



NATIONAL BANK OF THE REPUBLIC OF NORTH MACEDONIA

Banking Regulations and Resolution Department

GUIDELINES ON MANAGING CLIMATE-RELATED RISKS

October 2023

Contents

Glossary	3
Introduction	8
I. CLIMATE-RELATED RISKS AND THEIR TRANSMISSION CHANNELS.....	12
I.1 Physical risks	12
I.2 Transition risks	13
I.2.1 Changes in regulation	13
I.2.2 Technological changes	14
I.2.3 Changes in investor and consumer behaviour.....	14
I.3 Transmission channels of climate-related risks.....	15
II. MANAGEMENT OF CLIMATE-RELATED RISKS.....	19
II.1 Business strategy	19
II.2 Risk management process	22
II.2.1 Risk appetite.....	22
II.2.2 Identifying, measuring and monitoring climate-related risks.....	23
II.2.3 Incorporation of climate-related risks into existing risk management practices...27	
II.2.4 Stress testing rules	30
II.2.5 Information system	31
II.3 Organizational risk management structure	32
II.4 Inclusion of climate-related risks in ICAAP and ILAAP.....	33
III. Conclusion.....	35
Annex 1: ESG risks.....	36
Annex 2 Transmission channels for climate-related risks.....	38
Annex 3 Basel principles for managing climate-related risks.....	39
Annex 4 Expectations of the European Central Bank regarding the management of climate-related risks.....	41
Annex 5 Scenarios defined by the NGFS.....	42

Glossary

The terms used in these Guidelines shall have the following meaning:

- 1) **Anthropogenic emissions** shall denote emissions of greenhouse gases, aerosols or other atmospheric compounds that have an impact on the concentration of greenhouse gases or aerosols, resulting from human influence (use of fossil fuels, logging or reduction of forest areas, use of land or land conversion, poultry production, waste management or industrial processes).
- 2) **Anthropogenic removals** shall refer to the removal of greenhouse gases from the atmosphere as a result of human activities.
- 3) **Biological diversity (biodiversity)** shall represent the totality of living organisms as an integral part of ecosystems, and includes the diversity in species, between species, as well as the diversity of ecosystems.
- 4) **Global mean surface temperature** shall be an estimated global average of the surface air temperature over ice-covered land and oceans and of the temperature in the first few meters below the surface of ice-free oceans, with changes usually expressed as deviations from the value over a specified reference period.
- 5) **Global warming** shall be the estimated increase in global mean surface temperature over a 30-year period or over a 30-year period of a given year or decade, expressed relative to pre-industrial levels (1850-1900), unless otherwise specified.
- 6) **Transition risks drivers** shall represent the activities undertaken in response to climate change that could cause, increase or decrease transition risks. These include changes in policy, legislation and regulation, changes in technology and in market and consumer behavior, each of which can drive, accelerate, slow down or disrupt the transition to a green economy and achievement of sustainable development.
- 7) **Physical risks drivers** shall denote changes in weather and climate conditions that lead to increased physical risks and impacts on the economy (for example, the risk of flooding).
- 8) **Ecology** shall be the relationship of air, soil, water, animals and plants in a certain area or most often a scientific study of that relationship.
- 9) **Greenwashing** shall mean wrongly or inaccurately informing creditors, investors and other economic entities that the funds collected for financing or the product or service offered by a certain entity have a positive impact on the average life, in order for the entity to expand the list of investors, creditors or consumers or to provide access to better financing conditions.
- 10) **Environmental, social and governance risks (ESG risks)** shall mean the probability of losses or additional expenses, or loss of planned income, or loss of reputation of the bank due to the negative financial impact of current or future ESG factors on bank's counterparties and bank's assets.
- 11) **Environmental, social and governance (ESG factors)** shall represent a set of criteria that reflect the environment and ecosystems (environmental factors), rights,

interests and wellbeing of people and society (social factors) and transparency and legal compliance (governance factors) that impact the entity's investment decisions or its operation.

- 12) **Circular economy** shall represent an economic system in which the value of products, materials and other resources are retained in the economy for the longest possible period, increasing their efficient use in production and consumption, thus reducing the negative impact on the environment and it minimizes waste and the release of harmful substances in all phases of their life cycle. This system is based on recycling and rational consumption of resources and is an alternative to the traditional, linear economy.
- 13) **Ecosystem** shall be an area where plants, animals and humans live together with the environment, and their mutual relationship can be considered as a system. The boundaries of that system depend on the focus of interest, so the size of an ecosystem can range from very small spatial frames to the entire planet Earth.
- 14) **Ecosystem services** shall be the direct or indirect impact of ecosystems on the economic, social, cultural or other benefits that people or society can have from those ecosystems.
- 15) **Energy efficiency** shall be the ratio of the achieved useful output, to the input of energy for achievement of the useful output.
- 16) **Green economy** (low carbon economy) shall mean an economy with low carbon emissions that uses resources efficiently and is in the public interest.
- 17) **Green credit** shall mean credit exposure that is used to improve the energy efficiency of households and the corporate sector, support investments in green technologies, materials and the like, support investments in renewable energy sources, as well as for control and/or prevention of pollution, protection of the environment, reduction of climate-related risks, etc.
- 18) **Carbon footprint** shall be an absolute or relative measure of greenhouse gas emissions from certain entity or industry.
- 19) **Carbon intensity/Emission intensity** shall be the amount of carbon dioxide (CO₂) emissions released per unit of another variable such as gross domestic product (GDP), energy consumption for production or transport. An activity or process is carbon intensive if it has high carbon dioxide emissions relative to a certain reference value.
- 20) **Transmission channels** shall denote causal chains that explain how climate risks drivers give rise to financial risks that impact banks directly or indirectly through their counterparties, investments and the economy in which they operate.
- 21) **Climate** in the narrower sense of the word is usually defined as average weather conditions or as the average value and variability of surface changes such as temperature, precipitation and/or wind or other relevant changes over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization. Climate in a wider sense is the state, including a statistical representation, of the climate system.

- 22) **Climate neutrality** shall be a state in which human activities have no net effect on the climate system. Achieving this state implies net zero emissions of carbon dioxide or greenhouse gases, that is, a state in which anthropogenic emissions are decreased to zero (or almost to zero) or a state in which the current greenhouse emission is neutralized by anthropogenic removals in a precisely defined period of time. This condition is also known as carbon neutrality.
- 23) **Climate projection** shall be the simulated response of the climate system to a scenario of future emission or concentration of GHGs and aerosols, generally derived using climate models. Climate projections are distinguished from climate predictions by their dependence on the emission/concentration/radiative forcing scenario used, which is in turn based on assumptions concerning, for example, future socioeconomic and technological developments that may or may not be realized.
- 24) **Climate vulnerability** shall refer to the amount of damage that can be expected at different intensities of the physical hazard. In determining climate vulnerability, secondary impacts such as disruptions to normal business processes caused by the physical hazard may also be included.
- 25) **Climate sensitivity** shall be the change in annual global mean surface temperature in response to a change in the atmospheric concentration of carbon dioxide or other radioactive radiation.
- 26) **Climatic changes** shall represent changes in the average value of the climate or its variability, which persist over a longer period of time (usually decades or centuries). Climate change is the result of natural processes, external disturbances and long-term disturbances in the atmosphere or in land use as a result of human activities.
- 27) **Climate system** shall be the atmosphere, the hydrosphere, the cryosphere, the earth's surface and the biosphere, as well as their mutual influences.
- 28) **Macro (or macroeconomic) transmission channels** shall denote the mechanisms by which climate risk drivers affect macroeconomic factors, such as labor productivity and economic growth, and how these, in turn, may have an impact on banks through an effect on the economy in which banks operate. Macroeconomic transmission channels also capture the effects on macroeconomic market variables such as risk-free interest rates, inflation, commodities and foreign exchange rates.
- 29) **Micro (or microeconomic) transmission channels** shall be a mechanism through which climate risk drivers affect banks' individual counterparties, potentially resulting in climate-related financial risk to banks and to the financial system. This includes the direct effects on banks themselves, arising from impacts on their operations and their ability to fund themselves. Microeconomic transmission channels also capture the indirect effects on name-specific financial assets held by banks (e.g. bonds, derivatives, shares).
- 30) **Impaired asset** shall be an asset that at a certain point before the end of its economic life ceases to generate returns as a result of changes related to the transition to a low-carbon economy.

