

ALEKSANDRA NOCOŃ¹

Towards climate neutrality in mining and energy companies in Poland – an approach to their financing

Introduction

The consequences of climate change are now being experienced all over the world. Extreme weather phenomena, such as droughts, heatwaves, heavy downpours, storms, floods and hurricanes are being observed increasingly often. Another visible result of the changing climate is rising sea levels, melting glaciers, ocean acidification and biodiversity loss. The growing awareness of the need to neutralize the climate favors actions of national governments, international organizations and individual economic entities for the protection of the natural environment. At the same time, it is emphasized that without quick and decisive initiatives, life on some parts of the planet will soon become impossible. The main aim of the article is to identify activities aimed at neutralizing the impact of mining and energy companies in Poland on climate and to assess the approach of commercial banks in Poland towards financing their activities for climate neutrality. The article verifies the

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research hypothesis stating that commercial banks in Poland support the financing of activities conducive to achieving climate neutrality by companies from mining and energy industries.

The contribution of the paper is an analysis of the approach of commercial banks in Poland to finance and support companies moving towards climate neutrality as well as the assessment of the current involvement of the largest mining and energy companies in Poland in defining the assumptions of climate policy. The first part of the article presents the results of broad international literature studies on the concept of climate neutrality and the legal framework implemented in recent years to achieve it. In the following section, the methodology of the empirical research is characterized. The third part of the study presents the results of our own three-stage research, which presents the scale of greenhouse gas emissions in Poland against the background of European Union countries, activities of the largest Polish companies in the mining and energy industry for climate neutrality and the results of a questionnaire survey aimed at assessing the approach of commercial banks in Poland to finance initiatives aimed at climate neutrality. The study ends with the discussion and conclusions section, which summarizes all the undertaken theoretical and empirical considerations. The study shows that the mining and energy industry in Poland is aware of the need to implement quick actions to reduce their negative impact on the environment and to achieve climate neutrality by 2050. Moreover, it has been proven that the banking sector in Poland is open to finance socially responsible investments (SRI) supporting activities for climate neutrality. The following research methods were used in the article: literature studies, document analysis, secondary data analysis, case study, questionnaire survey and a synthesis method.

1. Literature review

The first United Nations Conference on the Human Environment was held in June 1972 in Stockholm, Sweden, where the need to protect environment and natural resources around the world was significantly highlighted ([United Nations 1972](#); [United Nations...](#)). Since then, there has been a lot of discussion and debate about the human impact on the environment, especially in the context of climate change, the degradation of natural resources and the use of fossil fuels. The careless use of fossil fuels in industry and transport has resulted in greenhouse-gas (GHG) emissions, which have led to global warming. Excessive amounts of CO₂ and other greenhouse gases in the atmosphere intensify the greenhouse effect, which has a negative impact on human and animal life and causes the loss of valuable environmental resources.

Against this background, the concept of climate neutrality was born as an action that can stop irreversible climate change and save the earth as a planet and man as its inhabitant. There are many publications and reports dealing with the issue of climate neutrality ([INFCCC 2021](#); [New Climate Institute 2020b](#); [United Nations 2022](#); [Alibaba Group 2021](#)). These studies identify the concept of climate neutrality and indicate the necessary actions

that may contribute to its achievement. The United Nations Framework Convention on Climate Change (UNFCCC) (UNFCCC 2021) defined climate neutrality as achieving a balance between emissions and the removal of GHGs from the atmosphere. At the level of the stakeholder (individual, company, organization, country etc.), climate neutrality is a state where GHG emissions are reduced or avoided and the remaining emissions are compensated for with carbon credits from projects that capture GHGs in the long term. The Intergovernmental Panel on Climate Change (IPCC) (IPCC 2018) stated that climate neutrality is the concept of a state in which human activities result in no net effect on the climate system. This means that anthropogenic emissions of GHGs are balanced by anthropogenic removals over a certain period. Ahammad (Ahammad 2012) pointed out that climate neutrality refers to activities, commitments and behaviors that do not emit greenhouse gases and do not lead to global warming and a variety of environmental threats. Thus, it is all socially and climate-responsible activities.

The other approach states that climate neutrality is related to carbon neutrality (Kong and Wang 2022; Zhang et al. 2021). Carbon neutrality is a balance between sources and sinks of carbon dioxide emissions (CO₂). Removals are referred to as negative emissions. If anthropogenic emissions to the atmosphere are balanced by anthropogenic removals over a specific period, emissions are net zero (IPCC 2018). Therefore, climate or carbon neutrality targets are also referred to as ‘net zero targets’. A zero emissions target (without the term “net”) implies that actual (gross) emissions go to zero and there will be no residual emissions that must be compensated for.

Currently, over a hundred countries and approximately 800 companies worldwide are considering the climate neutrality target (New Climate Institute 2020a; Wiese et al. 2022; Huovila et al. 2022). However, the scope of the climate neutrality objectives of individual countries and companies varies. The countries’ climate neutrality targets generally include the reduction of total greenhouse-gas emissions, which are required to be reported in accordance with the United Nations Framework on Climate Change (UNFCCC) and the Paris Agreement Article 7a (UNFCCC 2015). The Intergovernmental Panel on Climate Change (IPCC) has published guidance on how to estimate these emissions for different gases and sectors (IPCC 2021). Most countries around the world have climate neutrality targets that cover all greenhouse gases. However, some of them take into account only CO₂ emissions (e.g. Finland) (Government of Finland 2019), while New Zealand does not include methane emissions from agriculture and waste (Government of New Zealand 2019). Generally, each country states that they will try to achieve climate neutrality by 2050, which is in line with international guidelines for climate protection. However, some of the climate-friendly countries will try to do this earlier. Sweden aims to achieve carbon neutrality by 2045. In turn, the Norwegian parliament has adopted a resolution that Norway will become CO₂ neutral by 2035. Nowadays, not only states, but also socially responsible enterprises set their own climate neutrality objectives. In 2019, Siemens, RWE, and Volkswagen defined their carbon neutrality targets, which are to be achieved by 2030, 2040 and 2050, respectively. Many global as well as local companies followed their lead.

