SPRAWY MIĘDZYNARODOWE

2020, t. 73, nr 1
ISSN 0038-853X
DOI: 10.35757/SM.2020.73.1.07

Polityka klimatyczna: stałość i zmiany

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How will energy transition impact the major EU natural gas suppliers?

Jak transformacja energetyczna wpłynie na największych dostawców gazu ziemnego do UE?

Słowa kluczowe:
transformacja energetyczna, Europejski Zielony Ład, Equinor, Gazprom, wodór, emisje metanu

Keywords:
energy transition, European Green Deal, Equinor, Gazprom, hydrogen, methane emissions

How will energy transition impact the major EU natural gas suppliers?

This paper focuses on the adaptation strategies of two major EU natural gas suppliers – Gazprom and Equinor – to new challenges imposed by the clean energy transition. Oil and gas companies around the world have already started to adjust their business strategies, inter alia, by investing in renewable energy. The recently proposed European Green Deal adds additional decarbonisation pressure to the gas sector with the increasing supply of renewable and low-carbon gases and the reduction of energy-related methane emissions.

Jak transformacja energetyczna wpłynie na największych dostawców gazu ziemnego do UE?

Artykuł porównuje strategie biznesowe dwóch najważniejszych dostawców gazu ziemnego do Unii Europejskiej – norweskiej firmy Equinor i rosyjskiego Gazpromu. Transformacja energetyczna w kierunku niskoemisyjnego systemu energetycznego oznacza nowe wyzwania dla firm z sektora ropy naftowej i gazu oraz konieczność ograniczanie ich emisyjności, np. przez inwestycje w odnawialne źródła energii. Europejski Zielony Ład jest źródłem dodatkowej presji poprzez promowanie udziału gazu ze źródeł odnawialnych oraz ograniczanie emisji metanu w sektorze energii.

Introduction

We are living in a time of transition towards a clean energy system. Over the last few years, this process has accelerated in some regions, such as the European Union (EU). The European Green Deal, presented by the European Commission President – Ursula von der Leyen – in December 2019, sets an overarching objective to transform Europe into the 'first climate-neutral continent' within the next three decades.[1] According to the Green Deal, the EU gas sector will be gradually decarbonised through support for decarbonised gas production, a reform of the design of the gas market and an abatement of energy-related methane emissions.[2]

In addition to that, the EU Commission President suggested raising the 2030 emission reduction target from 40 to at least 55% during her first State of the Union speech.[3]

On 14 October 2020, the European Commission published a comprehensive EU strategy to reduce methane emissions,[4] which suggests a framework for the comprehensive measurement, reduction and verification of methane emissions and the creation of an independent international methane emissions observatory. The observatory will aggregate data on methane emissions globally. The strategy specifies that 'the Commission will consider proposing legislation on targets, standards or other incentives

1 Communication from The Commission to the European Parliament, the European Council, the European Economic and Social Committee, the Committee of the Regions, The European Green Deal. Brussels, 11 XII 2019. COM(2019) 640 final.

2 Methane is a highly potent but short-lived greenhouse gas (GHG) which causes 25% of the anthropogenic warming experienced today. At the same time it is the main component of natural gas. For more information, see M. Olczak and A. Piebalgs, *How far should the new EU Methane Strategy go?*, „FSR Policy Brief" 2019/07, issue 7, April 2019.

3 Communication from The Commission to the European Parliament, the European Council, the European Economic and Social Committee, the Committee of the Regions Stepping up Europe's 2030 climate ambition. Investing in a climate-neutral future for the benefit of our people. {SEC(2020)301final}-{SWD(2020)176final}-{SWD(2020)177final}-{SWD(2020)178final}.

4 Communication from The Commission to the European Parliament, the European Council, the European Economic and Social Committee, the Committee of the Regions on an EU Strategy to reduce methane emissions. Brussels, 14 X 2020. COM(2020) 663 final.

to reduce methane emissions from fossil energy consumed and imported in the EU',[5] should significant commitments from international partners on methane emissions be absent.

Russia and Norway have traditionally been the major natural gas suppliers to the EU. At the end of 2019, their shares in extra-EU gas imports were, respectively, 39% and 27%.[6] The role of national oil and gas companies – Gazprom and Equinor – was instrumental in maintaining these countries' relationships with the EU in the energy domain. As a result, the announcement of the decarbonisation of the EU gas sector poses a new challenge, not only to the EU gas sector but also to the companies which are currently the EU's top suppliers.

This paper seeks to examine how the major EU natural gas providers – Equinor and Gazprom – are adapting their business strategies to the new challenges related to the clean energy transition. In particular, the analysis will focus on three types of strategies: the move towards more efficient and more sustainable oil and gas operations with a focus on methane emission abatement; investment in renewable energy; and investment in emerging technologies such as the production of low-carbon hydrogen.[7]

The study is organised as follows. Section 2 provides a review of the academic literature assessing the impact of climate change and energy transition on oil and gas companies and how these companies have been responding to these challenges. Section 3 describes the methodology. Sections 4 and 5

5 Ibidem, p. 17.

6 *Quarterly report on European Gas Markets with focus on the impact of global LNG markets on EU gas imports*, Market Observatory for Energy, DG Energy, vol. 12, issue 4, Q4 2019 [online, accessed: 16 V 2020], available at: <https://ec.europa.eu/energy/sites/ener/files/quarterly_report_on_european_gas_markets_q4_2019_final.pdf>.

