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BARRIERS TO ACHIEVING CLIMATE GOALS. AN EXTERNAL CONTEXT

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ABSTRACT: Achieving climate goals is becoming one of the most important challenges facing humankind as climate change and its consequences are increasingly evident, better documented, and disclosed in reports, successive international agreements, and at periodically held climate summits. There are two reasons behind this article: *firstly*, the increasingly frequent demands regarding the necessity to disclose not only the main climate goals but also intermediate climate targets; and, *secondly*, conclusions from the analysis of environmental goals within the framework of environmental management systems presented in our previous publications. There are undoubtedly many factors influencing the achievement of climate goals, but the strength of their impact on the implementation of these goals varies significantly for a number of reasons. This review attempts to identify the main barriers to achieving the climate goals, especially those in organisational surroundings, without resorting to complex goal setting in applied concepts or management systems. The article focuses on the lack of a unified policy for achieving intermediate climate targets and, consequently, the primary goals; the importance of public awareness of risks; the dominance of the short-term perspective, consequences of the absence of uniform legislation and single markets, the significance of climate inequalities and climate injustice, and relevant resource and political constraints.

KEYWORDS: goals, climate change, barriers, environment

Introduction

The problems of climate change have been described exhaustively in literature as well as in numerous reports and commentaries to various types of international memoranda, usually in the form of legally binding agreements. These sources provide a comprehensive depiction of the causes of climate change, the state of the climate, the most important effects of climate change, climate goals aimed at slowing down the rate of climate change, and adaptation to ever-changing conditions of our lives, i.e. mitigating the effects of progressive climate warming.

The climate goals are set out in the Paris Agreement, signed in April 2016, whose overall objective is to intensify the global response to the threat of climate change and significantly reduce risks associated with climate change through the realisation – as defined in Article 2, Section 1 – of three main climate goals. *Goal 1* is “holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels”. *Goal 2* is “increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production”. *Goal 3* is “making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.” It is evident that the ways, and especially the effectiveness, of implementing the first goal condition the specificity of mechanisms of implementation of the second and third goals. This observation led to the choice of various determinants in the study, especially those that hinder the realisation of the first goal.

In order to achieve these goals, the instruments of response to the changes at various levels of governance (international, national, regional, and local), both at the macro and micro levels, have constantly been expanding. To meet the particular climate targets, further restrictions are being imposed in the form of emission fees, import duties, new legal regulations, etc. It should be noted that there are fewer and fewer contentious issues in the descriptions of these measures; however, controversies arise when two crucial questions are posed:

- Is the implementation of the climate goals realistic?
- What are the key determinants and especially the barriers (constraints) to the pursuit of these goals?

The present article attempts to answer these questions, i.e. to determine the extent of difficulty in achieving the main climate goals and intermediate climate targets and to identify the most important barriers to their implementation. The following literature review confirms the existence of a signif-

icant gap in climate change research, which the authors of this paper intend to fill to some degree while providing some inspiration for further, more in-depth analyses of this problem. The literature review also proves that the knowledge of the subject of this paper is dispersed and fragmented and requires consolidation and critical evaluation.

Providing a tentative answer to the first question, it is possible to state that at present, nobody seems to have any illusions that the achievement of the main goals of the Paris Agreement (2016) remains extremely difficult, not only because of the lack of coherent political will. The literature emphasises that the so-called global mitigation ambition, reflected in the Nationally Determined Contributions (NDCs), defined in the Agreement, is insufficient to achieve the 1.5°C long-term temperature limit (see, e.g., Geiges et al., 2020).

The most recent Sixth Assessment Report of the Intergovernmental Panel on Climate Change (AR6 Climate Change, 2021) evaluated a wide range of pathways to reach a limit of no more than a 1.5°C increase in average temperature. Those pathways are characterised by a substantial increase in near-term action and total GHG emission levels for about 50 % lower than what is implied by the current NDCs. These incremental improvements in reduction targets, even if achieved globally, are, in some experts' opinions, insufficient to align collective ambition with the Paris Agreement goals (Geiges et al., 2020). Undoubtedly, a massive, globally coordinated effort is required to achieve these goals. Carbon dioxide (CO₂) emissions alone are to be reduced by 45% in 2030 compared to 2010, and they must be reduced to zero by the middle of the 21st century (Heated debates, 2021). According to the International Energy Agency, however, there is only a 5% chance of meeting the 1.5°C targets, and the odds of maintaining a temperature rise within 2.0°C are estimated at about 50% (Heated debates, 2021), especially since many greenhouse gases remain in the atmosphere for extended periods (Global challenges, 2021). This increasing concentration of greenhouse gases means that, since the first industrial revolution, the average temperature has already risen by an average of 1.1°C, meaning that the limit set in the Paris Agreement has already been used up by two-thirds. Authors note that in the absence of significant improvements to the management of the Earth's resources, the average temperature over the next 80 years will be as much as 4°C higher than it was just 200 years ago. Previously, such a change occurred over a period of 20,000 years! (Zmiana klimatu, 2021).

As recent history shows reaching green targets is difficult. Not a single target has been met for water quality (EU's 2000 Water Framework Directive), air quality (EU's Air Quality Directive of 2008) or net-zero emissions (Green targets, 2021).

However, this preliminary answer to the question of the feasibility of meeting the set climate targets needs to be further elaborated, primarily by identifying the most important barriers to achieving these targets. Such identification will be carried out using a specific research methodology, including a literature review.

Research methods

The main research method was a systematic review of the available literature pertaining to the research problem and aim formulated in the introduction. The literature review was conducted by stages: (1) selection of keywords: climate change, climate goals, environmental goals, green targets; (2) searching for works containing the identified keywords in databases: Academic Search Ultimate, Business Source Ultimate, Education Resources Information Center, AGRICOLA, Open Dissertations, Green FILE, Newspaper Source and Google Scholar; (3) reviewing the retrieved publications; (4) opining on the relevance of the publications; (5) mapping the available literature; (6) summarising the selected publications; and (7) organising the collected research material. The procedure followed general research methodology (Easterby-Smith et al., 2015) and management and business research methodology (Easterby-Smith et al., 2015). The systematic literature review was supplemented with a grey literature review due to the need to update the cited data on climate targets.

In addition to the literature review, a cause-and-effect approach to the problem of climate change was also adopted. This approach is, in fact, a specification of the development process of a complex theory of a particular phenomenon, in our case, the problem of climate change. Cause-and-effect analysis generates a logically ordered sequence of interrelated information, often quantified in the form of indicators, easy to translate into a sequence of causes (driving forces), effects, and reactions (strategic objectives and actions), which to a large extent explain the mechanism of emergence of the phenomenon (problem) we are interested in, i.e. the state of climate and climate changes (Borys, 2006).

