Better late than later

Carbon footprint reduction and corporate climate competitiveness in Poland

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This document was published in January 2022, before the Russian invasion of Ukraine. The developed charts, statistics and data reflect the situation of the Polish and European economy based on the current knowledge at the time of issuing the report.

In descriptions where a significant change took place due to geopolitical factors, we indicated what has changed by adding an appropriate reference in a footnote.

30 years

The Polish economic success of the last 30 years has been achieved largely due to the adaptability and entrepreneurial spirit of the private sector with the support and benefits coming from Poland's membership in the European Union (EU) beginning in 2004. Today, Polish business again faces the need for transformation and adjustment comparable to the fall of communism after 1989. Activating the entrepreneurial potential, innovation, and adaptability of the private sector offers the opportunity for another amazing victory, this time in the area of climate competitiveness. With the support of EU mechanisms, we can win again, despite the relatively difficult starting position - this time in the green game. History likes to repeat itself, but for it to happen, it requires strong leadership and determination.

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Reducing the carbon footprint and building climate competitiveness should be a priority task for Polish companies

Our planet is boiling. Global warming is a scientifically proven fact; its consequences, which are already -felt, will be experienced by all of us. Despite many actions on a global scale, data analysis shows that we are not able to reduce emissions, not to mention entering the abatement pathway in line with the Paris Agreement. Meanwhile, this would be the only way to mitigate the global temperature increase to 1.5, or a maximum of 2ºC. Following a significant pandemic-related abatement in 2020, global greenhouse gas (GHG) emissions in 2021 are returning to pre-pandemic levels and are set to break new records in 2022.

What must happen for the abatement policies to be effective? Until recently, the missing piece of the puzzle was the real and ambitious commitment of enterprises. Business is directly and indirectly responsible for more than 70% of global emissions and has a decisive role to play in reducing them. Therefore, it is not surprising that the pressure to reduce emissions is increasing all over. The emission level is becoming one of the key parameters defining the market position of a company and its products in the new, low-carbon economy. Poland will not be an exception in this respect.

Since 50% of Polish GDP is based on exports and 75% of it goes to EU countries (including 29% to Germany), for most Polish companies, the zero-emission strategy and the zero-emission target of the EU and Germany are a fundamental change in the business environment. Is Poland ready for this?

The year 2021 brought a significant acceleration of the decarbonization policy at the European level, which is reflected, for example, in The Green Deal and the proposed package “Fit for 55”. These documents offer a comprehensive system of climate-supporting regulations that affect companies both directly and indirectly. Examples of mechanisms that directly affect business include support for energy efficiency and renewable energy sources, abatement of industrial emissions, a comprehensive corporate climate reporting system (including climate and environmental reporting, with a planned carbon footprint reporting requirement for companies with more than 250 employees, to be included in annual reports beginning in 2023), or the emission trading system (EU ETS). Indirect solutions

affecting companies include, e.g., financial market regulations, which are to reallocate private capital investments and funds from the banking sector to climate protection-related investments and companies that meet precisely defined requirements in this regard.

The decarbonization policy in Germany is also clearly accelerating. The first sign was the amendment to the Climate Protection Law ("Klimaschutzgesetz"), as part of which a more ambitious emission abatement goal by 2030 was adopted, and the zero-emission target was already set for 2045. This amendment was made following the judgment of the German Federal Constitutional Court, which deemed the existing provisions in this respect unconstitutional in April 2021. The result of the September 2021 elections and the composition and program of the new government coalition with the participation of the Greens also indicate a clear pro-climate direction in German policy. Concluded relatively quickly, the detailed coalition agreement provided for several mechanisms for further, radical acceleration of the “green” transition. It postulates accelerating of the deadline for abandoning coal from 2038 to 2030, achieving an 80% share of renewable energy by 2030, allocating 2% of the country's territory to wind farms, and roofing all new refurbished buildings with photovoltaic panels, as well as implementing the “green” hydrogen strategy as the industry's path to decarbonization.

50%

of Polish GDP is based on exports and 75% of it goes to EU countries, including 29% to Germany.

An important, yet underestimated element impacting the climate competitiveness of Polish companies will be more and more clearly formulated expectations of German and European contractors who will implement their own ambitious climate policies towards their trade partners, e.g., from Poland.

Western companies set specific emission abatement targets, both direct and indirect (emissions in the supply chains), in line with the abatement paths required by the implementation of the Paris Agreement objectives. This means reducing emissions by 50% by 2030 and achieving net-zero emissions by 2050. Meanwhile, many Polish companies still hesitate to take a serious approach to the subject of calculating carbon footprint, building GHG emissions reduction strategies, and climate reporting.

For the purpose of this report, a CDP-provided database was examined thoroughly to determine the advancement of climate strategies of Polish and Western European companies. Additionally, studies in this area published in Poland and Europe in the last two years were analyzed. Unfortunately, the conclusion is unanimous. **Polish companies are significantly lagging behind in implementing climate strategies.** Only a few calculate carbon footprint, and even fewer, have ambitious, verified goals in line with the Paris Agreement pathway and have defined a detailed action plan or initiative programs. The activity of business in implementing “green” energy solutions is also relatively low. The development of photovoltaics in Poland has so far been based mainly on the private sector and, partially, state auctions. The share of companies in the Renewable Energy Source (RES) market is insignificant, and the popularity of long-term contracts for the

supply of renewable energy to companies (the so-called Corporate Power Purchase Agreement, PPA) is low. The actual, and significant burden on the climate competitiveness of domestic companies is Poland's structurally unfavorable energy mix, which causes the carbon footprint to be between 2 and 15 times greater than in other EU countries.
The average emission intensity of the Polish economy per unit of GDP is between 2 and 5 times higher than in other EU countries due to the continuously highest share of coal in power production in Europe. This is due to the continued, top-European share of coal in electricity production, as well as high electricity consumption (Poland consumes 3 times more electricity per GDP unit than the OECD average).

The delay in the transformation of the energy sector in Poland, combined with the low activity of individual enterprises in this respect, leaves Polish companies with a very unfavorable starting position and means difficulties in competing in four areas:

- electricity costs,
- carbon footprint of products in both own supply chains and the organization itself,
- access to "green" funding,
- climate innovation in terms of products and services.

The lack of readiness or ability to compete in these areas carries specific business risks, including loss of customers, markets, and profits, as well as hindered access to funds.

At the same time, however, the "green" transition means not only threats and challenges, but also opportunities. In order to take advantage of such opportunities, Polish companies must urgently implement advanced climate strategies. Please note that ambitious climate strategies go significantly beyond overall image-building activities or the purchase of "green" energy itself. These strategies must achieve specific and measurable goals and implement profound changes in processes, products, supply chains, and the transformation of entire business models.

These strategies should be based on:

- analytically refined, measurable goals in line with EU plans and paths of goals of the Paris Agreement,
- specific reduction initiatives in different corporate operational areas,
- planned corporate energy transition,
- cooperation programs within supply chains,
- a climate innovation program as part of corporate products and services,
- thoughtful emission offsetting strategies.

Such an approach requires appropriate attention from the management boards, a dedicated team and interdepartmental cooperation, the appropriate skills and analytical tools, as well as investments spread over time.

In addition to building the climate competitiveness of their organizations and products, Polish companies should postulate, support, and lobby for accelerating systemic changes in the Polish economy toward decarbonization, especially in terms of transformation of the national grid toward a significant increase in the share of renewable, zero-emission energy sources.

How to use this report?

This report has been prepared in the form of a comprehensive guide on climate competitiveness, addressed to the owners, supervisory and management board members, as well as the managers of medium and large companies. The study also aims to provide comprehensive knowledge to audiences who have not encountered any issues related to the carbon footprint, climate strategies, or issues related to the energy transition so far. For this reason, the report covers all the important aspects necessary to understand the strategic implications of decarbonization, not presuming to completely exhaust particular topics (to maintain reasonable volume and readability). Therefore, some elements of the study can be discussed only briefly or omitted by people previously familiar with the subject of the corporate carbon footprint.

The report includes several parts.

The prologue – introduces the role of business in climate change mitigation, explaining the concepts and definitions related to the carbon footprint, including its calculation standards, Scopes 1 - 3 of the corporate and product carbon footprint. Familiarity with these foundations is essential for navigating the rest of the discussion.

Chapter 1 – presents a picture of changes in the external environment, especially in the EU and its largest economy, Germany, which is also Poland's largest trading partner. A synthetic picture of the regulatory mechanisms at the European level and the accelerated decarbonization policy in Germany is discussed, followed by changes in the local financial institutions as part of the decarbonization of the economy. The impact of each of these elements on business is also discussed. Readers familiar with the subject of EU regulations, "green" funds or German decarbonization policy can skip the relevant parts of Chapter 1.

Chapter 2 – provides an overview of the main climate strategy-related international business initiatives, especially reporting on climate change through CDP, as well as determining science-based targets (SBTs) and their verification as part of the Science Based Targets initiative (SBTi). Additionally, the authors discuss the definition of the Net-Zero Standard published by SBTi in November 2021.

Chapter 3 – offers a comparative benchmarking of Polish companies against those in western Europe (Germany, France, the UK, and Spain) based on the analysis of CDP's data. This is the first time such detailed data have been published. Having also reviewed other studies in this area, the authors have assessed the relative advancement of Polish companies in terms of climate strategies. Readers well-acquainted with the climate issues discussed in the Prologue and Chapters 1 and 2 can start reading the report from this chapter.

Chapter 4 – is an in-depth analysis of selected companies that have implemented advanced climate strategies, to clearly illustrate their policies. It can be used independently of the other elements of the report.

Chapters 5 and 6 – offer a summary of the conclusions on climate competitiveness that management must consider, a set of recommendations for specific actions to be taken urgently, a roadmap for building a climate strategy, and the "Checklist for CEOs". For readers focused on the business implications of the carbon footprint and decarbonization topics, as well as all those who are action-oriented, the authors recommend these two chapters, followed by a selective reading of Chapters 1-4.

This report can be used as a comprehensive guide to climate competitiveness, or as a collection of individual parts, to be used as needed.

2030
2050

Western companies set specific emission abatement targets, both direct and indirect (emissions in the supply chains), in line with the abatement paths required by the implementation of the Paris Agreement objectives. This means reducing emissions by 50% by 2030 and achieving net-zero emissions by 2050.

Meanwhile, many Polish companies still hesitate to take a serious approach to the subject of calculating carbon footprint, building GHG emissions reduction strategies, and climate reporting.

By reducing its carbon footprint, business has a key role to play in mitigating climate change

To protect the world from the effects of global warming, greenhouse gas (GHG) emissions must be mitigated for real, and immediately.

The policies and measures currently implemented are far from sufficient. Therefore, the world is on the path to global warming which will result in catastrophic and irreversible climate change. The main cause of climate change is the continuous increase in the concentration of carbon dioxide (CO_2) and other GHGs such as methane and nitrous oxide in the atmosphere. Despite years of efforts on the part of governments, the United Nations, as well as business and the NGO sector, little progress has been made in reducing emissions. In 2015, a broad, international coalition under the Paris Agreement set a goal to achieve emission abatement targets allowing for a mitigation of global warming to a maximum of 2ºC (compared to the pre-industrial era) and to take additional measures towards mitigating climate warming to 1.5ºC. Today's global warming is 1.2ºC, compared to the pre-industrial era. The possible scale of further emissions to mitigate climate change (the so-called "carbon budget" of possible emissions, within which the world economy must operate) is steadily abating. In its report published in August 2021, the Intergovernmental Panel on Climate Change (IPCC) estimates global carbon emissions to date (from 1850 to 2019) at 2,390 $GtCO_2$ (billion tones of CO_2). The remaining carbon budget, at the adopted goal of mitigating the temperature increase to 1.5ºC, with an estimated probability of 83% (i.e., without 100% certainty), is 300 $GtCO_2$. Assuming the target is mitigating the temperature to 2.0ºC, at an estimated probability of 83%, the remaining carbon budget is 900 $GtCO_2$ [1]. With 2021 emissions estimated at approx. 37 $GtCO_2$ [2], the remaining carbon budget for 1.5ºC warming will be exhausted in less than 10 years, and for the 2ºC warming target in 25 years. Therefore, mitigating climate warming to 1.5 or 2.0ºC requires implementing scientifically calculated emission abatement paths, meaning an immediate reversal of the emission increase trend and their significant abatement already in the current decade, by 2030. Unfortunately, after a slight drop in emissions in 2020, mainly due to the pandemic

[1] *„IPCC 2021, AR6, Summary for Policymakers*
[2] *Nauka o Klimacie portal, November 4, 2021, https://naukaoklimacie.pl/aktualnosci/global-carbon-budget-2021-przeglad-swiatowych-emission-co2/, accessed on December 2021.*

and the restrictions regarding business and travel, in 2021 GHG emissions returned to their pre-pandemic levels. In 2022, according to forecasts, they will break new records [3].

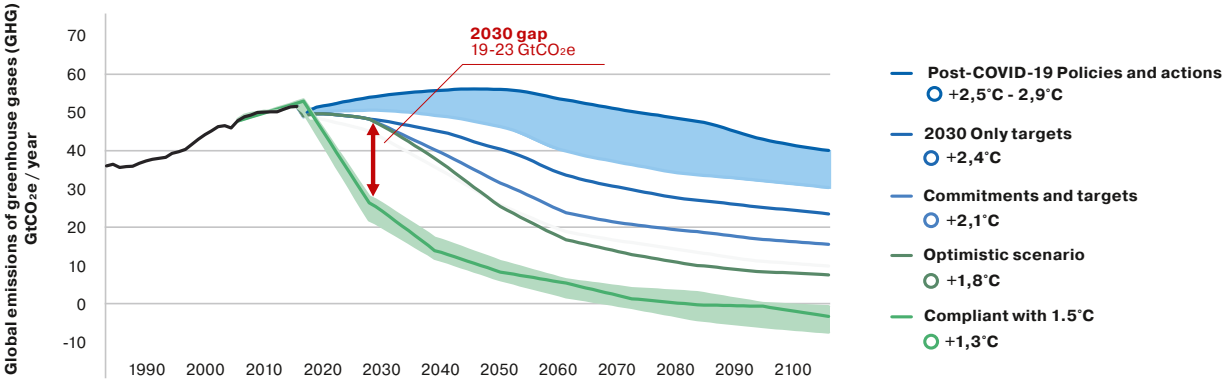
According to the Climate Action Tracker, the currently implemented measures and policies will have brought about a warming of 2.5-2.9ºC by the year 2100. National pledges, if they are met by the year 2030 ("The 2030 National Determined Contributions (NDCs)"), including those not supported by specific actions or policies, estimate the scenario at 2.4ºC warming, and long-term commitments at 2.1ºC.

These 1-2˚C differences in the increase in average global temperature can significantly escalate environmental effects. A concise summary of some of the most important parameters is found below.

Global temperature increase scenarios up to 2100

Global warming projections for 2100*

Emissions and expected global warming based on commitments and current policies



* *Updated on November 2021

Source: Climate Action Tracker

Firstly, a change in the average also means a shift in the entire temperature distribution, and thus a significantly greater frequency of extreme temperatures and weather phenomena, with a greater impact on individual environmental effects. Secondly, some of the environmental effects increase non-linearly, i.e., above a certain safe temperature range. This causes a significant intensification of the effects.

[3] *Nauka o Klimacie portal, November 4, 2021, https://naukaoklimacie.pl/aktualnosci/global-carbon-budget-2021-przeglad-swiatowych-emission-co2/, accessed in December 2021.*

Global warming scenarios – selected effects

Increase in global warming by 2100	1,5°C	2°C	3°C	4°C
Sea level rise	Sea level rise by 48 cm The need to resettle 46 million people	Sea level rise by 56 cm The need to resettle 49 million people	Sea level rise by more than 7 meters The Greenland ice sheet is almost completely melting	Sea level rise by almost 9 meters 470-760 million people at risk
Water	Water shortages in the Mediterranean, Australia, Brazil and Asia	8% of the world's population faces severe water shortages	Loss of almost half of the Himalayan glaciers	More frequent and more extreme droughts
Food	Restrictions on the production of wheat, rice, corn and soybean	A significant drop in the amount of crops	Extinction of local fish species	Global food insecurity
Fauna and flora	9 out of 10 coral reefs at risk of serious degradation	99% of all coral reefs disappear	Possible collapse of marine ecosystems	Half of all plant and animal species face local extinction

Source: Climatenexus: Comparing climate impacts at 1,5°C, 2°C, 3°C and 4°C

" Complex systems are non-linear, i.e., they break down or change radically when certain critical parameters are exceeded. For some time, they can "handle it", but if a certain level is exceeded, the system crumbles. The ecosystem is a great analogy. In this year's dramatic analysis, the famous climatologist Jonathan Rockstrom and his team have identified 15-16 "switches" in the global climate system. If they are exceeded, the system will crash beyond recovery. At the moment, nine of them are close to critical (bifurcation), and three have already reached the critical level. There are approximately 10 years left to mitigate this; otherwise, there is no return. Similarly, until the critical level is reached in economic, social, logistic, and political macrosystems, we will manage somehow. The problem is that we do not even know what and where these "switches" are."

– Prof. Piotr Płoszajski on climate as a complex system [4]

[4] *Quote from an interview for Rzeczpospolita portal, December 21, 2021, https://www.rp.pl/dodatki/art19220151-nowa-nienormalnosc-i-pandemia-nierownowag, accessed December 2021*

Climate risks: 1,5°C global warming

6% of insects **8%** of plants **4%** of vertebrates
lose over half of their climatically determined range

100%
increase in flood risk

46 M
people impacted by 48 cm SEA-LEVEL RISE by 2100

1 BILLION
people exposed in severe HEAT WAVES every 5 years

ice-free summers in the ARCTIC SEA every
100 years

350 M
urban residents exposed to severe drought by 2100

70-90%
loss of the world's CORAL REEFS

Lower economic growth at 2°C than at 1,5°C, particulary low-income countries

Lower yields and nutritional content of cereal crops in tropical regions

Decliming ocean productivity substantialy lower at 1,5°C than at 2°C

Climate risks: 2°C global warming

18% of insects **16%** of plants **8%** of vertebrates
lose over half of their climatically determined range

170%
increase in flood risk

49 M
people impacted by 48 cm SEA-LEVEL RISE by 2100

2,7 BILLION
people exposed in severe HEAT WAVES every 5 years

ice-free summers in the ARCTIC SEA every
10 years

410 M
urban residents exposed to severe drought by 2100

>90%
loss of the world's CORAL REEFS

Lower economic growth at 2°C than at 1,5°C, particulary low-income countries

Lower yields and nutritional content of cereal crops in tropical regions

Decliming ocean productivity substantialy lower at 1,5°C than at 2°C

Source: WRI: Comparing climate impacts at 1.5°C and 2.0°C warming, WWF

70%

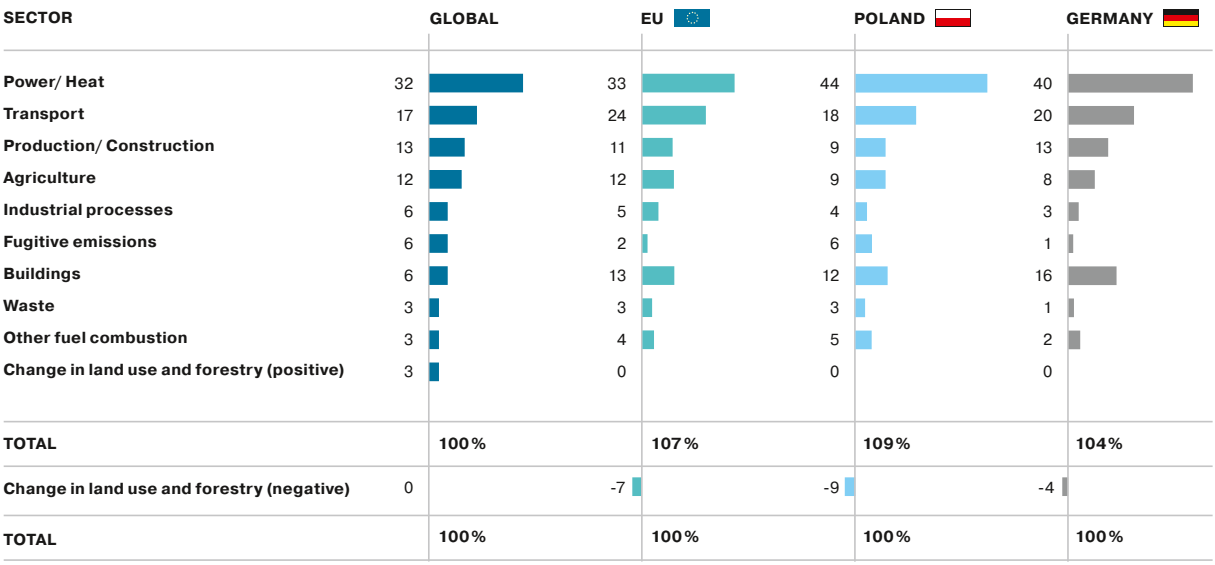
Business impacts directly and indirectly more than 70% of GHG emissions worldwide.

Please note that the projected effects of climate change, including the one presented by the IPCC and indicated in the figure above, represent a scientific consensus focused on the most likely scenarios. They do not fully consider the possible non-linearities and the effects of exceeding the critical points, as indicated by some scientists, including the above-mentioned Jonathan Rockstrom.

The structure of global, European, and Polish emissions shows that it is impossible to achieve significant results in climate change mitigation without the extensive involvement of business.

Business plays a key role in most emission areas

CO_2e, %, 2018



Source: Climate Watch, the World Resources Institute (2020)

Looking at the structure of the emissions, it is clear that business affects virtually every category and has a direct impact on some of them.

The direct categories for which business is fully responsible are emissions related to production, construction, and industrial processes, i.e., 13% of the emissions in Poland. The largest category of emissions, power and heat, is not only the responsibility of power producers and the consequence of the energy sector transformation, but also of individual corporate power buyers. Households only account for approximately 25% of all electricity and electricity consumption. The rest is the responsibility of business customers, ranging from small businesses to the largest power-consuming production plants. In terms of transport and buildings, a large proportion of emissions are those

directly related to business activity. Similarly, a significant proportion of emissions related to buildings is the result of business impact (corporate buildings). Even agricultural emissions remain indirectly impacted by food - processing companies. The total direct and indirect impact of business on emissions, both global and Polish, exceeds an estimated 70% of total emissions.

For this reason, in recent years there has been a growing pressure on companies to take specific actions, both from the public/consumers and regulators, at the global, European, and national levels (with varying intensity, depending on the country).

Carbon footprint: the measure of an organization's share of GHG emissions.

The basic, measurable indicator of business challenges in the context of climate change mitigation is its **carbon footprint**. In practical terms, understanding the starting point is the first step to taking part in the "race to zero": the quest to completely eliminate emissions that is ahead of companies. A detailed understanding of the carbon footprint structure also allows for the understanding of both climate "quick wins" and the level of long-term challenge involved in bringing a company to zero emissions.

Carbon Footprint – basic definition

Carbon footprint quantifies the amount of greenhouse gas emissions (GHG) caused during the whole lifecycle of a studied functional unit, which can be:

Carbon footprint calculation includes emissions of carbon dioxide, methane, nitrous oxide and other GHGs. Carbon footprint is expressed in CO_2 equivalent (CO_2e), which is a universal unit that indicates the global warming potential (GWP**) of each GHG, expressed in terms of GWP of one unit of carbon dioxide

* Greenhouse Gases (GHG), ** GWP - Global Warming Potential, źródło: GHG Protocol

A thorough understanding of the definition and how to measure carbon footprint is essential to understand how climate competition will evolve between firms and economies. It is also the necessary foundation for all the conclusions offered in this report.

Corporate **carbon footprint** is the total amount of GHG emissions related to business activity, expressed in CO_2 equivalent.

It should be emphasized that carbon footprint not only refers to the emission of CO_2, but also of other greenhouse gases, e.g., of methane and nitrous oxide. Refrigerant leakages can also be extremely important in some types of business, e.g., for distribution companies using the cold chain or for meat producers. For them, emissions of GHG other than CO_2 will contribute significantly to their total carbon footprint. According to the standards for calculating carbon footprint, emissions of all GHGs are converted into CO_2 equivalent emissions, using appropriate conversion indices that express the strength of the impact of individual gases on global warming.

The carbon footprint is not just CO_2

According to the GHG Protocol, the carbon footprint includes the emission of the following greenhouse gases:

CARBON DIOXIDE (CO_2)
METHANE (CH_4)
NITROUS OXIDE (N_2O)
SULFUR HEXAFLUORIDE (SF_6)
PERFLUOROCARBONS (PFCs)
HYDROFLUOROCARBONS (HFCs)
NITROGEN TRIFLUORIDE (NF_3)

Name	GWP* relative impact on the greenhouse effect
Carbon dioxide (CO_2)	1
Methane (CH_4)	28
Nitrous oxide (N_2O)	265
Sulfur hexafluoride (SF_6)	23 500
Nitrogen trifluoride (NF_3)	16 100

* GWP - 100 year global warming potential according to IPCC Report (AR5), a potential relative impact on the greenhouse effect in relation to CO2
Source: GHG Protocol

Measuring carbon footprint is based on established and well-defined standards, the most widespread and reputable of which is the **GHG Protocol**. It is a detailed methodology that allows for the calculation of corporate carbon footprint in various scopes, as well as those of products or services.

Corporate carbon footprint: standards and norms

GHG Protocol. A Corporate and Reporting Standard, revised edition, March 2004. World Resources Institute and World Business Council for Sustainable Development

GHG Protocol. Scope 2 Calculation Guidance. An amendment to the GHG Protocol Corporate Standard, 2015. World Resources Institute

GHG Protocol. Corporate Value Chain (Scope 3) Accounting and Reporting Standard, September 2011. World Resources Institute and World Business Council for Sustainable Development.

ISO 14064 standard Greenhouse gases.

PN-EN ISO 14064-1:2019-04
Part 1 (2018): Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals

PN-EN ISO 14064-2:2019-07
Part 2 (2019): Specification with guidance at the project level for quantification, monitoring and reporting of GHG emission abatement or removal enhancements

Source: GHG Protocol, incl. Required Greenhouse Gases in Inventories. Accounting and Reporting Standard Amendment, February 2013

Carbon footprint – emission scopes

SCOPE 1	SCOPE 2	SCOPE 3
Direct emissions resulting from: • Combustion of fuels in on-site or mobile sources owned or supervised by the company • Emissions resulting from technological processes • Fugitive emissions of refrigerants	**Indirect energy emissions** resulting from: • Consuming imported (purchased or supplied) power and heat • Technological steam • Cooling (GHG emissions arise in production sites)	**Other indirect emissions** generated along the entire value chain as a result of, e.g., production of raw materials or semi-finished products: • Purchased goods and services • Waste management • Transport of raw materials and products • Business travels • Use of products by end users

Source: GHG Protocol; own study

To understand the impact of GHG emissions on the competitiveness of companies, it is essential to understand emission Scopes 1, 2, and 3.

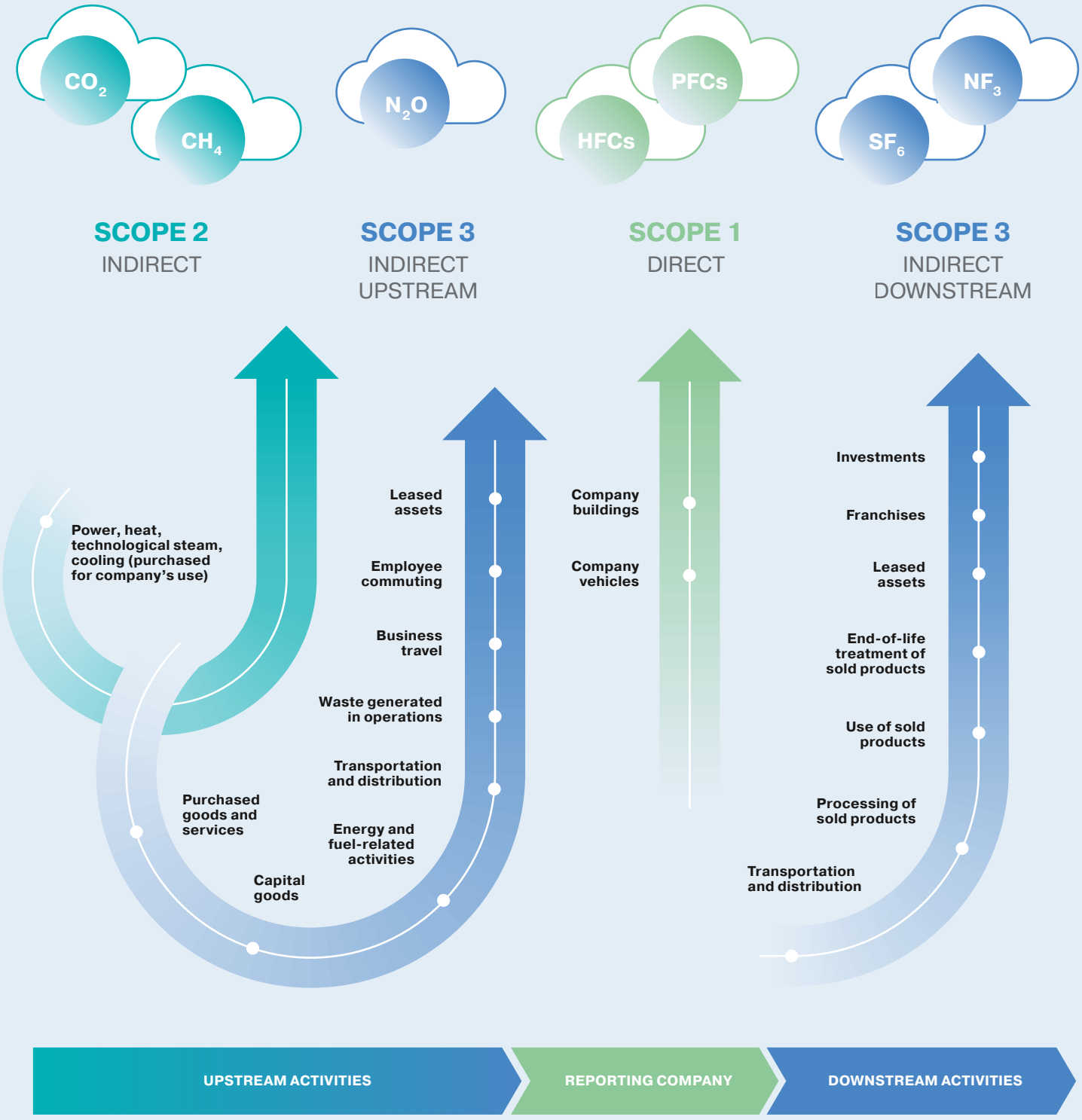
Scope 1 includes direct emissions resulting from the combustion of fossil fuels (or other GHG emissions) by the company. These are, e.g., gas combustion resulting from production processes or heating of buildings, fuel consumption by the corporate fleet, or fugitive emissions from, e.g., refrigerants leakages from freezers in a distribution center. Scope 1 is typically relatively easy to identify and calculate, as it mainly requires the collection of data on the corporate fuel consumption or refrigerant leakages.

Scope 2 is indirect emissions resulting from purchased electricity consumed by a company and possibly other media (e.g., heat or cooling). Identifying the Scope 2 carbon footprint is also relatively straightforward and requires mainly a detailed inventory of electricity consumption and sources (to determine the emission intensity of the power sources used).

Scope 3 is the most comprehensive view of the corporate impact on emissions. It considers the entire corporate value chain, from the carbon footprint of materials or semi-finished products used in production or services to emissions related to the use of the product and its disposal. Scope 3 also includes indirect emissions resulting from corporate operations, e.g., waste management, business trips, emissions of shipping partners, and others.

It is difficult to accurately calculate Scope 3 emissions, as it requires partnerships in the value chain outside of the company, which are only indirectly influenced, e.g., through purchasing policies. Scope 3 also goes deep into business processes, production processes, and the corporate product mix. Optimizing Scope 3 emissions can often lead to a significant overhaul of the product portfolio or business processes. Only companies that are relatively advanced in their climate strategies have full data on their Scope 3 carbon footprint. Expanding the knowledge and activities in this area is one of the priorities of their corporate climate strategy and taking the first steps toward building competitiveness.

GHG emission scopes according to the GHG Protocol



Source: GHG Protocol Scope 3 Standard

25%

The largest category of emissions, power and heat, is not only the responsibility of power producers and the consequence of the energy sector transformation, but also of individual corporate power buyers. Households only account for approximately 25% of all electricity and electricity consumption. The rest is the responsibility of business customers, ranging from small businesses to the largest power-consuming production plants.