- 31) **Carbon taxation (carbon tax)** shall generally refer to a tax levied on the carbon content of some goods and services, typically in the transport and/or energy sectors. The purpose is to reduce CO₂ emissions by increasing the price of these goods and services.
- 32) **Sustainable investments** are understood as investments in economic activity that are considered to contribute to the achievement of environmental protection goals.
- 33) **Sustainable finance** shall refer to the process of taking climate, environmental and social factors into account when deciding on financing, which leads to increased investments in long-term and sustainable activities.
- 34) **Sustainability** shall be a dynamic process that provides resilience to the natural system and to humans in an equitable manner.
- 35) **Sustainable development** shall be development that covers the needs of today's generation without jeopardizing the ability of future generations to meet their needs and allows for a balance between social, economic and environmental needs.
- 36) **Tipping point** shall refer to the critical point of changes in the system's features, beyond which there is a reorganization, often abrupt, after which the system no longer returns to the initial state, even if the drivers of change are reduced/non-existent. For an ecosystem, this point refers to the critical threshold at which the global or regional climate changes from one steady state to another.
- 37) **Adapting to climate change** shall mean taking measures to adapt to current or expected climate changes and their impact, in order to prevent or reduce damage from those changes, while using potential opportunities.
- 38) **Climate-related risks** shall denote potential risks that may arise from climate change or from efforts to mitigate climate change and related impacts and their economic and financial effects.
- 39) **Greenhouse gases** shall be those gaseous constituents of the atmosphere, natural and anthropogenic (human-related), which absorb and emit radiation at certain wavelengths within the spectrum of thermal infrared radiation emitted from the Earth's surface, from the atmosphere and from the clouds. This radiation causes the "greenhouse" effect. The main greenhouse gases in the Earth's atmosphere are: water vapour (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃).
- 40) **Taxonomy of sustainable economic activities** shall mean a system of recognition of economic activities that are considered to contribute to the achievement of environmental protection goals (sustainable economic activities) based on established standards for determining the compliance of economic activity with the principles of sustainable development and environmental standards. Such a taxonomy allows investors to direct resources towards the transition to a low-carbon economy. The taxonomy also facilitates a system for publishing data related to climate change.
- 41) **Transition plan** shall be a written document that defines the manner in which the entity plans to achieve the defined climate strategic goals and/or to manage the transition risks in the long term.

- 42) **Transitional risks** shall refer to an institution's financial loss that can result, directly or indirectly, from the process of adjustment towards a green economy and achievement of sustainable development.
- 43) **Climate change mitigation** shall imply human activities to reduce or prevent the emission of greenhouse gases. It is commonly associated with the goals defined in the Paris Agreement in terms of keeping global warming below 2°C and taking action to reach a limit of 1.5°C relative to pre-industrial levels.
- 44) **Management of climate-related risks** shall imply identifying, measuring or evaluating, controlling or reducing and monitoring the drivers of climate-related risks and their impact on other risks to which banks are exposed in their operations (for example credit, market, operational, liquidity risk or other risks).
- 45) **Physical risks** shall denote economic costs and financial losses resulting from the increasing severity and frequency of:
- Extreme weather events such as heatwaves, landslides, floods, wildfires and storms (so-called acute physical risks);
 - Longer-term gradual shifts of the climate, such as changes in precipitation, extreme weather variability, ocean acidification, and rising sea levels and average temperatures (so-called chronic physical risks);
 - Indirect effects of climate change, such as loss of ecosystem services (e.g. desertification, water shortage, degradation of soil quality or marine ecology).
- 46) **Physical hazard (or hazard)** shall be the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources.

Introduction

The effects of the climate change, which are expected to have a serious impact on economies and everyday life, are increasingly visible. In the period from 2011 to 2020, the global average surface temperature is 1.1°C higher than in pre-industrial levels. In addition, a number of regions and countries are experiencing far greater warming than the global average. As a result, the climate changes are considered a global "problem" that transcends national borders and requires international cooperation and coordinated solutions at all levels.

In order to deal with climate change and its negative impacts, world leaders at the UN Climate Change Conference in Paris in 2015 signed the so-called The Paris Agreement¹ which sets long-term targets for significant reductions in global greenhouse gas emissions and maintaining the increase in global average temperature below 2°C above pre-industrial levels, aiming to limit that increase to 1.5°C. As a signatory to the Paris Agreement, the European Union in 2019 announced the so-called European Green Deal², as an action plan to ensure economic sustainability by reducing greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels and achieving net zero greenhouse gas emissions by 2050 and investing in research and innovation for the preservation of the environment in the EU.

The Republic of North Macedonia is a signatory country to the Paris Agreement and is fully involved in this process, through numerous initiatives and activities³. At the same time, the country is one of the 6 countries from the Western Balkans, which in November 2020 signed the Sofia Declaration, with which the countries from the Western Balkans recognized the European Green Deal, as a cornerstone for the implementation of the Green Agenda for the Western Balkans (English Green Agenda for the Western Balkans - GAWB). In accordance with this agreement, the region also undertakes to achieve climate neutrality by 2050, for which an Action Plan with 58 activities and 7 roadmaps aimed at climate protection, provision of sustainable energy sources, circular economy, reduction of pollution has been prepared, ensuring sustainable agriculture, protecting nature and biodiversity, etc.

The banking sector is expected to play a key role in the achievement of these goals and in the transition to a green and sustainable economy, at the global and national level. This transformation will open up new business opportunities for the banks, but it will also cause the emergence of new risks that will arise from the transformation of the economy and the deterioration of natural and climatic conditions. Banks should assess the materiality of that impact and understand the impact that these risks have on their business model and risk profile. Banks are facing increasing pressures to publish data and information regarding their investment decisions. This new tendency is driven by a number of factors, such as the

¹ The agreement was signed on 12 December 2015, and entered into force on 4 November 2016. So far, 194 parties (193 countries and the European Union) have signed this agreement. The agreement stipulates obligations for all countries to reduce greenhouse gas emissions and work together to adapt to the impacts of climate change. The agreement provides a pathway for developed countries to assist developing countries in their efforts to mitigate and adapt to climate change by creating a framework for transparent monitoring and reporting on climate goals. The Paris Agreement provides a lasting framework that should guide global efforts in the coming decades to achieve a world of net-zero emissions and achieve the goals of sustainable development.

² The European Green Deal is not only an EU-level strategy for taking actions to deal with climate change, but is also a path to transition to a new model for sustainable economic growth, where growth is less dependent on the intensive use of natural resources. The European Green Deal is based on a set of policies in several areas, priority sectors and cross-sectoral themes.