Cause-and-effect analysis can also take the form of a sequence of groups of questions considering risk categories (Borys, 2006):

- Why does the problem exist? What are the causes of the problem? This group comprises questions about the risk sources. In the case of climate change, these questions are about the causes (C- Causes, sources of the climate condition, determinants of this condition), including environmental pressures (P – Pressure) and causal factors (D – Driving Forces);

- Does the problem exist? How significant is the problem? This second group of questions addresses the realisation of the risk – in our case, the risk of climate change, the state of the climate and the rate of change (S – State);
- What are the consequences of the existence of the problem? This is a question about the consequences: the effects of the risk of climate change (C – Consequences);
- How to solve the problem? is the key question about the response to the risk, i.e. to the causes, the realisation of the risk and its consequences, that is, in our case, reaction to the risk of climate change (R – Reaction/Response), which should be a comprehensive strategic response formulated at different levels of governance (global, national, etc.) addressing the causes, state, and consequences of climate change.

The presented groups of questions should be expanded to include questions on impact assessment (I – Impact) at two points in the cause-effect sequence: first, to assess the impact of causes on climate change and their effects; and second, to assess the impact of climate change on the scale of the climate change effects.

This useful tool has been only sporadically used in climate change research, despite the considerable achievements of international organisations (UN specialised agencies, OECD, World Bank) in conducting ratio analyses using the classic P-S-R formula or the extended D-P-S-I-R sequence applied by the European Environment Agency (EEA).

This article used the following cause and effect sequence: Causes (Pressure, Driving Forces, Impact) → State (Impact) → Consequences, → Reaction. The sequence is presented in Figure 1, and its organising qualities will serve as further considerations to identify barriers (hindering factors) to achieving climate goals.

We also considered the potential application of some other research methodologies such as goal attainment theory (King, 1992; Park et al., 2017), management by objectives theory (Tosi, 1970), theory of goal pursuit (Hinsz, 1998), and achievement goals theory (Elliot, 1999). None of them, however, explains the intricate cause-and-effect relationships in the process of climate goal achievement due to its complexity.

In our opinion, it is worth considering a more in-depth analysis of the research problem tackled in this paper, which seems to be a promising direction of further research aiming at the development of a theoretical model of interrelations between particular factors of climate change. In modelling these relationships and interpreting the processes taking place – in our preliminary assessment – it is also possible to use, in addition to the already signalled cause-and-effect approach, three other – largely complementary –

methods derived from value theory and systems theory and actor-network theory.

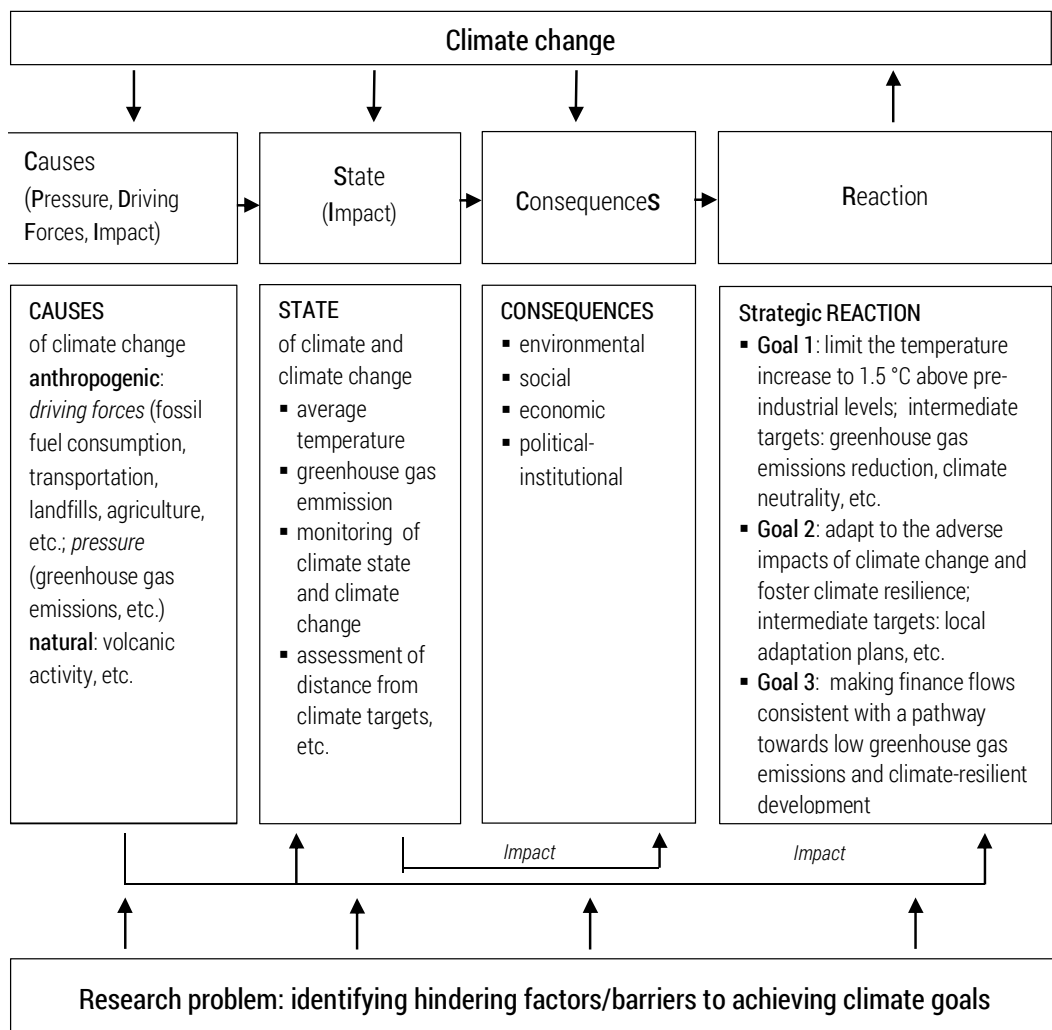


Figure 1. The research problem is set against the cause-and-effect sequence of climate change

Source: authors' work (see also Borys, 2006).

Systems theory can be successfully applied to interpret the phenomena occurring in climate change between social, technical, organisational, and economic systems. However, these relationships are also firmly rooted in an axiological substructure, i.e. in existing value systems. For example, the desire

for a quick profit (social and economic system) leads to the absence of new investments in the oil industry (technical system). This is accompanied by the often observed attitude of investors who, although wanting to invest in green projects, use a short-term perspective and tight economic calculation to turn these intentions into “empty” declarations. It will be further discussed in the following part of the article (cf. Von Bertalanffy, 1984).

A similar dissonance occurs when we look at certain aspects of the climate problem from the standpoint of actor-network theory – a theoretical and methodological concept in the social sciences, which derives from constructivist approaches and draws on the achievements of science and technology studies and sociology of scientific knowledge (see, e.g. Abriszewski, 2008). A typical actor (or actant) is, for example, a politician who forms complex networks with other politicians. Their decisions are influenced by both other actors and influential business groups. It is the politician who decides on the financial means to achieve the goals, including the climate goals, e.g. using the funds from carbon emission trading for energy transformation processes or for purposes entirely unrelated to energy transformation. A typical conflict of roles (I as a politician or CEO and I as a citizen) occurs in the behavioural process.

Research results

Identification of key barriers

The general answer given in the introduction to the question of the feasibility of achieving the Paris Agreement goals needs to be made more specific by revealing and identifying the most important barriers to the pursuit of these goals. The literature review also served this purpose.