7 Hydrogen is a versatile energy vector which can be used as an alternative to natural gas, especially in sectors which are difficult to electrify such as steel production. In contrast to natural gas, hydrogen does not emit carbon dioxide on combustion. I distinguish between three main types of hydrogen: green hydrogen produced from renewable electricity via water electrolysis; grey hydrogen produced from fossil fuels, mostly through steam methane reforming of natural gas or coal gasification (widely used today), blue hydrogen combining grey hydrogen with carbon capture storage (CCS) and turquoise hydrogen produced via pyrolysis. For more information, see M. Kędzierski, *Wodór – nadzieja niemieckiej polityki klimatycznej i przemysłowej*, Ośrodek Studiów Wschodnich. Komentarze, nr 330 [online], 6 V 2020 [accessed: 22 V 2020], available at: <https://www.osw.waw.pl/sites/default/files/komentarze_330_1.pdf>.

provide a comparison of the adaptation strategies of Equinor and Gazprom. In Section 6, the research questions are discussed. The final part draws conclusions.

Literature review

Oil and gas companies around the world are responding to the challenges posed by climate change and decarbonisation policies in various ways. Their divergent approaches can be explained by various factors such as: company-specific factors related to location and the regulatory regime in the countries in which they operate;[8] their economic and market positions; internal organisational factors linked to corporate culture or the position of the CEO;[9] their vulnerability to extreme weather events and changing climate conditions;[10] their involvement in international climate policy and their ability to influence decision-makers and non-state actors.[11]

Scholars often make a distinction between international oil companies (IOCs) and national oil companies (NOCs).[12] Privately-owned IOCs face pressure from their shareholders and they need to engage with various stakeholders to keep their social licence to operate. As a result, they need to adapt their business models to new conditions. At the beginning of 2020, BP announced the bold objective to become 'a net zero company by 2050 or

8 D. L. Levy, A. Kolk, *Strategic Responses to Global Climate Change: Conflicting Pressures on Multinationals in the Oil Industry*, „Business and Politics" 2002, vol. 4, issue 3, p. 275–300.

9 A. Kolk, D. Levy, *Corporate Strategy, Climate Change and Oil Multinationals*, „Winds of Change" 2001, vol. 19, issue 5.

10 A. M. Cruz, E. Krausmann, *Vulnerability of the Oil and Gas Sector to Climate Change and Extreme Weather Events*, „Climatic Change" 2013, vol. 121, issue 1, p. 41–53.

11 N. Nasiritousi, *Fossil Fuel Emitters and Climate Change: Unpacking the Governance Activities of Large Oil and Gas Companies*, „Environmental Politics" 2017, vol. 26, issue 4, p. 621–647.

12 T. Sueyoshi, M. Goto, *Data Envelopment Analysis for Environmental Assessment: Comparison between Public and Private Ownership in Petroleum Industry*, „European Journal of Operational Research" 2012, vol. 216, issue 3, p. 668–678; M. S. Bach, *Is the Oil and Gas Industry Serious About Climate Action?*, „Environment: Science and Policy for Sustainable Development" 2017, vol. 59, issue 2, p. 4–15; E. Shojaeddini et al., *Oil and Gas Company Strategies Regarding the Energy Transition*, „Progress in Energy" 2019, vol. 1, issue 1.

sooner', which sparked many discussions and questions.[13] Some oil and gas majors are following suit, with Repsol, Shell and Total announcing their climate targets and investing in renewable energy or in the development of future energy vectors, such as low-carbon hydrogen production.

On the other hand, there is a group of NOCs, either fully-owned or majority-owned by national governments, whose role in energy transition is crucial due to two main factors. First, they account for over half of global oil and gas production and an even larger share of world reserves.[14] Second, the revenues they generate are important both for the state budget and for national wealth, which in many cases depend heavily on the income from oil and gas production. In contrast to IOCs, NOCs lower their greenhouse gas (GHG) emissions because of policies adopted and enforced by the host governments, which can stem from climate change mitigation objectives (nationally determined contributions) or national energy security concerns.[15]

Another stream of scholarly research focuses on the relationship between the corporate strategies announced by oil and gas companies and their implementation. Sæverud and Skjærseth find that a high degree of consistency between proactive climate rhetoric and action can be found in companies in which the leadership is committed to the achievement of climate targets and where the corporate objectives are in line with regional and international climate policies and commitments.[16] Pickl analyses the renewable energy strategies of oil and gas majors and finds that companies with smaller levels of proven oil reserves are more likely to invest in renewable energy than companies with significant pools of oil reserves.[17] Among the former group, investment in renewable energy

13 *BP Sets Ambition for Net Zero by 2050, Fundamentally Changing Organisation to Deliver*, BP global [online], 12 II 2020 [accessed: 16 V 2020], available at: <https://www.bp.com/en/global/corporate/news-and-insights/press-releases/bernard-looney-announces-new-ambition-for-bp.html>.

14 *The Oil and Gas Industry in Energy Transitions. Insight from IEA Analysis*, International Energy Agency, Paris 2020, p. 6.

15 E. Shojaeddini et al., *Oil and Gas Company Strategies...*, p. 10.

16 I. Andreassen Sæverud, J. B. Skjærseth, *Oil Companies and Climate Change: Inconsistencies between Strategy Formulation and Implementation?*, „Global Environmental Politics" 2007, vol. 7, issue 3, p. 42–62.

17 M. J. Pickl, *The Renewable Energy Strategies of Oil Majors – From Oil to Energy?*, „Energy Strategy Reviews" 2019, vol. 26: 100370.

sources (RESs) and a shift from oil and gas to renewable energy helps the companies build more diverse and less volatile portfolios.

There is also a nascent stream of research on the geopolitics of energy transformation,[18] which gained more attention after the publication of a report by the International Renewable Energy Agency (IRENA).[19] The study by IRENA asserts that the global energy transition, which is driven by the increase in renewable energy production, will have crucial geopolitical consequences. It will influence relations between national governments, particularly fossil fuel importers and exporters, and lead to structural changes in socio-economic conditions. The clean energy transformation poses the biggest challenges to the group of exporters, which may experience greater instability and financial risks due to the decreasing demand for fossil fuels. On the other hand, there is growing concern about the supply of minerals which have a critical role in the growing deployment of clean energy technologies, such as solar panels and electric vehicles.[20]

Methodology

This paper provides a comparative analysis of the business strategies for adapting to the new conditions introduced by energy transformation. In contrast to existing publications which concentrate on a group of companies,[21] this paper will provide an in-depth analysis of two companies: Gazprom and Equinor. Both are examples of national oil companies which are owned and managed by national governments: of Russia and

18 R. Vakulchuk, I. Overland, D. Scholten, *Renewable Energy and Geopolitics: A Review*, „Renewable and Sustainable Energy Reviews" 2020, vol. 122: 109547.

