



**OPPORTUNITIES AND CHALLENGES IN THE
AFTERMATH OF CHANGING DYNAMICS IN THE
ARCTIC REGION: AN ASSESSMENT ON ENERGY
AND ENVIRONMENTAL FRAMEWORKS**

ŞEBNEM ALTINCI

Master's Thesis

Graduate School
Izmir University of Economics

Izmir

2021

**OPPORTUNITIES AND CHALLENGES IN THE
AFTERMATH OF CHANGING DYNAMICS IN THE
ARCTIC REGION: AN ASSESSMENT ON ENERGY
AND ENVIRONMENTAL FRAMEWORKS**

ŞEBNEM ALTINCI

Master's Thesis

A Thesis Submitted to
The Graduate School of Izmir University of Economics
Master's Program in Sustainable Energy

Izmir
2021

ABSTRACT

OPPORTUNITIES AND CHALLENGES IN THE AFTERMATH OF CHANGING DYNAMICS IN THE ARCTIC REGION: AN ASSESSMENT ON ENERGY AND ENVIRONMENTAL FRAMEWORKS

Altıncı, Şebnem

Master's Program in Sustainable Energy

Advisor: Prof. Dr. Mehmet Efe BİRESSELİOĞLU

July, 2021

Although the Arctic Region was an area that was difficult to access in the past, as a result of the effects of global warming, the ice cover has decreased and the region become more accessible. The easiness of access to the region and the emergence of several economic opportunities in the region attract the attention of Arctic and non-Arctic states to the region. The main opportunities emerging as a result of climate change in the region can be listed as rich hydrocarbon reserves, mineral resources, formation of Arctic maritime routes, tourism, and fishery. However, in addition to these opportunities, some difficulties also arise due to climate change and increased human activities in the region. Environmental pollution, the risk of oil spills, the traditional lifestyle of local peoples, and the disputes between Arctic countries related to the exclusive economic zones are among these challenges. When the opportunities and challenges created by the changing dynamics are evaluated, it is concluded that the opportunities in the field of energy and environmental problems are related to each

other. This study aims to shed light on the areas that need to be prioritized by identifying the opportunities and challenges that actors who want to be included in the Arctic Region may encounter in the field of energy and environment. Semi-structured in-depth interviews with 10 experts from Arctic and non-Arctic countries were analysed in order to identify opportunities and challenges in the fields of energy and environment. In order to validate and test the accuracy of the interviews, a literature review and strategy documents of the Arctic Council member and observer countries were used and multiple method triangulation was applied. With the final results obtained by the triangulation, opportunities and challenges in the field of energy and environment were revealed, and the areas that should be prioritized were determined. Based on these areas, policy recommendations have been made for countries that want to be engaged to the Arctic Region.

Keywords: Arctic Region, Energy, Environment, In-depth Interviews, Triangulation.

ÖZET

ARKTİK BÖLGESİ'NDE DEĞİŞEN DİNAMİKLER SONUCUNDA OLUŞAN FIRSATLAR VE ZORLUKLAR: ENERJİ VE ÇEVRE ALANINDA BİR DEĞERLENDİRME

Altıncı, Şebnem

Sürdürülebilir Enerji Yüksek Lisans Programı

Tez Danışmanı: Prof. Dr. Mehmet Efe BİRESSELİOĞLU

Temmuz, 2021

Arktik Bölgesi geçmişte erişilmesi zor bir alan olsa da küresel ısınmanın yarattığı etkiler sonucunda buz örtüsü azalmış ve bölge daha kolay ulaşılabilir bir hale gelmiştir. Bölgeye erişimin kolaylaşması ve bölgede birtakım ekonomik fırsatların ortaya çıkması Arktik ve Arktik dışı devletlerin ilgisini bölgeye çekmektedir. Bölgede iklim değişikliği sonucu ortaya çıkan başlıca fırsatlar zengin hidrokarbon rezervleri, mineral kaynaklar, Arktik deniz rotalarının oluşması, turizm ve balıkçılık olarak sıralanabilir. Ancak, bu fırsatların yanında bölgede iklim değişikliği ve insan faaliyetlerinin artması kaynaklı birtakım zorluklar da oluşmaktadır. Çevresel kirlilik, petrol sızıntısı riski, yerel halkların geleneksel yaşam tarzının risk altında olması ve Arktik ülkelerinin münhasır ekonomik bölge çatışmaları bu zorluklar arasında yer almaktadır. Değişen dinamiklerin oluşturduğu fırsatlar ve zorluklar değerlendirildiğinde enerji alanındaki fırsatlar ve çevresel problemlerin birbiriyle ilişki olduğu sonucuna varılmıştır. Bu çalışma, Arktik Bölgesine dâhil olmak isteyen aktörlerin enerji ve çevre alanında

karşılaşabileceği fırsatları ve zorlukları belirleyerek, önceliklendirilmesi gereken alanlara ışık tutmayı amaçlamaktadır. Enerji ve çevre alanlarına yönelik fırsat ve zorlukları belirlemek adına Arktik ve Arktik dışı ülkelerden alanında uzman 10 paydaş ile gerçekleştirilen yarı yapılandırılmış derinlemesine mülakatlar analiz edilmiştir. Yapılan mülakatların doğruluğunu test etmek adına literatür taraması ve Arktik Konseyi üye ve gözlemci ülkelerinin strateji dokümanları ile çoktu yöntem üçgenlemesi (multiple method triangulation) gerçekleştirilmiştir. Yapılan üçgenleme ile elde edilen nihai sonuçlar ile enerji ve çevre alanında oluşan fırsatlar ve zorluklar ortaya konmuş, önceliklendirilmesi gereken alanlar belirlenmiştir. Bu alanlara istinaden, Arktik Bölgesi'ne dâhil olmak isteyen ülkeler için politika önerileri yapılmıştır.

Anahtar kelimeler: Arktik Bölgesi, Enerji, Çevre, Mülakat, Üçgenleme.



To My Family

ACKNOWLEDGMENTS

I cannot express enough thanks to my supervisor Prof. Dr. Mehmet Efe BİRESSELİOĞLU for his faith and continued encouragement throughout the research. I offer my sincere appreciation for the opportunities that he created for my academic life. At the same time, I would like to express my gratitude to another department member, Assoc. Prof. Dr. Muhittin Hakan DEMİR, for his valuable support and guidance. I would like to thank my dear colleague, Berfu SOLAK, for all her help and patiently answering all my questions. Also, I would like to thank my mother, Ahsen AKSIN, for her unconditional love and support. And to my father, Ahmet Uğur ALTINCI, I offer sincere thanks for his priceless support in my life.



TABLE OF CONTENTS

ABSTRACT	iii
ÖZET	v
ACKNOWLEDGMENTS.....	viii
TABLE OF CONTENTS.....	ix
LIST OF FIGURES	xi
LIST OF TABLES.....	xii
CHAPTER 1: INTRODUCTION.....	1
1.1. Introduction.....	1
CHAPTER 2: LITERATURE REVIEW	4
2.1. Literature Review	4
CHAPTER 3: METHODOLOGICAL FRAMEWORK.....	10
3.1. Methodology.....	10
CHAPTER 4: UNDERSTANDING THE DYNAMICS OF THE ARCTIC REGION.....	15
4.1. Arctic Region.....	15
4.1.1. Dynamics in the Arctic Region	15
4.1.2. Potential Future of the Arctic Region in the Light of Neorealism.....	19
4.1.3. Arctic Governance	21
4.1.4. Energy.....	22
4.1.4.1. Arctic Energy Resources	22
4.1.4.2. Borders and Political Uncertainties	24
4.1.5. Environment.....	25
4.1.6. Strategy Documents of Countries	27
4.1.6.1. Arctic Council Member Countries' Strategies.....	27
4.1.6.1.1. Canada	27
4.1.6.1.2. The Kingdom of Denmark	28
4.1.6.1.3. Finland	29
4.1.6.1.4. Iceland.....	29
4.1.6.1.5. Norway	30
4.1.6.1.6. The Russian Federation.....	30
4.1.6.1.7. Sweden.....	31
4.1.6.1.8. The United States	31

4.1.6.2. <i>Observers</i>	34
CHAPTER 5: SCRUTINIZING THE ENERGY AND ENVIRONMENT RELATED ASPECTS IN THE ARCTIC REGION: WHAT ARE THE PRIORITIES?.....	40
5.1. <i>Analysis and Findings</i>	40
5.1.1. <i>Energy</i>	40
5.1.1.1. <i>Natural Resources of the Arctic Region</i>	40
5.1.1.2. <i>Renewable Energy Potential of the Region</i>	41
5.1.1.3. <i>Technological and Logistical Challenges of Producing Oil and Gas in the Arctic</i>	42
5.1.1.4. <i>Exclusive Economic Zone Conflicts and Lack of International Framework</i>	43
5.1.1.5. <i>Disputes Over Svalbard</i>	45
5.1.1.6. <i>Oil and Natural Gas Will Maintain Its Importance</i>	46
5.1.2. <i>Environment</i>	47
5.1.2.1. <i>The Effects of the Changes in the Arctic Region on the Global Climate</i>	47
5.1.2.2. <i>Sustainability Problem Arising from Emerging Opportunities in the Region</i>	48
5.1.2.3. <i>Pollution</i>	49
5.1.2.4. <i>Connection of Environmental Security and Human Security</i>	50
5.1.2.5. <i>The Importance of Conducting Scientific Studies and Developing the Region Under the Guidance of Science</i>	51
5.1.2.6. <i>Necessity of Increasing Social Sciences and Humanities in the Arctic Region</i>	52
CHAPTER 6: CONCLUSION	55
6.1. <i>Conclusion and Policy Recommendations</i>	55
REFERENCES	59

LIST OF FIGURES

Figure 1. Multiple Method Triangulation (author’s illustration).....	12
Figure 2. The stages of the methodology (author’s illustration)	13
Figure 3. Opportunities and challenges revealed as a result of the in-depth interviews (author’s illustration)	54
Figure 4. Opportunities and challenges achieved by the multiple method triangulation. (author’s illustration)	56



LIST OF TABLES

Table 1. Opportunities and challenges arising from the Energy and Environment fields reached as a result of the literature review.	8
Table 2. Stakeholders of Semi Structured In-depth Interviews.....	11
Table 3. Opportunities and challenges mentioned in Arctic policies of Arctic Council member states.	32
Table 4. Priority areas of the observer counties.	37



CHAPTER 1: INTRODUCTION

1.1. Introduction

The Arctic Region is the name given to the area and the ice-covered ocean located geographically above 66 degrees' north parallel. Jurisdictionally, there are eight countries (Canada, the Kingdom of Denmark (Greenland), Finland, Iceland, Norway, Russian Federation, the United States, and Sweden) in the arctic circle, and five of them namely, Canada, Denmark, Norway, Russia, and the United States are defined as littoral states or the Arctic Five (Arctic Council, 2021).

During the recent years, as a result of the effects of climate change, the strategic importance and visibility of the region in the international arena has increased. The changes in the region, and the decline of the ice cover create some economic opportunities in the region. These opportunities can be listed as facilitating access to natural resources, emerging Arctic maritime routes, tourism, fishing, access to mineral resources and acceleration of regional development (Tolvanen, 2019; Gassiy and Potravny, 2019; Matsumoto, Doumpos and Andriosopoulos, 2018; Theocharis et al., 2018). The most prominent among these opportunities is considered to be the rich hydrocarbon reserves of the region. Accordingly, the Arctic Region holds an estimated 13% of the world's undiscovered conventional oil reserves and 30% of world's undiscovered conventional natural gas resources (USGS, 2008). The abundance of natural resources in the region motivates Arctic and non-Arctic countries to develop national strategies and engage in the region.

Despite the occasions presented by the region with the impacts of global warming, the impact of the changes in the region on the ecosystem is also seen as an important result. While the global warming is regarded as a problem in itself for the Arctic Region and the rest of the world, growing human and industrial activities in the region also harms the region's vulnerable ecosystem. Increasing maritime traffic, tourism activities, oil extraction activities and oil spills in the region can be listed at the top of the problems that cause environmental complications (Dmitrieva and Romasheva, 2020; Afenyo, Jiang and Ng, 2019; Shapovalova-Krout, 2019; Johannsdottir and Cook, 2019; Mikhaylova, 2018). The oil spills that may occur as a consequence of the start of energy resource production in the region, a rise in marine transportation in the region, and pollution caused by industrial operations are all examples of environmental problems directly originating from the energy field. In this context, environmental and

energy fields for the Arctic Region are considered as closely related fields in terms of opportunities and challenges resulting from the climate change.

This thesis aims to reveal the energy and environmental related opportunities and obstacles in the Arctic Region in the light of the interviews conducted within the scope of the TUBITAK project, 118K497: Challenges and Opportunities in the Arctic Region: Preparing a Strategic Roadmap for Turkey, of which I am a scholar/project assistant. The analysis aims to reach an unbiased conclusion with the triangulation method by comparing the opportunities and difficulties obtained as a result of the analysis of the strategy documents of the Arctic Council member and the observer countries and the literature review. In this way, the states that will develop a national policy for the Arctic Region will be able to have full knowledge of the opportunities and challenges they may encounter in the fields of energy and environment.

Hence, this study aims to answer the following research questions:

- i) What is the definition of the Arctic Region and what are the changing dynamics in the region as a result of the climate change?
- ii) What is the importance and connection of environmental and energy fields in the Arctic Region?
- iii) What are the energy and environment related challenges and opportunities in the Arctic Region?
- iv) Can the possible future of the Arctic Region in energy and environmental issues be explained by realism or liberalism?
- v) What are the areas that countries that want to be included in the Arctic Region in the future should pay attention to in the fields of energy and environment?

This thesis consists of six chapters.

In this context, **Chapter 1** provides a background for the research by making an introduction to the Arctic Region and the changes experienced as an outcome of the climate change. Moreover, it shows the purpose of the study and the research questions in detail.

Chapter 2 illustrates a comprehensive and state-of-the-art literature review. First, a general literature review for the Arctic Region was completed, followed by a detailed review of the potentials and obstacles arising from energy and environmental issues in the Arctic Region.

Chapter 3 presents the methodological framework of the study. Multiple method triangulation was applied to validate the semi-structured in-depth interviews. In this context, the results obtained from the literature review and strategy documents of the Arctic Council member and the observer countries were compared with in-depth interviews and their relevance and reliability were tested.

Chapter 4 provides wide-ranging information about the energy and environmental fields by covering the Arctic Region and the changing dynamics in detail. At the same time, it presents the opportunities and challenges derived from the strategy documents of the Arctic Council member and the observer countries.

Chapter 5 includes an analysis of the semi-structured in-depth interviews conducted. Prioritized areas in the fields of energy and environment have been revealed. Furthermore, as a result of the findings and analysis, a comparison of the opportunities and challenges in the field of energy and environment has been presented.

Chapter 6 is the section containing the conclusion of the thesis. At the same time, it makes a final assessment of the opportunities and obstacles presented by the Arctic Region in the fields of energy and environment by comparing the methods used in triangulation and gives policy recommendations to countries that aim to be engaged in the region.

CHAPTER 2: LITERATURE REVIEW

2.1. Literature Review

Most of the scientific sources used in the literature review were mainly selected from the journals listed under databases such as ScienceDirect, Web of Science, Google Scholar, ResearchGate, as well as official strategy documents or policies of the Arctic Council member countries and observer states.

In the literature review relevant to the Arctic Region, more than 19,000 scientific sources were identified. With the conclusion that most of these scientific studies related to the Arctic Region dominated by Natural Sciences, resources in the field of Social Sciences and Humanities were determined with an additional filtering. The selected categories for this filtering are: Economics, Energy Fuels, Environmental Studies, Humanities Multidisciplinary, International Relations, Law, Political Science, Social Sciences Interdisciplinary, and Sociology. As a result of this filtering, 753 sources related to the discipline of Social Sciences and Humanities were found. Thereafter, a multidimensional screening for relevance was performed on 753 sources under the Social Sciences and Humanities discipline. After this screening, approximately 200 sources that were determined to be relevant to the subject were scanned and analysed.

Moreover, the main keywords used in the literature review are as follows: "arctic", "arctic region", "global warming", "energy resources", "climate change", "arctic five", "arctic eight", "arctic governance", "arctic climate", "international energy security", "arctic environment", "continental shelf", "united nations convention on the law of the sea", "international cooperation", "arctic development", "resource management", "arctic ocean", "arctic resource management", "environmental pollution", "arctic regime", "arctic council".

It was revealed by the literature review that majority of the literature associated to the Arctic Region concentrated on eight Arctic Council member countries (Denmark, Canada, Finland, the United States, Russia, Norway, Iceland, Sweden) which are the region's most active players (Todorov, 2018; Zhuravel, 2018; Haugseth, 2018; Zaikov, 2018; Todorov, 2017; Young, 2016). Following that, the studies predominantly conducted by 13 countries (United Kingdom, Poland, Japan, France, Germany, South Korea, Italy, Netherland, Switzerland, Spain, India, Singapore, China) which are observer countries of the Arctic Council. In this regard, the literature review conducted

with additional filtering reveals that the first five countries are Russia, Norway, Finland, United States, and Canada in terms of the abundance of publications in the scientific researches related to the Arctic Region (Vaatanen, 2021; Gunnarsson, 2021; Roberts, 2020; Shapovalova, Galimullin and Grushevenko, 2020; Giordano and Raymond, 2019). Likewise, the Arctic Council observer countries with the most publications are the United Kingdom, People's Republic of China, Germany, Netherlands, and France (Nick Pay and Calvo, 2020; Depledge, 2020; Kossa, 2019; Ravestein et al., 2018).

In addition to this, current studies in the discipline of social sciences and humanities related to the Arctic Region consist of diverse topics. For instance, energy (e.g. Nong, Countryman, and Warziniack, 2018; Lindholt and Glomsrød, 2018; McCauley et al., 2016), environmental issues (e.g. Parks et al., 2019; Stevenson et al., 2019; Johannsdottir and Cook, 2019; Leroux and Spiro, 2018; Necci et al., 2019), tourism (e.g. Tereschenko, 2018; Dawson, Johnston, and Stewart, 2017; Sevastyanov, 2018), and emerging logistic routes (e.g. Giguère, Comtois and Slack, 2017; Lasserre, 2014; Hong, 2012;) are some of them.

Nevertheless, it is not possible to reduce the Arctic Region to a single research area, since the arctic region and ongoing changes in the region have multi-dimensional results. However, it has been concluded that there are some links between these areas. In this context, this thesis only focuses on energy and environmental dimensions which are one of the related fields.

In the meanwhile, among aforementioned topics, environmental and energy issues are the most frequently studied by scientists in the international arena. Besides, energy and environmental subjects are considered in connection with each other, have been repeatedly studied together in the literature (Agarkov, Motina and Matviishin, 2018; Dobson and Trevisanut, 2018; Mazza, 2015; Johnston, 2012). At the same time, several opportunities and challenges resulting from climate change related to the energy and environment fields repeatedly mentioned in the literature (Bireselioğlu et al., 2020; Hong, 2018; Perez and Yaneva, 2016; Fidler and Noble, 2013).

