MASTER'S THESIS

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What shapes the GHG emission reduction measures? A comparative analysis of Norwegian and Russian oil and gas industries

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Preface

This is the stage I am finishing my research project, that implied a number of working hours, discussions and corrections. It is hard to deny, that the process was a challenging field of endeavour, through which I went for the first time. Therefore, it was unavoidable to face a variety of difficulties, preparing this Master's Thesis. Nonetheless, it was exciting experience, enabled me to identify the opportunities for obtaining new knowledge and enlarging my current vision about the studied subject of my research project. Thus, when understanding, that this process comes to the end, I could consider myself as a proud person.

I believe that I was given a unique opportunity to be the exchange student in the foreign University. I would like to appreciate cooperation of the MGIMO University and Nord University Business School, making my visit of Norway and studying the Master's course in Global Management come into reality in 2022. I left Norway approximately 18 months ago and I am completing this project now, in November 2023 at home, in Russia.

However, it is vital to say, that I could not go through all the stages and bear the burden alone. I would like to thank the efforts of my supervisor and researcher Elena Zhurova Sæther, who provided me with efficient feedback and recommendations for my research project. Her practical guidelines and expertise helped me to determine the research question and collect the qualitative data, required for my project. I would like to thank her for the support and help during my writing.

Moscow, 28.11.2023

Aleksandr Kochkin

Summary

These days the challenge of global warming has become the significant issue for the planet. International organisations, governments and businesses pay much attention to the consistent increase in greenhouse gas emissions. In order to affect this trend, various measures both nationally and internationally are being applied to slow down the process of global warming. Much attention is paid to the oil and gas industry, being considered to be the noticeable contributor to this problem. Norway and Russia possess the enormous production volumes of their national oil and gas industry. Therefore, much emphasis is made on their impact on the volumes of producing various emissions and opportunities of tackling the issue.

This project seeks to make a comparative analysis of greenhouse gas emissions reduction measures within the Norwegian and Russian oil and gas industry at the state, industrial and organisational levels. I carry out the analysis of the content of the legal enactments of both countries and the corporate documents of three oil and gas companies, including Norwegian Equinor ASA, Russian PJSC Gazprom and PJSC LUKOIL, towards greenhouse gas emissions reduction measures. Theoretical framework is based on the institutional theory, enabling to explain what shapes the particular measures, applied in both countries at each chosen level for the research. In order to obtain the relevant data, the qualitative content analysis is used. The research could be considered as the internet-based one, as involves a number of internet sources. Therefore, ensuring greater reliability, the data was collected from the secondary sources of information, expressed in the official websites of the Russian and Norwegian governments, their corresponding Ministries and administrations, and the corporate documents of the chosen companies. Side-by-side comparison is made on the determined criteria of each level, that provides sufficient and objective results.

The findings of my research identify that Norway is more advanced country in terms of the greenhouse gas emissions reduction measures within the oil and gas industry than Russia. At all three levels Russia lags behind at different degrees, that might make the country to consider and adopt the best practices, currently deployed in Norway. In its turn, in Norway, not all aspects regarding greenhouse gas emissions reduction measures have been resolved. A few established criteria of comparison at the state and organisational level demonstrate, that there is room for future improvements.

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1.0 Introduction

These days the challenge of global warming has become the significant issue for the planet. International organisations, governments and businesses pay much attention to the consistent increase in greenhouse gas emissions. Most attention is paid to the oil and gas industry, considered to be a significant contributor to the global warming and producing enormous volumes of greenhouse gas emissions. The oil and gas industry has always been in a public eye, assumed to be as one of the significant contributors to the increase in greenhouse gas emissions around the planet, influencing the global warming. In 2022 the volumes of greenhouse gas emissions from the operations, connected with the production, transportation and processing of oil and gas, amounted to 5,1 billion tonnes of CO2 equivalent (IEA, 2023).

In order to affect this trend, various measures both nationally and internationally are being applied to slow down the process of global warming. In many cases, it includes emission trading systems or ETS, carbon taxes, investments in low carbon solutions, like carbon, capture, utilisation and storage or CCUS technologies. Norway is considered to be as the leading country in the green transition with the advanced level of measures, impacting the limitation and prevention of greenhouse gas emissions within its national oil and gas industry. However, some countries lag behind development of measures towards reducing greenhouse gas emissions within their national oil and gas industry. Indeed, the greenhouse gas emissions reduction measures is being under development in some countries and yet requires much time to achieve the similar level of Norway. Therefore, this study attempts to understand the difference of the greenhouse gas emissions reduction measures in the Norwegian and Russian oil and gas industry and compare them fairly.

1.1 Motivation of the study

The aim of this research is to develop knowledge about the measures of reducing greenhouse gas emissions at the state, industrial and organisational levels in Norway and Russia based on the empirical data. Moreover, the focus in my study is made on the oil and gas industry. This sector always has been in a public eye, assumed to be the significant contributor to the increase in greenhouse gas emissions around the planet. The Russian and Norwegian oil and gas industries are not an exception. The national economies depend significantly on the national oil and gas industry. Norway approved itself to be the significant player, as the world producer of oil and natural gas. In 2022, total production of oil amounted to 232 million tonnes of oil equivalent (Production forecasts, Norwegian Petroleum, 2023).

In its turn, the Russian Federation has the broadscale oil and gas industry, embracing the whole country, expressing in that by the results of 2020, the total national production of oil stock in oil and gas industry of Russia amounted to 512,1 million tonnes (The Ministry of Energy of the Russian Federation, 2021). Moreover, on 01.01.2021 production of oil and gas condensate (oil raw materials) on the territory of the Russian Federation was carried out by 285 organizations holding licenses for the right to use subsoil (The Ministry of Energy of the Russian Federation, 2021). The issue of climate change has been taken into account by the government and the large national companies, like PJSC Gazprom, PJSC LUKOIL, Rosneft Oil Company and the others.

The issue of global warming and concerns about reducing greenhouse gas emissions was on the government agenda of both countries. Each country entered a variety of international agreements that touch upon the issue of global warming, including UNFCCC, the Kyoto Protocol and the Paris Agreement. However, the approaches of both countries towards the measures of reducing greenhouse gas emissions, deployed within the oil and gas industry, vary and have been developed along different paths.

Therefore, the empirical data have some limitations in the research literature. Indeed, the practice of introducing the measures of reducing greenhouse gas emissions within the oil and gas industry at the state, industrial or organisational levels in Norway and Russia has been attracting various investigators. Most researchers make emphasis on the separate overview of the emission reduction measures in one aspect of the oil and gas industry of both countries at the different levels. In terms of Norway, at *the state level*, Bruvoll and Larsen (2004) explored the impact of the instrument of the national climate policy, expressed in the carbon tax in order to identify the change in dynamics of decrease in 3 types of emissions including carbon dioxide, methane and nitrogen dioxide during 1990-1999 years in oil and gas industry. Nonetheless, the research did not consider the other instruments of the national climate policy, and to what other emissions they additionally could be applied. In terms of Russia, at *the state level*, Safonov (2020) analysed the Russian progress of decreasing greenhouse gas emissions during 1990-2002 and by 2018 in general as well as assessed the national potential of achieving the climate targets by 2030. However, the author highlighted the forecasts of increase in demand for oil and gas by 2035. The research was mainly focused on suggesting the perspective positions, including renewables, green hydrogen and the others, that might be interesting in terms of green shift, rather than placed attention on the particular measures, that could be used in the oil and gas industry.

At *the industrial level*, Gavenas et al. (2015) explored the change in dynamics in the volumes of greenhouse gas emissions in oil and gas extraction of Norway during 1997-2012, briefly mentioning the volumes of domestic greenhouse gas emissions in the Russian and Canadian oil and gas industry, including oil and gas production and transmission. However, the authors did not provide their article with comparison of the specified countries. In terms of Russia, Uvarova et al. (2014) analysed the dynamics of greenhouse gas emissions from the oil operations in the oil and gas industry from 1990 to 2009 years. Indeed, the research estimated the percentage of contribution to increase in greenhouse gas emissions of the national oil and gas industry during the specified period but did not explore the main sources of emissions, such as carbon dioxide, methane, nitrogen dioxide and the others.

At *the organisational level*, Romasheva & Cherepovitsyna (2023) conducted the comprehensive comparison of the specifics of the energy companies from three geographical areas - Europe, China and USA in terms of applying renewable energy sources or RES in their production operations in order to decrease greenhouse gas emissions. However, this was only one aspect of the measures the company might deploy to decrease its greenhouse gas emissions. Additionally, Masalkova & Romanova (2021) made a comparative analysis of the decarbonisation strategies of the international oil majors, including ExxonMobil, Shell, TotalEnergies, Gazprom, PetroChina, Sinopec, Shevron, Petrobras, where efficiency of the environment strategy, level of decarbonising operations within the oil and gas industry and degree of diversification were assessed. However, the investigation did not include the evaluations of the decrease in volumes of greenhouse gas emissions in the companies' operations based on the classification of Scope 1, 2 and 3, suggested by the Greenhouse Gas Protocol. Additionally, the research did not put Equinor ASA and PJSC LUKOIL on the comparative list.

Thus, the measures of reducing greenhouse gas emissions within the oil and gas industry of both countries at the state, industrial and organisational level were explored separately, rather than the unite scientific block. Investigators concentrated on various or individual aspects, including the dynamics of reducing particular type of emissions, the practical tools or policies and the contribution or actions of companies, based on their strategies, that could be explored from the different angles, and a set of various characteristics of government and corporate involvement into tackling the issue. The organisational level has been studied the most, as enables to conduct an analysis of the corporate measures of reducing greenhouse gas emissions on many sides. Therefore, the level of development and importance of the particular measure,

aimed at reducing greenhouse gas emissions in the oil and gas industry varies between Norway and Russia, which could be the case for research.

1.2 Research Question

Okeke (2021: 8) argues that "developing a low-carbon world is an inevitable choice in combating climate change". Norway is considered to be the significant player in the process of reducing greenhouse gas emissions as well as leading one in the green transition. The attention to the problems of climate change has been put into account since the 1990s of the 20th century, and continue progressing in the 21st century. The measures of reducing greenhouse gas emissions in the oil and gas industry have been gradually implemented. The most noticeable measures were introduction of a carbon tax in 1991 for the oil and gas companies and covering the oil and gas industry by the EU emissions trading system (EU ETS) in 2008. In terms of the Russian Federation, the attitude towards the issue of global warming has become more formalized recently, since 2021. Russia possesses oil and gas industry that remains as the biggest one in the world. The country could be the significant player towards the greater path of green transition around the world. Indeed, climate change has become the more comprehensive part of the governmental agenda within a country after signing the Paris Agreement and its further ratification.

The purpose of this research is to provide the sufficient and objective comparison of the measures of reducing greenhouse gas emissions, used in Norwegian and Russian oil and gas industry at the state, industrial and organisational levels, based on the content of legal enactments and the corporate documents. Therefore, the research questions could be formulated in the following way: What shapes the measures of reducing greenhouse gas emissions in the oil and gas industry in Norway and Russia at each level? What similarities and differences do they have at each chosen level? How advanced are these measures in both countries at each chosen level?

1.3 Scope and limitations

My study is only dedicated to the comparative analysis of the measures within the oil and gas industry of Norway and Russia, based on the content of the legal enactments and the corporate documents, including sustainability report 2021, the corporate strategy and corresponding documents of Equinor ASA, PJSC Gazprom and PJSC LUKOIL, published on the official governmental and corporate websites. In my project, I did not touch upon the measures of reducing greenhouse gas emissions in the other carbon-intense industries of both countries, for

instance, steel manufacturing or chemicals production that might differ from those, applied in the Norwegian and Russian oil and gas industry.

At the state level, the major focus was made on the key points in the Norwegian and Russian history towards developing attention to the issue of global warming, including signing and further ratification of the major international agreements and establishment of the legal framework towards measures of reducing greenhouse gas emissions, as well as the content of the currently existing general laws or acts and corresponding legal enactments. Thus, the other comprehensive factors, like the level of economic development or political situation at the time of applying the particular acts or documents, were not taken into account.

At the industrial level, my attention was placed on the direct measures of reducing greenhouse gas emissions within oil and gas industry of both countries, based on the established framework, consisted of the special laws, classification of emissions, listing and reporting procedures of greenhouse gas emissions by oil and gas companies and implementation of the projects, connected with CCUS-technologies.

At the organisation level, my research was limited by the number of oil and gas companies, based on the ownership ratio (state-owned, privately-owned, mixed ownership) and their freedom of actions. The major comparison was dedicated to the corporate measures of reducing greenhouse gas emissions in accordance with Greenhouse Gas Protocol and made, based on the content of the sustainability report 2021, the corporate strategies towards reduction of greenhouse gas emissions by 2030 & 2050 of those chosen companies and the other corresponding documents, mentioned in the content of the sustainability report 2021 and presented on the official corporate websites. Therefore, my project did not include the other Russian and Norwegian oil majors, which approach to the measures towards reducing greenhouse gas emissions, might vary and possesses the distinguishing features.

1.4 The structure of the study

My project involves seven chapters. The introduction deals with motivation as well as the purpose of my study. The theoretical framework is presented and described in the second chapter. The third chapter determines the research context of my project, including international agreements, carbon pricing, divided into emissions trading system or ETS and carbon tax, and carbon, capture, utilisation and storage or CCUS technologies. The fourth part reflects to the methodology, used in the project, and describes the qualitative content-analysis method as well as validity, reliability and ethical issues. Chapter five concentrates on the

empirical data, collected for my research. The information touches upon the measures of reducing greenhouse gas emissions within the oil and gas industry at state, industrial and organisational levels in Norway and Russia. Particular attention is given to the Greenhouse Gas Protocol and its classification of greenhouse gas emissions into Scope 1, 2 & 3. The conducted comparison at the state, industrial and organisational level, and findings of the project are given in the sixth chapter. The conclusion is written in the seventh chapter, giving the discussion part and making suggestions for further research.

2.0 Theoretical framework

A number of questions might arise, when dealing with the measures, focused on reducing greenhouse gas emissions in Norwegian and Russian oil and gas industry. Therefore, the questions, connected with motivation and particular purposes of using these measures, might appear. To answer them properly, some theory is to be applied for further analysis and discussion. Validity and reliability could be determined, depending on deployment of the applied theory. In the research project an *institutional theory* was used, as it attempts to explain the changes and development of some process or objects, happening under the pressure, coming from various institutions.

2.1 Institutional theory

Institutional theory assumes the corporate responds to the external pressures, coming from institutions or organisations. The main basis behind this theory is expressed in the process, that companies become the same or adopt similar practices. Such trend is called *isomorphism*. It could be expressed and tracked in adoption of similar production standards or introducing the unified business concepts within the organisation. Therefore, this adoption is becoming the similar process and in literature reflects to 3 main types of isomorphism. *Coercive isomorphism*. Coercive isomorphism implies that an organization is obliged to behave in a certain way under institutional pressure from the organization to which it is dependent (DiMaggio & Powell, 1983). Basically, when the government of a particular country is the participant of the international agreement and based on the consensus with other parties decides to implement new standardised regulative requirements within the one sector of the national economy, other countries have to follow the same programme. For instance, the countries entered the Paris Agreement and in accordance with its goals started to implement the similar and standardized measures of reducing greenhouse gas emissions, like National Determined

Contribution or NDC and establishing target reduction indicators, within the determined industries during the specified period of time. *Mimetic isomorphism*. This type of isomorphism implies that organisations tend to imitate more successful or advanced ones in the same environment they operate (DiMaggio & Powell, 1983). Basically, this type of isomorphism could be applied to the Russian energy companies, actively developed during the 2000s-2010s. In order to enter the foreign markets and properly satisfy the international standards of business, including accounting, finance, management, the companies started adopting the similar practices in order to "mimic" their competitors and partners. The same is true for the measures of reducing greenhouse gas emissions. *Normative isomorphism*. Buchko (2011) write that: "Normative isomorphism is largely thought to be due to professionalization, defined as "the collective struggle of members of an occupation to define the conditions and methods of their work, to control the 'production of producers,' and to establish a cognitive base and legitimation for their occupational autonomy (DiMaggio and Powell, 1983: 152)". Basically, with greater development and rising awareness around the global issues, the educational courses and practices are being introduced within educational establishments, affecting the future specialists, planning to apply for a job in the certain type of companies, including the oil and gas ones. Indeed, this could contribute to the higher concerns and addressing the issues on agenda within societies, impacting both the government and companies. Therefore, as a consequence, this trend might result in the national governments introduce or apply the legislative frameworks, meanwhile the companies could pay higher attention to introduction of the environmental practices within their corporate operations.

All three presented approaches are quite different in terms of the research context and could be used for explanation how the measures of reducing greenhouse gas emissions are presented and used within the Russian and Norwegian oil and gas industry.

To conclude, countries adopt the measures of reducing greenhouse gas emissions within their national sectors of economy, like the oil and gas industry by means of signing the international agreements, which requirements they have to meet. Meanwhile, the national companies in order to satisfy the international markets will be obliged to adopt the same practices from their more advanced rivals. However, if the social concerns touch upon the global issues, this might make both the government and companies to be involved in the process of applying the certain set of measures to satisfy this unrest. Therefore, the institutional theory enables to reflect the motivation and purposes of applying the measures of reducing greenhouse gas emissions within

the oil and gas industry at three chosen levels in Norway and Russia and provide my research with sufficient outcomes to reply to my research questions.

3.0 Measures of reducing GHG emissions as the research context

In this chapter I describe the brief history of the international legal framework towards global warming, which enabled to develop the measures, tasked with reducing greenhouse gas emissions around the world. Next, the description of the particular measures, such as carbon pricing, consisting of ETS, carbon tax, and CCUS-projects, is given. I touch upon their advantages, contribution to the international decrease in greenhouse gas emissions and examples in some countries. These aspects enable to both identify what unite or differentiate between Norway and Russia, regarding their greenhouse gas emissions reduction measures and carry out the proper analysis in the paragraphs 6.1-6.4.

3.1 International agreements

Global warming has been the issue, attracting attention of many scientists. In 1988, the *Intergovernmental Panel on Climate Change* (IPCC) was introduced. It is the organisation, responsible for conducting assessments of the risks of climate change and providing the measures of adoption and mitigation. IPCC includes 195 countries (IPCC, 2023). Based on the data from the IPCC, countries make decisions and formulate the strategy towards reduction of global greenhouse gas emissions. The activity of the IPCC impacts the main international agreement *Framework Convention on Climate Change*, UN FCCC, which was signed by more than 180 countries in 1992, relating to global reduction of greenhouse gas emissions around the world. 1990 was decided to be the basic year. The conference, organized in Rio de Janeiro, was the first comprehensive discussion towards the issue of global warming. Cramton et al. (2017: 30) write that:

> For 20 years, almost all climate negotiators have agreed on the need for strong climate-change mitigation. Even before Paris, there was a strong consensus that 2°C should be the goal. But this aspiration has not been translated into commitments and actions.

Therefore, the next step became the process of signing the Kyoto protocol in 1997. Writing about the main idea behind this document, Cramton et al. (2017: 222) argues that “initially, many countries supported a common commitment by all to reduce their emissions by an equal, agreed percentage below their 1990 emission levels”.

However, it was partial success, as it could not satisfy or take into account all countries or their national abilities to decrease the producing greenhouse gas emissions. The document had a few main disadvantages. First of all, it included and made the main focus on the developed countries with sufficient level of industrialisation and transition economies but did not take into account the developing ones, like China and India (Santos, 2022: 1). Secondly, another disadvantage of Kyoto Protocol did not fully cover the emissions, produced in other industries, for instance, aviation. Therefore, this made the international community to set up a special organisation, expressed in *the International Civil Aviation Organization*, enabling to find and establish the measures, produced from aviation. Green (2021: 2) writes that "in 2016, the International Civil Aviation Organization created a new plan to address aviation emissions, which were not covered under the Kyoto Protocol". Hereinafter, the targets of the initiative were prolonged by 2035 and the set of guidelines were established in order to facilitate greater achievement of the set goal. UNCTAD (2022: 13) notes that:

> Two years later the ICAO's council defined the set of rules guiding the initiative. Known as the Standards and Recommended Practices (SARPs), this set of rules constitutes a major step towards ICAO's goal of capping net emissions from international aviation at 2020 levels for the years 2021-2035.

Thus, the Kyoto Protocol did not enable to tackle the issue of reducing greenhouse gas emissions, as it was demonstrated at individual level of the aviation sector. However, despite the mentioned disadvantages, the Kyoto Protocol contributed to creation of the carbon dioxide emissions market, that in future will be called the ETS after signing of the Paris Agreement. Green (2021: 2) writes that:

> Article 6.4 creates a Sustainable Development Mechanism—a new international carbon market governed by the UN. It replaces the Clean Development Mechanism (CDM), the offset market created by the Kyoto Protocol.