19 *A New World: The Geopolitics of the Energy Transformation, Global Commission on the Geopolitics of Energy Transformation*, International Renewable Energy Agency, Abu Dhabi 2019.

20 T. Kim, M. Karpiński, *Clean energy progress after the Covid-19 crisis will need reliable supplies of critical minerals*, IEA [online], 6 V 2020 [accessed: 22 V 2020], available at: <https://www.iea.org/articles/clean-energy-progress-after-the-covid-19-crisis-will-need-reliable-supplies-of-critical-minerals>.

21 E. Shojaeddini et al., *Oil and Gas Company Strategies...*; M. Zhong, M. D. Bazilian, *Contours of the Energy Transition: Investment by International Oil and Gas Companies in Renewable Energy*, „The Electricity Journal" 2018, vol. 31, issue 1, p. 82–91; M. J. Pickl, *The Renewable Energy Strategies...*

Norway respectively. As a result, and in contrast to privately-owned international oil companies, their decision-making is highly influenced by state policies. However, it should be noted that some authors classify Equinor as an IOC because of the company's particular governance structure and the level of independence it enjoys.[22]

The paper adopts a framework proposed by Zhong and Bazilian[23] with modifications introduced by Shojaeddini et al.[24] These authors make a distinction between four groups of companies according to the strategies they adopt: (1) integrating low-carbon technologies into oil and gas production; (2) expanding beyond oil and gas production; (3) not engaging in low-carbon investment or emission reduction; or (4) aiming to reduce operational emissions. This classification allows companies to be ranked according to their engagement in energy transition and their degree of success in pursuing their strategies.

The above authors look at the following strategies: improving energy efficiency in operations and products; investing in renewable energy (solar, wind, biomass, geothermal, hydropower or marine energy); increasing the share of gas in production; and investing in new low-carbon technologies such as electric vehicles, hydrogen technologies and carbon capture and storage (CCS). These strategies can be grouped into three broader categories which will be the basis for this work: more efficient and sustainable oil and gas operations with a focus on methane emission abatement; investment in renewable energy; and investment in low-carbon technologies with a focus on hydrogen and CCS.

The following two sections provide in-depth analyses of the adaptation strategies pursued by Equinor and Gazprom. Each section starts with a brief presentation of the company, its history and its significance for its host state. This is followed by a description of the business environment and an assessment of the company's involvement in the above adaptation strategy categories based on publicly available data: annual reports and sustainability reports available on corporate webpages, press releases and press articles.

22 E. Shojaeddini et al., *Oil and Gas Company Strategies...*, p. 2.

23 M. Zhong, M. D. Bazilian, *Contours of the Energy Transition...*, p. 83–84.

24 E. Shojaeddini et al., *Oil and Gas Company Strategies...*, p. 2.

Equinor

Equinor was formed in 1972 as the Norwegian State Oil Company, or Statoil, when the Norwegian oil and gas industry was still in its infancy. The name Statoil was changed in 2018 to reflect the company's ambition to transform itself from an oil and gas company into an energy company. The Norwegian state owns a 67% share, and the ownership interest is managed by the Ministry of Petroleum and Energy. The petroleum sector plays a significant role in the Norwegian economy. In 2019, crude oil and natural gas accounted for almost half (47%) of the total value of all the country's exported goods.[25] Part of the revenue is transferred to the 'Government Pension Fund Global', which helps to stabilise the Norwegian economy and to balance the increasing costs of the pension system, at the same time allowing for significant investment in Norway and abroad.[26]

The entity was partially privatised in 2001 and is listed on the Oslo and New York stock exchanges. It is present in 30 countries in North and South America, Africa, Asia, Oceania and Europe. Since October 2014, the company has been led by President and CEO Eldar Sætre, who joined the company in the 1980s.[27]

Equinor is a major operator on the Norwegian continental shelf and one of the largest offshore operators in the world. In the last few years, the company has announced an expansion of its renewables portfolio involving investment in offshore wind, floating offshore wind, solar energy, low-carbon solutions such as CCS and, more recently, hydrogen.[28] At the same time, the bulk of the company's annual capital expenditure continues to be on oil and gas. Between 2016 and 2018, Equinor invested only 3–5% of its

25 Norwegian Petroleum: Exports of Oil and Gas [online, accessed: 17 V 2020], available at: <https://www.norskpetroleum.no/en/production-and-exports/exports-of-oil-and-gas/>.

26 For more information visit: <https://www.nbim.no/en/the-fund/about-the-fund/> [accessed: 17 V 2020].

27 Equinor [online, accessed: 16 V 2020], available at: <https://www.equinor.com/en/about-us/organisation.html>.

28 E. Shojaeddini et al., *Oil and Gas Company Strategies…*, p. 7–8.

annual capital expenditure in renewables.[29] Recently, the UK Advertising Standards Authority issued a warning to Equinor over an advertising campaign implying that gas is a 'low-carbon energy' source.[30] This suggests that it will be more and more difficult for Equinor to maintain its image as one of the 'cleanest' oil and gas companies.

Business environment and corporate strategy

Equinor's 2019 Annual Report starts with an overview of the current situation and major trends in energy markets.[31] It expects that the global economy will continue to rise at a pace of 2.6%, the weakest since the 2008 and 2009 global financial crisis. This will be further influenced by geopolitical tensions and the trade dispute between China and the US, Brexit and growing policy uncertainty, and the unpredictable effects of the COVID-19 pandemic, which result in inert consumer demand and lower industrial output.