³ The signatory countries to the Paris Agreement agree to provide information on their nationally determined contributions for the purposes of the agreement. The Republic of North Macedonia submitted its national contributions in August 2015. Because of the pronounced use of fossil fuels, above all the dominant participation of domestic lignite for the production of electricity, there is a potential for reducing greenhouse gases in the country. Precisely for this reason, the focus of the Macedonian national contributions is on mitigating climate change, i.e. on policies and measures that lead to a reduction of greenhouse gas emissions by 30% by 2030 (reduction of carbon dioxide emissions from the burning of fossil fuels), i.e. by 36% at a higher level of ambition, compared to the reference scenario. For this purpose, three scenarios have been developed: a reference scenario (scenario without measures), a mitigation scenario (with existing measures) and a more ambitious mitigation scenario (with additional measures). These contributions are revised in 2021 (more explanation in section 2 of these Guidelines).

changing of the regulatory setting, the inclusion of issues related to climate change (and more broadly to so-called ESG risks) in decision-making regarding the manner of management of these risks, the required level of capital and the provision of financial services. Hence, banks are expected to include the drivers of climate-related risks in their risk management practices and systems, in accordance with the nature, size and complexity of the financial activities they perform and the level of risk that banks are willing to take (the risk appetite).

In this process, both supervisory and regulatory authorities take on a new, proactive role with a dual objective: (1) banks to properly understand, identify, manage and control the drivers of climate-related risks they are exposed to and (2) supervisors to be prepared for the appropriate determination of the profile of climate-related risks of each bank. Their activities are aimed at building the capacities of the banking system for management of climate-related risks and enhancing its ability to support the transition to an economy with net-zero carbon emissions, but also to building of its own capacities for monitoring of these new risks.

The Bank of England was the first financial supervisor that has issued Guidelines on the management of climate-related risks by banks⁴ in April 2019. Later on, in November 2020, the European Central Bank (ECB) published a detailed Guide on climate-related and environmental⁵ risks (Annex 4 to these Guidelines). Following the example of these institutions, other national supervisors in the EU have also published their expectations and/or recommendations for the management of these risks⁶. When talking about regulatory initiatives, the activities of the Basel Committee on Banking Supervision are of particular importance. In June 2022, this Committee has issued the final version of the Principles for the Effective Management and Supervision of Climate Related Financial Risks⁷.

The existing international practice shows that the principle based approach has proven to be most adequate starting point for identifying and presenting the expectations of the supervisory authorities regarding the management of climate-related risks. This is in line with the recommendation of the Network of Central Banks and Supervisors for Greening the Financial System (NGFS)⁸ stated in the Guide for supervisors for the integrating climate-related and environmental risks in prudential supervision⁹. The guide contains five recommendations, one of which recommends that supervisors publish their expectations regarding supervisors understanding of a prudent approach to climate-related and environmental risks.

Following this example, the National Bank of the Republic of North Macedonia developed these Guidelines, which present the National Bank's understanding of the appropriate management of climate-related risks, taking into account the rest of the prudential regulation that banks in the country are obliged to comply with. The development of these Guidelines is part of the National Bank's activities for contributing to a green economy. Thus, with the amendment to the Strategic Plan of the National Bank in 2020, activities related to climate change were set as a strategic priority for the first time. At the beginning of 2021, the National Bank became

⁴ Supervisory Statement SS3/19 Enhancing banks' and insurers' approaches to managing the financial risks from climate change April 2019.

⁵ Guide on climate-related and environmental risks: Supervisory expectations relating to risk management and disclosure, November 2020, European Central Bank.

⁶ The National Bank of Hungary, supervisory authorities of Germany (BaFin), France (ACPR), etc.

⁷ [Principles for the effective management and supervision of climate-related financial risks, June 2022, Basel Committee on Banking Supervision.pdf](#)

⁸ The Network for a Greening the Financial System (NGFS) is a group of 116 central banks and supervisors and 19 observers committed to sharing best practices, contributing to the development of climate change and environmental risk management in the financial system and mobilizing mainstream finance to support of the transition to a green economy. The purpose of the Network is to help strengthen the global response needed to meet the goals of the Paris Agreement. To this end, the Network defines and promotes best practices to be applied within and beyond the NGFS membership and conducts analytical research on green finance.

⁹ Guide for Supervisors: Integrating climate-related and environmental risks into prudential supervision, May 2020.

a member of the NGFS, while in September 2023, the Council of the National Bank adopted the **Medium-Term Plan of the National Bank activities in the area of climate risk management for the period 2023 – 2025**, which aims to provide a comprehensive, systematic and consistent framework for managing climate-related risks across the prism of the central bank.

In this context, the Climate Change Survey¹⁰ should be highlighted, which the National Bank conducted at the end of 2021 with a participation from all banks and savings houses in the country as the most significant segment of the financial sector in the Republic of North Macedonia. The purpose of the Survey was to assess the knowledge of banks and savings houses of climate-related risks and to identify the current practices and policies of banks and savings houses for the management of these risks. The answers indicate the high awareness among banks and savings houses of the importance of climate-related risks as a source of risk for the financial stability, but with limited activities in terms of managing these risks and introducing new products and services in response to climate change. As **the main obstacles** for better management of this type of risks, banks and savings houses indicate the lack of standards and tools, the absence of regulatory guidelines, the lack of adequate data and limited internal resources and policies.

In addition to these activities, at the beginning of 2023 the National Bank introduced certain regulatory requirements relating to climate-related risks. Thus, with the Decision on the methodology for credit risk management¹¹, an obligation was introduced for banks to adequately incorporate climate-related risks into credit risk management. Due to the seriousness of the novelties introduced by this Decision, these requirements will be applied from 1 January 2025. Also, the new requirements which are introduced with the Decision on reports and data disclosure by banks¹² which refer to the publication of data and information about climate-related risks and ESG risks, should be emphasized¹³. In this way, they accept the trends present at the international level, and especially in the European Union where serious changes are made in the volume of reporting by banks for this type of risks, both to the supervisory authorities and to the public.

The results of the Climate Change Survey, new regulatory requirements and the international practice in this domain, confirmed the need for the development of these Guidelines, which presents the expectations and recommendations of the National Bank that banks¹⁴ should take into account when managing climate-related risks, and especially when determining their impact on the other categories of risks to which banks are exposed in their operations. In order to achieve this goal, the Guidelines consist of two parts. The first part provides a detailed overview of climate-related risks and their transmission channels, by defining physical and transition risks, their drivers and basic characteristics, as well as defining the transmission channels of climate-related risks and their impact on the traditional risks to which banks are exposed (credit risk, liquidity risk, market risk, operational risk). The second part contains guidelines for managing climate-related risks, taking into account the international standards and best practices, as well as the requirements of the existing banking regulation arising from the Banking Law, and especially the requirements of the Decision on the methodology for risk

¹⁰ [Climate related risks – results from the survey between banks and savings houses of the Republic of North Macedonia](#), National Bank of the Republic of North Macedonia, February 2022.

¹¹ Decision on the methodology for credit risk management (Official Gazette of the Republic of North Macedonia No. 57/23).

¹² Decision on reports and data disclosure by banks (Official Gazette of the Republic of North Macedonia No. 36/23).

¹³ This obligation of the banks will start on 1 January 2026.