Climate neutrality, also called carbon neutrality or net zero emissions, refers to the balance between CO₂ emissions and the absorption of CO₂ from the atmosphere into so-called carbon dioxide sinks (Liu et al. 2022; Client Earth 2020). At the present stage, achieving climate neutrality requires balancing greenhouse-gas emissions by carbon dioxide sinks. A carbon sink is any system that absorbs more carbon dioxide than it emits. Natural carbon sinks are soil, forests and oceans. According to estimates presented in the European Parliament report, natural sinks remove approximately 9.5–11 gigatons of CO₂ annually, while the annual CO₂ emission in 2019 was equal to thirty-eight gigatons (European Parliament 2018). This is why so far no man-made carbon sinks can remove excess CO₂ from the atmosphere in order to stop global warming. Moreover, in the event of forest fires or deforestation, carbon dioxide absorbed by natural sinks is released back into the atmosphere. Therefore, the main emphasis is on reducing CO₂ emissions. One way to reduce emissions is to offset the CO₂ emitted in one sector by reducing it in another. This is done by investing in renewable energy, energy efficiency or other clean, low carbon technologies. For this purpose, the EU Emissions Trading System (ETS) was established (European Commission 2015). Its aim is to reduce carbon dioxide emissions from industry. The EU Emissions Trading System obliges power plants and factories located in the European Union to have a permit to emit each ton of CO₂. The permits can be purchased through an auction.

To achieve emission neutrality by the middle of the 21st century, it is necessary to limit the increase in the global average temperature to 1.5 degrees Celsius, which has been recognized as safe by the Intergovernmental Panel on Climate Change (IPCC). This goal was enshrined in the Paris Agreement signed, by ninety-five countries, including the European Union (UNFCCC 2015). This was a milestone that set the direction for further work towards climate neutrality in the world. The Paris Agreement indicated that in order to achieve this goal, the signatories need to undertake to rapidly reduce the global level of greenhouse-gas emissions (Guterres 2020).

Climate change and the progressive environmental degradation caused the European Commission to accelerate work on the EU concept of climate neutrality in line with the European Union's international obligations under the Paris Agreement. As a result, on December 11, 2019, the European Green Deal was announced, which is the implementation of European climate neutrality concept (European Council – *European Green Deal...*). In the communication from the Commission on the European Green Deal, a new EU Growth Strategy has been published. The strategy includes actions that have to be undertaken to transform Europe into a climate neutral, fair and prosperous society with a modern, resource-efficient and competitive economy (European Council – *European Green Deal...*). However, the European Green Deal requires a holistic approach, so all EU actions and policies need to participate in achieving these goals (Auer et al. 2022). Thus, all current policies relating to climate neutrality have been revised and adjusted to increase climate ambition (European Commission – *Climate neutrality...*). Nevertheless, special attention has been paid to the mining and energy sectors, those that have the greatest impact on climate change and the environment.

In December 2020, the European Council approved a new binding EU target to reduce national net greenhouse-gas emissions by at least 55% (up from the previous 40%) by 2030 compared to levels in 1990 (European Council 2020). After that, in June 2021, it adopted the European Climate Law which makes climate neutrality a legally binding target in EU legislation. European Climate Law also establishes a European Scientific Advisory Board on Climate Change, which will provide independent scientific advice and reports on the EU’s climate action (European Council – *Latest EU...*). In order to adjust selected areas to the new emission reduction target, on July 14, 2021, the European Commission published a package of legislative proposals, the so-called “Fit for 55%” package (European Economic and Social Committee 2022; European Council – *Fit for...*). The package is a set of proposals to revise and update EU legislation and to put in place new initiatives with the aim of ensuring that EU policies are in line with the climate goals agreed by the Council and the European Parliament. Fit for 55 refers to the EU’s target of reducing net greenhouse-gas emissions by at least 55% by 2030 (European Council – *Fit for...*).

However, transformation towards climate neutrality requires significant capital outlays. The main source of foreign financing for enterprises in the mining and energy sector are international financial institutions (e.g. the European Investment Bank), commercial banks and the issue of corporate bonds (European Commission 2011). Financial institutions play a significant role in financing almost every economic activity. However, taking into account the scale of the financial needs of production enterprises, including energy and mining industries, the importance of financing from a banking market is particularly important (Grieg-Gran 2002). A typical project in these industries has a long-term nature, requires investments in the range of 700 mln USD – 1 bln USD and generates a high level of risk; therefore, without financial sector support, its implementation would be almost impossible (Frolova et al. 2021). In addition, due to the European Parliament’s *Sustainable Finance Strategy* implemented in July 2021, over the coming decade, Europe will need an additional source of financing for investments aimed at climate and environmental targets. Their scale goes beyond the capacity of the public sector, thus banks have an extremely important role in supporting climate neutrality (European Parliament 2020).

The path to climate neutrality is different for each company. The Intergovernmental Panel on Climate Change (IPCC), the International Energy Agency (IEA), the German Energy

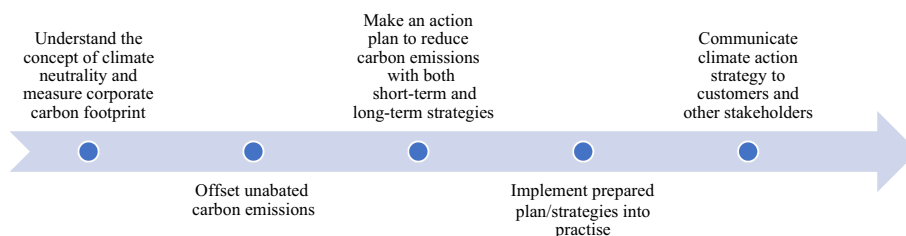


Fig. 1. Roadmap to climate neutrality
Source: own work based on cited literature

Rys. 1. Mapa drogowa do neutralności klimatycznej

Agency, and many other institutions or bodies have published reports, roadmaps or scenarios on actions necessary to meet the set target (see Figure 1) (Masson-Delmotte et al. 2019; IEA 2021; Jugel et al. 2021).

