production and animal breeding.

Concerning resource efficiency, focusing on sustainability in tourism development will enable a choice and development of business models which will adapt to the challenges related to climate change, such as low snow/ice waters, protection of fish population etc. However, all previously mentioned activities can result in increased energy use for the development and operation of new cultural industries, new infrastructure and increased needs of the population and the industry in terms of resources.

Regarding the impact of SO4(vi) on ecosystems, since nature and culture based tourism are the areas that present the greatest interest, and since the arctic nature and biodiversity are crucial for the development of the economic activities of the indigenous peoples' culture, it is important to maintain and protect the ecosystems in the area for achieving the SO. Special attention should also be paid to the protection of the endangered, sensitive biotopes and cultural landscapes that are included in the World Conservation Union (IUCN) Red List of threatened species. However, since these activities are not directly mentioned in the types of actions that are going to be considered for the programme, and since challenges and risks exist through, for example, increased mobility that can negatively impact biodiversity, it is assessed that overall the SO (vi) entails risks for negative impact on the ecosystems. Careful choice of projects and actions are needed that will aid in the protection of ecosystem services. EIA for specific projects that could affect the ecosystems with choice of mitigation measures, compensation actions and/or alternatives that would not affect flora, fauna and biodiversity are recommended.

Finally, SO4(vi) will promote a sustainable touristic development, delivering high-quality experiences for tourists and further developing the cultural and creative industry of the area. This means that both the economic and the cultural sector will be advanced creating benefits for all residents and specifically for the indigenous people who depend on these cultural and creative areas. Boosting cultural activities using digitalisation can create value for all Programme areas and prevent isolation and loss of tradition. Improving cross-border mobility and accessibility in the area will not only stimulate the competitiveness of the tourism sector but will also help residents, as there are many remote areas within the Programme area, dependent on a network of accessibility. Moreover, SO4(vi) will promote the diversity of cultures through strengthening the activities of indigenous people, preserving and revitalising remote communities with strong intangible cultural heritage and revitalizing the indigenous languages. Social development with culture support (arts, habits, traditions, etc.) increases the sense of belonging to the community and boosts the social identity. The economy of the Programme area will be strengthened, and well-being of residents will be ameliorated. Using artificial intelligence and easily visible cultural sector through digitalisation, people's creativity and cohesion in the community can be ameliorated and preconditions for the development of a future common cultural heritage can be created. However, there is a risk for isolation/neglection of areas which lack touristic interest and therefore special attention should be paid to considering the places where activities will be placed, to avoid segregation.

ISO 1 – Better governance

SO (iii) People-to-people action for increased trust

The specific objective focuses on people-to people increased trust. The key challenges in this context for the area relate to[12]:

- International borders closed due to the pandemic
- Re-establishment of cross-border relations in post-COVID times also outside of tourism and culture section
- Weakened mutual understanding of shared lives within the programme area
- The lack of cooperation in developing and implementing of smart specialisation strategies
- Cross-border transport infrastructure planning (e.g. lack of cross-border air traffic connections)
- The digital gap (access to and capacity to use the digital resources) in societies and especially in SMEs
- The use of existing public services and solutions should be made more widespread
- Legal and administrative barriers and language barriers

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[12] *According the proposed programme version of May 2021 and the Territorial Analysis version of April 2021*

- Economic disparities within the Programme area and the regions
- Obstacles stemming from different national legislations, incompatible administrative processes, or the lack of common territorial planning

The assessment of direct and indirect environmental effects is done base on the proposed related types of actions in the programme:

- Trust building (projects involving youth and children, sports, indigenous people, education, social inclusion, health services etc.)
- Continued support of long-term relations between educational and research institutions, public bodies, NGOs and business actors
- Empowering local communities through socio-economic integration and inclusion activities
- Development of systematic cross-border programmes and schemes to enable citizens' collaboration (e.g. sports, culture, art, music, municipality associations, giving the possibility to be part of international co-operation and mutual learning e.g. in summer schools)
- Promotion of volunteering actions and possibilities to open new collaboration possibilities
- Supporting actions enhancing participation of citizens in creating living environments (sharing practices and learning, participation in local decision-making processes)
- Building tolerance through cooperation with the youth
- Investing in young people and their cross-border operation
- Testing and piloting different digital and non-digital approaches and tools to connect people