The next step was signing the Paris Agreement in 2015, the more advanced and systematic set of the rules of decreasing greenhouse gas emissions globally. Describing this international document, Kuh (2018: 505) writes that "the Paris Agreement announces a goal of holding the increase in global average temperature to well below 2°C above preindustrial levels and to pursue efforts to limit the increase to 1.5°C". In order to structure and systemise contribution of the involved parties and efforts towards reduction of greenhouse gas emissions, Kuh (2018: 505) notes that "the Agreement requires all parties, both developed and developing, to prepare

and submit intended nationally determined contributions, or national emission reduction targets and actions". Nationally determined contributions or NDCs reflects the government policy towards the actions and measures (including carbon tax, ETS and the others) of reducing greenhouse gas emissions in accordance with the Paris Agreement as well as determine the climate targets by 2030 & 2050.

3.2 Carbon pricing

In this chapter carbon pricing and its tools are deeply described. Carbon pricing is being understood by various groups of countries as an effective market mechanism to boost the green transition and reduce the use of traditional fossil fuels. Kachi (2017) writes that "carbon pricing is not mentioned in the Paris Agreement, but it is an important policy tool that a growing number of countries and subnational governments are using to reduce emissions to help reach their international climate commitments". However, it is an integral part of emissions reduction measures, which to be mentioned in a county's Nationally Determined Contributions or NDC to express contribution to decrease in greenhouse gas emissions.

Funke & Mattauch (2019) mention that "over the last decade, carbon pricing has been increasingly taken up as part of national or subnational climate policies around the world". Indeed, describing practicability of carbon pricing, Baranzini et al. (2017: 3) note that "it is easily applicable to emissions coming from energy use, but can be extended to emissions arising from land use changes and other sources". Therefore, writing about the number of countries using carbon in their NDCs in 2020, Stavins (2020: 9) notes that "of the 169 Parties to the Paris Climate Agreement that have submitted specific pledges (known as Nationally Determined Contributions [NDCs]), more than half (88) refer to the use of carbon pricing in their NDCs".

Green (2021:2) also mentions that "importantly, carbon pricing is not solely a domestic climate policy; it has been—and will remain—a key feature of the multilateral regime to manage climate change". Stavins (2020: 12) argues that "the cost advantage of carbon pricing exists because of the flexibility it provides and the incentive it fosters for all sources to control at the same marginal abatement cost, thereby achieving cost-effectiveness in aggregate". Therefore, carbon pricing possesses lucrative advantages for governments, corporations and investors. For government authorities, carbon pricing is an effective tool to fuel the national budget, as Wang et al. (2022: 2) write that "even in a constrained budgetary context, it's crucial to have revenue sources like this to help offset the costs". For giant companies it is an opportunity to estimate impact of carbon pricing on their operations. Wang et al. (2022: 2) note that "corporations use

internalized carbon pricing to measure the influence of obligatory carbon prices on their operations and anticipate new carbon pollution and income opportunities". For private investors, which tend to make long-term investments, carbon pricing is the efficient way to increase investments in the initiatives, connected with decarbonisation. Wang et al. (2022: 2) write that "long-term entrepreneurs can also use carbon pricing to estimate the prospective impact of climate change policies on their investment portfolios, reassess investment plans and reallocate resources towards low-carbon or climate resiliency projects". Thus, carbon pricing is seen as the efficient and economic tool for governments, business and investors, and being considered and applied by various countries, as the efficient way of reducing greenhouse gas emissions. All this combination might positively impact the greater increase in greenhouse gas emissions in various industries in a particular country and globally.

Carbon pricing is divided into 2 sub-instruments. The first tool is the *emission trading system*. The second one is the *carbon tax*. Presenting the statistics in a development and trade reality check on carbon pricing, UNCTAD (2022: 10) writes that "the 68 carbon pricing schemes implemented in 2022, 36 are taxes and 32 are trading systems".

3.2.1 Emission trading system (ETS)

Talking about the definition of this notion, Long & Goulder (2023: 203) write that "a carbon emission trading system (ETS) is a market-based policy instrument to combat climate change". Describing the meaning of this tool, Long & Goulder (2023: 203) note that "it internalizes the societal cost of carbon dioxide (CO_2) emissions and thereby creates incentives for emission reductions through changes in production methods and levels of production as well as investments in low-carbon technologies". It is common to speak about ETS in connection with the carbon tax. However, both tools possess differences. Driscoll (2021: 3) writes that "ETSs are similar to carbon taxes but diverge in the implementation, monitoring required, and sometimes political viability". In comparison with the carbon tax, UNCTAD (2022: 10) write that "an emissions trading system (ETS) is the preferred carbon pricing instrument at the subnational level". Additionally, Driscoll (2021: 3) notes that "to implement the policy, governments set a cap on carbon emissions and subsequently sell permits to carbon polluters at a set price".

ETS is commonly used on the so-called *cap and trade* principal. Describing this principal, OECD (2023) writes that "an upper limit on emissions is fixed, and emission permits are either auctioned out or distributed for free according specific criteria". Indeed, describing the suggestions of this principal, Jung & Song (2023: 8) note that:

> If the firm emits less than the threshold determined by the government, then, the firm may benefit from selling the leftover allowances. However, if the firm emits more than the threshold, the firm would have to purchase the allowances to satisfy the regulation.

Some experts consider that ETS is more lucrative for polluters, as emission permits or allowances could be disturbed for free, enabling to avoid paying the rents to the government authorities. However, this avoidance from emitting firms is compensated by the imposed carbon tax. Therefore, both ETS and carbon tax are used at the certain balance to achieve the maximum efficiency in cutting greenhouse gas emissions.

Presenting the outcomes of using ETS, Cramton et al. (2017: 230) write that:

> The result of this would be an economically efficient reduction in emissions. This efficiency is a central goal of the policy partly because cost reduction is a great help in making a strong policy sustainable.

ETS is widely used in the countries of the European Union and other states of the EEA-EETA agreement, including Norway, Liechtenstein and Iceland. It is called the EU ETS, which is applied comprehensively on the territory of European Union. It mainly concentrates on calculating and gathering data about the produced greenhouse gas emissions from various industries. According to *State and trends in carbon pricing 2022*, ETS is also used in China, Mexico, Kazakhstan, Republic of Korea, Canada, New Zealand, Switzerland and the United Kingdom (World Bank, 2022: 16). Additionally, the United States has its own programme, which is similar to ETS and called *the Regional Green Gas Initiative*. It is dedicated to reduction of greenhouse gas emissions on the territory among various states of the United States. Describing RGGI, Lee & Park (2019) write that:

> The Regional Greenhouse Gas Initiative (RGGI) is the first mandatory cap-and-trade programme designed to reduce greenhouse gas (GHG) emissions in the USA. Cap-and-trade refers to creating a limit or 'cap' on GHG emissions from various emission sources. The RGGI programme limits carbon dioxide (CO2) emissions in particular from the electric power sector, the largest source of CO2 emissions for more than 40 years in the USA.

Thus, it is noticeable, that ETS carries the regional meaning for the world, where the largest initiatives are applied within European Union and USA. However, it is hard to deny that the other countries have already used this measure of carbon pricing. The *cap-and-trade* principle

enables to economically and efficiently reduce greenhouse gas emissions within the various industries of a particular country by setting the limits on the producing volumes of greenhouse gas emissions by the governments or giving an ability for emitters to sell the permissions to each other.

3.2.2 Carbon tax

Carbon tax is the second common tool in terms of reducing greenhouse gas emissions. The idea behind the carbon tax suggests, that the fixed amount of fee, the emitters are to pay in order to offset the various types of emissions, they produce. Carbon tax could be divided into 2 types: *domestic carbon tax* and *the border one*. The domestic carbon tax is deployed the most, especially in the carbon-intense industries. Therefore, in my research I would like to concentrate only on this type of carbon tax, as it considered as the most common one. It could be imposed in 2 main ways, either to the production of goods with the deployment of fossil fuels (explicit) or as fee in terms of the main emitting products, generating the CO2 emissions (implicit). UNCTAD (2022: 16) notes that:

> If explicit, it is a proper carbon/emissions tax based on the quantity of GHGs or their CO2 equivalent emitted during the production process of goods (or services). It defines a carbon price by applying an explicit tax rate on GHG emissions or on the carbon content of fossil fuels burned during the production process. An implicit tax would correspond to the levy of a duty on goods or services that are generally CO2/GHGs-intensive such as petrol or any GHG-emitting energy source.

Basically, the explicit form of carbon tax is used most commonly by the countries. It is important to mention, that carbon tax is the concept, being introduced in the 90s of the 20th century. Describing the pioneers of applying the carbon tax were the countries of the Northern Europe, Cárdenas Rodríguez et. al (2017) write that:

> The first carbon tax ever introduced was in Finland, in 1990. Norway, Sweden (both in 1991) and Denmark (1994) followed. These four countries also introduced the first taxes and fees on other air pollutants, particularly on emissions of sulphur dioxide and nitrogen oxides.

In comparison with ETS, the carbon tax is being used less widely. Describing deployment of this tool, UNCTAD (2022: 10) writes that "carbon taxes are predominantly implemented at the national and regional levels". Indeed, it covers some countries of EU, including Poland, Spain, Latvia, Netherlands, United Kingdom, Finland, France, Denmark, Ireland, Slovenia and

Luxemburg; as well as states of the EEA-EETA agreement: Iceland, Norway, Switzerland, Liechtenstein. Additionally, some other countries, like: Chile, Colombia, Argentina, South Afrika, Ukraine, Indonesia, Japan; applied or schedule to introduce the carbon tax (World Bank, 2022: 16).

Due to its nature as an economic and fiscal instrument, the carbon tax could give significant decrease in greenhouse emissions, if applied properly. Both Cosic et al. (2021, as cited in Wang et al., 2022: 2) and Ali et al. (2019, as cited in Wang et al., 2022: 2) mention that "using a market-based approach to reduce carbon dioxide emissions and combat global warming, carbon taxes are an effective tool". Indeed, carbon tax has various advantages. Green (2021: 1) writes that "first, carbon taxes provide certainty of cost: the price is set by the government". Carbon tax, applied to the emitters of emissions, is the additional way of budgetary recharge, enabling the government to embrace economically all social groups of a country. Wang et al. (2022: 2) note that "reduced carbon emissions, for instance, may reduce the release of other pollutants, while carbon monies may be utilized to assist low-income people in purchasing energy-efficient household items".

Green (2021: 1) writes that "carbon taxes are relatively easy to design and administer. Governments have lengthy experience in collecting taxes". Muhammad (2022: 165) notes that "compared to income tax and sales tax, a carbon tax is a less-distorted tax base since it reduces carbon emissions and generates revenue for the government". Finally, in terms of developing better environmental aspect for people, carbon tax could be viewed for the companies as the economic way to streamline their own operations and become more carbon neutrally. Describing this opportunity of carbon tax, Smetanina et al. (2014) mention that "direct taxes on emissions are economically efficient because for polluters have an incentive to reduce their pollution up to the point where further reduction would cost more than paying the tax, and to do so in the least costly way". Thus, it is noticeable, that application of the carbon tax possesses both social and economic advantages. Although, it is deployed less widely around the world, this tool could be spread more around the world as the national practice within the carbon-intense industries, especially, in combination with the emission trading system or ETS.

3.3 Carbon, capture, utilization and storage (CCUS)

In terms of technological approach to reducing one of the particular types of greenhouse gases globally, particularly carbon dioxide or CO2, the *carbon*, *capture*, *utilization* and *storage* (CCUS) technology have been gaining momentum. These days, CCUS is worldwide technological tool to reduce greenhouse gas emissions in many countries. For instance,

according to the map of global CCUS projects, the number of CCUS project in the world in 2022 was accounted for 137 projects, being developed or operated. For instance, the European region had the highest number of projects, accounted for 65 units (IOGP, 2022).

Describing the working principal of these technologies in terms of their application within the oil and gas industry, Cao et al. (2022: 3) write that "CCUS means that the carbon dioxide emitted from the production process will be purified and subsequently put into a new production process that can be recycled, rather than simply sequestered". Basically, CCUS consists of three main stages: capture, transportation, utilisation or storage. Describing the first stage, Cao et al. (2022: 3) write that "CO2 capture technology refers to the separation and collection of CO2 produced in industrial production, or the separation of oxygen from air for oxygen-enriched combustion to increase the concentration of CO2 in flue gas, thus reducing the difficulty of capture and energy consumption". This approach of deploying the CO2 capture technology could be expressed in production of electricity and hydrogen and make a number of industries to decrease or even stop using the fossil fuels, as the main energy source, contributing to the increase in greenhouse gas emissions, as well as facilitate greater satisfaction of the goals of the Paris Agreement.

In terms of the *transportation stage*, Cao et al. (2022: 3) write that "CO_2 transportation technology is relatively mature and can be realized by pipeline transportation, tanker transportation and ship transportation". Describing the costs of this stage, Cao et al. (2022: 3) write that "pipeline transportation is usually the most inexpensive way to transport CO_2 on land by applying high pressure and transporting it in liquid or supercritical state, and it is mostly used for long-distance transportation". Therefore, many experts consider, that there is a higher need for the pipeline systems to be constructed globally.

Explaining the last stage of this technological approach, Cao et al. (2022: 3) note that "CO_2 utilization and storage is to utilize CO_2 geologically or inject it into deep strata by industrial means, to enhance oil, gas, water and other resources extraction and to achieve permanent CO_2 storage". These days, the geological storage is considered to be the key aspect and the most potential way to store CO2, as the planet has enough natural space under the ground. The IPCC highlights the geological storage of CO2, as the long-term approach to store captured CO2. UNEP (2006: 15) writes that "at the global level, well-selected geological formations are likely to retain over 99% of their storage over a period of 1,000 years".

In terms of international cooperation, *the United Nations Economic Commission for Europe* (UNECE) and *the Intergovernmental Panel on Climate Change* (IPCC) are one of the contributors to development of CCUS technologies globally. In terms of UNECE, development is mostly carried out within the 56 countries, including the states of European Union, Western and Eastern Europe, which are not the members of EU, members of the Commonwealth of Independent States and some countries of the North America (Mission, UNECE, 2023). Both organisations prepare the analytical research and reports about the CCUS implications and the consequences of its use as well as makes the forecast of potential decrease of CO2 emissions. In terms of UNECE countries, they are required to implement CCUS-technologies with an ability to capture 90Gt of CO2 until 2050 in order to achieve the targets of the Paris Agreement as well as facilitate the 2030 Agenda for Sustainability Development (Carbon Capture, Use and Storage (CCUS), UNECE, 2023).

Thus, it is noticeable, that CCUS technologies could be considered as the perspective projects of decreasing greenhouse gas emissions significantly, especially in the oil and gas industry. Therefore, the higher need for this type of technologies is required both from countries and companies. Some signs are seen in the UNECE countries, obliged developing and implementing this type of technologies, meanwhile the European Union demonstrates the leading position towards the number of the CCUS-projects. Simultaneously, the other countries have already introduced or consider the opportunity to realise the similar projects on their territory.

4.0 Methodology

In this chapter I briefly describe the research design, its elements, the process of collecting background information for my research and incentives, that made me to consider the chosen research questions. Next, the applied content analysis method is described. Finally, I touch upon the aspects, dedicated to validity and reliability of the collected data as well as the ethical issues of my research.

4.1 Research design

The project is based on the *qualitative content analysis*. As Erlingsson & Brysiewicz (2017: 94) note that "the objective in qualitative content analysis is to systematically transform a large amount of text into a highly organised and concise summary of key results". Hence, a variety of informational sources and the data had to be assessed and compiled in the well-structured

and short paragraphs. Indeed, the analysis was based on the contents of the Norwegian and Russian normative documents and the other legal enactments about the measures, applied to the national oil and gas industry as well as information, given in the corporate documents, including the sustainability report 2021, the corporate strategy and the other corresponding documents[1] of the chosen companies. The mathematical approach or any type of calculations were not applied.

Moreover, the majority of studies, dedicated to the issue of global warming and greenhouse gas emissions, are mostly *quantitative* rather than *qualitative*. As it was stated in the paragraph 1.1, some researchers seek to identify the connection between the produced volumes of different types of greenhouse gas emissions and the particular operations within the oil and gas industry. Indeed, the qualitative investigations were made both at the state and organisational levels, where researchers assessed the government policy and the corporate strategies towards reduction of greenhouse gas emissions. Indeed, these explorations are justified, but they cannot reply to the following questions: why the mentioned processes emerge in this way, but not in the other? How and why the measures of reducing greenhouse gas emissions in the oil and gas industry differ in Norway and Russia? How the national specific of Norway and Russia contribute to the deployed measures of decreasing greenhouse gas emissions in the oil and gas industry?

This research is considered to be qualitative, although some quantitative data was collected. Most gathered data is the subject to provide the answer to the "why"-questions. I would like to represent the legal and corporate information as well as give the explanations for the phenomenon in my research topic.

In order to provide the sufficient and objective results as well as ease understanding of the obtained outcomes, a simple classification of assessment is established. It implies the following quantitative indicators, based on qualitative characteristics for better visualisation of the results, where:

- "3" - *advanced*;

- "2" - *normally developed*;

[1] In terms of Equinor ASA, *Energy transition plan 2022* was used in order to obtain information about the long-term strategy of reducing GHG emissions by 2050 and CCS projects. In terms of PJSC "LUKLOIL" the document *Global energy perspectives to 2050* was used to gather data about the forecast of CCUS development by 2050.

- "1" - *require improvements*.

Each indicator enables to access the compared chosen criteria and draw explanation, in which aspects the measures of reducing greenhouse gas emissions within the national oil and gas industry of both countries at the state, industrial and organisational level are advanced or not. The intermediate conclusions for each criterion are given at the end of paragraphs 6.1-6.3. Additionally, the table with qualitative results is given at the end of each stated paragraph for short visualisation of the carried comparison.

Thus, my research did not analyse particular qualitative or quantitative output of the deployed measures. Comparison was made based on the content of the highlighted documents. It is vital to note, that my investigation does not include interviews with the government representatives, the members (employees or managers) of the chosen companies or the oil and gas experts. Hence, in my project I could not use the in-depth insides, that might impact obtaining some more practical or rather comprehensive outcomes.

4.2 Research design elements

In order to conduct my research, I analysed the set of greenhouse gas emissions reduction measures of Norway and Russia within the oil and gas industry at the state, industrial and organisational level. Based on the literature, I used three main dimensions for my research. *The first element* includes development of the state agenda of both countries on the subject of reducing greenhouse emissions both nationally and internationally. It includes the general position of Norwegian and Russian governments towards global warming and the general legal framework towards climate change within a country. *The second element* is connected with the legislation of both countries, regulating greenhouse gas emissions in oil and gas industry, including the particular practices and mechanisms, like carbon taxes, ETS, CCUS-projects and the other measures, stated in the general and specific laws, applied to the oil and gas industry. Progressing my research, *the third element* is connected with three main leading oil and gas companies of Russia and Norway: Norwegian Equinor ASA, Russian PJSC Gazprom and PJSC LUKOIL. The choice is justified by the idea, that all three companies vary in terms of the ratio of private and state participation ownership as well as their freedom of actions in terms of reducing greenhouse gas emissions in their operations. It would be exciting to track their progress during the process of reducing greenhouse emissions and what particular measures they use. Therefore, the corporate strategy, sustainability report dated 2021 as well as the stated corresponding documents of the chosen companies, considering the particular measures of decreasing greenhouse gas emissions in their operations are analysed.

4.3 Background

Mainly my inspiration for the project came from a few main sources of information. First of all, it was *State and Trends of Carbon Pricing 2022*, annually published by World Bank. The report covers the measures of carbon pricing, applied by different countries. It also assesses impact on the process of reducing greenhouse gas emissions in a particular state and in the world. It provided me with the valuable data and information about carbon pricing instruments, including Emission Trading System (ETS) and carbon tax. Secondly, it became *OECD Environmental Performance Reviews: Norway 2022* published by OECD. The report generally highlights the achievement and progress of Norway made in green transition during the last decade, as one of the leading countries towards this trend. Furthermore, despite the success in many areas, Norway has potential for growth and the document provides the country with the sufficient recommendations and improvements that might affect more the environmental performance in future.

Additionally, my interest is dedicated to comparison of Norway and Russia in terms of their national oil and gas industry. As mentioned before, both countries have serious dependence on oil and gas sector, being one of the decisive factors in their national prosperity and economic development of both countries. It is hard to deny, that the oil and gas sector will remain an integral part of the national economies for the next few decades. However, rising concerns around global warming as well as state and corporate aspiration to decrease greenhouse gas emissions, especially, in the oil and gas industry, affects both countries. Therefore, it was exciting to analyse the content of the legislation norms, used by the governments of both countries in the oil and gas industry. Beyond that, it was breathtaking to assess the corporate emissions reduction measures, deployed by three chosen oil and gas companies in accordance with their corporate documents.

4.4 Content analysis method

To achieve the set goals, the various sources of information were used to gather the significant part of empirical data for my project by use of *the content analysis method*. In order to avoid potential misunderstanding, I would like to highlight my particular focus of the research. I do not aim to explore the potential output from the applied measures at the state, industrial and organisational levels in the oil and gas industry of both countries. I rather seek to analyse and compare the particular measures, used in the oil and gas industry at the mentioned levels of Norway and Russia, stated in the national legal enactments and the corporate sustainability reports 2021, their corporate strategies and the other stated corresponding documents. The

collection of information about legislation and companies was eased by the open access of particular normative documents and corporate documents, published on the official websites.