These are defined as a decarbonization pathway or a roadmap to neutrality. They include stages/steps that each entity needs to undertake towards achieving climate neutrality. The first step involves a company understanding the essence and importance of climate neutrality and its role in achieving the target as well as measuring the corporate carbon footprint generated by a company. The next step is to offset emissions by purchasing carbon credits, which invest in climate solutions such as clean energy and reforestation. It is not a target solution but is a decarbonization tool to tackle unavoidable emissions. The third step involves the creation of an action plan to define a further strategy to reduce emissions both in the short and long term. The fourth stage is the implementation of the strategy in practice, during which a company carries out operations and tasks included in the strategy. The last stage, carried out even during the performance of socially responsible activities, is communication to stakeholders about the actions taken for sustainable development.

Buettner (Buettner 2022) also states that the pace of environmental change indicates that actions should be taken sooner rather than later to keep the required action trajectory manageable and maintain the ability to meet the target. Analyzing the decarbonization paths in energy-intensive sectors, Nurdiawati and Urban (Nurdiawati and Urban 2021) emphasize that much research and work is focused on technology paths, while less on reforms that enable their implementation. Bauer (Bauer 2022) analyzed the paths to climate neutrality in four sectors with high emissions, even moving beyond direct emissions to also considering value-chain and end-consumers emissions. Bataille et al. (Bataille et al. 2018) presented an integrated transformation strategy in energy-intensive sectors. The conducted literature studies indicate that in recent years, an increased interest in the issue of climate neutrality has been observed. This applies both practical aspects and research studies undertaken in academic society. However, there is no comprehensive approach to this problem, as well as an assessment of the banking institutions' position to financing the transformation of enterprises in the mining and energy sectors. This is why the article makes a significant contribution to the current discussion and fills the identified research gap.

The increased level of climate ambition is not only about environmental benefits. They also help boost sustainable development, create new workplaces, provide health and environmental benefits to EU citizens, and contribute to the long-term global competitiveness of the EU economy by promoting green technology innovation (The European Council adopted... 2021).

2. Methodology

The empirical research was carried out in three stages. In the first stage, secondary data was analyzed, obtained from international databases, on the scale of greenhouse-gas emis-

sions in total and per capita in Poland compared to the other EU countries, as well as changes recorded in recent years in individual countries. This enabled the assessment of Poland's position on the international area with regard to the amount of greenhouse-gas emissions.

The second stage included a case study analysis of the targets and assumptions of the climate policies formulated and adopted by the largest mining and energy companies in Poland. The four biggest companies which represent mining and energy industry in Poland were analyzed. A comparative analysis was made, presenting the activities that the companies will implement by the end of the current decade (by 2030) and by 2050 (achieving climate neutrality).

In the third stage, a questionnaire survey among the representatives of the largest commercial banks in Poland was carried out. The main aim of this part of the research was the assessment of the banking institutions approach towards financing and supporting the activities of Polish enterprises in the implementation of climate policy targets. They allowed verification of the adopted research hypothesis stating that commercial banks in Poland support the financing of activities conducive to achieving climate neutrality by companies from mining and energy industries. The questionnaire survey was carried out among 129 respondents representing the ten largest commercial banks in Poland. The questions were developed using a 5-point Likert scale to obtain information on the degree of acceptance of a given statement by the respondents. Due to the limited scope of this study, the article presents only a part of the obtained results.

3. Results

3.1. The scale of greenhouse-gas emissions – Poland versus other EU countries

Poland was and still is one of the “infamous” leaders in greenhouse-gas emissions in Europe, next to the largest EU economies, such as Germany, Italy, Spain and France (see Figure 2). However, along with the growing awareness of the need to reduce the negative impact of CO₂ on the environment, in recent years, a reduction in greenhouse-gas emissions has been observed throughout Europe, including Poland. Despite this, the road to complete climate neutrality is still very long.

The Czech Republic is currently the largest CO₂ emitter among the European Union countries taking into account the value of greenhouse-gas emission per capita (see Table 1). The Netherlands, Poland and Estonia are also in the lead. Table 1 includes the EU countries with the highest emissions per capita. Interestingly, countries such as Finland and Ireland – considered as green, environmentally friendly countries – are also highly ranked. The economic sectors responsible for the majority of EU greenhouse-gas emissions are: production (23%), electricity supply (21%), as well as households and agriculture (14%) (Forsal 2022).

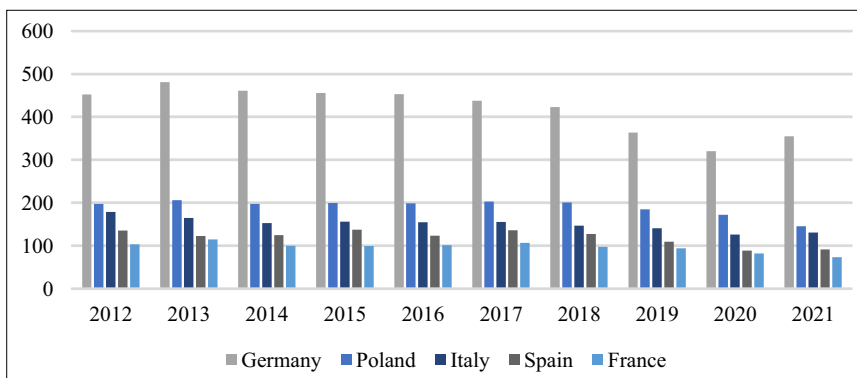


Fig. 2. Greenhouse-gas emissions in selected EU countries (in mln tones of CO₂ equivalent)
Source: own work based on European Environment Agency data