Carbon footprint: different industries and companies, very different scale and structure of emissions

In many companies (except for energy-intensive industries, such as cement or power production), Scope 3 can constitute a significant (even a 70-80% share) in total emissions. This is especially the case in the production based on semi-finished products with a significant carbon footprint (Scope 3 - Upstream), as well as in the production of finished products that generate a carbon footprint in their use phase, e.g., combustion of fuel in cars or electricity consumption by household appliances (Scope 3 - Downstream). For example, in the Mercedes-Benz Group, Scope 3 emissions account for 99% of total emissions, mainly due to fuel combustion emissions from manufactured cars, as well as the emissions per vehicle contained in components supplied for the manufacturing process. Scope 1 and Scope 2 emissions alone are approximately 1% of the total corporate carbon footprint.

Similarly, retail will have a significant share of Scope 3 (Scope 3 carbon footprint of sold products), similarly to distribution companies (the carbon footprint of shipping companies).

Automotive sector, Daimler AG, 2019*

Mercedes-Benz

CO_2 dioxide emissions in tonnes per vehicle

SCOPE 3
Purchased goods and services

SCOPE 1 and 2
Car manufacturing

SCOPE 3
Production of fuels and power

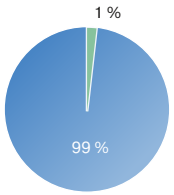
SCOPE 3
Vehicle operation

SCOPE 3
Recycling and waste disposal

SCOPE 1
Includes emissions on the premises of Mercedes plants as a result of combustion, e.g. by generators

SCOPE 2
Includes all emissions outside their factory premises resulting from the use of energy purchased from external sources, e.g., a local utility company

SCOPE 3
It includes all emissions generated before or after the production phase, e.g., carbon emissions generated in the supply chain, or in the recycling phase of vehicles



Share in total emissions (%)
- SCOPE 1 and 2 (1%)
- SCOPE 3 (99%)

Well to Tank (WTT) – describes the scope of fuel supply, from source production to fuel supply (transport to a charging point or fuel pump)

Tank to Wheel (TTW) – describes the fuel consumption of the vehicle and the emissions while driving

*from 01/01/2022, the Daimler AG concern is globally known as Mercedes-Benz Cars AG

Source: Mercedes-Benz, Daimler

For energy-intensive enterprises, e.g., those using heat in technological processes (cement, chemical, steel industries), Scope 1 of the carbon footprint will be very important. For example, at BASF, Scope 1 and Scope 2 emissions (directly related to production) account for 19% of total emissions.

Chemical sector, BASF, 2020

Total emissions: 113 million tonnes of CO_2e

BASF
We create chemistry

SCOPE 3
Purchased goods, products, services and capital goods

SCOPE 1 and 2
Production, including power and steam production

SCOPE 3
Transport of products, commuting and business trips

SCOPE 3
Emissions from the use of finished products

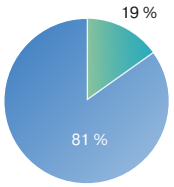
SCOPE 3
Combustion using energy, storage (cat.12)

SCOPE 3
Categories: 3b, 3c, 5, 8, 13, 15

SCOPE 1
Direct carbon emissions from sources at BASF plants This includes, for example, in-house production systems as well as power and steam generation systems

SCOPE 2
Indirect carbon emissions that arise at suppliers when generating the power BASF uses for production

SCOPE 3
All other carbon emissions generated in the value chain, e.g. at suppliers, in the product use phase, during disposal or transport



Share in total emissions (%)
- SCOPE 1 and 2 (19%)
- SCOPE 3 (81%)

* Cat. 3: Scope 3 emissions, fuel and energy related,
cat. 5: own waste,
cat. 8: leased assets (upstream, as a tenant),
cat. 13: leased assets (downstream, as the owner),
cat. 15: investments

Source: BASF

In transport or shipping companies, most of the carbon footprint will come from fuel combustion in vehicles, both in Scope 1 (their own fleets) and potentially in Scope 3 (subcontractors).

In the case of financial institutions or banks, a large part of the carbon footprint is constituted by Scope 3 emissions related to assets, or the loan portfolio, especially corporate. Please note that most financial institutions are in the process of launching data acquisition related to emissions in their asset portfolios.

The size and structure of the carbon footprint and its detailed sources for each scope vary significantly from industry to industry but can also fluctuate within a single industry, and even from one company to another. This is due to, e.g., the product mix and composition (especially materials), the production processes used, the location of plants (e.g., the local energy mix), the individual company energy efficiency, or the composition and wear of the machine park. However, in most cases, the size and structure of the carbon footprint varies due to the implementation of a deliberate carbon footprint reduction policy, or lack thereof.

Banking sector, NatWest Group, 2019

CO_2e emissions, in tonnes, calculated using the Market Based method

NatWest Group

SCOPE 1

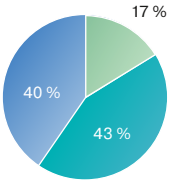
Combustion of fuels in on-site and mobile company equipment and of escaping refrigerants

SCOPE 2

Purchase of electricity, heat, steam or cooling by a company for own needs

SCOPE 3*

Business trips, consumption of paper and water, as well as waste disposal



Share in total emissions (%)
- SCOPE 1 (17%)
- SCOPE 2 (43%)
- SCOPE 3 (40%)

The market-based method includes emissions from sources selected by the NatWest Group, including renewable energy

The emissions per full-time employee are : 1,9 t CO_2e

*The data presented by NatWest Group does not include Scope 3, category 15: the emission intensity of the investment portfolio.
Source: carbonaccountingfinancials.com; Nat West

Product carbon footprint reflects the corporate carbon footprint and the entire chain involved in its production and use.

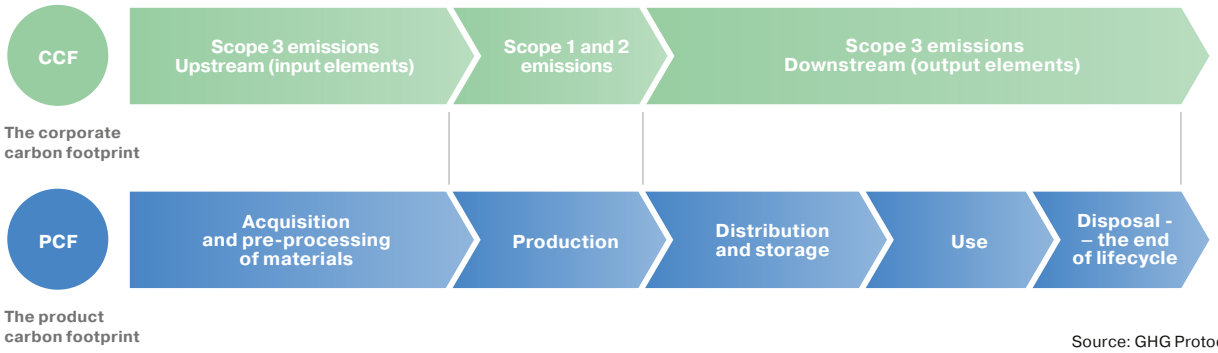
A very important topic is the carbon footprint of products, which means measuring the emission intensity of a product throughout its life cycle, from materials and components used, to production processes, to distribution, use, and disposal. The product carbon footprint reflects the corporate emissions from Scopes 1 through 3, applied to a specific product.

As with entire companies, the level of carbon footprint and its structure can vary significantly between functionally similar products. Under certain conditions, this can lead to significant differences in the market competitiveness of these products. For example, with information about a product's carbon footprint in their hands, a consumer or contractor could reconsider their choices, e.g., select a product with a lower or zero carbon footprint. The sum of these types of consumer choices can significantly impact market shares of companies or products. More details of these mechanisms are forthcoming later in the report.

1.2.3

A thorough understanding of Scope 1 and Scope 2 emissions, and then Scope 3, is the first step on the path to building a high corporate climate competitiveness.

What is the relationship between the corporate carbon footprint and product carbon footprint?



Source: GHG Protocol

Carbon footprint is a new dimension of the competitiveness of companies and products, in addition to price and quality.

Considering ambitious emission abatement targets at the global and European levels, understanding the carbon footprint of a company and its product(s) is a prelude to preparing for competition in the context of a required emission abatement. It can be said that in every sector and in every product market, the ways of competing will be changed by a new dimension: the carbon footprint. The previous model assumed competition in terms of quality of the product (a set of functional features valuable for the end user, for which they were willing to pay) and the cost of its production (depending on the cost effectiveness of the company), which translated into its attractive price.

Until now, the entire structure of the global economy, supply chains, production sites and national specializations, as well as market segments and positioning of companies, resulted from the search for the optimum, i.e., the right combination of price and quality for each product, in each industry.

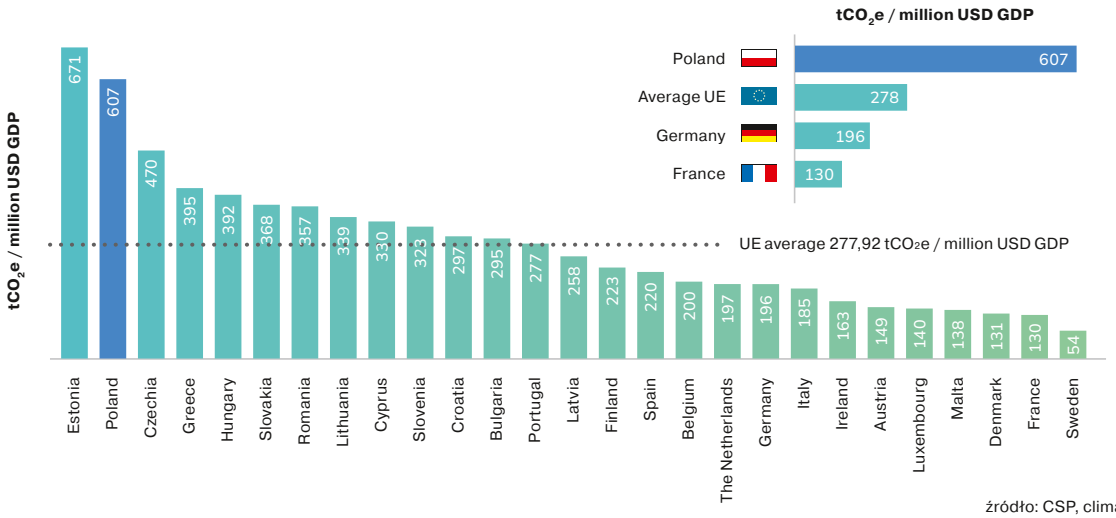
Currently, however, we are witnessing a fundamental change: the formation of a new, quantifiable, and definable value criterion, which is the carbon footprint of the company and the product. It is the result not so much of the customer/consumer expectations regarding the product but of society as a whole. In turn, how a company or national economy compares according to this new value criterion will determine the position of that company or country in the new low-carbon economy.

In this new area of competition, there are large differences in the level of advancement, both between countries and companies in individual countries (as clearly illustrated by the data presented later in the report). The starting points of the individual economies in this area also vary.

The average emission intensity of the Polish economy is more than double the European average

Poland is the second largest emitter of GHGs in the EU. Emissions per unit of Polish GDP are more than double the European average, triple the emissions of Germany and more than 4.5 times greater than in France.

CO_2e emissions per unit of GDP in the EU in 2018



źródło: CSP, climatewatchdata.org

It should be emphasized that due to the emission intensity of the Polish economy, domestic companies are in a difficult position in terms of competitiveness on the European and global arena. Carbon emissions per unit of GDP in Poland are more than double the European average, more than triple the emissions in Germany, more than 4.5 times higher than in France, and more than 10 times higher than in Sweden.

Combined with the low level of development of climate strategies (discussed later in the report), this situation is associated with a high risk.

The report also shows that European and international businesses, having realized the importance of the carbon footprint as a new dimension of competitiveness, have been dynamically implementing actions to build an advantage in this area. Gradually, they have also applied pressure to further accelerate the transition towards zero emissions. The timeframe for Polish companies to catch up is short. In the next chapter, we describe how the EU regulatory bodies and business environment, as well as the largest European economy, i.e., Germany, affect companies, and how the response of financial institutions to decarbonization accelerates the process.

WAKEUP CALL

This report is a wakeup call for Polish businesses and aims to persuade them to intensify actions to increase climate competitiveness.

Chapter 1

Decarbonization is accelerating and the pressure to reduce operational greenhouse gas emissions is growing

A. The acceleration of the decarbonization trend in European and German regulations will strongly affect the entire Polish economy and individual companies through trade and investment links

In the last year, there has been a clear acceleration in decarbonization policies.
It takes place in four intertwined dimensions:

- Implementation of the EU's decarbonization policy, with full determination and using a range of regulatory and financial instruments.
- A clear tightening of German climate policy in 2021 and its supposed further acceleration by a new government coalition including the Green party.
- The dynamic growth of "green" funding and the efforts of both international banks and global capital investors to "green up" their portfolios and limit the financing of "dirty" (high-emission, carbon-based) projects and assets.
- Increasing activity of business in Europe, including in Germany, in terms of the implementation of climate and decarbonization strategies, with specific goals and commitments to reduce GHG emissions and the respective actions and investments (including in supply chains). Clearly, redefining decarbonization as a new field of competition in domestic and international markets.

These changes not only reinforce each other, but also affect Polish companies, directly or indirectly.

A1. The Polish economy is highly dependent on exports and is related to the economies of the European Union and Germany

More than 50% of Poland's GDP are exports; the share of exports in GDP has increased by 20 percentage points since joining the EU and has been growing ever since.

Exports to EU countries accounts for more than 75% of total Polish exports (Germany alone accounts for more than 29% of total Polish exports). The share of exports to the EU has remained at a similar level for many years as part of the dynamic increase in the value of exports in general. On the other hand, the share of exports to Germany is even growing slightly.

Exports account for 50% of Poland's GDP

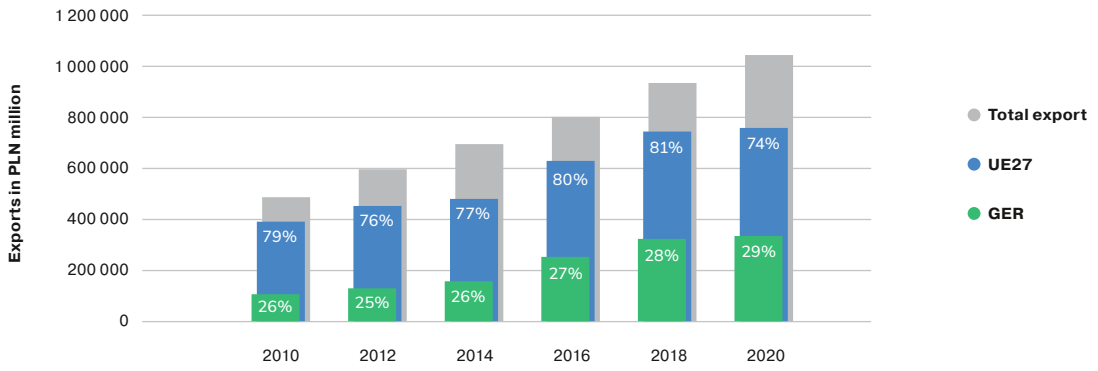
Polish exports are growing in parallel with the GDP growth, accounting for 51% of the Polish GDP in 2020. The increase in exports is responsible for the majority of the growth of the Polish GDP in the years 2005-2020.

Percentage

Source: Own study of CSP, based on MPiT DAG and the Central Statistical Office (GUS)

Such a scale of trade links means a huge influence of German enterprises on Polish suppliers and their sub-suppliers in terms of trade policies related to the decarbonization and carbon footprint of companies and products.

75% of all Polish exports go to the EU, and 29% to Germany



Source: Own study of CSP, based on the Central Statistical Office (GUS)

In addition, German companies are the largest group of foreign investors in Poland, comprising more than 16% of total investments worth more than 35 billion dollars. In 2018, investments of the second largest national investor, the United States, accounted for 11% of all investments in Poland. Therefore, it should be assumed that the decarbonization policy of the German parent companies will have a significant impact on the future of investments in Poland.

Germany, as the largest economy and the largest net contributor to the EU budget, plays a decisive role in shaping the EU's economic strategies. Please note that most EU countries, in particular the Nordic countries and the Netherlands, implement decarbonization policies similar to Germany's. Others, on the other hand, e.g., France, have had their own regulations on corporate emissions reporting for many years. Similarly, several US companies have advanced strategies in this regard, despite the country's changing decarbonization policy.

By showing what decarbonization pressure Polish companies can expect, the authors of this report have focused on EU regulations, present or future, and on the German market.

29%

of total Polish exports go to Germany alone.

50%

75%

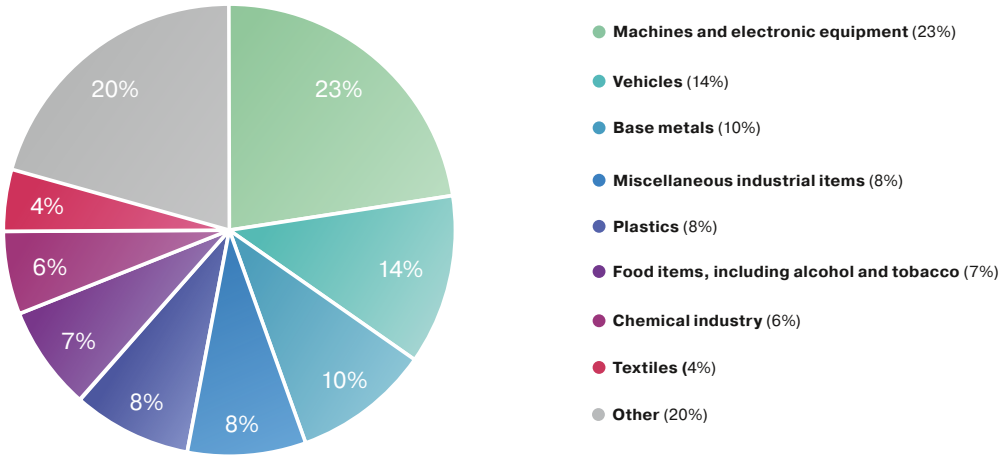
More than 50% of Poland's GDP are exports; the share of exports in GDP has increased by 20 percentage points since joining the EU and has been growing ever since.
Exports to EU countries accounts for more than 75% of total Polish exports (Germany alone accounts for more than 29% of total Polish exports).

A2. The largest scale of trade links concerns many sectors of industrial production, as well as the food industry. In total, the decarbonization process will affect the sectors employing almost seven million workers in Poland

The manufacturing sector dominates the structure of Polish exports, especially the production of machinery, electronic equipment, vehicles, and industrial products, as well as plastics and food products. Exports are generated partly by local branches of Western corporations, but to a very large extent also by a network of suppliers/subcontractors of German companies and enterprises from other EU countries. These suppliers/subcontractors are mainly medium-sized Polish companies, which depend on a specific group of foreign customers, often larger German or EU companies.

The structure of Polish exports to the EU

- **The sectors of machinery, electronic equipment and vehicle manufacturing have the largest share in Polish exports (37% of total exports).**
- **Miscellaneous manufactured articles and food products also have a significant share (15%).**
- **Highly energy-intensive sectors (base metals, plastics and the chemical industry) together account for approx. 24% of total exports.**

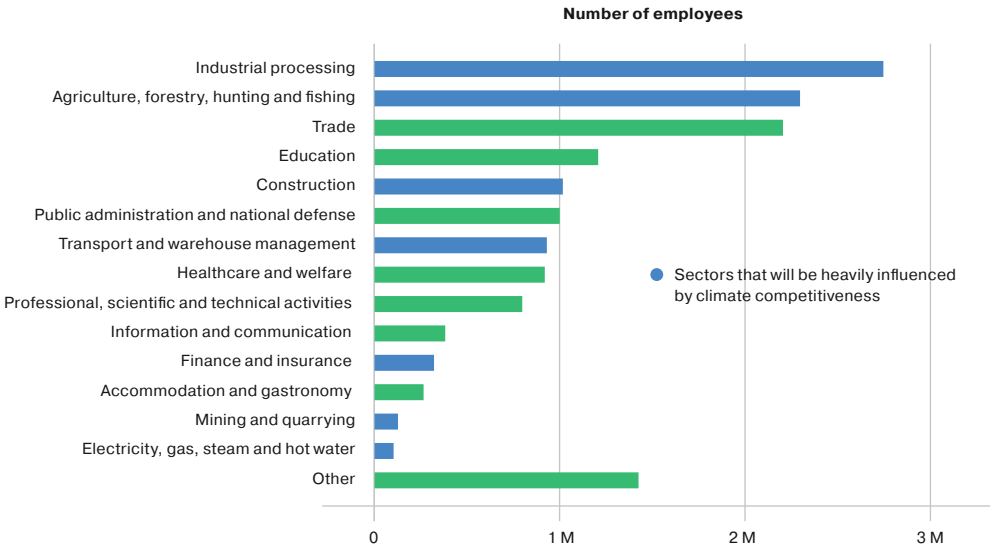


Source: Own study of CSP, based on the Foreign Trade Database of the Central Statistical Office (GUS); data for 2018

Polish exporters and other companies directly or indirectly influenced by the decarbonization policy (such as power production and mining) employ a total of over 7 million people.

Decarbonization of the economy will affect the sectors with the highest employment

- **Climatic competitiveness will significantly affect the leading sectors of the economy**
- **The sectors listed in the chart employ over 7 million workers in Poland, which accounts for approx. 50% of total workforce**



Source: Own study of CSP, based on the Central Statistical Office (GUS)

A3. The European and German decarbonization policies affect Polish companies both directly and indirectly, through financial institutions and the activities of European companies

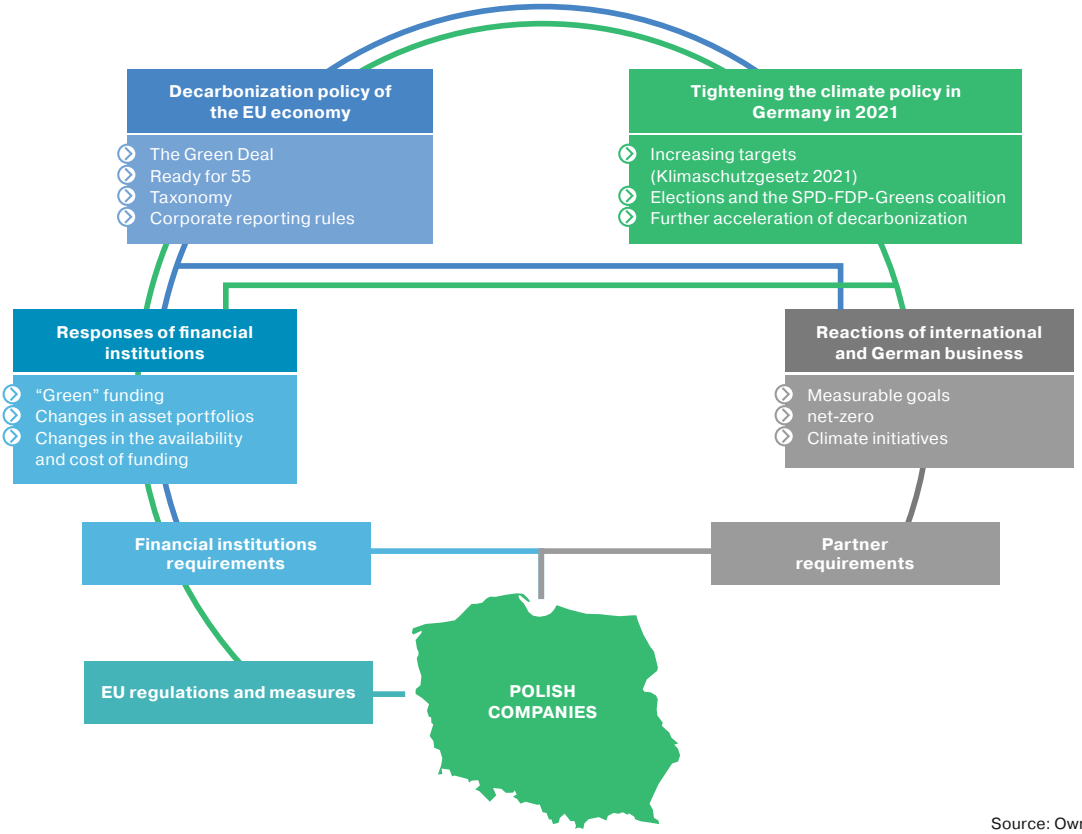
EU regulations and plans for a rapid climate transition of the German economy affect Polish enterprises in three ways:

- The new regulations directly change the legal context for the operations of Polish business and its access to EU funds.
- EU law affects international financial institutions, including banks and equity investors, which indirectly affects Polish companies.
- German and EU business partners influence Polish companies operating within international supply chains.

The first and second of these are relatively well understood in Poland. The effects of these phenomena can be mitigated to some extent in Poland by a delayed, incomplete, or "softened" effect in the Polish context of reporting rules or access to EU funds.

The third phenomenon is still relatively poorly understood. Meanwhile, to remain a part of the supply chains of multinational corporations requires meeting their expectations in terms of reducing GHG emissions.

System linking decarbonization trends and business in Poland



Source: Own study of CSP

Scope 3 Upstream of the business customer's carbon footprint (e.g., a European or German customer) in terms of the supply of components, products, or services are Scopes 1, 2, and 3 of the carbon footprint of a Polish company expressed as the carbon footprint of its products delivered to the customer. This is because the individual scopes of the corporate carbon footprint correspond to the individual stages of the product life cycle (cf. Prologue). The carbon footprint of a product produced by high-–carbon companies and the entire high-carbon supply chain will inherently be very large.

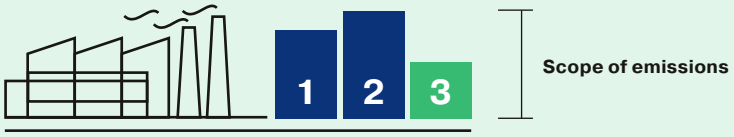
Carbon footprint relationships within the supply chain

GHG emission scope

- **1** Direct
- **2** Indirect - purchased electricity
- **3** Indirect - supply chain

■ **High emissions: electricity, or energy-intensive coal-based manufacturing processes.**

Supply of raw materials (steel and chemical plant, plastics)



Polish industrial processing company

Uncompetitive products with a high carbon footprint

International customer

- **Audi • BMW •**
- **Mercedes - Benz •**
- **Bosch • Siemens •**
- **IKEA •**

Source: Own study of CSP

Building transparent rules for reporting the corporate climate impact and implementing simple abatement levels under Scopes 1 and 2 (e.g., by increasing energy efficiency or expanding renewable energy sources) is now over. European and German companies are increasingly focusing on reducing their carbon footprint in Scope 3. Therefore, cooperation with suppliers is particularly emphasized, to create transparent rules for sharing their corporate carbon footprint, and in the next step – for its abatement. The first step in this process is to challenge suppliers to provide data on the carbon footprint of the company and the supplied products. This often becomes a requirement in formal purchasing processes or as part of relationships in the supply chain. The implications of this mechanism for corporate competitiveness will be discussed later in this report.

This chapter presents the main trends in EU and German regulations, as well as changes in the approach of financial institutions. Only the compilation of all three threads will demonstrate the scale of change that Polish companies will have to face.

B. The EU is clearly accelerating the implementation of its multidimensional climate policy

The European Union has had an active climate policy for more than 20 years. In this period, several regulations and mechanisms have been developed to encourage member states, as well as individual sectors of the economy, and companies to take actions to reduce GHG emissions. Over time, energy policy has deepened and expanded, turning into a climate policy. Its latest expression is the goal of full decarbonization of the EU economy by 2050, as well as the preparation of the necessary toolkit for the implementation of this plan as part of the EU's sustainable development strategy, known as the European Green Deal. In addition, in mid-2021, the 'Fit for 55' legislative package was proposed. It introduces several modifications in terms of 2030 emission abatement targets (as the first step toward full decarbonization of the economy, it assumes a 55% abatement of emissions compared to 1990), as well as additional implementation mechanisms.

In the long-term perspective, it can be said that EU climate regulations are characterized by several constants. Firstly, there is a tendency to gradually modify goals and policies, always toward more ambitious parameters. This reflects the social and political moods in the major member states, such as Germany. Secondly, the "leveling up", i.e., the transfer of solutions from more advanced national systems to a broader European level (a recent example is the transfer of the extended ETS system to the transport and construction sectors - what was once part of German regulations became the set of proposals included in the "Fit for 55" package - see below). Thirdly, and finally, new solutions are implemented based on non-binding recommendations and gradually transferred to the law in force.

Founding any business strategy on the assumption that European climate regulations will be loosened is extremely risky.

As European climate regulations develop over time, one should rather expect a dynamic acceleration, not a slowdown, in this respect. In view of the noticeable discrepancy between the current decarbonization plan of the EU economy and the pathway laid out in the Paris Agreement, it can be assumed that both the ambitions and the abatement efforts will increase. The growing socio-political pressure will also be accompanied by an important voice of business that has already prepared well for the change. These companies see it as an opportunity to enhance their competitive position and to increase market share, or margins.

The legal framework of the EU to mitigate climate change, based on global agreements (especially the Paris Agreement), contains regulations in three areas:

- the monitoring and reporting of GHG emissions at national levels,
- building market and legal mechanisms aimed directly at reducing national, sectoral, and individual corporate emissions,
- shaping mechanisms to redirect financial resources to pro-climate investments by introducing the transparency of expenditures and the reporting of companies and financial institutions.

The set of main legal acts in the above three areas comprehensively illustrate the legal framework of the EU's climate policy. From the corporate point of view, more important than knowing each of these legal acts is understanding how EU policy translates into companies in the Member States. Therefore, the following sections of the report focus on discussing the impact of the EU on enterprises, both direct regulatory mechanisms aimed at decarbonization and indirect mechanisms (through the financial regulation system).

Overview of the targets and legal framework of the EU's climate policy*

Target	Who	Legal framework
Abatement of GHG emissions, including CO_2	 EU, Member States	• United Nations Framework Convention on Climate Change (UNFCC) (1992) • Kyoto Protocol (1997) • Paris Agreement (2015)
Monitoring emissions, reporting, activity planning	 EU, Member States	• Climate monitoring mechanism • Managing the Energy Union
Direct reduction of emissions	 Member States Economic sectors Business entities	• EU Emissions Trading System (ETS) – **expanded!** • ESR - annual mandatory emission abatement targets for countries (2030 targets) • RES and energy efficiency directives (2030 targets) • CBAM - CO_2 cost for imported products – **new!** • LULUCF - Land Use and Forestry Directives • IED - Industrial Emissions Directive • BAT - Best Available Techniques Regulation
Redirecting funds to climate goals	 Economic sectors Business entities Financial sector	• Allocation of EU funds for climate purposes • Sustainable finance taxonomy • Non-financial business reporting (NFRD and CSRD) • SFDR - Sustainable Finance Disclosure Regulation

* Major mechanisms only, more detailed regulations not included

Source: Own study of CSP

49%

The decarbonization of these sectors must be accompanied by the development of renewable energy and energy efficiency. In 2030, the share of renewable sources in energy used by buildings in the EU area is expected to reach 49%. At the same time, new car emissions are expected to abate by 55% from 2021 levels.

B1. The European Union uses a number of regulatory mechanisms aimed at decarbonization

The decarbonization plan is implemented through a set of instruments and tools that directly or indirectly affect individual sectors of the economy and its specific representatives:

- **The CO_2 Emissions Trading System (EU ETS)**, which imposes additional costs on companies that emit CO_2 from large combustion plants (mainly energy producers and manufacturers using high-temperature industrial processes). This is a market-based mechanism that requires companies covered by this obligation to purchase allowances and the price is driven by supply and demand. Since its establishment in 2003, the EU ETS system has undergone several modifications that aim to gradually reduce the number of allowances on the market. This, in turn, increases their costs. The next reform planned under the Fit for 55 package confirms this direction, as it assumes further abatement of the supply of emission allowances. This will result in higher allowance prices, and thus encourage companies to implement the appropriate abatement measures.

- **Setting abatement targets for sectors not covered by the EU ETS** (ESR Regulation). The objectives to be achieved in the years 2021-2030 are set on a case-by-case basis by the Member States. The states must implement them through national measures in the agricultural, transport, and waste sectors, as in well as the municipal and residential sectors. Total abatement efforts within the EU ETS and in sectors not covered by the system are to meet the 55% target by 2030.