¹⁴ Wherever the term bank/banks is used in these Guidelines, it also refers to the savings house/s, which are expected to take due account of the expectations set forth in these Guidelines. Also, the expectations presented in these Guidelines can serve as a good basis for the rest of the financial institutions in the country in improving their risk management systems.

management and the Decision on good corporate governance rules for banks. From that aspect, the Guidelines refer to the inclusion of climate-related risks in:

- the adjustments of the banks' business strategy necessary for adequate incorporation of the impact of climate-related risks on the operations and the long-term strategic goals of the banks;
- the risk management process, that is, when determining the risk appetite, the impact on the management of other risks to which the banks are exposed, the stress testing rules and the information system;
- the organizational setting of risk management, especially in terms of determining the competences and responsibilities related to the management of these risks and the banks' capacity building to understand the impact of climate-related risks on the business models and manner of working of their clients;
- the process for determining the internal capital (ICAAP) and the process for determining the internal liquidity (ILAAP).

These Guidelines do not have a mandatory character for banks, but should rather serve as guidelines for the improvement of the banks' systems and their greater readiness to deal with the challenges that appear or may appear as a result of climate change. Taking into account the fact that there is a lack of adequate knowledge and experience of these risks at the international level, the Guidelines also aim to ensure the building and/or improvement of the banks' existing knowledge of the features and possible impacts of climate-related risks and the manner in which these risks can be managed. Despite the expectations and recommendations presented in these Guidelines, banks can take into account the analyses and recommendations published by the relevant international institutions and organizations, such as the Basel Committee on Banking Supervision, the Financial Stability Board, the European Central Bank, the European Banking Authority, the Network for Greening the Financial System etc.

The Guidelines could serve as a good basis for building the supervisory dialogue between banks and the National Bank regarding possible practices for identifying, measuring, monitoring and controlling or mitigating the effects of climate-related risks. At the same time, taking into account the fact that both supervisory authorities and banks are still at an early stage of development and establishment of appropriate systems for managing climate-related risks, further revision and improvement of these Guidelines should be expected, in accordance with the acquired knowledge and experiences, but also with the corresponding changes in the regulatory treatment of these risks. Also, in accordance with international standards and practices, the National Bank will assess the need for further improvement of the existing banking regulation, especially the risk management regulation.

I. CLIMATE-RELATED RISKS AND THEIR TRANSMISSION CHANNELS

The climate-related risks are usually divided into:

- *Physical risks* arising from weather and climate changes that affect the economy and everyday life.
- *Transitional risks* arising from the transition to a green economy.

The two groups of climate-related risks differ according to their characteristics, frequency, speed of occurrence and intensity of impact. Both groups of risks are characterized by the following:

- there are still no historical data and experience in sufficient volume on the basis of which the intensity of their impact can be reliably determined, which creates a high level of uncertainty. These risks are unavoidable, but are conditioned by decisions to mitigate or adapt to climate change, on a global and national level;
- they affect every consumer and every legal entity in all sectors and across all geographic areas, but with unequal intensity, which makes the management of these risks more complex, compared to other risks that are usually analyzed and managed by banks;
- timely action can help mitigate the magnitude of future risks.

In addition to the specific impacts of the physical and transition risks, their mutual influence should also be taken into account during their analysis. The longer the period of transition to a green economy lasts due to long-term or untimely policies (transition risks), the greater will be the physical impacts on the climate change (real or expected). Physical and transition risks can also lead to systemic risks, given that their impact can be negative on multiple segments of the financial system and/or if the financial problems of one or more companies or financial institutions caused by climate-related risks spill over into the entire system.

It should be taken into account that climate-related risks are part of the wider group of the so-called environmental, social and management risks (ESG risks) which become increasingly important at the international level. Considering the focus of these Guidelines (the management of climate-related risks), Annex 1 provides for a more detailed overview of the essential characteristics of ESG risks.

I.1 Physical risks

Physical risks refer to the effects of global warming and the effects of extreme weather events, the frequency of which has especially increased in recent years (endangering the environment, pollution of air, water and land, loss of biodiversity, deforestation, etc.). These risks may occur with a significant time lag, and the frequency and severity of each type of risk may also vary significantly and be difficult to predict. Physical risks can be divided into **acute risks**, which are associated with sudden, short and extreme weather events with a significant negative impact, and **chronic risks**, associated with gradual changes in climate.

Acute risks, also known as a physical hazard, are associated with sudden, short and extreme events with a significant negative impact, such as heat waves, floods, forest fires, storms, hurricanes, cyclones, typhoons, as well as extreme rainfall. Rising temperatures around the world have the potential to create acute climate change through heat waves¹⁵ associated with wildfires. A warmer atmosphere gathering more moisture leads to an increase in heavy and concentrated precipitation. An increase in the severity of rainfall and its concentration is

¹⁵ According to the World Weather Organization, heat waves are periods of 5 or more consecutive days in which the temperature exceeds 35°C. Such periods, accompanied by high humidity of over 95%, can have serious consequences on human health.

expected to cause acute climate events in the future, such as destructive flash floods that cause physical damage to property, infrastructure and agriculture.

Chronic risks are associated with the constant deterioration of environmental conditions. Chronic physical risks include: the rise of the sea level, the increase of the average temperatures (global warming) and the acidification of the oceans. In addition, long periods of rising temperatures can cause desertification, as well as adversely affect ecosystems and agriculture. These types of climate change have the potential to generate significant financial losses for financial institutions.

The manner in which physical risks affect economies varies by geographic location, as different regions have different climates and different levels of development. Thus, in the event of extreme flooding in a particular region, there may be immediate or gradual destruction of assets/property, causing their rate of depreciation to accelerate through decay or corrosion. Assets that are used as collateral for credit exposures and are exposed to destruction due to the effects of physical risks increase the credit risk for the banks that have approved those credit exposures.

I.2 Transition risks

Transitional risks arise from the efforts to reduce the effects of climate change during the transition from existing, traditional ways of production to a green economy. According to publicly available data, 84% of global energy production in 2019 came from fossil fuels¹⁶. Achieving the goals of the Paris Agreement means that this share should be reduced below 50% by 2050, that is, at least 30% of energy from fossil fuels should be replaced by renewable energy sources. Meeting these goals requires serious changes in public sector policies, but also changes in technologies (innovations) and the availability of those technologies (for example technologies that make renewable energy sources cheaper or enable the removal of greenhouse gas emissions), as well as changes in investor and consumer behavior.

I.2.1 Changes in regulation

The reduction of carbon dioxide emissions in accordance with the objectives of the Paris Agreement, imposes the need for targeted climate policies and corresponding changes in the laws and by-laws. Such policies include mechanisms to "penalize" emissions of carbon and other harmful gases (for example through introduction of a tax for the emission of greenhouse gases) or to "encourage" reduced use of fossil fuels and their replacement with renewable energy sources (by introducing subsidies for the use of electric vehicles or solar panels). The "punishment" measures could negatively affect the income from the basic economic activity of the entity that is the target of the measure, thereby reducing its capacity to settle its debts¹⁷. Such a measure could also have a negative impact on the value of the shares and bonds of entities whose activity or way of working are related to the emission of greenhouse gases.

The transition process cannot be implemented all at once, but needs to be implemented gradually according to a predefined framework and dynamics. Namely, if climate policies are introduced too late or actions are taken in an uncoordinated way (within the country and/or

¹⁶ Source of data: Our World in Data (www.ourworldindata.org) joint project of experts from the Oxford University and Global Change Data Lab.

¹⁷ On international level, there are also examples of restrictions, such as the example of the United Kingdom, where in 2020 a ban was imposed on the sale of vehicles that use diesel after 2030, as well as the intention of the European Commission to introduce such a ban in the European Union after 2035.

with other countries), investors could not fully predict their impact, which could lead to new sources of risks (the risks of litigation due to the losses suffered from the inappropriate transition are such an example).