Rys. 2. Emisje gazów cieplarnianych w wybranych krajach UE (w mln ton ekwiwalentu CO₂)

Table 1. CO₂ per capita emissions in selected EU countries

Tabela 1. Emisje CO₂ per capita w wybranych krajach UE

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Czech Republic	11.16	10.90	10.52	10.06	9.83	9.89	10.05	10.11	9.95	9.43	8.21
Netherlands	10.88	10.05	9.81	9.78	9.33	9.69	9.71	9.55	9.32	8.98	8.06
Poland	8.74	8.72	8.55	8.45	8.15	8.24	8.54	8.90	8.89	8.43	7.92
Estonia	14.26	14.38	13.49	14.96	14.35	12.06	13.34	14.24	13.56	9.34	7.88
Germany	10.31	10.01	10.05	10.24	9.73	9.73	9.74	9.51	9.07	7.97	7.69
Finland	11.95	10.51	9.46	9.51	8.72	8.05	8.59	8.10	8.30	7.69	7.09
Ireland	9.18	8.30	8.30	8.08	7.98	8.32	8.55	8.23	8.13	7.63	6.75
Slovakia	7.11	7.03	6.63	6.55	6.19	6.33	6.41	6.61	6.61	6.19	5.63
Cyprus	7.28	6.92	6.40	5.75	6.03	6.00	6.30	6.38	6.17	6.12	5.38

* Carbon dioxide (CO₂) emissions from the burning of fossil fuels for energy and cement production; land-use change is not included.

Source: own work based on Our World in Data.

A positive aspect of not only the growing awareness but also real actions to stop climate change is the observed reduction of CO₂ emissions in most EU countries. In 2021, Poland came second in terms of reducing the volume of emissions by 15.4% compared to the previous year (see Figure 3). Only Croatia turned out to be better, where the reduction of CO₂

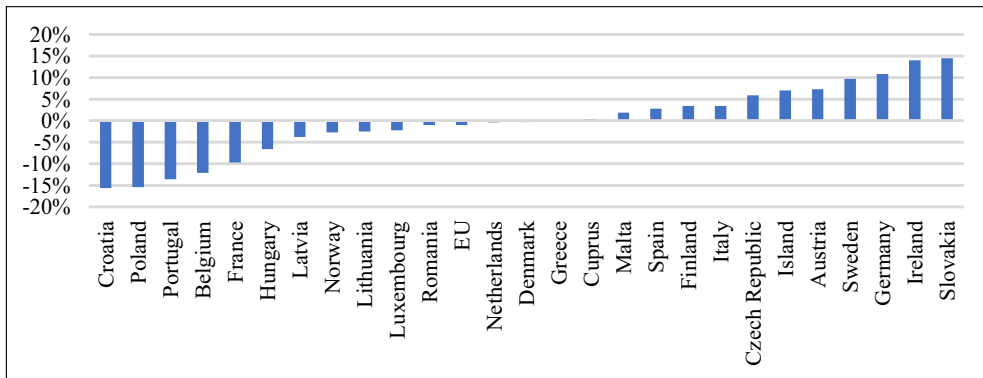


Fig. 3. Change in the volume of CO₂ emissions in the EU countries in 2021 compared to 2020 (in percent)
Source: own work based on Business Insider data

Rys. 3. Zmiana wielkości emisji CO₂ w krajach UE w 2021 r. w stosunku do 2020 r. (w proc.)

emissions amounted to 15.6%. It is also satisfying that the average for all EU countries has decreased too.

In turn, an increase in CO₂ emissions between 2020 and 2021 was recorded in twelve EU countries, including Slovakia, Ireland and Germany.

3.2. Climate policy assumptions of selected mining and energy companies in Poland – the case study

For companies in the mining and energy industry, achieving climate neutrality means a complete change in their business philosophy and existing business models. Nevertheless, they declare their readiness to act for the protection of the natural environment. The Transition Pathway Initiative report assessed the largest CO₂ emitters in the world in terms of climate risk management and their ‘carbon index’. The report shows that almost all companies perceive the risk of climate change and include it in their plans, but only 1/3 of them have a specific strategy for reducing carbon dioxide emissions adapted to the objectives of the Paris Agreement. In the energy, transport and industry sectors, this ratio is even lower, amounting to 1/5 (Dietz et al. 2022).

The conducted case study analysis of the largest Polish companies in the mining and energy industry shows that for the last few years, they have been implementing actions to reduce greenhouse-gas emissions. Some of them developed separate reports/strategies/documents dedicated to this issue, in which the assumptions and targets of the adopted climate policy were formulated and are conducive to achieving climate neutrality by 2050.