The changes experienced in recent years with the effect of climate change make the rich hydrocarbon resources accessible in the Arctic Region. Concordantly, reserves of oil, natural gas, and the rare earth minerals attract the attention of many Arctic and non-Arctic countries. In this sense, states that want to obtain economic benefits from the region or contribute to their national energy security develop strategies for the

region and the energy resources it holds (Matsumoto, Doumpos and Andriosopoulos, 2018; Maximova, 2018; Hong, 2014; Biresselioglu, Demir and Kandemir, 2012). Considering the abundance of natural resources in the Region, as well as the fact that the usage of hydrocarbon resources will not lose its importance in the near future, provide possibilities for many countries, which is quite significant. In addition to the rich hydrocarbon resources in the region, the region's renewable energy potential is an issue frequently studied in the literature that the region also has great potential for a sustainable future (Potravnyi et al., 2020; Morgunova et al., 2020; Tishkov et al., 2020; Kirsanova, Lenkovets and Nikulina, 2018; Lansetti, 2016; Boute, 2016). In the Arctic region, besides fossil fuels and renewable energy potential, another important factor is the rare earth mineral resources in the region (Andersson, Zeuthen and Kalvig, 2018; Dobretsov and Pokhilenko 2010). Mining in the Arctic is an important but contentious industry. While supporting local and regional economic development, it can create negative environmental impacts in the long run (Khaknazarov, 2017). In order to overcome negative environmental effects, studies are needed to observe sustainable mining and improve the living conditions of local people (Tolvanen, 2019). Although climate change and melting glaciers are a problem in itself; Providing access to the region, easing polar conditions, and accelerating the formation of Arctic sea routes are considered as some of the opportunities emerging in the region (Corell, 2006). On top of that, the increase in industrial activities in the region also causes socio-economic development. The region is thriving, various business opportunities are opened up for the locals, and it is easier for them to introduce their culture to the world (Gassiy and Potravny, 2019; Ng and Song, 2018; Tysiachniouk et al., 2018; Vasiliev, 2016).

Although the Arctic Region will become more accessible as a result of the increase in temperatures, it will be more expensive to engage in energy extraction activities in the region compared to other "traditional" regions. It can be said that the main reasons for this situation are harsh weather conditions and technological inadequacies (Dmitrieva and Romasheva, 2020; Carayannis, Ilinova and Chanysheva, 2019). Also, due to long distance to existing infrastructure, special equipment requirements suitable for the polar conditions, and with the current prices, oil and natural gas obtained from the Arctic cannot be competitive on markets (Petrick et al., 2017).

Another challenge created by energy activities in the Arctic Region is spill recovery (Wenning et al., 2018; Robinson, Gardiner and Wenning, 2017; Li et al., 2016). There are different requirements compared to the traditional methods against oil spills that

may occur in the Arctic Region. Therefore, it is very difficult to carry out this study in an ice-covered sea, both climatically and logistically (Shapovalova-Krout, 2019; Wilkinson et al., 2017; Knol and Arbo, 2014). Furthermore, another challenge for the production of hydrocarbon reserves and mineral resources in the Arctic region is the possibility of regional disputes between the coastal states. The United Nations Convention on the Law of the Sea (UNCLOS) states that, littoral nations have the right to seek natural expansion of their exclusive economic zones of up to "350 nautical miles" (UN, 1982). In this context, some of the littoral states to seek an extension to their exclusive economic zones through a official submission to the "United Nations Commission on the Limits of the Continental Shelf" based on Article 76. Relying on this article, some land disputes may occur between Arctic states especially in conflicted areas in terms of natural resources (Wither, 2018; Koivurova, Käpylä and Mikkola, 2015). On the other hand, international status of the emerging sea routes is disputed issue between the littoral states. In this sense, status of the emerging routes, namely the Northern Sea Route and the Northwest Passage, can be regarded as an international passage is a controversial issue among the states in the region, which has also been studied in the literature (Zhuravel, 2018; Todorov, 2017; Rothwell, 1993). When the changes in the Arctic Region are evaluated in terms of the environment, some opportunities and obstacles arise as well. Within this context, there are studies which mention that climate change in the region is a problem in itself and the human and industrial activities, that are estimated to rise in the region, will adversely affect fragile environment of the Arctic (Dmitrieva and Romasheva, 2020; Trump, Kadenic and Linkov, 2018). At the same time, as a result of increasing oil and natural gas extraction in the Arctic and increasing marine traffic with emerging sea routes, marine pollution occurs and threatens biological diversity and significantly damages the Arctic ecosystem (Afenyo, Jiang and Ng, 2019; Johannsdottir and Cook, 2019; Mikhaylova, 2018; Ivanova, Sokolov and Kharitonova, 2018; Thorsell and Leschine, 2016; Gulas et al., 2017). Besides that, increasing industrial activities in the region threatened the traditional life style of indigenous people, food and land security (Bogdanova et al., 2021; Arruda, 2015; Martello, 2008; Chance and Andreeva, 1995). Another issue menacing the unique ecosystem of the Arctic Region is the increasing tourism activities in the region. The high rate of human presence in the region is another factor that causes environmental problems. In order to overcome damages, tourism policies of Arctic states should consider environmental and climate issues

(Bonusiak, 2021; Kaltenborn and Emmelin, 1993). On the other hand, the literature also covers the opposing views which are quite limited in terms of environment. An opposing view is that with the help of emerging sea routes in the region, the route between Europe and Asia will be greatly shortened, which will lead to a decrease in global carbon emissions in the long run (Aksenov et al., 2017; Schøyen ve Bråthen, 2011).

In the light of all these studies, Table 1 below summarizes the challenges and obstacles, related to the energy and environment aspects of the region, which is highlighted by studies used in the literature review.

Table 1. Opportunities and challenges arising from the Energy and Environment fields reached as a result of the literature review.

Opportunities	Challenges
<p>Hydrocarbon Resources (Matsumoto, Doumpos and Andriosopoulos, 2018; Maximova, 2018; Hong, 2014; Biresselioglu, Demir and Kandemir, 2012; Padrtova, 2011).</p> <p>Minerals (Tolvanen, 2019; Andersson, Zeuthen and Kalvig, 2018; Khaknazarov, 2017; Dobretsov and Pokhilenko 2010).</p> <p>Renewable Energy Potential (Potravnyi et al., 2020; Morgunova et al, 2020; Tishkov et al., 2020; Kirsanova, Lenkovets and Nikulina, 2018; Lansetti, 2016; Boute, 2016).</p> <p>Regional Development (Gassiy and Potravny, 2019; Ng and Song, 2018; Tysiachniouk et al., 2018; Vasiliev, 2016).</p> <p>Emerging Sea Routes (Theocharis et al., 2018; Aksenov et al.,</p>	<p>Pollution (e.g. human activities, oil and natural gas extraction, increasing marine traffic, increasing tourism) (Dmitrieva and Romasheva, 2020; Trump, Kadenic and Linkov, 2018; Afenyo, Jiang and Ng, 2019; Johannsdottir and Cook, 2019; Mikhaylova, 2018; Ivanova, Sokolov and Kharitonova, 2018; Thorsell and Leschine, 2016; Gulas et al., 2017; Bonusiak, 2021; Kaltenborn and Emmelin, 1993).</p> <p>Expensive Energy Production (Dmitrieva and Romasheva, 2020; Carayannis, Ilinova and Chanysheva, 2019; Petrick et al., 2017).</p> <p>Risk of Oil Spill (Shapovalova-Krout, 2019; Wenning et al., 2018; Robinson, Gardiner and Wenning, 2017; Wilkinson et al., 2017;</p>

Table 2 (continued). Opportunities and challenges arising from the Energy and Environment fields reached as a result of the literature review.

<p>2017; Peters et al., 2011; Schøyen and Bråthen, 2011; Corell, 2006).</p>	<p>Li et al., 2016; Knol and Arbo, 2014).</p> <p>Risk of Dispute between Littoral States</p> <p>(Wither, 2018; Zhuravel, 2018; Todorov, 2017; King, 2016; Koivurova, Käpylä and Mikkola, 2015; Wasserab, 2009; Rothwell, 1993).</p> <p>Traditional Lifestyle of Indigenous People</p> <p>(Bogdanova et al., 2021; Tolvanen, 2019; Arruda, 2015; Martello, 2008; Chance and Andreeva, 1995).</p>
---	---

CHAPTER 3: METHODOLOGICAL FRAMEWORK

3.1. Methodology

The semi structured in-depth interviews is a qualitative research method used commonly in the discipline of Social Sciences and Humanities, and has been a vital tool for conducting research for decades. A guided dialogue is the format of this type of interview. The interviewer plans the semi-structured in-depth interview around a series of themes intended to address a specific research question, but the open-ended nature of the interview allows participants to share topics that are relevant to them that the researcher would not have anticipated (Barrick, 2020; Hristov and Krushkov, 2016; Gill et al., 2008). Semi-structured in-depth interviews are suitable to investigating complex behaviours, thoughts, and feelings. Also, in-depth, semi-structured interviews have made a significant contribution to literature in different research areas (Longhurst, 2009).

For instance, Mazumder et al. (2021) conducted in-depth interviews with young adults to learn more about how their behaviour changed during the COVID pandemic. Moreover, in-depth interviews also used in the field of healthcare research particularly. In this context, Landmark, Strandmark and Wahl, (2002) conducted in-depth interviews with ten ladies who had been diagnosed with cancer, this study explores the experience of social support. At the same time, preference differences between diverse groups can be revealed through interviews. As an example of use in the field of sociology Devine et al (1999) examined food choices in three different ethnic groups. Furthermore, in the field of energy; Horta et al. (2019) conducted 100 interviews with households about energy poverty. Biresselioglu et al. (2020) detects the “barriers and motivators” affecting the energy transition with 67 in-depth interviews.

Most of the studies in the field of Social Sciences and Humanities adopt qualitative methods in the literature related to the Arctic Region. For instance, methodology of case study (e.g. Konar, Frisch and Moran, 2017; Petrov, Zbeed and Cavin, 2018; Necci et al., 2019; Osthagen, Sharp and Hilde, 2018), comparative analysis (e.g. Todorov, 2018; Zagorski, 2018), participant observations combined with interviews (e.g. Haugseth, 2018; Saunavaara, 2018; Tysiachniouk and Petrov, 2018) and semi structured in-depth interviews (e.g. Dawson, Johnston and Stewart, 2017; McCauley et al., 2016; Kim, 2015). Also, it is seen that the most frequently used research method among quantitative research methods is survey (Tereschenko, 2018; Mikhaylova,

2018; Khaknazarov, 2018; Beveridge et al., 2016; Lee and Song, 2014; Parsons, Dinwoodie and Roe, 2011; Lasserre and Pelletier, 2011).

It is determined that in scientific studies about the Arctic Region, especially in the Social Sciences and Humanities discipline, method of in-depth interview is frequently used by researchers (Tysiachniouk and Petrov, 2018; Gramer, 2018; Haugseth, 2018; Mikhaylova, 2018; Dawson, Johnston

and Stewart, 2017; Loe and Kelman, 2016; McCauley et al., 2016; Kim, 2015; Ford et al., 2007). Therefore, it has been concluded that semi-structured interview technique is useful method for collecting comprehensive and detailed data related to the Arctic.

The interviews used in this study are completed within the scope of the project number 118K497 funded by TUBITAK, which appropriately meets the required content. In the project, a semi-structured interview protocol with the general framework and sample questions was developed to consult experts on the Arctic Region. At the same time, these interviews shed a light on the issues to be taken into consideration while preparing a strategic road map for the countries that seek alternative resources to meet their energy needs and try to engage in the Arctic Region. In this context, within the project 36 semi-structured in-depth interviews completed with the experts. In this context, among the interviews conducted with stakeholders within the project, 10 interviews that will give the most meaningful information about the content of this thesis were determined, and these interviews were analysed once more.

In the semi-structured in-depth interviews, the personal information of the participants was kept confidential and the views of the stakeholders were tried to be reflected anonymously. In this context, personal information of selected stakeholders is given in a detailed way anonymously in Table 2.

Table 3. Stakeholders of Semi Structured In-depth Interviews.

Interview	Country	Title/Position
Interview 1	Turkey	Academician on Climate Change and Environment
Interview 2	Turkey	Academician in Energy Geopolitics and Security
Interview 3	Turkey	Military Attaché Served in Norway (Retired)

Table 4 (contunied). Stakeholders of Semi Structured In-depth Interviews.

Interview 4	Italy	Senior Manager
Interview 5	England	Scientist
Interview 6	Norway	Senior Defence Consultant
Interview 7	United States	Senior Manager
Interview 8	Norway	Scientist
Interview 9	Poland	Consultant in the International Security Program
Interview 10	France	Scientist

Also in this thesis; It is planned that the findings that will be revealed as a result of the analysis of the semi-structured in-depth interviews will be validated with the "triangulation" method by comparing them with the results that will be obtained through literature review and examination of the strategy documents of the Arctic Council member and observer countries which illustrated in Figure 1 below.

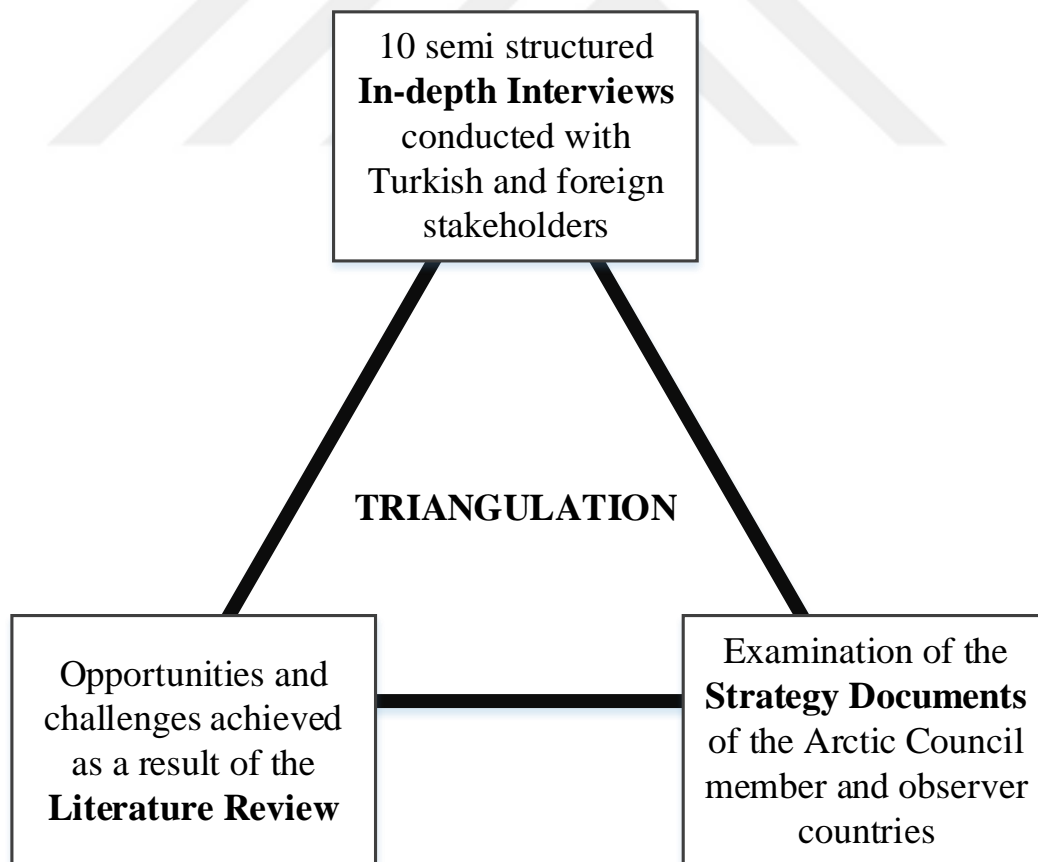


Figure 1. Multiple Method Triangulation

* Author's illustration

In qualitative research, the use of several methodologies or data sources to develop a broad understanding is referred to as triangulation (Patton, 1999). Therefore, the results were tested using triangulation to ensure their relevance and reliability. The four types of triangulation identified by Denzin (1978) and Patton (1999). These types are known as “method triangulation”, “investigator triangulation”, “theory triangulation”, and “data source triangulation”. Moreover, all these types of triangulation can be used on an individual basis or in a combination with each other (Polit and Beck, 2012). On the other hand, Renz (2018), Foster (2012), and Tonkin-Crine (2016) stress the significance of triangulation in both qualitative and quantitative research in order to obtain a more accurate and detailed picture of the phenomena under examined. In this thesis, in order to achieve impartial result, triangulation applied by utilizing multiple methods.

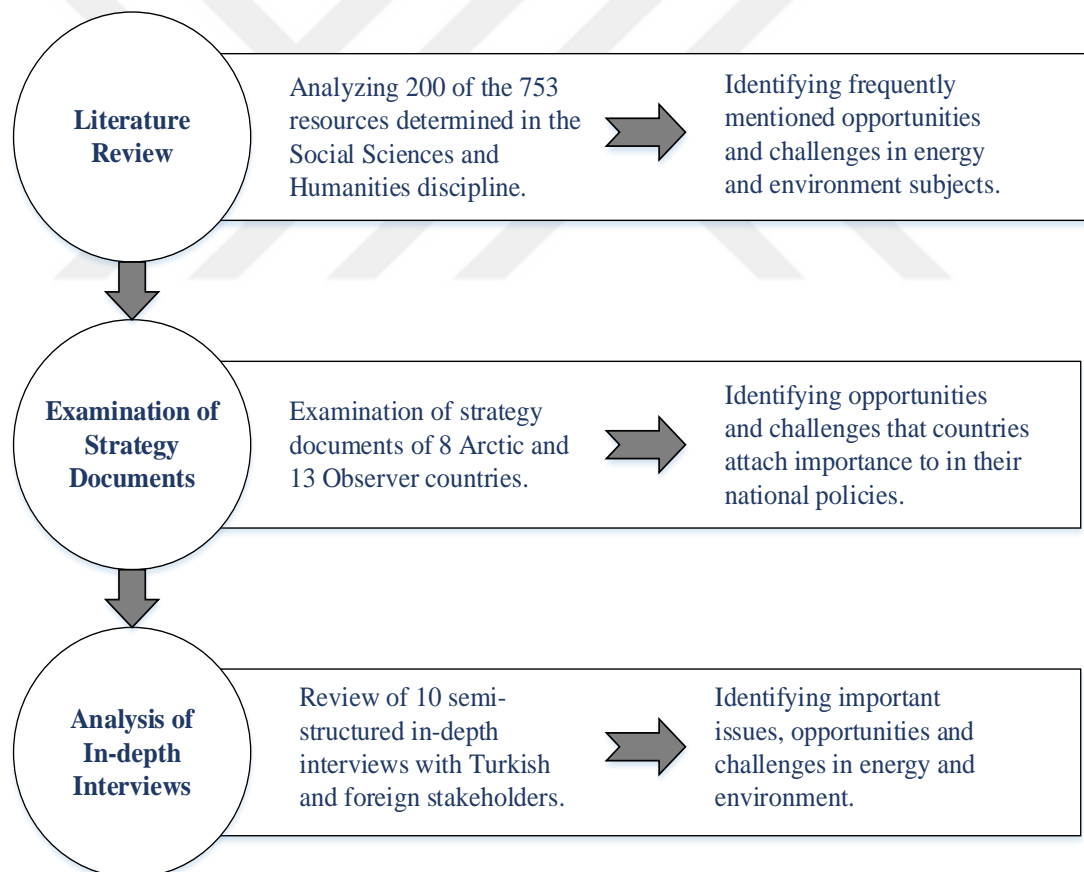


Figure 2. The stages of the methodology

* Author’s illustration

Consequently, the stages of the methodology are illustrated in Figure 2 above. In this sense, following a detailed and comprehensive literature review, the strategy

documents of the Arctic Council members and observer countries will be examined and the areas that countries attach importance to will be revealed. Following this, 10 semi-structured in-depth interviews with experts will be analysed to gather detailed information on energy and environment related issues, and challenges and opportunities will be identified.