These factors lead to the conclusion that the future energy outlook will be characterised by high volatility nurtured by shifts in geopolitics, challenges in resource replenishment, greater market cyclicality and structural cost changes, in addition to the transition towards a low-carbon economy.

More efficient and sustainable oil and gas operations (methane emissions)

On 6 January 2020, Equinor announced new climate ambitions. The company aims to reduce absolute greenhouse gas emissions from offshore fields and onshore plants in Norway by 40% by 2030, 70% by 2040 and to near zero by 2050. Reaching the 2030 target requires a decrease of over 5 Mt, which is around 10% of the total annual GHG emissions in Norway (52.7 Mt of CO_2 equivalent in 2017).[32] It should be noted that the target

29 C. R. Pooley, S. Pfeifer, *'Thank you Statoil! It's been a pleasure': Oil major changes name*, „Financial Times" [online], 15 III 2018 [accessed: 22 V 2020], available at: <https://www.ft.com/content/071bba1a-282e-11e8-b27e-cc62a39d57a0>.

30 H. Dempsey, *Gas is 'not a low-carbon fuel', UK watchdog rules*, „Financial Times" [online], 15 IX 2019 [accessed: 22 V 2020, available at: <https://www.ft.com/content/788005cc-d3e9-11e9-8367-807ebd53ab77>.

31 Equinor Annual Report and Form 20-F, Stavanger 2019 [accessed: 17 V 2020], available at: <https://www.equinor.com/en/investors.html#annual-reports>.

32 Norway's Fourth Biennial Report under the Framework Convention on Climate Change, Norwegian Ministry of Climate and Environment [online, accessed: 17 V 2020], available at: <https://unfccc.int/sites/default/files/resource/Norways%20Fourth%20Biennial%20Report%20FINAL.pdf>.

only refers to GHG emissions from offshore fields and onshore plants operated by Equinor in Norway. It does not include emissions from either Equinor's foreign assets or scope 3 emissions. The 2030 target will be achieved by electrifying key fields and plants, such as the Troll and Oseberg offshore fields and the Hammerfest liquefied natural gas (LNG) plant, increased energy efficiency and digitalisation. The company is less specific about its measures to achieve the 2040 and 2050 targets. They will be achieved through further electrification, 'consolidation of infrastructure' and new technologies such as hydrogen and CCS. None of these technologies were at a commercial scale when the targets were announced.

A month later, on 6 February 2020, Equinor launched a climate roadmap, updating the January announcement.[33] The company seeks to reduce the net carbon intensity of the energy it produces by at least 50% by 2050, including scope 1, 2 and 3 emissions; increase the efficiency of its operations by reaching carbon-neutral global operations by 2030; and increase its renewable energy capacity ten times by 2026 with a focus on global offshore wind.

Two elements will be crucial in achieving the net carbon intensity target: changes in the scale and composition of the company's oil and gas portfolio and the efficiency of its operations. In other words, Equinor expects to increase oil and gas recovery, increase gas production at the expense of more carbon-intensive oil production; increase renewable production; invest in CCS and the blue hydrogen business, and use offset mechanisms, natural sinks, biofuels, etc.

According to the International Energy Agency's (IEA) Methane Tracker, the Norwegian oil and gas sector already has one of the world's lowest methane intensities, with estimated total emissions of 26 kt in 2019.[34] In February 2020, Equinor committed to keeping methane emissions at a near zero level and to eliminate routine flaring by 2030. The company supported the direct regulation of methane emissions at the federal level in the US and sold its shale assets at Eagle Ford in the US to Repsol. These

33 Equinor aims to reduce its net carbon intensity by at least 50% by 2050 [online], 6 II 2020 [accessed: 16 V 2020], available at: <https://www.equinor.com/en/news/2020-02-06-climate-roadmap.html>.

34 Methane Tracker 2020 Interactive country and regional estimates, International Energy Agency [online, accessed: 17 V 2020], available at: <https://www.iea.org/reports/methane-tracker-2020/interactive-country-and-regional-estimates#abstract>.

assets accounted for 15% of its total shale oil and gas production in the US in 2018.[35] More recently, the company has supported the development of methane regulation in the EU through the Methane Guiding Principles Group. As a member of the Oil and Gas Climate Initiative (OGCI) – a voluntary industry initiative bringing together companies that support the Paris Agreement objectives – Equinor adopted a voluntary target to reduce the methane intensity of its upstream oil and gas operations to below 0.25% by 2025 compared to 2017 levels, aiming to achieve 0.20%. Achieving these objectives would mean reductions of a fifth and a third respectively.[36]

Investment in renewable energy

The company aims to gradually complement its oil and gas assets with renewable energy projects. In 2016, a separate business area, New Energy Solutions, was established together with a corporate venture fund, Equinor Energy Ventures.[37] So far, Equinor has invested USD 200 million in energy start-ups and other innovative entities active in the renewables market such as ChargePint (an electric vehicle charging network operator), Fos4X (a software development specialist for wind turbine optimisation), Oxford PV (a solar technology company) and energy storage companies such as Volta Energy Technologies, to name but a few.

Over the course of the last few years, the company has mostly invested in offshore wind projects: Sheringham Shoal with a total installed capacity of 317 MW and Dudgeon (402 MW) in England, Hywind Scotland (30 MW), and the Arkona offshore wind farm in Germany (385 MW).[38] In 2019, Equinor purchased three offshore wind development projects in Poland: Bałtyk I, II and III, with a potential capacity of over 2,500 MW. It is

35 L. Karagiannopoulos, Equinor sells its assets at U. S. Eagle Ford to Repsol for $325 million, „Reuters" [online], 7 XI 2019 [accessed: 10 V 2020, available at: <https://www.reuters.com/article/us-equinor-usa-divestiture-repsol/equinor-sells-its-assets-at-u-s-eagle-ford-to-repsol-for-325-million-idUSKBN1XH2S9>.