It is reasonable to mention, that there will not be the perfect representation of particular actions of governments and companies in reality, but it will give a clear understanding in which way, what current stage of development and what a particular set of the measures are implemented by them, contributing to reduction of greenhouse gas emissions.

However, it is vital to highlight the limitations of the content analysis method. Indeed, this way of research does not provide the clear pattern, how to conduct the research. Therefore, the researcher is responsible for the particular choices he or she makes to collect the data. This in turn make this way of research more difficult, as the gathered data could be presented in different ways, affecting the outcomes of the research.

The unit of my analysis became *the content of the secondary sources of information*. Taherdoost (2021) writes that "secondary data is an essential part of research that can help to get information from past studies as basis conduction for implementing a research or as the required background information". Taherdoost (2021) notes that "there are different sources of secondary data such as records, books, research articles, and internet articles". In terms of my research, the secondary data includes the content of the laws, acts, decrees and other legal enactments, dedicated to the Norwegian and Russian measures of reducing emissions, applied in the oil and gas industry of both countries. Additionally, the content of sustainability reports, corporate strategies and the other stated corresponding corporate documents, connected with the practices to reduce greenhouse gas emissions of the chosen companies was analysed, as the research unit.

The information of the general and specified governmental documents, like acts, laws, decrees and the other legal enactments, regulating the issue of greenhouse gas emissions and establishing the measures of reducing them in Norwegian and Russian oil and gas industry, were taken from the official websites of the Russian and Norwegian governments as well as corresponding Ministries and administrations, responsible for the regulation of climate change within each country. The content as well as data from the sustainable reports, the corporate strategy and the other corporate documents of Equinor ASA, PJSC Gazprom and PJSC LUKOIL, were presented on the official websites of the chosen organisations.

4.5 Validity and reliability

The project, based on the *qualitative content analysis*, requires an ability to present the collected information correctly. Noble & Smith (2015: 34) write that "unlike quantitative researchers, who apply statistical methods for establishing validity and reliability of research findings, qualitative researchers aim to design and incorporate methodological strategies to ensure the 'trustworthiness' of the findings". Hence, the importance of validity and reliability becomes the important aspect of my research.

In order to ensure greater reliability and validity, more research stages are to be done, as possible if there is an external observer looking for the progress of the researcher's progress. The aim of my research is to describe and analyse, which measures are used by Russia and Norway within their national oil and gas sector at the state, industrial and organisational levels and what shapes them in particular. My project does not analyse reliability of administrating the legal enactments of both countries and the data about the measures, described in sustainability reports, corporate strategies and the corresponding documents of the chosen companies. Therefore, reliability of the information, given in the research, is justified, as was gathered from the most reliable documents I could use in my project. They included the information about the current measures, deployed by the governments and chosen companies, which came from the official websites of the Norwegian and Russian government, the responsible Ministries and administrations, involved in the issue of reducing greenhouse gas emissions, and the investigated sustainable reports 2021, the corporate strategies and the other stated corresponding corporate documents of Equinor ASA, PJSC Gazprom and PJSC LUKOIL. Each source of information is provided with the proper citation and the links to the source with the open access for each user as well as investigator.

Additionally, several stages of my research have been described and discussed with my supervisor to ensure greater quality and feedback for the outcomes of my research project.

4.6 Ethical issues

Mirza et al. (2023) write that "when it comes to research, ethics refer to the norms and values that guide decisions regarding the collection of data and analysis of said data, as well as the dissemination of findings". While considering any research project, various ethical challenges might arise. They might appear, when dealing with the information collected from the Internet. Firstly, information is to be interpreted in the correct way to avoid any misunderstanding for future researchers. Secondly, information is to be proofed by the attachment of the source of information, where it was collected. Maronick (2009, as cited in Shikha, 2017) writes that

"internet-based research now constitutes one of the most common data collection methods around the world". My research could be considered as internet-based one, as implies a variety of internet sources. Therefore, it has to imply a few ethical principles. As Rodham & Gavin (2006: 92) note that "researchers who wish to complete their research via the on-line environment, in the absence of existing accepted guidelines drawn up specifically for this kind of work, must think carefully about the ethical implications of their research". It is important to specify, that my research did not imply the direct negotiations with the governmental authorities or the business representatives of the stated companies on-line or off-line in order to obtain deep insides that might impact more on the findings of my research. Hence, there was not the need to deal with the principles of justice, beneficence and autonomy, when involving participants into the qualitative research (Shikha, 2017).

At all stages of my research project, the collected secondary data was gathered from the official websites of the Russian and Norwegian government, including laws, act, decrees and the other legal enactments as well as the sustainability reports and the stated corresponding documents of the chosen oil and gas companies – Norwegian Equinor ASA, PJSC Gazprom and PJSC LUKOIL, available in the open access. Describing the issues of the secondary data, Tripathy (2013) writes that:

> If the data is freely available on the Internet, books or other public forum, permission for further use and analysis is implied. However, the ownership of the original data must be acknowledged.

In terms of my research project, each website provided the users with an ability to collect the specified data. However, each website contained the section with the similar requirement to mark the source and link to the used website. Therefore, there was no direct need to obtain the consent of gathering or using the secondary data, as it was presented in the free access for the researchers and users with obligations to make proper references. All obtained data is presented in accordance with the norms of the Norwegian educational system and proper citation rules.

5.0 Empirical chapter

In this chapter, the factors, that shapes the measures, applied to reduce greenhouse gas emissions in the Russian and Norwegian oil and gas industry at the chosen levels for the research, are described, based on the collected empirical data.

5.1 Measures of reducing GHG emissions at the state level

Paragraphs 5.1.1-5.1.2 describe *the state level*, where the history and the modern stage of developing the legal framework towards reduction of greenhouse gas emissions, including the several general laws and government position and the national strategy, is analysed in general in both countries.

5.1.1 Norway

The Norwegian government concerns about the climate change as well as greenhouse gas emissions could be tracked since the second half of 80th of the 20th century. The need for the measures, which could impact greenhouse gas emissions, was steadily discussed within the Norwegian government by different coalitions of parties. For instance, Kasa (2002, as cited in Gullberg, 2009) writes that "in 1990 the Syse Government, a centre-right minority coalition consisting of the Conservative Party, the Norwegian Christian Democratic Party and the Centre Party, proposed a CO2-tax covering mineral oil and gasoline". Later, the tax, partially applied to CO2 emissions from certain operations, was significantly developed. Ministry of Finance (1990, as cited in Gullberg, 2009) states that "the same year the Brundtland Government, a one-party minority government established by the Labour Party, proposed to extend the CO2-tax to also cover CO2-emissions from coal, petrol and petroleum production on the Norwegian continental shelf". In the following years, by rising concerns about the issue of global warming, Norway entered 2 key agreements, that also contributed to the Norwegian further policy of climate change. Yousaf (2012) writes that:

> Norway ratified the Kyoto protocol in 2002 following the united nation framework convention on climate change in 1993. According to the Kyoto protocol, Norway average greenhouse gas emissions should not increase more than 1% as compare to 1990 emissions level during the first commitment period (2008-2012).

The gradual implementation of the measures towards climate change was also supported by greater cooperation of Norway with European Union within the second half of 2000s, expressing in signing of the ETS-agreement, which ensuring the process of slowing down the global warming in the most lucrative way within European Union. Therefore, the Greenhouse Gas Emission Trading Act was introduced in 2005, and in 2008 Norway took participation into the EU Emissions Trading System or EU ETS (Emissions to air, Norwegian Petroleum, 2023a). However, the process of entering the EU ETS was going through 2 stages. Thus, Yousaf (2012) notes that:

> During the first phase, Norway did not include in petroleum industry apart from the refineries and few gas processing units. The main reason of excluding the oil industry was high level of carbon tax.

The second stage directly touched the oil and gas industry. Describing the next stage, Yousaf (2012) writes that "after that, Norway decided to integrate the carbon market with European Union in order to stabiles the price of carbon and give access to the local businesses to European market for buying and selling the emission allowances".

After integration in the European energy market, Norwegian government proposed the ambitious goals towards greenhouse gas emissions reductions. Gullberg (2009) notes that:

> With regard to coverage, the Stoltenberg I Government proposed a Norwegian ETS covering 80 per cent of the emissions from 2008. The emissions were to be reduced by 30 percent compared to emissions in 1990 by 2012.

Later, Norway entered the Paris Agreement, which became the key aspect in formulating the process towards climate change and reducing greenhouse gas emissions within Norway to become the carbon neutrally country. Norway was one of the first countries, which ratified the Paris Agreement in 2016.

In order to facilitate the satisfaction of the Paris Agreement goals, the country settled the special so-called *Climate Change Act* in 2017. The Government of Norway (Government.no, 2017) states that "the purpose of this Act is to promote the implementation of Norway's climate targets as part of its process of transformation to a low-emission society by 2050". The Act is dedicated to the so-called *Norway's long-term low-emission strategy for 2050* and suggests ambitious goals towards the green transition into 2 main stages: by 2030 & 2050. Describing the first stage, IEA (2022: 10) writes that "Norway has, through its enhanced nationally determined contribution (NDC) under the Paris Agreement, committed to reduce emissions by at least 50% and towards 55% by 2030 compared to 1990 levels". These actions are mostly connected with the steady increase in carbon tax, forcing the international oil and gas companies to adopt to the Norwegian green transition policy and develop their own technologies to produce less greenhouse gas emissions. The Government of Norway is aiming to achieve reduction of CO2 targets in accordance with the Paris Agreement. For that purpose, it is publishing *the white papers*. White papers or Meld.St. are submitted to the Storting by the Government. Basically, they contain the information about the progress, made in a particular filed or suggest future policy for a country (Government.no, 2012).

The current main document is white paper, reviewing the Climate Action Plan by 2030. The main focus is made on the emissions from the industries like, transport, waste, agriculture, buildings as well as a few types of industrial production and oil and gas industry, not included in the Emissions Trading System or the so-called non-ETS (Government.no, 2021). Describing one of the main priorities of this document, OECD (2022) writes that "Norway's Climate Action Plan 2021-30 proposes to raise the carbon tax from NOK 590 (USD 69) per tonne of CO_2-eq in 2021 to NOK 2 000 (about USD 233) by 2030". Noting the most effort, dedicated to the progression of carbon tax system in the non-ETS sectors by 2030, IEA (2022) writes that "a gradual increase in the taxation of greenhouse gas emissions which are not included in the emission trading system including transport, waste, agriculture, buildings, industrial production, and the oil and gas industry (to NOK 2000/tCO2eq) in 2030 including CO2 removals and emissions cuts in the LULUCF)".

That resulted in the tax rates were raised in 2022 in non-ETS sectors. Thus, World Bank (2022: 61) notes that:

> To keep up with the price increase trajectory, Norway increased the rates of carbon tax for approximately 30% for most fossil fuels in 2022. The general tax rate on non-ETS emissions increased from NOK 591 (USD 68)/tCO2e in 2021 to NOK 766 (USD 88)/tCO2e in 2022.

Moreover, the *Climate Change Act* was not only aimed at increase in the tax rates, as a fiscal tool, but also at giving the incentives to the other industries of Norway to facilitate the gradual achievement of high rate of decarbonisation. Describing this phenomenon, OHCHR (2019) writes that:

> New incentives have been put in place, including a strengthening of the Climate and Technology Fund and a ban on the use of mineral oil for heating of buildings from 2020. The Norwegian Government is promoting a green tax shift, an example of which is an exemption from import tax and VAT for buyers of plug-in electric cars. Increased levies on fossil fuels and greenhouse gas emissions have been employed in combination with a reduction in taxes applicable to other sectors.

Moreover, the amendments were made to the Climate Change Act in 2021. Achievement of 90-95 % reduction greenhouse gas emissions within Norway in comparison with the indicators of 1990 became the new target of the Act.

Moreover, the measures of carbon tax and EU ETS, applied to reducing greenhouse gas emissions within Norway, make energy companies to provide the industry with innovative solutions with the aim to reduce greenhouse gas emissions, as the rising commercial interest from the firms of implementing the CO2 storage projects on the Norwegian continental shelf is identified (Carbon capture and storage, Norwegian Petroleum, 2023a). Norway has been steadily developing the system of awarding the licenses of CO2 storage to the companies since 2019, resulting in that the companies with the required expertise and specific and industrial plans, willing to provide carbon capture solutions on the commercial base, has the right to be granted with the permission by the Ministry of Petroleum and Energy in accordance with the company's needs (Carbon capture and storage, Norwegian Petroleum, 2023b).

For instance, on March 31, 2023, four companies were granted with the exploration licenses for implementing CO2 storage in 2 areas, located in the North Sea (Norwegian Petroleum Directorate, 2023). Moreover, the government of Norway is aiming at implementing the ambitious CCS project within the territory of Norway in accordance with *Meld. St. 33 (2019–2020) Report to the Storting (white paper)*, which resulted in that under decision of the Norwegian Parliament the ambitious CCS project called *Longship* of Norway is being constructed at the current moment (Carbon capture and storage, Norwegian Petroleum, 2023c). The main purpose of this project is to impact an understanding, aimed at ensuring the safety and feasibility of CCS, optimising the costs and decreasing barriers for implementing future projects, connected with this technology, as well as enhancing regulative base and incentives for further activities, connected with CCS (Carbon capture and storage, Norwegian Petroleum, 2023d). The project is primarily aimed at reducing greenhouse gas emissions at the large scale, both in Europe and the world. In terms of successful implementation, it is estimated, that the project will create new jobs and be the significant tool, enabling to reduce emissions in cement and waste industry. The efforts have already been made to implement this project. The project is estimated to cost approximately NOK 28 billion, taking into account the investments and operating costs during the 10 years, meanwhile the government's share is expected to amount to around NOK 18 billion (Carbon capture and storage, Norwegian Petroleum, 2023e).

5.1.2 Russia

Being the significant player in the international oil and gas market, the Russian Federation's contribution to the increase in greenhouse gas emissions remains quite high. Bukvic et al. (2015) write that "emissions of CO2 (carbon dioxide, accounting for 90% of the total national GHG emissions included into the Kyoto Protocol) were recorded at 2.388 billion tons in 1990".

The base point in formulating agenda towards climate change of the Russian Federation could be considered participation in the United Nations Framework Convention on Climate Change in 1992 in Rio de Janeiro and its further ratification in 1994. As well as other countries, Russia entered the Kyoto Protocol, concerning the issue of global warming and greenhouse gas emissions. Describing ratification of the Kyoto Protocol in Russia, Bukvic et al. (2015) write that:

> Russia ratified the UNFCCC on November 04, 2004 by enactment of the Federal Law 34-FZ, committing to "exercise measures called to mitigate effects of climate change through limitation of GHG emissions, and protection and improvement of sinks and reservoirs". The Federal Law "On Ratification of the Kyoto Protocol to the United Nations Framework Convention on Climate Change" was passed in the RF State Duma on October 22, 2004, followed by adoption by the RF Federation Council on October 27, 2004. President Putin signed the Law on November 04, 2004 (reference No.128-FA). The Kyoto Protocol came into effect on February 16, 2005, i.e. 90 days after Russia had submitted the ratification document to the secretariat of the UNFCCC on November 18, 2004.

During the period of the President Dmitry's Medvedev tenure, the comprehensive view to the problems of global warming started to be formulated within the Russian government. This leaded to the creation of the Climate doctrine. On the 23rd April 2009 the general committee of the Russian government approved the Climate Doctrine of the Russian Federation. On the 17th December 2009 the president Dmitry Medvedev signed the Climate Doctrine.

The paragraph 1 of the Climate Doctrine suggests the systematic view towards the purpose, principals, contents and ways of implementing the measures of Russian Federation in terms of global climate change (Climate Center of Roshydromet, 2023).

The main directions of actions behind the Doctrine, stated in the paragraph 31 include improvement of the legislation base, legal and government regulatory environment in terms of climate change; development of economic mechanisms, connected with realisation of measures in terms adoption and easing anthropomorphic impact on the climate; scientific support in terms of establishment and realisation of the measures in terms of adoption and easing anthropomorphic impact on the climate; staffing support of establishment and realisation of measures in terms of adoption and easing anthropomorphic impact on the climate; international

cooperation in terms of f adoption and easing anthropomorphic impact on the climate (Climate Center of Roshydromet, 2023).

The tasks of the Climate Doctrine, stated in the paragraph 18, included reinforcement and improvement of informational and scientific base of the Russian Federation policy in terms of climate, including enforcement of science and technology and technological potential of the Russian Federation, ensuring the maximum complement and reliability of information about the state of the climate change system, impacts on climate, its current and future changes and consequences; establishment and realisation of prompt actions and long-term measures of adoption to the climate change; establishment and realisation of prompt actions and long-term measures of easing anthropomorphic impact on climate; participation in the initiatives of international community in terms of tackling the issues, connected with the climate change (Climate Center of Roshydromet, 2023).

Later, more comprehensive approach was formulated around the Climate Doctrine of 2009 by the President Vladimir Putin. *Decree of the President of the Russian Federation dated September 30, 2013 No. 752 "On reducing greenhouse gas emissions"* was introduced. It could be considered as the first try, aiming to achieve carbon neutrality within the Russian Federation. The document was aimed at settling 75% emissions reduction indicator by 2020 in comparison with the level of 1990 (Official publication of legal acts, 2013). However, the ambitious goal of decreasing greenhouse gas emissions by 75-80 % was quite unachievable by the stated year in Russia. Therefore, later, in 2015, the President Vladimir Putin targeted and prolonged the period in the process of reducing greenhouse gas emissions within the Russian Federation. Describing the actions of the President Vladimir Putin, RT (2015, as cited in Gusev, 2016: 45) writes that:

> Speaking at the 70th session of the UN General Assembly on 28 September 2015, Russian President Vladimir Putin paid special attention to the problem of global climate change, saying that Russia is planning by 2030 to limit greenhouse gas emissions to 70-75% compared to 1990 levels, thus making its contribution to slowing global climate change. It was further underlined that qualitatively new approaches are necessary to succeed.

Later that year, as the other countries, the Russian Federation entered the Paris Agreement. The agreement was signed by Russia on the 22nd of April 2016. However, the document was ratified a few years later, on the 23rd of September of 2019. Indeed, since entering and signing, the

Agreement was not fulfilled by the Russian government, but the steps in the formulation of legal norms for reducing greenhouse gas emissions started to progress. A few years later, the key Federal Law was applied in 2021, on which the measures to reduce emissions are being developed in the Russian Federation.

Thus, the current regulatory norms are based on *the Federal Law of July 2, 2021 No. 296-FZ "On limiting greenhouse gas emissions"* (The Ministry of Economic Development of the Russian Federation, 2023). This law was primarily used to facilitate the goals, declared in the Paris Agreement. The main principles, laying in the essence of this law, are described in the Enactment 3. They include supporting the sustained and balanced economic development of the Russian Federation, reporting on the outcomes in the CO2 emissions reduction by the regulated organisations, satisfaction of the target indicators of greenhouse gas emissions, voluntary involvement in realisation of the climate projects and scientific validation, systematic and comprehensiveness of the used approach to reduce greenhouse gas emissions (Official publication of legal acts, 2021).

The measures, subjected to facilitate reduction CO2 emissions in Russia, are described in the Enactment 4. They include state recording of greenhouse gas emissions, setting the target indicators of greenhouse gas emissions reduction and support in accordance with the legislation of the Russian Federation to decrease greenhouse gas emissions and increase their absorption. The main actions are to be carried by the government of the Russian Federation or the special, set and accountable administration (Official publication of legal acts, 2021).

One of the policy directions in the way to reduce greenhouse gas emissions by 2050 within the country is being carried by the Ministry of Economic Development of the Russian Federation. It is responsible for national administration of CO2 emissions reduction as well as formulation of the national policy and statutory regulation towards limitations of greenhouse gases (The Ministry of Economic Development of the Russian Federation, 2023).

The Ministry determines its actions, as the strategic direction in the process of CO2 emissions reduction in accordance with the following document – *the government edict of the Russian Federation dated 29 October 2021 No. 3052-r the Strategy of social-economic development of the Russian Federation with the low level of green gas emissions before 2050* (The Ministry of Economic Development of the Russian Federation, 2023). The strategy is mostly aimed at achievement of carbon neutrality within the Russian Federation by 2050 on condition of sustainable economic development. The strategy involves 2 possible scenarios - *no change*

scenario and *target* one. The *target scenario* is accepted as the main one in terms of introducing this strategy. The main priority is to ensure competitiveness and sustainable economic development of the Russian Federation in terms of the global energy transition. The target scenario assumes the lower path of decrease in energy exports of the Russian Federation by 2030 in comparison with the *no change scenario*, which considers that decrease in energy exports will move faster by the same year. The *target scenario* suggests investments in reduction of greenhouse gas emissions amount to 1 % of the Russian GDP during 2022-2030 and 1,5 % - 2 % within 2031-2050, respectively. By the mentioned steps, it is expected that the net volumes of emissions will decline by 60 % in comparison with 2019, and by 80% in comparison with 1990, respectively (The Russian Government, 2021). Moreover, the target scenario implies outperforming growth rates of non-energy exports for about 4,4 % annually. Contribution to the sustainable growth will be brought by the growth in investments in fixed capital at the level of 3,7 % annually and the stable growth of real disposable household income at the level of 2,5 % annually (The Ministry of Economic Development of the Russian Federation, 2021).