CHAPTER 4: UNDERSTANDING THE DYNAMICS OF THE ARCTIC REGION

4.1. Arctic Region

Geographically, the Arctic consists of an ice-covered ocean situated above the Arctic circle and lies above the 66 degrees' north parallel (EIA, 2012). Jurisdictionally, the Arctic contains eight countries, these are Canada, the Kingdom of Denmark (Greenland), Finland, Iceland, Norway, Russian Federation, Sweden, and the United States. These eight states meet and negotiate among themselves in matters related to the Arctic Region (Kuersten, 2016). Moreover, five Arctic littoral states (Canada, Greenland, Norway, Russia, and the United States) also called as the "Arctic Five" (Arctic Council, 2021).

Although the Arctic is sometimes mentioned as it is a single united region, it is actually a huge geographic area which covers northern parts of the Arctic States, populated by approximately 4 million people (Arctic Council, 2021). In this context, the Arctic Region is home to indigenous people as well as its unique ecosystem. Although the Arctic Region has a fragile ecosystem, the strategic importance of the region is increasing with the impact of climate change. Political balances in the region are transformed as the region becomes more accessible. The region's economic opportunities for Arctic and non-Arctic countries lead to an increase in human and industrial activity in the region. Accordingly, global warming and increasing industrial activities affect the traditional lifestyle of the indigenous population and cause environmental problems by threatening the Arctic ecosystem.

In the coming decades, the Arctic Region is expected to have significant economic and political potential, with the effect of various opportunities and obstacles. These are increased access to oil and natural gas reserves, maritime transport, fishery, environmental issues and military activities. As a result, it is possible to say that the region's status in the field of International Relations has expanded (Keil, 2013).

4.1.1. Dynamics in the Arctic Region

Historically, developments in the Arctic region raised security concerns throughout the Cold War years, and by the late 1980s the main topics of the Cold War dominated the Arctic agenda. However, the most peaceful period in the history of the region

started after the cold war period. The region, which has historically been a conflict zone and the target of military activities, has come to light in the international arena as a result of global climate change (Young, 2012).

The main reasons why the Arctic region attracts international attention are the rich hydrocarbon reserves in the region, mineral resources, tourism activities, fishing activities, and the ship traffic that is expected to increase with the sea roads. However, the wealth of the Arctic Region that has become accessible as a consequence of global warming and the opportunities that become appear in the region can create a struggle between the states of the region (Ates, 2017). In this context, The United Nations Convention on the Law of the Sea (UNCLOS), also known as the "Constitution of the Seas," is adopted to govern and prevent conflict regarding to the Arctic Ocean's continental shelf (Koivurova, Käpylä and Mikkola, 2015).

UNCLOS is a source of international law that includes regulations on the sovereign parts in the Arctic Ocean, the exclusive economic zones of littoral states, natural resource extraction on the seabed, navigation outside of the territorial waters, and environmental and natural resource protection (United Nations, 1982). Correspondingly, the Arctic Council governs the region, which remains the most active political power in the region, formed by Arctic nations in the 1996 Ottawa Declaration as an intergovernmental forum. Today, the Arctic Council plays a critical role in managing and developing international relations in the region (Arctic Council, 2019).

Although the region has only historically been defined as a conflict area, coastal states still maintain their military presence in the region today. For instance, Russia is the country in the Arctic that has militarized the region the most. Apart from having the largest military power in the region, it also has the lengthiest coastal line in the region. At the same time, Russia is the country with the richest hydrocarbon reserves in the Arctic Ocean. In this context, it is possible to say that the Arctic Region has a strategic significance for a major energy producer country like Russia (Stavridis, 2018).

It is expected that Russia, which is working to produce natural resources in the Arctic Region, will increase its natural gas and oil supply and export with continuous production (Sevastyanov, 2018). On the other hand, one of the main causes why the Arctic Region has regained importance in security studies is due to some provocative steps taken by Russia towards the region. For example, Russia's planting its flag on the Arctic Ocean's seabed in 2007, is an issue that caused littoral states to shape or

even change their security strategies towards the region (Avdonina and Dolgoborodova, 2018).

Russia's militarization activities in the region widen the division of "NATO allies and Russia confrontation" in the region. Although there are some conflicts of interest in the region, it is thought that the region will not host a hot conflict in the short run and that the relations will be developed by prioritizing international law and scientific studies rather than military power (Zagorski, 2018; Hough, 2015).

Another potential of conflict that may take place in the region is for the sharing of areas rich in terms of natural resources. Problems of the exclusive economic zone may arise due to the rich minerals and hydrocarbon resources. As aforementioned, "350 nautical miles" is accepted as natural extension zone of the countries. In this context, Russia, Canada, and Denmark over Greenland claim that the Lomonosov Ridge, which is rich in mineral resources, is in their natural expansion zone (Basaran, 2015; Wasserab, 2009). In line with international law and the rule of the Arctic Region, countries that can prove that the Lomonosov Ridge is within its natural expansion area will have the right to extract valuable mineral resources in this region.

Changes experienced in the Arctic Region with the effect of climate change, creates economic opportunities in the region. Especially, with the enabling of access to energy reserves and precious minerals, drilling activities, which were previously costly, have become relatively feasible (Wasserab, 2009). As a result of shrink of ice cap in the Arctic Region, which is one of the consequences of climate change, new maritime routes are emerged. Emerging sea routes in today's conditions offer ship passage at a certain time of the year (Theocharis et al., 2018). However, if these routes are actively used, Arctic shipping will not only reduce cruising times and costs, but will also play a helpful role in reducing global carbon emissions (Schøyen and Bråthen, 2011). In international trade, the Northern Sea Route shortens the existing route on the "Suez Canal" up to 30-40%, the route on the "Panama Canal" by 40-50%, and the existing route on the "Cape of Good Hope" up to 50-60% (Zhang, Huising and Song, 2019). Nevertheless, the use of the emerging maritime routes, namely Northern Sea Route and the Northwest Passage, for maritime transport in a reliable, efficient, and cost-effective manner is only possible with more investment in multiple regions, infrastructure development and suitable ships for hard climate conditions. Simultaneously, the usage of the aforementioned sea routes will also cause regional development especially for the coastal states (Lee and Song, 2014; Parsons,

Dinwoodie and Roe, 2011).

Apart from these, another economic opportunity offered by the region is fishery. Arctic fishing is an issue that is given importance by both riparian states and non-Arctic states. Internationally, Arctic ocean fishing is not only a matter of hunting but also a new route for Arctic governance and international cooperation. (Pan and Huntington, 2016). With the aim of sustainable fishing as a common target in the Arctic Region, it is possible to protect the economic interests of both littoral states and long-distance fishing countries (Zou and Huntington, 2018).

Simultaneously, there are increasing demand for the Arctic tourism market (Tereschenko, 2018). It was observed that different local communities in the region were positively affected by the increasing touristic interest in the region in terms of promoting their culture globally (Zaikov, 2018). Increasing new tourism markets in the region offer opportunities such as economic growth and new job opportunities for local people as well (Olsen, 2019). At the same time, due to the increasing oil extraction activities and increasing shipping traffic in the region, new job opportunities are also emerging for indigenous people.

Within the framework of all these conditions, a sustainable economy can be achieved in the Arctic Ocean with activities such as creating higher standards for environment, developing effective management plans, and improving safety standards (Mileski et al., 2018).

The aforementioned changes cause many opportunities to emerge in the region, but also cause several problems. For example, with the change of dynamics due to effects of global climate change and human activities in the Arctic region, the environment and the traditional economy are negatively affected. This situation, threatened the “security” of the indigenous population in the Arctic and triggered several inevitable changes in their traditional lifestyle (Mikhaylova, 2018). For instance, Russia which has a large proportion of indigenous peoples on its territory of the Arctic, is also engaged in a number of efforts to protect the traditional lifestyle of the local residents in the region, to eliminate the negative effects, and to keep their culture alive while protecting its economic interests in the region (Sokolova et al., 2019).

Even today, while there are difficulties in preserving the traditional lifestyles of indigenous people, with the beginning of all industrial activities in the Arctic Region, local people may lose their land or water sources in the region (Zhuravel, 2018). In this context, economic interest-based evaluations such as natural resources and

maritime trade routes regarding the Arctic Region pushes issues such as “human security” and “environmental protection” of the region into the background (Hough, 2015). Consequently, besides these positive effects, a large amount of environmental pollution has emerged as a result of increasing tourism, oil extraction activities and shipping in the region. This has led to the need to protect the lives, cultures and food security of the aforementioned indigenous people by the actors in the Arctic Region (Parks et al., 2019; Afenyo, Jiang and Ng, 2019).

4.1.2. Potential Future of the Arctic Region in the Light of Neorealism

As a consequence of effects of the global warming in the Arctic Region, great opportunities are emerging in the field of energy. The fact that the Arctic Region is rich in oil, natural gas and mineral resources attracts the attention of Arctic and non-Arctic states. According to UNCLOS, which is accepted as Arctic Ocean’s regulatory international law, states have right to request expansion in their exclusive economic zones up to “350 nautical miles”, in addition to their “200 nautical miles”. These expansion demands are directed towards the areas where rich in natural resources exist and it may cause states to confront each other.

The Arctic Council, which acts as a regulator in the Arctic Region, is criticized for its inability to prohibit “conflicts of interest” in the region. In this context, it is questioned whether the Arctic Region will become a conflict or cooperation area as a result of changing dynamics. The changes in the Arctic region and possible actions of states can be examined with theoretical approaches.

International institutions establish shared norms and principles that limit the activities of governments while encouraging long-term cooperation. The Arctic organizations were created in order to focus on shared interests such as search and rescue activities, ecosystem preservation, rights of individual population in the Arctic region, and regional development (Wegge, 2010). The region may appeal more foreign investment and achieve regional development goals if it has a solid legal framework (Ebinger and Zambetakis, 2009).

The Arctic is projected to become more of a conflict zone as changes accelerate and issues such as access to energy resources in the region become more important (Heininen, Sergunin and Yarovoy, 2014). Depending on which international relations theory the region is analysed with, the Arctic perception will be shaped in a different way (Jegorova, 2013).

The discipline of international relations offers several theories that aim to explain behavior of the states in the international arena. Accordingly, among these theories, realism may have considered as one of the most important one. However, the capacity of realism to explain current political events is questioned by other IR theories.

On the other hand, supporters of neorealism think that the main interest of the state is security. For this reason, each state will act in a way that will best serve its interests. In this context, states will strive to maximize their security. Therefore, they can use military force, develop strategies and form alliances, and increase their national power through the economy.

Considering the changing conditions in the Arctic Region, the accessibility of the Arctic region may result in states wanting to increase their economic power. At the same time, the race for economic interests will increase human activity in the region, causing security problems and resulting with the militarization of the region. Considering the regional structure, the possibility of establishing alliances can be evaluated as high. When the expected developments are combined with the inadequacy of the Arctic Council on security issues in the region, a structure suitable for neorealism is formed (Stojkovic, 2021).

In this sense, internal and external balancing are the two methods which states might achieve balance in the international environment. Internal balance refers to a state's ability to enhance its own capabilities through growing internal sources of power, such as economic development and/or military spending. External balancing occurs when states form partnerships to counterbalance the influence of stronger states or coalitions (Chen, 2013).

Kenneth Waltz, the father of neorealism, simply asserts that “faced with unbalanced power states try to increase their own strength or they ally with others to bring the international distribution of power into balance”. Also, internal and external balance, according to John Mearsheimer, are essentially two distinct expressions of the same behavior (Parent and Rosato, 2015).

Neorealism makes it apparent that the great powers' balancing choice under bipolarity was internal balancing—the growth of one's own economic or military might. Great countries, on the other hand, will have more options for external balancing-alliances in a multipolar system. External balancing refers to the formation of coalitions or the endeavor to undermine an opposing alliance. Considering all these, it is seen that the geopolitical changes in the Arctic Region can be explained by neorealism and external

balancing.

As the changes in the Arctic Region as a result of global warming is projected to increase over time, it appears possible that the conflicts of interest related to energy resources and economic interests will remain. As a result, as Arctic maritime routes become safer to use and energy production becomes more affordable, neo-realism is likely to become the most suitable framework to describe Arctic politics.

Contrary to this, external balancing is the least ideal for great powers since it needs outside assistance. However, the fact that the Arctic Region is not expected to host hot conflict in the near future means that external balancing may be preferred in order to maximize economic interests in the times of peace.

4.1.3. Arctic Governance

The Arctic Council is an intergovernmental forum, established by the eight Arctic states (Canada, the Kingdom of Denmark, Finland, Iceland, Norway, Russian Federation, Sweden and the United States) in the 1996, Ottawa Declaration. Apart from Arctic states, there are six permanent participants (Aleut International Association, Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North, and the Saami Council) to represent the indigenous population of the Arctic Region. Permanent Participants almost have the same status as member states and have the same rights to intervene and speak as member states. On all negotiations and decisions, the Arctic States are obligated to consult with permanent participants, although they are the primary decision-makers (Arctic Council, 2013). Besides, there are 6 working groups for the Council's activities. Also, within the Arctic Council there are 38 observers. Of these, 13 are “non-Arctic countries”, namely France, Germany, Italy, Japan, the Netherlands, China, Poland, India, Korea, Singapore, Spain, Switzerland, and the UK, 12 are “non-governmental organizations”, and 13 are “intergovernmental and inter-parliamentary organizations” (Arctic Council, 2021).

The amount of observers has drastically increased in recent years; it reveals the growing interest to the Arctic Region. Under these circumstances, with the rapidly increasing significance of the Arctic, both the Arctic states and the world demand the development of a new Arctic policy for the improvement of the region. The Arctic Council originally focuses on “environmental sustainability” and “sustainable development” issues, the scope of forum also contains social, cultural, and economic

issues with regional and global ramifications.

Without a question, the Arctic Council is the most significant international forum in the Arctic Region, and major player in the Arctic affairs (Koivurova and VanderZwaag 2007; Stokke and Honneland 2007; Koivurova 2010; Axworthy, Koivurova and Hasanat, 2012). However, the Arctic Council has real structural and organizational limitations. In order to successfully govern the Arctic, new forums should be recognized as regional governance becomes more complex (Higginbotham and Spence, 2016). An example of these limitations is Council's founding principles ignore any focus related to trade, security and immigration (Barry et al., 2020). Also, technically, since the Arctic Council is only a forum, it has no power to impose any regulation or decision since it has no legal aspect (Ateş, 2017). On the other hand, the Arctic Council is managed by a "rotating chairmanship" that lasts only two years, with the chair having the authority and responsibility to determine the agenda and host meetings. Chairmanship agendas may reflect the domestic interests of the chairmanship, for this reason there may be discontinuity between agendas of different chairs (Higginbotham and Spence, 2016).

Reform proposals are made to empower the Arctic Council. The most important of these proposals is the formation of a permanent secretariat of the Arctic Council. Stronger secretariats are also needed for the working groups and task forces. At the same time, it is also suggested to be more in contact with scientists who examine social problems (Kankaanpää and Young, 2012).

4.1.4. Energy

4.1.4.1. Arctic Energy Resources

With the melting of glaciers, the region becomes accessible and therefore the strategic importance of the region increases. By this means, formerly inaccessible oil and natural gas resources may turn into accessible at least periodically. Successful development of these hydrocarbon reserves would help to diminish the pressure on the global energy markets and potentially improve energy security (Johnston, 2010).

According to a study carried out by the Geological Survey of the United States, the Arctic Region has an approximate 13 percent of the world's undiscovered conventional oil reserves and 30 percent of the world's undiscovered conventional natural gas resources although the exact quantities of these resources remains unknown (USGS,

2008).

Reform proposals are made to empower the Arctic Council. The most important of these proposals is the formation of a permanent secretariat of the Arctic Council. Stronger secretariats are also needed for the working groups and task forces. At the same time, it is also suggested to be more in contact with scientists who examine social problems (Kankaanpää and Young, 2012).

According to a study carried out by the Geological Survey of the United States, the Arctic Region has an approximate 13 percent of the world's undiscovered conventional oil reserves and 30 percent of the world's undiscovered conventional natural gas resources although the exact quantities of these resources remains unknown (USGS, 2008). As a consequence of the impacts of global warming, the natural resources that could not be reached before has become easier to access. Since the average annual temperature increase is almost twice in the polar regions than in other geographies, summer sea ice is disappearing at a pace of 12% per decade in the region. This situation makes ice-free Arctic summers possible for the next decades (Eliasson et al., 2017; Keil, 2013; Lemke, 2011). In these circumstances, the long summer months in the region would cause the human activities to accelerate.

In this context, many countries are developing strategies for the region, as the Arctic region has been intriguing for many years and has remained relatively unexplored compared to other geographic areas. Moreover, the estimated quantity of reserves in the Arctic region appeals to both multinational companies looking for economic opportunities and countries looking for new frontiers. However, there are several political challenges, such as unresolved boundary disputes, it's a decelerating factor for oil and gas companies interested in energy extraction (Hong, 2012).

In addition to the aforementioned political and economic challenges, concerns about technology should also not be disregarded. Due to unique conditions of the region special equipment will be required such as special tankers and ice-breakers, with sufficient infrastructure to transport the obtained oil and natural gas to the global markets (Hilburn, 2008). Moreover, developing infrastructure and industrial activities in the Arctic will cause an extra costs and create concerns regarding the delicate nature of the Arctic environment (Hasle, Kjellén and Hagerud, 2009).