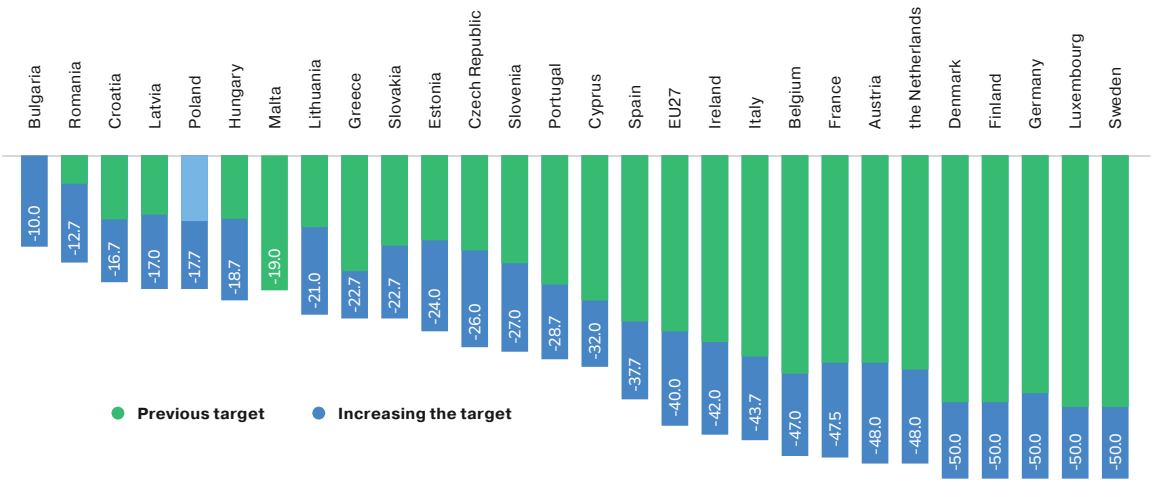
- **Setting targets for renewable energy sources and energy efficiency to be achieved by 2030,** which would lead to reducing fossil fuel consumption and replacing them with low- and zero-emission sources. The Fit for 55 package increases the planned share of RES in the final energy consumption from 32% to 40% and the planned energy efficiency from 32.5% to 39% for primary energy consumption and 36% for final energy consumption. In both cases, this will entail the need to increase national contributions to achieve these objectives at the EU level.

- Proposed by the European Commission under the Fit for 55 package, **the so-called CBAM, which is a mechanism for adjusting border prices of carbon products imported from outside the EU**. First, the mechanism is intended to cover cement, iron, steel, aluminium, fertilizers, and electricity. Its aim is to equalize the competitiveness of EU companies burdened with carbon emission costs arising from the EU ETS, which must compete with non-EU companies excluded from such costs. The mechanism, preceded by the preparatory phase, is to be put into operation, as proposed by the Commission, starting from the year 2026. In practice, it will constitute a type of duty imposed on goods imported into the EU, only that in this case it will cover the cost of carbon emissions resulting from the manufacture of the goods. The importer will have to pay that cost unless it has already been incurred in the country of manufacture. The fees will be paid by means of CBAM certificates, the cost of which is to reflect the cost of carbon emissions (they will be

correlated with the EU ETS allowance prices). The proposal for a regulation is already being developed by the European Parliament and the EU Council.

Proposed national targets by 2030 under the ESR regulation adopted by the European Commission in the "Fit for 55" package

Percentage



Source: European Commission, Document of the European Commission of 14/07/2021 Questions and Answers, Regulations on Effort Sharing and Land Use, Forestry and Agriculture

The transition to a climate-neutral economy by 2050 already means that the EU targets set in these areas must be accelerated by 2030 (above all, it means a reduction in GHGs by 55% compared to levels from 1990), as well as that the impact of the transition must be expanded in a significant manner. That is exactly what the Fit for 55 package from 2021 includes.

One of the main changes adopted by the European Commission in the Fit for 55 package is to cover the entire road transport sector, as well as the heating and cooling sector, and therefore the individual heating sector, with the obligation to bear the costs of carbon emissions under the so-called mini-ETS. This significantly extends the impact of the mechanism for evaluating the market cost of carbon emissions. Suppliers of fossil fuels, e.g., diesel fuel, coal, or natural gas for heating buildings, will have to bear the cost of emissions, as it is already the case for large industry and large-scale energy suppliers within the EU ETS. This solution is similar to the one implemented in Germany at the beginning of 2021 (see: German regulations below). Such an extension of the EU ETS scope is probably the most controversial element of the Fit for 55 package and it is opposed by several countries, including Poland, hence its presence in the final regulations is not certain, although it

should be assumed that it will be supported by the new government of the Federal Republic of Germany (see: the discussion of the situation in Germany below).

The decarbonization of these sectors must be accompanied by the development of renewable energy and energy efficiency. In 2030, the share of renewable sources in energy used by buildings in the EU area is expected to reach 49%. At the same time, new car emissions are expected to abate by 55% from 2021 levels.

B2. The sustainable financing mechanisms of EU as a new engine of the corporate climate transformation

Currently, around 2% of the EU's GDP is invested in the transformation of the energy system and the related infrastructure. However, according to the European Commission's forecasts, achieving climate neutrality requires an increase of these investments to 2.8 % per year, which means around 520 to 575 billion EUR, i.e., between 175 and 290 billion EUR of additional resources at the EU level. In this situation, it is certainly not enough to use public resources alone, both at the EU level and at the particular Member State level. Therefore, it is necessary to mobilize institutions with private resources for investments. In this respect, the focus is mainly on commercial banks, as well as e.g., investment funds. To encourage the investment of private and institutional resources in decarbonization, the EU is implementing several intermediary mechanisms.

2035

By 2035, all new cars registered in the EU must be zero-carbon.

55%

The transition to a climate-neutral economy by 2050 already means that the EU targets set in these areas must be accelerated by 2030 (above all, it means a reduction in GHGs by 55% compared to levels from 1990), as well as that the impact of the transition must be expanded in a significant manner. That is exactly what the Fit for 55 package from 2021 includes.

1. Linking the spending of EU funds with the realization of decarbonization goals and a special priority for projects in this area.

Under the new EU budget for 2021-2027, at least 30% of the resources must be devoted to actions that contribute to the EU climate objectives, which means, first, reducing GHG emissions and supporting energy efficiency, as well as RES. Business will be largely the beneficiary of these funds, including small and medium-sized companies. The main tool will be a system of qualifying investments as "green" in 100%, 40%, or 0%. The “100% green" projects, i.e., those with the highest impact, would be, for example:

- digitalization of data collection and processing in medium- and large-sized companies to support GHG abatement,
- providing telecommunications and information infrastructure to enable data collection and processing that are necessary for monitoring GHG emissions,
- energy efficiency programs and demonstration projects in large corporations and in the small and medium enterprise (SME) sector, if the objective is to achieve at least 30% abatement on average in direct and indirect GHG emissions compared to ex ante emissions,
- production of power and heat from biomass if the objective is to reduce carbon emissions in the plant by 80%,
- the implementation of high-efficiency cogeneration of efficient district heating or cooling systems with low life-cycle emissions (in the case of high-efficiency cogeneration – if the objective is to achieve emissions over the lifecycle of less than 100 g CO2e/kWh) or heat/cooling produced from waste heat,
- actions to reduce GHG emissions in the preservation and restoration of natural areas with high carbon capture and storage potential, e.g., by the re-irrigation of wetlands or by capturing landfill gas.

Projects with a “green” factor of 40% are, for example, the digitization of urban transport if the project is partially aimed at reducing GHG emissions.

In practice, this will allow for the awarding of projects contributing to the abatement of carbon emissions in such a way as to meet the necessary limit at the level of each member state. Projects that can be 40% and preferably 100% qualified as meeting the climate objectives will be supported by the awarding authorities, as they will allow the limit of 30% of the EU overall climate budget to be met. This means that the demonstration and calculation of the impact of a program on carbon emissions will be a condition for funding many EU projects.

2. Implementation of a financing system based on a detailed classification of business activities (EU taxonomy)

The European Union has recognized that to develop a precise definition of what constitutes an investment supporting environmental and climate objectives (and, in addition, social objectives), a system of a single classification of economic activities should be established, which means a system of so-called taxonomy of sustainable financing/investment.

The Taxonomy Regulation (2020/852) requires companies subject to the Non-Financial Reporting Directive (NFRD) to provide information on how and to what extent their activities meet the requirements of sustainable economic activity (according to technical qualification criteria). Such companies will have to disclose, for example, what is the share of the activities described in the taxonomy in their turnover, investment, and operating expenses. The various economic activities are assessed on the basis of technical criteria. If they are met, then the company can consider the expenses as compatible with the taxonomy, both the turnover from these economic activities and any investment, especially operating expenditure, in relation to the extension of the activity and its compliance with the taxonomy criteria. A company that plans to invest in complying with the taxonomy criteria could consider the capital expenditure for such activity to be compliant with the taxonomy. This solution will inform not only about the type of activity but also about investments that enable adaptation to the conditions defined in the taxonomy. The turnover of the company related to the investment can only be treated as "green" after the investment has been completed. Companies whose activities are not subject to technical criteria could consider all expenditure on the investments covered by the taxonomy as being in line with it. This includes the installation of RES or the improvement of the energy efficiency of heating systems, if they purchase products or services from entrepreneurs meeting the taxonomy's criteria.

Detailed lists and descriptions of the economic activities within the limits of the taxonomy shall include criteria in these six objectives:

- mitigating climate change,
- adaptation to climate change,
- sustainable use and conservation of water and marine resources
- building a circular economy, waste prevention and recycling,
- pollution prevention and control,
- protection and restoration of biodiversity and ecosystems.

For the first two objectives, the EC has already presented detailed guidelines on how to assess different kinds of economic activity. These guidelines, adopted in mid-2021 in the form of EC delegated acts, will apply from 2022. They describe in detail the main areas of the economy, e.g., energy, transport, and buildings. For the activity to be considered sustainable, it must clearly meet at least one of the above-mentioned objectives without damaging the others. The recognition of a business as sustainable will result in access to financing and its attractive conditions, as this will be the type of activity that is most likely to be supported by financial market participants. On the other side of the coin, there will be activities that are detrimental to sustainable development, e.g., coal investments. The number of companies ready for such funding will grow smaller and smaller. Therefore, even if there are private institutions prone to being involved in such investments, the scale of the financial risk is likely to result in being offered much less favourable conditions than for other activities. In the short term, the taxonomy criteria will determine the approach of financial institutions to technologies accelerating decarbonization.

0 CO_2e

after 2025, zero emissions will be required regarding the transport of motorcycles, passenger cars and light commercial vehicles .

The taxonomy will determine not only how private sector investment is financed, but also how EU funds operate. According to Article 10 of the Taxonomy Regulation, a prerequisite to consider a given economic activity a contributor to climate change mitigation is its **"significant contribution to stabilizing greenhouse gas concentrations in the atmosphere at a level that prevents dangerous anthropogenic interference with the climate system, according to the long--term temperature objective set out in the Paris Agreement by preventing or reducing GHG emissions or increasing the absorption of greenhouse gases, including through a process innovation or product innovation"**. Moreover, the principle of "do no harm", which is contained in the taxonomy, applies to all funds that will be spent from the EU budget after 2021. According to Article 17 of the Taxonomy Regulation, serious damage is caused by “significant greenhouse gas emissions” [5]. The interpretation of these provisions for each economic activity area was presented in detail in the delegated acts of the Taxonomy Regulation, which the EC adopted on June 4, 2021. They relate to climate objectives, that is, the mitigation of, and adaptation to climate change.

The technical criteria for assessing whether a given action is mitigating or reinforcing climate change are very specific for each kind of economic activity, up to specific carbon emissions per product unit. The purpose of this regulation is to define in sufficient and precise terms the criteria for "greenness" of a given activity or investment in order to achieve the desired effect, and to avoid

[5] *Regulation 2020/852 of the European Parliament and of the Council (EU) of 18th June 2020on the establishment of a framework to facilitate sustainable investment, amending Regulation 2019/2088 (EU), https://eur-lex.europa.eu/legal-content/PL/TXT/HTML/?uri=CELEX%3A32020R0852 (access 19th December 2021).*

575 billion

According to the European Commission's forecasts, achieving climate neutrality requires an increase of these investments to 2.8 % per year, which means around 520 to 575 billion EUR, i.e., between 175 and 290 billion EUR of additional resources at the EU level.

"greenwashing" [6]. For example, the technical criteria for taxonomy in the production of vehicles as a condition for achieving a positive impact on climate change varies by the class of vehicle. For trains and urban or suburban vehicles, full zero-emission (criterion zero CO_2/km) is required, while for passenger cars and light commercial vehicles, emissions of less than 50g CO_2/km by 2025 and full zero-emission of CO_2 (0 g CO_2/km) will be required starting from 2026.

After 2025, primary aluminium production that meets the criterion of a positive impact on climate change will need to have an emission intensity of less than 1484t CO_2 e/t of the product. Emissions above 1604t CO_2 e/t of the product will qualify its production as harmful to the climate. The same will be qualified for electricity production with an emission intensity of more than 270g CO_2/kWh of electricity. Regarding the transport of motorcycles, passenger cars and light commercial vehicles, similarly to vehicle production, until 2025, a limit of 50g CO_2 e/km was established as a criterion of a positive impact on climate change, while after 2025, zero emissions will be required.

As can be seen, the regulation of taxonomy (in relation to the types of economic activities that are emission-relevant and contribute greatly to those emissions), is approaching the point of establishing a very precise definition of the level of desired emissions. Linking EU or banking financial resources to Taxonomy criteria will ensure that only technologies, projects, and companies that implement these ambitious parameters can be supported or funded. Taxonomy is particularly focused on sectors that have a significant impact on climate change, such as energy, heavy industry, and transportion. This mechanism is also designed to ensure that companies could not boast of their “green” references without achieving specific parameters.

3. The regulations on corporate non-financial reporting are expanded and clarified in terms of scope, including carbon footprint and emissions

The ESG (Environment, Sustainability, Governance (ESG) business reporting legislation is, alongside taxonomy, one of the main pillars of the EU sustainable funding policy. As the EC points out: *businesses need a sustainable development framework to be able to change their business models accordingly, to ensure a transition in the financial world, and to prevent pseudo-green marketing.* [7]

The current NFRD (Non-Financial Reporting Directive) of 2014 requires large companies with more than 500 employees to report on climate and environmental issues. In the entire EU there are approximately 11,700 large companies, including many stock-listed corporations, banks, insurance

[6] *Creating a corporate image of an eco-friendly, green, or environment-oriented and climate-oriented organization based on apparent, limited, or even negligible environmental activities (from the perspective of the entirety of corporate actions).*

[7] *EC press release, Sustainable financing and the EU sustainability scheme: The Commission is taking further steps to redirect capital and investment flows toward sustainable business, Brussels, 21st April 2021, https://ec.europa.eu/commission/presscorner/api/files/document/print/pl/ip_21_1804/IP_21_1804_PL.pdf (access 19 December 2021).*

companies and other organizations designated by the State authorities as public-interest companies that are subject to this obligation. These companies are required to provide information on environmental issues, including climate-related issues, social and labour issues, respect for human rights, anti-corruption and bribery to the extent necessary to understand the development, performance, and situation of each company and the impact of its activities. Climate-related information should cover the main risks to development, performance, and the corporate climate change position, including the main risks associated with the negative climate impact of their activities.

The regulations in force so far do not regulate in detail the principles of presentation of these data, leaving companies with a great deal of freedom in that area. Apart from describing their activities in the ESG area, they should provide key indicators relevant to their specific business activity.

In line with the EC's voluntary additional guidance to the NFRD on non-financial reporting of 2019, companies should consider using selected indices to provide more precise climate-related information. This includes information related to performance, as well as the identification and management of the main risks. This makes data aggregation and comparison easier for their business and community partners. The information that companies should publish includes that on greenhouse gas emissions. The EC has identified four different indicators for companies that are in line with the definitions of Scopes 1 to 3 within the meaning of the GHG Protocol standards and the best reporting practices available. This includes initiatives developed by business and organizations such as TCFD, GRI, CDP (described in detail below), and others.

In practice, this means that to date it has been strongly recommended but still voluntary to provide detailed information on carbon footprint and abatement strategies, as well as climate risks.

The proposal of the Corporate Sustainability Reporting Directive (CSRD), which is to replace the NFRD Directive, and was adopted by the Commission on April 21, 2021, extends the reporting obligation to more ESG entities and ESG-related information.

EU sustainability reporting requirements, including climate change issues, will apply to all major companies and all stock-listed corporations, except microenterprises, which will be able to apply these requirements on a voluntary basis.

In EU terminology, a "large enterprise" is any enterprise that meets at least two of the following three criteria:

In turn, micro-enterprises are entities that do not meet at least two of the following three criteria:

As the EC points out, the new regulation means that nearly 50,000 companies across the EU will have to comply with detailed reporting standards on sustainable development. Up to now, under the NFRD Directive, this number has been less than 12 000 [8]. In Poland, approximately 4,000 to 5,000 companies will be subject to these regulations.

The new directive, which meets the expectations of investors, business partners, and customers, aims to ensure that businesses provide more reliable and comparable information on sustainable development. It also strengthens the existing provisions on non-financial information so that they will be consistent with the financial reporting regulations. The CSRD extends the issue of ESG, which must be reported by companies covered by this obligation, and introduces consistency with taxonomy, both in the area of division into the six main objectives (see the previous description of taxonomy), as well as in the criteria, including the thresholds of 'significant damage'. The reporting requirements must consider indicators of the extent of environmentally sustainable corporate activities (according to taxonomy), as well as the eligibility criteria contained therein.

The first set of standards is to be adopted by October 2022, after being developed by the European Financial Reporting Advisory Group (EFRAG). The work is to consider the proposals of the International Financial Reporting Standards Foundation for the creation of a new Sustainable Development Standards Board and the results of activities under the existing initiatives, including the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), the International Integrated Reporting Council (IIRC), and the Climate Disclosure Standards Board (CDSB) and CDP, a not-for-profit organization that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts.

[8] The proposal includes the development of separate standards for large enterprises as well as proportionate standards for SMEs. Small and medium-sized enterprises (as defined by the EU criteria) that are not stock-listed will be able to voluntarily use the unified standards. These standards will be consistent with the EU legal framework and based on international initiatives in this area.

According to the EFRAG Working Document published in September 2021, a very detailed set of standards is expected next year.

The communication points to the need to include in reports, among others, issues such as the impact of the implemented business strategy on greenhouse gas emissions, corporate emissions targets for the years 2025, 2030, and beyond, including targets on the abatement pathway consistent with the 1.5°C target that is achievable for the sector. Furthermore, EFRAG stresses the need to report planned and implemented climate actions, which would include the mix of energy consumed (including the number of MWh, emission intensity, the share of RES or the share of "green" hydrogen), greenhouse gas and GHG emissions (overall tCO2e, as well as by scope, or production unit).

In conclusion, it should be noted that after the entry of the new directive into force, i.e., already starting from the financial year 2023 (in the reports published in 2024), all large companies will have to present details of their environmental footprint, including greenhouse gas emissions, and disclose climate strategies.[9]

4. The SFDR Regulation enforces the transparency of banks and financial institutions in terms of emissions and the impact of their portfolios on climate

The information policy of the financial services sector in the field of sustainable development has been regulated by the Sustainable Finance Disclosure Regulation, (SFDR), which has been in force since March 10, 2021. It imposes obligations, e.g., on banks, insurance companies, investment funds, pension providers, as well as credit and portfolio management service providers. The document imposes greater transparency in the investment decision-making process with respect to activities related to various risks to sustainable development. It also requires information on the impact of investment decisions on sustainability factors. Furthermore, data on the impact of wage policies on sustainability risks are also to be made available.

The SFDR Regulation also determines obligations for the provision of information on sustainability risks to clients while concluding contracts with financial service providers. When a financial product is intended to reduce carbon emissions, the information that must be available before the conclusion of the contract should be related to the achievement of the emission abatement goal in relation to the objectives of the Paris Agreement.

[9] *After the publication of the original Polish language version of this report and before publication of this English language version, the planned implementation of CSRD regulation was delayed by one year, to start with the year 2024 (in the reports published in 2025).*

2023
2024

It should be noted that after the entry of the new directive into force, i.e., already starting from the financial year 2023 (in the reports published in 2024), all large companies will have to present details of their environmental footprint, including greenhouse gas emissions, and disclose climate strategies.

In practice, the technical standards linked to the SFDR Regulation (the Regulatory Technical Standard (RTS), related to the SFDR lead to the set of financial institutions mandatory reporting of GHG emission factors in Scopes 1, 2, 3 of the total investment portfolio, with the implementation of the Scope 3 reporting moved to January 1, 2023.

Financial institutions must report the average GHG emissions, weighted by the share of the value of the investment in the entire corporate portfolio. This means that the interest of financial institutions in the corporate carbon footprint data, both in Scopes 1 and 2, will increase significantly in the near future, and for Scope 3, it will follow soon after. In the long-term perspective, financial institutions will aim to reduce reported indicators, which will translate into a tendency to finance projects with a lower carbon footprint that will contribute to the abatement of the average portfolio's emission intensity factor.

C. Financial institutions are also aligning their strategies with climate risk factors and the priority of influencing climate change mitigation

The recent major change in the business environment of companies is a growing interest of various types of financial institutions (both banks and capital investors) in climate issues as part of a broader strategy to put more pressure on ESG issues (Environment, Sustainability, Governance).
A detailed analysis of the "green" funding trend is beyond the scope of this document, but we would like to draw attention to the mechanisms related to climate strategies that will affect companies and their competitiveness.

Under the new EU budget for 2021-2027, at least

30%

of the resources must be devoted to actions that contribute to the EU climate objectives.

C1. Banks implement climate criteria into their lending policies and risk management strategies

Banks are implementing ESG criteria into their credit policies – including climate issues – to a greater and greater extent. It stems, on the one hand, from regulatory requirements (e.g., those enforced by the SFDR Directive on reporting by financial institutions – see above) and, on the other hand, from the policies of banking supervisors in a particular Member State, as well as, the European Banking Authority (EBA) and the European Central Bank (ECB), which strive to establish taking climate risks into account in the assessment of banks credit portfolios (so-called "stress tests") and, ultimately, to include climate risks in bank capital requirements.

On October 19, 2021, the ECB announced the first wide-scope climate stress test of European banks using a consistent methodology. The test consisted of three modules:

- assessing the competence and organizational readiness of banks to manage climate risk,
- a benchmark between banks on the scale of bank revenue from high carbon footprint industries and the amount of GHG emissions financed by banks,
- a detailed analysis of the impact of the following on banks and their portfolios: assets from extreme weather events, a significant increase in the price of carbon emissions, and possible decarbonization scenarios over the next 30 years.

In the background of the broad implementation of this approach, there are not only the regulatory requirements of the EU, but also a real concern that is growing around the issue of translating climate risks into financial risks, which could affect the stability of the banking sector. The climate risks considered are both physical risks arising from climate change (e.g., damage to mortgage credit portfolios resulting from the flooding of properties located in low-lying areas, their loss of value, etc.) and transformational risks arising from a devaluation of assets or risks to credit portfolios related to industries and companies whose business models are threatened by decarbonization or climate change (e.g., coal and other fossil fuel assets).

From the point of view of the methodology of calculating the carbon footprint for financial institutions such as banks, Scopes 1 and 2 of their emissions remain relatively small, and most of their carbon footprint is contained in Scope 3, hidden in their credit assets and investments. For this reason, but also with the perspective of implementing its own decarbonization plan (based on its own strategy stemming from the expectations of, for example, investors and clients, as well as social attitudes), banks must influence the emission intensities of their clients.

In practice, this means that banks need to collect data on climate strategies – including the carbon footprint – from their customers, assess their risks and exposures, and make the data on the aggregated climate risks of their portfolio publicly available, including its weighted average carbon footprint. A further element of the bank strategy in that area is to offer more favourable financing conditions to customers and projects that reduce the bank's average carbon footprint, at the same time gradually moving away (either directly through credit decisions or through higher funding costs) from projects and companies with a high carbon footprint. The first visible element of such an approach is a complete suspension of financing of coal extraction and combustion by several commercial banks (over time, this strategy will be extended to other industries).

Cross-cutting reports at the European level show that to achieve the expected/declared emission intensity indicator, banks will have to adjust the asset portfolio structure to 20-30% of the portfolio, which means reducing the availability of funding for many companies and replacing these assets with other lower emission intensity items.

For many companies, this means more frequent and more intensive interactions with their financing banks regarding carbon footprint issues and their measurement, as well as climate strategies issues and emission reductions. In its activities, Climate Strategies Poland already notices the first implementation of the carbon footprint measurement resulting from the need to report its parameters in detail to banks – for the time being, mainly to international banks.

C2. Global capital markets integrate climate risks and corporate climate strategies in investment decisions and assessments

Capital markets also include climate issues in their investment strategies. This applies not only to public and private markets but also to so-called venture capital.

In public markets, this task is facilitated by the increasing and growing transparency of public companies in the area of reporting. Stock-listed companies in Europe are covered by the NFRD Directive and its optional recommendations (see above), which translates in a greater and greater way into the scope and detail of climate reporting (cf. company comparison data, presented below). Based on this public information and the data made available through voluntary detailed reporting on CDP platform, investment strategies are being developed for institutional investors, while stock exchanges create indexes that are broadly linked to ESG and climate issues, allowing investors to choose investments in companies of a specific profile. Institutional investors are increasingly paying attention to ESG issues, especially climate issues, in their dealings with company boards.
For example, the CEO of one Polish company, a branch of a corporation listed on the international financial market, stated that during the quarterly investor conference call, most of the time was

devoted to specific corporate climate actions. The most far-reaching expression of this commitment is the so-called investor activism, which aims to force certain actions through corporate mechanisms by supervisory boards and boards for specific actions. In 2021, phenomena of this kind were significantly accelerated – while up to that point, the climate activists' proposals had not been strongly supported by institutional investors, in 2021 this trend was reversed. In relation to the implementation of their own ESG and climate strategies by institutional investors, climate-related issues are being addressed with growing intensity by members of the supervisory boards and boards of directors of public companies.

One concern about the strategy to increase transparency and the pressure on climate actions of public companies is related to the "privatization" of emission intensity, namely the risk of transforming important greenhouse gas emitters from public stock-listed companies into institutions owned by private investors or private equity funds, without specific reporting and transparency requirements. However, on the part of private equity funds, one can also see a clear intensification of efforts in the area of implementing climate strategies. This is related to the influence of large institutional investors (e.g., pension funds or international financial institutions) on such funds. These investors often translate their requirements into the actions of investment managers. An additional factor is the awareness of fund managers working in the area of a macro-scale climate risks, as well as the risks and opportunities associated with the individual investment decisions in the context of their climate risks – and their translation into financial returns from investments.

Venture capital sees a huge opportunity to participate in the scaling of decarbonization solutions and the various types of technological innovation that can support and accelerate the departure from coal – hence a clear trend of the emergence of specialized venture capital type funds focused on technological pro-climate investment (Cleantech) and more generally on all carbon reduction related investments.

banks will have to adjust the asset portfolio structure to

20-30%

of the portfolio, which means reducing the availability of funding for many companies and replacing these assets with other lower emission intensity items

Larry Fink, head of BlackRock, the world's largest financial organization, managing more than 9 trillion USD of assets, said:

„I think that the next fifty unicorns will leverage technologies that create something related to sustainable development. The world doesn't need another food delivery service unicorn”.

[In the investment jargon, a ***"unicorn”*** is a new company reaching the value assessment of 1 billion USD]

D. The most ambitious. German regulations and support systems for decarbonization are extremely extensive, and in 2021 the changes significantly accelerated

Climate regulations in Germany are based on a combination of three factors:

- a strong evolution of social views and social pressure that translates into policy, followed by regulations and industrial policy at the national level
- the need for such a transformation of an economic model that would consider the interests and competitiveness of the industry, which is largely targeting export markets
- a relatively high capacity to implement long-term economic strategies under conditions of relative political stability and broad consensus on climate issues.

For years, Germany has been at the forefront of decarbonization policy, which continues to go beyond the EU framework, setting more ambitious targets and decisively shaping regulatory mechanisms. In the Federal Republic of Germany, there are several legal mechanisms to support the transition from coal, and in 2021 there was significant acceleration in this respect, which will certainly be continued by the new government coalition created by, among others, by The Greens – the mainstream party traditionally most focused on decarbonization.

D1. Germany already has a comprehensive legal system that regulates the decarbonization policy and contains solutions that go beyond EU legislation

At the legal level, Germany operates within the EU framework, determined by the European regulations described in the previous chapter, with the EU ETS emission allowance market, direct reduction mechanisms, and corporate reporting regulations, considering environmental and climate effects. Apart from that, however, it is important to remember about the specific regulations in force inside the country, which already go beyond the EU framework, and which are still undergoing dynamic development.

The basic legal framework for German decarbonization is the Climate Protection Act (Klimaschutzgesetz) of 2019. In its original form, the provisions included a reduction of emissions of 55% by 2030. Moreover, it defined sectoral objectives and set a framework for the management of these objectives: the responsibility of the ministries for implementing the objectives in various economic sectors, mechanisms for annual monitoring and conducting assessments of the results achieved, as well as the need to prepare and implement a specific "ad hoc program" (Sofortprogram) in the case of a lack of progress in reducing emissions according to the objectives.

On April 29, 2021, which was less than six months before the federal elections in Germany, the Federal Constitutional Court (Bundeverfassungsgericht, BVerfG) announced a key decision from the point of view of the legislative framework for decarbonization, recognizing the Climate Protection Act as insufficient and, thus, in a substantial part, non-constitutional because it strikes at fundamental rights and threatens the freedom of future generations. The Court points out that it is necessary to take scientific recommendations into account and present the emission neutrality plan. According to the Court, this recommendation is based on the need to protect the rights and freedoms of future generations and, therefore, leads to reasonable use of the possible " carbon budget" for emissions in a way that is fair to future generations. While stressing Germany's international responsibility, the judges also ruled that the Federal Republic of Germany cannot avoid the obligation to reduce emissions by pointing to the other States which do not reduce emissions. Therefore, the need to reduce emissions has become a constitutional standard that requires urgent implementation.

In response to the Court ruling and in the context of the forthcoming elections, the Federal Government has quickly adopted the review of the Klimaschutzgesetz, considering the new targets:

- the emission abatement has been increased to 65% by 2030 (previously 55%)
- a new long-term emission abatement target – to 88% by 2040
- moving the date of achieving climate neutrality from 2050 to 2045 (i.e., faster than the EU neutrality target set for 2050)

These objectives have been broken down by sector according to the graphics below. Until the Constitutional Court's ruling was published, the setting of such ambitious targets seemed politically unfeasible within the coalition which was in power during that time.

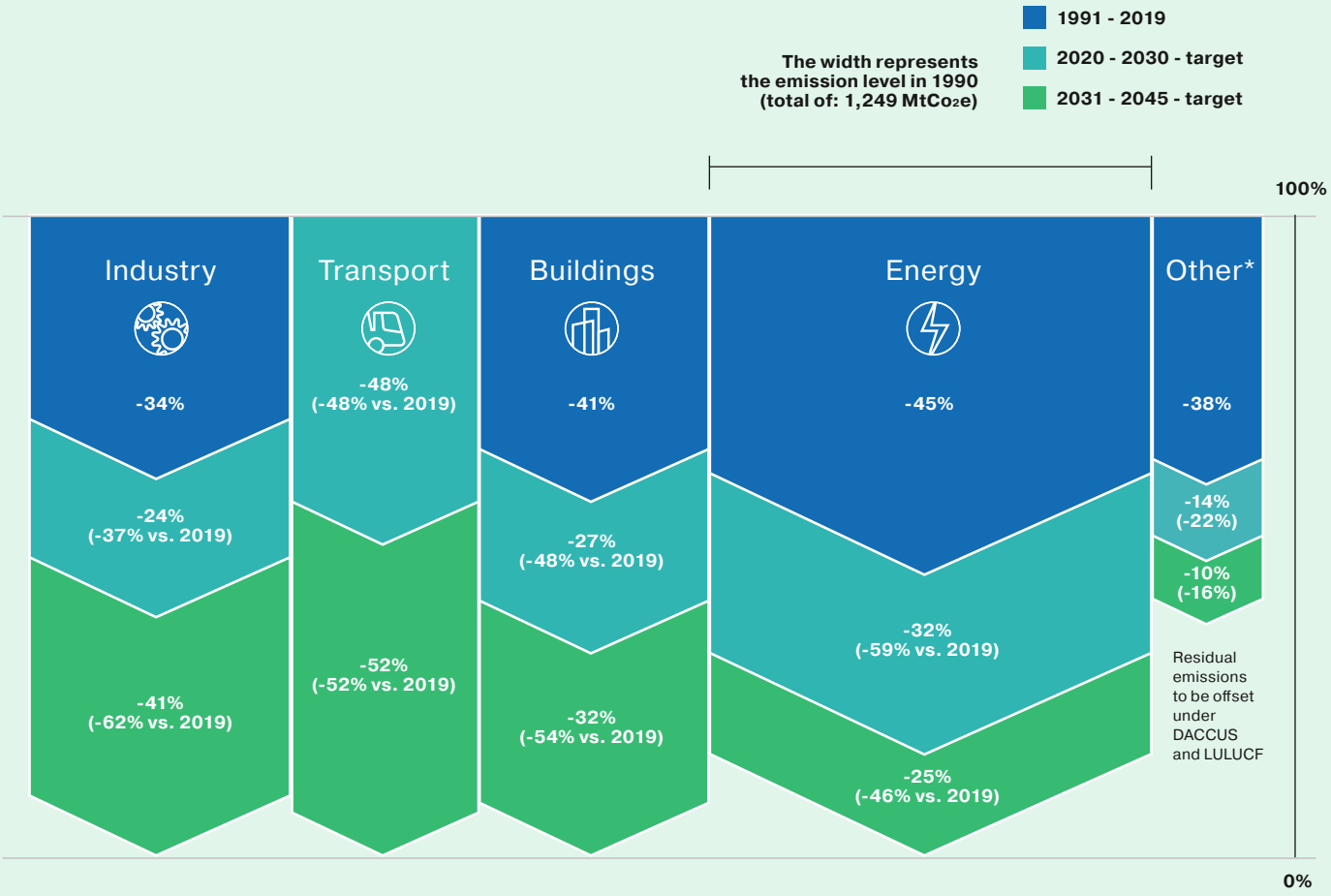
In the Federal Republic of Germany, there are several legal mechanisms to support the transition from coal, and in

2021

there was significant acceleration in this respect, which will certainly be continued by the new government coalition created by, among others, by The Greens – the mainstream party traditionally most focused on decarbonization.