36 For more information, see: <https://oilandgasclimateinitiative.com/> [accessed: 22 V 2020].

37 Equinor [online, accessed: 16 V 2020] available at: <https://www.equinor.com/en/what-we-do/new-energy-solutions/equinor-energy-ventures.html>.

38 Equinor sold a 25% ownership interest in the Arkona offshore wind farm to funds advised by Credit Suisse Energy Infrastructure Partners AG in October 2019.

investing in solar energy. In 2019 it acquired 5.2% of the shares of Scatec Solar and it has a few projects in South America, mainly in Brazil and Argentina.

Investment in renewables is an important element of Equinor's new strategy and image. The company plans to increase its installed renewables capacity to between 4 and 6 GW by 2026 from 0.75 GW in 2019 (1.3 GW total capacity) and to 12–16 GW by 2035. However, the target is conditional on the emergence of attractive investment opportunities.

Equinor plans to become a global offshore wind major thanks to its recent investments in the UK (Dogger Bank) and the US (Empire Wind). It is planning to leverage its experience in the operation of offshore projects and to commercialise floating wind solutions by 2030.

Investment in low-carbon technologies (hydrogen and CCS)

CCS is an important element not only in Equinor's strategy but also in the Norwegian climate strategy. Equinor has been investing in this technology since the mid-1990s and has contributed to the creation of a major CO_2 capture testing facility: the Technology Centre Mongstad. It is also continuing cooperation with Shell and Total on Northern Lights, enabling 1.5 mln tons of CO_2 to be stored a year from various onshore industries. If the project receives a positive final investment decision from the Norwegian government in 2020, it is expected to be operational in 2024.[39]

In contrast to CCS, hydrogen is a relatively new contribution to Equinor's corporate strategy. The company is aiming to combine the production of hydrogen from natural gas with CCS – so-called blue hydrogen – and it is already implementing some demonstration projects, for instance, the Magnum power plant together with Vattenfall and Gasunie, and the H-vision blue project in Rotterdam.[40]

39 R. Bousso, V. Klesty, *Equinor-led group approves major Norwegian CO2 storage project*, „Reuters" [online] 15 V 2020 [accessed: 17 V 2020], available at: <https://af.reuters.com/article/commoditiesNews/idAFL8N2CX5IK>.

40 Equinor [online, accessed: 22 V 2020], available at: <https://www.equinor.com/en/what-we-do/hydrogen.html>.

Gazprom

The origins of the Public Joint Stock Company Gazprom date back to 1989, when the Gazprom Gas Concern was created as Russia's first state-corporate enterprise. In 1993, the company was reorganised as the Russian Joint Stock Company Gazprom.[41] Initially owned by the Russian state, it was privatised in the 1990s and nationalised in the 2000s. The Russian government is currently the controlling shareholder with 50.23% owned by the Federal Agency for State Property Management and Rosneftegaz.[42] In 2005, a 20% restriction on foreign investment in the company was lifted. The company is listed on the Moscow Exchange and has been led by Deputy Chairman of the Board of Directors and Chairman of the Management Committee (CEO) Alexey Miller since 2001. Previously, Mr Miller served as the Deputy Energy Minister of the Russian Federation.

Gazprom is mainly known as a major natural gas producer and exporter. It accounts for roughly 11% of global gas production and owns the world's largest natural gas reserves (about 16% of global gas reserves) and the world's largest gas transmission system, with a combined length of pipelines of 175.4 thousand km.[43] Gazprom accounts for roughly 70% of Russian gas production. It is a vertically integrated company and it enjoyed a natural gas export monopoly (pipeline and LNG), which was confirmed by the 2006 Federal law 'On Gas Exports'. The export monopoly was broken in 2013 as a result of the growing importance of the Novatek and Yamal LNG project.[44] Gazprom is also a leading gas distributor and in recent years has been promoting the use of natural gas in transport. It is also one of the top four oil producers in the Russian Federation and a power and thermal energy producer.

41 Gazprom: Company history in brief [online, accessed: 25 V 2020], available at: <https://www.gazprom.com/about/history/company/>.

42 Gazprom: equity capital structure [online, accessed: 25 V 2020], available at: <https://www.gazprom.com/investors/stock/structure/>.

43 Management Report for 2019, PJSC Gazprom [online, accessed: 17 V 2020], available at: <https://www.gazprom.com/f/posts/72/802627/2019-mgt-report-en.pdf>.

44 J. Henderson, V. Yermakov, *Russian LNG: Becoming a Global Force*, „OIES Paper": NG 154, November 2019, p. 17–20.

As in Norway, the oil and gas sector plays a significant role in the Russian economy.[45] The revenue from taxation related to oil and gas extraction and exports accounts for between 36% and 51% of Russia's federal budget.[46]

The business environment and Gazprom's corporate strategy

One of the key energy trends mentioned in the Gazprom's 2019 Annual Report is the increase in natural gas consumption, especially in developing economies in Asia. This region is expected to replace the EU as the major natural gas importer by 2040, with a significant role being played by China. 'The importance of environmental matters' is considered as another important factor leading to the fast increase in the consumption of renewables and natural gas, which are expected to account for over 80% of total energy consumption globally.[47]

The expected increase in gas consumption will be driven by: growth in the global economy and global population; the environmental benefits of natural gas as a low-carbon alternative to other fuels; greater flexibility and dispatchability of natural-gas-fired power plants, which can better complement the various renewable sources; and decarbonisation of the transport sector through the use of natural gas.

Another trend identified in the 2019 Annual Report is a widening gap between domestic natural gas production and consumption in Europe, together with expected growth in Europe's gas demand. On the other hand, the global LNG trade is expected to flourish, with Asia-Pacific having a key role, and China in particular. This country imported over 133 bcm of natural gas in 2019.[48]

Despite earlier predictions concerning the increase in gas consumption in Russia, consumption decreased by 2.5% between 2018 and 2019 and reached 481 bcm.[49]

45 M. Bradshaw, T. Van de Graaf, R. Connolly, *Preparing for the New Oil Order? Saudi Arabia and Russia*, „Energy Strategy Reviews" 2019, vol. 26: 100374, p. 1–12.