Three main conclusions can be drawn from this review. *Firstly*, the knowledge of determinants of achieving climate goals is fragmented and, as a rule, dispersed in many publications. Only a few works make an attempt to “collectively” identify the underlying factors that could reveal barriers to the implementation of climate goals. One such attempt is to emphasise the importance of political factors, citizen ideology, environmental interest groups, natural gas production, and solar energy potential (Glasgow et al., 2021). *Secondly*, the constraints on the implementation of climate goals are located in particular spheres: social, economic, environmental, and political-institutional, but a large part of them is of cross-sectional nature – falling within several spheres of human activity. *Thirdly*, these constraints appear relatively independently at different levels (global, national, regional, local) or simultaneously at all these levels.

The literature review resulted in the identification of ten key barriers, characterised later in this article by their impact on the implementation of climate goals, with particular attention to the first two barriers. These are:

- lack of uniform goal attainment policies among major emitters;
- low public awareness of risks;
- dominance of short-term perspective and the urge to gain quick profits from investments;
- unethical determinants of investing in green projects;
- economic volatility;
- anti-environmental measures of economic growth;
- climate inequality and climate injustice;
- resource and technological constraints;
- political and institutional constraints;
- lack of uniform legal regulations and market conditions.

We realise that this is not a complete list of impediments to the attainment of climate goals and that an exhaustive characterisation of the identified barriers is beyond the scope of this study. However, their identification can serve as a basis for further discussion on this fundamental problem of the global dimension.

The first barrier is the lack of uniform goal attainment policies among significant emitters

While building up knowledge on the individual goals declared by countries whose contribution to global greenhouse gas emissions is significant, it should be stated that achieving the Paris Agreement goals appears unrealistic. According to the European Environment Agency (EEA), CO₂ dominates the emissions of these gases (80%), with the remaining 20% made up of emissions of methane (11%), nitrous oxide (6%) and hydrofluorocarbons (2-3%) (EEA 2019). Let us, therefore, look at the short- and long-term plans of the five largest greenhouse gas emitters. Table 1 includes data on total GHG emissions and CO₂ in particular as the most significant contributor to these emissions¹.

The largest emitter of CO₂ is China, which in 2005 overtook the USA in this rating, although in terms of emissions per capita, it ranks only fifth, just behind the USA. China's share of global CO₂ emissions reached almost 27 percent in 2018 and exceeded 3 percent in 2019, i.e. an increase of 3.4 percent. (Table 1). The rapid rise in emissions between 2000 and 2010 was due to the

¹ For statistical purposes, in estimating total greenhouse gas emissions, these other gases are converted to carbon dioxide equivalent (CO₂e) calculated from *Global Warming Potential* (GWP). The GWP for carbon dioxide is 1, and for methane, for example, it is 30 (for the last 100 years). GWP can vary depending on a selected time frame.

increase in coal mining and burning and the acceleration of China's economic growth. It should be noted that there was a 2 percent average annual increase in this contribution from 2015 to 2019 (Table 1). In 2021, China announced its intention to reduce its emissions by 65 percent by 2030, compared to 2005 emissions, and to achieve carbon neutrality in 2060 (Cleaning up, 2021). Although China's coal consumption has somewhat declined in recent years, it still accounts for more than half of the world's coal consumption. This is accompanied by China's prominent pledge to reduce coal consumption from 2026. The Chinese government is aiming to make use of non-fossil fuels in the production of 25% of the country's energy by 2030 (Climate change, 2021).

Table 1. Top five CO₂ emitters (2018-2019 data)²

Country or group of countries	Greenhouse gas emissions	CO ₂ emission				
	in millions of kilotons of CO ₂ equivalent in 2015	in billions of tons in 2018	% share of global emissions 2018 ^{a)}	% share of global emissions in 2019 ^{a)}	Change (in %) between 2018 and 2019	Average annual change (in %) from 2015
China	13.0	10.1	26.9 (1)	30.3 (1)	+ 3.4	+ 2.0
USA	6.4	5.4	16.0 (2)	13.4 (2)	- 2.6	- 0.7
EU+UK	4.5	3.6	12.5 (3)	8.7 (3)	- 3.8	- 1.4
India	3.3	2.7	5.2 (5)	6.8 (4)	+1.6	+3.2
Russia	2.2	1.7	5.5 (4)	4.7 (5)	- 0.8	+ 0.9

(a) Ranking position in brackets

Source: authors' work on the basis of Annual activity report, 2020; Greenhouse gas emissions, 2021; and JRC Annual Report, 2019.

Moreover, it is worth noting that China is gaining an advantage in the pace and scope of development of renewable energy sources (RES). However, dirty energy still accounted for about 62% of electricity generation in China in 2020, and the government authorities have set a target of reaching peak consumption of this type of fuel in 2025, with non-fossil energy sources set to exceed 80% of the total energy mix by 2060 (Najwięksi emitenci, 2021). However, according to the Global Energy Monitor, China's global coal-fired power capacity continues to increase by building new facilities while ensuring that China will not invest in coal mines overseas. In 2020, the coal-fired power generation capacity in China rose for the first time since 2015. New

² Statistical data on fossil fuel CO₂ emissions are now available for each country for the period 1970-2019, while national emissions of other greenhouse gases are available for 1970-2015.

coal plants are expected to operate for at least 30 years, which could solidify the role of the black fuel in the country's global energy mix even beyond the middle of this century (Global Energy Monitor, 2021)³. China, as a signatory to the Paris Agreement, has pledged that its greenhouse gas emissions will begin to decline after 2030, and while there is some likelihood that this will occur, according to Climate Action Tracker assessments, China's actions are inconsistent and highly insufficient to achieve its goal of limiting global warming to 2°C, let alone its immediate target of 1.5°C (Statistical Review, 2021). According to other experts, although the net-zero carbon target is impossible to achieve nationwide, it is still feasible in some regions of China (see, e.g., Pan, 2020).

The United States' second place on the list of largest greenhouse gas emitters, with a 16 percent share of global CO₂ emissions, is not surprising, as the U.S. was the most significant contributor until 2005, and in terms of per capita emissions, it currently ranks 4th. In 2019 the U.S. share was 13.4 percent, which represents a 2.6 percent decline in the share of global CO₂ emissions. The U.S. also recorded a 1 percent average annual decline in this share between 2015 and 2019. (Table 1). The U.S. government intends to reduce its CO₂ emissions by at least 50 percent by 2030, relative to its 2005 emissions. It also intends that half of the new vehicles will be electric by 2030. The U.S. is planning to achieve climate neutrality by 2050 (Promises to be carbon neutral by 2050); however, these plans will face opposition from some lawmakers concerned about the impact of the new green policies on the U.S. coal industry and gas extraction through fracking (Climate change, 2021). This unfavourable atmosphere around climate policy has been primarily created by the Donald Trump administration, which supported fossil fuels, including coal, and which announced the U.S. withdrawal from the Paris Agreement (which was supposed to happen after a year-long process, a few days after the presidential election). A significant shift towards a pro-climate course occurred at the end of 2020 and was related to the election of President Joe Biden, one of whose first decisions was to re-enter the Agreement (Statistical Review, 2021). In the U.S., there has been a favourable trend of decreasing greenhouse gas emissions for several years, although currently still, more than 80 percent of energy comes from fossil fuels. This observed decline is primarily related to the replacement of coal with less emission-intensive natural gas, the development of renewable energy sources (RES), an increase of RES in the energy mix, as well as improvements in energy efficiency. According to Climate Action Tracker assessments, U.S. actions are still not sufficient

³ In the second half of 2021, to mitigate the effects of the energy supply collapse that caused widespread energy shortages and curtailed industrial activity, coal mines in China increased their output to as much as 12 million tons per day (Dlaczego Chiny i Indie, 2021).

to achieve the goal of reducing climate warming and staying within the limit of global average temperature increase (Statistical Review, 2021).