Climate Change Act: sector targets for 2030, GHG emissions neutrality in 2045

Change in emissions in Germany by sector, 1990-2045, % of emissions in 1990



- *Agriculture, waste management and others;
- In 2019, transport did not change compared to 1990;
- Bioenergy with carbon capture, utilization and storage (BECCUS) shown as negative emissions in the industrial and energy sectors;
- DACCUS – direct air carbon capture – utilization and storage of carbon dioxide;
- LULUCF – land use, land use change and forestry

Source: German Environment Agency (2021) GHG emissions data;
BCG analysis (Report "Climate Paths for Germany 2.0, BCG / BDI, October 2021)

Parallel to the Climate Protection Act, a Climate Protection Plan (Klimaschutzprogram) was implemented together with several specific legal mechanisms and programs that serve to achieve the above-mentioned objectives. Below follows a brief introduction to these mechanisms and programs:

1. System of additional charges for combustion emissions in the transport and construction sectors (heating). It entered into force in 2021 under the Fuel Emissions Trading Act (Brennstoff-Eissandelsgesetz, BEHG). This legislation operates side-by-side with the EU ETS and involves charging fuels – fuel oil, natural gas, petrol, and diesel – for emissions at the level of the entities that place these fuels on the market. They will have to purchase emission permits resulting from the combustion of these fuels.
The price of allowances shall be partially regulated and shall be:

- in 2021, the fixed price: 25 EUR per tonne of CO_2 equivalent, which translates into approximately 7 cents per liter of petrol and about 8 cents per liter of diesel
- in 2022: increase to 30 EUR per tonne; in 2023: 35 EUR in 2024: 45 EUR, in 2025: 55 EUR
- in 2026, an auction system with a price between 55 and 65 EUR
- and starting from 2027: a market price with an optional price range

The fixed-price and price range mechanisms turn the system into an instrument similar in its essentials to a carbon emission tax. The revenues thus generated are intended to be used in full to support decarbonization mechanisms and to implement cover systems for businesses and residents. For example, they will be used to subsidize energy-intensive businesses in the event of an increased risk of transferring the business abroad due to new carbon costs which are not to be borne by the international competition. Another way to use the RES funds will be to reduce the surcharge on RES in the energy bills of individual consumers. Thus, the costs of subsidizing RES will be borne by fuel combustion emitters rather than by individual customers.

2. **The launch of several public financial and technical support programs to intensify corporate decarbonization efforts.** This support focuses on specific levers (such as energy efficiency and the use of renewable energy) and on actions in specific sectors, for instance, construction, materials, transport, steel, etc. Examples of such initiatives are the following (the list is not detailed):

- **Energy efficiency support program** – a mechanism of supporting projects that increase energy efficiency and resource usage efficiency to reduce carbon emissions, with subsidizing up to 60% of the investment costs and competitive project selection mechanisms aimed at maximising the effectiveness of carbon abatement (a potentially maximal abatement of CO_2 in relation to the amount of a surcharge). The program is aimed at both small and large companies.
- **Support program for projects related to the industrialization of battery production (mobile and stationary),** including the development of material technologies, the improvement of energy efficiency in battery production, digital techniques that support the life cycle of batteries, and the development of new generation battery techno- logies to provide solutions to improve the utility of renewable energy sources in industry.
- **A program to support energy efficiency and process heat produced by industry** – aimed at reducing primary energy use through investments in production processes that reduce emissions, but also through, for example, the use of industrial heat for the supply of district heating networks.
- **Technology Transfer Program – Light Construction,** supporting changes in construction techniques and construction materials, as well as improving resource usage efficiency to radical abatement in building emissions.
- **Support program for the abatement of carbon emissions and the use of CO_2 in the material industries.**
- **Funds supporting the introduction of climate-friendly fuels and propulsion systems for ships.**
- **Legislation on the e-mobility infrastructure in buildings,** which requires building facilities to be equipped with an infrastructure for charging electric cars. In addition, support for company vehicle fleet renewal programs and incentives for companies to use electric cars.

3. The German Hydrogen Strategy is a key element of the climate policy, particularly in terms of full decarbonization and achieving climate neutrality [10]. The final goal is to use "green" hydrogen in the energy-intensive industries on a mass scale and to make Germany one of the world's leading hydrogen manufacturers. It plans to use hydrogen in the steel, chemical, and cement industries, as well as in transport and heating. Due to the scale of this transformation, the strategy has been written for many years and includes, among others:

- support to initiate the transition of heavy industry to hydrogen technologies (up to EUR 9 billion)
- financial support for the launch of the hydrogen market and investments in electrolysers, i.e., hydrogen production equipment
- support of the construction and deployment of the necessary transmission infrastructure, including the use of gas infrastructure and the management of new investments in gas infrastructure in such a way that natural gas can be converted into hydrogen in the future
- introduction of the "carbon contracts for difference", which cover the difference between the cost of avoiding emissions through hydrogen investment and the savings from the EU ETS eliminated emission costs, which reduces the cost barrier to technology deployment
- establishing mechanisms for the use of hydrogen in transport and building adequate infrastructure for this purpose
- plans for international cooperation within the EU, in particular the North Sea and Baltic Sea countries, to ensure an adequate hydrogen supply; this is linked to the availability of large amounts of renewable energy, especially offshore wind farms, and requires market mechanisms to be established at the European level
- a plan for the structure of responsibility for the implementation and a way of coordinating the hydrogen strategy

The adopted hydrogen program is very ambitious. Such a rapid development of hydrogen production in Germany is at high risk, and hence there are already several mechanisms in the program itself for the purpose of building international cooperation in this area. In addition, the demand for "green" hydrogen will also be greater than the supply of renewable energy available in Germany. This is, of course, a particular opportunity to develop hydrogen technology for export in the neighbouring countries, especially in Poland near the Baltic coast, and to locate the offshore wind farms there.

[10] National Hydrogen Strategy, "Nationale Wasserstoff Strategie" June 2020, https://www.bmwi.de/Redaktion/EN/Publikationen/Energie/the-national-hydrogen-–strategy.pdf?__blob=publicationFile&v=6 (access 19th December 2021).

4. Legislative acts determining the strategy for the transformation of the energy sector, including:
a. The Act on the complete withdrawal from the production of electrical energy from coal beginning in 2038 (Kohleverstromungsbeendiungsgesetz, KVBG)
b. The Renewable Energy Act (Erneuerbare-Energien-Gesetz 2021, EEG 2021), amended on January 1, 2021, assumes reaching 65% share of renewable energy in the energy system by 2030, as well as a total climate neutrality in energy production by 2050. The Act contains several additional mechanisms to facilitate the expansion of the renewable energy production system, mainly solar and wind, both in the distributed energy production form and in the form of large systemic installations. This law will soon be amended on the basis of the findings of the new coalition.

D2. The new political situation after the elections means a further acceleration of the decarbonization of the German economy

The new government of the Federal Republic of Germany will further accelerate the decarbonization programme. The “traffic light coalition” [12], with Chancellor Olaf Scholz at the helm, represents an important turning point in German policy. Although Germany has a consensus on decarbonization policy and none of the major parties in their electoral programs questioned the need to continue this course, the presence of the Greens in the new government coalition (for the second time, followed by the cabinet of Gerhard Schröder) will increase the focus on climate issues. Appropriate announcements have already been made during the initial findings at the beginning of the coalition talks.

The coalition agreement announced on November 24, 2021, contains a number of specific objectives, premises and solutions for climate policy, including, for example:

- accelerating the transition from coal from 2038 to 2030 (this point includes an "ideally by" note, which means that coalition members are aware that this objective could be difficult to achieve)
- reaching a threshold of 80% of renewable energy by 2030 and replacing most of the withdrawn coal power by RES, thus confirming Germany's departure from the atom and urging to treat gas as a transitional fuel, which should eventually be abandoned as well
- to increase the capacity of RES by 2030 (from a quite substantial level already achieved), a number of specific facilitations for investments in RES have already been foreseen in the coalition agreement, such as: the reservation of 2% of the country's territory for land-based wind farms, major facilitation of location decisions for RES, the obligation to place photovoltaic installations on, if possible, every roof when building new buildings or renovating existing ones, as well as expanding offshore wind farms from the current 7.8 to 70 GW and increasing the capacity of the photovoltaic installations from 54 to around 200 GW

[11] *The name comes from the colours of the parties – red of the SPD, yellow of the FDP and green of the Greens*

- an ambitious hydrogen strategy together with a temporary use of gas in new installations, which will be adequately prepared to convert gas into hydrogen, and once the target of renewable “green” hydrogen production is reached – investing in hydrogen-ready installations
- maintaining cost per tonne of CO_2 in the EU ETS emissions trade system over 60 EUR with minimum price mechanisms in case EU ETS prices started falling below 60 EUR (the goal is maintaining a high carbon emission price as a certain incentive for companies to invest
- reaching the target of 15 million fully electric cars on the roads by 2030, a mass development program of charging infrastructure for cars, and a plan of registration of zero-emission cars only before the EU target date of 2035.

Of course, much depends on detailed practical solutions, but it can already be said that with such objectives, German climate policy will be the most ambitious agenda for climate transformation and decarbonization in the world. Furthermore, the fact that the seats of the Minister of Economics and Climate, the Minister of Environment, the Minister of Agriculture, and the Minister of Foreign Affairs were taken by the leaders of the Greens means that climate policy will play an important role in all sectors of the economy and in Germany's international policy. A certain anchor of climate policy could turn out to be the fiscal conservatism of the FDP, which will include the extremely important Ministry of Finance, as well as a plan to maintain budgetary discipline and spending limits. This could be counter-productive to the necessary investments in the decarbonization transition and lead to tensions or delays in the implementation of the climate policy.

German climate policy will be

the most ambitious

agenda for climate transformation and decarbonization in the world.

For Polish companies, this means further tightening of the German climate policy, which will translate into strategies of German companies and EU regulations which will directly affect Polish business. The new German government could also mean much less tolerance of the entire EU for the slow pace of climate transformation in Poland.*

* After the publication of the Polish language version of this report and before publication of this English version, the German government has developed an accelerated version of these measures in relation to a plan to accelerate the energy transition in response to the need to achieve independence from Russian fossil fuels. Also, the initial packages of regulations implementing these agreed measures were introduced.

Chapter 2

Reporting on emissions and implementing ambitious reduction targets and detailed climate strategies is becoming a business standard

Reporting emissions is not yet fully required by law, as is the case of reporting of audited financial data. Works on the introduction of such standards at the European level is advanced and will come into force for most large and medium-sized companies beginning in 2023 (cf. the CSRD directive in the above description of the EU regulations). However, there is already a very well-established set of climate reporting standards. Most of the available standards and reporting platforms, as well as the planned EU regulations, are based on the recommendations of the Task Force on Climate-Related Financial Disclosure (TCFD) published in 2017. It comprehensively addresses the reporting of climate risks and opportunities, including the issue of reporting carbon footprint data.

TCFD recommendations define the areas of climate reporting, broken down into the scope of disclosure of risks and activities related to counteracting climate change (the "mitigation of climate change"). This includes, for example, how attempts to stop climate change through regulations and related acts will affect companies and their operations, and also how companies will positively or negatively contribute to climate change mitigation. A separate area of reporting relates to risks and activities related to adaptation to climate change. It includes mainly physical and possibly economic risks caused by the effects of climate change. TCFC also contains several specific indices that companies should report, including the carbon footprint according to GHG standards, the share of renewable energy in the corporate energy balance, etc.

Most large European companies have implemented detailed climate reporting, based on standards developed by TCFD or similar, and present the data either as part of their annual financial reports or as part of dedicated climate reports. Using standardized platforms for climate reporting (such as CDP), which ensures data comparability between companies, is also recommended.

A. CDP is the world's environmental disclosure platform for companies, cities, states and regions

The most popular and high-tech platform for corporate climate reporting is the CDP (previously known as the Carbon Disclosure Project), available for more than 20 years. In 2021, more than 13,000 companies used it to report their climate strategies and emissions. This constituted a year-to--year increase of 37% and was a significant acceleration in the growth of the reporting scale compared to previous years. In addition to climate information, companies also report data on water security and forests on CDP's disclosure platform.

Reporting on climate strategies is growing rapidly

Source: CDP

Together, these companies account for more than 64% of global stock market capitalization, 96% of the FTSE 100 index, and 80% of the S&P 500 index. As many as 1,500 of these companies come from China.

Considering growing concerns related to environmental threats and opportunities, investors and other financial institutions require reliable, comprehensive, and comparable environmental due diligence data. In 2021, nearly 600 investors with assets worth more than 110 trillion USD turned to thousands of companies to share relevant environmental data through CDP.

The second important mechanism is the supply chain inquiries related to the purchase of goods and services. In this case, data inquiries were supported by over 200 organizations with a total purchase value of over 4 trillion USD. A detailed description of this mechanism is discussed later in the report.

Reporting to CDP includes filling in and submitting a detailed questionnaire, which in its form includes several dozen questions related to the area of climate impact and the management of corporate climate risks. The questionnaire is consistent with, e.g., the TCFD methodology (see above) and includes eleven thematic areas, such as:

- **Governance** – responsibility for the climate area within the company, but also for the issues of managing the incentive systems in this area
- **Business and financial strategy** – integration of climate issues into strategies and financial planning
- **Targets and performance** – detailed information on the emission reduction goals according to scopes and progress in their implementation
- **Emissions data** – detailed data on GHG emissions for the individual scopes (1, 2, and 3, to the extent determined by the company)
- **Energy data** – regarding electricity consumption and the use of energy from renewable sources

The detailed reporting to CDP requires analytical data on emissions for individual Scopes, as well as well-thought-out, prepared, and implemented elements of climate strategies on at least a basic level. Therefore, reporting on the CDP platform mobilizes companies to advance their climate strategies, especially to gradually improve in subsequent reporting cycles.

Based on the questionnaire responses, CDP assesses the advancement of the corporate climate strategies, both in terms of the scope and content of the information provided and assigns a score from A to D (a separate note is given to companies that do not provide data, (F score) or where extent of the data provided does not allow for a score). The scores for individual companies, publicly available on CDP's website, are used, for example, by financial institutions to create investment indices.

In 2020, 129 European companies received the highest A score, of which 16 were from France and Germany, and 20 from the UK. Additionally, 159 European companies scored A-, and another 144 a B or B- (both scores indicating the relative advancement of the climate strategies). As for companies based in Poland, none received an A or A- score in 2020, one received a B (LPP S.A.), and one a C (CCC S.A.). Some companies scored a D and most of those surveyed did not have data to report or chose not to make it public.

In 2021, 93 companies in Europe received the highest A score, of which 22 came from France, 12 from Germany, and 14 from the UK. Additionally, 221 European companies received an A- and another 566, a B or B-, both showing the relative advancement of their climate strategies. Among the companies based in Poland, again none received an A or A- score in 2021. LPP S.A. remained in the lead with a B-, while a C score was given to Boryszew Maflow and LUG S.A., in addition to CCC S.A.: Wirtualna Polska Holding received a C-.

In addition to Polish-based companies, which remain the focus of this study and are analyzed in detail, attention should be paid to Polish subsidiaries of multinationals and financial institutions. Among them, two groups should be distinguished: companies listed on the Polish stock exchange (mainly banks) and local branches of multinational corporations. They former are also asked to respond to CDP questionnaires at the request of investors, but their data are usually reported at the group or corporate level. Therefore, the assessment also pertains to the international group level. In 2021, this group included BNP Paribas Bank Polska S.A., Santander Bank Polska S.A., and Orange Polska S.A. with an A- score, and Bank Millennium S.A. with a B score.

The second group consists of local branches of multinational corporations, which are not called separately to disclose environmental information on a local level following investor interest in group--level data (for investment opportunities). This group includes several A-scored corporations that make up the so-called "A-list" on climate change. To receive an A score, companies must,among other things, have robust climate governance and oversight, as well as rigorous risk management processes and verified Scope 1 and 2 emissions. They must also reduce emissions throughout their value chain. The prestigious A-list includes Jerónimo Martins, Danone, Unilever, Carrefour, and L'Oréal.

110 trillion USD

In 2021, nearly 600 investors with assets worth more than 110 trillion USD turned to thousands of companies to share relevant environmental data through CDP.

The structure of the ratings shows that most companies are still on track to implement climate strategies. However, the number of leading companies grows and they clearly increase the gap from the “climate laggard” companies. This means that continued progress in the implementation of climate strategies is essential.

In summary, the scale of reporting on corporate emissions and climate strategies (especially in line with CDP standards) is growing and accelerating rapidly. These are no longer general slogans or declarations, but specific quantitative data reported under detailed standards. The transparency of global and European companies on their impact on climate change is becoming the norm.

B. Net-zero SBTi Standard: the first detailed standard for corporate net-zero emissions

Another element of an increasingly specific, quantitative approach to climate issues is the implementation of analytically refined, ambitious corporate emission reduction targets. According to the Paris Agreement, the goal of emission reduction is to mitigate global warming below 2°C, and to strive towards a maximum of 1.5°C. These goals affect the necessary scale of emission reductions by approximately 50% in the short-term perspective (by 2030), as well as long-term, to achieve the goal of net-zero emissions by 2050. To comply with the Paris Agreement, companies must in fact commit to an ambitious, precisely calculated, and tight schedule of emission reduction. On the other hand, declarations of corporate compliance with Paris goals can be analytically verified. "Temperature rating” declarations, i.e., the indicator of the global temperature increase implied by the corporate decarbonization pathway, can be evaluated (how much would the global warming increase on average if all global emissions were to abate according to the schedule proposed by the company).

1,5°C

According to the Paris Agreement, the goal of emission reduction is to mitigate global warming below 2°C, and to strive towards a maximum of 1.5°C.

The leading initiative in this regard is the Science Based Targets Initiative (SBTi), a joint project involving CDP, the UN Global Compact, the World Resources Institute, and the Worldwide Fund for Nature (WWF). The SBTi defines the technical standards for setting Science-Based Targets (SBTs) in accordance with the Paris Agreement. It also promotes actions and best practices to reduce emissions. SBTi verifies whether the defined corporate targets are consistent with the scientific approach and the appropriate emission reduction trajectory (1.5°C, well-below 2°C).

As of January 2022, 2,356 companies had committed to the initiative, including 1,108 companies with approved SBTs. Of this pool, 1,282 companies were from Europe and 582 of them had approved SBTs. Among the members of the initiative were eight Polish companies. However, only one of them (Żabka Polska Sp. z o.o.) has had a verified near-term 1.5°C-aligned SBT (the remaining seven have committed to setting and documenting SBTs)[13].

The achievement of ambitious climate targets must be largely based on actual reductions in corporate emissions within their own value chain. Please note that so far, the declarations of climate neutrality were based solely or predominantly on emission offsets. For example, carbon emission reduction certificates were purchased based on afforestation projects in developing countries in Asia. Although such projects bring some added value to tackling climate change, in the long run they cannot substitute for actual emission abatement in highly industrialized economies. It is not possible to compensate for all commercial emissions with projects related to the growth of carbon-absorbing biomass. The abuse of simple, cheap, and often low-quality or unstable compensation projects ("offsets") is one of the symptoms of "greenwashing". Companies and corporations are accused of crediting themselves with illegitimate "green" references and replacing actual pro-environmental activities with marketing gimmicks. On the other hand, in the absence of clear standards, businesses often chose the simplest and cheapest way to achieve the goal of the loosely defined "climate neutrality" and used simple solutions to build a corporate image and emphasize their commitment to climate issues.

[13] *Data according to public SBTi data available at https://sciencebasedtargets.org/companies-taking-action (access on December 19, 2021).*

SBTi's scientifically validated and verified targets (SBTs) assume that Żabka will reduce its total Scope 1 and Scope 2 GHG emissions by 25% by 2026, relative to a 2020 benchmark, and reduce its in-store GHG emissions intensity by 70% by 2026 (Scope 3, tCO_2/PLN 1M), relative to the same timeframe. Additionally, by 2026, the chain will engage business partners, responsible for 75% of its product and service purchase spend, in setting scientifically validated abatement goals.

Anna Gorączka, Green Officer, Żabka Polska:

Every day at Żabka we take several environmentally friendly actions, in which we include both our employees, business partners, franchisees, and customers. We actively work on mitigating the negative impact of our operations on the natural environment: reducing energy consumption, searching for low- and zero-emission sources, testing innovative "green" technologies, and encouraging consumers to make planet-friendly choices. Reaching carbon neutrality by 2025 in terms of Scope 1 and Scope 2 of GHG emissions, and abatement of in-store emissions intensity in Scope 3 are among the goals we declared in our Corporate Responsibility Strategy.

Rafał Rudzki, ESG Director, Żabka Polska:

We were the first modern convenience chain in Central and Eastern Europe to join the SBTi, which promotes the responsible and transparent setting of carbon footprint abatement targets across the value chain, based on scientific knowledge. In the goals reviewed and approved by SBTi, we declared, among other things, an abatement of up to 70% in the intensity of GHG emissions in our stores by 2026 (Scope 3, tCO_2/PLN 1M), relative to the same time. Additionally, we have committed to engaging our business partners in setting SBTs, because we believe that acting together will be more beneficial to the planet.

Therefore, there has recently been a clear push to clarify the definition of net-zero corporate emissions. **The first comprehensively developed global net-zero framework is the SBTi's "Net-Zero Standard" published in October 2021**. It assumes a comprehensive approach to defining the corporate net-zero path, according to four key elements:

Principle 1:

Set near-term SBTs: 5- to 10-year emission reduction goals consistent with mitigation pathways to keep global warming below 1.5°C.

Principle 2:

Set long-term SBTs: to reduce emissions to a minimum residual level, consistent with reduction scenarios to mitigate global warming below 1.5°C by no later than 2050.

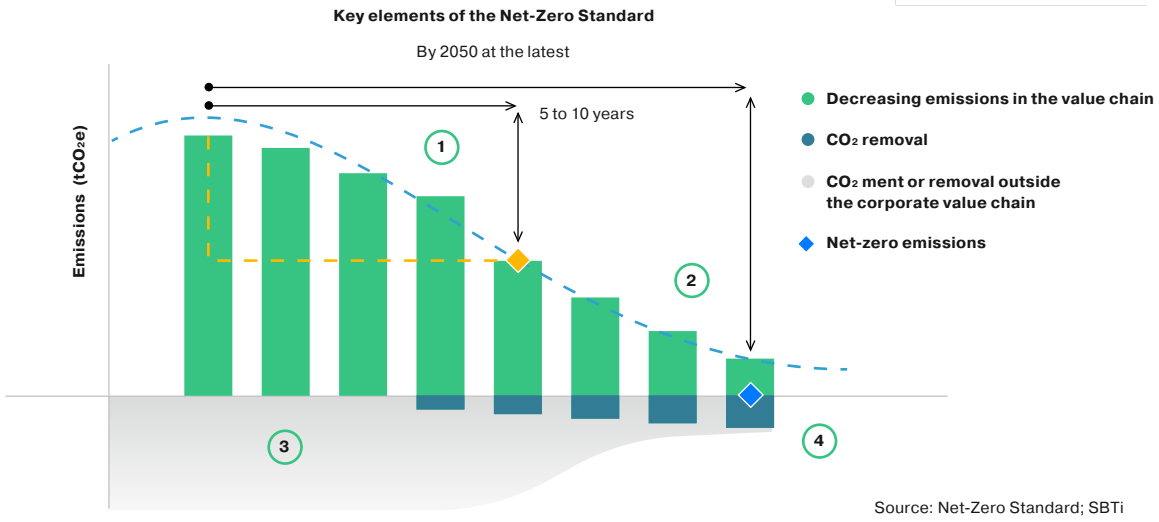
Principle 3:

Beyond value chain mitigation: in the transition to net-zero emissions, companies should take actions to mitigate emissions beyond their value chain. This includes activities that avoid or reduce GHG emissions, as well as those that remove and store greenhouse gases from the atmosphere.

Principle 4:

Neutralization of residual emissions: all residual emissions (at an expected rate of 5-10% of initial emissions, for most companies) must be neutralized through the permanent removal of carbon from the atmosphere to reach net-zero emissions.

The Net-Zero Standard by SBTi is a precise set of rules for achieving net-zero emission



Source: Net-Zero Standard; SBTi

The elements of the Net-Zero Standard include, among others, detailed rules for the verification of targets, emission reduction paths in line with science, industry guidelines, and guidelines for beyond value chain mitigation (detailed guidelines will be published in 2022).

The introduction of the Net-Zero Standard and long-term SBTs, which are the extension of SBTs, is another example of developing and specifying (also quantitatively) corporate climate strategies. It also means that climate strategies are moving from the declarative and qualitative, communication-related layer to a quantitative specific layer, determining the operations and the business strategy of the company.

By mid-January 2022, as part of the "Business Ambition 1.5°C" campaign, more than 790 companies declared that they would achieve net-zero emissions by 2050 in accordance with the Net-Zero Standard. Seven of them already had long-term SBTi-approved emission reduction targets. Zero-carbon standards are expected to evolve over time from the level of voluntary business initiatives into formal regulations that define corporate climate goals. Until the publication of the report, no polish company has announced a plan to achieve a zero-emission target in accordance with the Net-Zero SBTi Standard.

790

companies declared that they would achieve net-zero emissions by 2050 in accordance with the Net-Zero Standard.

Polish companies should also strive to join the group of climate leaders in terms of setting ambitious emission and carbon footprint abatement targets. They should also transform these targets into specific, measurable commitments consistent with SBTs and advanced net-zero standards, such as the latest SBTi Net-Zero Standard.

C. International campaigns and initiatives mobilize companies to act

The rapidly growing corporate climate activity manifests itself in the abundance of grassroots initiatives and voluntary engagement in climate initiatives. Apart from initiatives to disseminate environmental information (including the leading disclosure platform CDP) and mechanisms for setting and verifying targets (including SBTi), there are a number of campaigns, platforms, and initiatives engaging business in climate strategy issues. They are to encourage setting ambitious targets, exchanging experiences, and promoting the climate involvement of the corporate leaders.

One of the major initiatives in the recent period is the "Race-to-Zero" campaign organized by the UN for COP26. It brings together more than 3,000 companies and 173 large investors (including cities, regions, and universities) around the idea of achieving net-zero emissions by 2050 at the latest. Participation in the initiative involves declarations of achieving a net-zero status by 2050, as well as an abatement of emissions by 50% within the next decade. It also requires presenting detailed plans in this regard within 12 months at the latest [14]. The initiative consolidates several local, national, and industry net-zero initiatives. It includes, among others, large business platforms such as Certified B Corporation, Business Ambition for 1.5°C (related to SBTi), Exponential Roadmap Initiative, as well as financial institution platforms such as Net Zero Asset Owner Alliance, Net Zero Banking Alliance, or Net Zero Asset Managers Initiative. The Race-to-Zero platform will continue to expand its operations after COP26 in Glasgow.

Another important platform is the "We Mean Business" coalition associating seven international NGOs focused on cooperation with business on climate change. The coalition's goal is to achieve global net-zero by 2050 and to reduce emissions by 50% before 2030. On the one hand, the coalition and its members cooperate directly with companies that support challenging net-zero targets. On the other hand, they are the voice of business on national climate policies, in line with the philosophy

[14] *Information on the Race to Zero campaign comes from the campaign's official website, https://unfccc.int/climate-action/race-to-zero-campaign#eq-3 (accessed on December 19, 2021).*

of positive feedback between the companies involved and the ambitions and actions of respective governments. Through its partners, the coalition brings together more than 2,600 companies with a capitalization of more than USD 24 trillion.

In Germany, an interesting initiative is the KlimaWirtschaft Foundation (formerly: Stiftung 2Grad, "Foundation 2 Degrees") associating over 30 German corporations and personally 31 CEOs of companies, with the mission of reducing global warming to less than 2ºC. The Foundation operates on three levels. The first is recommending and reviewing the state policy in Germany to increase ambitions and climate aspirations, the second is creating a bridge between climate science and business, and the third promotes the cooperation and exchange of best practices by businesses. On October 11, 2021, after the start of post-election coalition talks, KlimaWirtschaft initiated an open letter, in which 69 major German companies called the newly forming government to implement an accelerated climate neutrality program within 100 days of its establishment. The group of companies includes a broad range of sectors, including heavy industry and the financial sector[15].

The German Industry Association (Budesverband der Deutschen Industrie, BDI), Germany's largest industrial association, has had a relatively conservative approach to overaccelerating the climate transition so far. Therefore, it was quite an important event that the BDI announced the report "Climate Paths 2.0: A Program for Climate and Germany's Future Development" published on October 21, 2021. The plan was developed in cooperation with BCG and was validated bottom-up with German industry (over 150 companies). Regarding the German climate targets tightened in 2021 (a 55% abatement in emissions by 2030 and emission neutrality by 2045, see above), the plan presents specific paths to achieve these targets in industry, transport, construction, and energy, along with the necessary national policies. The BDI has assessed the program as feasible, and the costs of its implementation for the state budget (230-280 billion EUR by 2030) are compared to the post-war Marshall Plan (70% of GDP) and the integration of East Germany after 1990 (40% of relative GDP)[16].

The above international examples show a new trend of business overtaking regulatory bodies. Similarly, there was a very intensive presence and activity of business at COP26 in Glasgow. For the first time on such a scale, business joined the conference, which is basically an intergovernmental one[17]. **This shows a change in the attitude of a large part of business, which has departed from the status of a conforming climate regulations addressee. Instead, they moved into an offensive position, initiating changes and even accelerating national policies in this area.**

[15] Press release: https://klimawirtschaft.org/en/__trashed-2__trashed-7241.
[16] Klimapfande 2.0, BDI, 21.10.2021, https://bdi.eu/media/publikationen/#/publikation/news/klimapfade-2-0-ein-wirtschaftsprogramm-fuer-klima-und-zukunft/ (accessed on December 19, 2021).
[16] Cf. Big Business and COP26: are the net-zero plans credible, „Financial Times", October 11, 2021, https://www.ft.com/content/d91b5934-de9e-4eef-a008-697bce53263f (accessed on December 19, 2021).

RACE-
-TO-ZERO

One of the major initiatives in the recent period is the "Race-to-Zero" campaign organized by the UN for COP26. It brings together more than 3,000 companies and 173 large investors (including cities, regions, and universities) around the idea of achieving net-zero emissions by 2050 at the latest. Participation in the initiative involves declarations of achieving a net-zero status by 2050, as well as an abatement of emissions by 50% within the next decade.

The most ambitious Polish companies and business associations should aspire from being focused on following EU and national regulations and the requirements of financial institutions, to moving to an ambitious role and taking a leadership role in the transformation of the economy towards zero--emission. They should also consider active lobbying on national policy.

Chapter 3

The climate laggards. Polish companies between denial and climate helplessness

As European companies are building their competitiveness by reducing emissions and creating new, climate-favorable strategies, Polish companies are clearly less advanced in adapting to trends related to the decarbonization of the economy. Moreover, the Polish economy as a whole is significantly more "carbon-intensive" than European economies. As a consequence, within the new climate-related areas of market competition, Polish companies have significant work to do in a short amount of time in order to prepare for the challenges ahead.