46 T. Mitrova et al., *Global Climatic Threat and Russian Economy: Searching for the Way*, „SKOLKOVO Energy Center Report", May 2020, p. 51.

47 PJSC Gazprom Annual Report 2019 [online, accessed: 15 X 2020] available at: <https://www.gazprom.com/f/posts/72/802627/gazprom-annual-report-2019-en.pdf>.

48 Ibidem, p. 60–61.

49 Ibidem.

The 2019 Annual Report identifies the following priorities in the gas business: to uphold its leadership among global oil and gas companies by diversifying sales markets and 'forms of distribution', by securing reliable gas supplies to its customers; increasing the efficiency and scale of its operations; and by growing the company's potential in R&D and human resources. The list of priorities includes the realisation of a joint project with AO RusGazDobycha to construct a gas processing complex with an annual capacity of 45 bln cubic metres and a liquefaction plant in the vicinity of Ust Luga seaport.

More efficient and sustainable oil and gas operations (methane emissions)

Gazprom's GHG objectives are in line with the national goal of reducing emissions to 75% of their 1990 levels. The company seeks to achieve this, *inter alia*, through its Energy Saving and Energy Efficiency Programme (saving at least 28.2 million tons of oil equivalent from 2011 to 2020) and a reduction of its gas consumption by at least 11.4% and GHG emissions by at least 48.6 million tons of CO_2 equivalent.[50]

In 2018, both Gazprom and Rosneft signed the Guiding Principles on Reducing Methane Emissions across the Natural Gas Value Chain, joining a group of companies such as BP, Shell and Equinor.[51] However, it should be noted that, in contrast to those companies, Gazprom remains a rather inactive member of the Methane Guiding Principles Group. The main objective of this initiative is to reduce methane emissions arising along the natural gas value chain by acting in the following areas: a continual reduction in methane emissions; a strong performance across the gas supply chain; improved accuracy of methane emission data; and advocating for sound policy and regulations and increased transparency.

According to data provided by Gazprom, the company has decreased its methane emissions thanks to reduced leaks from operation processes and the prevention of natural gas bleeding during pipeline repair works. Other targets relate to GHG accounting, reducing associated petroleum gas flaring, energy-saving activities, including the use of alternative energy

50 E. Shojaeddini et al., *Oil and Gas Company Strategies...*, p. 11.

51 Methane Guiding Principles [online, accessed: 11 V 2020], available at: <https://methaneguidingprinciples.org/>.

sources, and natural gas vehicle (NGV) fuel market development. In 2018, Gazprom Neft achieved a 78.32% associated petroleum gas (APG) use level and set a target to increase the level of APG use to 95% in 2020 for projects with a developed gas infrastructure and 2022 for the whole Gazprom Neft Group, including the new assets. The 95% utilisation target has been specified in binding Russian methane regulations.

According to the IEA Methane Tracker data, the Russian oil and gas industry's estimated total methane emissions in 2019 accounted for 12.361 kt (12.36 Mt), that is 15.2% of global emissions. Almost twice as much as the national estimate submitted to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat (6674 kt in 2017) via the National Inventory Report.[52] The World Bank estimates that the volume of flared gas in Russia increased by 3 bcm between 2014 and 2018. As a result, Russia remains the top flaring country in the world.[53]

The numbers reported by Gazprom are much lower – 0.02% for production, 0.29% for transmission and 0.03% for underground storage.[54] This casts doubt on the accuracy of both the company's and national methane estimates in Russia, as well as the effectiveness of the company's individual targets in reducing methane emissions from the oil and gas facilities it operates.

Investment in renewable energy

In the company's strategy, renewable energy is perceived as a risk rather than an opportunity. In contrast to Equinor, the company is not planning to invest in renewable energy projects, apart from ones located in Russia. Gazprom's renewable energy investment is at the same level as secondary sources of energy, such as turbo expanders. Hydropower has been the main source of renewable electricity. Between 2015 and 2018, renewable energy

52 Methane Tracker 2020 Interactive country and regional estimates, International Energy Agency [online, accessed: 17 V 2020], available at: <https://www.iea.org/reports/methane-tracker-2020/interactive-country-and-regional-estimates#abstract>.

53 *Global Gas Flaring Reduction Partnership*, the World Bank data [online, accessed: 16 V 2020], available at: <https://www.worldbank.org/en/programs/gasflaringreduction#7>.

54 Gazprom PJSC response to Public consultations on the EU methane strategy [online, accessed: 18 X 2020], available at: <https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12504-EU-Methane-Strategy/F541028>.

source investments at PJSC Gazprom's facilities were close to RUB 43 million, which accounted for just 2.39% of all capital expenditure in 2018 (RUB 1.795.9 bn). In 2018, Gazprom owned a total of 1.529 solar, wind and hydropower units.

Investment in low-carbon technologies (hydrogen and CCS)

Gazprom's strategy concerning hydrogen is only directed towards the EU market. In June 2018, Gazprom presented a three-stage scenario for the decarbonisation of the EU economy in line with the Paris Agreement objectives. Stage 1 foresees emission reduction through coal-to-gas switching in power production and oil-to-gas switching in transport. Stage 2 foresees the use of a mixture of methane and hydrogen produced from natural gas in the energy and transport sectors, and the last stage focuses on a full switch to hydrogen with emission reduction potential of up to 80% by 2050 through cracking and cold plasma pyrolysis.[55] The most viable option seems to be to produce low-carbon hydrogen (turquoise hydrogen) through pyrolysis. The document does not mention any plans related to the development of CCS.