The European Union as an “aggregate” emitter of greenhouse gases is included in international statistics together with the United Kingdom (UK) up to and including 2019, as the latter is no longer formally a member of the EU as of February 1, 2020 (with a transition period until mid-2020). The EU was the third-largest greenhouse gas emitter in 2018, with a 12.5 percent share of global CO₂ emissions. In 2019, this share was already less than 9 percent, which meant a decrease in the percentage of global CO₂ emissions by almost 4 percent. The EU also recorded an average annual decline in this share between 2015 and 2019 in the range of 1.5 percent (Table 1) and is planning to cut its emissions by 55 percent by 2030 (Fit for 55 plan), compared to the EU’s 55 percent by 2030 (Fit for 55 plan) in relation to the level of these emissions in 1990. Earlier arrangements set this target at 40%. The 55% reduction target is, however, 5% less than the European Parliament originally intended to include in the draft agreement of the EU member states and 10% less than proposed by Greenpeace, which criticised the agreement, considering it to be rather unambitious. In this context, achieving the goals of the Paris Agreement is – according to Greenpeace – very distant (Beldowicz, 2021). The Fit for 55 plan is associated with a significant increase in the share of renewable energy sources (RES) in the energy mix, aiming to reach 40 percent by 2030. Like the United States, the EU intends to achieve climate neutrality by 2050, primarily by switching away from coal in the power sector, significantly reducing imports of fossil fuels, including natural gas, increasing energy efficiency and productivity, electrification of transport, switching to alternative fuels, etc. The largest emitters of CO₂ greenhouse gases in the EU are Germany, Italy, Poland and France – the share of these countries in global emissions of this gas is a total of 5% (2 % for Germany and 1 % for each of the other three countries) (Global Carbon Project, 2018). It should be emphasised that the adoption of GHG emission reduction targets by the EU does not mean that they are not contested by some member states, including Poland, stressing the different financial and technical possibilities and the varying impact of the coal lobby on the speed of the energy transition (<https://www.bbc.com/news>, 2021). The reputation of the EU exercising leadership in the struggle against climate change is highly dependent on demonstrating compliance and taking effective enforcement action where necessary (Peeters & Athanasiadou, 2020).

India, another country studied in the context of reducing greenhouse gas emissions, ranks fourth, with similar emissions levels to the European Union, although in terms of per capita emissions, it ranks a distant eleventh. Yet it is necessary to note here that while India’s share of global CO₂ emissions exceeded 5 percent in 2018, the country has a similar population to China

(and within a few years, India is expected to become the world's most populous country), while its share of global CO₂ emissions is five times lower than China's and 3 times lower than the U.S. (with more than 4 times the population). However, in 2019, India's share of global CO₂ emissions increased by 1.6 percent, to almost 7 percent, with an evident upward trend of an average annual change of more than 3 percent between 2015 and 2019 (Table 1). India, as a developing country, continues to be heavily dependent on fossil fuels, especially coal. However, the Indian government aims to reduce the "emission intensity" of CO₂ by 45 percent by 2030 and assumes that 50 percent of its energy will come from non-fossil fuels. India has also committed to achieving climate neutrality (net-zero emissions) by 2070, i.e. 10 years later than China and 20 years later than the US and the EU. These intentions, however, must be confronted with the fact that India's annual CO₂ emissions have steadily increased over the past two decades, although India still produces the lowest per capita emissions of the world's top five emitters. Behind such greenhouse gas reduction targets is a fairly common argument among developing countries, and one that is emphasised repeatedly in the Paris Agreement, that the wealthier and more industrialised countries should bear a more significant financial and organisational burden because, in retrospect, they have made a far greater contribution to global warming.

For this reason, the developing countries are proposing another complementary measure of CO₂ emissions intensity and, at the same time, a climate action goal: reduction of these emissions per unit of GDP, i.e. in the context of achieved economic growth. According to the Indian government, this is a fairer way to set GHG reduction targets compared to other countries. To this intention, India has signed the Paris Agreement to reduce emissions per unit of GDP by 30-35 percent from 2005 levels by 2030. However, given India's low per capita GDP, this could still mean an increase in emissions in absolute terms (Statistical Review, 2021).

Until recently, India has based its energy mix on coal, but the growth of coal consumption in India has slowed in recent years, and renewable energy sources (RES), particularly photovoltaics (PV), are being expanded with increasing vigour. As part of the Paris Agreement, India has set a target of 40 percent of RES as a share of electricity production in 2030 (Porozumienie Paryskie, 2016). It should be noted, however, that in India, the pro-coal lobby – like in China – is still powerful because as much as 72 percent of India's electricity production is from coal, and according to BloombergNEF analysts, the dirtiest fossil fuel will still account for 21 percent of India's energy mix in 2050 (Bloomberg New Energy, 2021). Indeed, the Indian government forecasts that the capacity of coal-fired power stations will increase from 208 gigawatts today to 267 gigawatts by 2030. New coal-fired power stations are expected to operate for at least 30 years, solidifying the black fuel's role in

the global energy mix beyond mid-century (Global Energy Monitor, 2021). That is why the 2021 United Nations Climate Change Conference in Glasgow, India, with China, championed the future of coal. Over the last decade, no nation has increased coal-fired power capacity as much as these two. Not only does coal remain crucial to their current energy needs, but it looks like it will also play an essential role in the decades to come, despite the fact that the two Asian giants are increasingly using renewable energy sources (Dlaczego Chiny i Indie, 2021).

The Russian Federation closed the top five greenhouse gas emitters in 2019 with a nearly 5 percent share of global CO₂ emissions. However, a year earlier, Russia's share of these emissions was 5.5 percent, earning it the world's fourth-largest emitter. It should be noted that between 2015 and 2019, Russia experienced an average annual growth of this share in the range of 1 percent (Table 1). Data for Russia have been reported in the BP Statistical Review of World Energy since 1985, i.e. after the dissolution of the Soviet Union. The collapse of heavy industry and the far-reaching recession led to a reduction in emissions. Since the end of the 20th century, the emissions have remained relatively constant, with, as already mentioned, a moderate upward trend since 2015. The availability of fossil fuels, interests of related lobbies, and little innovation in renewable energy sources (RES) and energy efficiency technologies have delayed the development of carbon-free energy sources in Russia. As part of the Paris Agreement, Russia has declared that by 2030 its GHG emissions will amount to 17-22 percent below the 1990 levels, excluding LULUCF (land use, land-use change and forestry) and by 25-30 percent including LULUCF. According to Russia's latest version of the low-carbon development strategy, the government sees the potential to reduce greenhouse gas emissions by up to 80 percent by mid-century and aims to achieve carbon neutrality in 2060, i.e. at the same time as China, 10 years earlier than India, and 10 years later than the U.S. and the European Union (Rosja planuje, 2021). According to Climate Action Tracker's assessment, Russia's actions are highly insufficient to achieve the climate goals set out in the Paris Agreement (Statistical Review, 2021).