Based on an objective assessment, Polish companies face a relative lag in building climate competitiveness. This results from two problems:

- the negligible level of relative advancement of even the largest Polish companies, including listed companies, in the real creation of climate and decarbonization strategies, as confirmed by a review of available data and a number of independent studies and analysis
- lags in the energy transition both in the companies themselves and at the systemic level, resulting in a structurally high carbon footprint of Polish companies and products

A. Polish companies are only starting the journey toward preparing and implementing climate strategies and collecting basic information on their full carbon footprint

CDP is recognized by climate strategy leaders as the "gold standard" for reporting on climate. For the purpose of this report, CDP as a partner in the study provided the full scope of data reported by Polish companies, as well as comparative data for all companies reporting to CDP from the most advanced markets in Europe, i.e., Germany, France and UK, as well as Spain. Access to this information allowed for a precise comparison of the climate progress of large Polish companies against the benchmark of European countries. The level of provided data allows for precisely

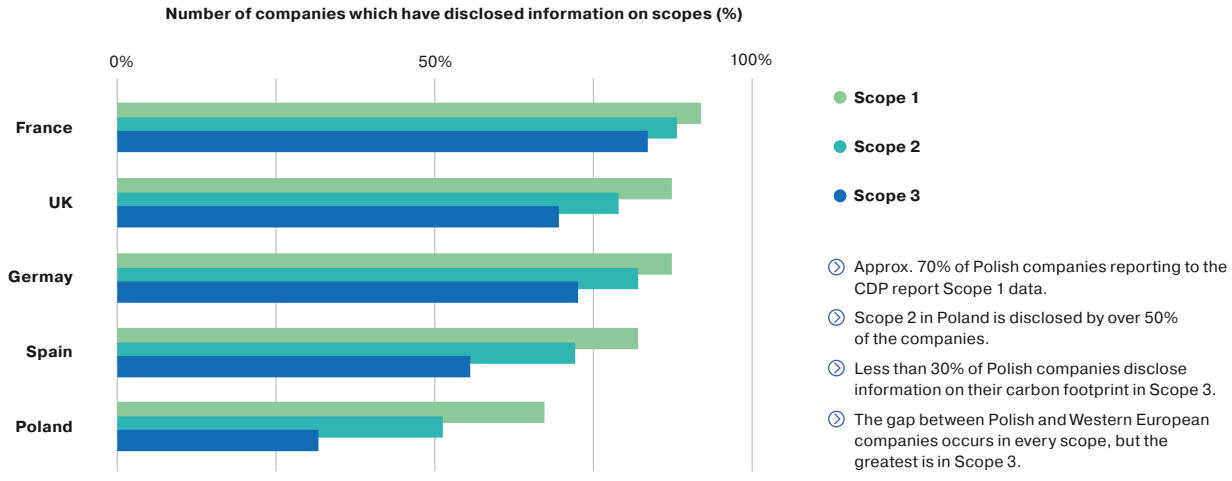
defining gaps in the climate reporting progress of Polish companies, and to establish a gap in relation to developed markets in individual areas.

All in all, the following analysis is based on the data collected from **43 Polish companies** and available in CDP's database, compared to 1**57 companies from Germany, 161 companies from France, 421 companies from the UK and 124 companies from Spain**. The analysis does not include companies that have restricted confidentiality when reporting to CDP. This often applies to companies that have disclosed information, e.g., as a result of a request from a business partner. In most cases, proprietary data are limited in scope and are therefore omitted from the collective cross-sectional CDP analysis to avoid distorting the results by fragmented data. Consequently, the number of companies analyzed in this chapter is lower than the total number of companies reporting to CDP in each country.

A statistical comparative evaluation of the best practices of Polish companies was made in relation to those of Western Europe based on selected elements of the CDP reporting. The analysis comprised five areas showing the level of advancement of climate strategies.

1. The scope of carbon footprint data reporting; considering Scope 1, Scope 2, and Scope 3, including individual categories of Scope 3.

Reporting of carbon footprint data in Polish companies is limited, especially in Scope 3



- Approx. 70% of Polish companies reporting to the CDP report Scope 1 data.
- Scope 2 in Poland is disclosed by over 50% of the companies.
- Less than 30% of Polish companies disclose information on their carbon footprint in Scope 3.
- The gap between Polish and Western European companies occurs in every scope, but the greatest is in Scope 3.

* The analysis included companies that reported the value of emissions in the given scope. Scope 3 specifies companies that reported any category in this respect. No. of analyzed companies: Poland-43, Germany-157, France-161, UK-421, Spain-124. The companies were assigned to countries by the location of company or group headquarters (for multinational corporations).

Source: Own study based on the database provided by CDP

It is clearly visible that the scope of reporting by Polish companies' reporting is less detailed, in particular with regard to Scope 3 emissions. Looking in detail at reporting categories in Scope 3, data related to almost every category is significantly less available. This means that measuring Scope 3 emissions in Polish companies that are most advanced in climate issues (provided they report to the CDP) is only at the beginning, and it is less advanced than in Western corporations. However, it can be concluded that the measurement of the carbon footprint has already begun in the basic dimension, that is, in Scope 1 and Scope 2.

Polish companies report Scope 3 categories to a much lesser extent than Western companies

No. of companies reporting Scope 3, by category (%) *

		Poland	Germany	France	UK	Spain
Upstream	Purchased raw materials and services	16,3%	52,9%	78,9%	43,9%	37,1%
	Capital goods	2,3%	24,8%	57,1%	24,2%	23,4%
	Energy and fuel-related emissions (not included in Scope 1 and 2)	16,3%	41,4%	60,9%	50,4%	30,6%
	Transport and distribution	18,6%	42,0%	51,6%	26,6%	26,6%
	Operational waste	14,0%	39,5%	66,5%	46,3%	32,3%
	Business travels	20,9%	61,8%	74,5%	62,7%	45,2%
	Commuting	7,0%	45,2%	64,0%	34,4%	37,1%
	Rented assets	2,3%	12,1%	14,3%	9,5%	12,9%
Downstream	Transport and distribution	11,6%	28,7%	47,8%	15,7%	14,5%
	Processing of sold products	2,3%	8,3%	9,9%	5,2%	3,2%
	Using sold products	4,7%	22,9%	36,6%	16,4%	16,1%
	Handling of sold products after use	2,3%	18,5%	36,0%	15,0%	9,7%
	Rented assets	2,3%	8,9%	9,9%	9,0%	4,0%
	Franchises	2,3%	3,8%	7,5%	3,3%	6,5%
	Investments **	2,3%	6,4%	11,8%	7,8%	12,1%

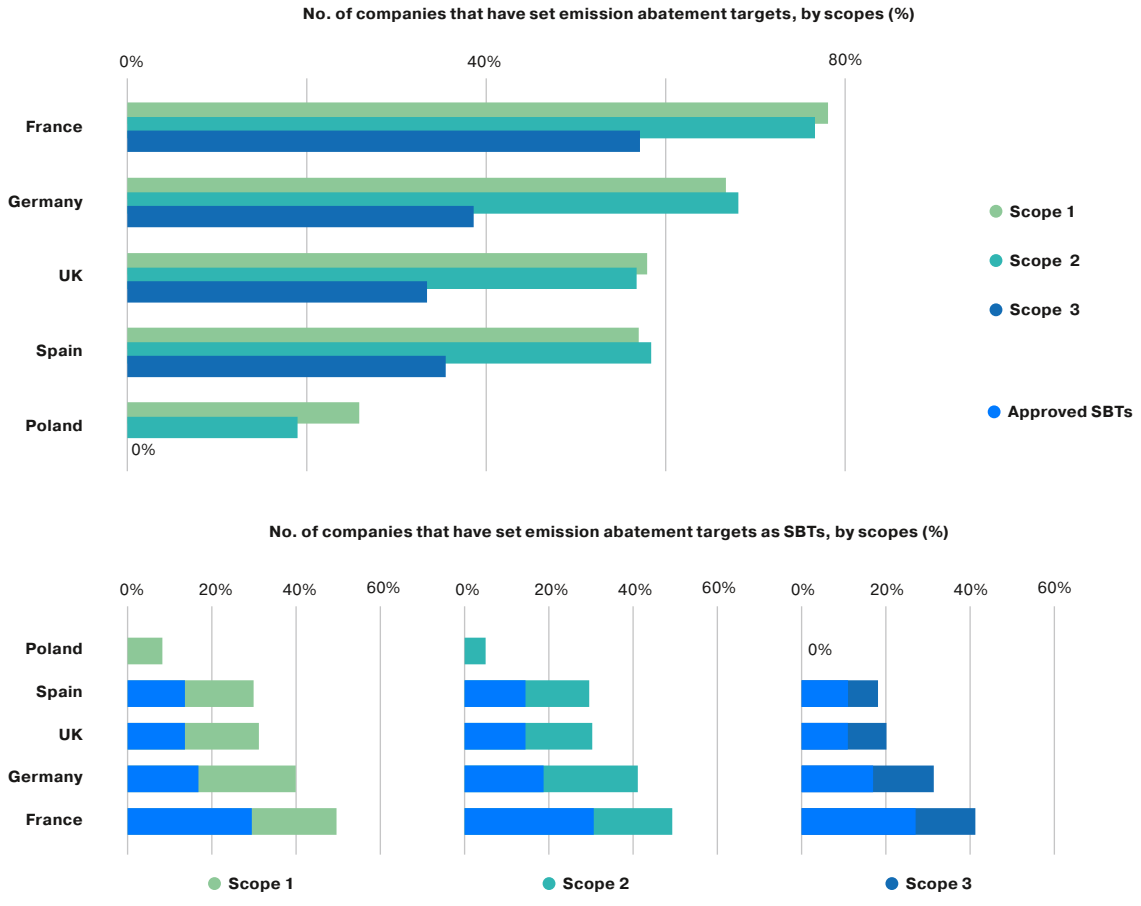
* The analysis included companies that reported the value of emissions in the given Scope 3 categories.
** No. of analyzed companies: Poland-43, Germany-157, France-161, UK-421, Spain-124.
The companies were assigned to countries by the location of company or group headquarters (for multinational corporations).

Source: Own study based on the database provided by CDP.

2. Setting any emission reduction targets and specifically the targets broken down into individual emission scopes.

The step from measuring the carbon footprint to setting emission reduction targets looks much worse. Only a few Polish companies have targets in Scopes 1 and 2, and none have targets in Scope 3. This is unlike Western European companies, most of which have defined targets for Scopes 1 and 2, and a significant part also for Scope 3. Polish companies are hardly ever found in the group of companies that set science-based targets (SBTs) and verify them through SBTi. This means that the climate strategies of Polish companies are not very specific and measurable in relation to more developed markets.

Few Polish companies have any abatement goals targets set, with no SBTs in place



* Companies that have declared any Scope 3 categories are included in Scope 3.
No. of analyzed companies: Poland-43, Germany-157, France-161, UK-421, Spain-124. The companies were assigned to countries by the location of company or group headquarters (for multinational corporations).

Source: Own study based on the database provided by CDP

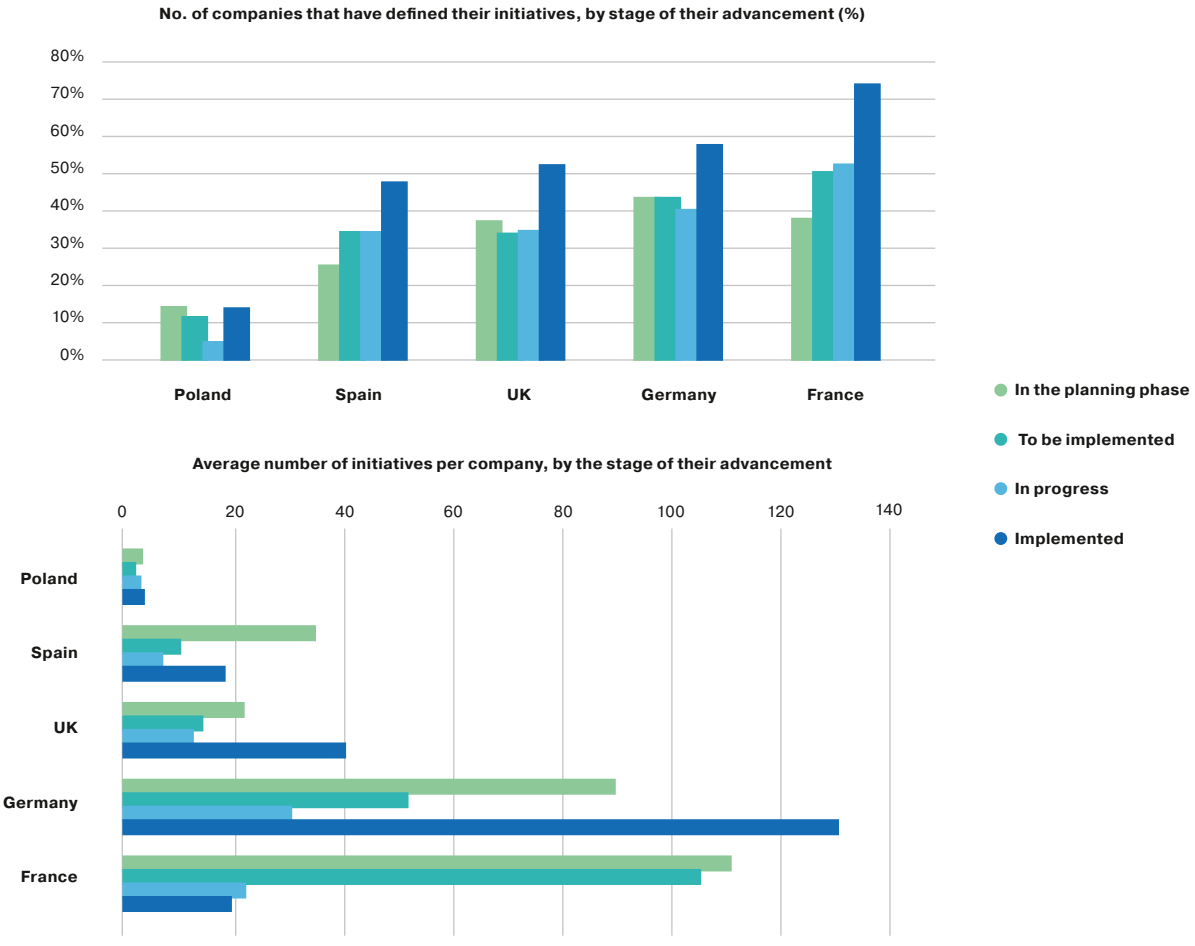
14%

Approximately 14% of Polish companies reporting to CDP have defined any initiative, while among Western European companies the percentage ranges between 30 and 70% on average, depending on the status of the initiatives. Many Western European companies also report initiatives that have already been implemented (50-70% depending on the country).

3. Defining emission reduction initiatives and their implementation stage

Similarly, the situation with building emission reduction programs based on specific initiatives is far from satisfactory. Approximately 14% of Polish companies reporting to CDP have defined any initiative, while among Western European companies the percentage ranges between 30 and 70% on average, depending on the status of the initiatives. Many Western European companies also report initiatives that have already been implemented (50-70% depending on the country). The intensity of the programs is also significantly different: Western European companies report, on average, several dozen to several hundred initiatives per company at various stages of implementation. In the case of Polish companies, it is only a few initiatives on average. It can be concluded that, in terms of activities and initiatives to reduce emissions, Polish companies have not yet started their worki.

The level of advancement of emission abatement programs in Poland is low compared to Western companies



* No. of analyzed companies: Poland-43, Germany-157, France-161, UK-421, Spain-124. The companies were assigned to countries by the location of company or group headquarters (for multinational corporations).

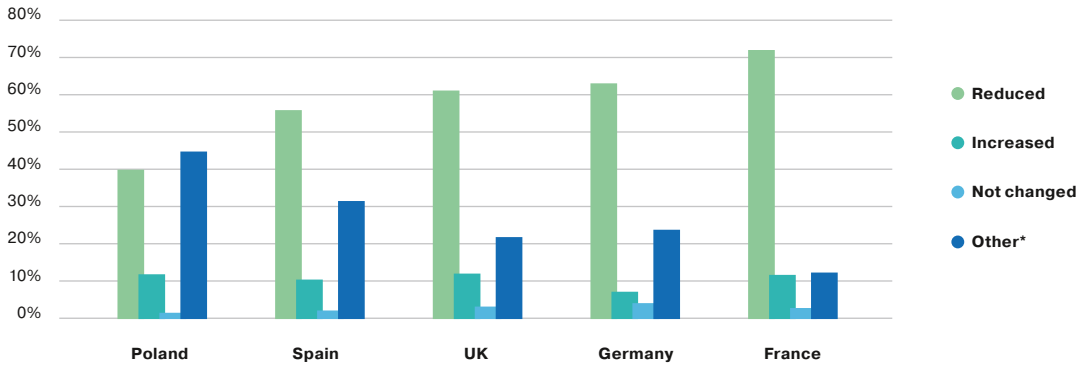
Source: Own study based on the database provided by CDP.

4. Emissions' reduction results and the use of renewable energy within Scope 2

There is also a significant lag in the progress toward reducing emissions, especially in terms of the transition to renewable energy in Scope 2. Most Western European companies report progress in reducing their carbon footprint. Between 35-40% of companies report a share of renewable energy of more than 50% in total energy consumption. In Poland, such a level of "green" power is reported by only approximately 12% of companies.

The emission abatement results achieved so far and the use of renewable energy

No. of companies that declared the achieved results in emission abatement (%)



No. of companies using RES energy, broken down by (%) share of renewable energy in total energy (%)**

	Poland	Germany	France	UK	Spain
>80%	4,7%	21,0%	11,8%	20,9%	25,8%
50-80%	0,0%	15,3%	13,7%	11,9%	15,3%
30-50%	4,7%	8,3%	9,9%	5,5%	6,5%
10-30%	9,3%	8,9%	20,5%	7,4%	4,0%
0-10%	25,6%	15,9%	24,8%	18,5%	11,3%
No information	55,7%	30,6%	19,3%	35,8%	37,1%

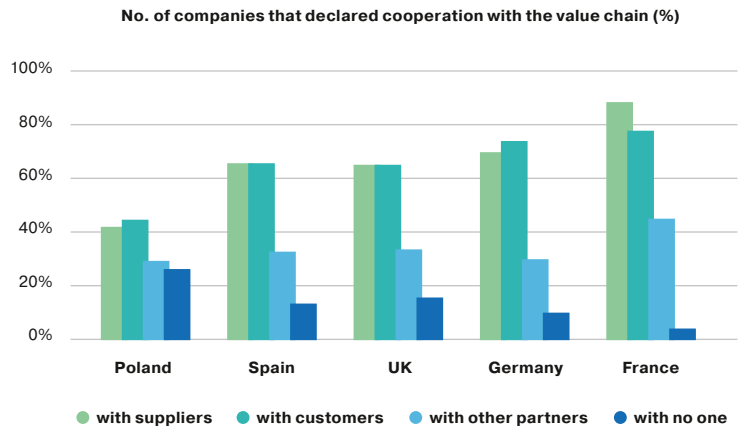
* The 'Other' category in the analysis of the declared emission abatement results identifies companies that have marked the following statements: “This is our first reporting year, so we don't have any data to compare”, and “We have no emissions data,” including companies that have not responded at all. The analysis of the use of RES included only the answer: “Consumption of purchased or acquired power”.
** The analysis included only those companies that provided correct values (with a 1% estimate error for the sum of renewable and non-renewable energy) for renewable energy and for total purchased or acquired power. The category "No information" defines companies that did not provide information on the use of RES energy or the data is provided incorrectly.
No. of analyzed companies: Poland-43, Germany-157, France-161, UK-421, Spain-124. The companies were assigned to countries by the location of company or group headquarters (for multinational corporations).

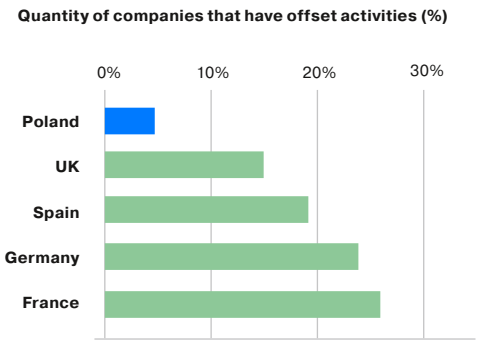
Source: Own study based on the database provided by CDP.

5. Supply chain engagement and leveraging offset projects outside of their own supply chain.

A relatively large proportion of Polish companies (approximately 40%) declare that they will start climate-related suppliers engagement. This, however, is a significantly lower percentage in relation to Western European companies (60-80%). The use of voluntary carbon offset projects is much less widespread; only 5% (i.e., individual companies) in Poland reported the use of such tools.

Involvement in work with the value chain and the use of offsets





*No. of analyzed companies: Poland-43, Germany-157, France-161, UK-421, Spain-124. The companies were assigned to countries by the location of company or group headquarters (for multinational corporations).

Source: Own study based on the database provided by CDP.

In conclusion, it can be stated that Polish companies should first focus on the basic elements of the climate strategy to fill the gap in relation to more developed markets. This includes, in particular:

1. accurately measuring emissions of Scopes 1 and 2 and setting relevant targets
2. implementing projects related to the transition to renewable energy sources to reduce Scope 2 emissions
3. launching the measurement of Scope 3 emissions
4. defining emission reduction programs and specific emission reduction initiatives
5. launching the preparation for defining long-term SBTs (after gaining analytical control of the exit point and emission reduction opportunities)
6. applying offset mechanisms
7. implementing formal climate strategies and launching communication and reporting in this area

35%
40%

Most Western European companies report progress in reducing their carbon footprint. Between 35-40% of companies report a share of renewable energy of more than 50% in total energy consumption.
In Poland, such a level of "green" power is reported by only approximately 12% of companies.

The analysis allows to conclude that the number of companies reporting to CDP from Poland is significantly lower than in other countries, even taking into consideration the size of the economy and the number of large companies. This could be due to the lower awareness and motivation of companies to transparently report their climate strategies, especially in such an advanced tool as the CDP platform. However, a question remains whether companies prepare and implement climate strategies without making the effort to report in detail on their climate impact through CDP?

In addition to CDP's data showing the relatively low level of advancement of Polish companies in climate strategies, several independent, comprehensive analyses have recently appeared, focused mainly on listed companies and the largest entities. All reveal a coherent picture of the relatively low level of participation of Polish companies in the climate transformation.

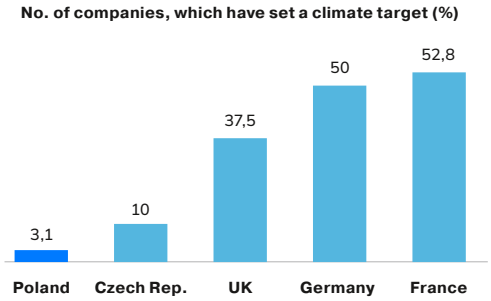
The percentage of Polish companies that have set a climate target is only 3%, while in Germany or France it is over

50%

Alliance for Corporate Transparency coordinated by the non-profit organization Frank Bold and featuring a number of other climate organizations (https://www.allianceforcorporatetransparency.org) made a comprehensive analysis of 2019 data from 1000 public companies from Europe, as well as an in-depth analysis of public companies from the Mediterranean (Spain, Italy, Greece) and Eastern Europe (including Poland, the Czech Republic, Slovakia, Romania, and Hungary) based on data for 2020. These European regions were identified as lagging behind in the implementation of climate reporting and strategies (the above reports also touched on aspects of environmental reporting broader than climate).

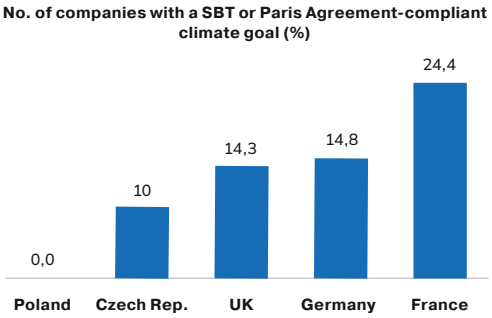
The comparison of business in Poland against Western European countries based on the analysis of 1000 companies in 2019 shows a clearly lower level of progress in terms of establishing climate policy and setting carbon footprint reduction targets, especially SBTs. The same applies to reporting the carbon footprint in individual scopes. When it comes to most Polish companies, a significant percentage of them only publish Scope 1 data. At the same time, they completely lack emission reduction targets, in particular SBTs. This is entirely consistent with the image derived from the CDP data.

Setting a company climate target



The percentage of Polish companies that have set a climate target is only 3%, while in Germany or France it is over 50%.

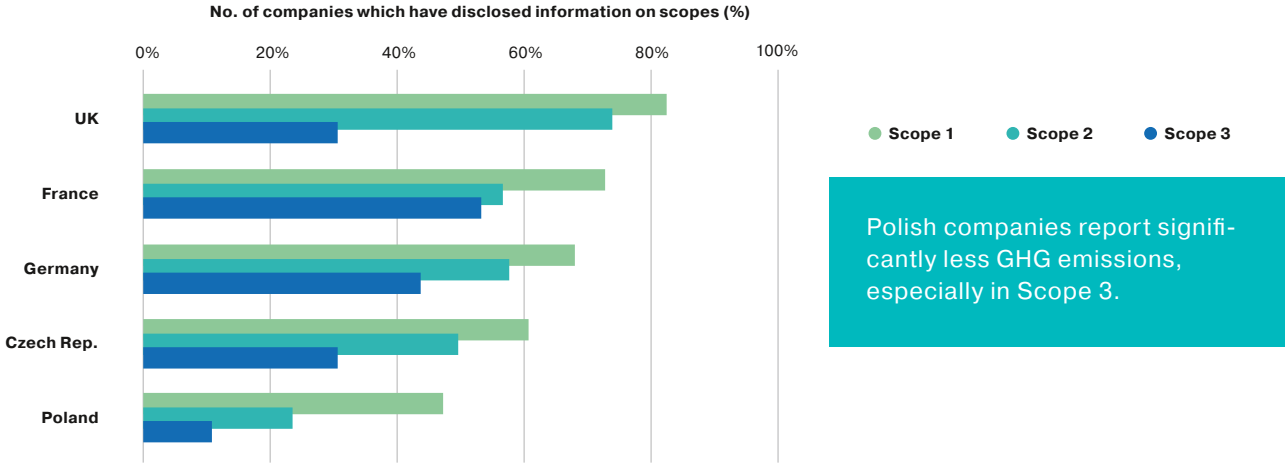
Climate goal: SBT or Paris Agreement - compliant



None of the surveyed Polish companies have a SBT or Paris Agreement-compliant climate goal.

Source: Alliance For Corporate Transparency, Raport 2019. Analysis of the sustainable development reports of 1000 companies subject to the NFRD directive.

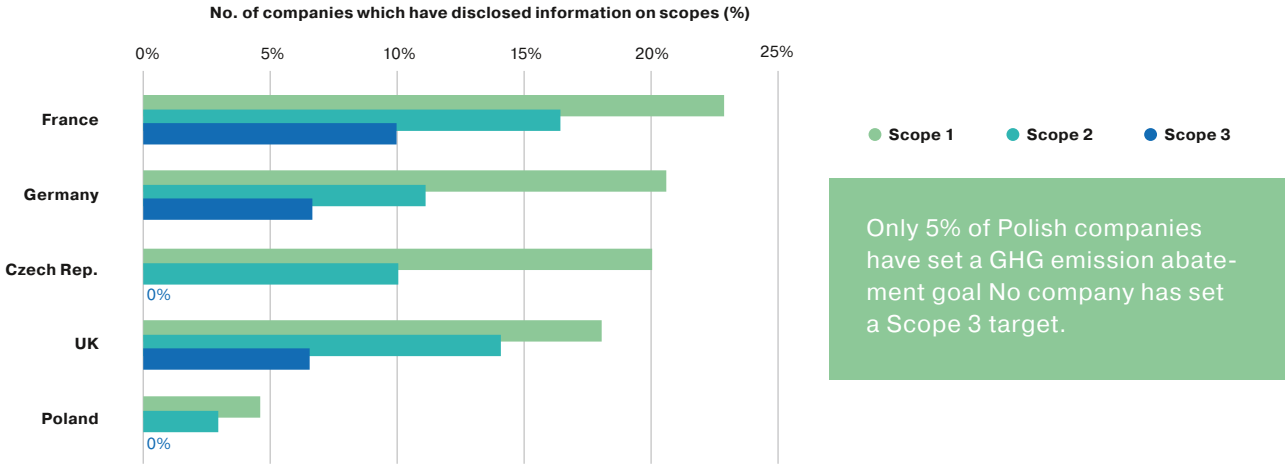
Disclosure of information on emissions in individual scopes



Polish companies report significantly less GHG emissions, especially in Scope 3.

Source: Alliance For Corporate Transparency, Raport 2019. Analysis of the sustainable development reports of 1000 companies subject to the NFRD directive.

Setting a company GHG emission abatement goal

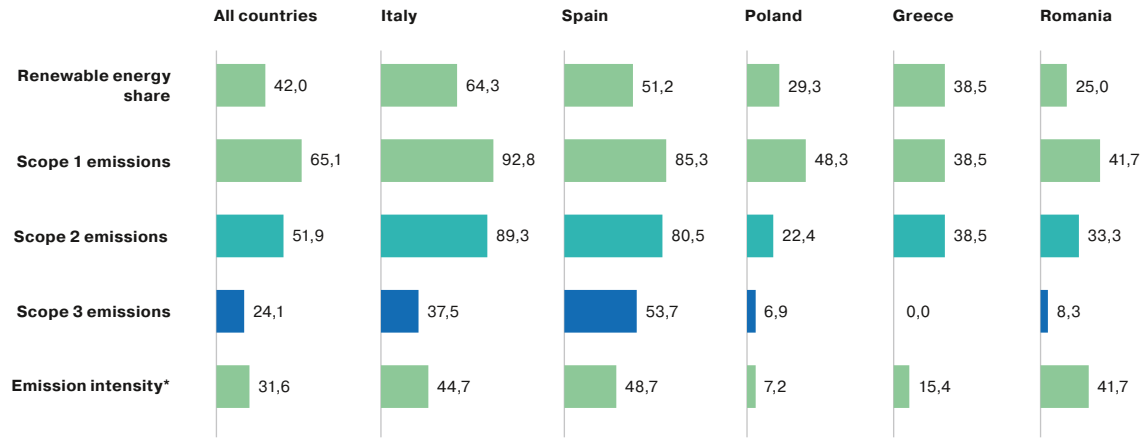


Only 5% of Polish companies have set a GHG emission abatement goal No company has set a Scope 3 target.

Source: Alliance For Corporate Transparency, Raport 2019. Analysis of the sustainable development reports of 1000 companies subject to the NFRD directive.

An in-depth study for 2020 comparing the countries of Eastern and Mediterranean Europe showed the lack of progress of Polish companies compared to 2019, as well as a clearly lower level of progress of Polish companies compared to companies from the Mediterranean countries. The analysis also revealed a clearly lower level compared to Romanian companies in each parameter, apart from reporting in Scope 1.

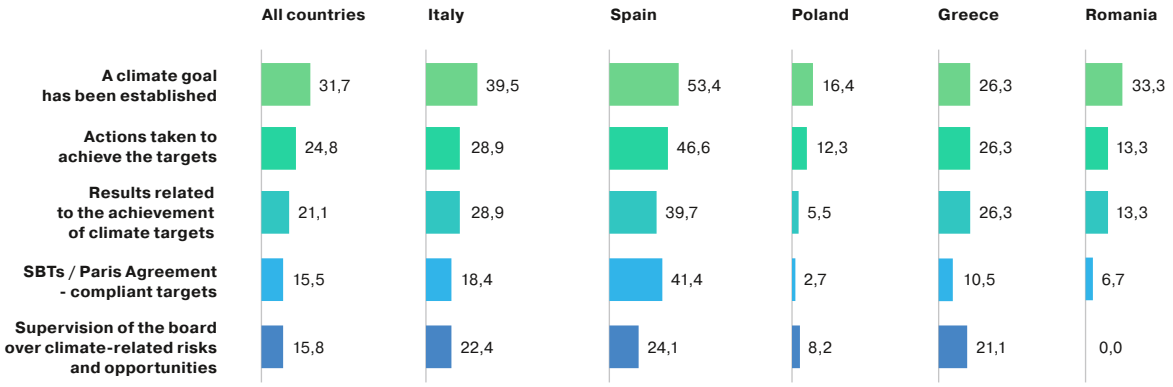
Scope of reporting emissions and other climate KPIs



*Emission factors converted per unit of activity of the company, e.g., production volume.