I.2.2 Technological changes

Technology and technological changes related to energy conservation, increased use of non-fossil fuels are important drivers of the transition to green economy. Technological innovations can reduce the costs of renewable energy sources and make them more competitive with fossil fuels, which are the main source of greenhouse gas emissions¹⁸. On the other hand, the increasing application of climate-neutral technologies can lead to market disruption and "depreciation" of once valuable investments in equipment and fixed assets. Subjects, that produce or use coal or oil and that expect future income on their balance sheets as a result of still unused reserves of oil and coal could face increased risks in relation to the future prices of these resources, in the event that due to technological innovation there was a devaluation of their reserves.

Such changes impose a need for changes in the business model of companies that use outdated technologies, which requires time and adequate financial resources.

I.2.3 Changes in investor and consumer behaviour

In addition to changes in regulation and technological changes, increased awareness of the effects of global warming and growth in demand for so-called "green" financial products and investments can also cause changes in legal entities, including banks, to adapt their business strategies. Thus, increased awareness and expectations of global warming may change consumer preferences and reduce demand for goods whose production is based on high carbon emissions, turning such goods from high-return assets into "depreciated" assets. The significant reduction in the value of these goods and consequently the lower incomes of their producers who are also borrowers, can negatively affect their ability to repay debts, which would lead to an increase in non-performing loans at banks. At the same time, the rapid growth of demand for renewable energy sources can cause a serious increase in their prices and form the so-called price bubbles. The effect is similar from the changes in the behavior of investors who start taking climate changes into account when making investment decisions.

In addition, changes in consumer and public behavior can also cause an increase in reputational and litigation risk. Banks can be subject to litigation because of the negative effects of financing carbon-intensive projects or sectors, or because of the lack of "pressure" on clients from these sectors to reduce their carbon footprint. Such activities represent additional pressure on governments, legal entities and financial institutions to reduce greenhouse gas emissions.

Box 1 Litigation risks

Litigation risks may arise from initiatives by individuals or legal entities to encourage activities to support the transition to a green economy or to compensate for losses caused by physical or transition risks. In relation to physical risks, litigations are usually initiated against persons who are considered to be directly or indirectly responsible for the occurrence of a particular physical hazard. Much more often, litigations related to climate

¹⁸ Many technologies that support the transition are still at an early stage of development or are not sufficiently available, which may disrupt the planned dynamics for the transition to the green economy. Such is the example of hydrogen as an energy source that can replace kerosene used in the aviation industry, but for which full and proper utilization it takes time.

change relate to transition risks and refer to the failure to take appropriate actions and measures to reduce the emission of greenhouse gases and achieve the goals of national and international obligations and agreements, such as the Paris Agreement. In addition, changes in consumer behaviour and expectations and growth in investor awareness are contributing to an increasing number of litigations filed against companies that have failed to adequately manage or disclose climate-related risks.

On the international level, the growth of litigations related to climate change is evident. Thus, in the period from 1986 to 2014, 800 litigations were initiated, while in the period of only eight years (2015 to 2022), the number of litigations increased to 1,200, of which almost 25% were initiated in the period from 2020 to 2022¹⁹. In addition to the growth of awareness and expectations of the general public, the growing number of scientific researches on anthropogenic impacts on climate change are additionally used and can be used in the future as proof of the merits of litigations. The largest number of litigations initiated are against the central and local authorities, where most of the time such court proceedings are initiated by non-governmental organizations that use these litigations not only for the purpose of obtaining certain financial damages, but also as an instrument for raising awareness and pressure for an increase of activities to achieve the goals of climate policies.

Banks' exposure to litigation risks can be double, direct, through litigation against banks, but also indirect through the impact of litigation against bank clients. Thus, litigations can be brought against banks for incomplete or inadequate disclosure of data on exposure to climate-related risks or continued financing of carbon-intensive projects or sectors. With the publication of the so-called green taxonomies (for more details see Box 3 EU Green Taxonomy) and the strengthening of requirements regarding the public publication of data on climate-related risks, in the future an increase in this type of litigation is expected. The financing of carbon-intensive projects or sectors can be considered as a direct influence of the banks on the drivers of climate change, which can arise as a basis for initiating litigations²⁰.

Even in conditions where no litigations are brought against the banks for the financing of such projects or sectors, the banks may be exposed to credit risk due to the litigations brought against the customers of those sectors or against the customers involved in such projects financed by the banks. If the legal dispute initiated against the client of the bank is successful, the client will have to pay certain financial damages or take appropriate actions that may limit his ability to repay the obligations to the bank. Even if the litigation is not successful, there is a risk of reputational damage for that client, but also for other entities from the same sector, which can again have negative impacts on the bank, especially in the case of significant concentrations in the bank's portfolio towards those sectors.

I.3 Transmission channels of climate-related risks

Despite the fact that climate-related risks have specific characteristics different from the characteristics of traditional risks to which banks are exposed in their operations, practice shows that the exposure of banks to climate-related risks can be measured through their impact on other risks, such as credit, market, liquidity, operational and reputational risk. This

¹⁹ Source: Global trends in climate change litigation: 2022 snapshot, Policy report 2022, The Centre for Climate Change Economics and Policy, The Grantham Research Institute on Climate Change and the Environment.

²⁰ In addition to the impact that the environment and climate changes can have on the operations of banks and the risks they are exposed to, it is necessary to take into account the impact that banks, with their activities to support unsustainable projects and investments, can have on people and environment.

impact can occur directly, for example through lower revenues or profitability of the bank's customers or a decrease in the value of its assets, or indirectly, through movements in macroeconomic indicators. Hence, it is of particular importance to know and understand these risks drivers and the existing and potential channels for transmitting their impact on other risks to which banks are exposed. Usually, the transmission channels of climate-related risks are divided into microeconomic and macroeconomic transmission channels (Annex 2 of these Guidelines).

Microeconomic transmission channels can be divided into two groups of influences on banks' exposure:

- 1) the influence of the drivers of climate-related risks on the customers of the banks, through:
 - reduction of their profitability and liquidity, i.e. the possibility of repaying debts to the bank,
 - damage to real estate or other property placed as security for credit exposures approved by banks, or
 - reduction in the value of the financial instruments issued by those clients, in which the bank has invested;
- 2) the influence of the drivers of climate-related risks on the bank's assets and limiting its ability to operate smoothly.

The first group of microeconomic channels of transmission usually has an impact on the credit, market, liquidity and reputational risk of the bank, while the second group is mostly related to the materialization of operational and reputational risk. Table 1 provides a summary overview of the most significant microeconomic channels of transmission of climate-related risks on credit, market, liquidity, operational and reputational risk.