The measures of decarbonisations, involved in this strategy, include support measures for the development, replication and scaling of low- and non-carbon technologies, stimulation of the use of secondary energy resources, changes in tax, customs and budgetary policies, development of sustainable financing, measures to conserve and use the absorptive capacity of forests and ecosystems, support technologies for capturing, using and using greenhouse gases (The Ministry of Economic Development of the Russian Federation, 2021).

Moreover, *the government edict of the Russian Federation dated 29 October 2021 No. 3052-r the Strategy of social-economic development of the Russian Federation with the low level of green gas emissions before 2050* implies the target indicators and the level of reducing greenhouse gas emissions by 2030. The strategic indicators of greenhouse gas emissions reductions determine cursor by 2030 at the level 2,212 billion tonnes of carbon dioxide equivalent in comparison with 1990 (The Russian Government, 2021). The maximum mass of net emissions is 1.673 billion tons of equivalent. CO2 (in comparison with 54% in 1990). Additionally, the indicators of CO2 reductions are set in various industries with the different volumes, presented in the Appendix 1.

The subject to this document is so-called *regulated organisations*. In accordance with the paragraphs 1 and 2 of *the government edict of the Russian Federation dated 14 March 2022,*

No. 355 on criteria for legal entities and sole proprietors being qualified as regulated organisations, the notion "regulated organisations" suggests, that these are companies (legal entities or sole proprietors), which produce emissions in the volume of 150 thousand tonnes of CO2 equivalent and more within the period from the 1st January to the 31st of December, which is calculated on the equation of production process' equation multiplied by the cursor in accordance with the type of emitted greenhouse gas (Official publication of legal acts, 2022). Additionally, the government applied *the government edict of the Russian Federation dated 22 October 2021, No. 2979-r* on the list of greenhouse gas emissions, in respect of which the government accounting of greenhouse gas emissions and maintenance of a greenhouse gas cadastre are carried out, which determines 7 groups of carbon dioxide gases and related subtypes (Official publication of legal acts, 2021).

Additionally, each Russian region has the right to implement its local regulatory norms, as an experimental approach to contribute to the decrease in CO2 emissions in a particular area in accordance with *the Federal Law of March 6, 2022 No. 34-FZ "On conducting an experiment to limit greenhouse gas emissions in certain constituent entities of the Russian Federation"* (Official publication of legal acts, 2022). One of the examples could be *the Sakhalin case*. In this region, the local government implemented *the Decree of the Government of the Sakhalin Region dated November 28, 2022 No. 551 "On approval of the program for conducting an experiment to limit greenhouse gas emissions in the Sakhalin region"*. This Decree suggests application of measures within the region, aimed at reducing CO2 emissions to achieve carbon neutrality in Sakhalin region within the period from 1st December 2022 to 31st December 2028. The companies, which are the subject to the law and based on the Sakhalin territory, have to report about reduction of CO2 emissions and find new ways to decrease the volumes of CO2 emissions to satisfy the cursor of emissions applied by the government as well as make payments in case of excess of the accepted level (Official publication of legal acts, 2022). The law also estimates the opportunity to involve other regions of Russia into implementation of this legal procedure with the future corrections, including, determination of periods to achieve carbon neutrality and formulating unique law for the specific regions. Currently, the government considers the opportunity to launch the experimental law in 4 regions: the Republic of Bashkortostan, Khabarovsk Krai, the Irkutsk Region and Kaliningrad Region.

5.2 Measures of reducing GHG emissions at the industrial level

In this sub-chapter, the paragraphs 5.2.1-5.2.2 define *the industrial level*, where the content of the particular laws of both countries within the oil and gas industry are analysed. Additionally, the paragraphs touch upon carbon pricing, classification of emissions, the reporting procedures and CCUS development and projects are analysed.

5.2.1 Norway

Norway was one of the first players alongside with the other Nordic countries in reducing of greenhouse gas emissions in the oil and gas industry, which started to introduce gradual and systematic measures in the 90th of the 20th century.

From the industry perspective, the emissions of CO2 emissions are regulated by 4 main acts. It includes the Petroleum Act, the CO2 Tax Act on Petroleum Activities, the Sales Tax Act, the Greenhouse Gas Emission Trading Act and the Pollution Control Act (Emissions to air, Norwegian Petroleum, 2023b).

Pollution Control Act plays the significant role in regulation of the oil and gas companies, operation on the Norwegian Continental Shelf. It is dedicated to the measures, enabling to eliminate or reduce the harmful consequences for the environment. Moreover, each company is to get the production license in order to develop a discovery, based on the established and approved production development plan or PDO in accordance with the requirements of the Ministry of Petroleum and Energy (Emissions to air, Norwegian Petroleum, 2023c). The approved licenses influence the oil and gas companies significantly, as enable the government side of Norway to determine the volumes of greenhouse gas emissions, which could be produced by companies. Basically, emissions, produced from the oil and ga industry are the subject to the conditions, stated in the plans for development and operation or PDOs and the permissions, granted in accordance with the Pollution Control Act (Emissions to air, Norwegian Petroleum, 2023d).

Indeed, the licenses suppose the exception for greenhouse gas emissions by companies in accordance with *Pollution Control Act*. However, Makhortov (2006) specifies that:

> According to the document pollution is prohibited, unless it is permitted by law, regulation or individual permits (MVD). Thus almost all pollution activities in Norway may be carried out only after individual permission or licensing of the Norwegian Pollution Control Authority or the county environmental agencies (MVD).

Therefore, for higher assurance from the government side, Makhortov (2006) writes that "the pollution control authority has the right to require an environmental impact assessment from the company that is planning to start petroleum activity in certain area".

These days, Norway uses carbon pricing, expressing in combination of EU ETS and carbon tax in terms of the oil and gas sector. Describing the unite use of both tools, OHCHR (2019) write that "half of emissions part of the EU ETS, of the other half almost 70 pst of emissions have a carbon tax". Thus, based on this combination, companies, operating on the Norwegian Continental Shelf, for each produced tonne of CO2 emissions, are to pay approximately NOK 1100, in comparison with the other non-petroleum companies in Norway and the other states with oil and gas activity (Emissions to air, Norwegian Petroleum, 2023e).

As it was stated in the paragraph 3.2.1, ETS is commonly used on the principle of *cap and trade*. EU ETS follows this principle, which Norway also deploys in its petroleum sector. The price, used in EU ETS for the petroleum industry is increasing steadily in Norway. For instance, the price, acquired for the polluters to emit 1 tonne of CO2 accounted for roughly 81,24 Euros or NOK 820 (Emissions to air, Norwegian Petroleum, 2023f).

In terms of the carbon tax, Norway introduced it in 1991 in terms of oil consumption and production of fossil fuels on the Norwegian Continental Shelf. In Norway, carbon tax is formulated, taking into account the specifics of the national oil and gas industry, as operations are mostly made on the Norwegian Continental Shelf. Therefore, application of this tool implies the following: In accordance with the CO2 Tax Act on Petroleum Activities, all types of the combustion of gas, oil and diesel in petroleum activities, made on the Norwegian Continental Shelf and emissions of CO2 and natural gas are the subject to the carbon tax (Emissions to air, Norwegian Petroleum, 2023g).

Carbon tax embraces not only the emissions of carbon dioxide, but also other types of emissions. The Norwegian legislation divides waste gases into 5 main types, including carbon dioxide or CO2, contained in the waste gas, nitrogen oxides or NOx, non-methane volatile organic compounds or NMVOCs, methane or CH4, and sulphur dioxide or SO2 (Emissions to air, Norwegian Petroleum, 2023h).

The indirect emissions of NOx and NMVOCs, contributing to the greenhouse gas, are also the subject for the carbon tax. In 2005, Norway entered the Gothenburg Protocol and declared to reduce the emission of NOx by 23 % in 2020 in comparison with 2005 and NMVOC by 40% in 2020 in comparison with 2005, respectively. In terms of statistics, in comparison with the

volume of 55 100 tonnes, the NOx emissions in 2021 amounted to 40 200 tonnes (Emissions to air, Norwegian Petroleum, 2023i). It is estimated that the decrease equals to 37%. In 2007, the special tax for NOx, which is imposed to large gas turbines and machinery, and from flaring. However, this tax suggests exceptions for the companies, cooperating with Norwegian government or various commercial organisations towards the implementation of measures in process of NOx emissions reduction (Emissions to air, Norwegian Petroleum, 2023j). Thus, one of the achievements of this Protocol could be expressed in the idea that: In 2018, those oil and gas companies, decided to enter the agreement, paid a contribution of NOK 16,5 per 1 kg of nitrogen oxide to the special NOx Fund. Other industrial companies had to pay NOK 10,5 per 1 kg of nitrogen oxide. The income, accumulated by the fund, is deployed to facilitate investments by the participants of the agreement, aimed at reducing their emissions of nitrogen oxide (Emissions to air, Norwegian Petroleum, 2023k).

NMVOCs account for one fifth of all greenhouse gas emissions in the petroleum sector and are mainly produced from activities, connected with storage and loading of crude oil offshore, and in smaller amounts from the gas terminals. By the investments in NMVOC recovery equipment, Norway succeeded in the process of decreasing the volumes of this type of emissions significantly. In 2021, the indicator amounted to 30 000 tonnes in comparison with the number, accounted for 216 000 tonnes in 2000 (Emissions to air, Norwegian Petroleum, 2023l).

In terms of environmental reporting in the Norwegian oil and gas industry, there is the special register, collecting the data about the volumes of CO2, released by the oil and gas industry. Each company, operating on the Norwegian Continental Shelf is to provide the database with the submitted reports about emissions. The national operator Offshore Norge is responsible for collecting the reports with the data about the produced emissions into the air or sea from the operators and add it to the national database called EPIM Enviromental Hub or EEH (Emissions to air, Norwegian Petroleum, 2023m).

In terms of CCUS, as it was described in the paragraph 5.1.1, Norway is currently implementing the ambitious and large project – *Longship*, enabling to cut CO2 emissions in Europe and the world. The Norwegian government partially invested (about 2/3) in the project. Moreover, this project will be facilitated and constructed by the efforts of Equinor ASA and the other international companies, like Total and Shell, that is touched upon in the paragraph 5.3.2.

5.2.2 Russia

The oil and gas industry plays the significant part of the Russian economy. Russia relies strongly on the oil and gas exports. In 2021, the revenues, obtained from fossil fuels, including oil and natural gas, made up 45 % of the national federal budget of Russia. In the same year, the country's crude and condensate output, amounted to 10,5 mln. barrels per day, contributed to the 14 % of world total supply (IEA, 2022). However, Makarov et al. (2021) note that "the substantial role fossil fuels play in Russia's economy underlies challenges on the pathway toward an active climate change mitigation policy". Nonetheless, some progress has been made by Russia. During the period from 1990 to 2020, the cumulative volume of greenhouse gas emissions in the oil and gas industry declined from 197,9 mln. to 152,8 mln. tonnes of CO2 equivalent, correspondingly (Roshydromet, 2022: 27).

Moreover, it is important to mention, that the government made a few general steps towards establishment of the legal norms, regulating the gradual decrease in greenhouse gas emissions for the last few years. In terms of particular measures, the regulations are made in accordance with the mentioned *the government edict of the Russian Federation dated 22 October 2021, No. 2979-r* in the paragraph 5.1.2. This document embraces all the organisation, which operation activity is connected with the emission of greenhouse gas emissions. These could be the energy companies and non-energy ones.

The edict includes the following types of greenhouse gas emissions, that should be accounted and reduced by companies: carbon dioxide (CO2); methane (CH4); nitrous oxide (N2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF6); nitrogen trifluoride (NF3) (Official Internet Portal of Legal Information, 2021). Sorokin (2021) argues that the regulated organisations under the action of this law are considered to be the companies, which operating activity produces 150 000 tonnes of CO2 per year and more before 01.01.2024, and 50 000 tonnes of CO2 and more after 01.01.2024. Such a system is implemented in 2 stages, due to absence of systematic database about the emissions produced by various organisations and the only source of information was the expert assessment reports. Such measures will enable to identify the most significant producers of emissions and after the beginning of 2024 the second stage will allow to find less significant contributors to producing emissions.

Additionally, the paragraph 3 of *the Order of the Federal Service for Supervision of Natural Resource Usage dated 30 June 2015 No. 300* identifies 17 various criteria of organisations, which are the subject of regulative norms. In terms of oil and gas industry, the 2 aspects could

be applied to the regulated organisations are the companies, which operations are connected with extraction, transportation, storage and processing of oil and natural gas as well as coal (removal of process gases as a result through candles and deflectors (diversion, scattering, bleeding) without charge or catalytic oxidation, blowing wells, process pipelines, sections of gas pipelines, process equipment; starts, stops, change of operating modes of gas compressor units, as well as degassing of associated gases from coal seams and air ventilation of coal mines). Additionally, the companies, which refine oil are also the subject to this law. The refining operations include stationary fuel combustion, flaring of hydrocarbon mixtures, catalytic cracking and reforming processes, coke calcination and hydrogen production, hydrocarbon mixture flaring, production of petroleum coke and oxidized bitumen, desulfurization (Official publication of legal acts, 2021).

Additionally, in accordance with the Enactment 7 of *the Federal Law of July 2, 2021 No. 296-FZ "On limiting greenhouse gas emissions"* the reporting process has been launched both for the regulated companies in energy and non-energy sector. The procedures are general for all companies, considered to be regulated organisations. *The Federal Service for Supervision of Natural Resource Usage* is to be provided with the reports in accordance with the requirements of the Russian government from the regulated organisations before the 1st July each year after the reference year (the 1st January 2023). The Federal Service for Supervision of Natural Resource Usage is responsible for the expertise of the submitted reports and accounting of the emissions, expressed in the government information system for calculating produced greenhouse gas emissions (Official publication of legal acts, 2021).

Companies are to calculate the volumes of producing greenhouse gas emissions on their own resources in accordance with the instructions of *the Order of the Federal Service for Supervision of Natural Resource Usage dated 30 June 2015 No. 300*. The following industries are included in this Law: metallurgy; oil refining; other industrial processes; flaring; fuel combustion and materials production; transport (Official publication of legal acts, 2015).

Additionally, Sorokin (2021) writes about the launch of *the draft plan for the Federal Law on introduction of amendments to the Code of the Russian Federation on Administrative Offenses* in December 2022. The idea behind the projects suggests introducing the changes in the Federal Law No. 296-FZ, in the enactment number 7, dedicated to "*Failure to submit, untimely submission of emissions of gases or substances left in the specified emission report of knowingly unreliable information*" (Informational and legal web portal GARANT.RU, 2023).

The enactment includes the measures, applied to the regulated organisations, expressing in the notification and the amount of penalty. In terms of executive officers, the amount of penalty equals from 35 to 50 thousand Rubles. In terms of sole proprietors, the amount of penalty equals from 100 to 250 thousand Rubles. In terms of legal entities, the amount of penalty equals from 100 to 500 thousand Rubles (Informational and legal web portal GARANT.RU, 2023). The law will enable to impact the organisations, which try to avoid reporting about greenhouse gas emissions or mispresent and fake the submitted information.

In terms of development of CCUS technologies, one of the paragraphs of *the ordinance of the Federal Service for Supervision of Natural Resource Usage dated 16.04.2015 No. 15-r* suggests the measures of CCUS, that could be applied in the energy sector and particularly in the oil and gas industry. The document highlights the importance of CCUS technology as the measure to decrease greenhouse gas emissions in all energy sectors, mentioned by the IPCC (The Federal Service for Supervision of Natural Resource Usage, 2015). In terms of the oil and gas industry, the document establishes the procedure of gas lifting. The paragraph 1.2.3 “Capture and storage of CO2 and other greenhouse gases” declares that:

> With regard to the current conditions of the Russian Federation, as an anthropogenic activity for the capture and disposal of CO2 and other greenhouse gases, the capture and injection of natural and associated petroleum gases into oil reservoirs can be considered in order to increase their oil recovery and increase the volume of oil production (the so-called "gas lifting"). (The Federal Service for Supervision of Natural Resource Usage, 2015).

Additionally, the paragraph suggests the norms for organisations to prepare the cadastral reports of captured and stored CO2 emissions into the oil reserves by the use of CCUS technologies in accordance with the IPCC assessing principals.

5.3 Measures of reducing GHG emissions at the organisational level: Norway-Russia

In the further paragraphs the analysis of the chosen companies’ applied measures of reducing greenhouse gas emissions, is given. Therefore, a few aspects should be clarified. First, in the paragraph 5.3.1, the Greenhouse Gas Protocol and the corresponding classification of emissions, separated into three main groups – Scope 1, Scope 2 and Scope 3, that unite the chosen oil and gas companies, are described. Next, in the paragraphs 5.3.2-5.3.4, the review of measures, based on the sustainability reports dated 2021, corporate strategy and the stated corresponding documents of the chosen oil and gas companies, is given.

5.3.1 GHG Protocol

In the process of reducing greenhouse gas emissions at the organisational level, companies formulate their corporate strategies in line with the government frameworks, regulating this process, based on the targets of the Paris Agreement. Moreover, one of the aspects of corporate strategies, which is reflected in many sustainability reports of international oil and gas companies, is reduction of greenhouse gas emissions in accordance with the classification of Scope 1, 2 and 3, based on the Greenhouse Gas Protocol. This is the document, introduced by two organisations - the World Resources Institute and the World Business Council on Sustainable Development, aimed at establishing the unite and world standard for companies to assess the volumes of producing GHG emissions from their operations (Green, 2010: 5). Describing the principle of the GHG Protocol, Kasperzak et al. (2022: 3) write that "the GHG Protocol distinguishes three "scopes" of emissions that can be attributed to a firm". Classification includes 3 groups of emissions (Scope 1, Scope 2 and Scope 3), produced by a company from direct or indirect operations.

Determining the first group of emissions, Kasperzak et al. (2022: 3) note that "Scope 1 exclusively includes a firm's direct emissions, i.e., emissions of sources owned or controlled by the firm". Basically, Scope 1 emissions are mostly corporate industrial emissions, which could be managed by the company. In sustainability reports, most companies make focus on streamlining the operations, connected with this group of emissions. It is easier for corporate management to prepare and organise the steps in this process, as the emissions from the main operations could be calculated more precisely. Scope 1 could be considered as the setup and the incentive for the companies to streamline their operations in terms of technological aspect in three main blocks to greater facilitate the overall decrease of greenhouse gas emissions.

Determining the notion of the second emissions group, Kasperzak et al. (2022: 3) write that "indirect emissions that result from the production of electricity that is purchased by the firm are captured by Scope 2". Basically, this group makes emphasis on the volumes of indirect greenhouse gas emissions, being produced by the acquired various types of energy by a particular company.

If considering the combination of groups, decrease in greenhouse gas emissions from Scope 1 should facilitate greater technological development of the main operations and impact Scope 2, since the more advanced technologies might reduce the corporate own consumption of the energy. Hence, the combination of both groups contributes to the rapid way of enhancing the current technological level, allowed for the companies at the current moment, and higher path

of reducing greenhouse gas emissions in the long-term period of time by lower deployment of energy, the companies might consume.

Describing the last group, Sholi et al. (2023: 2) write that "Scope 3 deals with all other indirect GHG emissions, including waste disposal, outsourced activities, vehicles not owned or under the reporting entity's control, and the extraction and production of purchased materials and fuels". Basically, it is not the obligatory to specify and determine the volumes of Scope 3 emissions. The various types of indirect emissions might vary and depend on the specific activities of a particular company. However, all three chosen companies presented the data about reducing volumes of greenhouse gas emissions in this group in their sustainability reports 2021.

Thus, there was a direct need to specify the essence of GHG Protocol and its concept of Scope 1, 2 & 3, as Norwegian Equinor ASA, Russian PJSC Gazprom and PJSC LUKOIL follow this document and reflect the statistical data in their sustainability reports dated 2021 about the progress of reducing Scope 1, 2 & 3 emissions. Each company has its own approach to this classification in accordance with their business activity. Therefore, the corporate focus on the particular measures of decreasing Scope 1, 2 & 3 emissions and the volume of produced and cut emissions varies.

5.3.2 Equinor ASA

Since the company Equinor ASA is the largest energy corporation within Norway, it holds the role of the main player in the green transition both in the country and the world. Lestan & Kubasova (2022) determine that:

> Equinor is not a standard NOC. It is more of a hybrid enterprise between the two categories of IOC and NOC. It is listed on the stock exchange and is owned 67% by the state.

Describing the mixed nature of the company, Lestan & Kubasova (2022) write that:

> Equinor largely acts on behalf of the Norwegian government and to some extent represents the country's oil and gas industry. Company, in turn, allows the state to gain independence from fuel supplies and acquire greater importance and influence in the international arena.