Two companies, two strategies: key similarities and differences

The companies differ in their assessment of the business environment and global energy trends. While Equinor highlights a global economic slowdown and political tensions which could impact oil and gas demand and lead to more volatile prices, Gazprom relies on the IEA's predictions of a growing demand for natural gas as a low-carbon alternative to coal and oil, especially in developing economies in Asia.

As a result, the companies are adopting diverging strategies. Gazprom is planning an expansion of its gas infrastructure to Asia (Power of Siberia and Power of Siberia 2), which, on the one hand, may indicate an interest in this emerging natural gas region, and on the other, Gazprom's understanding is the demand for natural gas in Europe is likely to decrease over

55 Blue fuel, Special focus: Climate Pathways to 2050, Gazprom Export Global Newsletter 2018, issue 49 [online, accessed: 13 V 2020], available at: <http://www.gazpromexport.ru/files/BLUE_FUEL_49325.pdf>.

time. In contrast to the geographical diversification pursued by Gazprom, Equinor is proposing a pragmatic portfolio diversification based on divestment of some oil and gas assets and investment in the most promising ones, for example Vaca Muerta in Argentina.

At the same time, Equinor is implementing a strategy to become an energy company with a gradual increase in renewable energy investment, mainly wind and solar. Investment in wind, and offshore wind in particular, is perceived as a way to gain a competitive advantage by using its expertise in operating offshore fields. In contrast, Gazprom perceives the increase in renewable energy as a risk due to competition with natural gas in power generation, yet it has been integrating rising shares of renewable energy in its operations, mainly hydropower.

Despite these differences, there are also some common elements in their strategies. First, both companies treat methane emissions from their operations as a significant challenge and a continual abatement of methane leaks features as a significant element in their strategies. Both companies set specific targets and aim to reduce all types of methane releases, including emissions from flaring. Moreover, Gazprom and Equinor are the Methane Guiding Principles (MGP) members.

Another similarity is that both companies consider hydrogen to be a potential business opportunity. Both companies invest or plan to invest in blue hydrogen projects using CCS (Equinor) and other low-carbon processes such as pyrolysis (Gazprom). It should be noted that the European Commission perceives green hydrogen produced from renewable electricity as the key energy vector in the future EU energy system, and it expects blue hydrogen to play a limited role.[56] This suggests a divergence between the EU Commission's expectations and the companies' perceptions of business opportunities as green hydrogen is more expensive to produce and transport than blue hydrogen. This observation confirms the finding[57] that oil and gas companies are moving towards areas that are linked with their current operations or in which they already have a competitive advantage –

56 FSR webinar on decarbonised hydrogen from natural gas [online], 15 IV 2020 [accessed: 22 V 2020], available at: <https://fsr.eui.eu/event/very-low-decarbonised-hydrogen-from-natural-gas/>.

57 M. Zhong, M. D. Bazilian, *Contours of the Energy Transition…*

for example, Equinor investing in offshore and floating wind projects – yet they are unwilling to invest in technologies which are far from their core business activities. The same holds true for Gazprom.

Discussion and the way forward

A transition to a net-zero energy system will not be possible without the involvement of the world's major energy companies, including the EU's natural gas suppliers – Equinor and Gazprom.[58] Therefore, we can expect that those companies will remain significant EU energy providers even in 2050. However, what is uncertain is the type of energy commodity they will be exporting to the EU. The most likely scenarios are: to continue to supply natural gas, which could be then transformed into blue hydrogen in the EU; to produce low-carbon or decarbonised hydrogen with CCS or via pyrolysis (turquoise hydrogen) and transport it to Europe in a separate hydrogen network; or mixing hydrogen with natural gas and transporting it in the natural gas pipelines.

However, those scenarios may be undermined by the reservations about blue hydrogen of some EU member states, especially Germany, which considers only renewable hydrogen to be sustainable in the long term. The EU Hydrogen Strategy assumes that blue hydrogen will play a role, especially in the short to mid-term, but will not provide the funding to retrofit existing plants to produce hydrogen from fossil fuels, leaving the decision up to member states or the private sector.[59]

Future developments will be influenced by two factors: the economics of green hydrogen vs blue hydrogen and national policies. In his recent article, Michael Liebreich highlights four factors influencing the cost of green hydrogen: the cost of renewable electricity; the capacity factor at which plants run; the cost of electrolysers; and the cost of capital.[60] Liebreich concludes that it is likely that by 2030 green hydrogen will be competitive with blue hydro-

58 *The Oil and Gas Industry in Energy Transitions…*

59 More information on the EU Hydrogen Strategy is provided in the later part of this paper.

60 M. Liebreich, *Separating Hype from Hydrogen – Part One: The Supply Side*, „Bloomber NEF" [online], 8 X 2020 [accessed: 17 X 2020], available at: <https://about.bnef.com/blog/liebreich-separating-hype-from-hydrogen-part-one-the-supply-side/>.

gen and quite close to being competitive with fossil fuel-based hydrogen. But much of the hydrogen consumed in Europe is likely to imported from countries able to produce it at a lower cost (Morocco, Australia) and, even if produced in Europe, 'it will probably not be made using European electrolysers, and certainly not using exclusively European renewable power'.[61]

The policy and regulatory framework, and more specifically the financial support accompanying the policies, will have a substantial impact on the cost of green hydrogen production. In July 2020, the EU Commission adopted the EU Strategy for Energy System Integration[62] and the Hydrogen Strategy for a Climate-Neutral Europe,[63] laying out a detailed programme for the production and distribution of green hydrogen.

The plan foresees the increase of electrolyser capacity in the EU from 60 MW to 6 GW by 2024 and to 40 GW by 2030, which will cost between EUR 24 and 42 billion. This adds up to EUR 220–340 billion on 80–120 GW of additional solar and wind generation; EUR 11 billion to retrofit half of the existing fossil fuel-based hydrogen plants with carbon capture and storage; and EUR 65 billion for hydrogen transport infrastructure. The total of between EUR 320 billion and 458 billion will be partly financed by the funding available in the EU's long-term budget combined with the Next Generation EU recovery package, that is EUR 1824.3 billion.[64] Yet, only part of this amount will be spent on hydrogen.