Table 1 Microeconomic channels of transmission of climate-related risks

Risk	Channel of transmission of climate-related risks (physical and transition risk) on traditional risks
Credit risk	Negative impact on the income and/or wealth of households, enterprises or countries. The drivers of physical and transition risks can have a significant impact on banks' customers and their creditworthiness. Banks with a significant share of mortgage loans in their portfolios are exposed to the risk of non-payment in the event of a decrease in the value of the collateral, regardless of whether it is a residential or commercial building. In addition to the destruction of the security itself as a result of the physical danger (for example, a flood), real estate prices are reduced throughout the region ²¹ , which reduction can last for a long period of time or even become permanent in regions that are prone to frequent floods. Physical hazards can disrupt the supply chain, especially if the suppliers of the banks' legal entities are located in climate-vulnerable countries or regions. Changes in temperatures or precipitation can have a serious impact on agriculture, which makes the creditworthiness of banks' customers from this business more sensitive to climate change. The effect on the creditworthiness of bank customers is similar from the activities for the transition to a green economy (the drivers of transition risks). It should be expected that customers

²¹ As a result of the flooding caused by Hurricane Sandy in 2012, real estate prices in New York were reduced by almost 20%.

	who are affected by the measures taken within the framework of climate policies or customers who will not be able to adapt in time to new technologies or to the new demands of consumers and the public, will generate lower revenues, which will reduce their ability to settle their obligations to the banks.
Market risk	A decline in the value of the bank's financial assets, including the potential to cause large, sudden and adverse price corrections. Climate-related risks may lead to a reduction in the effectiveness of the instruments that the bank uses to protect or reduce exposure to market risk. Extreme climate events or weather disasters (physical risks) can cause greater sensitivity in financial markets. Transition risks can cause a rise in the prices of financial products or an increase in funding costs. On the other hand, incorporating the risks associated with climate change into the price of financial instruments can reduce the risk of unexpected market price movements.
Liquidity risk	The liquidity of the banks can be reduced directly, by limiting the banks' access to stable sources of financing, or indirectly, through the growth of the liquidity needs of the banks' customers (for example, in the case of withdrawal of funds from the banks to cover damages caused by weather disasters).
Operational risk	The physical risks associated with climate change can have a direct impact on the bank's property and the possibility of smooth operation, but also on the infrastructure used by the bank to perform financial activities. There is also the risk of non-compliance with the legal framework, as well as the risk of litigation related to climate-sensitive investments.
Reputational risk	Increase in the negative perception of the public or deterioration of its reputation among its clients, shareholders, regulators, employees or the public, due to non-compliance with the legal framework, new technologies, changes in behavior and expectations of consumers and investors.

Macroeconomic transmission channels refer to the mechanisms through which drivers of climate-related risks affect macroeconomic indicators and how those indicators affect the operations of banks and their clients. Macroeconomic transmission channels include macroeconomic market variables such as interest rates, inflation, exchange rates, etc. The influence of these channels is different on the individual traditional risks, while the previous practice shows that their influence is the greatest on the credit and market risk.

Extreme climate change can limit resources or cause damage that can lead to mass migrations, relocation of population out of affected areas and reduction of available human capital. The introduction or growth of the greenhouse gas emission tax, the increase in prices of carbon-intensive sectors or changes in consumer behavior can cause a decrease in the income of the bank's corporate clients. Enterprises can respond to a decrease in income by raising prices or reducing other production costs, for example by reducing the number of employees. The final effect in both cases is a decrease in the disposable income of the population, that is, a decrease in consumption, which ultimately again affects the slowdown in the growth of the gross domestic product. Such socio-economic changes can indirectly affect the banks by reducing economic growth, worsening the macroeconomic environment and reducing the

creditworthiness of the banks' debtors, i.e. growth of the credit and market risk to which they are exposed in their operations.

The transmission of the impact of individual drivers of climate-related risks can occur through both transmission channels, which further increases the effect of these risks. Thus, the physical risks drivers can cause damage to real estate, which has a negative impact on the wealth of the population, and thus on the bank's exposure to credit risk. At the same time, those drivers also increase macro risks, that is, they have a negative impact on the overall macroeconomic environment. Such impacts can limit the bank's ability to identify the true level of exposure to climate-related risks, but also limit the country's ability to effectively establish and implement policies for the transition to a green economy.

II. MANAGEMENT OF CLIMATE-RELATED RISKS

In accordance with the Banking Law and the by-laws on risk management²², banks are required to establish a risk management system that will include all material risks they are exposed to while performing financial activities. At the same time, the risk management system and its scope shall be aligned with the bank's development plan and business policy and be subject to regular improvement, taking into account changes in the external environment, the bank's risk profile, the introduction of new or changing the existing products and services, the expansion of the markets in which the bank is present, etc.

Taking into account such regulatory requirement, banks are expected to assess the materiality of the impact of climate-related risks, in accordance with the business model²³ and risk profile, as well as the external environment. The assessment of the materiality of the impact of climate-related risks takes into account the transmission channels and drivers of physical and transition risks covered in the previous chapter of these Guidelines, including the intensity and uncertainty regarding their impact. At the same time, banks are expected to determine the impact of climate-related risks in the short, medium and long term.

Depending on the determined level of materiality of the impact of climate-related risks, banks are expected to determine the scope and manner of their inclusion in the development plan (business strategy) and in the overall risk management system²⁴. In addition, in order to achieve a higher degree of transparency in the bank's operations, international standards and experiences indicate the need for publishing appropriate data and information related to banks' exposure to climate-related risks and the manner in which they are managed. With the adoption of the Decision on reports and data disclosure by banks (Official Gazette of the Republic of North Macedonia No. 36/23), from 1 January 2026, banks will be required to publish data and information on climate-related risks and ESG risks.

II.1 Business strategy

The development plan (business strategy) is the basic tool through which banks determine their business model and position themselves in the business environment²⁵. When preparing and revising the development plan and business policy, banks take into account the analyses of the current and assumptions about the future macroeconomic environment, market movements, competition, the regulatory environment, the financial plan and the projections of the financial statements, the new products and services they will offer, human and technical resources and so on. Climate-related risks can affect all these areas that influence the development and revision of the banks' business strategy, which is why it is essential to understand and assess how these risks affect the business environment and the resilience and sustainability of the bank's business model in the short, medium and long term. Scenario analyses can be a useful tool for modeling the potential business environment in which a bank could operate in the future, and it is recommended to apply a range of different likely

²² Decision on the methodology for risk management (Official Gazette of the Republic of North Macedonia No. 113/19, 69/20 and 314/20).

²³ In accordance with the Decision on good corporate governance rules for banks (Official Gazette of the Republic of Macedonia No. 24/18 and Official Gazette of the Republic of North Macedonia No. 113/19), "business model" shall denote the most important products and services offered by the bank that enable generation of the planned income and the planned growth, in accordance with its business policy.

²⁴ In accordance with the Decision on the methodology for risk management, the risk management system includes: 1) an efficient risk management process based on risk appetite statement and the established risk culture, 2) the adequate organizational layout of the risk management and 3) internal capital adequacy and assessment process (ICAAP) and internal liquidity adequacy and assessment process (ILAAP).

²⁵ The term business environment usually covers a wide range of external factors and trends that shape the conditions in which the bank operates or will operate. It also includes the macroeconomic variables, competition, policies and legislation, technologies, social and demographic trends, and geopolitical trends.

scenarios, such as the scenarios developed by the Network for Greening the Financial System (for more details see Annex 5 Scenarios defined by the NGFS).

It should be taken into account that the time horizon of the impact of climate-related risks may be different. Thus, certain weather events, such as floods, can have a short to medium-term effect, while chronic physical risks or changes in consumer behavior can have long-term effects that should be properly taken into account when determining the bank's business strategy. This would also cause an extension of the time period to which it refers. Usually, the business strategy refers to a period of three to five years²⁶, which may not be enough to cover all the climate-related risks. Therefore, the recommendations for extending the time period to which the business strategies of the banks refer to at least ten years are increasingly present.

Taking into account the importance that climate-related risks can have on the long-term bank's operations, banks are encouraged to determine strategic goals related to climate change (climate strategic goals). They shall follow these goals, that is, ensure the implementation of global efforts for adaption and mitigation of climate change established in the Paris Agreement. In this context, the Nationally determined contribution (NDCs) to the Paris Agreement of the Republic of North Macedonia should be taken into account as a contribution to the efforts for achieving the goals of the Paris Agreement²⁷, but also the indications, analyses and recommendations of a large number of international institutions and authorities²⁸.