The JSW Group is the largest producer of high-quality hard coking coal in the European Union and one of the leading producers of coke used for smelting steel. The company,

Table 2. The climate policy assumptions of selected companies from the mining and energy industry in Poland

Tabela 2. Założenia polityki klimatycznej wybranych firm z branży wydobywczej i energetycznej w Polsce

Company	Climate neutrality targets	
	Targets by 2030	Targets by 2050
JSW Group	<p>Reduction of the carbon footprint by 30% compared to 2018, through:</p> <ul style="list-style-type: none"> ◆ searching for low-emission technological and process solutions ◆ optimization of energy consumption in operating activities ◆ increasing energy efficiency of production processes – machines and devices ◆ continuing the reduction of greenhouse-gas emissions ◆ reducing the carbon footprint of the organization and individual products – coal and coke 	<p>Climate neutrality, through:</p> <ul style="list-style-type: none"> ◆ continuing the reduction of methane emissions ◆ optimizing energy production and consumption ◆ participation in research on the development of new technologies – ventilation air methane (VAM), carbon capture, utilization and storage (CCUS), hydrogen production
KGHM Polska Miedz SA Group	<p>Reduction of emission by 30% – main directions of decarbonization:</p> <ol style="list-style-type: none"> 1. Reduction of indirect emissions, including: <ul style="list-style-type: none"> ◆ development of own zero and low-emission sources ◆ improvement of energy efficiency in production departments and streamlining of technological processes ◆ purchase of energy from RES under PPA contracts 2. Gradual reduction of direct emissions: <ul style="list-style-type: none"> ◆ hydrogen doping in technological processes ◆ first implementations in the field of electromobility 	<p>Climate neutrality – main directions of decarbonization:</p> <ol style="list-style-type: none"> 1. Total reduction of indirect emissions, including: <ul style="list-style-type: none"> ◆ electricity and heat only from zero and low-emission sources (own sources) 2. Maximum reduction of direct emissions: <ul style="list-style-type: none"> ◆ hydrogen technologies ◆ electromobility ◆ implementation of advanced technologies within the production line ◆ use of CCU and CCS technologies 3. Potential offset of other emissions
PGE Group	<p>Company transformation and production decarbonization through:</p> <ul style="list-style-type: none"> ◆ evolution of the generating portfolio towards renewable units ◆ no investment in new mining or coal generation and asset separation 	<p>Climate neutrality, through:</p> <ul style="list-style-type: none"> ◆ conversion of CHP plants for gas fuel and biomass ◆ shutdown of production based on natural gas in the power industry by 2042 at the latest ◆ use of new zero-emission mature technologies (e.g. green H2, SMR)

Climate neutrality targets	
Targets by 2030	Targets by 2050
<p>Reduction of CO₂ emissions by 78% by 2030 through:</p> <ul style="list-style-type: none"> ◆ striving to improve energy efficiency in order to reduce or not increase the use of fuels and energy ◆ reduction of greenhouse-gas emissions by applying the best technologies and practices ◆ gradual phasing out of anthropogenic sources of greenhouse-gas emissions from fossil fuels, through the development of renewable energy and zero and low-emission electricity generation technologies ◆ including global warming effects as an additional criterion for assessing new activities or investments ◆ building the energy infrastructure required to reduce emissions of energy systems ◆ active search for technical and organizational solutions that minimize the company's operational impact on climate change ◆ supporting clients in reducing energy consumption and energy management ◆ permanent monitoring of direct greenhouse-gas emissions from sources used by the company 	<p>Climate neutrality by continuing all actions undertaken to reduce CO₂ emissions</p>
Tauron Group	

Source: own work based on: JSW Group 2022; KGHM Polska Miedz SA 2021; PGE Group 2021; Tauron Group 2019.

meeting the guidelines for disclosing information on climate change, has been conducting the integrated reporting of all activities affecting the natural environment since 2017. In its strategy for 2022–2030, it defined the scope of investments for climate protection and the development of renewable energy. By 2030, its goal is to reduce the carbon footprint¹ by 30% compared to 2018 and to achieve climate neutrality by 2050 (see Table 2). In order to achieve the adopted targets, JSW will reduce greenhouse-gas emissions by maximizing the energy use of gas from the demethanation of mines. This will reduce methane emissions to the atmosphere. By 2030, the company will allocate over 4 bln PLN for these activities. In addition, since 2018, some of the mines owned by JSW have been implementing the “Economic use of methane” – an investment project aimed at increasing the yield of own energy and reducing methane emissions as well as a carbon footprint by 1.3 mln MgCO₂e by 2025 (JSW Group; JSW Group 2022).

KGHM Polska Miedź SA Group is one of the leaders in copper and silver production in Poland, which influences sustainable development worldwide. It also adopted a climate policy in which it assumes a reduction of direct and indirect emissions by 30% by 2030 (compared to 2020 level) and achieving climate neutrality of the parent company by 2050 (see Table 2). Direct emissions are related to the company’s production activities, in particular, emissions from metallurgical processes, emissions associated with the use of motor fuels by mining vehicles and machinery in mines and emissions related to the production of energy from own sources using natural gas. In turn, indirect emissions are related to the use of electricity and heat purchased on the market. A more detailed description of the targets set out in the climate policy is the KGHM Decarbonization Program, which defines the overall investment outlays related to the implementation of the reduction of greenhouse-gas emissions (KGHM Polska Miedź SA 2022).

PGE Group, the owner of the largest in Europe lignite mine Bełchatów and the Bełchatów power plant, sets the target to become a leader in sustainable energy transformation in Poland. Similarly to the previously analyzed enterprises, it wants to implement significant changes in the company’s functioning, investments in low and zero-emission energy sources as well as grid infrastructure by 2030, and then achieve climate neutrality in 2050 (see Table 2).

The Tauron Group declares that it is aware of a need for changes towards a green transformation and challenges resulting from new regulatory conditions as well as obligations in the field of activities aimed at stopping climate change. As a part of the “Green Return” project, which will be implemented until 2030 and will cost around 48 bln PLN, the company wants to reduce carbon-dioxide emissions by 78% (see Table 2). The biggest change will be the dynamic development of renewable energy sources, using sun, wind and water. Moreover, recognizing the value of the offshore wind-energy sector for the development of the

¹ The carbon footprint is the total sum of greenhouse-gas emissions during the full life cycle of a product (company). It is expressed as a carbon dioxide equivalent per functional unit of products (Co₂e/functional unit). It is a kind of ecological footprint.

Polish economy and increasing the country's energy security, Tauron along with PGE and Enea, will build offshore wind farms in the Polish Exclusive Economic Zone (Polish EEZ) in the Baltic Sea. All of these activities are expected to contribute to achieving the company's climate neutrality by 2050.