It is important to note that as much as 80 percent of global greenhouse gas emissions are attributable to 20 countries. In addition to the top five countries listed above, the emitters also include Japan, Iran, South Korea, Saudi Arabia, Indonesia, Canada, Mexico, South Africa, Brazil, Turkey and Australia, and of the EU+UK countries, Germany, the UK, Poland, Italy and France.

Among these countries, the case of Australia – a major coal exporter – is noteworthy in implementing the Paris Agreements' goals. While many countries have set ambitious targets to achieve net-zero emissions by 2050, Australia is not in line with this positive trend. While the government has com-

mitted to a 26 percent reduction in emissions by 2030 from 2005 levels, experts argue that Australia must commit to a 47 percent reduction by 2030 if the global climate goal of keeping temperature rise below or within 1.5°C is to be met (Morrison, 2021). According to Climate Action Tracker (CAT), Australia's approach to climate targets, policies, and finance is "highly insufficient". Under Australia's current policies, emissions will continue to rise, and the country could contribute to a pessimistic climate change scenario, i.e. an increase in average global temperature of more than 3°C by the end of this century (Climate Action Tracker, 2020). Australia did not announce any binding targets before the Glasgow summit, and only later did it declare emission reductions not by 2030 but by 2050 (Heated debates, 2021).

Barrier Two: low public awareness of risks

According to Anita Engels, people often lack knowledge about what to do to meet environmental goals (Grant me green, 2021) despite the wide availability of knowledge about climate change – its causes, state, and the increasingly visible effects at both global and local levels. Currently, there is an asymmetry between the indicators that promote increased public awareness of the threats resulting from climate change and the dominant factors that perpetuate the low awareness or even unawareness of these threats and the need for minimisation and adaptation to the changes taking place.

What, then, encourages the raising of public awareness in this area? The literature often emphasises that natural disasters significantly impact risk awareness, as they render climate risks more tangible. For example, the 2021 flood, which claimed more than 200 lives, has left a painful imprint in Germany's public awareness (Heated debates, 2021). When the Rhine River lacked water, especially in 2018 and 2020, it was only then that people saw further real evidence that global warming was occurring. Only when transportation by water became impossible did those who were producers begin to wonder about what was happening to the environment and the climate. The number of such observed and experienced extreme weather events is also increasing in Poland,⁴ however, with different – in the sense of permanence of the record in people's memory – changes in Poles' awareness. It is predominantly short-term memory, especially in people not directly affected by extreme weather phenomena. There are also two additional effects: the fading, over time, of the intensity of experiences; and the appearance of new dangerous emotional "overlays" of threats from other areas that affect our sense of security

4 In Poland, extreme weather events include storms, hurricane winds, tornadoes, squalls, pressure surges, extremely low humidity, extreme heat and frost, heavy rainfall causing floods, heavy snowfall with ground blizzards and snowstorms, and droughts.

(pandemics, international tensions, military conflicts, etc.) as well as not always associating these phenomena with global climate change (see, e.g. Ekstremalne, 2022). Obviously, this does not mean challenging the impact of the reality of environmental threats on public awareness.

Another factor contributing to the social awareness of climate changes and the need for actions to minimise their effects is the increasing level of environmental awareness and the growing significance of the state of the environment in people's quality of life. This can be observed especially in three groups of social behaviours: *firstly* – changing consumer behaviours that are beneficial for the environment and consistent with the paradigm of sustainable consumption (Severo et al., 2019; Borys, 2016); *secondly*, the dynamic growth of prosumer behaviours (as a particular exemplification of the said paradigm), particularly in the production and consumption of electricity and the growing share of third-wave prosumers, i.e. those who integrate in their motivation for pro-environmental actions economic, social and environmental motives, which is entirely consistent with the nature of the new paradigm (Szymusiak, 2013); and *thirdly* – dissemination, although not always in real terms, of various pro-environmental activities, both within the organisational (e.g. by reducing CO₂ emissions) and in the institutional and systemic dimension (e.g. through dissemination and implementation of environmental management systems, clean production, etc.). These actions are driven by various motives, not necessarily economic ones only.

However, in-depth studies are still needed to assess to what extent the consciousness of threats and climate goals shapes social and individual environmental awareness. Based on Terror Management Theory, on the one hand, existential threat is associated with increased self-concern, which may lead to a certain weakening of motivation to protect the environment (Fritsche & Häfner, 2012). On the other hand, despite the view that long time horizons and social distance are perceived as key psychological barriers to pro-environmental actions, the accompanying or intentionally triggered sense of threat to our existence can spark the “motivation to leave a positive legacy” (Zaval et al., 2015). This means that it can contribute to actions that are beneficial to future generations – in line with the principle of intergenerational justice.

The awareness of threats resulting from climate change – besides the already mentioned positive changes in some social and professional groups – also shows great inertia in the ways of thinking and in the approach to this problem, which is often illustrated by a passive, usually unreflective submission to certain thought patterns, often “imported” from the most popular myths (there are clear analogies here to the approach to pandemics and vaccines). These myths are revealed, for example, in such widely circulated statements as: “global warming is an invention of scientists”, or “human-pro-

duced and emitted carbon dioxide is irrelevant to climate change”, or “there is no scientific evidence for the anthropogenic of global warming”, or that “even melting all the ice on Earth will not raise the level of the seas and oceans”, despite the fact that no severe scientific publication questioning the crucial role of human activity in climate change has appeared in the last ten or so years. Naturally, we ignore here the whole range of conspiracy theories circulating on social media.

Low social awareness is also strengthened by the conviction that our individual, local, national, or even European Union actions have little or no effect on averting dangerous climate change because the key issue is “the need to globally cease greenhouse gas emissions”. So why, for example, should Poland make this effort when “it has no chance of saving the climate, as its share in global emissions amounts to only 1%” (Popkiewicz, 2016). However, most people simply do not react to such an apparent logical error, believing that egocentric passivity towards climate change is justified in this way.

Finally, the low social awareness regarding this issue may also be “preserved” by the information policy in some countries, which is inconsistent with the truth (facts). Two examples of such a policy should be mentioned here. The first from Poland alleges that the European Union’s climate policy, or more precisely, the European Union Emissions Trading System (EU ETS), is responsible for as much as 60% of the increase in electricity prices at the end of 2021, while this 60%, in fact, applies only to 32%, i.e. the first component of the energy price (energy production costs) since the remaining 68% of the price comprises network usage costs and national taxes and fees. Without this explanation, a hostile or at least indifferent attitude towards the EU climate policy and, indirectly, the Paris Agreement goals is almost guaranteed, especially in the situation of very high inflation, not only in the area of energy prices (Rząd za ceny, 2022).