Source: Alliance For Corporate Transparency, Raport 2020. Reports of 300 companies from Central, Eastern and Southern Europe subject to the NFRD directive were analyzed

Setting company emission abatement targets



Source: Alliance For Corporate Transparency, Raport 2020.
Reports of 300 companies from Central, Eastern and Southern Europe subject to the NFRD directive were analyzed.

Also, dedicated research of Polish listed companies shows the lack of advancement and progress in climate strategies. The Corporate Climate Crisis Awareness Study by the Reporting Standards Foundation, the Association of Stock Exchange Issuers, and Bureau Veritas shows a very low result of Polish companies (in 2020, 1.79/10 on average), a deterioration of the result between 2019 and 2020 (an average abatement from 1.89 to 1.79/10), and a very small group of companies with high scores (seven companies with scores above 7/10).

Climate awareness survey of companies, 2019-2020

2019		2020	
Average score	1,87 pkt	Average score	1,79 pkt
Best score	9,33 pkt	Best score	8,50 pkt
Percentage of companies with 0 score	32%	Percentage of companies with 0 score	35%

44 of 153 companies scored more than **2 points.**
55 of 153 companies scored between **0 and 2 points.**
54 out of 153 companies **did not even reach a fraction of a point.**

The most climate-conscious companies in 2021	
Score	Company
8,50	**CCC S.A.**
8,33	**LUG S.A.**
8,08	**LPP S.A.**
7,66	**PZU S.A.**
7,58	**Wielton S.A.**
7,25	**ASBISc Enterprises PLC**
7,08	**BNP Paribas Bank Polska S.A.**

Source: Corporate Climate Crisis Awarness Study, Association of Stock Exchange Issuers, Reporting Standards Foundation, Bureau Veritas

CDP

In summary, both data from CDP and independent research on listed companies, show that Polish businesses are only in the early stages of measuring their carbon footprint. They have also only started implementing formal emission reduction targets, as well as broader climatic strategies and programs. Importantly, Polish enterprises are also significantly less advanced in the implementation of climate strategies than companies from other European countries, especially the largest ones such as Germany, France or the UK.

The latest report in this area is the study **"Corporate Indifference"** by Think Tank Instrat[18]. According to this report, only 13 out of the 140 largest companies listed on the Warsaw Stock Exchange have announced any climate targets. Only eight issuers out of the 140 largest companies have announced climate strategies, and only three more had planned to do so by the end of 2021.

The Instrat report defines four main barriers to the greater advancement of listed companies in building climate strategies:

1. minor pressure from stakeholders, including listed institutional investors, which results from the insufficient consideration for climate-related and environmental issues in the business strategies of the financial sector
2. lack of regulatory incentives, especially those resulting from regulating the investment criteria for pension fund policie
3. limited selectivity of the WIG-ESG index in terms of climate strategies
4. limited scope of skills in terms of implementing advanced climate strategies both on the part of decision makers and external service providers
5. Low climate awareness among Poles in general, and among the management and supervisory officers of listed companies

An important caveat is that all the above reports relate to companies headquartered in Poland. The situation is different for international companies operating in Poland, which implement climate strategies within their entire organizations (internationally). Most of the largest foreign investors in Poland have advanced climate strategies, disclose information via CDP platform, and have set ambitious SBTs.

[18] *"Corporate Indifference", Instrat, October 2021, https://instrat.pl/wp-content/uploads/2021/11/Fundacja-Instrat-Korporacyjna-Obojętność.pdf (accessed on December 21, 2021)*

Climate activity of the largest investors in Poland

TOP 20 companies *	CDP	SBTi	Race-to-Zero	Country of origin
Orange	●	1.5°C, NET-ZERO	Business Ambition for 1.5ºC	France
ArcelorMittal SA	●			Luxembourg
Kingfisher plc (Castorama)	●	1.5°C	Business Ambition for 1.5ºC	UK
Adinan Topco Sarl (Allegro, Ceneo, ebilet)				Luxembourg
Volkswagen Group	●	Well-Below 2°C		Germany
Schwarz Beteiligungs-kg (Lidl, Kaufland)		1.5°C		Germany
Fiat Chrysler Automobiles n.V.	●			Italy
International Paper Co	●	Well-Below 2°C		USA
Deutsche Telekom AG (T-Mobile)	A-List	1.5°C, NET-ZERO	Business Ambition for 1.5ºC	Germany
Jeronimo Martins (Biedronka, Hebe i inne)	A-List	●		Portugal
Optimum Ventures Magántokealap				Hungary
WH Group Limited (Animex Foods, Agri Plus, Agri Vet, Smithfield)	●			China/ Cayman Islands
Danone	A-List	2°C	Business Ambition for 1.5ºC	France
Innogy International Participations n.V.				The Netherlands
Unibail-Rodamco-Westfield (centra handlowe)	A-List	1.5°C	Business Ambition for 1.5ºC	France
Canpack	●	●		USA
Grupa PSA**	●	2°C		France
CRH PLC	●			Ireland
Famille Mulliez (Auchan, Leroy Merlin)	●			France
Veolia Environnement	●	2°C, NET-ZERO	Business Ambition for 1.5ºC	France

* Foreign companies with subsidiaries in Poland by investment value, 2018, according to Amcham
** PSA Group before the merge

Source: Own study of CSP, data from CDP and SBTi come from 2021

In summary, both data from CDP and independent research on listed companies, show that **Polish businesses are only in the early stages of measuring their carbon footprint. They have also only started implementing formal emission reduction targets, as well as broader climatic strategies and programs.** Importantly, Polish enterprises are also significantly less advanced in the implementation of climate strategies than companies from other European countries, especially the largest ones such as Germany, France or the UK.

B. The energy transformation of Polish companies is only beginning

Although a detailed assessment of national policy and efforts to change Poland's energy mix exceeds the scope of this study, the approach of companies to energy transition is an important element of climate competitiveness. Expecting a solution to the problem only at the systemic level is highly risky, considering the slow pace and slow progress of Poland in this regard.

At the technology and energy market level, companies have access to several tools that allow them to limit ties to an overly carbon-based grid, positively affecting both energy costs and carbon footprint. Solutions to reduce the Scope 2 carbon footprint by transitioning to renewable energy sources include:

1. Investing in their own RES, in particular "on-site" photovoltaic installations, i.e., on the company's premises (both on the roof and on the ground), which in the current regulatory and technical conditions can provide 20-25% of a company's electricity demand depending on their energy consumption profile
2. Investing in their own RES production assets (solar panels or wind) off-site, i.e., organized as separate power generation units outside the company's premises, serves the corporate energy needs as an independent power producer, operating as a separate branch of the company
3. PPAs that allow the purchase of "green" power from dedicated RES installations built and managed by specialized companies.
4. Gas co-generation installations partially reduce emissions in relation to coal-only sources.

An important element of the strategy to reduce costs and emissions is improvement projects related to corporate energy efficiency. These include specific changes that limit electricity consumption in production processes, simple thermal renovation improvements of buildings, replacing heating and cooling technologies, or modernizing lighting with LED technology according to the principle that unused MWh are the cheapest and the least emitting.

From the point of view of highly energy-intensive companies, it is important to implement a solution that will diminish the role of coal power in production processes. Business leaders have announced plans to implement small modular nuclear reactors (SMRs) to secure energy-intensive production, or an alternative pathway of hydrogen strategies modeled on German solutions. Both directions, due to their more systemic nature, require business cooperation with the state to ensure long-term favorable regulatory conditions and an appropriate energy policy for the transformation of the power production of energy-intensive companies, as well as significant investments in nuclear or hydrogen power.

Polish companies are relatively behind all the above decarbonization strategies. Thus far, the development of the RES market has been focused on individual clients (mainly micro-power installations in family houses) and on professional wind and solar farms in national prosumer systems: contract-, and in recent years, auction-based. The share of medium and large companies in RES investments was negligible. The corporate PPA market was also defunct and began to recover relatively well only in the second half of 2021, due to the dynamic increase in energy prices. The scale of the implementation of energy efficiency projects, despite the extensive use of energy audits and various types of support mechanisms, was not huge. On the other hand, private initiatives related to SMRs initiated among energy-intensive companies in 2021 by the Synthos group, followed by the launch of works on a hydrogen strategy, are only the first steps towards a systemic power transformation of energy -intensive sectors.

At the end of 2021, it can be concluded that Polish companies have significant work ahead to remedy the climate awareness and skills gap in a short time, to implement real carbon footprint measurements and to define emission reduction strategies, broader climate strategies and corporate energy transformation.

Only

5%

of Polish companies have set a GHG emission abatement goal. No company has set a Scope 3 target

Given the unfavorable starting point and the dynamic change in the external environment, it seems crucial for owners and investors, Supervisory and Management Boards to understand the implications of climate policy on the competitive position of companies. Leaders need to understand the risks of climate lag and the possible business opportunities that result from progressing in this area.

Chapter 4

Chasing the leaders. Comprehensive climate strategies increasingly focus on Scope 3

The scale of business involvement in climate issues is growing rapidly both in Europe and around the world. Among global companies, there is a large group of "climate leaders" with very advanced strategies in this area, including mainly major international corporations that have been implementing climate strategies and specific actions for many years. Their motivations, historically rooted in the idea of corporate social responsibility (CSR), are rapidly evolving towards a strong business and strategic approach. This is due to the recognition of regulatory trends and capital market requirements described above, but also rapidly changing consumer sentiment, especially among corporations operating in the area of consumer goods and services. This is because especially Western societies consider the climate-related profile and reputation of a company in their purchasing decisions.

In the group of climate leaders, four main directions for action are currently visible:

- enhancing climate strategies with actions aimed at reducing emissions in Scope 3 (emission reduction in Scopes 1 and 2 is in most cases already advanced).
- evolution toward the establishment of analytically verified SBTs in line with the Paris Agreement pathway (mitigating global warming clearly below 2°C or 1.5°C) and long-term goals (including achieving net-zero emissions).
- implementation of an ever-broader scope of activities going beyond offsets or the partial use of renewable energy sources and aimed e.g., at redesigning processes and products (or product mix) or even entire business models.
- a significant increase in interest in working with suppliers and the entire supply chain to achieve the Scope 3 Upstream emission reduction effect.

In addition, it is clearly visible that medium-sized and smaller companies also set ambitious emission reduction targets and implement climate strategies and best practices of detailed climate reporting.

> The significant advancement in corporate data reporting and verification standards means that it is becoming more and more difficult to declare a climate commitment without specific actions, targets, and achievements in reducing greenhouse gas emissions.

Climate strategy leaders go far beyond basic emission reporting or declaring medium - to long-term goals by implementing specific actions to reduce emissions. Selected examples of such leaders are presented in the case studies below.

Most of them are companies that find it difficult to make significant progress in reducing emissions due to the nature of their business, product, or supply chain. To enable comparison of individual companies, their activities are presented in a standardized format that includes:

- the scope of reporting, including information on when and in what form the data are presented
- information on the adopted goals and commitments
- information on the activities of the corporate framework
- information on activities carried out jointly with suppliers

109

suppliers are obliged to use 100% renewable electricity, and more make suitable commitments

Apple

a decade of calculating the carbon footprint and multidimensional abatement efforts

Apple is an example of a company with a very advanced climate strategy that has evolved over many years even though the size of the company and the scope of its impact differ from the Polish context. Apple started reporting Scopes 1 and 2 (beginning in 2011) and made intensive efforts to reduce emissions in these scopes, including a full transition to renewable energy in its facilities, reaching climate neutrality for Scopes 1 and 2 in 2020. The next stage was the in-depth measurement of the carbon footprint in Scope 3, making a commitment to reduce it by 75%, and implementation of SBTs. The consequence of this approach was building a plan of cooperation with suppliers and, most interestingly, Apple's commitment to produce enough renewable energy to cover the energy needs of all the corporate products (Scope 3, Downstream).

Case study: Apple

Reporting

- Detailed annual environmental footprint reports
- Carbon footprint in Scopes 1 and 2, calculated from 2011
- Scope 3 calculated in categories 1, 4, 6, 7, 9, 11 and 12, calculated from 2015
- CDP rating A (2020), rating A- (2021)

Own actions

- Apple achieved climate neutrality in Scopes 1 and 2 in April 2020
- Constant innovation and product improvements, e.g., more efficient hardware and power adapters, smarter power management software
- Introducing a new, 100% recycled aluminum alloy
- The use of recycled materials in components and the introduction of the Zero Waste program
- Business and production facilities powered with 100% renewable energy
- Investments in hydroelectric plants, biofuels, wind farms and solar farms, etc. around the world, both for own purposes and to support the supply chain and emission offset

Targets and commitments

- Carbon-neural company in Scope 3 by 2030
- Net-Zero products until 2030
- Reduction of GHG emissions in Scope 3 by 75% compared to 2015
- Abatement according to the SBT 1.5°C pathway

Activities involving suppliers

- Cooperation with the supply chain to abate emissions, introducing a tool for monitoring emissions of suppliers
- The Supplier Clean Energy Program was introduced in 2015. It supports suppliers in the energy transformation to 100% RES
- 109 suppliers are obliged to use 100% renewable electricity, and more make suitable commitments

Source: Apple Environmental Progress Report 2021

IKEA

end-to-end consideration of the business model in the context of climate

IKEA is an interesting example of a climate strategy leader due to the high level of climate ambitions combined with a particularly difficult area of corporate activity. IKEA has an extensive supply and logistics chain, a significant carbon footprint of the materials contained in the products, and the high cost of replacing these materials with low-emission ones. Therefore, IKEA, despite very advanced reporting (full scope beginning in 2016) and ambitious goals (SBTs in line with the 1.5°C path), is quite cautious about setting targets in Scope 3 (abatement of emissions in the supply chain by 15%) compared to 2016, but at the same time, it undertakes intensive activities in the field of supply chain management and supports its suppliers in the decarbonization process. The example of IKEA is important because it presents the mechanism of influence on Polish suppliers (a significant part of the IKEA supply chain are Polish plants belonging to the group and Polish external suppliers).

Case study: IKEA

Reporting

- Annual ESG reports
- Carbon footprint calculated in all scopes from 2016
- Scope 3 calculated in categories: 1, 3, 4, 6, 7, 9, 11, 12 and 14
- CDP rating A (2020)

Own actions

- Investments in wind farms and solar farms for own use and in the supply chain
- Promotion of electromobility and its increasing supply to customers, investments in charging stations at the corporate showrooms
- Pilot program of "parking-less stores" - electromobile home deliveries of purchase
- 200 million EUR to climate change mitigation, including 100 million EUR for energy transformation
- Circular economy - introducing the "buy back and resell service" in November 2021, which allows customers to resell used company furniture to find another owner
- By 2030, 100% of the assortment will be produced only from renewable or recycled materials, using components from recycled materials
- Further activities are planned, to be described in the upcoming report for 2021

Targets and commitments

- A fully circular and climate positive company in all areas until 2030
- Abatement of GHG emissions in the supply chain by at least 15% compared to 2016
- Abatement according to the SBT 1.5°C pathway

Activities involving suppliers

- Detailed selection of suppliers in terms of materials used for production, as well as power and emission efficiency
- A program to support suppliers in the energy transformation, to achieve 100% share of renewable energy in the supply chain, mainly in Poland, China and India

Source: IKEA Sustainability Report FY20

200 million

EUR to climate change mitigation, including 100 million EUR for energy transformation

Automotive companies

focus on electric car manufacturing and cooperation within the supply chain

Other examples are German companies from the automotive industry: BMW and Daimler AG. Car manufacturers, due to their emissions structure, must first focus on reducing Scope 3 Downstream, i.e., emissions resulting from fuel consumption in their vehicles. That is why the manufacturer takes intensive measures to develop the production and sale of electric cars, with dynamically growing investments in this area, both in product and marketing. By implementing SBTs, these companies plan to reduce emissions per kilometer by 40% by 2030. In practice, this means a radical increase in the share of electric cars sold. It is also recommended to undertake extensive activities in supply chains, aimed at reducing the carbon footprint contained in the manufactured car (Scope 3 Upstream).

Case study: BMW Group

Reporting

- Annual ESG reports
- Carbon footprint calculated in all scopes calculated from 2016
- Scope 3 calculated in 7 categories: upstream chain, logistics, utilization phase, disposal, business trips and employees' commuter traffic
- CDP rating A (2020), rating A- (2021)

Own actions

- Constant development of the electromobility offer and creating public charging infrastructure, e.g., in China
- Constant improvement of modern vehicle charging technologies
- Investments in solar farms and geothermal energy
- Partial switching from truck transport to rail
- 25% reduction of power consumption in vehicle production by 2030 compared to 2016

Targets and commitments

- 80% reduction in gas emissions per one manufactured vehicle by 2030 compared to 2019
- A 40% reduction in gas emissions per km traveled by a vehicle in the use phase by 2030 compared to 2019
- 20% reduction in gas emissions per vehicle in the supply chain by 2030 compared to 2019
- Abatement according to the SBT 1.5°C pathway

Activities involving suppliers

- Committing key suppliers to transitioning 100% to renewable energy sources
- Pilot program for suppliers to facilitate the launch of mitigation processes in the supply chain

Source: BMW Brilliance Sustainability Report 2020; BMW Group Report 2020

Case study: Mercedes-Benz*

Reporting

- Annual ESG reports
- Carbon footprint in Scopes 1 and 2 calculated from 2006, broken down into location-based and market-based in Scope 2 from 2016
- Scope 3 calculated in categories 1, 4, 5, 6, 7, 9, 11 and 12; no information on the reporting start date was provided
- Scope 3 includes cars sold in a given year, not the entire production volume
- CDP rating A- (2021)

Own actions

- Constant expansion of the offer of electric models: passenger cars, vans as well as trucks and buses
- Developing highly efficient internal combustion engines that can also run on e-fuels
- "Green" charging network from 2021 at the "Mercedes me Charge" charging points
- From 2022, all branches of Daimler AG, Mercedes-Benz AG, Daimler Trucks AG and Daimler Mobility AG in Germany plan to purchase 100% of their power from renewable sources
- Global investments in solar and wind farms, in biogas and biomass as well as geothermal energy

Targets and commitments

- Carbon-neutral production at Mercedes-Benz Cars & Vans production sites around the world and at Daimler Trucks & Buses production sites in Europe from 2022
- City car fleet free from significant NO_2 pollution from 2025
- New, carbon-neutral fleet until 2039
- Mitigating carbon emissions in a new vehicle fleet by 40% by 2030 compared to 2018
- Abatement according to the SBTi

Działania z dostawcami

- Over 75% of suppliers have signed the Ambition Letter, committing themselves to delivering carbon-neutral products
- Manufacturing battery cells using renewable power supplied by two companies
- Due diligence in the selection of TSL (transport and shipping) service providers in terms of emission intensity

* from 01/01/2022, the Daimler AG concern is globally known as Mercedes-Benz Cars AG

Source: Daimler Sustainabilyty Report 2020

Industrial companies

energy transition and innovations in technological processes

On the one hand, the challenge for industrial companies is the need to reduce emissions resulting from the production technology itself, especially the "heavy", energy-consuming ones. However, the challenge is to reduce the carbon footprint of the components themselves, also from energy-intensive production. However, the most ambitious companies make a regular effort to reduce emissions, where possible. At the same time, they invest in R&D in production technology and engage in the regulatory dialogue to create the conditions for "greening up" heavy industry in the long term. e.g., through "green" hydrogen technology.

dr Ewa Łabno-Fałęcka, Director of Communications and External Relations, Mercedes-Benz Manufacturing Poland

On January 29, 1886, Carl Benz patented his "Motorwagen 1" at the Imperial Patent Office in Berlin, under the number 37435 29. In the same year, Gottlieb Daimler developed the 1.5 HP engine. Thus, the era of the automobile had begun. For nearly 140 years, the German manufacturer has continued to provide the market with superior drive systems and increasingly sophisticated internal combustion engines. Whereas in 1958 a two-liter four-cylinder engine generated around 50 hp, today the same engine generates more than four times as much power. Mercedes-Benz Group AG is currently targeting zero-emission driving in its main markets by 2035. From 2030 onwards, on the other hand, the group will only produce all-electric cars (if market conditions allow). Mercedes production will be carbon-neutral by 2039.

Dariusz Sokulski, Head of Energy Efficiency Department, Siemens

Siemens is already monitoring its suppliers and the entire supply chain for carbon neutrality. In other words: soon it could turn out that companies that do not take definite steps to implement the decarbonization strategy will lose their competitiveness in the market.

Hence, the appeal not to postpone the energy transformation of enterprises but to take action today. Success will largely depend on the commitment and responsibility of the management, and decarbonization experts will prove invaluable in this process. There is a need for a holistic view of corporate power management: from solutions that reduce electricity consumption, through sustainable power generation, to smart energy distribution, storage, and management.

Almost a decade ago, Siemens committed to reducing the carbon footprint of its operations to zero by 2030. The declarations did not stop there. By implementing a number of measures, including increasing energy efficiency, we have reduced the corporate carbon footprint by more than 50% since 2014. The next task is to reduce Scope 3 GHG emissions, that is, at our suppliers, by 20% by 2030 and to zero by 2050.

Case study: BASF SE

Reporting

- Annual ESG reports
- Carbon footprint in Scopes 1 and 2, calculated from 2008
- Scope 3 calculated from 2008 according to the GHG Protocol in all 15 categories
- The product carbon footprint calculated from 2021
- CDP rating A-

Own actions

- Upgrade of own manufacturing equipment towards energy-efficiency; developing a completely new manufacturing process with low carbon emissions
- Over 70% of the corporate power needs are covered by high-efficiency combined heat and power plants using gas and steam turbines
- Replacing fossil fuels with renewable energy as part of corporate energy purchases
- Systematic reduction of nitrous oxide emissions
- Investments in RES: hydroelectric plants, or solar and wind farms
- The commitment to cradle-to-gate the carbon footprint of all corporate products

Targets and commitments

- Business growth with no increase in gas emissions by 2030 compared to 2018
- Net-Zero in Scopes 1 and 2 by 2050
- Reduction of emissions by one-third in Scopes 1 and 2 compared to 2018 while maintaining growth of the company
- Mitigation in line with the 2°C Paris Agreement path

Activities involving suppliers

- No specific actions mentioned
- Due diligence in the selection of service providers in terms of emission intensity and focus on calculating the carbon footprint

Source: BASF Management Report 2020, Energy and Climate Protection

Case study: Siemens AG

Reporting

- Annual ESG reports
- Carbon footprint in Scopes 1 and 2 calculated from 2014
- Scope 3 calculated from 2016 in categories 1-6
- CDP rating A- (2020, 2021)

Own actions

- Business and production facilities powered with 70% renewable energy worldwide
- Investments in RES: hydroelectric plants, or solar and wind farms worldwide
- Expansion of the electric vehicle fleet and charging stations to reduce combustion emissions by 33% by 2025 compared to 2014

Targets and commitments

- Carbon neutrality in Scopes 1 and 2 by 2030 compared to 2014
- 20% reduction in Scope 3 gas emissions by 2030 and carbon neutrality by 2050
- Abatement according to the SBT 1.5°C pathway

Activities involving suppliers

- Since 2018, Siemens has conducted surveys among its suppliers, verified their reporting status and readiness to cooperate in terms of emission mitigation
- Mitigation of supplier emissions are based on energy transition
- Detailed categorization of suppliers in terms of emissions
- Introduction of an online emissions reporting system within the supply chain from 2020
- Over 9,000 out of 65,000 suppliers reported their emissions in detail in 2018

Source: SIEMENS Sustainability information 2020

Polish climate strategy leaders: LPP and CCC

When analyzing the progress in implementing climate strategies, two Polish companies with the highest CDP score (in 2020) of all Polish companies are noteworthy, i.e., LPP SA and CCC.

These Polish climate strategy leaders have been measuring Scopes 1 and 2 for several years, and Scope 3 for some time, at least in some categories. They have undertaken activities related to energy efficiency and renewable energy, as well as in the area of transport (initiatives within the supply chain are still in an early stage). It should be emphasized that when it comes to specific actions, both LPP and CCC are more advanced in their climate strategies than other Polish companies, including listed companies. This is confirmed by independent reports and scores on CDP platform.

Case study: LPP S.A.

Reporting

- ESG as part of the annual corporate reports
- Carbon footprint calculated in all scopes from 2018
- Scope 3 categories: 1, 3, 4, 5, 6, 9 and 11
- CDP rating B (2020), rating B- (2021)

Own actions

- 100% of the power used by online store servers is to come from renewable sources by the end of 2021
- Replacing air shipments with sea freight to decrease in the number of tonne-kilometers in downstream deliveries year-by-year
- Replacing lighting in brick-and-mortar stores with LED
- Increasing the number of warehouses to reduce transport-related emissions

Targets and commitments

- 15% reduction in GHG emissions for Scope 1 and 2 by 2025, compared to 2019
- No information on the SBTi track

Activities involving suppliers

- Partnership with shipping companies, e.g., DPD Group, to mitigate their emissions

Source: LPP's 2020/21 Integrated Report

Case study: CCC S.A.

Reporting

- Annual ESG reports
- Carbon footprint in Scopes 1 and 2 calculated from 2019
- Scope 3 calculated from 2021
- CDP rating C (2020, 2021)

Own actions

- Embracing the principles of circular economy: mapping (identification and analysis) of material flows in the corporate value chain
- Abandonment of plastic bags in all stores of the CCC Capital Group
- Increasing energy efficiency and reducing the amount of waste by 7% by 2022 compared to 2019
- Increasing the share of recyclable cardboard packaging to 80%
- Increasing the percentage of hybrid cars in the corporate fleet; now, they constitute approx. 30% of the fleet in CCC SA and CCC.eu Sp. z o.o.
- Emissions of harmful gases (hydrogen) related to charging warehouse trucks was eliminated by launching a fleet of lithium-ion-powered trucks
- By January 2020, LED lighting was introduced in 80% of stores in Poland
- Launching of a pilot collection of used footwear in CCC stores in Poland

Targets and commitments

- Reduction of GHG emissions in Scope 1 and 2 by 7% compared to 2019
- The SBTi path is to be defined in 2022

Activities involving suppliers

- No specific actions involving suppliers
- In 2020, the CCC Group supported 7 main suppliers in environmental efforts by conducting ISO 14001 audits
- Due diligence in the selection of TSL service providers in terms of their environmental impact

Source: Non-financial report of the CCC Group for 01/01/2020 - 31/01/2021

Kamila Budnik, Sustainability and Internal Communication Leader, CCC S.A.

Each evaluation of our company is important to us because it shows us not only the areas that we already have managed well, but also areas for improvement. This motivates us to take further action, introducing new and innovative solutions and setting further ambitious goals. Sustainable development is the basis of our business activities, which we strongly emphasize in our new Business Strategy "GO.25. Everything Fashion. Omnichannel Platform", announced in the fall of 2021. The ESG goals are an integral part of it. Climate change is a very important issue and as a major business, we not only should address it, but wish to do so.

Therefore, in our new strategy, we have set realistic, long-term emissions mitigation targets for the CCC Group, introduced circular solutions, and worked with our suppliers to expand environmental standards.

Magdalen Kopaczewska, Investor Relations Manager, LPP S.A.

In 2021, we achieved the highest score among all Polish companies reporting to CDP, B-. This is an effect of our actions toward sustainable development, which we carry out according to the objectives set out in the LPP strategy: “For People For Our Planet”.

In this strategy, we have strongly focused on reducing our carbon footprint and meticulously calculating it. By 2025, we want to reduce emissions by 15%, and we are consistently striving to achieve this goal, e.g., by increasing the use of renewable energy in our operations, optimizing transport and logistics, shortening the so-called last mile, but also by implementing modern solutions in the area of sustainable construction of our warehouses, offices, and showrooms. Environmental responsibility cannot be approached by looking only at the core business, which in our case is the product and its manufacturing process. Only a comprehensive change offers a real chance to improve the condition of our climate and reduce our corporate carbon footprint.

When analyzing the activities of the most advanced companies, the natural development of their climate strategies can be observed. This is done in six steps:

Step 1: Start measuring the carbon footprint of Scopes 1 and 2 and define initial targets for these scopes.

Step 2: Launch activities aimed at reducing the carbon footprint in Scopes 1 and 2 using the mechanisms of energy efficiency and RES.

Step 3: Gradually expand the carbon footprint measurement and reporting area to include Scope 3.

Step 4: Set specific and measurable goals, including SBTs.

Step 5: Take action throughout the value chain, especially with suppliers, to reduce the Scope 3 carbon footprint.

Step 6: Search for innovative solutions for products, processes, or entire business models, which in the long term will allow to reduce emissions difficult to reduce with simple methods.

These activities usually constitute a program that has been in place for at least a few years. In addition to the above-mentioned stages, it also includes establishing dedicated corporate teams, developing skills, climate strategy reporting and external communication, as well as including the climate strategy in the corporate business strategy (including sales).

The last chapter presents recommendations based on the above analysis for Polish companies, which are often only starting on the journey of creating their own climate strategy.

Chapter 5

In the coming years, climate competitiveness will determine not only the market success, but also the survival of many companies

There are several aspects of the competitiveness of Polish companies in the context of climate, but there is one key element that affects the level of climate competitiveness in Poland.

Companies located in our country face a particularly difficult challenge because the carbon footprint of the company, its products, and local supply chains is affected by the high emission intensity of coal power.

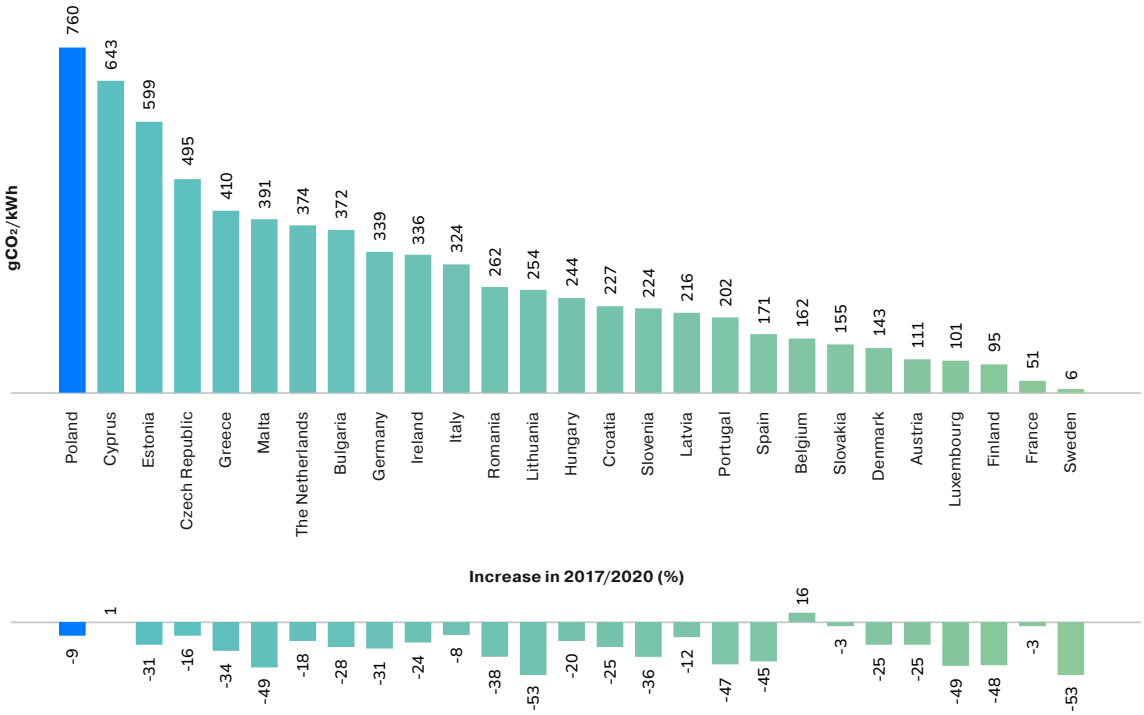
The average emission index of a MWh of power in Poland is by far the worst in Europe, between 2 and 15 times higher than in other countries (not only in Germany and France, but also in the Czech Republic, Slovakia or Hungary). This is due to the large share of coal, especially highly emissive lignite, in the Polish energy mix. At the same time, the emission intensity of one 1 MWh of power in Poland has been abating more slowly in recent years than in other European countries. In 2020, it abated by 9% compared to 2017, while in the same period in Germany an abatement by 31% was recorded. In Sweden, Spain, Portugal, and Finland, the abatement was nearly 50%.