Furthermore, from an environmental point of view, spill containment/spill recovery is another important challenge for the Arctic Region. Containment/recovery contingencies will be different and more challenging than “traditional” projects, both

in terms of planning and equipment, due to climatic and logistical concerns. The probability of a significant oil spill in Arctic seas is possible to rise in the coming years as production rates and discoveries rise. International law provides a comprehensive framework for regulating spills from shipping, but when it comes to spills from petroleum development operations, it is not strict enough. So, there is a regulatory gap in the prevention of oil spills (Shapovalova-Krout, 2019).

Environmental risks and public opposition to oil and natural gas production in the Arctic Region are factors that might hamper hydrocarbon development, especially given the obvious environmental obstacles related to the oil-spill preparedness. In this context, in order to overcome environmental challenges sustainability must be prioritized overexploitation in the Arctic, because the scale of the implications is global. Oil spills from “blowouts”, “pipeline leaks” or “shipping accidents” pose a remarkable risk to the unique ecosystem of the Arctic, since the spill clean-up is almost impossible in icy water. Besides, marine ecosystems are particularly vulnerable and important species are at risk.

However, the fact that the Arctic Region is rich in hydrocarbon resources draws the attention of many countries. Energy importing countries focus on alternative regions in order to diversify their supplier countries and existing energy sources (Matsumoto, Doumpos and Andriosopoulos, 2018). Apart from the rich natural gas and oil resources in the region, the fact that the Arctic is suitable for renewable energy resources and the application of new technologies makes Arctic an indispensable element. In particular, projects aimed at installing off-shore wind turbines in the region will greatly increase the share of renewable energy in the region.

Consequently, despite the above-mentioned non-negligible potential of energy resources and environmental concerns, commercial profitability, a combination of high oil prices and strong demand, technical advancements, stable political relations, and financial income are all factors that influence the growth of the Arctic Region. In order to advance in the Arctic region by considering the benefits of the ecosystem and society; The strategies and steps taken by countries and multinational companies must proceed with environmental awareness within the framework of sustainability.

4.1.4.2. Borders and Political Uncertainties

There are some international boundary disputes in the Arctic Region arising from the availability of rich natural resources, like in many parts of the globe. However, in order

to continue oil and gas projects and to gain economic benefits from the Arctic Region clear borders between littoral states are needed. Although there is no hot conflict today in a region that has historically been a cold war zone, the risk of countries facing confrontation still continues. Besides the hydrocarbon resources, the fishing quotas of the coastal states are also determined according to these boundaries and clearly determine the responsibilities of the countries in case of an emergency (Osthagen, 2017).

The main reason of these uncertainties in the region is the problem of exclusive economic zone. According to the United Nations Convention on the Law of the Sea, states have independent economic rights on their coasts up to “200 nautical miles” from the seabed. However, according to the convention, coastal states have right to demand natural expansion of up to “350 nautical miles” in their exclusive economic zones through a formal submission to the framework to resolve maritime boundary disputes in the Arctic, namely “United Nations Commission on the Limits of the Continental Shelf (CLCS)” (Johnston, 2010; Gunitskiy, 2008). Based on these rights, the issue of natural expansion has become an intra-Arctic problem. For instance, Russia and Norway settled dispute in 2010, regarding maritime boundary disagreement in the Barents Sea after decades of negotiations. However, several disputes remain in the other parts of the region. To exemplify, Canada and Denmark claiming that the natural expansion area of the continental shelves for the Lomonosov Ridge, which Russia already claims. In addition, most obvious maritime boundary dispute is between the United States and Canada is in the Beaufort Sea (Baker and Byers, 2012). As can be realised in this context, the UN Convention on the Law of the Sea may cause problems and legal gap due to the fact that it cannot meet the needs according to the changing conditions of the Arctic region.

Accordingly, five Arctic states issued the Ilulissat Declaration in 2008, confirming that each state would remain devoted to the legal framework of UNCLOS to resolve any coinciding claims (Hong, 2012). The purpose of this declaration is to keep the Arctic Region as a peaceful area away from hot conflict despite the border disputes.

4.1.5. Environment

As Arctic and non-Arctic countries increase their economic and political presence in the region, several environmental problems in the region are expected to increase and become more visible. Increasing maritime transportation is one of the primary concern

for the environment in the Arctic region. The maritime traffic to be created by the emerging sea routes that are expected to be widely used in maritime transport poses great risks to the unique and vulnerable Arctic ecosystem. (Parks et al., 2019). In this context, environmental groups have concerns that increased maritime traffic will leave irreversible environmental damage in the Arctic Region (Booth and Ferris-Rotman, 2018).

Another issue threatening the arctic ecosystem is plastic pollution. Increasing maritime traffic, industrial activities, and human activities are the main factors causing plastic pollution. Plastic pollution in the Arctic Ocean is particularly concentrated in active industrial areas such as the Barents Sea. It is stated that plastic pollution in the Arctic Ocean can have serious consequences for nature of the region. (Grøsvik et al., 2018). Nevertheless, it is seen that the scientific data in the literature regarding the damages caused by plastic pollution is insufficient. Particularly, Russia and Norway are expected to conduct more scientific research and take necessary precautions for the region due to their close location to the Barents Sea and their intense activities in the region (Hough, 2015). In this context, it is recommended to restrict the use of certain types of plastic in the Arctic Region. In addition, recycling and disposal should be carried out with regional projects as well (Ivanova, Sokolov and Kharitonova, 2018). Apart from the pollution produced by the increasing marine traffic and plastic pollution, oil spills, waste water and sewage wastes also pose a great threat to the Arctic environment (Afenyo, Jiang and Ng, 2019). As mentioned earlier, it does not seem possible to prevent and clean oil spills with existing technologies in Arctic conditions. Also, ignoring the risk of spill and continuing industrial activities in the region could seriously harm the ecosystem and would create irreversible damages.

Aforementioned factors, which cause environmental concerns in the Arctic Region, are tried to be controlled by a number of rules that regulate the approaches of pollution reduction techniques in ice-covered areas. As a result, given the potential for oil pollution to affect a wide range of national jurisdictions, the governance structure that regulates offshore oil and gas activities in the Arctic has to be strengthened in terms of oil spill prevention and response (Gulas et al., 2017). However, since there is limited technological capacity to prevent oil spills in the Arctic, and logistical difficulties arising from the deviation of the region also delay activities for environmental protection (Doelle, Bankes and Porta, 2012).

On the other hand, there is an opinion that sea routes formed as a result of melting

glaciers, which are seen as one of the bad consequences of global climate change, can be beneficial for mitigation of climate change. Since the usage of Arctic maritime routes will reduce the distance to be travelled, as well as reduce the fuel requirement and use, and accordingly, carbon dioxide emissions will decrease (Aksenov et al., 2017). However, this situation should not be expected to have effects that will reduce global warming. Also, it should not be forgotten that the melting of glaciers in the Arctic region itself creates global problems.

Under all these observed environmental conditions, it is expected that the countries in the Arctic Region should focus on environmental and social issues instead of fighting in order to increase their benefits, and they should attach importance to the protection of nature and indigenous population. Industrially active areas offering several economic opportunities, however they will be encounter with significant threats, which policy makers need to take potential effects into account on the environment and native populations (Eliasson et al., 2017).

4.1.6. Strategy Documents of Countries

In addition to the scientific studies, it is very important to examine the national policies of the Arctic states, which are the most important actors in the region. It's an important step in order to precisely identify the challenges and opportunities that countries may encounter in the fields of environment and energy.

4.1.6.1. Arctic Council Member Countries' Strategies

4.1.6.1.1. Canada

Approximately 40% of Canadian land is considered as Arctic or at least northern. Furthermore, 150,000 indigenous people live in Canada's Arctic territories (Arctic Council, 2021). There are several mentioned objectives in the latest Arctic policy published by Government of Canada. The first of these objectives is to ensure the indigenous peoples' social development and enhance their living conditions. At the same time, it is also stated as another target to improve the northern region as well as Canada's other regions and strengthen the regional economy. Priority areas that strengthen the regional economy are listed as tourism, commercial fisheries and cultural industries following the energy sector. Simultaneously, the importance of maintaining the ecosystem and the environment in Canada's arctic strategy is

underlined. In this regard, it is also tried to diminish effects of the climate change. Also, the protection of endangered species is also among the issues given in this respect.

Arctic policy of the Canada has also emphasized the importance of north and the northern people are safe and well defended. In this context, Canada made clear that it will continue to demonstrate its sovereignty in the region both socio-economically and militarily (Government of Canada, 2019). Nevertheless, there are also a few unresolved international issues between Canada and other littoral states. For example, with the United States in the Beaufort Sea and with the Kingdom of Denmark over Hans Island. On the other hand, the legal interpretation of the Northwest Passage by Canada as domestic waters rather than an international passage is another point of conflict between Canada and the United States (Arctic Institute, 2021). In May 2019, Canada submitted its expected partial submission regarding its continental shelf in the Arctic Ocean to the United Nations Commission on the Limits of the Continental Shelf (CLCS). However, with the promptly changing dynamics in the Arctic bringing more human activity, especially tourism, security of the environment remains firmly on the radar for Canada (Arctic Institute, 2021).

4.1.6.1.2. The Kingdom of Denmark

The national Arctic strategy of the Kingdom of Denmark covers three areas. These areas are; Denmark, Greenland and the Faroe Islands. Greenland, considered as the world's biggest “non-continental island”, is situated on the continent of the North America. However, in terms of geopolitics, it is part of Europe. In addition, the population density is the world's lowest. Greenlanders are descended from the Thule Culture of the Inuit. Since the Thule people were skilled hunters, hunting was historically the most valuable source of food for the Greenlandic people.

Besides, gold, diamonds, coppers, rare earth minerals, and oil are among the natural resources found in Greenland. The tourism industry is also growing, as the number of tourists increases. On the other hand, the Faroe Islands are a group of 18 islands in the North Atlantic Ocean halfway between Iceland and Scotland. Consequently, the Faroe Islands are strategically located in the center of the European-North American shipping line. The primary source of income for the islanders is fishery resources. In this sense, the Danish Government is accountable for the Kingdom of Denmark's foreign and security policy as well, which is carried out close partnership with the

governments of Greenland and the Faroe Islands. Also, the Danish Armed Forces perform an important role such as sovereignty protection in the region (Arctic Council, 2021).

“The Kingdom of Denmark Strategy for the Arctic 2011-2020” emphasizes four priority areas. These are security issues, sustainable development of economic opportunities, climate changes, and international cooperation. Besides, Greenland places a high value on socioeconomic growth of population, improved healthcare and education services, and infrastructural improvements (Kingdom of Denmark, 2011). The Arctic policy of the Kingdom of Denmark is uncontroversial. Despite recognizing the risk of conflict in the region, it emphasizes the importance of “international cooperation” as well (Arctic Institute, 2021).

4.1.6.1.3. Finland

Although Finland's Arctic Region Strategy 2013 identifies the whole country as Arctic, almost one-third of the country's territories situated above the Arctic Circle, which is the province of Lapland (Arctic Council, 2021). In 2013, the Finnish government published an updated strategy called as "Finland's Strategy for the Arctic Region 2013". The revised strategy is more economic opportunity oriented and on the basis of five essential principles. These are listed as; Finland is an Arctic country, its expertise in the Arctic Region, sustainable development and environmental protection, exploitation of economic opportunities, and international cooperation (Arctic Institute, 2021). Between 2017 and 2019, Finland served as the Arctic Council's chairman. Even if Finland has no direct access to the Arctic Ocean, it is seeking a role as a technology and service provider country. To this end, Finland's Arctic priorities are primarily focused on sustainable development, economic opportunities, indigenous concerns, and promoting the European Union as an Arctic stakeholder (Prime Minister's Office Finland, 2013; Arctic Institute, 2021).

4.1.6.1.4. Iceland

The sustainable use of natural marine and energy resources are Iceland's primary industries. Also, tourism become a significant part of economy of the Iceland in recent years. Furthermore, Iceland is also the only Arctic state without an indigenous population in its territories (Arctic Council, 2021). In terms of Arctic policies, Iceland's parliament published “A Parliamentary Resolution on Iceland's Arctic Strategy” in

2011, with twelve principles. Among the twelve principles described in this strategy are highlighted the importance of maintaining Iceland's status as a coastal state, improving the socio-economic conditions of Arctic people and their communities through access to sustainable growth (Government of Iceland, 2011; Arctic Institute, 2021).

4.1.6.1.5. Norway

Northern Norway's economy has been based on fishing and marine resources for decades. However, fisheries, tourism, sustainable energy, power, and mining are all important industries today (Arctic Council, 2021). It's necessary to separate the mainland of Norway and the “Svalbard archipelago” when considering Norway and the Arctic. The Svalbard Treaty, signed in 1920, gave Norway sovereignty over the Svalbard. However, the Treaty grants citizens of the signatory countries the freedom of habitation and work on the islands, and limits Norway's power related to tax policies and militarization of Svalbard (Arctic Institute, 2021).

The following five areas were given top priority by the Norwegian government: international cooperation, knowledge-based economic development, development of the scientific studies, creating reliable infrastructure, emergency preparedness, and environmental protection (Norwegian Ministry of Foreign Affairs, 2014). One of Norway's top foreign policy priorities is the Arctic and its economic development. Exploration and development of oil and gas reserves in the Barents Sea, in particular. Norway encourages the development of new technologies and businesses in the region. Furthermore, the Norwegian government is aware that international cooperation in the region is critical. In this regard, the Barents Sea Agreement in 2010 between Norway and Russia looks like an outstanding example of how to resolve such overlapping interests (Arctic Institute, 2021).

4.1.6.1.6. The Russian Federation

Russia covers 53% of the Arctic Ocean's coastline including six seas. These are the Barents Sea, Pechora, South Kara, Kara, Laptev and Chukchi. Approximately, two and a half million people living in Russian Arctic territory. As a result, one of Russia's top national priorities is the productive and effective growth of the Arctic Region. Russia's main Arctic industry is the extraction of natural resources, especially oil and natural gas. The nation produces the third-largest amount of hydrocarbon resources in the

world. According to USGS, more than half of the resources are on the Russian coast with 58 percent of the total, Russia is by far the largest resource owner. More than half of the potential Russian Arctic resources are situated in the West Siberian Basin, and almost 80% of those resources are natural gas (USGS, 2008). Exploration and exploitation of these massive resources might be critical for the Russian economy in the long run, not only because of the economic advantages it could bring to the country's northern regions, but also because the generation of oil revenues remains critical for the budget of Russian Federation.

Another high-priority of Russian Federation is Arctic's socioeconomic growth. Moreover, the development of science and technology are one of the major priorities. Environmental protection and regional cooperation are also given equal importance in the Arctic (Arctic Council, 2021). Furthermore, Russia's national strategy related to the Arctic region consist using the natural resources of the region for the social and economic development of Russia (Russian Federation, 2008).

4.1.6.1.7. Sweden

In Sweden's latest strategy document "Sweden's strategy for the Arctic region" published in 2020, priority was given to 6 areas. These areas can be listed as: (1) international cooperation, (2) security and stability, (3) climate and environment, (4) scientific research studies, (5) sustainable economic development, and (6) regional development and indigenous people (Government Offices of Sweden, 2020). Since Sweden does not have direct entree to the Arctic Ocean, it is trying to position itself as a supporting country by offering services, scientific research, and information (Schulze, 2017).

4.1.6.1.8. The United States

The United States became an Arctic nation in 1867 with the purchase of Alaska. Alaska's main industries have been petroleum exploration and mining. Fishing and tourism are the two other important sectors that are gaining importance and demand. The United States' priorities in the Arctic include national security, promoting cooperation and partnership with other regional countries, protection of the environment, economic development, involving indigenous population in policies that affect them, and funding scientific research (Arctic Council, 2021).

On the United States, Arctic development is concentrated in Alaska, where the

majority of discoveries and production has happened onshore. The United States' Arctic strategy places a special emphasis on national security. This includes both military and environmental policies, as well as energy policy. The United States places a high focus on the development of oil and natural gas, mineral resources, and ensuring free trade (Schulze, 2017).

Table 5. Opportunities and challenges mentioned in Arctic policies of Arctic Council member states.

Country	Opportunities	Challenges
Canada	Regional development and economic benefits: Tourism, commercial fisheries, natural resource sector, and cultural industries	Outstanding international disputes: Lomonosov Ridge Human activity related ecosystem and environment problems
Greenland	Natural resources: Gold, diamonds, rare earth minerals, oil Tourism Strategic location: in shipping line Fishery Scientific research activities	Traditional lifestyle of indigenous people Risk of international conflict
Finland	Scientific research activities	Traditional lifestyle of indigenous people Environmental concerns
Iceland	Natural marine and energy resources Tourism	Environmental concerns
Norway	Fishing and marine resources Tourism	Risk of conflict Lack of emergency preparedness and

Table 6 (continued). Opportunities and challenges mentioned in Arctic policies of Arctic Council member states.

	Sustainable energy Mining Natural resources: oil and natural gas	environmental concerns
Russia	Regional development: socio-economic growth Natural resources: oil and natural gas Science and technology development	Risk of conflict and security concerns Environmental protection
Sweden	Scientific research activities Regional development	Environmental concerns
United States	Natural resources: oil Mining Fishery Tourism Scientific research activities	National security concerns: regarding energy and environmental related policies, and militarily

Table 3 above summarizes the opportunities and obstacles posed by the Arctic policies of the Arctic Council member states. In this context, comparing the opportunities and challenges posed by countries, it is concluded that there are some differences between the "Arctic Five" and the "Arctic Eight". The opportunities presented by the littoral states in their strategies for the region are regional development and economy centred. The main economic opportunities mentioned are; mineral resources, hydrocarbon reserves, fishing, and tourism. On the other hand, the Arctic strategies of Iceland, Sweden, and Finland are primarily scientific research oriented. In economic terms, being a service provider country to the region is among its economic interests. When

the challenges posed by countries are examined, the main challenges that arise are the necessity of protection of the environment and the fragile ecosystem, the risk of international conflict against regions rich in natural resources, and the protection of the traditional lifestyle of native population. In this context, while littoral states emphasize the risk of international conflict in addition to other problems, the states that do not have a coast on the Arctic ocean highlight environmental problems.

4.1.6.2. Observers

Apart from the Arctic nations, the Arctic Council observer states also have a considerable presence and develop strategies for the region. Since the presence of some observer members in the region is at least as important as the Arctic states, it is very important to examine the strategy documents in order to understand their perspectives on the region and to have information about the possible future of the region.

Non-Arctic states should be agreed to several key conditions to be accepted as observer member states to the Arctic Council. Accordingly, they must embrace and support the Arctic Council's objectives as outlined in the Declaration of Ottawa, as well as acknowledge the Arctic nations' sovereignty and jurisdiction within their Arctic territories. Moreover, candidates for observer status have to recognize the United Nations Convention on the Law of the Sea (UNCLOS) as the Arctic ocean's legal framework (Arctic Council, 2019).