The second example comes from the USA, but it is, fortunately, of some historical significance only. It relates to the way Donald Trump addressed the issue of climate change during his presidency in 2017-2020. As emphasised by A. Plachciak (Plachciak, 2021, pp. 261-262), Trump displayed a manipulative ability to present difficult issues using catchy generalisations, and often outrageous fake news, which made the information he gave highly persuasive in the realm of social media. This unfortunately also applied to his statements on climate change, in which Trump, when referring to global warming, questioned its existence, interchangeably calling it a costly, total mystification, a completely controlled enterprise, or real stupidity, or fiction, myth or nonsense, or manipulated and based on false science data as well as “a repeatedly proven lie” (Plachciak, 2021, p. 261). Did all of this have an impact on shaping public awareness of climate risks and on Americans’ recognition of the importance of effective climate policy? According to John McWhorter – a

linguist from Columbia University – the fact that in his statements on climate change, Donald Trump informally articulated his beliefs, he managed to appeal to the tastes and beliefs of millions of his fellow citizens. Especially when he claimed that “The concept of global warming was created by Chinese [...] they really do believe the American public is stupid”. According to A. Plachciak, the content of such statements undoubtedly captured the imagination of average U.S. citizens, leaving a long-term mark on their consciousness, including their approach to global and domestic climate policy (Plachciak, 2021, p. 262; McWhorter, 2017).

Other barriers to achieving climate goals

The third identified barrier is the **dominance of the short-term perspective and the urge to gain quick profits from investments**. While environmental awareness is one of the factors influencing our behaviours, our economic responses are driven by other processes resulting from the urge to gain quick profits and return on investment.

Individual countries declare their willingness to reduce greenhouse gas emissions by mentioning successive dates: 2030, 2045, 2050, and some even 2070. However, such long-term planning raises certain doubts. In practice, all that matters is what is happening now or in the near future, rather than some distant climate goals. For this reason, the Federal Constitutional Court in Germany has ordered the government to clarify how exactly it intends to achieve its climate goals by 2030. The court did not challenge the overarching goal but demanded that immediate targets be presented (Red in robe, 2021).

One example that can be used to explain economic behaviour is the oil and gas industry. Oil producers are no longer pursuing major investments. Pioneer intends to increase oil production by 5 percent over the next six years, and ConocoPhillips plans to raise it by 3 percent over the next decade. There is a relationship between lower investment and a higher price per oil barrel. In 2021 alone, the U.S. oil shale industry earned about 350 billion dollars. Investors are pleased because they are making money on their shares, and the share prices are soaring. In 2020 the oil shale industry declared the implementation of environmental, social and corporate governance (ESG) targets. There are limited prospects for pro-environmental extraction (methane leakage can be prevented, and new combustion technologies can be used). It is believed that these companies are not pursuing environmental goals (these are less important), but are concerned with economic goals, i.e. higher dividends (Shumpeter, 2021).

The fourth barrier comprises **unethical determinants of investing in green projects**. It is not only greed or the desire for a quick return on investment that drives the economy and causes social inequality. Investments in

green projects can also be associated with moral or ethical considerations. It is well known that 70% of cobalt is mined in the Democratic Republic of the Congo, a country with a rich history of corruption. This mining sector exploits the country's poor (Caneiro Oliveira et al., 2020). Also, lithium mining has been problematic due to legal issues related to water injustices in the Atacama Salt Flats in Chile. Lithium extractivism increases both water depletion and ethno-cultural rifts in Salar de Atacama and intensifies protests and social mobilisation for water justice (Jerez et al., 2021; Condition for green growth, 2021).

The fifth barrier is **economic volatility**. Emissions of CO₂ and other hazardous environmental elements depend on many factors, such as the economic situation, which in turn is determined by a variety of other factors, including those of a random nature, such as pandemics or war conflicts. During the COVID-19 lockdowns, CO₂ emissions fell by 9 percent, but as the post-lockdown economy looked to rebound (or rather, investors sought to recoup their money), they skyrocketed (The switch, 2021). In October 2021, President Xi Jinping announced that China would stop funding new coal-fired projects overseas. However, Chinese coal mines were ordered to ramp up production to meet surging energy demand as the economy was recovering from the lockdown (Climate change, 2021).

The sixth barrier consists of “**anti-environmental**” **measures of economic growth**. Despite the fact that more and more people believe that economic growth cannot come at any cost and that the calculation of its benefits and drawbacks, including negative environmental impacts and climate change, should be increasingly acknowledged, their attitudes toward economic growth vary widely from ambivalence to concern (Tomaselli et al., 2019). It is not only economic growth that is important, but also the purpose for which its results are used as well as social and environmental costs. The classical economic growth measurement formula based on GDP (and GDP per capita) does not consider this. For many years, the necessity of moving away from such a measurement of economic growth to other indicators has been emphasised. An excellent example of such a measure is Daly and Cobb's Index of Sustainable Economic Welfare (ISEW), which is a non-monetary index of social welfare. It considers – unlike GDP – both mineral resource management and intergenerational social and environmental justice and involves weighted personal consumption, income distribution, and costs of ecological degradation (Woźniak, 2004).

The seventh barrier is **climate inequality and climate injustice**. One of the essential prerequisites for achieving climate goals is the participation of developing countries (Boodoo et al., 2018). Climate goals are closely related to climate-finance goals. In 2009, rich countries offered a sum of 100 billion dollars annually to developing countries, but in 2019, only 25 percent of this

amount was provided (50 percent was promised) (Heated debates, 2021). Poor countries are complaining about the lack of funding and express their observations that the greater responsibility for whatever is currently happening to the climate lies with the rich countries that prospered on dirty energy (Heated debates, 2021). The failure of the richer nations to fulfil their promises has undoubtedly damaged trust (McGrath, 2021).

In order to ensure that countries are equally involved, efforts must be made to secure an “fair” contribution from countries in the fight against climate change (within the framework of so-called climate justice) and, above all, a contribution from countries to the reduction of greenhouse gas emissions (Todić, 2020).

Inequalities involve more than just the commitment of particular countries. Another problem is wealth inequality, which affects environmental behaviours. Tackling extreme inequalities and eliminating excessive emissions associated with the consumption and investments by the world's wealthiest is critical to maintaining the Paris Agreement goals (Carbon inequality in 2030, 2021).

The eight key barriers to achieving climate goals include all the **resource and technological constraints**. Investments in green projects are blocked in the U.S. by some circles, especially wealthy individuals, who claim, for example, that wind turbines destroy scenic ocean views. The acreage for wind turbines and solar farms should reach 160,000 square kilometers in 2030, i.e. less than 2 percent of the area of the continental United States, but six times the size used in 2021 (Condition for green growth, 2021).

Almost every country has embarked on planting trees as a cheap way to reduce carbon emissions, but it is thought it may not be enough to achieve the forest cover required to meet the climate goals (What is net zero, 2021). A hectare of forest can contain between 1,000 and 2,500 trees, and so 5,000 hectares is almost nine million trees (Deforestation, 2021). These constraints are definitely related to the limited resources of the basic green elements (Condition for green growth, 2021; Khan et al., 2020).