In terms of green transition, the management of Equinor ASA is in the same line with the Norwegian government and seek maximum opportunities to achieve the settled goals in the

Paris Agreement by 2030. Therefore, in the process of reducing greenhouse gas emissions, Equinor ASA builds its sustainability activity on 3 main principles, including *low carbon*, *always safe* and *high value*. The aspect of *low carbon* is the key one, as all the actions to decrease greenhouse gas emissions are built around it. Low-carbon principal is in line with the 13th goal of sustainable development goals or SDGs. The priority is given to creation of the low-carbon advantage, which the company highlights in each sustainability report (Equinor ASA, 2021: 3).

In the annual sustainability report 2021, the CEO of the company paid much attention to the increase in global temperature and the greater need for the measures of decreasing emissions, noting that:

> 2021 was a significant year for all of us. The pandemic continued to impact our lives. Emissions returned to pre-Covid levels and the IPCC stated that global warming had already reached 1.1 °C. The International Energy Agency (IEA) report, "Net Zero by 2050", demonstrated that getting to net zero will require a total transformation of the world's energy systems. As the global economy picked up, so did greenhouse gas emissions. Increased demand for energy, combined with a reduced supply of gas globally, led to a surge in European energy prices towards the end of the year. (Equinor ASA, 2021: 5)

Therefore, the corporate strategy towards green transition suggests the measures, which could be applied in the short-term, middle-term and long-term period of time. Mostly, the corporate strategy of Equinor ASA concentrates on the achievement of 50 % emissions reduction in its operations by 2030. Thus, in its sustainability report 2021, Equinor ASA (2021: 5) states that "our ambition is to reduce our group-wide emissions by 50% by 2030, and we aim to realise this ambition by 90% absolute reductions".

Additionally, as the long-term goal the company would like to gradually achieve net zero by 2050. Thus, in its Energy transition plan 2022, Equinor ASA (2022: 11) states that "Equinor has set a clear ambition to become a net-zero company by 2050, including emissions from production and final consumption". Currently, as the gradual development, by 2030, the company is aiming to satisfy the international demand of oil and gas as well as steadily decarbonize its up-stream operations. The significant focus is made on reducing greenhouse gas emissions in operations of Scope 1 & 2. Thus, the company states in its Energy transition plan 2022 the following:

> To respond to the need for the rapid and substantial near-term emissions reductions, Equinor's ambition is to reduce operated scope 1 and 2 GHG emissions by net 50% by 2030 relative to 2015. We aim for 90% of these reductions to be met by absolute reductions. (Equinor ASA, 2022: 13)

Equinor ASA includes in Scope 1 & 2 *upstream* (exploration, development and production) on onshore and offshore and *midstream* (processing and refining) operations. Describing the results in decrease of greenhouse gas emissions, Equinor ASA (2021: 4) writes that "Equinor's total scope 1 and 2 GHG emissions were 12.1 million tonnes CO_2e in 2021, representing a decrease compared to a three-year average". Indeed, the company made the progress in gradual decrease of greenhouse gas emissions:

> We have made significant emission reduction improvements since 2015. Our net GHG emissions in 2021 were 28% lower than the level in 2015. We are on track to deliver the ambition of reducing group-wide net emissions by 50% by 2030, and to achieve an 8 kg CO_2/boe upstream intensity by 2025. (Equinor ASA, 2021: 26)

In terms of Scope 3 emissions, the company includes greenhouse gas emissions from products and supply chain. In its sustainability report 2021, the significant decrease in this group of emissions and its highest indicator was mentioned. Thus, Equinor ASA (2021: 4) writes that "Equinor's scope 3 GHG emissions were 249 million tonnes CO_2e which is stable compared to a three-year average". For instance, during the period from 2016 to 2020 in the sustainability report 2021, the Scope 3 emissions amounted for 239, 250, 252, 247, 250 mln. tonnes of CO2 equivalent, respectively (Equinor ASA, 2021: 27). In terms of this group of emissions, the corporate ambition is to decrease Scope 3 by 20% by 2030, by 40% by 2035, by 100% by 2050. Therefore, the company makes the serious focus on reducing Scope 3 emissions, expressed in development of renewable energy and low-carbon solutions, like CCS projects.

In terms of renewable energy, the company sees the way to reduce emissions by means of electrification of oil and gas operations. Gielen et al. (2021:2) write that "Equinor are focusing on diversifying their portfolios by investing in renewable energy, hydrogen, and electric vehicle (EV) infrastructure". Therefore, in its sustainability report 2021, Equinor ASA (2021: 23) states that:

> Electrification of NCS installations is a key component in reducing CO_2 emissions both for Norway and for Equinor. It involves replacing a fossil fuel-based power supply with predominantly renewable energy, reducing Norwegian CO_2 emissions by around 10%.

A few projects have been launched by the company on the fields on the Norwegian Continental Shelf. For instance, the company applied measures to deploy electrification on the field Sleipner Field Centre and the target reduction indicator of emissions was expected at the level of 150 000 tonnes of CO2 after the launch in the 4th quarter of 2022. Additionally, the plan to electrify Troll B and Troll C was approved. It is expected, that applied measures from 2026 will enable to cut emissions of 500 000 tonnes of CO2 emissions as well as 1700 tonnes of NOx. In 2021 the plan to electrify Oseberg field and Oseberg South was approved with the expected indicator of emissions' reduction at the level of 300 000 tonnes of CO2 (Equinor ASA, 2022: 23). Moreover, the company has the *energy transition strategy 2022*, where the focus is primarily made on the development of CCS technology. Describing one of the ideas, laying behind this fact, Skjølsvold et al. (2013, as cited in Tvedten & Bauer, 2022: 3) write that "the Norwegian petroleum industry works to prevent the "excess" CO_2 contained in the extracted gas from being released into the atmosphere, but CO_2 is still released once the exported gas is combusted". Therefore, Skjølsvold et al. (2013, as cited in Tvedten & Bauer, 2022: 3) concludes that "major investments have been made in CCS technology".

Hence, in its *energy transition strategy 2022*, the company highlights the importance of CCS technologies, as the gaining momentum way, to significantly reduce emissions by 2030 and 2035. In its Energy transition plan 2022, Equinor ASA (2022: 16) states that "we are applying our decades of CCS experience to reach our ambition of developing a CO_2 transport and storage capacity of 5-10 million tonnes by 2030 and 15-30 million tonnes by 2035". For instance, much attention was paid to the ambitious cooperation project *Northern Lights* in the energy transition strategy of Equinor ASA with Shell and Total. The Northern Light is only the initial stage of a more ambitious project *Longship*, mentioned in the sections 5.1.1 & 5.2.1. In its Energy transition plan 2022, Equinor ASA (2022: 16) declares that:

> Northern Lights is part of the full-scale Norwegian Longship CCS project, the first ever cross-border, open-source CO_2 transport and storage infrastructure network. It will offer companies across Europe the opportunity to capture and store their CO_2 safely and permanently underground.

Besides developing the CCS projects on the territory of Norway, the company seeks opportunities to widen its investments in CCS in other countries. For instance, Equinor ASA (2022: 16) states that "in the UK, we are part of the Northern Endurance Partnership, which aims to put in place the offshore infrastructure to transport and store CO_2 from projects in the

UK's pioneering East Coast Cluster (ECC)". The indicators estimate the 50% storage of all emissions, produced by the industrial cluster, which by 2030 might equal up to 27 mln. tonnes of CO2.

5.3.3 PJSC Gazprom

PJSC Gazprom is the public limited company, in which half of the shares (50% plus 1 share) is owned by the Russian government. It is mainly responsible for geological research, production, transportation, storing and commercial deals with the natural gas, gas condensate and oil, as well as, managing the housing and public utilities (Gazprom, 2023). The importance of this company is justified by the fact that 68% of total gas production in Russia accounted for Gazprom in 2021 (IEA, 2022).

Annually, the company publishes the sustainability reports, in which the applied measures towards achievement of SDGs are presented. PJSC Gazprom uses all measures, contributing to gradual achievement of all 17 SDGs. Therefore, within the framework of the 13th goal of sustainable development, the company implements measures, dedicated to the greenhouse gas emissions reduction, PJSC Gazprom (2021: 64) states that "reductions in GHG emissions are part of PJSC Gazprom's corporate strategy. Measures are taken to minimize climate change consequences for the Company's production activities".

Describing the current corporate strategy, reflected in its sustainability report 2021, PJSC Gazprom (2021: 82) notes that "by 2030, the company plans to decrease the specific GHG emissions by 11,2 %". In order to facilitate achievement of this goal, Gazprom, being half-owned by the state, sees gasification as not only the way to reduce greenhouse gas emissions from its own production operations, but also as a strategic tool contributing to the increase in the national wealth and prosperity, PJSC Gazprom (2021: 145) mentions that:

> One of Gazprom's key focus areas is gas infrastructure expansion across Russia. Availability of gas to the most remote regions of the country contributes to the people's well-being and infrastructure efficiency while also reducing pollutant emissions.

Additionally, in its sustainability report 2021, PJSC Gazprom (2021: 80) states that "as a state-owned company, PJSC Gazprom is guided by the climate goals set by the Russian Federation and aligns its low-carbon development activities with the Low Carbon Social and Economic Development Strategy of the Russian Federation to 2050". As the result, the company's position is in the same line with the Russian government in terms of achieving the climate

targets as well as implementing the measures, facilitating decrease in greenhouse gas emissions and increase of the national prosperity, especially for the most remote regions of the country.

To evaluate and maintain statistics about the producing greenhouse gas emissions, the company uses the system of classification Scope 1, 2 and 3. As PJSC Gazprom has a number of subsidiaries like PJSC Gazprom Neft and the others, the company accounts for the volume of produced emissions, as the unite entity - *Gazprom Group*. The reports are given in accordance with *the Federal Law of July 2, 2021 No. 296-FZ "On limiting greenhouse gas emissions"* and *the Order of the Federal Service for Supervision of Natural Resource Usage dated 30 June 2015 No. 300*, mentioned in the paragraph 5.2.2. Therefore, in the sustainability report 2021, Gazprom (2021: 83) specifies that "all Gazprom Group companies perform control and accounting of GHG emissions using the same procedure, which is based on the Methodological Guidance on the Quantification of Greenhouse Gas Emissions by Entities Engaging in Business and Other Activities in the Russian Federation".

In terms of Gazprom Group, Scope 1 includes production, transportation, processing, underground storage and other activities. According to the sustainability report 2021, the decrease in these emissions was noticed within 2019 and 2020, which accounted for 236,45 and 210,32 mln. tonnes of CO2 equivalent, respectively. However, the increase of 15,7 % was identified in 2021, accounting for 243,28 mln. tonnes of CO2 equivalent (Gazprom, 2021: 83). Indeed, explaining the reason of gain in Scope 1 emissions, PJSC Gazprom (2021: 83) states that "the increase in Scope 1 GHG emissions observed in 2021 had to do with the improvement in the Group's operating results on the back of the recovery in natural gas consumption and sales following the COVID-19 pandemic, as well as with the declining production at brownfields (the launch of booster compressor stations) and pre-commissioning at greenfields".

Scope 2 embraces the same operations (production, transportation, processing, underground storage), excluding other activities. The same trend was happening in 2019-2021 years. Both in 2019 and 2020, the decreasing indicators of Scope emissions, amounted for 13,8 and 11,79 mln. tonnes of CO2 equivalent, respectively. In its turn, in 2021, there was a slight increase by 5,2 % (Gazprom, 2021: 83).

In terms of Scope 3, Gazprom Group includes the types of products such as gas, oil and gas condensate and other energy resources, sold by the company. During 2019-2020, there was the smooth decline from 1154,54 to 1078,50 mln. tonnes of CO2 equivalent, respectively.

However, in 2021 there was the increase by 6,7 %, expressing in 1150,75 mln. tonnes of CO2 equivalent.

PJSC Gazprom also seeks opportunities to increase energy efficiency towards its production operations, as the additional way to prevent emitting greenhouse gas emissions. For instance, Gazprom (2021: 94) states that "a set of energy saving measures taken in the reporting year helped PJSC Gazprom prevent the release of 1.91 bcm of natural gas (31.39 mmt of CO2 equivalent)".

In terms of CCS technologies, the company establishes development of these technologies as the sub-technology of producing hydrogen. Thus, in its sustainability report 2021, Gazprom (2021: 86) states that "the Company is also considering the use of carbon dioxide capture technologies for conventional hydrogen production from natural gas". Within the framework of hydrogen energy development, the company has RoadMap activities, which also includes assessment of geological reservoirs for captured CO2. Thus, in its sustainability report 2021, Gazprom (2021: 86) states that "together with Gazprom Nedra assessed the potential geological reservoirs in the Nadym-Pur-Taz Region which are suitable for CO2 capture and storage projects".

Moreover, the subsidiary Gazprom Neft is going to implement the project of CCS. For instance, the pilot CCS-project, that should be set up in Orenburg. Afanasiev (2021) describes it "as a commercial undertaking aimed at capturing carbon dioxide at the gas-fired Kargalinskaya thermal and electric power plant and the Orenburg gas and condensate processing facility".

The initial investments in the project amounted to 30 bln. Rubles or 410 mln. dollars. Describing the stages of this project, Afanasiev (2021) writes that:

> In the initial phase, Gazprom Neft expects to gradually increase the capacity to store up to 1 million tonnes of carbon dioxide in depleted oil and condensate reservoirs at a depth of about 2500 metres. The captured CO_2 will be transported by pipeline to the Orenburg field to be injected into the reservoir.

Afanasiev (2021) mentions that the estimated volumes of CO2 for injection in the field reservoirs will account for 5 bln. tonnes of CO2 equivalent with the potential additional annual increase by 50 mln. tonnes of CO2. The project could be run in the operating phase by 2025-2027.

Additionally, due to the 50 percent of state participation, the Gazprom experts also support the legislation drawing, concerning the process of reducing greenhouse gas emissions, contributing to the national strategy of sustainable development by 2050. In its sustainability report 2021, Gazprom (2021: 85) notes that "experts from PJSC Gazprom and Gazprom VNIIGAZ took part in drawing up the legislative framework for the draft law On Limiting Greenhouse Gas Emissions, new rules and regulations, and draft Russia's 2050 Development Strategy with Low Greenhouse Gas Emissions devised by the Ministry of Economic Development".

5.3.4 PJSC LUKOIL

PJSC LUKOIL is one of the largest public limited oil and gas company in the Russian Federation. It is responsible for exploration, development of fields, refining, trading and distribution of petroleum products, gas processing products and petrochemicals within Russia as well as other countries (LUKOIL, 2023).

For the company, sustainability aspect in its corporate strategy is not the new one, as PJSC LUKOIL pioneered in preparing sustainable development reports, being the company, which submitted the first report as early as in 2003. In the company's sustainability report 2021, the company prioritised the measures, which embraces the 4-9, 12-17 SDGs. In terms of reducing greenhouse gas emissions, the company is aiming to achieve the 13th goal, expressed in the carbon neutrality. The company has the programme of *environmental safety*, which includes the subprogramme called "the clean air". It suggests, the general scope of measures, aimed at decrease in greenhouse gas emissions by means of replacement or development of production equipment, application of CCUS-systems, the increase of deployment level of oil-associated gas, measures, connect with streamlining of flaring system as well as carbonless combustion (LUKOIL, 2023).

As other energy companies, PJSC LUKOIL also shares the ambition to achieve net zero controlled emissions by 2050. In order to do so, the company is aiming at completing the second task of its mission, expressed in reduction of controlled emissions from Scope 1 and Scope 2 operations. The company settled the goal of reducing greenhouse gas emissions by 2030 by 20 % in comparison with 2017 (LUKOIL, 2020). In terms of PJSC LUKOIL, it is important to mention that the calculation of Scope emissions was originally based on the mentioned in the paragraph 5.2.2 *the Order of the Federal Service for Supervision of Natural Resource Usage dated 30 June 2015 No. 300*. However, in 2020, the company carried out the significant inventory emissions in accordance with Greenhouse Gas Protocol, where the emissions were divided into Scopes 1, 2 & 3. The first calculations were made for the period

of 2016-2019 years. Scope 1 embraces the direct emissions from the main operations, including geology and production, oil refining and oil chemicals, electricity and transportation. For this group indicators amounts to - 40,17; 40,47; 39,62 and 39,82 mln. tonnes of CO2 equivalent, respectively. Scope 2 includes indirect emissions from the same operations. The second group implies the following statistics: 10,44; 10,45; 8,95; 8,64 mln. tonnes of CO2 equivalent, respectively. Additionally, Scope 3 emissions, consisting of the indirect greenhouse gas emissions from the use of the Group's own products sold, including the sale of oil, gas and petroleum products, were calculated for the year 2019, which amounted to 385,72 mln. tonnes of CO2 equivalent (LUKOIL, 2020). During the period of 2017-2021, based on the combination of Scope 1 and Scope 2, the company made the progress to gradually decrease greenhouse gas emissions. During the specified period, emissions in the combination of Scope 1 and Scope 2 decreased by 20 percent or from 50,897 to 41,491 mln. tonnes of CO2 equivalent (LUKOIL, 2021: 147).

In terms of *CCS technologies*, the company also sets the goals in the second task of its corporate strategy, connected with implementation of carbon, capture and storage projects. More data about the potential contribution of this technology under deployment of PJSC LUKOIL is given in the company's report of *Global energy perspectives to 2050*. It is mostly dedicated to the future world trends in the energy industry as well as the company's role in the global energy transition. The company sets 3 particular energy scenarios by 2050 - *evolution*[2], *equilibrium*[3] and *transformation*[4]. In this document, the company (LUKOIL, 2021: 49) states that "Russia has the highest CO2 storage potential in the world, which is estimated at 1000-1200 GT of CO2 mainly in oil and gas deposits and aquifers" (LUKOIL, 2021: 49). The indicators, connected with reduced emissions by CCUS within Russia by 2050 varies, depending on the characteristics of each scenario, specified in the Appendix 2.

5.4 Summary

In the previous paragraphs I aimed at gaining understanding of how the measures of reducing greenhouse gas emissions at the state, industrial and organisational levels in Russia and Norway are presented. Therefore, *at the state level*, the brief history, reflecting the main stages of the Russian and Norwegian governments to enter the international agreements towards

[2] Suggest the steady development of global energy markets in terms of international legal framework and national programs, based on the current technological development level.
[3] Suggests the balance between economic development and achievement of climate targets.
[4] The sharp change in the global energy market and industries as well as achievement of carbon neutrality by leading countries by 2050.

preventing climate change and what aspects contributed to establishment of the current legislation framework, regulating reduction of greenhouse gas emissions, consisting of carbon pricing or the other measures, including CCUS-projects and the respective laws, impacting the subjected companies and industries, was studied. *At the industrial level*, the emphasis was made on the general and specific Acts, Laws and the other legal enactments, describing the particular practices, being applied to the oil and gas industry of Norway and Russia. Additionally, the reporting procedures of the released volumes of greenhouse gas emissions, their classification as well as development of CCUS technologies were covered. At the organisational level, at first I touched upon the Greenhouse Gas Protocol, the 3 chosen companies follow to make the proper evaluations of the producing volumes of greenhouse gas emissions, based on the suggested classification of Scope 1, 2 and 3. Then, the content of the sustainability reports, dated 2021, the corporate strategies and the mentioned corresponding documents of 3 chosen companies – Equinor ASA, PJSC Gazprom and PJSC LUKOIL in order to separately describe and assess the volumes of Scope 1, 2 and 3 emissions, what operations each company includes in these groups, their CCUS-projects and initiatives as well as the target indicators specified in their corporate strategies and aimed at achievement of decarbonisation in their operations by 2030 & 2050, was analysed.

6.0 Analytical research

In this chapter, comparative analysis was conducted. The research made an attempt to reveal, whether the Norwegian and Russian measures towards reduction of greenhouse gas emissions have similarities and differences at the state, industrial and organisational levels within the national oil and gas industry, based on the established criteria for each section in accordance with the collected qualitative data and presented in the chapter 5.0. For the sake of brevity, the comparative tables are provided. They reflect briefly the description of similarities and differences at all three levels. At the end of each paragraph, I drew the outputs based on the carried comparison and the tables with the results. Each criterion was provided with the qualitative mark, described in the paragraph 4.1. The last paragraph briefly illustrates and summarizes the results, obtained from the conducted comparison at all three levels, and draws the findings of my research.