Engagement to the Arctic Region as an observer member state is considered a beneficial situation for countries. The observer states can send experts to the working groups and task force meetings. It is also important for commercial interests of observer states. Observers can also contribute search and rescue and oil spill response activities. With the help of Arctic Council, Arctic nations also may work together with observers about climate change mitigation and adaptation actions. Presence of non-Arctic observers in the Arctic Council may be an effective reinforcement for implementations of Paris Agreement as well.

Currently, there are 13 observer countries in the Arctic Council, which are United Kingdom, Poland, France, Germany, Italy, Netherland, Switzerland, Spain, India, Singapore, Japan, China, and South Korea. Among the Arctic Council observer countries, **China**, which attracts the most attention with its involvement in the Arctic Region, prioritizes scientific research and the scientific research value of the region.

Secondly, regarding the environmental protection China aims to use environmentally-friendly polar technical equipment. In particular, China aims to be involved in the region in the development of the Arctic sea routes. In addition to this, extraction and exploration of oil, natural gas and mineral resources in the region, fishing, and tourism sectors are also listed among the economic areas that China gives importance to (The People's Republic of China, 2018). **France's** priority areas are: Cooperation in scientific research and economic opportunities, defense and security concerns, environmental protection, French presence in the Arctic Council, and European Union (French Republic, 2016). Priority areas of **Germany** can be listed as: Climate change and environmental protection, international cooperation, security issues, scientific research, sustainable development and security of indigenous peoples. Also, Germany supports international cooperation, prioritizes scientific studies, and develops policies by being aware of the fragile ecosystem of the Arctic region (The Federal Government of Germany, 2019). **India** is an active country in climate studies, as the effects of climate change create significant economic difficulties for India. On the other hand, India has diplomatic and commercial ties in the extraction and development of Arctic hydrocarbon resources through its partnership with several Arctic states (Government of India, 2013). **Italy** is a country that has scientific research history for many years in the Arctic Region, focusing on the environment and biodiversity, and attaching importance to climate change. Most of the scientific studies carried out are aimed at the protection of the Arctic ecosystem (Ministry of Foreign Affairs, 2015). **Japan** is investing in satellite systems, research stations and research vessels in order to improve its presence in the Arctic Region. Environment, indigenous peoples, science and technology, international cooperation, sea routes, development of natural resources, and national security are listed as priority areas of Japan. In addition to all these, Japan conducts scientific research on the Arctic Region, supports international cooperation, and showed its interest in Arctic sea routes, partnerships for mineral resources, and continuing fishing activities while protecting the environment (The Headquarters for Ocean Policy, 2015). **Netherlands** attaches importance to climate change and environmental issues. The Dutch government prioritizes research and development investments that make climate-friendly technologies in order to cope with the negative effects of climate change such as sea level rise due to melting of ice and ocean acidification (Arctic Institute, 2021). The presence of **Poland** in the region is based on years of scientific research. Poland, on the other hand, favors international cooperation

in the Arctic Council and promotes the potential involvement of the European Union to the Arctic Council (Arctic Institute, 2021). The **Singapore** government has policies regarding the maritime routes expected to emerge as a result of climate change. Shipbuilding and port management are some of Singapore's areas of expertise, and Singapore's Arctic Region investments are shaped around these areas. Since Singapore is highly dependent on maritime trade as an economy, it closely follows the changes in the Arctic Region (Arctic Institute, 2021). **South Korea** has been active in scientific research in the Arctic region since the early 90's. The goals stated in the policy document published by South Korea are listed as strengthening international cooperation, increasing the technological and scientific research capacity, and benefiting from economic opportunities in the Arctic Region by considering sustainability (Korea Maritime Institute, 2013). **Spain** involved in the Arctic regions predominantly through international scientific cooperation. According to its strategy paper, Spain aims to conduct scientific research activities through international cooperation, protect the environment, maintain its presence in international organizations related to the polar regions, protect the well-being of indigenous people, develop sea routes within the framework of international law, and manage Arctic fishery resources under the auspices of the European Union (Government of Spain, 2016). Also, Spain's earliest presence in the polar regions, even if primarily Antarctic, helps to maintain its presence in the Arctic Region (Arctic Institute, 2021). Despite being the newest observer of the Arctic Council, **Switzerland** is among the leading countries in polar research activities. Switzerland attaches importance to international cooperation, and conducts research on the negative effects of climate change. At the same time, Switzerland is seen as a technology provider country for the polar research. Switzerland's superior scientific research capacity, its sensitivity to the environment, and its technological capacity suitable for polar conditions helped its involvement as an observer country to the Arctic Region (Swiss Federal Department of Foreign Affairs, 2015). As a last observer country, **the United Kingdom** in its Arctic strategy paper, primarily focuses on scientific research, climate change, the environment, and indigenous peoples. It also supports regional and economic development with its policies related to commercial maritime routes, energy activities, and fishing resources (Polar Regions Department, 2018). On the other hand, post-Brexit, Scotland reshapes its foreign policy of the Arctic to differentiate itself from the UK. In 2019, Scotland published its first Arctic policy document called "Arctic Connections" (Arctic

Institute, 2021).

Due to their political status in the region, it is not possible to evaluate the strategies of the observer countries towards the Arctic region like the littoral states. However, the strategies of the observer countries are also very decisive in terms of understanding the possible future of the region. In this context, Table 4 shows the areas that the observer countries prioritized and considered as opportunities in the Arctic Region.

Table 7. Priority areas of the observer counties.

Countries	Prioritized Areas
United Kingdom	<ul style="list-style-type: none"> • scientific research • climate change • environment • indigenous population • commercial maritime routes • energy activities • fishing resources
Poland	<ul style="list-style-type: none"> • scientific research • international cooperation
France	<ul style="list-style-type: none"> • scientific research • economic opportunities • defense and security concerns • environmental protection
Germany	<ul style="list-style-type: none"> • climate change and environmental protection • international cooperation • security issues • scientific research • sustainable development • security of indigenous population
Italy	<ul style="list-style-type: none"> • environment and biodiversity • climate change • scientific studies

Table 8 (continued). Priority areas of the observer counties.

Netherland	<ul style="list-style-type: none"> • climate change • environment • scientific studies
Switzerland	<ul style="list-style-type: none"> • scientific research • international cooperation • climate change • environment
Spain	<ul style="list-style-type: none"> • international scientific cooperation • protection of the environment • indigenous people • maritime routes • international law • fishery
India	<ul style="list-style-type: none"> • climate change • scientific studies • extraction and development of Arctic hydrocarbon resources
Japan	<ul style="list-style-type: none"> • environment • indigenous people • science and technology • international cooperation • sea routes • development of natural resources • national security • mineral resources • fishing activities
Singapore	<ul style="list-style-type: none"> • emerging maritime routes • climate change • shipbuilding and port management

Table 9 (continued). Priority areas of the observer counties.

<p>China</p>	<ul style="list-style-type: none"> • scientific research and the scientific research value • environmentally-friendly polar technical equipment • Arctic maritime routes • extraction and exploration of oil, natural gas and mineral resources • fishing • tourism sectors
<p>South Korea</p>	<ul style="list-style-type: none"> • international cooperation • technological and scientific research capacity • business opportunities in the Arctic Region • sustainability

It was concluded that the areas prioritized or considered as an "opportunity" by the observer countries are different from the member states of the Arctic Council. Observer countries give priority to the soft topics such as climate change, environment, local peoples, scientific research and international cooperation. Environmental and ecosystem problems, which are mostly considered as difficulties by Arctic Council member countries, are shown as a priority area and reason for being in the region for observer countries. On the other hand, although some observer countries have economic interests, it is also revealed that the main motivation for the region in general is conducting scientific research.

As a result, these outputs reveal that the presence of observer countries in the region can be considered as an opportunity for environmental issues and for the future of the Arctic region.

CHAPTER 5 SCRUTINIZING THE ENERGY AND ENVIRONMENT RELATED ASPECTS IN THE ARCTIC REGION: WHAT ARE THE PRIORITIES?

5.1. Analysis and Findings

5.1.1. Energy

5.1.1.1. Natural Resources of the Arctic Region

The fact that the Arctic region hosts 13% of the world's undiscovered oil reserves and 30% of the undiscovered natural gas resources and these resources become accessible as a result of the melting glaciers with the effect of global warming creates new dynamics in the region. The Arctic Region is becoming an appealing territory for both Arctic and non-Arctic states as its geostrategic importance grows. Even for geographically distant states, the Arctic Region is regarded a strategic location due to its massive hydrocarbon reserves. When the oil and natural gas in the Arctic Region is produced continuously will also be reflected in market prices, therefore developments are closely followed by global actors. However, in addition to the opportunities such as accessible energy resources that emerged, with the effect of climate change, several difficulties also arise in the region. For that reason, the Arctic Region is becoming prominent not only in the energy and environment field, but also in the economic, political and military issues. In this context, the arctic, which is the ultimate limit of energy supply, is becoming increasingly significant, as a consequence of rising energy demand as a result of increasing population and industrialization, and experts underlined the Arctic Region's global importance:

“When we say the Arctic, we are talking about a region that has been spoken more and more in recent years, especially in the context of energy. Because the energy demand due to rapidly increasing economic growth, the increasing energy demand due to population, directs our attention to new regions, especially to regions that have not been explored until now.”

Interview 2, Turkey, Academician in Energy Geopolitics and Security

“With its mineral resources, geographically and politically, in terms of natural resources, Greenland will be the centre of future developments in the Arctic.”

Interview 4, Italy, Senior Manager

“Of course, oil and natural gas in the Arctic increase geostrategic importance of the region. [...] the region will become a very important place in the future. Also, if we add that oil and natural gas are about to run out in other regions and with the effect of global warming and melting glaciers, it seems that this region will create a really hot agenda from every angle.”

Interview 3, Turkey, Military Attaché Served in Norway (Retired)

“With the melting of glaciers in the Arctic region, the region becomes more accessible. In this way, the possibility of extracting natural resources in the region increases. As other oil-rich areas become gradually empty, the potential in the north becomes more obvious. [...] more countries are interested in the Arctic and the opportunities it creates.”

Interview 6, Norway, Senior Defence Consultant

“It is not possible to keep energy separate from economy or politics in any way. We need to consider it as an energy and geopolitics. [...] Because the energy demand due to rapidly increasing economic growth, the increasing energy demand due to population, directs our attention to new regions, especially to regions that have not been explored until now. Therefore, the Arctic may first come to the fore in terms of energy, but it is not possible to separate it from the economic and political dimensions.”

Interview 2, Turkey, Academician in Energy Geopolitics and Security

5.1.1.2. Renewable Energy Potential of the Region

Hydrocarbon reserves are not the only reason why the Arctic Region is considered as significant in the field of energy; the region also has a great renewable energy potential. In the future, it will be possible to use the renewable energy potential of the region with technological developments and decreasing costs in renewable energy systems. Topics such as energy efficiency and energy density should be targeted. Governments, the private sector, and the scientists should work together to ensure sustainability in the region. On the other hand, considering the fragile nature of the region, energy activities in the region should be carried out within the framework of sustainability. Although the Arctic Region's oil and natural gas resources are tempting, efforts to mitigate the effects of climate change and encourage renewable energy should be prioritized, since just being in the Arctic region is an issue that will create

emissions in itself:

“If the energy resources in the Arctic Region are to be produced, it will be more beneficial to seek ways to use them in a way that is less harmful to the environment, with the new technologies. Supporting investments in this direction and directing companies towards it can be at least an opportunity.”

Interview 1, Turkey, Academician on Climate Change and Environment

“We should work with major oil companies to ensure sustainable extraction of resources. I see great potential in cooperation.”

Interview 8, Norway, Scientist

“Focusing on energy efficiency. Reducing the energy density. These should be the main goals. Therefore, the future of the world is in renewable resources. This is a huge disadvantage for the Arctic at a time when oil prices are low.”

Interview 2, Turkey, Academician in Energy Geopolitics and Security

5.1.1.3. Technological and Logistical Challenges of Producing Oil and Gas in the Arctic

The rich hydrocarbon resources in the Arctic Region are frequently mentioned as an opportunity and it is stated that these resources have become accessible with the changes caused by global warming. However, it is not possible to produce oil and natural gas resources in the Arctic Region only through the effects of climate change. In this context, the harsh polar climate in the Arctic Region, the need for technology and special equipment suitable for the conditions of the region, the logistics problems that may occur due to the geographical distance of the region, and the position of the energy market are the main issues that may negatively affect or slow down the production of natural resources in the Arctic Region. The Arctic Region continues to be a problematic area to work in due to its challenging conditions. In order to carry out any activity in the region, ice-class equipment and ice-breakers are needed, which increases the cost. On the other hand, the geographical distance of the oil and natural gas to be produced in the region, the logistical problems that may occur and the low prices in the energy markets also question the feasibility of extracting the resources in the Arctic Region. When high costs and low oil prices are combined, investment in the region cannot be made:

“There is a potential in the Arctic Region, but at the same time there is also a problem of cost. [...] the reasons for the high cost are that the region is an extremely cold area. Technologies to be used here require special design. Special materials are required for both exploration and drilling equipment. Furthermore, in order to work in the region, it is necessary to keep a large stock of spare materials and parts, which increases the cost. As a natural consequence of all this, many investment banks are hesitant to give loans for new exploration and drilling projects to be made in the Arctic [...].”

Interview 2, Turkey, Academician in Energy Geopolitics and Security

“In addition to the factors created by climate change, technological development is also important, and developments facilitate the extraction of energy resources in extreme conditions. With the development of technology, it becomes possible to drill deeper and in extreme weather conditions. All these factors increase the importance of the Arctic region.”

Interview 6, Norway, Senior Defence Consultant

“As the glaciers begin to melt, access to oil and mineral resources under the glaciers increases. Technology is also a factor, but despite the advancement of technology, breaking glaciers is not an easy task... Geographical distance is one of the challenges. Ice-breaking ships are needed.”

Interview 1, Turkey, Academician on Climate Change and Environment

“Continental shelves and deep ocean waters go further than 500 meters deep. It would not be wrong to say that almost no work has been done in these areas due to technological problems. [...] 90 billion barrels of oil reserves are estimated. Now, it is also discussed that all that is found will be produced. The ability to produce over 40-50% of oil reserves is marginal. Usually less can be extracted.”

Interview 2, Turkey, Academician in Energy Geopolitics and Security

5.1.1.4. Exclusive Economic Zone Conflicts and Lack of International Framework

Rich hydrocarbon reserves, mineral resources, fishing, tourism, and logistics routes in the region attract the attention of the regional states and creates economic opportunities. These opportunities also make it difficult for the Arctic Ocean to be shared by the littoral states (Canada, Greenland, Norway, Russia, and the United

States). According to the United Nations Convention on the Law of the Sea (UNCLOS), littoral states have independent economic rights in the region up to “200 nautical miles” from their seabed. At the same time, they have the right to request expansion of their exclusive economic zone up to “350 nautical miles” according to Article 76 of UNCLOS. Due to this article, the littoral states may experience conflict of interests in areas that have economic potential in terms of energy, mineral resources and fishing. Due to aforementioned opportunities, national security concerns can be experienced in the region and the region is militarized. For instance, the mineral-rich Lomonosov Ridge, claimed by Canada, Greenland, and Russia, the Northwest Passage created debate between Canada and the United States, and the Barents Sea conflict that have been resolved between Russia and Norway. In order to prevent possible conflicts, the “Ilulissat Declaration” was signed by the littoral states. The experts underlined the exclusive economic zone problems, boundary disputes between littoral states and the necessity of a comprehensive international framework for the Arctic:

“It needs an arbitration unit in the region to resolve many ongoing maritime disputes regarding Law of the Sea issues. I think the Arctic Region is an area that needs coordination and cooperation.”

Interview 7, United States, Senior Manager

“There is a conflict of three countries, especially in the Lomonosov Ridge. There is a question mark on how the Arctic Council will handle this. The littoral states are especially considering how much of this region they can add to their continental shelf. Mineral resources, fresh water resources and fishing income are very important.”

Interview 3, Turkey, Military Attaché Served in Norway (Retired)

“Once the Arctic Ocean becomes accessible year-round with or without an icebreaker, it will become UNCLOS regulated international waters, which means everyone can access it. [...] International waters will be a matter of debate if we do not have a clear understanding of what to do with EEZs.”

Interview 5, England, Scientist

“In my opinion, the Arctic Council is not strong enough to intervene in the crisis, it does not have the power to intervene because it is the only international center. [...] From my point of view, there is a lack of international law to guarantee security.”

Interview 4, Italy, Senior Manager

“There is no overarching international framework for conflict resolution in the Arctic region. The closest we have to this is the United Nations Convention on the Law of the Sea. [...] Denmark claimed an area of 900,000 square kilometres beyond Greenland's coast. Of course, one of the reasons for this claim was for future commercial routes. Canada claimed that the Northwest Passage was within Canadian territorial waters. Against this, America claims that it is an international strait. Consequently, it is clear that there is a need for an inclusive international framework.”

Interview 6, Norway, Senior Defence Consultant

“Energy can be thought as both an environmental and national security issue. But from an economic point of view, I think energy is primarily a matter of national security.”

Interview 7, United States, Senior Manager

“According to the United Nations Convention on the Law of the Sea, each littoral state has the right to 200 nautical miles from their own coasts, which is approximately 170 kilometres. It has the exclusive right to all underground richness, from fishing to the surface of the sea and below the seawater. Lomonosov Ridge is a conflicted area. At the same time, the United States and Canada mutually claim portions of the Beaufort Sea. So there are unresolved exclusive economic zone issues in the region.”

Interview 2, Turkey, Academician in Energy Geopolitics and Security

“There is also a competition for natural resources such as oil and fishing. On the one hand, there are opportunities and commercial activities, on the other hand, these opportunities pose national security problems.”

Interview 6, Norway, Senior Defence Consultant

5.1.1.5. Disputes Over Svalbard

According to the Svalbard Agreement, the exercise of Norwegian sovereignty in the region is subject to certain conditions and not all Norwegian laws apply. Countries that signed the treaty were given equal rights to engage in commercial activities on the islands and mostly coal mining. Today, the ownership of hydrocarbon reserves and minerals, which have become accessible with the effect of climate change, has been the subject of debate. This situation causes disagreements between Norway and the signatory countries:

“There is also a rights issue regarding energy extraction and fish resources in the Svalbard region. Norway claims that it has exclusive economic zone rights around Svalbard. This is opposed by almost all signatory countries.”

Interview 6, Norway, Senior Defence Consultant

“For the Norwegian government, the Svalbard agreement was signed a century ago, and from the Norwegian perspective, the agreement is difficult to fully implement. In Svalbard, countries other than Norway also have some special rights in research areas. As a fully sovereign state, Norway wants to change this regime and I totally understand why.”