2-15

times higher than in the leading countries is the average emission intensity of electricity in Poland and is the highest in the EU

The average emission intensity of electricity in Poland is the highest in the EU, 2-15 times higher than in the leading countries

gCO_2 emissions per 1 kWh in the EU in 2020, according to the production mix



Source: Association of Issuing Bodies (AIB)

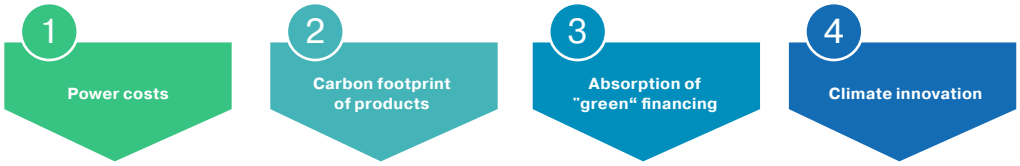
The high corporate power emission index directly impacts the highly uncompetitive Scope 2 carbon footprint. In terms of the local supply chain of raw materials and components for manufacturing, the uncompetitive Scopes 2 of the suppliers in the chain will accumulate, resulting in a very high final carbon footprint of the product exported to a German or French contractor.

The high carbon content of Polish power also means a significantly higher cost, resulting from the costs of emission allowances that must be borne by Polish power producers managing coal-fired power plants.

The four most important areas of corporate climate competitiveness include:

1. Electrical power prices – cost competitiveness.
2. Carbon footprint of a product in the supply chain – market competitiveness of products.
3. Readiness to absorb "green" funds – competitiveness in terms of access to capital.
4. Climate innovation – developing and implementing new product, process, and business model solutions adapted to the low-emission economy.

The areas of climate competitiveness of Polish enterprises



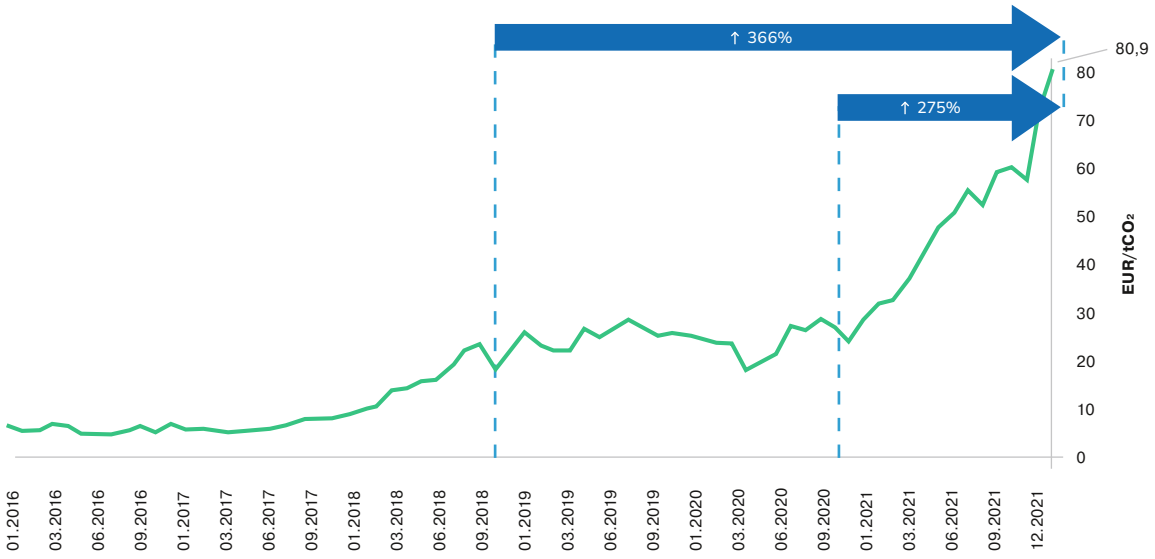
	1 Power costs	2 Carbon footprint of products	3 Absorption of "green“ financing	4 Climate innovation
Mechanism	High prices of coal-based power resulting from emission costs (EU ETS) and coal asset subsidies (the power market)	Contractors / clients require demand carbon footprint abatement in their supply chains	Ability to meet the requirements and criteria of "green" financing	Competition/new players are taking over the market, based on innovative solutions
Impact on competitiveness	Increase in costs, abatement in margins	Loss of counterparts / outlets and revenues	Availability / cost of financing	No new revenue streams
Parties involved - company segments	All companies, the most energy-intensive	Exporters, medium-sized private companies, local plants	Large companies, listed companies	All companies
Awareness	Medium / high	Very low	Average	Very low
Readiness to compete	Medium / low	Very low	Average	Very low

A. Polish companies need to implement energy transition strategies to solve the problem of high, still rising electricity prices resulting from an outdated energy system that is still based on coal

The high wholesale price of power in Poland significantly and structurally increases the long-term costs of the power available to Polish companies, compared to other EU countries.

Polish coal-based power, burdened with EU ETS fees and the highest emissions per megawatt hour in Europe, is structurally more expensive than power in Europe. The prices of emission allowances continue to break records; in November 2021 they exceeded EUR 70 per tonne of carbon emissions for the first time, increasing more than 2.5 times during the year and more than a dozen times since 2016.

Rapid increase in the prices of CO_2 emission allowances in the EU ETS

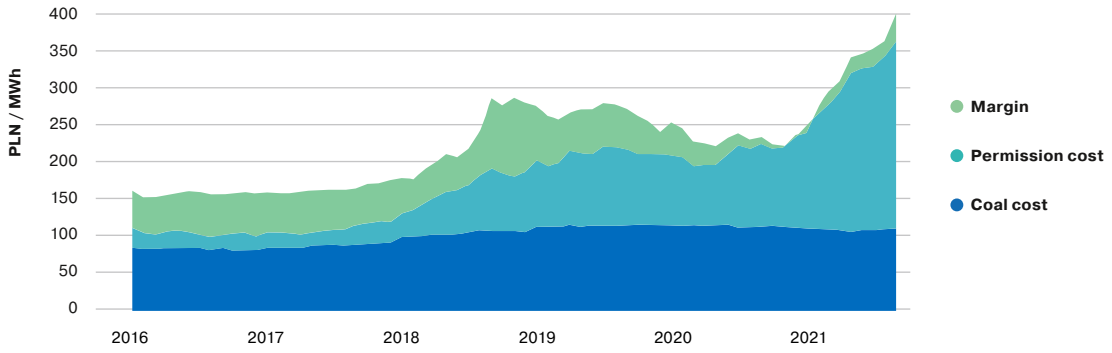


Source: Investing.com

The cost of carbon emissions is already a dominant component in the price of power, significantly higher than the cost of coal required to produce it. In November 2021, the cost of emissions (over PLN 251/MWh) was more than twice as high as the cost of coal (PLN 111/MWh).

The costs of emission allowances account for 70% of the wholesale power price in Poland

Shares of power costs and margins, by model; efficiency was adopted at 35% and emission intensity at 0.964 t/MWh



Source: Forum Energii; TGE, EEX, ARP

Furthermore, the costs of EU ETS emissions are directly charged to energy-intensive companies that use coal in their production processes.

The short-term increase in gas prices impacted prices in EU countries from September 2021. However, earlier, power prices in Poland were the highest in Europe for an extended period due to the increasing prices of emission allowances. This situation is expected to repeat in 2022 as gas prices normalize. Moreover, with astronomical EU ETS emission costs, the surplus of Polish power prices over prices in other European countries will break the record if the market fails to adjust.

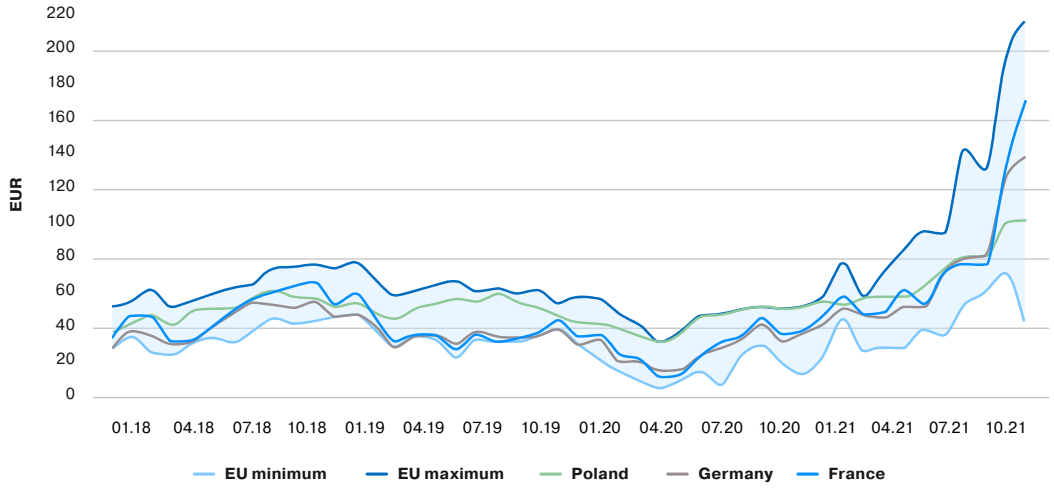
An additional cost incurred by power consumers, resulting from the need to subsidize the production of coal-based power in Poland, is additional fees for energy distribution (the so-called "capacity fee"). The amount of PLN 76.2/MWh was introduced in 2021 and is due to the electricity consumed by business clients from 7:00 to 22:00. From 2022, the capacity fee for companies will be increased to 102.6 PLN/MWh of power used between 7.00 a.m. and 10.00 p.m.[19]

[19] *with a flat energy consumption and a variation between the peak and off-peak hours below 15% will pay lower rates. However, this applies to a minority of companies.*

70 €

Polish coal-based power, burdened with EU ETS fees
and the highest emissions per megawatt hour in Europe,
is structurally more expensive than power in Europe.
The prices of emission allowances continue to break records;
in November 2021 they exceeded EUR 70 per tonne of carbon
emissions for the first time, increasing more than 2.5 times
during the year and more than a dozen times since 2016.

Average monthly wholesale power prices - Poland compared to the EU, Germany and France



źródło: EMBER

The share of power in the total costs of companies could range from a few percent in light production or services to several dozen percent in highly energy-intensive activities. The uneven increase in energy prices in relation to international competition significantly deteriorates the cost of product competitiveness. In a typical case, it means a decrease in profitability and, in the extreme case, a loss of price competitiveness. For example, a large industrial company estimated an abatement in EBITDA solely due to a 20-25% increase in power prices in 2022.

Companies understand the effect quite broadly. The major, large-scale impact of the increase in power prices for business in 2021 will start in 2022 due to the permanent 2-3 year price contracts. The 2021 increases will be reflected in contracts between suppliers and customers mostly from 2022, as companies will be forced to transfer the increase in power costs, which is part of the already observed inflation impulse, or to cut costs in other areas, or reduce margins and profits.

To build a competitive pricing advantage, companies must implement their energy transformation toward the use of "green" energy as much as possible, using on-site installations or their own solar and wind farms, or power purchased on the basis of long-term renewable PPAs.

For example, Daimler's Mercedes-Benz engine factory located in Jawor near Wroclaw secured access to "green" power produced in a nearby wind farm in Taczalin by securing a PPA with VSB[20].

[20] *According to Gram w Zielone portal, https://www.gramwzielone.pl/energia-wiatrowa/32068/fabryke-mercedesa-w-jaworze-zasili-energia-wiatrowa (accessed on December 21, 2021).*

The contracted price has not been disclosed, but according to expert assessments based on the contract date (before 2018), the Jawor factory can certainly improve the power cost in relation to 2021. Most likely, the fee does not exceed PLN 200-220/MWh (compared to current prices at approximately 400 PLN/MWh).

Both suppliers of potential PPAs and potential energy recipients from such contracts revealed in the survey that interest in PPAs increased significantly in the second half of 2021, while the supply of ready-made renewable energy projects that allow the conclusion of such contracts is limited. Several representatives of the automotive industry, as well as advanced technologies, point to the lack of easy access to PPAs in Poland.

An interesting example is Google, which has committed to power all its operations centers with 100% “green” energy by 2030, as part of its global decarbonization policy. Therefore, access to appropriate net-zero power resources is the main criterion for the location of regional Google Cloud data processing centers. Therefore, despite significant barriers related to the availability of an adequate amount of "green" power in Poland, the fact that Google has locating such an investment in Poland and launched it in April 2021 expresses the company's optimism that the Polish zero emissions energy market will gradually increase.

High power costs are a problem for all companies, but mostly for the most energy-intensive companies for which the share of power cost in total operating costs is the highest. Companies are increasingly aware of the structural problem with power costs in Poland and are increasingly implementing measures to cut the ties to the coal-based energy system.

To build cost competitiveness in the area of energy, companies must not only accelerate their own energy transition but also impact the acceleration of the nationwide energy transition at the systemic level.

In 2022 a large industrial company solely due to increase in power prices estimated an abatement in EBITDA to

20-25%

dr Ewa Łabno-Fałęcka, Director of Communications and External Relations, Mercedes-Benz Manufacturing Poland

The electric engines and batteries plant was, in our intention, a high-tech facility based on Industry 4.0 technologies, Big Data analysis, artificial intelligence and virtual reality (approximately 100 robots and 220 autonomous vehicles are currently operating there, and products and production lines have their "digital twins", etc.). We were aware that all this reduces the harmful impact on the environment, but the energy mix in Poland and traditional energy consumption, as if by definition, would not allow us to be a "smart factory". Therefore, the purchasing and planning department researched the market for renewable energy suppliers. We were fortunate because 12 kilometers from our plant in Jawor there is the Taczalin Wind Power Plant owned by VSB. This was a pioneering PPA agreement in Poland (and probably the first in Europe) between a “green” energy manufacturer and an industrial customer, to power a large factory (approximately 1,500 employees and several hundred people from partner companies) directly from an ecological source, using existing transmission networks. The heat used in the factory is produced in a state-of-the-art on-site energy center (95% from biomass and 5% from biomethane-certified natural gas). It was only two or three years later that Mercedes-Benz announced that by the end of 2022 all passenger car factories in Europe would be emission-free. The Jawor plant had long been in operation by then.

Magdalena Dziewguć, Business Director, Google Cloud in Poland

On the one hand, the supply of “green” energy in Poland is already insufficient according to the demand, which is reported even by the technology sector itself. However, sometimes declarations alone are not enough. Only the presence of specific investments in the market that need such energy constitutes a mobilizing factor and drives "green" energy projects. This is how we look at our growing involvement in Poland.

We have been taking climate change mitigation and our own actions in this regard very seriously for a long time. We have been a net-zero company since 2007, and since 2017 we have been covering 100% of our electricity needs with purchases from renewable sources. But we don't just want to boast about our decarbonization achievements. We also want to be that mobilizing factor and support other companies, and the entire economy, in achieving the same goals.

In order to develop in Poland, we, Google, need further investments, planned for the coming years, which will increase the amount of available “green” energy. In turn, this will enable us to ensure that local businesses and institutions using, for example, our Warsaw cloud computing center will be able to fully meet their decarbonization targets. Thus, future projects that generate “green” energy will create a domino effect that will support the climate competitiveness of the entire economy.

B. Companies must consciously manage their operational and product carbon footprint to defend and strengthen their position in international supply chains

Regardless of the power costs, a challenge in international supply chains, especially for exporters and companies working, e.g., as sub-suppliers to exporters, is the high carbon footprint of their products. It is the result of the accumulated carbon footprint of high-emission energy in Poland.

The carbon footprint of products manufactured by Polish companies is the Scope 3 carbon footprint of their European business customers. At the same time, it is a component of the carbon footprint of the end products of these customers. Several large and medium-sized Polish companies already receive specific inquiries from their clients about the carbon footprint of their products.

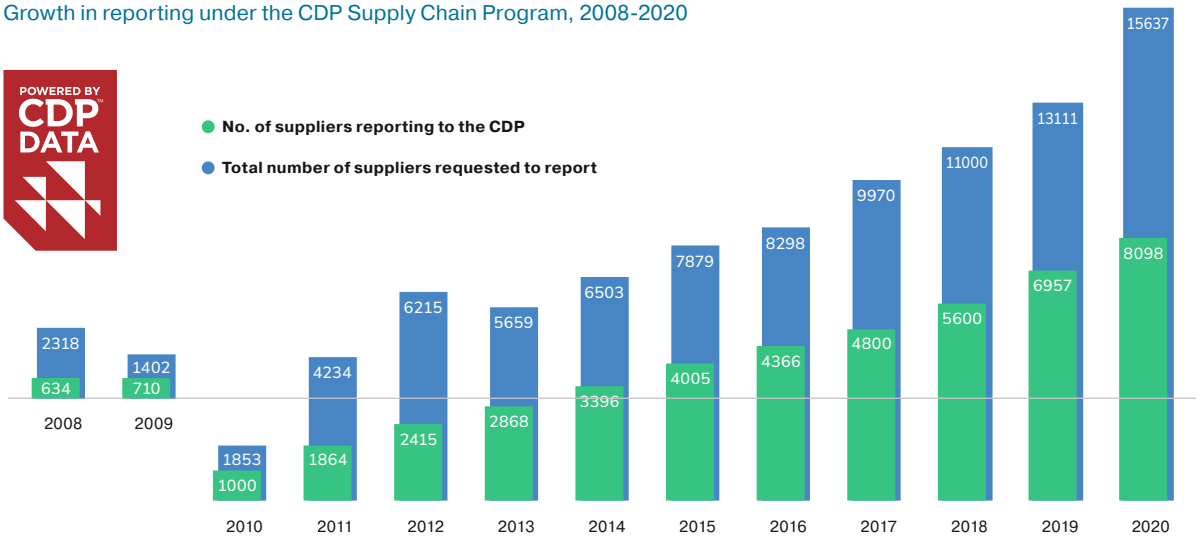
> **At the Climate Strategies Poland Foundation, we work with suppliers of German and European car manufacturers. Although these are not companies subject to, e.g., non-financial reporting and are not yet affected by bank requirements, they must calculate the carbon footprint of their activities and products in great detail and report it to clients. In this context, the carbon footprint of raw materials used in production is very important for industrial processing companies (e.g., manufacturers of steel or plastic components), as it affects further levels of the supply chain. In Poland, these raw materials could also have a high carbon footprint resulting from the use of coal-based power.**

An example of a specific mechanism that consistently generates inquiries from Polish companies is the CDP-operated supply chain program, as part of which companies systematically obtain information from their suppliers. The program includes a significant group of large contractors of Polish companies, including all major automotive concerns (BMW, Ford, Daimler AG, General Motors, Toyota, Volvo, Stellantis, Nissan), consumer goods producers (e.g., PepsiCo, The Coca-Cola Company, S.C. Johnson, Colgate Palmolive, BAT, Johnson & Johnson), retailers (Ahold Delhaize, Walmart), electronics manufacturers (Samsung Electronics, Cisco Systems, Intel Corporation) as well as industrial companies, financial institutions, telecommunications providers, and more. Many of these companies have adopted SBTi-verified emission targets that require them to reduce their Scope 3 emissions and work with suppliers to do so. A group of more than 200 CDP Supply Chain members are large corporations that use this program to work with their supply chains. Thus, they encourage their suppliers to expand their reporting with environmental transparency, as well as to implement specific changes in their home coutries.

Importantly, 73% of the CDP Supply Chain members have declared the possibility of resigning from cooperation with suppliers who do not achieve specific environmental protection results.

The scale of data inquiries and reporting within supply chains is growing dynamically

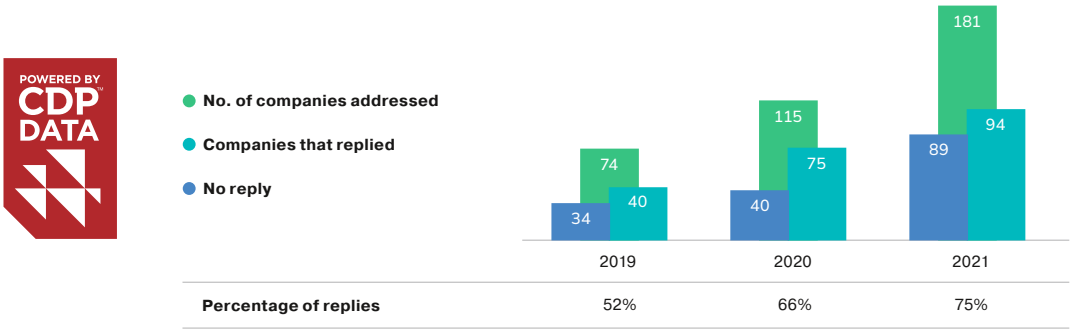
Growth in reporting under the CDP Supply Chain Program, 2008-2020



Source: CDP

The number of companies collecting data as part of the CDP Supply Chain Program is growing dynamically. The number of inquiries received by Polish companies is also growing. In 2021 alone, CDP Supply Chain Program members requested 141 strategic suppliers based in Poland to disclose information on climate strategies. Of the 94 companies that responded, 45% (i.e., slightly over 20% of all respondents) reported having emissions reduction initiatives and 27% (i.e., approx. 13% of all respondents) reported having climate targets.

CDP Supply Chain Program - requests for Poland



	2019	2020	2021
Percentage of replies	52%	66%	75%

Source: CDP

Canpack is an example of a company that started reporting to CDP as part of the Supply Chain Program, then quickly implemented its climate strategy, and started suppliers' engagement.

Case study: CANPACK

Reporting

- Annual reports on sustainable development through membership of the UNGC
- Reports to CDP since 2013
- The corporate carbon footprint calculated in Scopes 1 and 2 from 2014, but not fully
- Carbon footprint in all scopes classified by the CDP since 2018

Own actions

- 100% of power in facilities in Poland, the Netherlands, Great Britain, Colombia and Slovakia comes from renewable sources, which accounts for over 50% of the corporate total power consumption. The introduction of RES reduced the corporate carbon footprint in Scopes 1 and 2 by 20% compared to 2019, and by 30% compared to 2018.
- In Finland, traditional blue gas-powered forklifts have been replaced by electric vehicles (AGV); this optimization resulted in a reduction of blue gas consumption in the plant by 90%.
- In Russia, the potential of an innovative BioReaktor is being investigated, to allow the reduction of volatile organic compounds (VOC). With positive test results, the company will consider implementing this solution in other CANPACK plants.
- The use of high-capacity trucks in Finland and the Netherlands allowed reducing the number of journeys.
- As part of the offset activities, a tree planting program was launched in India.

Targets and commitments

- The company joined the SBTi initiative and committed to setting a GHG abatement goal (in progress).
- From 2022, all CANPACK production plants will be 100% powered by RES.

Działania z dostawcami

- Train your buyers and suppliers on sustainability challenges, encouraging suppliers to participate in the CDP supply chain program.
- Suppliers are required to sign a Code of Conduct. To ensure they comply with the guidelines, the sustainability team regularly assesses and audits suppliers for their sustainability practices ("69% of our suppliers were checked for CSR in 2017-2019").

Source: CANPACK SUSTAINABILITY REPORT 2020

"Building more resilient supply chains requires close and transparent cooperation. By working hand in hand with our clients, we can identify risks early and launch actions to improve the entire supply chain. This cooperation supports the important goals of the entire industry,"

- said Bartłomiej Wojdyło, Deputy Sustainability Director at Canpack.

94

companies that responded, 45% reported having emissions reduction initiatives and 27% reported having climate targets.

73%

73% of the CDP Supply Chain members have declared the possibility of resigning from cooperation with suppliers who do not achieve specific environmental protection results.

The practice of cooperation between the Climate Strategies Poland Foundation and Polish suppliers clearly shows that automotive manufacturers, particularly German ones, are significantly and rapidly increasing the scope of their requirements. This is due to the climate strategies of these companies (see case study BMW and Daimler AG, p.106-107). The solutions applied in this area include, for example:

- Formal requirements for suppliers to provide data on the carbon footprint of products in the purchasing process and contract renewals, according to the GHG Protocol standards.
- Tools and platforms implemented for the systematic collection of products on carbon footprint data throughout the supply chain.
- Timeline requirements to prepare specific climate strategies.
- Inquiries about abatement goals and program support initiatives.
- Requirements for the implementation of renewable energy sources in the operations of supplier companies.
- Signing formal pledges ("commitment letters") to reduce emissions over time.

In the context of the carbon abatement targets and commitments of large international clients, it should be expected that over time the need to report data or any actions will morph into the need to achieve specific emission (carbon footprint) parameters of products offered to these customers.

A reliably calculated product carbon footprint becomes an indispensable requirement for continuing cooperation with the client. In the next step, implementing measures to reduce emissions will also become a requirement to continue the business relationship.

In this perspective, precise knowledge of the climate strategies of a company's customers and markets and the willingness to first report and then reduce their own emissions and those of their own supply chain become a strategic priority. Failure to do so could hinder the survival of the company or production plant.

On the other hand, implementing advanced climate and decarbonization strategies in the company and its supply chain will help it compete more effectively in the market. It will also strengthen and develop customer relationships, increase orders, and potentially achieve better prices and improve margins through greater added value of the low-emission offer.

Based on current cooperation with companies as part of Climate Strategies Poland, we can assess that awareness of the above mechanisms in supply chains is still very low. Polish companies in international supply chains are clearly surprised by the emerging requirements of their contractors and are seeking quick solutions, sometimes to no avail.

On the other hand, the Polish branches of international companies display a much greater level of awareness. When corporate emission reduction goals are met, they take action with their local suppliers. They also try to accelerate the launch of energy transition strategies, preparing for intra-corporate competition for resources, investments, and operation scaling also in terms of the carbon footprint of Polish production, and not just its quality or cost.

C. Readiness to absorb "green" financing- competitiveness in access to capital.

The EU financial market regulations aimed at "greening" the capital, as well as the initiatives of the financial sector (see Chapter 2), create a framework for a significant redirection of funds to "green" investments. This creates a significant demand from financial institutions for such projects, which now significantly exceeds the supply. At the same time, the reporting framework for financial institutions burdens the portfolios of banks and financial institutions with "high-carbon" assets, such as coal or unmitigated energy-intensive industrial assets, deteriorating the weighted average benchmarks of these portfolios.

The above situation leads to a significant change in investment and credit policies, which on the one hand make it difficult to access "high-emission" project capital. However, projects classified as "green" or "sustainable" gain easier access to capital at a noticeably lower cost, which could become increasingly important in an environment of rising interest rates. Large European banks are advanced in implementing a sustainable portfolio strategy and are going beyond the enforcement of transparency from companies toward advising clients on emission abatement or offset, as exemplified by Comerzbank in Germany.

By the end of 2023 Deutsche Bank committed to finance sustainable financing transactions worth

€200 billion

Commerzbank's climate strategy, implemented since 2009, ensured a 70% reduction in GHG emissions by 2020. This target was achieved in 2018. Since 2015, Commerzbank has offset the remaining emissions with certificates from climate protection projects, which allow it to be completely climate neutral since then. The bank has turned its climate strategy into a business strategy and advises international companies on obtaining allowances and emission certificates, Certified Emission Reductions (CER). As part of its strategy, Deutsche Bank committed to finance sustainable financing transactions worth EUR 200 billion by the end of 2023, which is one of the key strands of the strategy for the future development of the entire capital group.

Today, in Poland, the need to report the carbon footprint affects large companies that obtain funds on the Western European market from large European banks and funds especially. For example, one of the top 10 companies in Poland requested CSP's help in determining the pathway to a full carbon footprint inventory distributed in multiple locations of the company, as a prerequisite of a large international bank to extending its financing worth hundreds of millions of PLN.

Polish banks (except selected Polish branches of international banks) are only just creating appropriate reporting policies and adjusting credit and investment procedures in this regard. However, the progress is extremely fast, and greater activity of the banks should be expected in this regard. Meeting the ESG criteria also allows for access to slightly cheaper financing, even by a several basis points, which is important in large corporate financing transactions. At the same time, the structure of such transactions more and more often links the financing price with the achievement of specific goals, e.g., reducing the emission level by 10% during the transaction period, or maintaining the level of ESG assessment performed by a specialized third party. Failure to meet these criteria results in a price increase or establishing a prerequisite for the compensation of the increased margin calculated over the duration of the transaction.

70%

Commerzbank's climate strategy, implemented since 2009, ensured a 70% reduction in GHG emissions by 2020.

Tycjan Bielecki – CEO and Chief Country Officer Poland at Deutsche Bank Polska S.A.

Financial institutions and capital markets are one of the main strands in the strategy to shift the burden of transition to a sustainable economy. It is already visible today through regulatory obligations imposed on individual sectors, such as the requirements to include sustainable development factors in agency scoring, the need to include the ESG criteria in the credit assessment by banks, or the investment policies of capital market funds. Banks have traditionally played the role of a financial partner in economic development, and hence their role will be to support transition processes and finance the gradual but consistent implementation of ESG goals. This applies also to clients whose activities will be classified as "brown" according to the taxonomy. I have no doubt that it will be a long-term process that will require not only an appropriate assessment of the starting point of a company or sector, but also creating a comprehensive and realistic strategy to achieve specific and firm goals. ESG is confused with image-building at times. However, from the perspective of the financial sector, it must be based on hard facts that can be assessed quantitatively and qualitatively by specialized analysts, based on dedicated models. Suffice it to say that according to independent reports, financial needs in Poland for the transition to a zero-emission economy are estimated at EUR 380 billion by 2050.

In my opinion, we have only started on the reconstruction of the perspective on economic relations. From the perspective of the financial sector, more market regulation is still ahead of us. It aims at visible shifts of financial flows towards compliance with the SDG goals of the United Nations or the EU Green Deal. Initially, they take the form of bottom-up industry initiatives (such as Net-Zero Asset Managers Initiative or Net-Zero Banking), and then allowances and capital incentives, which will ultimately be backed by penalization measures (e.g., the Green Assets Ratio) and verified, e.g., as comprehensive stress tests for climatic factors. Additionally, considering the additional dimensions

of ESG risks, including climate risks, will significantly impact the price and often the availability of financial products: from insurance, to loans, to emitting financial instruments or making capital investments. The structure of reporting requirements imposed on financial institutions even today necessitates the obtaining of information on ESG from clients, including activities undertaken by specific companies in this respect. The natural next step is to compare them against a peer group, also in dimensions that have not been crucial so far, and will have a real impact on credit, investment, or insurance decisions soon.

At the same time, we are witnessing the transition of non-financial reporting standards. In the near future, it will lead to the development of uniform definitions under the International Accounting Standards, which will enable a regular audit of such data. Thus, the complete comparability and reliability of the data will be obtained, which will be the basis for better measurement and valuation of the risks and opportunities associated with a transaction. The above dynamics will apply not only to the relationship of financial institutions with their retail or business clients but also to their investors and capital donors. Moreover, such dynamics will also effectively acquire clients who often select a financial institution to service their needs (e.g., public tenders) based on its assessment against the background of ESG factors and indexes.

Therefore, there is nothing left to do but roll up our sleeves and actively participate in shaping a new, fuller economic reality. In my opinion, it has already arrived.

In the Polish context, European funds remain an important source of financing for companies under EU programs and those serving the public sector under public procurement. As indicated above in Chapter 2, considering environmental and climate criteria in distributing EU funds and in the Public Procurement Law could have a significant impact on the possibility of obtaining such funds by Polish enterprises.

A practical implication for all companies, not only the largest players, is the probable need for climate reporting. This includes corporate carbon footprint reporting, at least in Scopes 1 and 2, to financing banks (both Polish and foreign). These requirements can be determined by banks and apply to a broad range of companies, not only stock-listed. On the other hand, transparency and, over time, the implementation of appropriate climate and emission abatement strategies will allow for better conditions for bank financing and easier access to EU funds.

D. Climate innovation is the most difficult and advanced area of climate competition

In most industries and sectors, bringing a company to net-zero across all three scopes will require further-reaching steps than installing solar farms on roofs of facilities, or even requesting three main suppliers to do so. At a more advanced stage, it will be crucial to have a more fundamental view of how companies meet customer needs while minimizing environmental impact. This means a fundamental reconstruction and redesign of products and services, to center them around low emissions, yet in such a way that they create unique value for the customer.

An example of such an approach is the implementation of the Orange Flex service in Poland by the telecommunications provider Orange[21]. Designing such a product requires a good analytical understanding of the real carbon footprint of an existing product in each of its elements. In the case of a telecommunications tariff, this means, e.g., the carbon footprint of data centers or cellular base stations that support the product, both related to electricity consumption, but also the carbon footprint of the physical product itself (e.g., a SIM card), or the carbon footprint related to the need for the customer to travel to a brick-and-mortar branch to purchase it, and much more.