6.1 Comparison at the state level

At *the state level*, I focused on the government actions of Norway and Russia during the history of rising importance and awareness of global warming, the general legal framework towards greenhouse gas emissions reduction and the national strategies of reducing greenhouse gas emissions on the long-term basis. Thus, in order to conduct a relevant and fact-based comparison, a few major criteria were determined and described below:

a) *Government involvement in the issue of greenhouse gas emissions*. In this paragraph, I decided to highlight the key points in the history of both countries (signing of the UNFCCC and the other international agreements) in terms of rising importance towards the issue as well as analyse the contents of the general Laws and the other legal enactments, accepted in both countries, touching upon reduction of greenhouse gas emissions within both countries.

b) *The general approach of both countries to tackle an issue*. This aspect analyses the general and currently existing legal framework towards greenhouse gas emissions reduction in both countries, based on the major Laws and Acts. Additionally, this point highlights the characteristics of the national government approaches to the measures of reducing greenhouse gas emissions, describes the established reporting system for the companies at the legal degree as well as legal initiatives in tackling the issue and measures, that are being deployed or will be applied in future in order to have a greater impact on the issue.

c) *National strategies of both countries in terms of greenhouse gas emissions reduction on the long-term basis*. The last aspect involves a few sub-points, regarding the national target indicators towards emissions reduction by 2030 & 2050, respectively. Also, it involves the descriptive comparison of the measures, that are to be deployed on the long-term basis as well as future development of CCUS-technologies within both countries.

For clarity and easier perception of information, the comparison, based on the chosen criteria, is concisely demonstrated in the Table 2.

Table 2. Comparison of the Norwegian and Russian measures of reducing greenhouse gas emissions in oil and gas industry at the state level, based on the established criteria

Criteria		
Government involvement in the issue of greenhouse gas emissions		
Country	**Norway**	**Russia**
Similarities	- Ratification of UNFCCC; - Ratification of the Kyoto Protocol; - Ratification of the Paris Agreement.	

Differences	**National Parties** concerned about the issues of greenhouse gas emissions in the 80-90s of the 20th century	Preoccupation with an issue came from **the Russian Presidents** during the second half of 2000s and 2010s: - 2008-2009, Dmitry Medvedev; - 2015 – 2023, Vladimir Putin.
	Introduction of carbon tax in 1991; Cooperation with the European Union: - Introduction of Greenhouse Gas Emission Trading Act in 2005; - Integration into EU ETS in 2008; - Determination of the target indicators of decrease in greenhouse gas emissions in ETS by 30% by 2012 in comparison with 2008 by the government of Mr. Stoltenberg.	Introduction of the Climate Doctrine in 2009 by Dmitry Medvedev (established the unachievable goals); Vladimir's Putin identification of new climate targets of decrease in greenhouse gas emissions by 2030; - Introduction of the Federal Law No. 296-FZ in 2021.
The general approach of both countries to tackle an issue		
Similarities	*Establishment of the underlying Acts, dedicated to the issue*	
	Norway	**Russia**
	- Climate Change Act (2017); - The White Paper (2019-2020); - Climate Action plan (being as a part of *the White Paper*, 2019-2020, involves measures to achieve target decrease in emissions by 2030 & 2050).	- Federal Law No. 296-FZ (2021); - Additional supporting laws, the Presidential decrees for problem solving process; - the Russian Strategy of social-economic development of the Russian Federation with the low green gas emissions before 2050
Differences	Systematic and internationally oriented approach with companies' involvement	Nationally oriented and partially established approach to specific aspects of the issue
	Granting energy companies with licences for introducing CO2 storage projects	Introducing the reporting norms and requirements, the list of the commercial organisations, obliged to submit the reports with the produced volumes of greenhouse gas emissions (150 000 tonnes of CO2 equivalent)
	Increase in carbon tax rates, imposed to energy companies, making them to identify the ways for green transition	
	Government involvement in the international project *Longship*, oriented at decrease in CO2 emissions both in Europe and the world	Introduction of the experimental laws within a few regions, aimed at establishing measures to reduce greenhouse gas emissions during the specified period
	Current *Climate Action Plan* is aiming at the gradual increase in tax rates in carbon tax and both industries of the ETS and non-ETS sector	Current Russian strategy determines the target indicators of decrease in greenhouse gas emissions by 2030 in 4 main sectors: energy, industrial, transportation and others.

National strategies of both countries in terms of greenhouse gas emissions reduction on the long-term basis		
Similarities	*Long-term strategy of decrease in greenhouse gas emissions by 2050*	
	Strategy is to be implemented in 2 major stages: - achievement of the target indicators by 2030; - achievement of the target indicators by 2050; - sets the ambitious indicators of reducing greenhouse gas emissions.	
Differences	*Difference in the content of the national strategies*	
	Norway	**Russia**
	- Decrease in GHG emissions by 40% by 2030; - Decrease in GHG emissions by 90-95% by 2050.	- Decrease in GHG emissions by 60% by 2030; - Decrease in GHG emissions by 80-85% by 2050.
	Sets the clear set of measures with well-designed plan for implementation	Requires additional explanations for the major aspects of the document
	Gradual increase in tax rates in ETS and non-ETS sectors by 2030	Major focus on *the target scenario* implies: - steady increase in macroeconomics indicators; - internal growth of investments; - lower decrease in energy exports.
	Continuous investments in development of CCUS projects	Focus on development of CCUS technologies, but requires further explanations about the supportive measures

The paragraphs below describe the detailed analysis of each stated point.

a) *Government involvement in the issue of greenhouse gas emissions*

In terms of the government involvement in the issue, a few main steps were made in a similar way before ratification of the Paris Agreement. Indeed, both countries have been following the international trends, rising around the issue of global warming. They entered and ratified UNFCCC as well as the Kyoto Protocol. However, the national process, occurring within both countries differs dramatically.

Norwegian government position towards the measures of reducing greenhouse gas emissions has been addressed and supported mostly by the national Parties. The issue of emission reduction has been positioned as the vital one since the 80s of the 20th century and has been steadily discussed at the state level, representing various opinions of different coalitions of the national Parties. They mostly had the significant impact on introducing the measures, applied to the oil and gas industry within Norway. The early government steps about the issue of global warming in the 90th of the 20th century contributed to the launch of the carbon tax in 1991. The

first foundations proposed by the government and increasing concerns about global warming also led to ratification of the Kyoto Protocol. Additionally, geographical closeness and rising cooperation and integration with European Union, expressed in proposition of *Greenhouse Gas Emission Trading Act in 2005* and later involvement into ETS-agreement or EU ETS in 2008. Later, the significant role in national development of measures to decrease greenhouse gas emissions was played by the government again. In 2008 the Norwegian government, for the first time ruled by Mr. Stoltenberg, proposed the Norwegian approach to ETS, setting the clear goal, dedicated to cover 80% emissions from 2008, meanwhile 30 % of greenhouse gas emissions would have to be reduced by 2012 in comparison with 1990.

Similar to Norway, *the Russian government position* towards climate change and the measures of reducing greenhouse gas emissions has been formed under a number of internal and external factors, but in another way. The base point could be considered the participation in the UNFCCC and its further ratification in 1994. Same as Norway, Russia entered the Kyoto Protocol in 2004, which was ratified later by introducing the Federal Law in 2005. However, the general impact on developing the policy was made in the second half of 2000s. It is also important to mention, that the carried analysis demonstrated, that in terms of Russia, the issue of climate change was mostly problematized by its Presidents. Therefore, unlike in Norway, the turning point as well as the first try to launch a more comprehensive approach to the issue was launched by the President Dmitry Medvedev, expressed in foundation of the Climate Doctrine. Back to 2009, the Doctrine set the idealistic goals by 2020, which could not be properly achieved, that in turn made the President Vladimir Putin in 2015 to prolong the goals by 2030 by ordaining a new Federal Law a few years later, in 2021 and determine a more systematic approach to slowing down of global warming.

Thus, government involvement of Norway in the issue of greenhouse gas emissions could be considered as *advanced* (= 3), since involvement into the issue of reducing greenhouse gas emissions was mostly supported by the national government and simultaneously under the international agreements. Meanwhile, Russian involvement in the issue could be considered as *normally developed* (= 2). Indeed, at the early stages, Russia raised concerns about the issue of global warming and entered the international agreements. However, there was not the clear and systemised vision towards measures of reducing greenhouse gas emissions until 2009-2015 years. Indeed, the government relied on the international agreements, on the basis of which the national legislation was formed.

b) *The general approach of both countries to tackle an issue*.

Russia and Norway are similar in a few ways to satisfy the targets of the Paris Agreement. Both countries introduced the general laws, which state the key fundamentals, which are to be achieved by 2030 & 2050 to become the carbon neutrally countries. In terms of Norway, the country introduced the specific law in 2017 – *the Climate Change Act* as well as the government report - *the White paper*. In its turn, before ratification of the Paris agreement Russia has already settled t*he Federal Law of July 2, 2021 No. 296-FZ "On limiting greenhouse gas emissions"*, which currently remains as the general one in terms of the policy, targeting the issue of global warming and measures to reduce the volume of greenhouse gas emissions within the country. Based on this Decree, Russia develops its legislation - several laws and decrees and the other legal enactments, stated in the paragraph 5.1.2, have been launched sine 2021 to clarify and determine the target volumes of greenhouse gas emissions, its types, which companies should be involved in the process of reducing greenhouse gas emissions and pay fees for the extended volumes of greenhouse gas emissions. The steps are seen in the experimental law, which have been applied to Sakhalin region of the Russia Federation, showing, that the government is concerned about the rising issue of global warming and seek opportunities to influence it. Additionally, the similar laws based on the outcomes of Sakhalin region, could be considered for implementation in the other 4 regions of Russia.

However, the primary difference in the national approaches to the climate change is seen. Unlike Russia, Norway strongly relies on fiscal actions. The country is aiming at the gradual increase in tax rates on carbon to make international companies facilitate and support the green transition. For instance, energy companies are granted with the licenses to implement the CO2 storage projects on the Norwegian Continental Shelf. Additionally, extra involvement and strong interest of Norway lay in implementation of the projects *Longship* (2/3 of investments were vested by the Norwegian government), stated in *Meld. St. 33 (2019-2020) Report to the Storing (White Paper)*, aiming to promote CO2 storage technology and reduce significant volumes of emissions in Europe and the world. Moreover, it is important to notice, that *Climate Action Plan by 2030* (stated in *the White Paper*) makes emphasis on implication not only the standard industries, included in the ETS-system (where the carbon tax on the various types of fossil fuels has been raised in 2022), but also seeks to cover the non ETS ones, where the carbon tax was raised in 2022. Indeed, some incentives have been introduced by the national government towards such fiscal reforms. For example, in accordance with *the Climate Change*

Act, some tax shifts, including exemption from the import tax and VAT, have been introduced for those buyers, which decided to acquire plug-in electric vehicles.

The approach of the Russian government is primarily nationally oriented. It is aimed more at the internal measures, enabling to decrease greenhouse gas emissions within the country in various industries or regions of the country. Based on *Decree of the President of the Russian Federation dated November 4, 2020 No. 666 "On reducing net greenhouse gases"* (Official publication of legal acts, 2020), the target indicators have been settled by 2030 in various sectors of the Russian economy, including: energy, industrial, transportation and the others. It is also noticeable, that *the government edict of the Russian federation dated 14 March 2022 No. 355 on criteria for legal entities and sole proprietors being qualified as regulated organisations* on a sample basis is trying to embrace mostly the commercial organisations, like legal entities and sole proprietors, which are considered to produce the volume of emissions out of the scope (150 thousand tonnes of CO2 equivalent). However, this document lacks the unified requirements for all other companies, which could produce lower volumes of emissions than stated in the government enactment and might be the subject to similar legal enforcement and should be taken into account. Additionally, as it was mentioned, some regions (Sakhalin, Republic of Bashkortostan, Khabarovsk Krai, the Irkutsk and Kaliningrad Regions) have already implemented the experimental laws in accordance with *the Federal Law of March 6, 2022 No. 34-FZ "On conducting an experiment to limit greenhouse gas emissions in certain constituent entities of the Russian Federation"*. However, these experimental laws remain as the trial ones and do not possess generality, as each member of the Russian Federation could imply the practices, it assumes the best ones at its pleasure. Therefore, until they do not bear or give sufficient results, adoption of the similar laws in the other regions of Russia will depend either on the positive results or the new Presidential Decrees or government edicts, making the local administrations constrainedly introduce the special laws to satisfy the government requirements.

To conclude, the Norwegian government approach to the issue of reducing greenhouse gas emissions is comprehensive and well systemised, determining it as *advanced* (= 3) one. The national Acts (like Climate Change Act) and white papers (dedicated to the CO2-storage project Long Ship and Climate Action Plan) enables to embrace various aspects of the specified issue. The Climate Change Act is aimed at achieving the primary long-term goal, expressing in carbon neutrality by 2050. Meanwhile, white paper, proposing the Climate Action Plan by 2030, suggests the practical measures to be introduced and deployed within the specified

period. Indeed, the most impact in this Plan is made on the fiscal actions, which embraces and are applied both to ETS and non-ETS industries. However, it is hard to say, that the government is only aiming at raising taxes. It also sets conditions to attract oil and gas companies for implementation of the CO2 storage projects, as well as, taking part in engagement in the international projects, like *Longship*, demonstrating the national interest and commitment to the stated actions in the government documents.

The Russian approach of reducing greenhouse gas emissions could be considered as *normally developed* (= 2). The Russian government demonstrates concerns about the issue of global warming and sets proposals of tackling this issue. Indeed, since signing and later ratification of the Paris Agreement, the signs in direction of developing the legislation base are seen. The major Federal Law No. 296-FZ was ordained in 2021 in order to satisfy the targets of the Paris Agreement and on which base the other additional Acts or government edicts were implied, contributing to gradual development and improvement of the legislation base towards reducing greenhouse gas emissions within Russia. Some systematic and organisational steps have been done in the national economy – the target indicators by sector by 2030 of greenhouse gas emission reduction were settled. However, currently the Russian legislation towards emission reduction lacks the systematic and comprehensive approach in various aspects, like: widening and engaging the higher number of companies, which could potentially produce greenhouse gas emissions in accordance with the existing legislative base; setting the same legal standard in terms of the unified measures for reducing emissions on a particular territory for all regions of the Russian Federation; more strict involvement of the local governments in particular regions of Russia to introduce the similar laws, that have already been used in Sakhalin and the other mentioned regions, participating in realisation of the experimental laws.

c) *National strategies of both countries in terms of reduction greenhouse gas emissions on the long-term basis*.

In the same line, the Russian and Norwegian government position are similar in setting the national programme, designed to support the national sustainable economic development by 2050. Both plans reflect the incentives and actions to achieve carbon neutrality by 2050. However, the primary measures and target indicators vary, taking into account the national specifics and potential to decrease greenhouse gas emissions.

The Norwegian long-term Strategy, aimed at achieving climate neutrality by 2050, states the primary measures, suggesting reduction of greenhouse gas emissions by 90-95 % by 2050 in

comparison with the target level of 1990, based on and strongly supported by the Climate Action Plan, stated in the White Paper.

The Norwegian long-term strategy could be considered, as *normally developed* (= 2). Indeed, the major moves are mainly concentrated on the fiscal actions, like increasing carbon taxes in a variety of national ETS and non-ETS sectors, but also on heavy investments in CCUS-technology projects and providing incentives for the oil and gas companies. However, the constant reliance on the taxes might decrease willing of the companies, working in the ETS industry (where the oil and gas industry is the subject) to continue operating in Norway as well as maintain investment activity into CCUS-projects.

The Russian strategy implies reducing greenhouse gas emissions by 60% by 2030 in comparison with 2019, and by 80% by 2050 in comparison with 1990, respectively. In terms of Russia, it is noticeable, that the gradual stages were introduced in order to structure the steps, facilitating the process of decarbonisation. The target indicators were prolonged and responsibly recalculated in order to suggest the current realistic basis of 2019 and the future one of 1990, in comparison with the ones, presented in *the Climate Doctrine* of 2009.

However, *the Russian Strategy of social-economic development of the Russian Federation with the low green gas emissions before 2050 requires improvements* (= 1). Indeed, the document concentrates on *the strategic scenario*, counting upon and prioritizing the steady increase in macroeconomic indicators, like annual growth in investments in the fixed capital and real disposable household income, and lower decrease in energy exports with simultaneous internal increase in investments in ways of reducing greenhouse gas emissions in 2022-2030 and 2031-2050, respectively. Nonetheless, the Strategy is presented as the general document, declaring the steps or directions in which it should be implemented, and a few main assumptions, like implications of the target scenario, but strongly lacks some specifics about the following aspects: which particular technologies are to be considered or included into the low- or non-carbon ones; by which incentives the spread of those technologies should be facilitated; which incentives are to be deployed to increase the use of secondary energy resources; in which ways the tax, customs and budgetary policies are to be changed in order to impact the Strategy positively; which supportive measures for CCUS-technologies are to be introduced in Russia.

Additionally, it is reasonable to notice, that both strategies set the ambitious goals and the question of realism, connected with the national abilities to achieve the target indicators remains as the debating point.

Thus, the carried comparison at the state level demonstrated the following outcomes, stated in the Table 3.

Table 3. The results of the carried comparison, based on the chosen criteria at the state level

Criterion	**Country**	
	Norway	**Russia**
a) Government involvement in the issue of greenhouse gas emissions	*Advanced* (= 3)	*Normally developed* (= 2)
b) The general approach of both countries to tackle an issue	*Advanced* (= 3)	*Normally developed* (= 2)
c) National strategies of both countries in terms of greenhouse gas emissions reduction on the long-term basis	*Normally developed* (= 2)	*Requires improvements* (= 1)

Indeed, the carried comparison suggests, that Norway is more advanced country in terms of its measures of reducing greenhouse gas emissions rather than Russia. It is reasonable to say, that Russia might analyse the Norwegian measures of reducing greenhouse gas emissions and adopt the best practices. In terms of criterion "*a)*", Russia should push the issue of reducing greenhouse gas emissions more often in senior government circles, constantly debating and come to the most sufficient decisions in terms of widening the legal framework and supplementing laws with new amendments. In terms of criterion "*b)*", the Russian government might focus on greater involvement into green transition, for instance, by means of tending the issue of establishment of the development strategy for CCUS-technologies and identifying the incentives for oil and gas companies to implement the projects in this field by introducing the Federal laws or the regional ones and consistently transit this practice into the other regions. However, it is noticeable, that criterion "*c)*", demonstrates, that both countries might have room for improvements. As it was mentioned before, the national strategies set the ambitious target indicators of reducing greenhouse gas emissions by 2030 & 2050. Thus, before the specified years the indicators might be reconsidered by the governments of both countries.

6.2 Comparison at the industrial level

In this chapter, I put attention on analysis and comparison of the measures at the industrial level, stated in the content of particular laws, decrees and the other legal enactments, currently

applied in the oil and gas industry of Norway and Russia, I used in the paragraphs 5.1.1 and 5.1.2. Thus, for a relevant and fair comparison, a few major criteria were determined:

a) *Regulatory environment of both countries in terms of greenhouse gas emissions decrease in the national oil and gas industry*. This point is aimed at analysing the established legal framework within the oil and gas industry, degree of elaboration of the legal base towards the measures of reducing greenhouse gas emissions, and the features of particular deployed tools.

b) *Classification of greenhouse gas emissions within oil and gas industry*. Here a few brief differences and similarities in classification of greenhouse gas emissions within the oil and gas industry of both countries are described.

c) *Listing producers of greenhouse gas emissions in the oil and gas industry*. In this point, the main features of listing the oil and gas companies, producing greenhouse gas emissions, as well as the reporting systems within both countries are compared.

d) *Development of CCUS technologies*. In the last point, the differences between the current legislative base, regarding development of the CCUS technologies, are described and compared.

For clarity and easier perception, the comparison, based on the chosen criteria, is concisely demonstrated in the Table 4.

Table 4. Comparison of the Norwegian and Russian measures of reducing greenhouse gas emissions in oil and gas industry at the industrial level, based on the established criteria

Criteria		
Regulatory environment of both countries in terms of greenhouse gas emissions decrease in the national oil and gas industry		
Countries	**Norway**	**Russia**
Similarities	*Lack of similarities*	
Differences	*The legal framework* consists of 4 main Acts, touching upon decrease in greenhouse gas emissions; *CO2 Tax Act on Petroleum Activities* describes classification of emissions and regulates the carbon tax rate for each type.	The major law is *the Federal Law No. 296-FZ*; There is a possibility of introducing adjustments into current legislative base, relating reduction in greenhouse gas emissions.
	Carbon pricing is the major tool (ETS and carbon tax)	Russia does not deploy the carbon pricing tools
Classification of greenhouse gas emissions within the oil and gas industry		
Countries	**Norway**	**Russia**
Similarities	Prioritising of the following types of emissions:	

	- Carbon dioxide (CO2); - Methane (CH4); - Nitrous oxide (NOx).	
Differences	NOx and NMVOCs are the subject of the Gothenburg Protocol	The emissions are the subject of the internal regulation by the state regulators of Russia
	Classification includes: - non-methane volatile organic compounds (NMVOCs); - sulphur dioxide (SO2).	As Russia possesses a more diversified oil and gas industry, the current classification involves: - hydrofluorocarbons (HFCs); - perfluorocarbons (PFCs); - sulphur hexafluoride (SF6); - nitrogen trifluoride (NF3); - the other subtypes of greenhouse gas emissions.
Listing producers of greenhouse gas emissions in the oil and gas industry		
Countries	**Norway**	**Russia**
Similarities	*Lack of similarities*	
Differences	Production licence of the oil and gas companies determines the permissible volume of greenhouse gas emissions in accordance with *the Pollution Control Act*	Oil and gas companies (subjected to *the Federal Law No. 296-FZ*) are obliged to submit the reports to *the Federal Serice for Supervision of Natural Resources Usage*
	A possibility to get an exemption of tax through the environmental impact assessment by the pollution control authority	Oil and gas companies are to implement a reporting system on their own; If the reports are not submitted in time, the penalties are imposed; The companies are not given the incentives for investments into technologies towards decrease in greenhouse gas emissions.
	A national operator *Offshore Norge* handles a special register of emissions' producers (EPIM Enviromental Hub or EEH)	
Development of CCUS technologies		
Countries	**Norway**	**Russia**
Similarities	*Lack of similarities*	
Differences	Government involvement into investment activity (project *Longship*); Granting the oil and gas companies with the licences to set up a CO2 storage projects.	Gas-lifting is prioritised, as the major technology, aimed at CO2 storage; CCUS technologies are considered as the measure of maintenance of cost-effectiveness of an oil and gas industry.