Climate strategic goals can refer to a certain quantitative or qualitative goal that the bank plans to achieve in a certain period of time in response to climate-related risks. In most cases, climate strategic goals refer to the reduction of greenhouse gas emissions²⁹, but they can also include goals aimed at the appropriate management of climate-related risks, such as reducing exposure to certain types of transition risks, increasing investments in sustainable investments or sustainable finance growth. Climate strategic goals are considered to be properly set and determined if:

- Aligned with the other long-term goals of the bank;
- To be set at the level of the entire portfolio, at the level of an individual activity or at the individual customer level;
- Adequate indicators have been determined for their measurement and monitoring of their implementation in accordance with the established limits (as part of the risk appetite)³⁰, for which ensuring accurate and relevant data is of particular importance;
- To be revised and updated on a regular basis (preferably on an annual basis).

The establishment of climate strategic goals assumes adequate monitoring of their achievement. For these goals, at the international level, the so-called transition plans that define the activities for achieving the set climate strategic goals and the dynamics for their

²⁶ According to the Annex 4 of the Decision on the methodology for risk management, the banks' development plan should refer to a period of at least three years and should be in line with their long-term goals.

²⁷ [The revised national determined contribution to the Paris Agreement of 2021](#), with the Roadmap for its implementation can be found on the website of the Ministry of Environment and Physical Planning (a special section dedicated to climate change).

²⁸ The reports of the Intergovernmental Panel on Climate Change (IPCC), the Network for the Green Financial System (NGFS), the Protocol on Greenhouse Gas Emissions (GHG Protocol), as well as the documents, regulations and recommendations of the European Commission for Sustainable Finance.

²⁹ For example, by determining greenhouse gas emissions from levels 1, 2 or 3, if applicable, in accordance with the Greenhouse Gas Protocol of the World Resources Institute and World Business Council for Sustainable Development (for more details see footnote 40).

³⁰ The indicators from Table 2 List of factors and indicators for assessing client/project exposure to climate-related risks can also be used.

achievement become increasingly important. For the banks, the transition plans³¹ are an important part of the activities of the financial sector for supporting the efficient distribution of the capital to activities with low greenhouse gas emissions, as well as an important tool in the appropriate management of climate-related risks. The transition plans shall be aligned with the bank's business strategy, contain precisely defined activities that should be undertaken by the bank in order to achieve the climate strategic goals, be reliable and be revised and updated on a regular basis. Also, in order to properly implement the transition plans, the bank is expected to determine the responsibilities within its organizational structure, i.e. to determine clear responsibilities for the bank's bodies and the persons/boards involved in the management of climate-related risks.

Box 1 Transition plans

Transition plans have the potential to become an extremely important tool in achieving the ultimate goal of net zero greenhouse gas emissions. Transition plans can be **aimed at the strategy**, that is, at ensuring transparency for the public in relation to the climate strategic goals of the entity and the way in which the achievement of those goals is planned, and they can also be **aimed at the risk**, that is, at the management of climate-related risks, and above all to transition risks. The second type of plans have a smaller scope both in terms of content and in terms of the way of their implementation.

The importance of transition plans for banks is twofold, both as preparers of their own transition plans and as users of transition plans made by their clients. The information from the transition plans developed by the bank's clients can be crucial for the banks when deciding on the approval of financial means for supporting the transition. The success of banks in accepting and dealing with climate-related risks largely depends on how well their clients manage and mitigate their exposure to these risks. This also means that the extent to which a bank can credibly develop and implement its climate change strategy depends largely on the extent to which its clients can credibly develop and implement their strategy. In this domain, banks can play a proactive role in encouraging and supporting their clients to develop and implement transition plans, which would certainly be of great importance for the country's overall efforts to achieve NDCs to the Paris Agreement.

Another tool for monitoring the resilience of banks' business models and for monitoring the achievement of strategic goals is the establishment of long-term Key Performance Indicators (KPIs) for banks' exposure to climate-related risks (for example: indicators for the emission of carbon dioxide or for the energy efficiency of the bank's clients or the projects it finances)³². These indicators can refer to the overall operations of the bank or to certain business lines or portfolios.

In this context, the capacities of the banks to understand the impact that climate-related risks have on the business models and the manner of working of their clients are of particular importance. The greater the capacity of banks in this domain, the greater the success in finding sustainable products and services (so-called "green" credits or "green finance") that would on the one hand respond to the needs of clients, but on the other, would enable timely adjustment of the banks' portfolio in order to reduce or mitigate the negative effects of

³¹ For more details on the meaning and content of the transition plans see the NGFS's Report published in May 2023 (Stocktake on Financial Institutions' Transition Plans and their relevance to Micro-prudential authorities)

³² A more extensive list of possible KPIs can be found in [the EBA's report on the management and supervision of ESG risks by credit institutions and investment firms from 2021 \(EBA/REP/2021/18\)](#).

climate-related risks³³. The offer of such products should be supported by appropriate changes in the banks' policies for approving credit exposures. In this way, the bank's strategy can effectively enable the achievement of the bank's long-term goals and ensure its sustainable development.

II.2 Risk management process

The previous chapter of these Guidelines showed the different types of impacts of climate-related risks on the operations of banks. Active management of these risks is crucial for their timely identification and taking appropriate actions for reducing or mitigating the negative impacts. It implies appropriate incorporation of these risks into the bank's risk appetite, providing appropriate procedures and rules for management of climate-related risks, especially in terms of their identification and measurement, as well as incorporation of these risks into the management of other risks which are assessed to be or may be influenced by the drivers of climate-related risks, appropriate inclusion of these risks in the stress testing performed by the bank, as well as improvement of the bank's information system in order to provide information and data that are needed for timely notification of the bank's employees and bodies involved in risk management.

II.2.1 Risk appetite

According to the Decision on the methodology for risk management, banks shall establish a risk appetite statement, which takes into account all the material risks to which the bank is or can potentially be exposed and determines the aggregate level of risk that the bank is willing to take to achieve its long-term goals, as well as determines the types of risks it is willing to take within its risk capacity. The inclusion of climate-related risks in the risk appetite statement implies their adequate identification, measurement and monitoring (more details are provided in the next two parts of this chapter), as well as reduction or limitation by determining quantitative or qualitative indicators of exposure to these risks and their thresholds, as well as internal limits to limit that exposure.

Quantitative and qualitative indicators should serve as an appropriate tool in reducing or limiting climate-related risks depending on the risk appetite determined by the bank. At the same time, quantitative indicators should cover the long-term nature of climate changes, for example by including the impact of global warming or the emission of greenhouse gases. These quantitative indicators should take precedence, although, taking into account the lack of widely accepted definitions and a unique understanding of climate-related risks, banks can initially use qualitative indicators for measurement and monitoring of these risks. The banks will have to determine the procedure in case of exceeding the thresholds of the prescribed indicators or the internal limits.

The established internal limits for the exposure to climate-related risks can also refer to the financing of certain projects or clients that have been determined to have a negative impact on environment or the climate, that is, do not meet the requirements for sustainable or green finance. It is recommended that the banks' efforts be aimed at identifying the business lines that are exposed to physical and transition risks and at determining whether these business lines should continue to be carried out to the same extent or whether they need to be reduced, adjusted or completely abandoned.