The assessment of the Interreg specific objective is given according to the definition given above regarding the colours:

Policy objectives	Specific objectives	Climate change		Marine environment (incl. the sea and freshwater system)		Soil and land use		Pollution and waste (incl. chemicals)		Resource efficiency (incl. circular economy - CE)		Ecosystems (incl. flora, fauna, biodiversity and ecosystem services)		Population and health (incl. social inclusion & culture)	
		+	-	+	-	+	-	+	-	+	-	+	-	+	-
ISO 1: Better Governance	ISO 1:3: People-to people action for increased trust														

Comments to the assessment:

This objective focuses on increasing trust through people-to-people actions. Enhanced cross-border contacts and mutual understanding, sharing of know-how, as well as increasing trust and respect between the people within the programme aera can aid in the development of joint plans and strategies, needed for the implementation of all other Policy Objectives. People-to people activities can create better prerequisites for the strengthening of grassroots activity and building capacity by investing in small-scale focused operations and by paying attention to local initiatives.

Digital solutions will also improve the communication and may reduce environmental footprints in the region. Most actions related to this part of the programme are assessed to not have a significant impact. However, there is a significant positive impact for population and health and some identified risks in categories "soil and land-use" and "ecosystems". Planning for activities that will boost collaboration and participation can require land-use exploitation to house these activities and ecosystems could be affected by those. Concerning all other categories, possible scenarios related to an increased trust and people-to people connections can be linked to increased mobility and thus increased GHG emissions and risk for spills both on the nature and the marine environment. However, digitisation could prevent increased travel needs for meetings and for ensuring collaboration and infrastructure developments. Increased trust could help in the creation of cross-border waste collection networks, if legislation allows such activities. If waste can be collected from a wider area can more efficient management and treatment systems be implemented resulting in lower environmental impacts relating to waste.

5.3 Programme proposal compared to alternatives

Consequences of ZERO alternative

The zero alternative describes environmental conditions and the probable development of the environment in a given future if no program is implemented. The zero alternative also takes into account the measures and the change that can be expected to be implemented even if no new programme is adopted.

Developing a future scenario for the region's environmental conditions without the programme being implemented contains major uncertainties. There are a number of different parameters that the programme does not control and that can affect development in the region in various ways, both economically, socially and environmentally.

For the region, this means that greenhouse gas emissions will not decrease to the extent required to achieve international climate goals, that water quality in the marine environment and in lakes and watercourses will not have a level that ensures biodiversity and human health, and that biodiversity will also continue to be depleted. Furthermore, the landscape image and the cultural environment are judged to be negatively affected by various activities. The presence of toxic substances will not fall to acceptable levels, and cities in the region will continue to have air quality problems. In the zero alternative, the region is also judged to continue to have inhabitants who experience exclusion and an uncertain social and / or economic situation.

The key environmental challenges for the involved countries are in all cases climate change related issues, but also

Finland:
- Biodiversity losses due to climate change;
- The risk of severe flooding is increased in the entire Barents area

Sweden:
- Surface water may contain high levels of humus and other turbid particles and groundwater often contain iron and manganese
- Biodiversity losses due to climate change;
- The risk of severe flooding is increased in the entire Barents area

Norway:
- Biodiversity losses (destroyed or divided habitats for animals and plants) due to climate change;
- The risk of severe flooding is increased in the entire Barents area

Russia:
- The risk of severe flooding is increased in the entire Barents area
- Depreciation of water supply networks and facilities
- Biodiversity losses

Looking at the chapter "Existing environmental problems and trends", we can conclude that major challenges differ in the four countries, but if major and significant challenges are combined, all countries face many similar challenges. For all countries common major and significant challenges appear in goals **2, 12, 13, 14, 15** i.e. Zero hunger, Responsible consumption and production, Climate actions, Life below water, Life on land respectively. The proposed programme for Kolarctic 2021-2027 is clearly focusing on several of the above common challenges, pointing to a clear positive effect of running the programme compared to the zero alternative.