[21] *Note for full transparency: Climate Strategies Poland was Orange's partner in calculating the carbon footprint and designing the low-emission Orange Flex product.*

The next step is to redesign the product from scratch so that it fulfills its purpose and meets customer needs with a minimum carbon footprint (e.g., as a result of the use of a virtual e-SIM and remote activation of the service, which is sold via online channels). Part of this strategy is also to ensure an adequate amount of renewable energy to power the product and possible compensation for emissions that cannot be avoided (so-called residual emissions). Of course, an important element will be to properly document the zero-emission product and make this information public to build the trust of customers and other stakeholders.

Another radical example of a company that has reconsidered its entire business model is IKEA. In a pilot conducted in a European city, the chain introduced a completely new store format: no parking spaces. Customers arriving with low-emission urban transport select and order the product in the store, and have it delivered to the customer by IKEA's zero-emission transport method (except for small items that the customer can take with them). Such a complete redesign of the traditional IKEA logic (large stores, self-service, and own transportation to cut costs as much as possible) is a fundamental innovation in the corporate business model. Another example of these types of initiatives recently implemented by IKEA is the buy-back and resale model through its Circular Hubs. The project started in Poland in November 2021 and is an example of an applied circular economy. It is also a far-reaching innovation in the business model of a company traditionally founded on a large-scale supply of cheap, new furniture with low production costs and a short life cycle. Such activities show the high level of corporate awareness of the reality of the carbon footprint of its operations and the need to reinvent in terms of a low-carbon economy, taking their customers along in the transformation journey.

According to independent reports, financial needs in Poland for the transition to a zero-emission economy are estimated at

€380 billion

Jacek Hutyra, Climate Officer, Orange Poland

Reducing emissions on our way to net-zero is of course our primary responsibility. But we do not want to treat environmental activities only as an obligation (although it certainly is), a “problem”, or a "must". For this reason, from the very beginning, we have also been seeking value in this respect, for customers and all stakeholders.

In mid-2021, one of our services, Orange Flex, became the first net-zero telecommunications service in Poland. This was of course possible thanks to, first of all, determining how Orange Flex affects the climate (first of all, power!) and how this impact can be maximally mitigated and compensated. In addition, we offer Smart City services leveraging the Internet of Things, which allow us to provide city services and utilities to residents more economically, cheaply, and with fewer emissions. We also offer photovoltaic installations that allow individual customers and business clients to produce their own renewable energy. These are just a few examples of our environmental responsibility--focused services.

The area where the greatest innovations in emission improvement are needed is heavy industry such as cement, steel, or chemical manufacturing. Innovations can concern either the production process itself, e.g., hydrogen technology (mostly in steel or chemical manufacturing, and a limited use in cement production) or in alternative products, e.g., the use of cement alternative technologies in construction.

In several processing industries, e.g., in the automotive supply chains, it will be important to redesign products using different materials or in a way that allows easy recycling to create circular material flows, which greatly reduces emissions.

In the TSL industry, real innovation lies in the redesign of entire transport systems to improve efficiency, intermodality, and greater use of low-emission modes of transport. Poland has great potential to actively participate in the transformation of transport as the largest exporter of electric buses in the EU and a leading producer of rolling stock for passenger transport.

Another important area of innovation in terms of emissions is food production and processing, especially techniques and technologies that allow reducing or eliminating the use of extremely high-emission fertilizers or technologies and products related to the production of synthetic meat.

Developing climate innovation requires companies to think long-term about low-carbon emissions in terms of the entire industry and rethinking the role of one's industry and ways to meet customer needs from scratch.

For most companies, this means implementing their own R&D projects in low-emission innovations, sectoral partnerships, monitoring innovations appearing on the market, and for some companies, corporate venture capital investments in startups. All these activities are designed to allow early access to emerging new solutions to be actively implemented on a commercial scale at the right time, in line with the broader decarbonization policy of the company and the industry.

CLIMATE STRATEGY

The level of climate innovation of Polish companies still leaves much room for improvement. Poland needs much more activity in this respect; the growing number of innovative business projects will be a clear sign of integrating climate strategies into long-term corporate business strategies.

E. Other areas of climate competitiveness

The carbon footprint of products in international supply chains, energy costs, availability and cost of funding, as well as the implementation of climate innovations in products and business models, appear to be of key importance for the competitiveness of Polish enterprises in the short and medium term.

However, apart from the above-mentioned elements, there are other elements that affect the business in the long term or impact certain companies in specific industries. These are: **1) physical (operational) climate risks 2) changes in customer/consumer attitudes 3) changes in employee attitudes: acquiring, engaging and retaining talent**.

1. Adaptation to physical climate risks

The risks and business impacts discussed in this report were mainly related to the transitional effects / risks: how the transition to a "green"/sustainable economy and the reduction of emissions affect companies that are part of an ongoing transition. In addition to transitional risks, companies must consider the possibility of physical risks related to climate change.

The assessment of physical risks related to climate change and its mitigation (the climate change adaptation strategies) are an element of climate reporting standards, including TCFD standards, non-mandatory recommendations to the EU Non-Financial Reporting Directive (NFRD) and a mandatory element of the planned new EU CSRD. These standards also define the need for appropriate policies in this regard.

> **In the Polish context, the physical risks associated with climate change are not at all negligible and could concern, e.g., access to water, extreme weather phenomena, problems with the supply and continuity of production or power cuts.**

As global warming and its direct impacts on business progress are observed, managing these risks is likely to become an increasingly important part of climate competitiveness. In turn, this implies the need to prepare climate adaptation strategies and incorporate climate risks into long-term investment decisions (e.g., the location of production plants or other physical assets).

2. Adapting to changes in consumer attitudes

Just as in supply chains and business relationships, the requirements of large customers play an important role, in the case of consumer goods the growing awareness of consumers regarding the environmental footprint (in particular the carbon footprint) of products is of considerable importance. Apart from influencing purchasing decisions (e.g., customers choosing products with a lower carbon footprint), it could manifest itself as significant changes in the purchasing habits in a growing number of customer segments (e.g., extending product life cycles, limiting discretionary purchases), including quite radical changes in behavior (e.g., resignation from car ownership or air travel). Although in Poland such trends are only emerging, they could grow rapidly in certain demographic groups, such as the youngest consumers. On the other hand, these changes also create specific business opportunities for companies. Therefore, changes in attitudes towards climate change among their potential consumers should be actively monitored. A more advanced strategy is to stay ahead of trends and to actively communicate and educate consumers on environmental protection, which also allows the brand to be strongly associated with low-carbon emissions. However, such a strategy must be based on real, measurable activities of the company. Otherwise, the effect on the brand could be strongly negative and stir accusations of "greenwashing".

3. Climate change: changes in employee attitudes

When working on corporate emission reduction programs and, more broadly, environmental programs, companies (the management) often encounter an unexpectedly high commitment of their employees. Often, their employees' initiatives are also the reason for starting work on carbon footprint or emission reduction. For example, a medium-sized IT company in Poland has taken steps to calculate its carbon footprint influenced by a grassroots initiative by a broad range of young developers. They made it clear that without an action plan to mitigate the climate impact, the company's attractiveness as an employer was in question.

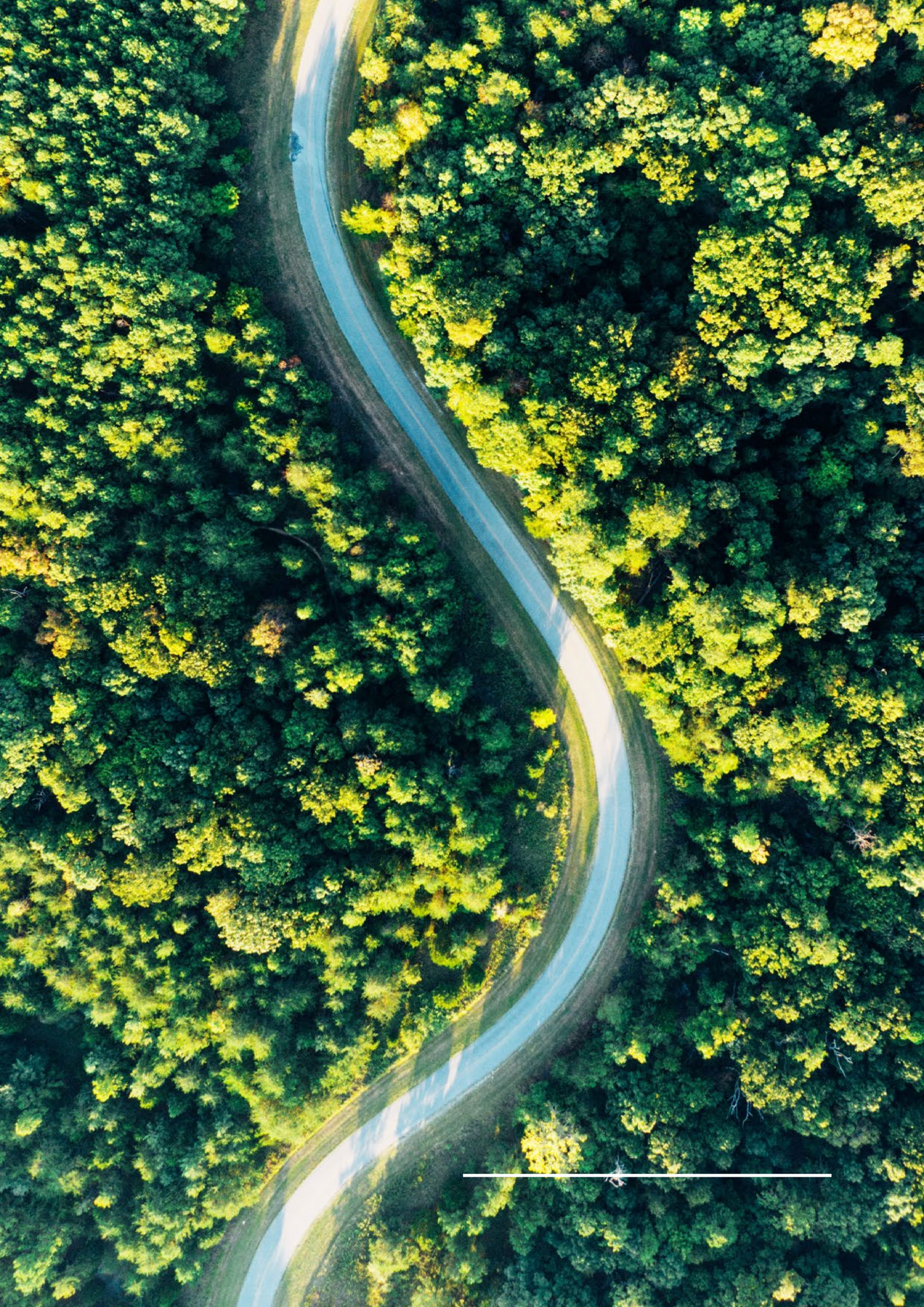
Due to the important educational and motivational aspect of emission reduction programs, companies often include employee education initiatives aimed at climate change. Companies want to involve their employees in specific actions to reduce emissions in areas such as energy efficiency, paper use, commuting (an element of Scope 3), business trips, or fleet policy.

A clear corporate climate strategy can also be a competitive advantage, increasing the employer's attractiveness in the eyes of the best talent in the recruitment processes.

The analysis of specific areas of climate competitiveness shows that European companies must not ignore climate strategies in their business strategies. Polish companies have a structurally inferior starting position and are in transition. Therefore, accelerating processes of adaptation to the changing environment in terms of climate points, to the need to urgently place climate competitiveness at the center of interest of owners and investors, Supervisory Boards, Management Boards and top management of companies. Urgent actions must be implemented in line with the Climate Competitiveness Road Map.

Mirosław Proppe, President, WWF Polska

“Responsible business is primarily one that thinks about its continuity and operational effectiveness, regardless of changes in the environment, customer tastes, raw material prices, regulations, or technical innovations. We all need to realize that a 1.5°C warming of the Earth will cause a climate change that will affect business. The necessity to transition to zero-carbon technologies, as well as water shortages, increased frequency and violence of sudden weather phenomena, etc., will force the adjustment of business models. It is better to start adjusting them now, at relatively lower costs, in order to take advantage of the new opportunities and avoid some losses."



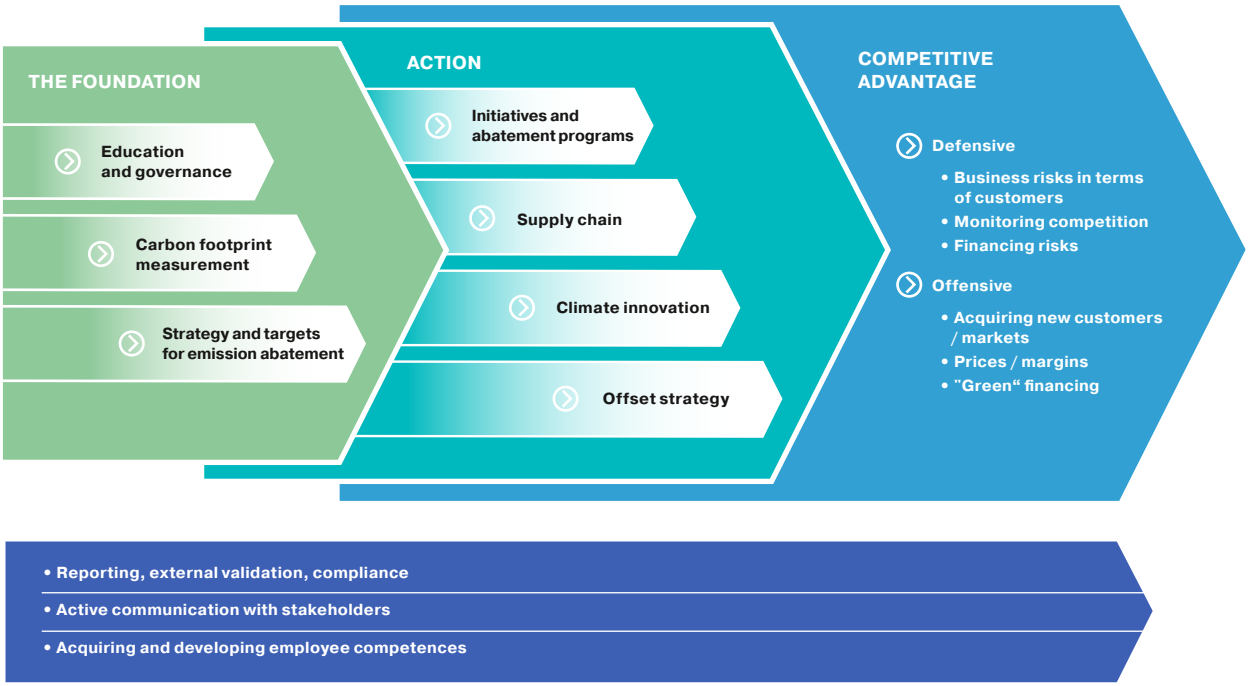
Chapter 6

Building corporate climate competitiveness

Taking into account the regulatory aspects, domestic and international business initiatives, as well as the experience of the most advanced companies, allows us to define a clear strategy for building the corporate climate competitiveness.

The strategy for building corporate climate competitiveness should consider various starting points (from establishing basic foundations to cases of more advanced strategies), the close integration of the climate strategy with the business strategy, as well as reporting, communication, and building human skills. The activities within the developed strategy can run in parallel and be gradually enhanced, detailed, and expanded, since executing a climate strategy is a process of continuous improvement and raising competences.

Climate Competitiveness Roadmap



A. The roadmap for building corporate climate competitiveness

A1. Create a strong foundation

At the initial stage, the company needs to build the competence and analytical foundations that allow it to start building climate competitiveness. This means, first, education and appropriate empowerment of climate competitiveness in the organization, as well as defining the starting point, i.e., calculating the corporate carbon footprint and defining reduction goals and strategies.

Building climate competences and governance

The challenges and opportunities resulting from the advancing climate change cover many areas and levels of business reality. In practice, this means that addressing them requires the expansion of competences throughout the organization. Supervision over the change should be exercised by top management. The recommended steps are as follows:

STEP 1

Increase internal competences in the area of carbon footprint and climate strategies among management through a properly structured knowledge--building program focused on the practical aspects of corporate climate competitiveness.

STEP 2

Introduce top management (Management/Supervisory Board) to the topic and build understanding through education and discussion of the changing external and competitive context and implications for the company.

STEP 3

Define the owner(s) of the topic of climate competitiveness at the Management Board/Supervisory Board level and define the leader and inter-functional working team responsible for the corporate climate strategy, reporting to the Board/CEO.

Measuring the carbon footprint

Transferring the complexity of climate challenges to business reality must be based on measurable, reliable, and scientifically proven indicators. The most important parameter for detailed measurement and monitoring is the carbon footprint. The recommended steps are as follows:

STEP 1

Measure the carbon footprint – in Scopes 1 and 2 – as a basic element for rapid implementation.

STEP 2

Review Scope 3 and establish precise Scope 3 carbon footprint measurement categories based on significance; schedule to expand Scope 3 inclusion over time.

STEP 3

Implement gradual and scheduled extension of carbon footprint measurement and reporting in Scope 3 (also in cooperation with suppliers and possibly clients).

STEP 4

Measure the carbon footprint of products.

a. Establish priority products given client requirements (existing or expected), based on commercial risk monitoring.

b. Other (by default: carbon footprint for all products).

STEP 5

Build a permanent process to update your carbon footprint data on a regular basis.

STEP 6

Audit and independently verify carbon footprint data for quality assurance.

Create a climate strategy and establish measurable goals

The real corporate goal should be to enter the path of decarbonization. This means setting ambitious, measurable and adequately verified emission reduction targets, preferably SBTs (Science Based Targets). However, the goals must be verified analytically in terms of feasibility over time. The recommended steps are as follows:

STEP 1

Define emission reduction targets under Scopes 1 and 2.

STEP 2

Define Scope 3 reduction targets (in line with the defined Scope 3 categories).

STEP 3

Determine the ways to achieve those goals in individual areas and forecast the expected effects - analytical validation of the feasibility of goals and determination of areas difficult to reduce).

STEP 4

Make a preliminary cost and business benefits estimate related to the reduction of emissions.emisji

STEP 5

Verify the targets in terms of SBT/the Paris Agreement pathway (1.5 or 2˚C), compliance, for example, according to the SBTi methodology.

CARBON FOOTPRINT

Transferring the complexity of climate challenges to business reality must be based on measurable, reliable, and scientifically proven indicators. The most important parameter for detailed measurement and monitoring is the carbon footprint.

A2. Act! Specific activities related to building climate competitiveness

Moving to real actions in terms of climate strategy means building an emission reduction program that includes many initiatives of various types related to different areas of the organization. Depending on the scale, advanced companies have programs consisting of several dozen to several hundred different initiatives, combined into a coherent and precisely managed program.

Managing the emission abatement program and establishing the initiative plan

Real climate action requires creating a GHG abatement program that includes many initiatives of various types in different areas of the company. Depending on the scale, climate-advanced companies have programs consisting of several dozen or even several hundred different initiatives creating a coherent and precisely managed program.

- Establish a formal emission abatement program.
- Define emission reduction initiatives, with schedules and budgets.
- Implement the program management and progress measurement process vs. specific KPIs.
- Determine the necessary costs/investments and include the program in the OPEX/CAPEX budget, along with the analysis of benefits and specific business case initiatives (determine the investment decisions).

Impact on the supply chain

Environmentally advanced companies work closely with their supply chain to measure and reduce the carbon footprint of Scope 3.

1. Start educating and communicating with the supply chain as part of the measurement and data collection of Scope 3.
2. Involve suppliers in emission reduction projects in terms of provided products and services.
3. Formalize activities under the low-carbon Supply Chain Program.

Climate innovation

Achieving zero emissions in virtually every industry will require the implementation of innovations and new solutions that must be developed through strategic partnerships and investments into innovation projects.

Identify the areas that are the most challenging in the company and its value chain, that is, where emission reduction without product, process, or technology innovation is impossible.	Monitor innovative solutions in these areas at the industry level to ensure quick access to emerging solutions.	Launch or participate in your own innovation projects, featuring industry stakeholders or external partners, to find solutions to the most challenging areas of emission reduction.

The offset strategy

An important element of achieving the net-zero strategy is the use of appropriate offset mechanisms outside a company's value chains. The purpose is to balance residual emissions technically that are impossible to reduce (physically), i.e., residual emissions.

Define a clear, best-practice--compliant policy on carbon footprint offset.	Select offset projects under appropriate standards (e.g., the Gold Standard).	Purchase projects.

Moving to real actions in terms of climate strategy means building an

emission reduction

that includes many initiatives of various types related to different areas of the organization

CLIMATE STRATEGY

When implementing climate strategies, the company should work intensively to integrate these activities with business strategies to eliminate possible business risks and actively build a competitive advantage.

A3. Build a competitive advantage by leveraging climate strategies in your business strategy

When implementing climate strategies, the company should work intensively to integrate these activities with business strategies to eliminate possible business risks and actively build a competitive advantage.

DEFENSIVE ACTIONS: reducing business risks

- Identify the risks of losing customers (especially in export markets) and mitigate them by using your developed climate strategy with customers and in competitive customer/contract acquisition processes.
- Monitor competition and emerging market initiatives/activities in climate strategies and respond appropriately.
- Identify risks related to access to funding or additional funding requirements and address them.
- Identify products and assets (e.g., production-related) that could become uncompetitive in the climate context and could require redesign/change.

OFFENSIVE ACTIONS: taking advantage of opportunities

- Acquire new customers based on the advantages of the low-emission transition of the company/product, taking the right place in the rebuilt supply chains.
- Use the climate strategy to increase prices/margins in the context of changing customer needs ("low carbon bonus").
- Identify the possibility of using "green" funding for the purpose of a low-carbon transition of the company, its products, technologies, or supply chains, as well as for the general funding of the company's development as a low-carbon leader.

A4. Support and image-building activities

Appropriate reporting and communication policies, as well as an HR strategy that supports your corporate.

A. Report/share data on carbon footprint and climate strategy:

- Publish a dedicated climate strategy report and update it regularly, including carbon footprint, reduction goals, and action plans.
- Include the activities in Annual Reports/ NFR/ESG Reports.
- Share and verify data on voluntary platforms for standardized reporting and certification of climate strategies, e.g., CDP, SBTi.

B. Communicate the activities to stakeholders:

- Clients (using climate competitiveness in your commercial strategy)
- Banks
- Investors
- Employees
- Other stakeholders and the public

C. Acquire and develop competencies

- Launch recruitment processes to acquire key climate-related competencies.
- Develop skills (as well as awareness), in-house by training management and employees on the elements of the climate strategy and corporate activities, especially commecial / business use of climate competitiveness.
- Engage a broad circle of employees in initiatives related to building climate competitiveness as an element of building commitment and corporate image.

B. Adaptation to climate change

The climate competitiveness strategy focuses on achieving a corporate competitive advantage in climate change mitigation by reducing the corporate carbon footprint and using the company's advantage in this regard in its commercial and financial strategy. In the long term, companies must also consider that global mitigation efforts might fail to achieve reasonable results and include climate change scenarios above the 2°C pathway in their long-term business planning. This applies to long-term investments in fixed assets with a life cycle of over 10-15 years in particular, as well as acquisitions or location decisions, etc.

Managing physical/operational corporate risks related to the consequences of climate change requires appropriate analysis and adaptation of corporate plans to the risks in various climate change scenarios. Such analyzes are also part of best practices in climate reporting (cf. TCFD requirements).

In practice, especially in the Polish context and in the short and medium term, the importance of building climate competitiveness based on mitigating the impact of your company on climate change in the context of the requirements of customers, contractors, financial institutions, and regulatory bodies will bear a significantly greater business weight than adaptation to climate change as it progresses.

a climate change

adaptation plan is an important element non-financial reporting of companies.

C. Corporate energy transformation

Due to Poland's weak position resulting from its long-term attachment to a coal-based energy system, the energy transition strategy of Polish companies towards low-carbon, especially in Scope 2, must include ambitious targets and plans for the corporate energy transition **REGARDLESS** of systemic changes at the national level. The transformation must include, in particular.

- Determining the pathway to 100% RES power, both produced independently and purchased from professional suppliers
- Implementing as many as possible initiatives related to power efficiency/reduction of electricity consumption, both in production processes (powering machines and devices, power efficiency of production processes, production planning over time, etc.) and in facility maintenance (e.g., heating and cooling technologies, thermal insulation, lighting)

Please note that due to the structural increase in power prices (which will continue in Poland in the longer perspective due to the burden of EU ETS costs and the still high share of coal in energy production), most of such projects will have favorable financial parameters and will allow savings in relation to the business-as-usual scenarios. However, when analyzing energy efficiency projects and transitioning to RES, companies should define investment project evaluation criteria that consider both direct savings and indirect benefits from reducing the corporate carbon footprint. One of the methods is to add the "cost of emissions", that is, the benefits resulting from the avoided carbon emissions to such analysis. Such internal carbon footprint pricing mechanisms are widely used by leaders in the low-carbon transition.

A shortage of appropriate, truly "green" power sources or the inability to build them within the next 2-3 years due to the above-mentioned systemic constraints on the development of RES could be a significant challenge for companies in Poland. Therefore, it is extremely important to secure the sustainable availability of "green" power as soon as possible. This can be achieved, for example, through long-term RES-based corporate power purchase agreements.

10-15 years

In the long term, companies must also consider that global mitigation efforts might fail to achieve reasonable results and include climate change scenarios above the 2°C pathway in their long-term business planning. This applies to long-term investments in fixed assets with a life cycle of over10-15 years in particular, as well as acquisition or location decisions, etc.

A checklist for the CEO

A.	Calculated Carbon Footprint, Scopes 1 and 2	☐
B.	Calculated Carbon Footprint, Scope 3 - in selected categories - in total	☐
C.	Monitoring of the requirements set by key customers and financial partners in the climate area has been launched	☐
D.	Emission reduction targets set for Scopes 1, 2 and 3	☐
E.	Emission reduction program/action plan accepted, and owners designated	☐
F.	Company energy transition plan formulated and implemented	☐
G.	Identified business opportunities based on the climate strategy	☐
H.	Climate strategy included in reporting and external communication	☐
I.	The climate aspect considered in investment and strategic decisions	☐
J.	A dedicated team and a designated board member	☐

Emphasis on system changes

Regardless of the implementation of the strategy of building climate competitiveness at the corporate level and participation in the "race to zero", it is extremely important for businesses to engage in influencing system-level changes, including engaging business organizations in the discussion on the necessary climate transition.

The Polish economy is highly and strategically related to that of the EU through exports and direct investments. The EU as a whole introduces decarbonization with great determination, far beyond the point of no return. The only possible option will be to take up the challenge and try to catch up with, or even advance ahead of, the changes taking place in Europe.

The Polish economy has been able not only to catch up, but even to outpace the largest Western European economies in terms of adapting certain technological changes (e.g., the banking sector, digital and fintech payments, retail sector, e-commerce and shipping services, gaming industry). We have leveraged the possibility of a direct leap into the most modern solutions, but also the innovation and efficiency of the private sector. We currently need a similar breakthrough in terms of climate competitiveness and the “green” transition of the economy.

In addition to engaging in the transition of individual companies and the rapid development of advanced strategies among as many business leaders as possible, business and industry association-level initiatives are needed. Initiatives that go beyond the defensive logic of delaying changes and the slow adaptation to the applicable regulations will inspire other companies to follow, and thus quickly change the entire system.

Passive anticipation of regulatory requirements and minimal activity is a recipe for failure in terms of competitiveness of enterprises, industries, and the entire national economy.

The key elements of the necessary system changes are:

- Radical acceleration of decarbonization of the power sector: a much faster departure from coal than by 2049, as currently announced by the government. Combined with an earlier departure from subsidies for coal-based power production and the launch of more ambitious energy transition plans, 2035 seems to be the real date.
- Maximizing the potential of private capital to rapidly increase the installed capacity of renewable energy sources.
- Elimination of regulatory barriers that hinder the development of RES, especially limitations in the development of offshore wind farms (Distance Act) and maximum simplification of administrative procedures related to location decisions for all RES projects.
- Maximum acceleration of the pace of modernization investments in the grid to radically increase the possibility to connect RES in the distributed generation model.
- Development and implementation of a power grid management model that will enable the smooth integration of multiple dispersed sources ("smart-grid").
- Maximum simplifications and facilitations for corporate investors in RES for non-limit use to meet their own needs within the existing connection capacities, also for large installations.
- Systemic support for the development of energy storage methods.
- Accelerating the construction of large, systemic low-emission sources, especially offshore wind farms.
- The issue of the energy transition of energy-intensive sectors is genuinely addressed, considering the rapid implementation of a hydrogen strategy based on detailed plans.
- Development of support mechanisms for companies investing in the decarbonization of their activities.
- Development of innovations supporting the decarbonization of the economy and individual sectors (including the redirection of innovation support mechanisms towards decarbonization -related goals).
- Ensuring the maximum use of EU funds in the current budget perspective to implement the above priorities, and redirect most, or all the revenues from the EU ETS and the capacity fee to these objectives.

The voice of Polish enterprises and business leaders striving to ensure long-term climate competitiveness should be louder and it should mobilize political decision-makers, regulators, and those responsible for system-level solutions towards urgent action.

About the Climate Strategies Poland Foundation

The Climate Strategies Poland Foundation (www.climatestrategiespoland.pl) is a non-profit organization. We are working to support the transition from environmental declarations to specific emission actions to mitigate it.

We calculate the carbon footprint of organizations, services, products and events, build emission reduction strategies, and educate. Our team of experts has the necessary experience and a broad understanding of the climate context in Poland, combined with a realistic understanding of the business context. We work closely with global organizations specializing in carbon footprint reporting and decarbonization strategies, such as CDP. We support partners in building reduction strategies, selecting offsets, and communication activities.

The Foundation's statutory goals include education on carbon and environmental footprint reduction, and support for local governments and organizations in building environmental awareness. We build awarness among citizens of major Polish cities, we support representatives of local governments. We are partners of the Union of Polish Metropolises and support the largest Polish cities on the pathway to zero emission. We have calculated carbon footprints and prepared emission reduction strategies for business clients representing the telecommunications, manufacturing, food, construction and pharmaceutical sectors, as well as investment funds and banks.

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Advisor, manager, and entrepreneur, he is a graduate of Warsaw School of Economics and MBA program at INSEAD. For over 10 years, he has been an active investor and entrepreneur involved in the renewable energy sector for B2B, B2C and local government.

He managed large business organizations, including as Managing Director in Polkomtel S.A. Additionally, as a consultant and associate partner at McKinsey & Company, he advised the largest Polish and global corporations on strategy and business development.

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Dr. Drewko has extensive experience in the field of sustainable development strategies, energy, and in particular carbon footprinting and GHG management. She has implemented projects related to GHG emissions management in the banking, telecommunications, energy, tourism, chemical, pharmaceutical, retail, and education sectors.

She holds a Bachelor of Science in Environmental Protection and Management from Gdansk University of Technology, a Master of Science in Environmental Engineering and a Ph.D. in Economic and Social Sciences from the Technical University of Hamburg (TUHH), as well as a Master of Business Administration from Northern Institute of Technology.

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Co-founder of the Climate Strategies Poland Foundation. She deals with climate strategies of companies and supports a thoughtful approach to climate change, building awareness about climate change and its slowdown.

She has many years of experience in building communication strategies, communication risk management in business (McKinsey & Company), and public administration. She is a Member of the WWF Foundation Council, Client Earth Program Council, Institute of Public Affairs Foundation, and Pismo Magazine Foundation.
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Co-founder of the Climate Strategies Poland Foundation, he supervises the area of carbon footprinting projects and cooperation with local governments and European institutions. He has overseen carbon footprint calculation projects for a number of companies and products in Poland, including large international corporations.

A graduate of the Executive MBA Program at Aix-Marseille Graduate School of Management, he is an experienced advisor who has worked for many years with the Polish government and European institutions, e.g., the European Green Deal. For the last few years, he was a member of the Cabinet of the President of the European Council. Previously, he was Head of the Political Office of the Prime Minister. He advised on strategy, communication, public policy, and international relations. He managed the Polish edition of the largest European youth program, EYCA.

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EU regulatory expert, specializing in energy, climate, environmental, and budgetary policies.

A Founder and CEO of the Gate Brussels consulting company. He currently manages the BalticWind.EU platform and cooperates with the Industry Alliance for Energy Efficiency (POBE) and the RE-Source Poland Foundation, dealing with the dissemination of the corporate PPA model.

From 2015-2018, he worked as the Director of the Polish Electricity Committee in Brussels, representing the interests of the electricity sector. Prior to that, from 2010 to 2015, he worked in the Cabinets of EU Budget Commissioners, as well as in the EC Budget Directorate. He has participated in the work and negotiations of many EU regulations creating the legal framework for the modernization of the energy sector. He has authored many analyses and reports on energy transition.