Another issue concerns technological barriers and sometimes even the lack of certain technologies. For example, the much-touted carbon capture and storage technology is very expensive and as yet unproven (What is net zero, 2021). The widespread deployment of carbon capture and storage technology may almost double the anthropogenic water footprint. It is argued that compromises between climate change mitigation benefits and water resources must be explored (Rosa et al., 2021).

Achieving climate goals requires the deployment of new technologies and even new industries on a massive scale. The problem is that in the past, transformations in energy production and distribution have been slow. Steam and oil were added to new developments, and now they must be removed

(Condition for green growth, 2021). Research findings suggest that no new CO₂-emitting infrastructure can be commissioned and that existing infrastructure may need to be retired early in order to attain climate goals (Tong et al., 2019).

However, the development of new technologies should be approached holistically, i.e. not only through the prism of less energy-consuming equipment in the energy or chemical sectors but also in the context of hitherto neglected branches of the economy, for example, the construction industry. It is crucial to apply carbon capture and storage technologies in the production of basic building materials such as cement and steel (Johnsson et al., 2020). Another issue is that obsolete electric power transmission lines in Poland, and even in countries with a higher level of economic development, are often unsuitable for smart grid technologies (Luthra et al., 2014).

Political and institutional constraints constitute the ninth barrier. They are connected not only with the lack of awareness, will to act, or pressure from various interest groups but also with the fear of high costs of transformation. Their derivatives are the fears of those in power to stay in power. Moreover, the methods used to measure the costs of transformation have numerous limitations, which renders it difficult to make rational decisions. Bureaucratic barriers are also an important constraint as they hamper the undertaking of pro-environmental actions.

The main political and institutional constraint appears to be concerned about transition costs. Scenario models run by central banks suggest that the transition to a renewables economy will entail higher price levels in the long term. This is particularly important at present as the world economy emerges from the COVID-19 pandemic with high inflation rates, which are further exacerbated by Russia's military invasion of Ukraine. It is believed that while it is necessary to recognise the economic benefits of saving the planet, it is also essential that the public be provided with a clear roadmap, including the economic disadvantages of the climate transition (The Bank of England, 2021).

A second less apparent problem lies in methodological barriers hindering policy decisions. One study sought to determine to what extent sustainability ratings reflect company performance in achieving the 2°C targets. For this purpose, researchers analysed "nine rating schemes used by investors and three commonly used in academic studies. Most rating schemes do consider corporate greenhouse gas emissions in their analysis, whereas only a minority scale emissions by factors that have the potential to allow benchmarking against science-based targets. None take the final step of mapping climate indicators against the 2°C target" (Rekker, 2021).

There is no doubt that the big role is to be played by energy modelling that can assist national decision makers in determining strategies that

achieve net-zero greenhouse gas emissions. However, there are concerns about whether the current models provide sufficient information about system feasibility, actor behaviour, and policy effectiveness. In the modelled options for mitigation, a range of demand-side measures are often absent, resulting in a risk of overreliance on carbon dioxide removal (CDR) and leading to “concerns over the robustness of corresponding pathways” (Pye et al., 2021).

The third problem is the low efficiency of public administration. Bureaucratic procedures in functional structures significantly lengthen decision-making processes, which threatens the development of modern technologies and delays financial support for poor countries. Reaching agreements to build new power distribution lines between U.S. states alone could take up to more than a decade (Condition for green growth, 2021), and in Germany, the Federal Climate Change Act advances a multi- rather than cross-sector climate governance, failing to increase coordination across sectors and ministries (Flachsland & Levi, 2021).

Lack of uniform legal regulations and market conditions is the tenth barrier. It is the source of many unethical environmental behaviours in organisations (see Bugdol et al., 2021). The lack of a single market for emissions trading and carbon pricing also exacerbates these behaviours. Researchers suggest that only a full global adoption of common legal regulations can contribute to more effective implementation of environmental goals (The great disrupter, 2020).

The carbon price is soaring, but it does not affect all areas of human activity. Maritime transport, for example, is not expected to be covered by a regulatory scheme until several years from now. Road transport and emissions from buildings may be covered separately (Coming into its own, 2021). The current CO₂ emissions trading scheme is attractive to speculators and big market players (Coming into its own, 2021). The trading system for these permits may favour those who are the largest, with the most financial resources (The great disrupter, 2020). For example, in February 2021, an emissions permit trading market was launched in China, but it did not cover all industries. Moreover, companies have to pay only 20 percent if emissions exceed the set standards. The maximum fines are only \$4,500 (Cleaning up, 2021).

Conclusions

1. With respect to the *first barrier*, it should be noted that “None of the countries that has a net zero target has implemented sufficient short-term policies to put itself on a trajectory towards net zero” (McGrath, 2021). Australia did not announce any defined targets prior to the Glasgow summit, and Russia and Indonesia did not declare any changes from previous agreements. India also did not alter its climate strategy to meet climate goals more effectively (Heated debates, 2021). The data in Table 1 for the top five CO₂ emitters show both favourable and unfavourable changes in 2019 compared to 2018. China (up 3.4 percent) and India (up 1.6 percent) saw the most significant emissions increase.
2. In contrast, the most significant decrease was observed in the EU+UK (by -3.8 percent), the United States (by -2.6 percent) and Russia (by -0.8 percent). The share of coal in global electricity production fell to 34 percent in 2020, i.e. the lowest contribution of this fuel in more than two decades. However, according to BloombergNEF, coal still remains the biggest source of energy. At the Glasgow Climate Summit in 2021, under pressure from India and China, coal commitments were significantly reduced because in the COP26 (Glasgow Climate Pact) final declaration, instead of moving away from coal, countries committed only to phase down the use of unabated coal, which could be detrimental to the implementation of the Paris Agreement climate goals (Dlaczego Chiny i Indie, 2021). Achieving these goals requires more ambitious changes to food systems as well as the elimination of fossil fuels and other non-food emissions (Clark et al., 2020).
3. As far as the *second barrier* is concerned, the balance between factors conducive to the growth of social awareness of climate threats and factors perpetuating the state of low awareness, or even unawareness of those threats, reveals, however, that in spite of positive changes in the understanding of some social and professional groups, there is still great inertia in the ways of approaching this problem. The most popular myths about the causes, effects and the very existence of the phenomenon of climate change, the conviction about the insignificant influence of our individual, local or national actions on these changes, and the incidents in the field of information policy, which are “spotty”, but very harmful for building pro-environmental awareness, as well as the low understanding of the real effects of climate change among the political elite in some countries, all play a particularly unfavourable role here.
4. The urge to gain quick profits from investments (the *third barrier*) is associated with the domination of a short-term perspective over a

medium- and long-term perspective in economic planning. The long-term view, which is how climate goals are formulated, does not always resonate with individual stakeholder groups, as it often extends beyond their life horizons. It is, therefore, necessary to disaggregate long-term goals into medium- and short-term ones and to demonstrate to the public the specific, positive effects of their implementation.