Interview 10, France, Scientist

“From the security point of view, Svalbard is a demilitarized area. Enforcement of regulations and law without a military presence other than coastal security is one of the challenges faced in the region. But so far these issues have not dominated the region, at least not as far as I have observed. I think emerging maritime routes, energy, resource extraction and science are the main field in the region.”

Interview 8, Norway, Scientist

5.1.1.6. Oil and Natural Gas Will Maintain Its Importance

Despite all these difficulties and the potential for conflict, the main reason why the region cannot be ignored is that oil and natural gas will maintain its importance in global markets and that the resources in the Arctic Region create great economic opportunities. The International Energy Agency makes predictions over various scenarios and accordingly the percentage of oil and coal will decrease in 2040 for reasons such as environmental concerns. In 2040, the share of oil falls from 34% to 28% in the scenario of the International Energy Agency. But the natural gas rises from 24% to 25%. This means that natural gas and oil will maintain their importance in the coming decades. Both as a fuel and as a resource, which is also very important input of various industrial products. Research shows that, despite the expected large increase in renewable energy, natural gas in particular will remain important:

“Any improvement in the context of oil and natural gas will have a global impact wherever it takes place in the world.”

Interview 2, Turkey, Academician in Energy Geopolitics and Security

“Today, 33.6% of the energy consumed in the world is met by oil. Despite all

the efforts to search for alternative energy sources, oil is indispensable for the transportation sector. [...] it is the input of thousands of industrial products. The second is natural gas, when we look at natural gas, 24% of the energy consumed in the world is met from natural gas and important fuel for energy transition.”

Interview 2, Turkey, Academician in Energy Geopolitics and Security

5.1.2. Environment

5.1.2.1. The Effects of the Changes in the Arctic Region on the Global Climate

Changes in the Arctic Region as a result of climate change affect not only the region but the whole world. The melting of glaciers causes a global change, affects natural processes and causes the change of climate systems. In fact, changes in ocean currents, acceleration of storms, growth of cyclones are processes associated with melting glaciers. As the ice cover disappears, the changes experienced are such that they can cause loss of biodiversity and food chains are also badly affected. At the same time, the changes in this region have environmental, social and economic consequences. In the interviews, experts highlighted the environmental effects of climate change and the changes experienced in the Arctic Region:

“The melting of glaciers in the Arctic has been one of the factors that made climate change visible. [...] The melting of glaciers triggers a global change. Ocean currents are changing, causing climate systems to change. The acceleration of storms, the growth of cyclones are processes associated with melting glaciers. Therefore, the change in the Arctic Region affects the whole world and causes chain reactions. Along with these natural results, social, economic and political consequences can also occur.”

Interview 1, Turkey, Academician on Climate Change and Environment

“We need to think and understand what the peak of climate change will mean for the Arctic and the world.”

Interview 5, England, Scientist

“What happens in the Arctic Ocean is the kind of thing that will concern everyone on the planet. It's not just about a particular region. Therefore, all states in the world are stakeholders. At the same time, each nation has a certain

responsibility, perhaps a duty, to contribute. So the responsibilities are not directly national, but global.”

Interview 8, Norway, Scientist

“According to the scientific studies, our future is seriously threatened. I do not approve the thoughts like climate change is not a big deal, or climates change happened at certain periods in history.”

Interview 3, Turkey, Military Attaché Served in Norway (Retired)

“As the ice cover disappears, you have different light regimes during the summer months. [...] This will cause some problems in the formation of algae and the emergence of organisms that would not normally be there during the summer months. As a result, you will find yourself in a chain of effects in which different organisms are formed outside of the right time. [...] My colleagues are mostly concerned about biodiversity loss. If biodiversity and food chains are badly affected, that is the real disaster. Biodiversity isn't just important for the Arctic. It is essential for the well-being of all humanity.”

Interview 8, Norway, Scientist

“Climate change is a problem in itself. When the resources there start to be consumed, the ecological effects it will create in the Arctic and in the world are very important because the effects there are not limited to the Arctic.”

Interview 1, Turkey, Academician on Climate Change and Environment

5.1.2.2. Sustainability Problem Arising from Emerging Opportunities in the Region

The Arctic Region has gained importance in the international arena and has become an area of interest for states. The main reason for this interest is that the region has become more available with the effect of climate change and its accessibility has increased. The changes resulting from climate change have created some opportunities in the region. With the melting glaciers, natural resources in the region have become reachable, logistics routes have started to emerge, fishing activities have gained speed and the interest in northern tourism has started to increase. It is even thought that the emergence of new sea routes could reduce carbon emissions. Although all these developments are considered as opportunities, the experts state that they will be more harmful to the region in the long run. For this reason, the region should be developed under the principle of sustainability in the long term rather than the profit it will bring

in the short term:

“The effects of this change in the long term lag behind the profit to be made in the short term.”

Interview 1, Turkey, Academician on Climate Change and Environment

“There are growing concerns for the future of the region also by countries outside the Arctic. These concerns pertain to energy, transport, routes, shipping, security and beyond. Therefore, there is a fundamental problem when it comes to the Arctic.”

Interview 5, England, Scientist

“Activities of oil, natural gas, and fishing should be based on knowledge and careful investigations and should be carried before accessing and starting research. We need an established system and regulations for these to happen. I think countries agree that at least a scientific community should be established and governance should be maintained in this way.”

Interview 8, Norway, Scientist

“With the emergence of new maritime routes carbon emissions may decrease, but if production activities continue at the same pace, carbon emissions will not decrease. If there is more trade because the route is shorter, there will be more emissions for their production, which creates a dilemma.”

Interview 1, Turkey, Academician on Climate Change and Environment

5.1.2.3. Pollution

Any industrial or human activity in the Arctic Region has irreversible effects on the environment. These impacts can also be considered as the biggest challenges related to the region. The consensus of experts is that the Arctic ecosystem should be protected and environmental issues should be particularly underlined. Pollution that may occur in the Arctic Region will damage the fragile ecosystem and cause irremediable damage. As a result of the interviews, the main points to be considered in the region are; oil spills, increased maritime traffic and tourism activities. Oil spills, which are very difficult to clean up even in traditional extraction activities, are considered very costly and nearly impossible in Arctic conditions. Full cleaning may not be achieved because of the icy waters. As a result of the oil spill in the region, the marine species in the region will be under great threat. On the other hand, it is expected that an additional pollution will occur in the region due to the increase in maritime traffic with

the emergence of sea routes. The materials used on the ships and the increase in the human population in the region are considered negative in terms of ecosystem of the region. In addition, tourism activities in the region are also seen as a threat to the environment. Even the footprints of people who come here are considered as pollution and pose a threat to the ecosystem. For this reason, environmental risks should be considered and the protection of the ecosystem should be prioritized by all states:

“Cleaning up an oil spill, even under normal conditions, cause enormous costs and may never be completely cleaned up. In the event of an oil spill, you destroy all marine life there. You are putting future generations at risk. As a result of such an accident in the region, even if it seems theoretically possible, it would be very unlikely and would take a lot of time to completely clean up.”

Interview 2, Turkey, Academician in Energy Geopolitics and Security

“Oil spills are increasing as maritime transport along the coasts of the emerging sea routes increases. Ships aren't always the way they should be, and that will have environmental implications.”

Interview 6, Norway, Senior Defence Consultant

“Tourism has a lot of negative effects. Maritime traffic increased dramatically in the Arctic Region. It causes pollution and also damages the nature. For example, if people walk on the tundra a path is formed from the footprints, and remains visible for 200-300 years, it is not covered by grass or anything else, the area is very sensitive.”

Interview 8, Norway, Scientist

“A significant amount of ships come to the north of Svalbard, Greenland, Norway for tourism activities, and hundreds of people pollute these places in that three-month period. The footprint of each actually means pollution.”

Interview 3, Turkey, Military Attaché Served in Norway (Retired)

5.1.2.4. Connection of Environmental Security and Human Security

As a result of the economic opportunities created by the climate change in the Arctic Region, the security problems of the indigenous people in the region also arise. The concept of security in the Arctic Region is generally evaluated within the framework of military and economic security. However, the changes experienced with the effect of climate change can also cause social, political and ecological problems. For this reason, with the effect of climate change, the concept of security in the Arctic Region

should be evaluated multidimensionally. Industrial and human activities which are expected to increase in the region will significantly affect the traditional lifestyles of indigenous people in the region. The economic security of the people, who mostly make their living by hunting and fishing, will also be under threat:

“The Arctic Region is undergoing a major change, and as a result, not only security, trade and environmental issues, but also the security of the people living in the Arctic Region are emerging. All these issues are interconnected and related. They are also affected by this change; they even experience it first-hand.”

Interview 9, Poland, Consultant in the International Security Program

“The effects of climate change cause greater threats and risks in terms of ecological security. Although the trade routes that will be emerged when the glaciers melt are seen as an advantage, it is a question mark how the melting of the glaciers will cause environmental problems. What will be the social and economic effects of this? [...] Security should not be considered one-dimensionally.”

Interview 1, Turkey, Academician on Climate Change and Environment

“Economic activities in the region and activities for the extraction of resources will completely change life of indigenous people and put them under threat. There are also health-related negativities caused by these activities. Their economic security is also under threat. They mostly survive by hunting and fishing. The extinction of these species will also negatively affect them.”

Interview 1, Turkey, Academician on Climate Change and Environment

5.1.2.5. The Importance of Conducting Scientific Studies and Developing the Region Under the Guidance of Science

With the changes experienced in the Arctic Region, the region has become more suitable for scientific studies. Scientific studies on the region gained momentum as it began to be able to reach distances that are difficult to reach under normal conditions. The region is considered to have great potential, especially for medical and biological research. At the same time, in order to ensure environmental protection as a result of the changes experienced, climate science should be focused in the region and environmental protection should be prioritized and developed under the guidance of science. In addition to that, scientific studies have an important place in ensuring

sustainable peace in the Arctic Region. Different nations will be able to conduct scientific studies peacefully in the Arctic Region, ensuring that the region is protected and remains as a peaceful area:

“The policy of European countries in the Arctic is very different from each other. [...] The common point is about cooperation, research, and climate change. This is a really good thing because we need these [...].”

Interview 5, England, Scientist

“We're talking about 6% of the world's surface. Scientists can work in different areas. It is necessary to involve the polar research with scientific studies.”

Interview 3, Turkey, Military Attaché Served in Norway (Retired)

“Polar research is a kind of diplomatic passport to access the Arctic Council. I think that economic issues are the matter of the private sector... Some dimensions, such as climate science, are global. There are non-negligible interactions between Arctic and global climate.”

Interview 10, France, Scientist

“We know that the Arctic is an important region for the entire planet, and the region is now more accessible. Previously, this was a mysterious area. What you are facing today is a new North Pole.”

Interview 4, Italy, Senior Manager

5.1.2.6. Necessity of Increasing Social Sciences and Humanities in the Arctic Region

It has been concluded that studies in the discipline of Natural Sciences are more common in the Arctic Region, and even today, the region continues to be dominated by Natural Sciences. However, with the changes as a result of climate change, the need of Social Sciences and Humanities, and interdisciplinary studies is increasing. Despite this fact, in the interviews with experts, it was stated that scientific studies in the discipline of Social Sciences and Humanities in the Arctic Region are less involved and supported compared to Natural Sciences. In order to ensure environmental protection in the region, it is important to popularize Social Sciences as well as Natural Sciences:

“I have a colleague who wants to do research on Svalbard in the field of Social Sciences and Humanities. However, Social Science is not allowed in Svalbard.”

Interview 10, France, Scientist

“Especially with climate change, interdisciplinary studies regarding to the polar regions need to become more widespread. Scientifically, there is a need to be more involved, and governments need to develop strategies to support science.”

Interview 1, Turkey, Academician on Climate Change and Environment

“The region is suitable for conducting atmospheric research, it is a quiet and undisturbed place to work, and the atmospheric conditions are quite suitable. [...] Natural sciences dominate the region in general. There are few social science projects in the region, mostly geography and sociology are studied, there is not much history or other fields.”

Interview 8, Norway, Scientist

	ENVIRONMENT	ENERGY
CHALLENGES	<p>Climate change</p> <ul style="list-style-type: none"> → Social and economic consequences → Changes in climate systems (changes in ocean currents, increase in storms, increase in cyclones) → Global responsibility <p>Preservation of ecosystem function</p> <ul style="list-style-type: none"> → Long-term effects of human activities <p>Pollution</p> <ul style="list-style-type: none"> → Oil spill → Increased maritime traffic → Arctic tourism <p>Environment and human security</p>	<p>Hydrocarbon reserves</p> <ul style="list-style-type: none"> → Technological and logistical barriers (geographical distance, harsh climatic conditions, special equipment requirement) → Feasibility problem created by low prices <p>Renewable energy</p> <ul style="list-style-type: none"> → Technological and logistical barriers <p>Exclusive Economic Zone border disputes arising from energy resources</p> <p>Lack of international framework</p>
OPPORTUNITIES	<p>Increase in scientific studies</p> <ul style="list-style-type: none"> → The necessity of increasing studies in the discipline of social sciences and humanities <p>Decrease in carbon emissions due to the emerging maritime routes</p>	<p>Hydrocarbon reserves</p> <ul style="list-style-type: none"> → Increasing energy demand → Increasing accessibility with the effect of climate change and technology <p>Renewable energy</p> <ul style="list-style-type: none"> → High potential <p>Mineral resources</p> <ul style="list-style-type: none"> → High potential <p>Oil and natural gas will maintain its importance</p>

Figure 3. Opportunities and challenges revealed as a result of the in-depth interviews

* Author's illustration

CHAPTER 6: CONCLUSION

6.1. Conclusion and Policy Recommendations

As a result of climate change and melting of glaciers, several opportunities emerged in the Arctic Region. These opportunities can be listed as the accessibility of minerals and rich hydrocarbon resources in the region, emerging maritime routes, tourism, and fishing activities. As a result of these opportunities, the region has become a new competition area among the littoral states and it has also led to an increase in the interest of non-Arctic states towards the region. However, while the changes in the Arctic Region create opportunities for the Arctic and non-Arctic states, they also cause several difficulties. The geopolitical changes in the region cause some security problems and transformed the political balance. Likewise, the effects of environmental problems in the region are not limited to the Arctic Region, but caused global effects. Despite the problems arising in the region, the biggest factor that increases the visibility of the Arctic Region in the international arena is rich hydrocarbon reserves it holds. It is predicted that the Arctic Region has 13% of the world's undiscovered oil reserves and 30% of the undiscovered natural gas resources. These figures keep the interest of states and multinational companies in the Arctic Region alive. On the other hand, the most important issue that comes to mind when the Arctic Region is mentioned is climate change and the necessity of preservation of the environment. The environmental impacts of industrial and human activities, which are generally considered as opportunities in the Arctic Region, can be described as the biggest challenge.

In this context, in order to reveal the opportunities and challenges related to the energy and environmental fields, semi-structured in-depth interviews were conducted with 10 stakeholders who are experts in their fields. At the same time, in order to avoid a biased result and to validate the interviews, multiple method triangulation was applied. In this sense, the opportunities and challenges obtained from the literature review and the strategy documents of the Arctic Council member and observer countries were compared with the interview results, and their accuracy is tested. In this way, the areas that should be prioritized in the Arctic Region in the fields of energy and environment were determined. The opportunities and challenges in the fields of energy and environment obtained as a result of the application of three different methods are shown in Figure 4.

	OPPORTUNITIES	CHALLENGES
LITERATURE REVIEW	<ul style="list-style-type: none"> Rich hydrocarbon resources Mineral resources Potential of renewable energy Regional development Emerging maritime routes 	<ul style="list-style-type: none"> Environmental pollution Cost of energy production in polar conditions Environmental problems that may occur due to technological and logistic deficiencies Disputes between littoral states Preservation of the traditional lifestyle of indigenous population
STRATEGY DOCUMENTS	<ul style="list-style-type: none"> Natural resources Regional development Mineral resources Tourism and commercial fisheries Emerging maritime routes Potential of scientific research Potential of renewable energy 	<ul style="list-style-type: none"> Disputes between littoral states and national security issues Environmental problems Preservation of the traditional lifestyle of indigenous population
IN-DEPTH INTERVIEWS	<ul style="list-style-type: none"> Scientific studies (especially in the field of social sciences) The possibility of decreasing carbon emissions due to the emerging maritime routes Hydrocarbon reserves Renewable energy potential Mineral resources 	<ul style="list-style-type: none"> Climate systems changing as a result of global warming Protection of the ecosystem and environmental pollution Environment and human security Technological and logical barriers for energy production Insufficient international legal framework Disputes between littoral states

Figure 4. Opportunities and challenges achieved by the multiple method triangulation.
 * Author's illustration

As a result of the literature review, opportunities related to the energy and environment fields in the Arctic Region can be listed as rich hydrocarbon reserves, mineral resources, potential of renewable energy, regional development opportunities, and emerging maritime routes. In addition to these, the Arctic countries consider tourism,

commercial fishery, and potential of scientific research as an opportunity in their strategy documents for the region. As a result of the analysis of semi-structured in-depth interviews, the rich hydrocarbon reserves, renewable energy potential of the region, mineral resources and scientific research potential of the region are listed as opportunities in the field of energy and environment, in common with the literature review and strategy documents of the Arctic states. On the contrary, different from the literature review and strategy documents, in-depth interviews with experts reveal that the possibility of decrease in carbon emissions with the effect of emerging maritime routes and scientific research opportunities in the field of social sciences as an opportunity.

Considering the challenges, environmental pollution, high costs of energy production in polar conditions, risk of oil spill, disputes between littoral states, need of preservation of the traditional lifestyle of indigenous population are the difficulties that arise as a result of literature review. In addition to the difficulties reached as a result of literature review, national security problems are also included in the strategy documents of the Arctic countries. The conducted interviews, on the other hand, reveal the challenges related to energy and environment in the Arctic Region in more detail. The change of global climate systems, the protection of ecosystems and biodiversity, the concepts of environmental and human security, technological and logistical barriers of energy production, and the inadequacy of the international legal framework have been evaluated by experts as difficulties encountered in the region.

Based on the aforementioned challenges and opportunities, priority areas for energy and environment have been determined and policy recommendations have been made for countries that want to engage in the Arctic Region in the future. Since it is expected that the opportunities in the Arctic Region will become more accessible and tangible in the future, it will be more profitable for the states that will be included in the region to create their strategies by considering these recommendations.

In this context, these policy recommendations can be listed as:

(1) The main motivation for inclusion in the Arctic Region should be determined as scientific study opportunities. In addition to the natural sciences and engineering studies that dominate the region, the discipline of social sciences and humanities should also be given importance.

(2) In addition to the classical understanding of security in the region, human security and environmental security concepts should be included. In this context, the

preservation of the traditional lifestyles of local people and the protection of the ecosystem should be among the priority areas.

(3) Countries that want to take advantage of the economic opportunities in the region can find a chance to be included in the region by solving the technological and logistical deficiencies in the region/by becoming a technology provider country.