The paragraphs below give the detailed analysis of each stated point.

a) *Regulatory environment of both countries in terms of greenhouse gas emissions decrease in the national oil and gas industry*

A few general differences and similarities in terms of legislation, applied to the oil and gas industry could be identified. Indeed, both countries possess the legal framework, regulating greenhouse gas emissions, produced within their national oil and gas industry.

Norwegian regulatory environment is considered to be as *advanced* (= 3) one. As it was demonstrated in the paragraphs 5.1.1 and 5.2.1, Norway was one of the pioneers by introducing carbon pricing. Norwegian concerns about climate change were on the agenda from the 80s of the 20th century, that gradually led to the carbon pricing initiatives, expressing in carbon tax in 1991 and involvement in EU ETS in 2008. Since the Norwegian economy is mostly based on the oil and gas industry, the general legislative norms or Acts were developed and issued around the oil and gas industry at the first steps. Norway established the legal framework, consisting of 4 main Acts, being involved in and touching upon the various aspects of measures of reducing greenhouse gas emissions in the industry. Indeed, the country uses the instruments of carbon pricing. Since 1991, the carbon tax has been applied to CO2 emissions and regulated in accordance with *the CO2 Tax Act on Petroleum Activities*, which could be as the primary one, stating the sources of emissions (paragraph 5.2.1) in the petroleum industry and which tariffs are deployed in each group. In parallel, by this identification, the Act determines the main groups of greenhouse gas emissions, which are the subject to the tax collection.

Russian regulatory environment *requires improvements* (= 1). In Russia, as it was mentioned in paragraphs 5.1.2 and 5.2.2, t*he Federal Law of July 2, 2021 No. 296-FZ "On limiting greenhouse gas emissions"*, being the general law, regulates the measures of reducing greenhouse gas emissions in Russia, embraces the various industries, which are subject to this document, including oil and gas sector. Indeed, in accordance with this law, the companies, which operations are connected with extraction, transportation, storage, processing of oil and natural gas as well as refining of oil, are the subject to this law. However, the law doesn't describe or suggest the measures, similar to the carbon pricing (carbon tax or ETS) in Norway. The law mostly orients on the classification of greenhouse gas emissions, the target reduction indicators and the reporting procedures for the companies, subjected to this Law. Consequently, unlike in Norway, where carbon pricing, consisting of both ETS and carbon tax, in Russia all other Laws or Acts and legislative norms towards reducing greenhouse gas emissions will be built upon this general Federal Law. This means, that the Russian legal framework both is currently being developed and could be adjusted in future and the tools, used in carbon pricing, might not be on the list of priorities in the Russian approach to reducing greenhouse gas emissions.

b) *Classification of greenhouse gas emissions within oil and gas industry*

Approach to the various types of greenhouse gas emissions demonstrates divergent angles to the specific groups of emissions. In both countries the classification of the types of greenhouse gas emissions is *advanced* (= 3) but have a few obvious differences.

Unlike Russia, as it was stated in the paragraph 5.2.1 in terms of reducing of NOx and NMVOCs emissions, Norway was affected by the external trends in climate change. Indeed, Norway took apart in the Gothenburg Protocol, which contributed to widening of the carbon tax, which also applied both to the NOx and NMVOCs emissions produced by oil and gas companies. Simultaneously, the incentives for the companies were also launched. Foundation of the special NOx Fund motivated many oil and gas companies to become the participants of this agreement, as it gives the financial benefits, facilitating corporate investments, aiming at reducing their own NOx emissions. Therefore, the carbon tax for NOx is not only presented as the fiscal tool, but also the financial measures, aimed at streamlining the companies' technologies to decarbonise their own operations, connected with the release of NOx.

Russia in opposite suggests the detailed list of emissions with the purpose of identifying the most significant polluters in accordance with *the Federal Law dated 2 July 2021 No. 296-FZ*. The broader classification and the list of greenhouse gas emissions are explained by the greater scale of operations and diversification of the oil and gas industry in Russia. Indeed, in both countries, systematisation and structure of the main types of greenhouse gas emissions in the oil and gas industry are described by point. Basically, both countries similarly include in their classification the following types of emissions: *carbon dioxide* (CO2) and *methane* (CH4) and *nitrous oxide* (NOx). At the same time, unlike Norway, which includes the specific emissions, like non-methane volatile organic compounds (NMVOCs) and sulphur dioxide (SO2), the Russian classification of emissions is wider and embraces the following emissions: hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF6); nitrogen trifluoride (NF3); as well as the other subtypes of greenhouse gas emissions.

c) *Listing producers of greenhouse gas emissions in the oil and gas industry*

The reporting procedures of produced greenhouse gas emissions by polluters in oil and gas industry have a number of fundamental differences in both countries.

Norwegian listing the oil and gas companies could be considered as the *advanced* (= 3) one. Unlike Russia, it is noticeable, that in Norway the issue of producing greenhouse gas emissions

by the oil and gas companies is integrally controlled by the state and expressed in the measures, facilitating the environmental protection. As it was stated in the paragraph 5.2.1, all the companies, willing to produce oil on the Norwegian Continental Shelf are to be granted with the license and approve the PDO or Production Development Plan. Each license is also the subject to *the Pollution Control Act*, enabling to regulate the polluters' volumes of greenhouse gas emissions. In individual cases companies could be given the tax exemptions. However, the state involvement is applied here, as in order to get a permission for releasing greenhouse gas emissions during production, the pollution control authority has the right to require an environmental impact assessment. Moreover, due to the importance of the petroleum sector, Norway has already established the register in the form of EPIM Enviromental HUB (EEH) by the efforts of *Offshore Norge*, obliging all the operators on the Norwegian Continental Shelf to submit the reports about greenhouse gas emissions in the air and discharges in the water.

At the same moment, the Russian reporting system *requires improvements* (= 1). It could be considered as the bureaucratical one and as it was mentioned in the paragraph 5.2.2 does not embrace the other companies with the lower volumes of emissions, making emphasis only on detection of the large polluting companies. Indeed, it is the significant step towards establishing and improving the reporting system, as in the previous years, the Russian government depended strongly on the expert analysis due to the absence of its own database of emissions. However, the system suggests that those oil and gas companies (stated as the subject to *the Federal Law of July 2, 2021 No. 296-FZ "On limiting greenhouse gas emissions"*) on their own to provide the Federal Service for Supervision of Natural Resource Usage with the reports, containing the information about volumes of emissions in accordance with the special recommendations. Therefore, only one governmental institution is fully responsible for the reporting process. Moreover, these legislative norms, touching upon the reporting system, could be considered as the negative rather than efficient ones. While Norwegian government authorities are involved into the process of listing all the polluters in the oil and gas industry in cooperation with Offshore Norge, deploying its EPIM Environmental HUB (EEH) to account greenhouse gas emissions, the Russian government tries to involve companies into adoption of a new reporting systems by introduction the penalties for untimely submitted reports by oil and gas companies, which could be applied to them instead of, for instance, providing the subjected companies in the oil and gas industry with the special incentives (like tax exemptions or soft loans), in order to increase corporative involvement into the reporting procedures. Indeed, it is reasonable to highlight, that such measures, on the contrary, might affect the Russian companies to adopt

quickly to the new reality and be more productive at calculations of their greenhouse gas emissions. However, it is reasonable to notice, that reporting system of greenhouse gas emissions within the Russian oil and gas industry is at the stage of development, that might suggest additional scope of research on the topic, whether these measures are efficient or not.

d) *Development of CCUS technologies*

Norwegian way of developing CCUS-technologies could be considered as *advanced* (= 3) one. As it was described in the paragraph 5.1.1, in Norway the importance of CCUS-technologies comes from the government and its involvement in granting the companies with licences for CO2 storage projects or investing of projects like *Longship* (paragraph 5.1.1 & 5.2.1). Additionally, the nature of developing is mostly aimed at facilitating the greater green transition and widening practice of application of CCUS technologies both in Europe and the world.

In opposite, the Russian legislative norms, dedicated to the CCUS-technologies in oil and gas industry, are expressed in *the ordinance of the Federal Service for Supervision of Natural Resource Usage dated 16.04.2015 No. 15-r*, which got the significant impact and was supported by the recommendations of IPCC and its accessing principals, *requires improvements* (= 1). As it was stated in the paragraph 5.2.2, it is hard to deny, that this legal enactment highlights the mechanism of *gas lifting*, as the key tool, enabling not only to store the significant volumes of CO2 and other greenhouse gas emissions within the oil reserves, but also to streamline and even increase the level of oil production within Russia. Therefore, it is reasonable to suggest, that the legislative norms, applied to the CCUS-technologies in oil and gas industry, could be considered as the way of maintaining strategic implication of the oil and gas industry, encouraging oil and gas producers to facilitate greater development of this technology, contributing to prolongation of cost-effectiveness of the Russian energy resources and its further exports.

Thus, the carried comparison at the industrial level demonstrated the following outcomes, stated in the Table 5.

Table 5. The results of the carried comparison, based on the chosen criteria at the industrial level

Criteria	**Country**	
	Norway	**Russia**

a) Regulatory environment of both countries in terms of greenhouse gas emissions' decrease in the national oil and gas industry.	*Advanced* (= 3)	*Require improvements* (= 1)
b) Classification of greenhouse gas emissions within oil and gas industry	*Advanced* (= 3)	*Advanced* (= 3)
c) Listing producers of greenhouse gas emissions in the oil and gas industry	*Advanced* (= 3)	*Require improvements* (= 1)
d) Development of CCUS technologies	*Advanced* (= 3)	*Require improvements* (= 1)

Indeed, the carried comparison demonstrated, that Norwegian measures of reducing greenhouse gas emissions at *the industrial level* are more *advanced*, rather than the Russian ones. Therefore, it is reasonable to say, that Russia should adopt the best practices from Norwegian petroleum industry. Only the criterion "*b)*" demonstrates, that the classification of emissions in the petroleum industry is equally advanced in both countries. However, in this criterion Russia might adopt the similar Gothenburg Protocol to NOx and NMVOC emissions in its national oil and gas industry, affecting the Russian oil and gas companies to make focus on greater decarbonisation of their operations. In terms of criterion "*a)*", the primary measures of reducing of greenhouse gas emissions are based on one general Federal Law No. 296, introduced in 2021. It should be added by the enactments, stating the more precise and detailed descriptions of particular aspects this document lacks. In terms of the criterion "*c)*" Russia should establish the similar register of greenhouse gas emissions, producing by the oil and gas companies, operating in the country, and make the data updates in time in order to possess the complete picture and make improvements in the policy of reducing greenhouse gas emissions more quickly. The last criterion "*d)*" was briefly described in the findings in the paragraph 6.1 and the similar ideas are applicable to and justified in this paragraph.

6.3 Comparison at the organisational level

Since comparison of the 3 chosen oil and gas companies implies a variety of aspects, in this paragraph I decided to structure it in the following way. In the *Table 6*, the 2 major corporate features were put, determining the corporate nature, including: *structure of partnership* (state owned, privately owned, mixed), and *freedom of corporate* actions (an executive agent of government tasks, an independent entity). These 2 aspects enabled to separate all 3 chosen companies based on the objective criteria, as well as, facilitated better understanding of the companies' nature. My attention is given to the comparison of the content of both corporate

strategies and sustainability reports of each chosen company towards reducing greenhouse gas emissions within the corporate operations.

It is important to highlight, that in this paragraph in terms of similarities, I decided to write the aspects, presumably uniting all 3 companies, including:

- following *the Greenhouse Gas Protocol*, each company takes into account by assorting the greenhouse gas emissions from their operations into 3 main groups, including: Scope 1, 2 & 3;
- Presence of *Corporate strategy, aimed at achieving reduction of* greenhouse gas *emissions in the operations by 2030 and by 2050.*

Such a decision was made in order to concentrate on the comparison of difference of the companies, that imply a number of factors. Thus, touching upon the differences, 4 following criteria for comparison were identified:

a) *Target indicators of reducing emissions by 2030 & 2050*. This point involves the mid-term indicators each company has settled until 2030, and the main measures, they have to apply in the operations (based on the Greenhouse Gas Protocol) in order to achieve the set targets. In terms of the targets by 2050, this aspect determines the long-term indicators as well as set of actions, each company is going to apply in order to achieve carbon neutrality by 2050.

b) *CCUS-technologies*. This point demonstrates differences in the characteristics of the corporate approach to development of this type of technology, the current or future projects in this field and assumptions of improvement of CCUS.

c) *Cooperation with the government*. The last aspect reflects the chosen companies' involvement into cooperation with the governments in tackling the issue of reducing greenhouse gas emissions.

For clarity and easier perception, the comparison, based on the chosen criteria, is concisely demonstrated in the Table 6.

Table 6. Comparison of Equinor ASA, PJSC Gazprom and PJSC LUKOIL in terms of the measures towards greenhouse gas emissions reduction, based on the established criteria

Features	**Companies**		
	Equinor ASA	**PJSC Gazprom**	**PJSC LUKOIL**
Structure of partnership	**67 % -** state owned; **33 % -** privately owned.	**50 % + 1 share** – state owned;	**100 % of shares -** privately-owned

		the remaining shares – privately owned.	
Freedom of corporate actions	Executive agents of the government tasks		An independent entity
Similarities			
Following *the Greenhouse Gas Protocol*			
Corporate strategy, aimed at achieving reduction of greenhouse gas emissions in the operations by 2030 and by 2050			
Differences			
Company	**Equinor ASA**	**PJSC Gazprom**	**PJSC LUKOIL**
Target indicators of reducing greenhouse gas emissions stated in the corporate strategies			
Description	**By 2030**		
Description	Decrease of greenhouse gas emissions by 50%	Decrease of greenhouse gas emissions by 11,2 %	Decrease of greenhouse gas emissions by 20 %
	By 2050		
Description	Decrease of 90 % of greenhouse gas emissions by 2050 Diversification of investment portfolio: - renewable energy; - electrification on the NCS.	Decrease of emissions by the programme of national gasification of the Russian remote regions; Aimed at improvements: - increase in the national wealth; - decrease in harmful impact of the global warming.	Seeking to achieve carbon neutrality by 2050 by gradual decrease in greenhouse gas emissions in operations of Scope 1 & 2; Aimed at decrease in greenhouse gas emissions of Scope 3.
CCUS-technologies			
Description	Internationally oriented approach	Nationally oriented approach	
	Comprehensive and systematic approach	Regional and experimental initiatives, rather than a comprehensive approach	Sees the potential, and considers opportunities of development
	- Participant of *East Coast Cluster* (UK); - *Longship* – stage "*the Northern Lights*" (in cooperation with international companies *Shell* and *Total*).	- sub-technology of producing hydrogen; - the RoadMap activities with subsidiary *Gazprom Nedra* (research of geological reservoirs); - a trial CCUS-project in Orenburg, releasing by *Gazprom Neft*.	- sees potential of CCUS; - *Global energy perspectives to 2050*. In accordance with the *transformation scenario* – decrease by 500 mln. tonnes of CO2 equivalent.
Cooperation with the government			
Description	Remains as the executive agent of the	Companies could be involved by the government of Russia;	

	government tasks. Government is responsible for the decision-making process.	Participation in writing the draft of *the Strategy of social-economic development of the Russian Federation with the low level of green gas emissions before 2050*.

Below the detailed description for comparison of the chosen companies is provided, based on the established criteria.

All three chosen companies follow *the Greenhouse Gas Protocol* and implement the measures, seeking to decrease greenhouse gas emissions in their main groups of operations, included in the Scope 1, 2 and 3, and reflected in the companies' sustainability reports. They are considered to be the decisive and impactful ones in the process of preventing global warming. The investigated sustainability reports carry the same sections or data, dedicated to the target indicators of reducing greenhouse gas emissions by means of Scope 1, 2 and 3, enabling to consider, that the reports also follow the same structural standard. However, the corporate approaches to the particular measures vary, depending on the chosen company.

In terms of Norway, Equinor ASA plays the significant role in the process of reducing greenhouse gas emissions, that reflected in its corporate strategy. It is important to mention, that the company is partially owned by the government (67%), making it follow the national policy in the oil and gas industry. In this case, it is obvious to consider, that the government represents the policy maker, positioning the control over the company's operations, meanwhile the company is an executive agent, carrying responsibility and seeking to facilitate the government purposes. Thus, *cooperation with the government* could be assessed as *normally developed* (= 2). Indeed, the company has the certain level of independence, taking decisions, connected with realisation of government will, but simultaneously it is to follow its established and accepted laws and policies. The *corporate strategy* of Equinor ASA could be considered as *advanced* (= 3) one, as it is well defined and structured, making emphasis on short-term, middle-term and long-term period of time. The company states *low carbon* principle, satisfying the goals of the Paris Agreement. Same as the Russian companies, the company make emphasis on *the target indicators by 2030 and 2050* in terms of decarbonisation. The company is aiming at embracing emissions from all Scope 1 (*exploration*, *development* and *production*), 2 (*process* and *refining*) and 3. In terms of the first two groups, it seeks to decarbonise its operations in Scope 1 and 2 by 50 % by 2030. As the long-term priority, the company seeks to decarbonise its operations by 90% by 2050. In terms of the last group, the company operates both internally

and externally and seeks ways to diversify its portfolio of investments, that results in decreasing volumes of emissions in the group of operations, included in Scope 3, is positioned as the highest ones. In this group for the last five years (2016-2020), the company has managed to maintain the average level of decrease in emissions of Scope, equalling approximately to 248 mln. tonnes of CO2. Such results were mainly achieved by the renewable energy and low-carbon solutions, consisting of electrification of the production infrastructure on the fields of the Norwegian Continental Shelf. Developemnt of *CCUS-technologies* by Equinor ASA could be considered as *advanced* (= 3). The company participates both in national and international development of CCS technologies, realising the international project *East Coast Cluster* (paragraph 5.3.2) in UK and the national one – *LongShip* (paragraphs 5.1.1 & 5.2.1), where the company takes part in the stage of "the Northern Lights" in cooperation with the other international energy companies, including Shell and Total, which enables to significantly cut emissions by 2030, and by 2035, respectively. In comparison with Equinor ASA, unlike PJSC Gazprom, PJSC LUKOIL positions the CCUS-technologies, as the additional way to cut CO2 emissions, based on 3 scenarios, proposed in its corporate document *Global energy perspectives to 2050*.

Analysis of PJSC Gazprom demonstrated, that same as Equinor ASA, the corporate strategy could be considered as *advanced* (= 3) one. It established the goals to decrease greenhouse gas emissions by 2030 & 2050. In terms of the strategic indicators, specified in the sustainability report 2021, the company seeks to decrease greenhouse gas emissions by 11,2 % by 2030. Indeed, such a number might strongly differ from Equinor ASA or PJSC LUKOIL strategic goals in term of reducing greenhouse gas emissions, but as it was stated, that Gazprom Group involves a variety of subsidiaries and its production scale likely surpass the other 2 companies. In terms of *the long-term strategy* by 2050, unlike the Norwegian energy company, in the second aspect, PJSC Gazprom seeks to facilitate and satisfy the government programme of national gasification, as the way of reducing greenhouse gas emissions. Indeed, it is also noticeable, that the similar trend, where the Russian government represents the role of policy maker, meanwhile the company identifies the measures to achieve the established goals. Nonetheless, in accordance with *the Low Carbon Social and Economic Development Strategy of the Russian Federation to 2050*, the company seeks to settle 2 national issues, expressing in increasing the national wealth by means of providing the remote regions with the accessible and sustained gas infrastructure and decrease the harmful impact, caused by global warming. Since PJSC Gazprom consists of a number of subsidiaries, the reports, containing information

about decrease in greenhouse gas emissions by Scopes, data is given in the form of the unified term “Gazprom Group”. However, with the whole scale of subsidiaries, which is implied in *Gazprom Group*, the company’s level of decrease in both Scope 1 (*production*, *transportation*, *processing*, *underground storage* and *other activities*) and 2 (*production*, *transportation*, *processing*, *underground storage without other activities*) is much higher and more complex, than Equinor ASA. Taking into the account the indicators, stated in the sustainable reports in 2021 of both companies, the Equinor’s share of Scope 1 and 2 (12,1 mln. tonnes of CO2) in the main operations is about 20 times lower that the Gazprom’s ones (243,2 mln. tonnes of CO2), meanwhile the contrast in the Scope 3 emissions of both companies is also significant, where Equinor ASA (250 mln. tonnes of CO2) is 4 times less than Gazprom Group’s total volume (1150,75 mln. tonnes of CO2) in 2021. Indeed, such a difference in the produced volumes of emissions could be explained by the scale of production capacities of both companies.