3.3. Banks and their support to finance climate policy targets in Poland

In recent years, there has been a trend among commercial banks in Poland towards greening their loan portfolio (Pyka and Nocoń 2021). Banking institutions are becoming increasingly aware of a need to finance projects implementing sustainable development objectives, which results in a growing offer of their “green” products supporting activities conducive to climate neutrality. The results of the conducted questionnaire survey indicated that 41.09% of the respondents noticed the growing pressure of banks to finance projects related to stopping climate change (Figure 4). In banks, as in non-financial institutions, a transformation that favors the achievement of ESG (*Environmental, Social and Corporate Governance*) goals is observed. Commercial banks in Poland declare that they will support the climate neutrality of Poland and Europe in line with the concept set out in the European Green Deal. Bank Ochrony Środowiska, one of the most “green” banking institutions in Poland, the activities of which contribute to environmental protection, was the first Polish bank which joined the global Science Based Targets initiative, which promotes activities aimed at climate protection, including halting temperature increase until 2100 and reducing carbon footprints.

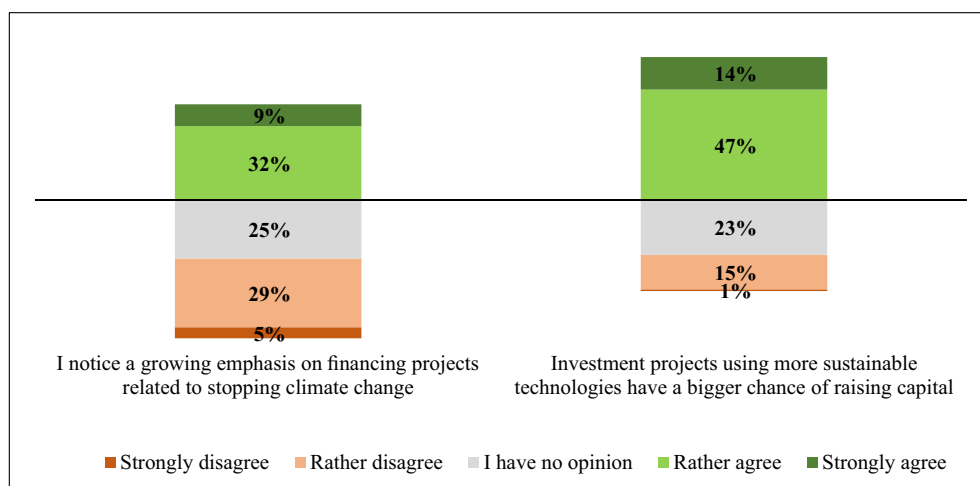


Fig. 4. Questionnaire survey results – Part 1

Source: own work

Rys. 4. Wyniki badania ankietowego – część 1

It is also satisfactory that, according to the empirical research, investment projects using more sustainable technologies have a greater chance of raising capital in commercial banks in Poland. This view is confirmed by 61.24% of respondents (see Figure 4). Only 15.50% of respondents are against it, while 23.26% did not have an opinion on this subject. This means that Polish banking institutions support the ongoing energy transformation aimed at achieving climate neutrality.

The conducted empirical research has also shown that banking institutions in Poland adjust to the European Investment Bank guidelines. In the opinion of 55.81% of the respondents, the bank they represent – in line with the EIB’s decision – limits financing of projects related to fossil fuels, mainly in the field of coal and oil (Figure 5). In this way, banks strive to become “green”, supporting the reduction of activities that have a harmful effect on the climate. Of all respondents, 22.48% are against this view, and 21.71% of them do not have an opinion on this matter. Additionally, the empirical research indicated that commercial banks in Poland adjust their loan offer to the new energy financing policy defined by the European Investment Bank. The new EIB energy lending policy is based on five principles ([European Parliament – *The European...*](#)):

- ◆ prioritizing energy efficiency to support the new EU target under the EU Energy Efficiency Directive;
- ◆ enabling the decarbonization of energy by stepping up support for low or zero-carbon technologies to achieve a 32% share of renewable energy across the EU by 2030;
- ◆ increasing financing for decentralized energy generation, innovative energy storage and electromobility;
- ◆ ensuring grid investments necessary for new renewable energy sources with unpredictable production characteristics, such as wind and solar energy, as well as strengthening cross-border interconnections;
- ◆ increasing the impact of investments on supporting energy transformation outside the EU.

According to 57.36% of respondents, commercial banks in Poland implement the above principles into their lending policy (Figure 5). Only 24.81% of them do not have an opinion on this matter, while only 17.83% of the respondents are against this view ([Pyka and Nocoń 2021](#)).

The obtained research results also show that the share of financing renewable energy projects by bank loans increases. Thus, banks’ lending activity supports the achievement of climate neutrality. This view is shared by 58.14% of respondents (see Figure 6). As a result, the process of the greening loan portfolio of commercial banks in Poland intensifies. For enterprises (borrowers), this may mean more preferential credit conditions which favor climate and energy goals, including lower interest rates, no commission, the possibility of deferring the repayment of the capital part of a loan, or zero commission for its early repayment.