(4) States that want to play a role in the extraction of energy and natural resources in the region should establish partnerships with Arctic countries to operate in the field.

(5) Countries that want to be included in the Arctic Region should be aware of the effects of climate change and should work to protect the ecosystem and biodiversity. Before taking advantage of the economic opportunities in the region, it should act in order to slow down the change in global climate systems and to protect the fragile ecosystem of the region.

REFERENCES

- Afenyo, M., Jiang, C. and Ng, A. (2019) *Climate change and Arctic shipping: A method for assessing the impacts of oil spills in the Arctic*, Transportation Research Part D, Transport and Environment, Vol. 77, pp. 476-490.
- Agarkov, S., Motina, T. and Matviishin, D. (2018) *The environmental impact caused by developing energy resources in the Arctic region*, IOP Conference Series: Earth and Environmental Science, Vol. 180, No. 012007.
- Aksenov, Y., Popova, E., Yool, A., Nurser A., Williams, T., Bertino, L. and Bergh, J. (2017) *On the future navigability of Arctic sea routes: High-resolution projections of the Arctic Ocean and sea ice*, Marine Policy, Vol. 75, pp. 300-317.
- Andersson, P., Zeuthen, J.W. and Kalvig, P. (2018) *Chinese Mining in Greenland: Arctic Access or Access to Minerals?* Arctic Yearbook, 2018, pp. 1-15.
- Arctic Council. (2013). *Arctic Council Rules of Procedure* [Online]. Available at: <https://oaarchive.arctic-council.org/handle/11374/940> (Accessed: 27 June 2021).
- Arctic Council. (2021). *About The Arctic Council* [Online]. Available at: <https://arctic-council.org/en/about/> (Accessed: 26 July 2021).
- Arctic Institute. (2021) *Countries* [Online]. Available at: <https://www.thearcticinstitute.org/countries/> (Accessed: 27 June 2021).
- Arruda, G.M. (2015) *Arctic governance regime: the last frontier for hydrocarbons exploitation*, International Journal of Law and Management, Vol. 57, pp. 498-521.
- Ateş, O. (2017) *Rusya Federasyonu'nun Arktika Politikası*, Avrasya İncelemeleri Dergisi, Vol. 1, pp. 57-95.
- Avdonina, N. and Dolgoborodova, S. (2018) *Covering geopolitical problems in the context of the Arctic exploration in the American media discourse (based on The New York Times content analysis)*, Arctic and North, Vol. 33, pp. 150-160.
- Axworthy, T.S., Koivurova, T. and Hasanat, W. (2012) *The Arctic Council: its place in the future of Arctic Governance* [Online] Available at: <https://gordonfoundation.ca/resource/the-arctic-council-its-place-in-the-future-of-arctic-governance/> (Accessed: 28 June 2021).
- Baker, J.S. and Byers, M. (2012) *Crossed Lines: The Curious Case of the Beaufort Sea Maritime Boundary Dispute*, Ocean Development & International Law, Vol. 43, pp. 70–95.

- Barrick, L. (2020) *Interviews: In-Depth, Semistructured*, International Encyclopedia of Human Geography (Second Edition), pp. 403-408.
- Barry, T., Davidsdottir, B., Einarsson, N. and Young, O. (2020) *The Arctic Council: an agent of change?*, Global Environmental Change, Vol. 63.
- Basaran, I. (2015) *The Lomonosov Ridge and the Overlapping Outer Continental Shelf Claim to North Pole*, Journal of Maritime Law and Commerce, Vol. 46(1).
- Beveridge, L., Fournier, M., Lasserre, F., Huang, L. and Têtu, P. (2016) *Interest of Asian shipping companies in navigating the Arctic*, Polar Science, Vol. 10(3), pp. 404-414.
- Biresselioglu, M.E., Demir, M.H. and Kandemir, C. (2012) *Modeling Turkey's future LNG supply security strategy*, Energy Policy, Vol. 46, pp. 144-152.
- Biresselioglu, M.E., Demir, M.H., Solak, B., Kayacan, A. and Altinci, S. (2020) *Investigating the trends in arctic research: The increasing role of social sciences and humanities*, Science of The Total Environment, Vol. 729, No. 139027.
- Bogdanova, E., Andronov, S., Soromotin, A., Detter, G., Oleg, S., Hossain, K., Raheem, D. and Lobanov, A. (2021) *The Impact of Climate Change on the Food (In)security of the Siberian Indigenous Peoples in the Arctic: Environmental and Health Risks*. Sustainability, Vol. 13(5), No. 2561.
- Bonusiak G. (2021) *Development of Ecotourism in Svalbard as Part of Norway's Arctic Policy*. Sustainability, Vol. 13(2), p. 962.
- Booth, W. and Ferris-Rotman, A. (2018). 'Russia's Suez Canal? Ships start playing a less-icy Arctic, thanks to climate change' *The Washington Post* [Online]. Available at: https://www.washingtonpost.com/world/europe/russias-suez-canal-ships-start-plying-an-ice-free-arctic-thanks-to-climate-change/2018/09/08/59d50986-ac5a-11e8-9a7d-cd30504ff902_story.html?utm_term=.fd330cbb733f (Accessed: 26 June 2021).
- Boute, A. (2016) *Off-grid renewable energy in remote Arctic areas: An analysis of the Russian Far East*, Renewable and Sustainable Energy Reviews, Vol. 59, pp. 1029-1037.
- Carayannis, E., Ilinova, A. and Chanysheva, A. (2019) *Russian Arctic Offshore Oil and Gas Projects: Methodological Framework for Evaluating Their Prospects*. J. Knowl. Econ. Vol. 11(4), pp. 1403-1429.
- Chance, N.A. and Andreeva, E.N. (1995) *Sustainability, equity, and natural resource development in Northwest Siberia and Arctic Alaska*, Human Ecology, Vol. 23, pp. 217-240.

- Chen, R. (2013) *A Critical Analysis of the U.S. "Pivot" toward the Asia-Pacific: How Realistic is Neo-realism?* *Connections: The Quarterly Journal*, Vol. 12(3), pp. 39-62.
- Corell, R. (2006) *Challenges of Climate Change: An Arctic Perspective*, *Ambio*, Vol. 35, pp. 148-52.
- Dawson, J., Johnston, M. and Stewart, E. (2017) *The unintended consequences of regulatory complexity: The case of cruise tourism in Arctic Canada*, *Marine Policy*, Vol. 76, pp. 71-78.
- Denzin, N.K. (1978). *Sociological methods: A sourcebook*. 2nd edition. NY: McGraw-Hill.
- Depledge, D. (2020) *NATO and the Arctic: The Need for a New Approach*, *The RUSI Journal*, Vol. 165(5), pp. 80-90.
- Devine, C.M., Sobal, J., Bisogni, C.A. and Connors, M. (1999) *Food Choices in Three Ethnic Groups: Interactions of Ideals, Identities, and Roles*, *Journal of Nutrition Education*, Vol. 31(2), pp. 86-93.
- Dmitrieva, D. and Romasheva, N. (2020) *Sustainable Development of Oil and Gas Potential of the Arctic and Its Shelf Zone: The Role of Innovations*, *Journal of Marine Science and Engineering*, Vol. 8(12), p. 1003.
- Dobretsov, N.L. and Pokhilenko, N.P. (2010) *Mineral resources and development in the Russian Arctic*, *Russian Geology and Geophysics*, Vol. 51(1), pp. 98-111.
- Dobson, N. and Trevisanut, S. (2018) *Climate Change and Energy in the Arctic—The Role of the European Union*, *The International Journal of Marine and Coastal Law*, Vol. 33(2), pp. 380-402.
- Doelle, M., Bankes, N. and Porta, L. (2012) *Using Strategic Environmental Assessments to Guide Oil and Gas Exploration Decisions: Applying Lessons Learned from Atlantic Canada to the Beaufort Sea*, *Review of European*, Vol. 22(1).
- Ebinger, C. and Zambetakis, E. (2009) *The geopolitics of Arctic melt*, *International Affairs*, Vol. 85, pp. 1215 - 1232.
- Eliasson, K., Ulfarsson, G., Valsson, T. and Gardarsson, S. (2017) *Identification of development areas in a warming Arctic with respect to natural resources, transportation, protected areas, and geography*, *Futures*, Vol. 85, pp. 14-29.
- Energy Information Administration. (2012) *Annual Energy Outlook 2012 with Projections to 2035*. [Online] Available at: [https://www.eia.gov/outlooks/aeo/pdf/0383\(2012\).pdf](https://www.eia.gov/outlooks/aeo/pdf/0383(2012).pdf) (Accessed: 27 June 2021).
- Fidler, C. and Noble, B.F. (2013) *Advancing regional strategic environmental*

assessment in Canada's Western Arctic: Implementation opportunities and challenges, Journal of Environmental Assessment Policy and Management, Vol. 15(1).

Ford, J., Smit, B., Wandel, J., Allurut, M., Shappa, K., Ittusarjuat, H. and Qrunnut, K. (2008) *Climate change in the Arctic: Current and future vulnerability in two Inuit communities in Canada*. The Geographical Journal Geographical Journal, Vol. 174, pp. 45-62.

Foster, S. (2012) *Triangulation data to improve care*. Nursing Management, 3, 14-19.

French Republic. (2016). *The Great Challenge of the Arctic: National Roadmap for the Arctic* [Online]. Available at: https://www.diplomatie.gouv.fr/IMG/pdf/frna_-_eng_-_interne_-_prepa_-_17-06-pm-bd-pdf_cle02695b.pdf (Accessed: 26 June 2021).

Gassiy, V and Potravny, I. (2019) *The Compensation for Losses to Indigenous Peoples Due to the Arctic Industrial Development in Benefit Sharing Paradigm*. Resources, Vol. 8(2), p. 71.

Giguère, M., Comtois, C. and Slack, B. (2017) *Constraints on Canadian Arctic maritime connections*, Case Studies on Transport Policy, Vol. 5, pp. 355-366.

Gill, P., Stewart, K., Treasure, E. and Chadwick, B. (2008) *Methods of data collection in qualitative research: interviews and focus groups*, British Dental Journal, Vol. 204, pp. 291–295.

Giordano, N. and Raymond, J. (2019) *Alternative and sustainable heat production for drinking water needs in a subarctic climate (Nunavik, Canada): Borehole thermal energy storage to reduce fossil fuel dependency in off-grid communities*, Applied Energy, Vol. 252.

Government of Canada. (2010). *Statement On Canada's Arctic Foreign Policy* [Online]. Available at: https://www.international.gc.ca/world-monde/assets/pdfs/canada_arctic_foreign_policy-eng.pdf (Accessed: 26 June 2021).

Government of Iceland. (2011). *A Parliamentary Resolution on Iceland's Arctic Policy* [Online]. Available at: <https://www.government.is/media/utanrikisraduneyti-media/media/nordurlandaskrifstofa/A-Parliamentary-Resolution-on-ICE-Arctic-Policy-approved-by-Althingi.pdf> (Accessed: 26 June 2021).

Government of India. (2013). *India and the Arctic*. [Online]. Available at: <https://mea.gov.in/in-focus-article.htm?21812/India+and+the+Arctic> (Accessed: 27 June 2021).

Government of Spain. (2016). *Guidelines for a Spanish Polar Strategy*, [Online]. Available at: <https://www.thearcticinstitute.org/countries/spain/> (Accessed: 27 June 2021).

2021).

Government Offices of Sweden. (2011). *Sweden's strategy for the Arctic region* [Online]. Available at:

<https://www.government.se/4ab869/contentassets/c197945c0be646a482733275d8b702cd/swedens-strategy-for-the-arctic-region-2020.pdf> (Accessed: 26 June 2021).

Gramer, R. (2018). *Stretched on Thin Ice*, [Online]. Available at: <https://foreignpolicy.com/2018/09/12/stretched-thin-on-thin-ice-arctic-circle-climate-change-norway-coast-guard/> (Accessed: 26 June 2021).

Grosvik, B.E., Prokhorova, T., Eriksen, E., Krivosheya, P., Horneland, P.A. and Prozorkevich, D. (2018) *Assessment of Marine Litter in the Barents Sea, a Part of the Joint Norwegian–Russian Ecosystem Survey*, *Frontiers in Marine Science*, Vol. 5.

Gulas, S., Downton, M., D'Souza, K., Hayden, K. And Walker T. (2017) *Declining Arctic Ocean oil and gas developments: Opportunities to improve governance and environmental pollution control*, *Marine Policy*, Vol. 75, pp. 53-61.

Gunitskiy, V. (2008) *On Thin Ice: Water Rights and Resource Disputes in the Arctic Ocean*, *Journal of International Affairs*, Vol. 61(2), pp. 261-262.

Gunnarsson, B. (2021) *Recent ship traffic and developing shipping trends on the Northern Sea Route—Policy implications for future arctic shipping*, *Marine Policy*, Vol. 124.

Hasle, J.R., Kjellén, U. and Hagerud, O. (2009) *Decision on oil and gas exploration in an Arctic area: Case study from the Norwegian Barents Sea*, *Safety Science*, Vol. 47, p. 832.

Haugseth, P. (2018) *High North scenarios and subnational realities: policies and practices in the Norwegian/Russian border zone*, *Arctic and North*, Vol. 33, pp. 116-134.

Heinen, L., Sergunin, A. and Yarovoy, G. (2014) *Russian Strategies in The Arctic: Avoiding a New Cold War*. Available at: https://www.uarctic.org/media/857300/arctic_eng.pdf (Accessed: 28 June 2021).

Higginbotham, J. and Spence, J. (2016) *NORTH OF 60: Toward a Renewed Canadian Arctic Agenda* [Online]. Available at: https://www.cigionline.org/sites/default/files/north_of_60_special_report_lowres.pdf (Accessed: 26 June 2021).

Hilburn, M. (2008) *Trans-Arctic Shipping?* *Seapower*, pp. 34-36.

Hong, N. (2012) *The melting Arctic and its impact on China's maritime transport*,

Research in Transportation Economics, Vol. 35, pp. 50-57.

Hong, N. (2018). *China's Interests in the Arctic: Opportunities and Challenges. Examining the implications of China's Arctic policy white paper* [Online]. Available at: <https://chinaus-icas.org/research/chinas-interests-in-the-arctic-opportunities-challenges/> (Accessed: 28 June 2021).

Horta, A., Gouveia, J., Schmidt, L., Sousa, J., Palma, P. and Simões, S. (2019) *Energy poverty in Portugal: Combining vulnerability mapping with household interviews*, Energy and Buildings, Vol. 203.

Hough, P. (2015) *The Arctic*, International Security Studies, pp. 383-392.

Hristov, H. and Krushkov, H. (2016) *In-Depth Interview*, Mathematics and Informatics, Vol. 59(4), pp. 368-380.

Ivanova, L., Sokolov, K. and Kharitonova, G. (2018) *Plastic pollution tendencies of the Barents Sea and adjacent waters under the climate change*, Arctic and North, Vol. 32, pp. 99-118.

Japan Headquarters for Ocean Policy. (2015). *Japan's Arctic Policy* [Online]. Available at: https://www8.cao.go.jp/ocean/english/arctic/pdf/japans_ap_e.pdf (Accessed: 27 June 2021).

Jegorova, N. (2013) *Regionalism and Globalisation: The Case of the Arctic*, Arctic Yearbook 2013.

Johannsdottir, L. and Cook, D. (2019) *Systemic risk of maritime-related oil spills viewed from an Arctic and insurance perspective*, Ocean Coastal Management, Vol. 179.

Johnston, P.F. (2010) *Arctic Energy Resources and Global Energy Security*, Journal of Military and Strategic Studies, Vol. 12(2).

Johnston, P.F. (2012) *Arctic Energy Resources: Security and Environmental Implications*, Journal of Strategic Security, Vol. 5(3).

Kaltenborn, B.P. and Emmelin, L. (1993) *Tourism in the high north: Management challenges and recreation opportunity spectrum planning in Svalbard, Norway*, Environmental Management, Vol. 17, pp. 41-50.

Kankaanpää, P. and Young, O.R. (2012) *The effectiveness of the Arctic Council*, Polar Research, Vol. 31(1).

Keil, K. (2013) *The Arctic: A new region of conflict? The case of oil and gas*, Cooperation and Conflict, 49(2).

Khaknazarov, S. (2017) *The study of public opinion on industrial mining in the*

- Nefteyugansk district of Yugra, Arctic and North*, Vol. 28, pp. 87-96.
- Khaknazarov, S. (2018) *On the interaction of indigenous peoples of the North and industrial companies: the case of Yugra*, Arctic and North, Vol. 30, pp. 97-108.
- Kim, H. (2015) *Success in heading north?: South Korea's master plan for Arctic policy*, Marine Policy, Vol. 61, pp. 264-272.
- Kingdom of Denmark Ministry of Foreign Affairs. (2011). *Denmark, Greenland and the Faroe Islands: Kingdom of Denmark Strategy for the Arctic 2011–2020* [Online]. Available at: <http://library.arcticportal.org/1890/1/DENMARK.pdf> (Accessed: 26 June 2021).
- Kirsanova, N.Y., Lenkovets, O.M. and Nikulina, A.Y. (2018) *The role and future outlook for renewable energy in the Arctic zone of Russian Federation*, European Research Studies Journal, Vol. 21(2), pp. 356-368.
- Knol, M. and Arbo, P. (2014) *Oil spill response in the Arctic: Norwegian experiences and future perspectives*, Marine Policy, Vol. 50, pp. 171–177.
- Koivurova, T. (2010) *Limits and possibilities of the Arctic Council in a rapidly changing scene of Arctic governance*, Polar Record, Vol. 46, pp. 75-83.
- Koivurova, T. and VanderZwaag, D. (2007) *The Arctic Council at 10 years: retrospect and prospects*, University of British Columbia Law Review, Vol. 40.
- Koivurova, T., Käpylä, J. and Mikkola, H. (2015). *Continental Shelf Claims in the Arctic: Will Legal Procedure Survive the Growing Uncertainty?* [Online]. Available at: <https://www.fiaa.fi/wp-content/uploads/2017/01/bp178.pdf> (Accessed: 28 July 2021).
- Konar, B., Frisch, L. and Moran, S. (2017) *Development of best practices for scientific research vessel operations in a changing Arctic: A case study for R/V Sikuliaq*, Marine Policy, Vol. 86, pp. 182-189.
- Korea Maritime Institute. (2013). *Arctic Policy of the Republic of Korea* [Online]. Available at: http://library.arcticportal.org/1902/1/Arctic_Policy_of_the_Republic_of_Korea.pdf (Accessed: 27 July 2021).
- Kossa, M. (2020) *China's Arctic engagement: domestic actors and foreign policy*, Global Change, Peace & Security, Vol. 32(1), pp. 19-38.
- Kuersten, A. (2016) *The Arctic Five Versus the Arctic Council*, Arctic Yearbook 2016, pp. 389-395.
- Landmark, B.T., Strandmark, M. and Wahl, A. (2002) *Breast cancer and experiences*

of social support. In-depth interviews of 10 women with newly diagnosed breast cancer, Scandinavian Journal of Caring Sciences, Vol. 16(3), pp. 216-223.