5. Unethical determinants of investing in green projects (*fourth barrier*) are not only related to the exploitation of developing countries but also to the fact that the extraction of some of the resources needed for new green investments may expose humanity to further poverty and cause irreversible climate change.
6. Economic volatility (*fifth barrier*) is a natural occurrence, but it is now compounded by factors such as pandemics and wars. These extraordinary events mean that declarations about investing in green ventures can become mere promises. Investor behaviours are not only unethical, but they are also dilemmas investors face when they have to make decisions about green investments (vide the cobalt mining situation). The “colonial shadow of green electromobility” (Jerez et al., 2021) encountered in places where lithium is mined is the best evidence of the social and economic barriers to introducing modern technologies.
7. With regard to the existing anti-environmental measures of economic growth (*sixth barrier*), it should be concluded that it is not only economic growth that is important, but for what purpose its effects are used and what its social and environmental costs are. This is what the classical formula for measuring economic growth based on GDP (and GDP per capita) does not address.
8. Achieving the climate goals is problematic because it requires, on the one hand, billions in investment and solidarity with others and, on the other hand, the removal of numerous constraints (*seventh barrier*). To a significant extent, the lack of the same goals is due to a sense of injustice. For example, India is a significant emitter of CO₂, but it is also a former colony and, on a per capita basis, emits minimal CO₂. Hence it demands a different methodology for calculating emissions relative to GDP. Inequalities are both a cause and an effect of the difficulties in achieving climate targets. It is hard to deny that the wealthiest countries were and still are the main polluters. Those who have already accumulated wealth are now urging others to fight climate change while still failing to meet their financial targets.
9. The main barriers also include resource and technological constraints (*eighth barrier*) as well as political and institutional constraints (*ninth barrier*). While the former can be partly eliminated (we will not produce new land, but we can increase forest cover from 38% in the EU to 45%),

the latter should be removed as soon as possible, especially those that hinder undertaking many investments and settling financial resources due to the lack of procedural approaches.

10. Lack of uniform legal regulations and market conditions (*tenth barrier*) is caused by different levels of economic development and different legal cultures but can also result from various latent interests (e.g. the desire to retain dirty energy industries within one's country in order to maintain a high rate of economic growth or to counter unemployment).

The following changes, which could increase the odds of achieving the climate goals set out in the Paris Agreement, should be recommended:

1. Behavioural changes are needed, e.g., reduction of meat consumption, use of low-carbon heat pumps, removal of long-distance travel, and investments in less energy-intensive home appliances (What is net zero, 2021). Even if fossil fuel emissions were immediately halted, current trends in global food systems would prevent the attainment of the 1.5°C target and, by the end of the century, threaten the achievement of the 2°C targets (Clark et al., 2020).
2. Scaling down resource uses is also the most feasible way to achieve the climate targets as it reduces energy demand (Hickel, 2019).
3. There is a need to modify the perception of the sustainable development goals. Significant direct and indirect interconnections exist between sustainable development goals and the Paris Agreement (İzzet, 2017). It is often difficult to combine living in harmony with nature with the need for economic development, which is why some researchers propose alternative pathways for realising human development objectives that rely on reducing inequality within nations and between them rather than aggregate growth (Hickel, 2019).
4. It is necessary to reduce emissions not only of CO₂ but also of other gases such as methane and nitrous oxide. Methane is a potent greenhouse gas, about 80 times more effective at trapping heat in the atmosphere than carbon dioxide, and its emissions have increased in recent years. One of its sources is agriculture. With the growing human population, reducing methane emissions will be a challenging task. Given the estimated emission of 11.7 Gt C per year for 2019 due to combustion of fossil fuels and deforestation, simulations suggest that the 1.5°C target of the Paris Agreement will not be achieved unless carbon and methane emissions are severely curtailed in the next 10 years (McBride et al., 2021).

Table 2. Main barriers to achieving climate goals

Barrier	Barrier removal odds	Comments
Lack of uniform goal attainment policies among major emitters	Small odds of removal, despite announcements of joint action by the Chinese and U.S. governments starting in 2021	This is more a consequence of inequality and pressure from various interest groups (see Australia's targets). Investments by oil companies in African countries continue (major investors include Agip, BP, Chevron, Exxon Mobil, Shell).
Low public awareness of risks	Significant. The odds will increase as more disasters become apparent, and education is broadly defined and expanded.	It is a determinant of actions taken, strongly constrained from the point of view of the decision-maker in the organization who makes short-term decisions and engages in pro-organizational anti-environmental behavior.
Dominance of short-term perspective and urge to gain quick profits from investments	Slight odds of removal, which is caused by the desire for returns on dirty investments and driven by business models.	The short-term perspective is supported by low levels of business confidence. Data suggests that CEO tenure rates are decreasing (e.g. https://corpgov.law.harvard.edu/2018/02/12/ceo-tenure-rates/)
Unethical determinants of investing in green projects	Small odds of removal – possible reduction	This barrier results, among others, from large economic inequalities within individual countries, or the usurpation of greater rights to use resources by large corporations. It may be limited by actions aimed at increasing global economic cohesion, support for countries with a low level of economic development in the climate policy, or increasing the use of 'green' economic policy tools in developed countries (moving away from income taxes to green taxes, intensification of research and development, generating 'green' investments, etc.).
Economic volatility	No barrier removal possible	Economic volatility is a natural process occurring in free market economies. In the near term, as a result of pandemics and war, it is expected that the global economy will become more imbalanced. It is important to maintain the direction of the climate goals, as there will be strong pressure to relax them or even „suspend“ the climate policy.
Anti-environmental measures of economic growth	Average odds of barrier removal	The measurement of economic growth using traditional indices, mainly GDP, despite many disadvantages, has also an indisputable advantage, namely the universality of its methodology and the possibility of comparing the level of economic prosperity in time and space. However, the development and popularization of complementary measures that take into account environmental issues should be pursued. Some modifications of classical indices are also possible, but these, as literature and economic practice show, are not easy.
Climate inequality and climate injustice	Small. Higher odds of restoring climate justice and lower odds of removing inequality.	Wealth inequalities are widening, the promises made so far to meet financial targets for the poorest have not been delivered, undermining confidence in these processes.
Resource and technological constraints	In the case of land, the odds are unfeasible; in the case of technology, the odds are high.	Research should consider to what extent the development of new technologies can offset the constraints of crop monocultures and limited land resources.

Barrier	Barrier removal odds	Comments
Political and institutional constraints	Average odds of barrier removal. If there are concerns about environmental costs the odds will increase	The most immediate, assuming there is such awareness, is the simplification of administrative procedures, which will accelerate the approval process and pro-environmental decision-making. Pressure from interest groups due to political attitudes can be a significant obstacle (vide anti-environmental lobbying). As the consequences of global warming become more visible, cost concerns will be reduced.
Lack of uniform legal regulations and market conditions	Odds are small, which is due to a number of factors: pressure from interest groups, legal culture, latent interests of industrial corporations	Emissions pricing is currently being implemented in other countries (e.g. China), but regulations to reduce carbon leakage (affecting one-fifth of the globe) are also being introduced.

Source: authors' work based on literature review.

The contribution of the authors

Tadeusz Borys – 40% (conception, methodology, literature review, data analysis, interpretation, writing and correction).

Marek Bugdol – 30% (conception, methodology, literature review, data analysis, interpretation, writing and correction).

Daniel Puciato – 30% (literature review, data analysis, interpretation, writing and correction, text edition).

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