Moreover, unlike Equinor ASA and PJSC LUKOIL, PJSC Gazprom positions the *CCUS-technologies* could be considered as *requires improvements* (= 2). Indeed, the company sees it as the sub-technology for producing hydrogen. However, a more comprehensive and systematic approach is required. Basically, as it was stated in the paragraph 5.3.2, the company implements the RoadMap activities in cooperation with *Gazprom Nedra* in the Nadym-Pur-Taz Region for carrying research of geological reservoirs. Additionally, only the subsidiary *Gazprom Neft* gradually implement one experimental CCUS-project in Orenburg, which might be in the phase of development, that enables to suggest, that currently CCUS-technologies for PJSC Gazprom are not on the list of priorities, as the way to decrease greenhouse gas emissions. However, these are the regional initiatives, rather than the complex programme on realising the unified CCUS-projects around the whole country. Therefore, if both mentioned project bring the positive outcomes, they might make the corporate management reconsider the approach to development of CCUS-technologies, which is room for additional research.

In terms of PJSC LUKOIL, the actions for reducing greenhouse gas emissions are also being implemented in the form of the *target indicators* by 2030 & 2050, based on the corporate strategy. In comparison with PJSC Gazprom, PJSC LUKOIL is a privately-owned company and sees the operations in Scope 1 and 2, as the vital ones to decrease greenhouse gas emissions based on its corporate mission. The total volume of produced emissions in Scope 1 and Scope 2 in 2021 amounted to 41,491 mln. tonnes of CO, which is approximately 4 times higher, than Equinor ASA possess (12,1 mln. tonnes of CO2), and 6 times lower than the Gazprom Group’s

indicator (243,2 mln. tonnes of CO2). In terms of Scope 3 emissions, the only data, published for the year 2019, (the company's volume of emissions amounted to 385,72 mln. tonnes of CO2 equivalent) enables to make a comparison with the other 2 companies. Thus, Scope 3 emissions of PJSC LUKOIL for 2019 were approximately 1,5 times higher than Equinor ASA and almost 3 times lower than Gasprom Group's volume of emissions. It is vital to mention, that in all 3 companies in my research, PJSC LUKOIL was the latest one, which decided to follow *the Greenhouse Gas Protocol* and make emission inventory based on the concept of Scope 1, 2 and 3 only in 2020 in comparison with other 2 companies, which have been calculating emissions, based on practices of this document since 2016 or even earlier, that also presents room for additional research.

CCUS-technologies requires improvements (= 1). Unlike Equinor ASA or Gazprom Group, due to the company's nature, PJSC LUKOIL also stated the significant potential in its Sustainability reports 2021 in CCUS-technologies based on the "*Transformation*" scenario (the assumed decrease in CO2 emissions thanks to CCUS will amount to 500 mln. tonnes of CO2 equivalent) with reference to its corporate document the *Global energy perspectives to 2050*. It is also important to mention, that the corporate strategy, sustainability reports with the stated corresponding corporate documents were analysed, that limited my scope of investigation and unlikely enabled to explore more data about the existing projects, connected with CCUS-technologies. Thus, the company might possess the higher assessing indicator.

Cooperation with the government in terms of the Russian oil and gas companies, unlike Equinor ASA, which could be consider as the government executive in the energy sector and does not require the additional contribution to the government actions, this point could be considered as *normally developed* (= 2). Indeed, the companies' sustainability reports dated 2021 of PJSC Gazprom and PJSC LUKOIL, mentioned the companies' direct participation in formulation of the national programme, dedicated to the sustainable economic development programme by 2050 of the Russian Federation. Therefore, it is obvious to mention, that the governmental efforts in this direction are not enough and it has to cooperate with those companies in reliance on their expertise and deeper understanding by which measures the goals of this programme could be achieved and what instruments companies might deploy to facilitate it. However, despite involvement into the sustainable economic development programme by 2050 of the Russian Federation, PJSC LUKOIL is remaining fully owned by the private party and might seek to follow and achieve its own goals rather than facilitate greater implementation of government requirements, that gives room for the further investigations.

Thus, the carried comparison at the organisation level demonstrated the following outcomes, stated in the Table 7.

Table 7. The results of the carried comparison, based on the chosen criteria at the organisational level

Criteria (differences)	**Company**		
	Equinor ASA	*PJSC Gazprom*	*PJSC LUKOIL*
a) Target indicators of reducing greenhouse gas emissions stated in the corporate strategies by 2030 & 2050	*advanced* (= 3)	*advanced* (= 3)	*advanced* (= 3)
b) CCUS-technologies	*advanced* (= 3)	*requires improvements* (= 1)	*requires improvements* (= 1)
c) cooperation with the government	*normally developed* (= 2)	*normally developed* (= 2)	*normally developed* (= 2)

Indeed, it is hard to say, that there is a clear dominance in all three chosen aspects by one company. In terms of criterion "*a)*" it is noticeable, that all three companies are equally advanced. Each company formulated the systemised and comprehensive strategies with indicators of decreasing greenhouse gas emissions by 2030 & 2050 and determines the main measures of reducing them in accordance with the classification of Greenhouse Gas Protocol. Meanwhile, in accordance with the criterion "*b)*" the Russian companies are at the stage of developing CCUS-technologies, that might require more efforts from them to implement more projects in this technological field. Finally, the criteria "*c)*" demonstrates, that collaboration of government and business is equally and normally developed, that is justified by the specifics of each chosen oil and gas company. However, it stands to reason, that governments should attract oil and gas companies more often, as they are direct participants in the industry, having more practical experience and knowledge, that might be deployed more frequently.

6.4 Findings

Thus, the carried analysis showed, that Norwegian measures of reducing greenhouse gas emissions within the national oil and gas industry at the state, industrial and organisational levels are more *advanced* rather than the Russian ones. Indeed, Norway is not an absolute leader in terms of tackling the issue of decreasing greenhouse gas emissions, as a few criteria of comparison at *state* and *organisational* levels were assessed as *normally developed* (= 2) or *required improvements* (= 1), emphasizing potential for further development. However, the analysis also demonstrates, that Russia falls behind Norway at three chosen levels to different

degrees. Norwegian measures are more systemised and robust in comparison with the Russian ones.

At *the state level*, it is important to note, that the Russian legislation towards reducing greenhouse gas emissions developed chaotically in many ways before ratification of the Paris Agreement. Indeed, Russia entered the major international agreements (UNFCCC, the Kyoto Protocol), but the issue of global warming and the requirement of establishing measures of reducing greenhouse gas emissions became more systematic and comprehensive since introducing the Climate Doctrine of 2009 by the President Dmitry Medvedev. Unfortunately, the document did not give the sufficient outcomes to achieve the target indicators of decrease by 75% by 2020. Therefore, after ratification of the Paris agreement, and in 2021, when the significant improvements in the legal base have been introduced by the President Vladimir Putin, starting from *the Federal Law of July 2, 2021 No. 296-FZ "On limiting greenhouse gas emissions"*, which established the legal framework, and implementation of the other legal enactments. However, the Russian legal framework is at the stage of development and might be expanded, that require further investigations to assess them.

At *the industrial level*, the comparison demonstrated the lowest results for Russia. Therefore, it is reasonable to mention, that Russia might be recommended to take into account the Norwegian practices and experience in terms of developing its national legislation towards reducing greenhouse gas emissions at the industrial level. The Russian approach to reducing greenhouse gas emissions remains as the general one, based on *the Federal Law of July 2, 2021 No. 296-FZ "On limiting greenhouse gas emissions"* and the other corresponding legal enactments. However, the general document does not suggest the specific measures of reducing greenhouse gas emissions. Indeed, it is aimed at a uniform approach but does not position or note an application of carbon pricing, as the main tool to decrease greenhouse gas emissions. Additionally, the reporting system of producing greenhouse gas emissions in Russia by the oil and gas companies could be named as coercive and bureaucratic system, as it suggests, more involvement from the companies into the implied requirements. The measures are mostly aimed at identification of the large companies, producing significant volume of greenhouse gas emissions, but do not take into account the other emitting companies, and forcing them to submit the required data on their own in accordance with the guidelines, stated in the additional government document *the Order of the Federal Service for Supervision of Natural Resource Usage dated 30 June 2015 No. 300*. Additionally, unlike the Norwegian government, which provide the energy companies in the petroleum industry with the licenses to implement CCUS-

projects, particularly connected with CO2 storage, on the Norwegian Continental Shelf or seeks to promote the project *Longship* internationally and support it by heavy investments from the governmental side, the Russian approach to this technology in the oil and gas industry remains more nationally oriented. Deployment of this technology is aimed at using it as the strategic tool, enabling to increase the oil recovery and the national level of oil production, that in its turn maintain the energy exports of the country. Therefore, it is reasonable to assume, that until Russia depends strongly on the stable exports of the oil and gas industry, there might not be the significant decisions towards establishment of the more comprehensive and detailed approach to developing CCUS-technologies within the country.

At *the organisation level*, all three companies demonstrated the advanced level of the corporate strategies in terms of indicators and reduction measures of greenhouse gas emissions by 2030 & 2050, respectively. However, the Russian companies fall behind the other 2 criteria. Indeed, it is noticeable the efforts of the Russian companies and understanding of developing CCUS technologies. PJSC Gazprom is a more advanced company in developing of these technologies. However, its efforts remain at the level of nationally oriented and local projects. PJSC LUKOIL make sufficient forecasts and develop its sustainable agenda towards reduction of greenhouse gas emissions, taking into account CCUS technologies, as one of the ways to facilitate this process. However, there is scope for the company's growth in this technological filed. Therefore, it is reasonable, that PJSC Gazprom and PJSC LUKOIL might turn to the experience of Equinor ASA in terms of implementing CCUS-projects, analysing the major trends in this field and adopting them to their operations. Moreover, all three companies should advance their cooperation with the national governments, participating more in debates of the legislation towards greenhouse gas emission reduction and making practical proposes, based on their expertise. Indeed, as it was demonstrated in the paragraphs 5.3.3, 5.3.4 & 6.3, the Russian companies took part in formulating *Strategy for the long-term development of the Russian Federation with low greenhouse gas emissions until 2050*. However, this is one of the examples, stated in the corporate sustainability report 2021, and there were no direct notions of taking participation in the similar or corresponding laws and acts. Meanwhile, Equinor ASA remained as the government executive, putting the government requirements into practice.

To sum up, Norwegian measures of reducing greenhouse gas emissions within its national oil and gas industry at all three levels were considered as more advanced rather than the Russian ones. However, Norway is not the ideal, as some points of the national emissions reduction measures might be improved. On the other side, Russia is consistently developing its measures

of reducing greenhouse gas emissions within the oil and gas industry and might learn the efficient and strong practices from Norway at all three levels.

7.0 Conclusion

This chapter gathers all the conclusions in my research project. Thus, the outcomes of my study are the subject to the other researchers and academic professionals. At first, I would like to demonstrate briefly the implication of the applied institutional theory. Then, I conclude this paragraph, stating the limitations of my study and suggestions for future studies.

7.1 Theoretical discussion

The concerns around the issue of global warming are growing momentum. The oil and gas industry is considered to be the significant contributor to the increase in the greenhouse gas emissions. Therefore, the actions have been done by the international organisations, governments and oil and gas companies. The progress of settling the problem has been made by entering and ratification of the various international agreements, including IPCC, the Kyoto Protocol and later the Paris Agreement. The last one became the unified document for the most countries, motivating them to develop and introduce the measures more systematically to reduce greenhouse gas emissions globally. Oil and gas industry is considered to be the significant source of those emissions, which have always attracted attention from various players. Therefore, the most decisive measures of decarbonisations should be primarily introduced here.

Currently, Norway and Russia are the participants of the Paris Agreement. Indeed, significant industrial output in the national oil and gas industry is the vital influencer to the volumes of greenhouse gas emissions around the world. Therefore, the whole research was primarily conducted to analyse, what shapes the measures, used to decrease the volumes of greenhouse gas emissions in the Norwegian and Russian oil and gas industry at the state, industrial and organisational levels, based on content of the legal enactments, realised by the national government of both countries, and corporate documents of the chosen oil and gas companies. Indeed, my research project had a set of limitations, which were described in the paragraph 1.3.

In my research project the institutional theory was applied, allowing to explain the change of processes or objects in reply to the external pressure coming from the institutions or organisations. The theory could be divided into three types of isomorphism, consisting of

coercive, *mimetic* and *normative* isomorphism. From a personal perspective, I would like to describe the first 2 types of isomorphism, as they reflect my research the most.

Thus, the institutional theory enabled to draw a few main outcomes:

1) In my research *coercive isomorphism* was mainly expressed at the state level in terms of the strict application of the measures, based on the existing legal framework towards reducing greenhouse gas emissions within the oil and gas industry. Norway demonstrates greater governmental involvement into the issue of reducing greenhouse gas emissions within the oil and gas industry. Norwegian concerns about global warming were addressed by the debates between the national Parties from the 80ths, that resulted in that Norway, as the other Nordic countries, introduced the carbon tax in 1991. In 2005, Norway launched the Greenhouse Gas Emission Trading Act in order to enter the emissions trading system or EU ETS in 2008. Later, the target indicators of reducing greenhouse gas emissions by 2012 were declared by the government, ruled by Mr. Stoltenberg in 2008. Currently, Norway continues to pursue its strategy of achieving carbon neutrality by 2050, based on the existing legal framework. The Norwegian approach suggests the measures of carbon pricing, expressed in the combination of the carbon tax and EU ETS, which is strictly maintained by the existing general framework and governmental authorities. The emphasis is made on the fiscal measures, dedicated to the increase in the tax rates.

2) Russian government also demonstrates attention to the issue of global warming as well as measures of reducing greenhouse gas emissions within oil and gas industry at the state level. Currently, *the Federal Law of July 2, 2021 No. 296-FZ "On limiting greenhouse gas emissions"*, introduced in 2021, is the general document in terms of climate policy in the country. All other laws, decrees or edicts, supporting the climate policy and reduction of greenhouse gas emissions, are established around this Federal Law. However, *coercive isomorphism* at the state level of Russia is less highlighted. Indeed, the legal framework is partially under development and regulation of the issue has softer application. This means, that government apply the laws, but leaves the quality of their implementation to the oil and gas companies or the local governments of Russia without sufficient oversight as well as does not involve the other companies with emissions that may also be the subject to the similar legal enactments. The only strict measure, ensuring the companies following the applied laws, reflected the penalties for untimely submitted reports about produced greenhouse gas emissions by the Russian oil and gas companies. Indeed, the process is controlled by the Federal Service

for Supervision of Natural Resource Usage, but it involves much of paperwork and puts much pressure on the one government agency.

3) *Mimetic isomorphism* was observed in the organisation level. In the context of my research, it was expressed in the chosen Russian companies (PJSC Gazprom, PJSC LUKOIL), that "mimicked" the international oil and gas companies (like Equinor ASA) in terms of establishing the sustainability reports and the corporate strategies, aimed at achieving target indicators of decrease in greenhouse gas emissions in their operations by 2030 & 2050, correspondingly. This type of isomorphism was also demonstrated in the Russian companies, that calculated and divided the greenhouse gas emissions into Scope 1,2 & 3 in accordance with the suggested classification of *Greenhouse Gas Protocol*, that had already been deployed in the other international oil and gas companies, like in the chosen Norwegian company Equinor ASA.

7.2 Limitations and suggestions for future research

The research project involves a number of aspects, which could have potential for future studies. The research project was aimed at carrying out the comparative analysis of the measures towards reducing greenhouse gas emissions in the Russian and Norwegian oil and gas industry at the state, industrial and organisational levels, based only on the content of the legal enactments and the described corporate documents of the chosen companies.

However, *at the state level*, there is always reasonable to evaluate, whether the same or different reduction measures are applied in the other industries, which play the similar significant role in the national economy of both countries. What progress have been made in reduction of greenhouse gas emissions in terms of the volumes in a particular industry, like steel manufacturing or chemicals production, during the specified period in both countries? How the government position has been forming around a particular sector of the economy in terms of reducing greenhouse gas emissions?

Additionally, both countries have the long-term national strategy of decarbonisation by 2050. For Norway, there is a national *long-term low-emission strategy for 2050, stating the target indicators by decreasing GHG emissions by 90-95% by 2050*. In Russia, there is *the Strategy of social-economic development of the Russian Federation with the low level of green gas emissions before 2050*, which declares to reduce greenhouse gas emissions by 75-80% by 2050. Both strategies could be analysed separately or on the comparative basis. For instance, despite of the systemised approach of decarbonisation, there is room for research, whether Norway is

able to achieve its climate targets or not by 2050. In terms of Russia, the national document involves *no change* and *target* scenarios, where the second one is strongly prioritized by the government. However, the document was realised in 2021, when the Russian Federation was in the other international economic and political conditions in comparison after the beginning of the special military operation in Ukraine on the 24th February 2022. Therefore, there is room for additional research, whether the current international and sanctioned conditions around the country enables to achieve the goals of the Strategy, stated in the original target scenario or not. In terms of simultaneous comparison of both national decarbonisation strategies by 2050, it is worth analysing in detail, in what ways the government approaches are presented towards the measures, reducing greenhouse gas emissions and what outcomes have already been achieved to decrease them around the entire country.

At the industrial level, the suggestion is strongly connected with the current level of CCUS-projects in both countries. As it was mentioned, Norway has already established the licensing rounds for the energy companies, willing to implement those technologies on the Norwegian Continental Shelf. Additionally, Norway is aimed at implementing the large-scale CCUS project *Longship*. However, the project is being at the phase of construction and what outcomes both in Norway and the other world in terms of reducing greenhouse gas emissions it might bring in the future remains as the additional topic for the researchers. Meanwhile, in Russia the CCUS-technologies are mostly positioned as the way of maintaining cost-effectiveness of the oil reserves rather than the way of reducing greenhouse gas emissions. Indeed, development of technologies is seen at the organisation level, expressed in the local projects, released by the Russian oil and gas companies, as one of the ways to tackle the issue. Therefore, it would be interesting to analyse, how the importance of CCUS has been developing in the context of national oil and gas industry for the last 2 decades in Russia (during 2000s-2020s) and how it relates to the oil and gas companies.

At the organisational level, the research was quite little and mainly limited by the number of the oil and gas companies for the analysis. Therefore, the list included only one Norwegian company and two Russian ones. Indeed, their characteristics are quite different. Both Equinor ASA and PJSC Gazprom are partially owned by the government and build their corporate strategy in the same line with the government, meanwhile PJSC LUKOIL is the fully privately-owned company. Thus, it would be exciting to enlarge the list of oil and gas companies, based on the ownership of participants and assess their measures of reducing greenhouse gas emissions in their operations in both countries. Another way to conduct further research would

be grouping the various oil and gas companies of both countries, based on the classification by the operations in *upstream-midstream-downstream* in accordance with the Greenhouse Gas Protocol and make a rating, enabling to evaluate each company's performance in terms of reducing greenhouse gas emissions.

It is important to highlight, that my research did not use the interviews with the government representatives, corporate members or oil and gas experts, that might possess in-depth insides and could bring more detailed results for the similar investigations or the other research projects, that would be based on my suggestions.

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9.0 Appendix

Appendix 1. Target indicators and the level of reducing GHG emissions by 2030 by industry of the Russian Federation

Industry	Greenhouse gas emissions limit volumes (billion. tonnes equivalent CO2)
Energy sector	
Electricity	558 mln. tonnes
Heating	138 mln. tonnes
Oil	105 mln. tonnes
Main pipeline transport	68 mln. tonnes
Coal and natural gas	23 mln. tonnes
Total	**894 mln. tonnes**
Industrial production	
Iron industry	148 mln. tonnes
Non-ferrous metallurgy	9 mln. tonnes
Production of building materials	62 mln. tonnes
Chemistry and oil chemistry	111 mln. tonnes
Timber and woodworking industry, paper and paperboard industry	33 mln. tonnes
Total	**405 mln. tonnes**
Transportation	
Auto	157 mln. tonnes
Aviation	18 mln. tonnes
Railways	9 mln. tonnes
Sea and inland waterway transport	2 mln. tonnes
Total	**186 mln. tonnes**
Others	
Housebuilding and housing and public utilities	371 mln. tonnes
Waste management	84 mln. tonnes
Agricultural sector	222 mln. tonnes
Total	**677 mln. tonnes**

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Appendix 2. CCUS emission reduction by 2050 in accordance with the scenarios of PJSC LUKOIL, mln. tonnes of CO2 equivalent

Scenario	CCUS emission reduction by 2050, in mln. tonnes of CO2 equivalent
Evolution scenario	100
Equilibrium scenario	200
Transformation	500

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