In conclusion, the Zero alternative can be summarised as follows:

Positive consequences for the Environment	A number of political decisions in each country point to initiatives that will reduce environmental effects towards the goals set for each country.
Negative consequences for the Environment	All indications show that most of the goals will not be achieved, which means that a program such as the Kolarctic Programme will increase the pace of implementing measures that can contribute to less negative consequences. Without programs, things go slower.

Consequences of the Environmental Alternative

One way to create an Environmental Alternative is to re-prioritize investment priorities. Program areas (Policy Objectives - PO) contribute to varying degrees to the environmental goals. If you only study the green, yellow, and red markings, you will find that PO2 generally have a greater positive impact on the environmental goals compared to the other policy objectives. In the proposed program, it is still unclear what the investment profile will be.

An environmental alternative will then be to prioritize away the initiatives that have a high risk of contributing negatively to the environment. Note that this is partly a speculative reasoning, but also an input to the design of the program.

We assess e.g., the possibility of not financing any projects that contribute to increased mobility (related to tourism or to increased industrial activities), without setting requirements for sustainable and climate resilient solutions. These requirements could be for example to introduce measures to avoid absorption of toxins and other pollutants in the groundwater, to manage ships' wastes and possible accidents, to control the amount of increased traffic and thus emissions that the project is going to cause, and to require for compensation actions for the negatively affected ecosystem (e.g. with provision of specific wildlife corridors, wetland areas, etc.). Other requirements can be related to initial assessments on the balance between energy requirements and energy savings from using of digitisation, as well as EIAs (Environmental Impact Assessments) to avoid financing projects that would eventually result in negative environmental impacts. That is, certain business policy goals are partly set lower in favour of environmental policy goals.
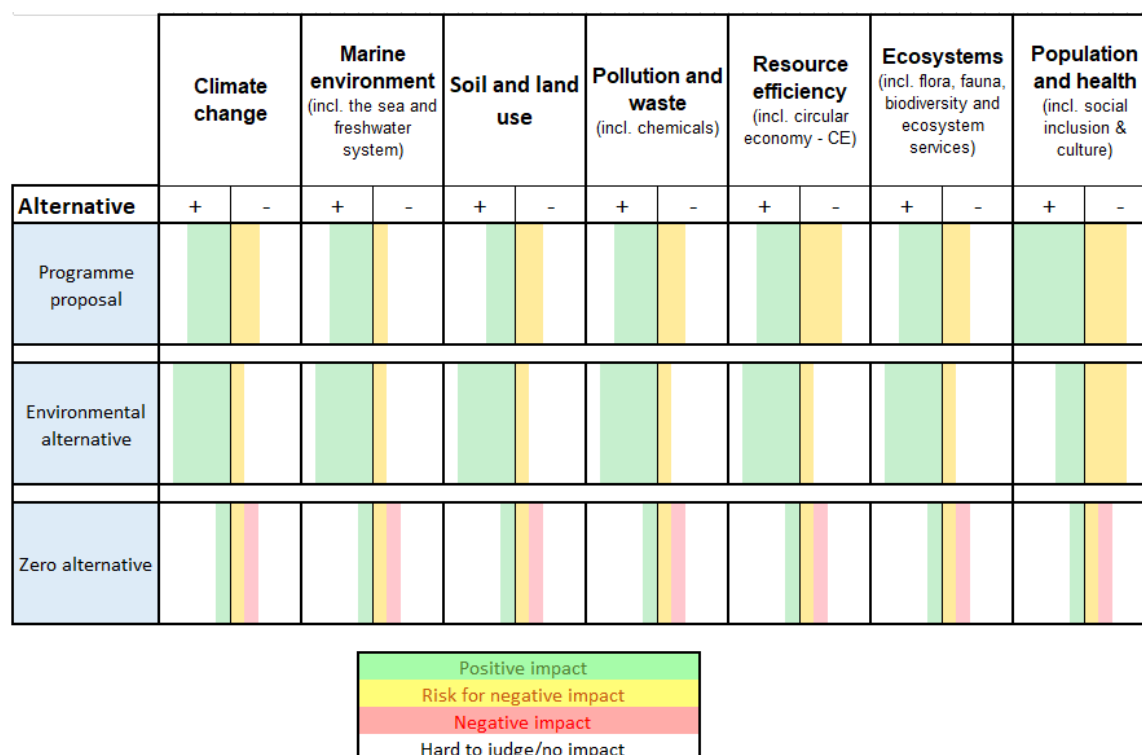
Aspects such as biodiversity are demonstrably a problem for all countries and avoiding interventions in nature that harm this can be prioritized away - either directly in the program, or through strict criteria for project support. Interventions in nature such as major infrastructural initiatives can e.g. not be selected.