Lansetti, S. (2016) *The “keep in the ground future” of Arctic fossil fuel resources*, Arctic and North, Vol. 25, pp. 5-19.

Lasserre, F. (2014) *Case studies of shipping along Arctic routes. Analysis and profitability perspectives for the container sector*, Transportation Research Part A, Vol. 66, pp. 144-161.

Lasserre, F. and Pelletier S. (2011) *Polar super seaways? Maritime transport in the Arctic: an analysis of shipowners’ intentions*, Journal of Transport Geography, Vol. 19, pp. 1465-1473.

Lee, S. and Song J. (2014) *Economic Possibilities of Shipping though Northern Sea Route*, The Asian Journal of Shipping and Logistics, Vol. 30(3), pp. 415-430.

Lemke, P. (2011) *Arctic processes and global climate*, in Wasum-Rainer S, Winkelmann I and Tiroch K (eds) *Arctic Science, International Law and Climate Change* Heidelberg: Springer, pp. 45–54.

Leroux, J. and Spiro, D. (2018) *Leading the unwilling: Unilateral strategies to prevent arctic oil exploration*, Resource and Energy Economics, Vol. 54, pp. 125-149.

Li, P., Cai, Q., Lin, W., Chen, B. and Zhang, B. (2016) *Offshore oil spill response practices and emerging challenges*, Marine Pollution Bulletin, Vol. 110(1), pp. 6-27.

Lindholt, L. and Glomsrød, S. (2018) *Phasing out coal and phasing in renewables – Good or bad news for arctic gas producers?*, Energy Economics, Vol. 70, pp. 1-11.

Loe, J.S. and Kelman, I. (2016) *Arctic petroleum's community impacts: Local perceptions from Hammerfest, Norway*, Energy Research & Social Science, Vol. 16, pp. 25-34.

Longhurst, R. (2009) *Interviews: In-Depth, Semi-Structured*, International Encyclopedia of Human Geography, pp. 580-584.

Martello, M. (2008) *Arctic Indigenous Peoples as Representations and Representatives of Climate Change*. Social studies of science, Vol. 38, pp. 351-76.

Matsumoto, K., Doumpos, M. and Andriosopoulos, K. (2018) *Historical energy security performance in EU countries*, Renewable and Sustainable Energy Reviews, Vol. 82(2), pp. 1737-1748.

Mazumder, A., Bandhu Kalanidhi, K., Sarkar, S., Ranjan, P., Sahu, A., Kaur, T., Kaur, D., Bhattacharya, A., Priyadarshini Suna, S., Prakash, B., Deb, K.S. and Wig, N. (2021) *Psycho-social and behavioural impact of COVID 19 on young adults:*

Qualitative research comprising focused group discussion and in-depth interviews, *Diabetology & Metabolic Syndrome*, Vol. 15(1), pp. 309-312.

Mazza, M. (2015) *Energy, Environment and Indigenous Rights: Arctic Experiences Compared*, *The Yearbook of Polar Law Online*, Vol. 7(1), pp. 317-351.

McCauley, D., Heffron, R., Pavlenko, M., Rehner, R. and Holmes, R. (2016) *Energy justice in the Arctic: Implications for energy infrastructural development in the Arctic*, *Energy Research & Social Science*, Vol. 16, pp. 141-146.

Mikhaylova, G. (2018) *The Arctic society under the environmental and climate change (based on survey results)*, *Arctic and North*, Vol. 32, pp. 78-87.

Mileski, J., Gharehgozli, A., Ghoram, L. and Swaney, R. (2018) *Cooperation in developing a disaster prevention and response plan for Arctic shipping*, *Marine Policy*, Vol. 92, pp. 131-137.

Ministry of Foreign Affairs. (2015). *Italy and the Arctic* [Online]. Available at: https://www.esteri.it/mae/en/politica_estera/aree_geografiche/europa/articolo/ (Accessed: 27 June 2021).

Morgunova, M., Solovev, D., Nefedova, L. and Gabderakhmanova, T. (2020) *Renewable energy in the Russian Arctic: Environmental challenges, opportunities and risks*, *Journal of Physics: Conference Series*, Vol. 1565.

Necci, A., Tarantola, S., Vamanu, B., Krausmann, E. and Ponte, L. (2019) *Lessons learned from offshore oil and gas incidents in the Arctic and other ice-prone seas*, *Ocean Engineering*, Vol. 185, pp. 12-26.

Ng, A.K.Y. and Song, D. (2018) *Arctic shipping, transportation, and regional development*, *Maritime Policy & Management*, Vol. 45(4), pp. 419-421.

Nick Pay, V. and Calvo, H.G. (2020) *Arctic Diplomacy: A Theoretical Evaluation of Russian Foreign Policy in the High North*, *Russian Politics*, Vol. 5(1), pp. 105-130.

Nong, D., Countryman, A. and Warziniack, T. (2018) *Potential impacts of expanded Arctic Alaska energy resource extraction on US energy sectors*, *Energy Policy*, Vol. 119, pp. 574-584.

Norwegian Ministry of Foreign Affairs. (2017). *Norway's Arctic Strategy – between geopolitics and social development* [Online]. Available at: <https://www.regjeringen.no/contentassets/fad46f0404e14b2a9b551ca7359c1000/arctic-strategy.pdf> (Accessed: 26 June 2021).

Olsen, K. (2019) *Indigenous tourism and the Barents Euro-Arctic Region (BEAR)*, *Arctic and North*, Vol. 349, pp. 35-45.

- Osthagen, A. (2017) *Establishing Maritime Boundaries in Arctic Waters* [Online]. Available at: <https://www.thearcticinstitute.org/establishing-maritime-boundaries-arctic-waters/> (Accessed: 26 June 2021).
- Osthagen, A., Sharp, G.L. and Hilde, P.S. (2018) *At Opposite Poles: Canada's and Norway's approaches to security in the Arctic*, *The Polar Journal*, Vol. 8(1), pp. 163-181.
- Pan, M. and Huntington, H.P. (2016) *A precautionary approach to fisheries in the Central Arctic Ocean: Policy, science, and China*, *Marine Policy*, Vol. 63, pp. 153-157.
- Parent, J. and Rosato, S. (2015) *Balancing in Neorealism*, *International Security*, Vol. 40 pp. 51-86.
- Parks, M., Ahmasuk, A., Compagnoni, B., Norris, A. and Rufe, R. (2019) *Quantifying and mitigating three major vessel waste streams in the northern Bering Sea*, *Marine Policy*, Vol. 106.
- Parsons, J., Dinwoodie, J. and Roe, M. (2011) *Northern opportunities: A strategic review of Canada's Arctic icebreaking services*, *Marine Policy*, Vol. 35, pp. 549-556.
- Patton, M.Q. (1999). *Enhancing the quality and credibility of qualitative analysis*, *Health Sciences Research*, Vol. 34, pp. 1189–1208.
- People's Republic of China. (2018). *China's Arctic Policy* [Online]. Available at: http://english.www.gov.cn/archive/white_paper/2018/01/26/content_281476026660336.htm (Accessed: 26 June 2021).
- Perez, C.E. and Yaneva, Z.V. (2016) *The European Arctic policy in progress*, *Polar Science*, Vol. 10.
- Petrick, S., Riemann-Campe, K., Hoog, S., Growitsch, C., Schwind, H., Gerdes, R. and Rehdanz, K. (2017) *Climate change, future Arctic Sea ice, and the competitiveness of European Arctic offshore oil and gas production on world markets*, *Ambio*, Vol. 46, pp. 410–422.
- Petrov, A., Zbeed, S. and Cavin, P. (2018) *Arctic's knowledge economy: Spatial patterns of knowledge and technology production in the Arctic*, *Arctic and North*, Vol. 30, pp. 4-17.
- Polar Regions Department. (2018). *Beyond the Ice: UK policy towards the Arctic* [Online]. Available at: <https://www.changing-arctic-ocean.ac.uk/wp-content/uploads/2018/04/beyond-the-ice-uk-policy-towards-the-arctic.pdf> (Accessed: 27 June 2021).

- Polit, D.F. and Beck, C.T. (2012) *Nursing research: Generating and assessing evidence for nursing practice*. 10th Edition. Philadelphia, PA: Lippincott Williams and Wilkins
- Potravný, I., Yashalova, N., Boroukhin, D. and Tolstoukhova, M. (2020) *The Usage of Renewable Energy Sources in the Arctic: The Role of Public-Private Partnership*, *Environmental Economics*, Vol. 3(1), pp. 144-159.
- Prime Minister's Office Finland. (2013). *Finland's Strategy for the Arctic Region 2013* [Online]. Available at: https://vnk.fi/documents/10616/1093242/J1613_Finland%E2%80%99s+Strategy+for+the+Arctic+Region.pdf/cf80d586-895a-4a32-8582-435f60400fd2?version=1.0 (Accessed: 26 June 2021).
- Ravestein, P., Schrier, G., Haarsma, R., Scheele, R. and Broek, M. (2018) *Vulnerability of European intermittent renewable energy supply to climate change and climate variability*, *Renewable & Sustainable Energy Reviews*, Vol. 97, pp. 497-508.
- Renz, S.M. (2018) *Two strategies for qualitative content analysis: an intramethod approach to triangulation*, *Qualitative Health Research*, Vol. 5, pp. 824-831.
- Roberts, K. (2020) *Understanding Russia's security priorities in the Arctic: why Canada-Russia cooperation is still possible*, *Canadian Foreign Policy Journal*, pp. 211-227.
- Robinson, H., Gardiner, W. and Wenning, R. (2017) *Spill Impact Mitigation Assessment Framework for Oil Spill Response Planning In The Arctic Environment*, *International Oil Spill Conference Proceedings*, pp. 1325-1344.
- Rothwell, D.R. (2013) *International Law and Arctic Shipping*, *Michigan State International Law Review*, Vol. 22.
- Russian Federation. (2008). *Russian Federation Policy for the Arctic to 2020* [Online]. Available at: <http://www.arctic-search.com/Russian+Federation+Policy+for+the+Arctic+to+2020> (Accessed: 26 June 2021).
- Saunavaara, J. (2018) *Arctic subsea communication cables and the regional development of northern peripheries*, *Arctic and North*, Vol. 32, pp. 51-67.
- Schøyen H. and Bråthen, S. (2011) *The Northern Sea Route versus the Suez Canal: cases from bulk shipping*, *Journal of Transport Geography*, Vol. 19(4), pp. 977-983.
- Schulze, V.G. (2017) *Arctic Strategies Round-up*. [Online] Available at: <https://www.arctic->

[office.de/fileadmin/user_upload/www.arcticoffice.de/PDF_uploads/Arctic_Strategies_EN_10.11.17.pdf](https://www.arcticoffice.de/fileadmin/user_upload/www.arcticoffice.de/PDF_uploads/Arctic_Strategies_EN_10.11.17.pdf) (Accessed: 27 June 2021).

Sevastyanov, D. (2018) *Recreational nature management and tourism in the new development plans of the North of Russia*, Arctic and North, Vol. 30, pp. 18-32.

Shapovalova, D., Galimullin, E. and Grushevenko, E. (2020) *Russian Arctic offshore petroleum governance: The effects of western sanctions and outlook for northern development*, Energy Policy, Vol. 146.

Shapovalova-Krout, D. (2019) *International Governance of Oil Spills from Upstream Petroleum Activities in the Arctic : Response over Prevention?*, International Journal of Marine and Coastal Law, Vol. 34(4), pp. 668-697.

Sokolova, F., Zolotarev, O., Maksimova, L. and Sibiryakov, I. (2019) *Strategic priorities and forms of the applying ethnopolitics in the Arctic areas of the Russian Federation*, Arctic and North, Vol. 34, pp. 110-133.

Stavridis, J. (2018) 'Avoiding a Cold War in High North' *Bloomberg* [Online] Available at: <https://www.bnnbloomberg.ca/avoiding-a-cold-war-in-the-high-north-james-stavridis-1.1071723> (Accessed: 27 June 2021).

Stevenson, T., Davies, J., Huntington, H. and Sheard, W. (2019) *An examination of trans-Arctic vessel routing in the Central Arctic Ocean*, Marine Policy, Vol. 100, pp. 83-89.

Stojkovic, D. (2021) *The Race for the Arctic: A Neorealist Case Study of Russia and the United States*, E-International Relations, Available at: <https://www.e-ir.info/2021/05/17/the-race-for-the-arctic-a-neorealist-case-study-of-russia-and-the-united-states/> (Accessed: 29 July 2021).

Stokke, O.S. and Honneland, G. (2007) *International cooperation and Arctic governance: regime effectiveness and northern region building*, 1st edition. Routledge. Swiss Federal Department of Foreign Affairs. (2015). *Swiss polar research: Pioneering spirit, passion and excellence* [Online]. Available at: https://www.eda.admin.ch/dam/eda/en/documents/publications/Science/Schweizer_Polarforschung_EN.pdf (Accessed: 27 June 2021).

Tereschenko, E. (2018) *Dynamics of border tourism in the Barents Euro-Arctic Region*, Arctic and North, Vol. 33, pp. 47-54.

The Federal Government of Germany. (2019). *Germany's Arctic Policy Guidelines* [Online]. Available at: <https://www.auswaertiges-amt.de/blob/2240002/eb0b681be9415118ca87bc8e215c0cf4/190821-arktisleitlinien->

[download-data.pdf](#) (Accessed: 26 June 2021).

Theocharis, D., Pettit, S., Rodrigues, V. and Haider, J. (2018) *Arctic shipping: A systematic literature review of comparative studies*, Journal of Transport Geography, Vol. 69, pp. 112-128.

Thorsell, D. and Leschine, T. (2016) *An evaluation of oil pollution prevention strategies in the Arctic: A comparison of Canadian and U.S. approaches*, Marine Policy, Vol. 72, pp. 255-262.

Tishkov, S., Shcherbak, A., Karginova-Gubinova, V., Volkov, A., Tleppayev, A. and Pakhomova, A. (2020) *Assessment the role of renewable energy in socio-economic development of rural and Arctic regions*. Entrepreneurship and Sustainability Issues, Vol. 7(4), pp. 3354-3368.

Todorov, A. (2017) *The Russia-USA legal dispute over the straits of the Northern Sea Route and similar case of the Northwest Passage*, Arctic and North, Vol. 29, pp. 62-75.

Todorov, A. (2018) *Approaches of foreign countries to legal regulation of the oil and gas development on the Arctic continental shelf*, Arctic and North, Vol. 30, pp. 33-48.

Tolvanen, A., Eilu, P., Juutinen, A., Kangas, K., Kivinen, M., Markovaara-Koivisto, M., Naskali, A., Salokannel, V., Tuulentie, S. and Similä, J. (2019) *Mining in the Arctic environment – A review from ecological, socioeconomic and legal perspectives*, Journal of Environmental Management, Vol. 233, pp. 832-844.

Tonkin-Crine S. (2016) *Discrepancies between qualitative and quantitative evaluation of randomised controlled trial results: achieving clarity through mixed methods triangulation*. Implement Science, Vol. 11, pp. 1-8.

Trump, B.D., Kadenic, M. and Linkov, I. (2018) *A sustainable Arctic: Making hard decisions*, Arctic, Antarctic, and Alpine Research, Vol. 50(1), No. e1438345.

Tysiachniouk, M. and Petrov, A. (2018) *Benefit sharing in the Arctic energy sector: Perspectives on corporate policies and practices in Northern Russia and Alaska*, Energy Research & Social Science, Vol. 39, pp. 29-34.

Tysiachniouk, M., Henry, L.A., Lamers, M. and van Tatenhove, J.P.M. (2018) *Oil and indigenous people in sub-Arctic Russia: Rethinking equity and governance in benefit sharing agreements*, Energy Research & Social Science, Vol. 37, pp. 140-152.

United Nations. (1982). United Nations Convention on the Law of the Sea. [Online]. Available at:

https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf

(Accessed: 26 July 2021).

USGS. (2008). Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle [Online]. Available at: <https://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf> (Accessed: 26 July 2021).

Väättänen, V. (2021) *Securing Anticipatory Geographies: Finland's Arctic Strategy and the Geopolitics of International Competitiveness*, Geopolitics, Vol. 26(2), pp. 615-638.

Vasiliev, V. (2016) *The Arctic Council: A Tool for Regional Development & Policy-Shaping*, Arctic Yearbook.

Wasserrab, J. (2009) *Kutuplara Hücüm Var*, Deutsche Welle Türkçe, Available at: <https://www.dw.com/tr/kutuplara-h%C3%BCcum-var/a-4945878> (Accessed: 27 June 2021).

Wegge, N. (2010) *The political order in the Arctic: power structures, regimes and influence*, Polar Record, Vol. 47, pp. 165 - 176.

Wenning, R.J., Robinson, H., Bock, M., Rempel-Hester, M.A. and Gardiner, W. (2018) *Current practices and knowledge supporting oil spill risk assessment in the Arctic*, Marine Environmental Research, Vol. 141, pp. 289-304.

Wilkinson, J., Beegle-Krause, C., Evers, K.U., Hughes, N., Lewis, A., Reed, M. and Wadhams, P. (2017) *Oil spill response capabilities and technologies for ice-covered Arctic marine waters: A review of recent developments and established practices*, Ambio, Vol. 46, pp. 423–441.

Wither, J.K. (2018) *Svalbard*, The RUSI Journal, Vol. 163(5), pp. 28-37.

Young, O. (2012) *Arctic Politics in an Era of Global Change*. The Brown Journal of World Affairs, Vol. 19(1), pp. 165-178.

Young, O. (2016) *Governing the Arctic Ocean*, Marine Policy, 72, 271-277.

Zagorski, A. (2018) *The Arctic defense postures in the context of the Russia-West confrontation*, Arctic and North, Vol. 31, pp. 65-78.

Zaikov, K. (2018) *Russian-Norwegian borderland in the foreign historical literature in the 20th — beginning of the 21st centuries*, Arctic and North, Vol. 30, pp. 49-61.

Zhang, Z., Huising, D. and Song, M. (2019) *Exploitation of trans-Arctic maritime transportation*, Journal of Cleaner Production, Vol. 212, pp. 960-973.

Zhuravel, V. (2018) *Rights of the indigenous peoples of the Russian Arctic: problems and solutions*, Arctic and North, Vol. 30, pp. 62-78.

Zhuravel, V. (2018) *The Arctic as a constantly evolving multidimensional space*,

Arctic and North, Vol. 31, pp. 51-64.

Zou, L. and Huntington, H. (2018) *Implications of the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea for the management of fisheries in the Central Arctic Ocean*, Marine Policy, Vol. 88, pp. 132-138.