A consequence of the ongoing process of the greening credit offer of commercial banks in Poland is changes in their financing policy. On the basis of the provisions included in the European Green Deal, the European Union has made a number of ambitious commit-

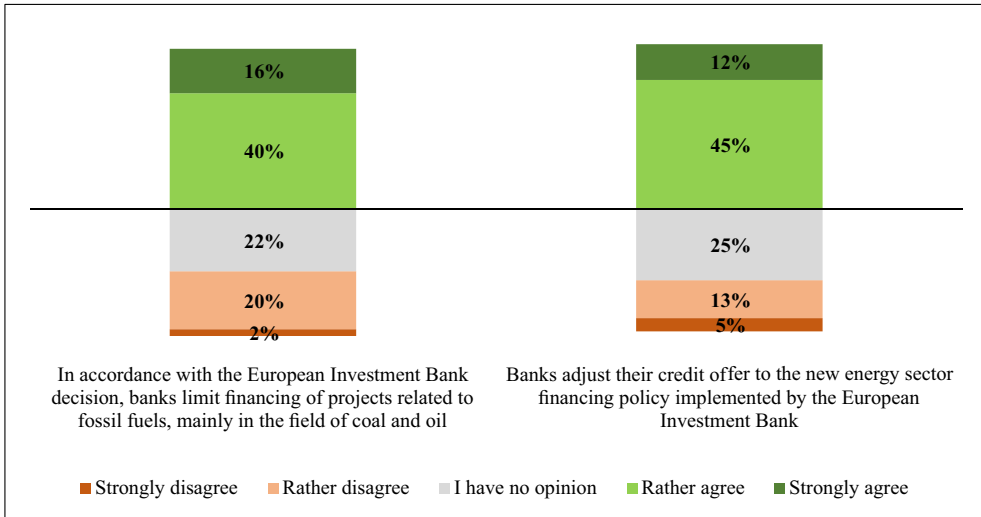


Fig. 5. Questionnaire survey results – Part 2

Source: own work

Rys. 5. Wyniki badania ankietowego – część 2

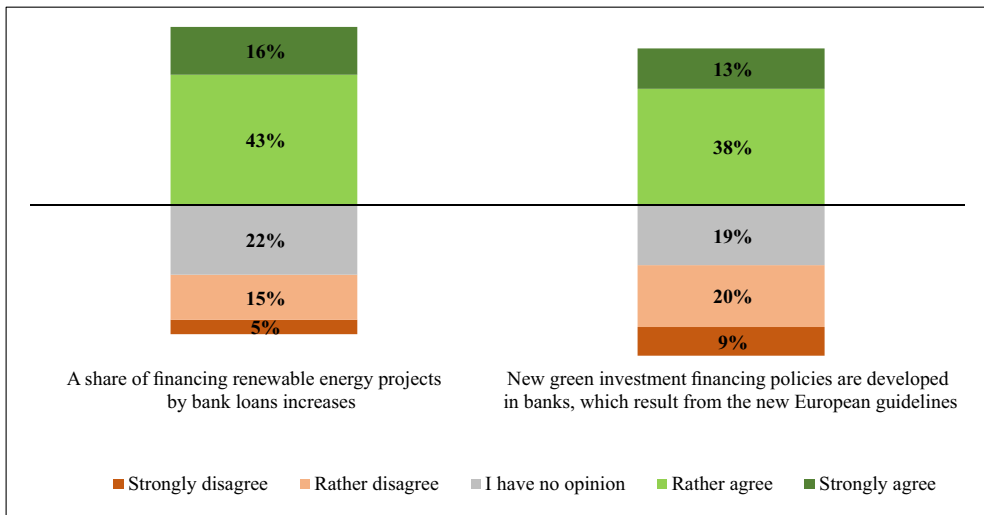


Fig. 6. Questionnaire survey results – Part 3

Source: own work

Rys. 6. Wyniki badania ankietowego – część 3

ments to become the first climate neutral continent by 2050 and to reduce greenhouse-gas emissions by at least 55% by 2030. To achieve these goals, it is necessary to adapt all funding sources – public and private, national and multilateral. As the research results indicate, 51.16% of respondents consider that commercial banks in Poland are adapting to the ambitious targets adopted at the EU level, developing new provisions of their policy of financing green investments in accordance with the new European guidelines (Figure 6). In 2018, the European Commission adopted the first action plan on financing sustainable growth. On this basis, the European Union implemented three basic elements of a sustainable finance framework (European Commission 2018):

- ◆ a classification system or taxonomy for sustainable activities;
- ◆ a disclosure framework for non-financial and financial corporations;
- ◆ investment tools, including benchmarks, standards and labels.

The first core element is the EU taxonomy of sustainable economic activities (Regulation (EU) 2020/852...). The Taxonomy Regulation aims to provide a robust, science-based classification system enabling non-financial corporations as well as banking institutions to adopt a common definition of sustainability, thereby providing protection against “pseudo-green marketing”. The second element is a mandatory disclosure regime for non-financial and financial corporations, providing investors with the information they need to make informed decisions about sustainable investments. Disclosure requirements cover the environmental and social impacts of company’s activities as well as the business and financial risks that a company incurs from its sustainability exposure (“double materiality” concept). The third element is the set of investment tools, including benchmarks, standards and labels. They help participants in the financial market to align their investment strategies with the EU climate and environmental targets. They provide them with more transparency. According to the empirical research results, the sustainable finance framework is reflected in the new policy of financing green investments of banking institutions in Poland. Their policies are strictly subordinated to the EU framework. Only 29.46% of the respondents do not agree with this view, while 19.38% of them do not have an opinion on this issue.

Discussion and conclusions

Energy transformation aimed at reducing greenhouse-gas emissions, and ultimately climate neutrality undoubtedly requires unprecedented and decisive actions to mitigate climate change and restore natural capital on a global scale. The European Union’s efforts are now focused primarily on supporting investment flows towards environmentally sustainable economic activity. However, a big challenge is the financing of the energy transformation taking place in individual countries – albeit to a different extent – which is one of the main determinants of climate neutrality.