Effects on the population and health are generally positive through cross-border measures, but otherwise contribute to a lesser extent to other environmental goals.

Positive consequences	Increased focus on the initiatives that contribute positively to the environment is, of course, positive for the environment.
Negative consequences	The negative consequences of this reasoning are that cross-border cooperation has an environmental policy focus, while other policy goals are given lower priority.

Comparing the Alternatives with the Programme Proposal

If we compare the three alternatives: Programme proposal, Environmental alternative and Zero alternative, we come to the following visualisation:

Alternative	Climate change		Marine environment (incl. the sea and freshwater system)		Soil and land use		Pollution and waste (incl. chemicals)		Resource efficiency (incl. circular economy - CE)		Ecosystems (incl. flora, fauna, biodiversity and ecosystem services)		Population and health (incl. social inclusion & culture)	
	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Programme proposal														
Environmental alternative														
Zero alternative														

Legend:
- Positive impact (green)
- Risk for negative impact (yellow)
- Negative impact (red)
- Hard to judge/no impact (white)

From the figure it is clear that the Environmental alternative is considered best for the environment, which naturally should be the case. Still, it is the assessment group's view that the Environmental alternative as a whole, will be less effective in the long term to contribute to the future cohesion policy within the EU and to fulfil the overall purpose of the Interreg programmes. In conclusion, taking all the objectives related to the establishment of the programme into account, such as cross-border collaboration and business development, the proposed Programme is considered to be the preferred alternative. However, there are amelioration possibilities for the proposed Programme. Conducting Environmental Impact Assessments (EIA) when selecting among specific projects, as well as when performing actions during the implementation period, could provide the opportunities to implement projects in the best possible way.

5.4 Cumulative and Synergetic effects

The most devastating environmental effects are not normally caused by single direct environmental effects from an individual project but by the combination of individually small effects from a number of projects. The environmental assessment therefore includes an assessment of cumulative effects. The cumulative environmental effects caused by the aggregation of past activities, ongoing activities and activities in the foreseeable future within the geographical area affected by the program are related to consequences for the natural and aquatic environment, with the risk of significant impact on biodiversity.

The positive and negative consequences that a cross-border collaboration would have - based on the action proposals that we have read - are described in the respective areas above.

Measures that have positive or negative effects on the climate and the natural/aquatic environment generally have a cross-border effect. The climate effect is global and affects / benefits everyone. The geographical area is largely composed of water and sea. Efforts that improve the aquatic environment in a country contribute to positive effects in the neighbouring country; directly or indirectly.

Effects on land use, as well as effects on cultural environments, are generally linked to the places where investments take place, which makes them more regional / national than border regional.

Biodiversity is generally an environmental challenge for all countries, so the development of investments in initiatives that create positive feedback on this is important. This applies to aspects linked to transport corridors, increased tourism or labour travels - to take a few examples. Cross-border learning can make a positive contribution to this goal.

Increased collaboration between people in the two countries is generally positively linked to the population and environmental health. It also creates greater conditions for diversity and inclusive aspects. Cross-border measures linked to the population's health create the conditions for positive effects on related environmental goals.

5.5 Mitigation of potential negative environmental effects

The high level of abstraction of this type of programme, where projects and activities are not determined, makes it difficult to do a quantitative and detailed assessment of the potential effects from the programme. The direct negative environmental effects that can be identified relate mainly to potential resource and energy usage. Also, both activities and projects will use transportation means. Enhancing growth and competitiveness of SMEs is recommended to have a clear focus on eco-innovations, clean tech, green procurement, and circular economy to mitigate potential negative effects.