In contrast to the EU, hydrogen is not a priority in Russian energy policy. Discussions are still at an early stage and the first draft of the road map for the development of hydrogen energy in 2020–2024 was recently adopted. Russia has the potential to produce low-carbon hydrogen cost-effectively,

61 Ibidem.

62 Communication from The Commission to the European Parliament, the European Council, the European Economic and Social Committee, the Committee of the Regions Powering a climate-neutral economy: An EU Strategy for Energy System Integration. Brussels, 08.07.2020. COM(2020) 299 final.

63 Communication from The Commission to the European Parliament, the European Council, the European Economic and Social Committee, the Committee of the Regions A hydrogen strategy for a climate-neutral Europe. Brussels, 08.07.2020. COM(2020) 301 final.

64 The Council of the European Union [online], 10 XI 2020 [accessed: 13 XI 2020], available at: <https://www.consilium.europa.eu/en/policies/the-eu-budget/long-term-eu-budget-2021-2027/>.

yet the key hurdle 'is posed by the absence of significant genuine interest from the central authorities in challenges related to global climate change; this translates into very limited regulatory and funding activity'.[65] It cannot be ruled out that Russia may become more favourable towards low-carbon technologies enabling Russian energy companies to keep their position in export markets. Otherwise, the Russian government may risk a decline in national budget revenues.

Gazprom, in particular, could benefit from this change in the Russian government's stance. As the future of the Nord Stream 2 project is uncertain, Gazprom may be more willing to look for other opportunities to maintain its position in the EU market, and blue hydrogen is certainly one of these. However, the success of this strategy depends on the degree of support from the national government and on the ability of the company to demonstrate credibly that it has methane emissions from its oil and gas operations under control.

Norway unveiled its hydrogen strategy in early June 2020, one month prior to the publication of the EU strategy.[66] The Norwegian strategy foresees the production of both green hydrogen via water electrolysis using renewable electricity and from natural gas with CO_2 handling. Technology maturity and high costs are defined as key barriers, therefore the strategy foresees substantial financial support for research, demonstration and development projects. Other important instruments include the Emissions Trading System and taxes – flat CO_2 tax will be increased by 5% every year for all sectors by 2025. Hydrogen produced in Norway is expected to be mainly used in the maritime sector, heavy transport and industry.

The strategy does not foresee the export of natural gas-based hydrogen on a large scale. It is possible in the longer term, yet depends on three factors: more stringent GHG requirements, demand, and the willingness of potential customers to pay for blue hydrogen.

65 S. Kardaś, *W oczekiwaniu na rosyjską strategię wodorową*, Ośrodek Studiów Wschodnich. Komentarze, nr 344 [online], 2 VII 2020 [accessed: 17 X 2020], available at: <https://www.osw.waw.pl/pl/publikacje/komentarze-osw/2020-07-22/w-oczekiwaniu-na-rosyjska-strategie-wodorowa>.

66 The Norwegian Government's hydrogen strategy towards a low emission society, [online], 3 VI 2020 [accessed: 17 X 2020], available at: <https://www.regjeringen.no/contentassets/8ffd54808d7e42e8bce81340b13b6b7d/hydrogenstrategien-engelsk.pdf>.

The variant in which Norwegian natural gas plays a role in the EU's hydrogen strategy is considered as more realistic. The document stipulates that '[t]he Norwegian authorities will work to ensure that natural gas reforming combined with CCS can compete on equal terms with hydrogen from water electrolysis in the European energy market'.[67] Despite it being technically possible to export hydrogen produced in Norway – both blue and green – due to the higher transport costs per unit of energy, it will 'be more effective to produce hydrogen close to the end users rather than in Norway'. The strategy concludes that '[m]ixing hydrogen in the gas pipeline network and establishing production close to users in Europe is currently the more rational approach'.[68]

Conclusions

The transition towards a net-zero energy system is accelerating, particularly in the EU. Such a transition is impossible without the major energy companies being on board, therefore the success of clean energy transition depends to a large degree on the ability of these companies to transform their current business models. Despite gradual portfolio diversification towards renewables, particularly offshore wind and solar photovoltaic undertaken by Equinor, traditional fossil fuel companies are more inclined to move towards areas where they have more experience and a competitive advantage. Therefore, we can expect further investment in efficient and more sustainable oil and gas operations to reduce methane emissions and the production of low-carbon hydrogen from natural gas with CCS.

An alternative strategy, already pursued by Gazprom and supported by the national energy strategy,[69] is based on geographical diversification towards regions with growing natural gas demand to balance out the risks related to declining natural gas demand in Europe. The pivot to China

67 Ibidem, p. 48.

68 Ibidem, p. 49.

69 S. Kardaś, *Nowa strategia energetyczna Rosji – optymistyczne plany w niepewnych czasach*, Ośrodek Studiów Wschodnich. Komentarze, nr 325 [online], 15 IV 2020 [accessed: 8 V 2020], available at: <https://www.osw.waw.pl/sites/default/files/komentarze_325.pdf>.

seems to be a way forward, taking into account the recent declaration that the country aims to reach carbon neutrality by 2060.

The strategies of Equinor and Gazprom are, and will be, highly influenced by national policy-makers, which will play a decisive role in the creation of regulatory frameworks, enabling different technologies, such as the production of hydrogen, both green and blue, to mature. The timing of these policies is equally important. The decisions taken by the policy-makers within the next 10 years in response to the COVID-19 pandemic offer an enormous opportunity to accelerate transition towards a clean energy system, both in the European Union and in the major natural gas exporting countries to the EU.[70]

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70 International Energy Agency, World Energy Outlook 2020 [online], Oct. 2020 [accessed: 18 X 2020], available at: <https://www.iea.org/reports/world-energy-outlook-2020>.

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