The conducted empirical research indicated that although in recent years Poland has been reducing greenhouse-gas emissions compared to the European Union, it is still at the

beginning of its path to complete climate neutrality. One of the factors is the energy transformation taking place in Poland. The largest companies in the mining and energy industry have adopted the assumptions of the climate policy in which they declare to reduce greenhouse-gas emissions by 30% by 2030 and achieve climate neutrality by the middle of this century. As the case study analysis shows, these assumptions translate into real activities undertaken by the analyzed enterprises. This gives hope that Poland will meet the ambitious goals imposed on all EU Member States in the European Green Deal. Financial support is a very important aspect of the energy transformation. The questionnaire survey has proven that banking institutions in Poland are ready to support socially responsible investments. The consequence of this is the ongoing process of the greening credit offer of commercial banks in Poland (Pyka and Nocoń 2021). The results presented in this study show that these institutions pay a lot of attention to financing investments contributing to the reduction of climate change. They adjust their loan offers to the new financing policy of the energy sector implemented by the European Investment Bank. Moreover, they limit the financing of fossil-fuel projects, mainly in the field of coal and oil. They also create new provisions of the policy of financing green investments, in accordance with new European guidelines. All these activities are aimed at limiting the financing of activities that are harmful to the climate and supporting those that favor renewable energy, energy efficiency, and technological innovation allowing the production of clean energy.

The study identifies activities aimed at neutralizing the impact of mining and energy companies in Poland on climate, as well as assessing the approach of commercial banks in Poland towards financing their activities for climate neutrality. This allowed achieving the main aim of the article. Based on the conducted empirical research, the formulated research hypothesis was positively verified. Commercial banks in Poland support the financing of activities conducive to achieving climate neutrality by companies from mining and energy industries. However, it should be emphasized that the conducted theoretical and empirical studies do not exhaust the issue of climate neutrality in Poland. There are still many challenges ahead of companies in the mining and energy industries. Undoubtedly, it is important that they are aware of a need for changes in the scope of their activities as well as the approach to running a business in new socially responsible conditions. The considerations presented in this study may therefore be the basis for further in-depth research aimed at assessing the degree of implementation of climate policy objectives of the analyzed companies and their effectiveness in the context of reducing greenhouse-gas emissions and achieve climate neutrality objectives. This area may form the basis for further empirical research.

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TOWARDS CLIMATE NEUTRALITY IN MINING AND ENERGY COMPANIES IN POLAND – AN APPROACH TO THEIR FINANCING

Keywords

climate neutrality, climate policy, financing climate policy targets, mining, energy sector

Abstract

Nowadays, fighting to stop climate change is not only possibility, it is indisputably an imperative for our future life on the Earth. The concept of climate neutrality was established at the beginning of the twenty-first century but has gained importance in the last decade. Climate neutrality can be achieved if CO₂ emissions are reduced to a minimum and all remaining CO₂ emissions are offset with climate protection measures. In order to limit global warming to 1.5°C – a threshold the Intergovernmental Panel for Climate Change (IPCC) suggested is safe – climate neutrality is essential by 2050. The main aim of this article is to identify activities aimed at neutralizing the impact of mining and energy companies in Poland on climate and to assess the approach of commercial banks in Poland towards financing their activities towards climate neutrality. The article verifies the research hypothesis stating that commercial banks in Poland support the financing of activities conducive to achieving climate neutrality by companies from mining and energy industries. The empirical research was

carried out in three stages. It included data analysis, case study and questionnaire survey. The study shows that the mining and energy industry in Poland is aware of the need to implement quick actions to reduce their negative impact on the environment and to achieve climate neutrality by 2050. Moreover, it has been proven that the banking sector in Poland is open to financing socially responsible investments (SRI) supporting activities for climate neutrality.

W KIERUNKU NEUTRALNOŚCI KLIMATYCZNEJ PRZEDSIĘBIORSTW Z BRANŻY WYDOBYWCZEJ I ENERGETYCZNEJ W POLSCE – PODEJŚCIE DO ICH FINANSOWANIA

Słowa kluczowe

górnictwo, polityka klimatyczna, sektor energetyczny, neutralność klimatyczna, finansowanie celów polityki klimatycznej

Streszczenie

We współczesnym świecie walka o powstrzymanie zmian klimatycznych nie jest już tylko możliwością, ale bezsprzecznie imperatywem, warunkującym nasze przyszłe życie na Ziemi. Koncepcja neutralności klimatycznej powstała na początku XXI wieku, jednak zyskała na znaczeniu w ostatniej dekadzie. Neutralność klimatyczna może zostać osiągnięta, jeśli emisje CO₂ zostaną zredukowane do minimum, a wszystkie pozostałe emisje zrekomensowane środkami ochrony klimatu. Aby ograniczyć globalne ocieplenie do 1,5°C – próg sugerowany przez Międzyrządowy Zespół ds. Zmian Klimatu (IPCC) jako bezpieczny – niezbędna jest neutralność klimatyczna do 2050 roku. Celem artykułu jest identyfikacja działań na rzecz neutralizacji wpływu na klimat przedsiębiorstw z branży wydobywczej i energetycznej w Polsce, jak również ocena postawy banków komercyjnych w Polsce wobec finansowania ich działań na rzecz neutralności klimatycznej. W artykule weryfikuje się hipotezę badawczą głoszącą, iż banki komercyjne w Polsce wspierają finansowanie działań sprzyjających osiągnięciu neutralności klimatycznej przedsiębiorstw z branży wydobywczej i energetycznej. Badania empiryczne były trzyetapowe. Obejmowały analizę danych wtórnych, studium przypadku oraz badania kwestionariuszowe. W opracowaniu wykazano, iż branża wydobywcza i energetyczna w Polsce jest świadoma potrzeby wdrożenia szybkich działań w kierunku ograniczenia ich negatywnego wpływu na środowisko, a w perspektywie roku 2050, osiągnięcia neutralności klimatycznej. Dowiedziono ponadto, iż sektor bankowy w Polsce jest otwarty na finansowanie inwestycji odpowiedzialnych społecznie, wspierających działania na rzecz neutralności klimatycznej.