Also, future projects and activities funded by the programme must aim to ensure that no adverse effects to the important environmental objectives are supported by the Kolarctic Programme (even if the direct impacts will occur in the long run). These potential negative effects must be considered while exchanging respective experiences and practices or while strengthening the implementation of regional programmes in these areas.

The character and the management of this kind of regional programme requires travelling of partners, representatives of member countries, and programme management. It is the overall purpose of the programme to promote prosperity while connecting the region, and to provide capacity development by interregional cooperation activities. Emission of greenhouse gases, air pollution and noise are the most significant environmental issues related to this activity. However, the use of digital meetings has been established as a new norm, that hopefully will continue in the future. It is recommended to keep using digital meetings in order to mitigate negative impact from travelling with fossil fuelled vehicles.

6. RECOMMENDATIONS FOR THE PROGRAMME

Recommendations for development of the programme:

- Secure the set of requirements and criteria for project support. It is the focus of the individual projects that determines the environmental effect. The criteria should ensure that environmental risks are minimized by making efficient choices, assessments and monitoring. The requirements should be noted in the description of the program, so that these are integrated in the support criteria. This means that the criteria must also capture consequences in the longer term than the program period.

- Prioritization of funds in the program between PO1, 2, 4, SO and ISO1 also has an effect on whether environmental goals can be reached or not. Even if there is quite a lot of money in the program, it should be considered whether there is time to carry out all the different activities included in the program. There are four areas with somewhat different types of actors. The opportunity to create positive effects on the environment also depends on the size of the effort and the time available. Is there enough time? Is the money enough for everything to be achieved?

- Ensure a structured and continuous follow-up of the program and its projects, to avoid negative cumulative/synergistic environmental effects of the program.

7. PROPOSED MONITORING MEASURES

An environmental impact statement shall contain an account of the measures planned for follow-up and monitoring of the significant environmental impact that the implementation of the plan or program entails. There are also requirements to report these measures either in the decision to adopt the plan or programme, or in a separate document in connection with the decision.

Follow-up and monitoring can be seen as part of the process of environmental assessment. When planning the evaluation, it is primarily the significant environmental impact that is to be monitored. How extensive and detailed the follow-up needs to be depends, among other things, on how environmentally damaging the implementation of a plan or program can be assumed to be. In cases where the environmental assessment process has been able to contribute to a minimized environmental impact, the need for follow-up is generally less than if the plan has not been able to be adapted to avoid environmental impact. However, there is always a need to follow up and monitor any unforeseen environmental impact that the implementation of the plan or program may lead to.

8. REFERENCES

EU Directive 2001/42 / EC - https://ec.europa.eu/environment/eia/sea-legalcontext.htm

UN Sustainable Development Report - https://www.un.org/sustainabledevelopment/progress-report/

Kolarctic Programme proposal, version of May 2021

Kolarctic 2021-2027 Territorial Analysis, version of April 2021

EC, Environment, 2020. https://ec.europa.eu/environment/eia/sea-legalcontext.htm

EU's Biodiversity Strategy 2030, https://ec.europa.eu/environment/strategy/biodiversity-strategy-2030_sv

Appendix

A. Comments and actions related to public consultation on the scope of the environmental report:

Actors that answered to consultation but did not have any comments on the scope of the report:

Swedish Transport Administration: The scope is right regarding geography boundary and timescale. The included environmental issues that can cause a significant environmental impact are relevant. There are no environmental issues not relevant to the environmental assessment with regards to the focus of the programme and the included environmental objectives are relevant. The zero alternative seems reasonable and the other alternative to the programme has been chosen correctly.

Arbetsförmedlingen, the Swedish Public Employment Service: *"Arbetsförmedlingen agrees on the suggested scope. Environmental issues are not part of our area of expertise and it is therefore difficult for us to comment on. Arbetsförmedlingen, can, however, enhance the project and contribute to the Kolarctic programme in our area of expertise i.e. labour market and skills supply. We welcome that other strategies and frameworks have been considered in the work."*

B. List of contacted actors for consultation on the environmental report (the ones that responded are highlighted in blue)
C. Comments and actions related to public consultation on the environmental report