³³ In January 2020, the EBA published a report on Sustainable Finance – Market Experiences. According to the results of the survey conducted by the EBA for the purposes of the report, 83% of the banks that participated in the survey answered that they already have or plan to offer green products. At the same time, 29% of the banks answered that they approve or develop green or energy efficient mortgage loans, while 23% approve or develop green loans for business facilities.

Defined limits can refer to individual projects or clients, but they can also refer to certain sectors, geographical areas, etc., thus influencing the reduction of concentration risk. For these purposes, banks can use the methods for measuring and monitoring the exposure to climate-related risks (for example using internal evaluations or ratings), based on which the banks will make approval decisions (the so-called positive lists or identifying clients who, within the activity to which they belong, have the best results in terms of meeting the criteria for sustainable development) or excluding certain activities or clients from their credit or investment policy. Such limits can encourage a constructive dialogue between the bank and the clients in order to reduce or mitigate the exposure of those clients to climate-related risks.

II.2.2 Identifying, measuring and monitoring climate-related risks

The identification of climate-related risks is mostly related to the establishment of criteria based on which banks will be able to determine whether a certain asset can be considered as a "green asset". In the absence of an internationally accepted definition of green assets, banks have at their disposal several approaches that they can use to classify the assets, i.e. the exposures in their portfolios, as follows:

- using the so-called green taxonomies that contain clear criteria based on which banks and all other economic entities in the country will be able to determine whether a certain economic activity can be defined as "sustainable". Taxonomies usually have a mandatory character, that is, they are part of the legislation of a certain country. An example of such a taxonomy is the taxonomy published in the EU by Regulation 2020/852³⁴. Considering the efforts of the Republic of North Macedonia for compliance with the relevant EU regulation, banks are recommended to take into account the EU Green Taxonomy in the classification of assets, i.e. credit exposures;
- international classifications and classification principles that have a voluntary character and are adopted by international organizations such as the Intergovernmental Panel on Climate Change (IPCC);
- internal classifications, developed by the bank itself, which usually take into account the risk profile and the geographical structure of the bank's portfolio and its business environment. When developing internal classifications, banks can use ratings from third parties, publicly available information and data on the carbon footprint of individual activities, projects or clients, incorporate an assessment of clients' transition plans, etc.

Box 2 EU Green Taxonomy

The EU Green Taxonomy³⁵ is part of the EU Action Plan for ensuring sustainable development and achieving the climate and energy goals of the EU for reducing greenhouse gas emissions to net zero carbon emissions by 2050 and halving emissions by 2030. It defines six environmental objectives and four principles for sustainable economic activity.

EU environmental objectives:

- 1) Climate change mitigation
- 2) Climate change adaption
- 3) Sustainable use and protection of water and marine resources

³⁴ Regulation 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088.

³⁵ Regulation 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088.

- 4) Transition to a circular economy
- 5) Pollution prevention and control
- 6) Protection and restoration of biodiversity and ecosystems

EU principles for a certain economic activity to be considered as a sustainable economic activity:

1. To significantly contribute to the achievement of one or more environmental objectives;
2. Not causing significant harm to the other environmental objectives (DNSH), which means that the significant contribution to the achievement of one of the environmental objectives is not achieved by causing significant harm to another environmental objective;
3. Follow minimum social and governance safeguards, defined by the EU taxonomy;
4. Comply with the technical screening criteria defined in advance for each of the environmental objectives.

This arrangement of the EU Taxonomy implies a further more detailed definition of each of the six objectives and their connection with the four principles for identifying sustainable economic activities. This implies the adoption of an additional set of by-laws by the European Commission which should enable the appropriate and unique application of the EU Taxonomy by the Member States. On 9 December 2021, the European Commission adopted the first bylaw defining the technical criteria for assessing the fulfillment of the first two environmental objectives: climate change mitigation and adaptation³⁶. This by-law is in force from January 2022. The technical criteria for the other four environmental objectives are also expected to be published³⁷.

The EU Taxonomy, in addition to climate change, also covers environmental objectives, and also enables, albeit to a limited extent, the identification of activities that cannot be considered as entirely sustainable, due to the lack of appropriate technology and alternatives. The main purpose of this taxonomy is to help economic agents (investors, issuers of securities, persons/entities involved in project financing, etc.) to move towards an efficient and resilient low-carbon economy, as well as to serve as a starting point for the new EU regulation on the publication of data and information on climate change by financial and non-financial entities, including banks.

Considering the absence of a national green taxonomy in the Republic of North Macedonia, the establishment of internal classifications seems to be the most appropriate step in identifying climate-related risks. In their development, banks can take into account international classifications and classification principles, including the EU Green Taxonomy. At the same time, the basic challenge in the development and establishment of internal classifications refers to the determination at which level the classification will be applied, i.e. whether it will be based on the activity to which the client belongs, or on the client himself/herself and their characteristics, or it will be taken into account the specific asset, i.e. the exposure of the bank. The activity-based approach is the easiest to apply given the relatively larger volume of publicly available data on the basis of which it is possible to evaluate whether it is a sustainable or green economic activity. Existing international or national taxonomies and standards can be a useful tool in establishing this approach. The disadvantage of this approach is the fact that the efforts and activities undertaken by individual entities to reduce their carbon footprint are often not taken into account. The client-based approach has that advantage and enables the identification of clients who, within a separate activity, have appropriate transition plans.

³⁶ [EU Regulation No. 2021/2139](#)

³⁷ In April 2023, a draft text of the technical criteria for the remaining environmental objectives was published.

The latter approach is based on the asset itself and allows distinguishing green from non-green assets based on the characteristics of the that asset. For example, the classification of mortgage loans as green will depend on their energy efficiency. This classification is the most appropriate from the point of view of identifying the bank's exposure level to climate-related risks, but it requires a detailed database, as well as a detailed understanding of the production process of the asset. Namely, when classifying assets on an individual basis, it should be taken into account how that asset was produced (what was the emission of greenhouse gases during its production) and how that asset will be used. Also, banks should take into account the so-called transition component, that is, the possibility of a certain non-green asset/activity to become green³⁸ over time.

Experience and practice so far shows that the existing methods and approaches that banks use when measuring other risks to which they are exposed, cannot be used without limitation when measuring climate-related risks. This is due to the specific characteristics of climate-related risks, the uncertainty regarding the necessary time period to measure their impact, as well as the (in)availability of adequate historical data on the basis of which the future could be predicted. Hence, appropriate adjustments or the development of completely new methods for measuring climate-related risks are needed.

At the international level, banks and other financial institutions often use the following approaches and methods for measuring and monitoring climate-related risks. Considering the early stages of their development, but also the limited experience of their use, each of these methods has its own advantages and disadvantages, which relate to the complexity, reliability of the assumptions, appropriateness of the data, etc.:

1) **Climate-related risk scores or ratings**, based on which the level of exposure of the bank to a specific asset, client/project or the entire portfolio to climate-related risks is determined. It is a matter of a combination of the classification carried out in the previous phase and precisely determined factors and indicators on the basis of which each asset, client/project or portfolio is assigned with an appropriate rating for the exposure to climate-related risks. Thus, if the classification established within the framework of identifying climate-related risks starts from the activity to which the client belongs, then the established evaluation indicators will apply to each activity. Indicators for each rating can be based on quantitative or qualitative factors (examples of such indicators are given in the following table). For each of these indicators, the bank can determine appropriate thresholds or internal limits, depending on the determined risk appetite. The bank's information system, which will be discussed in section OII.2.5 Information system of these Guidelines, should provide adequate data and information that will enable adequate monitoring of established thresholds and internal limits.

Table 2 List of factors and indicators for assessing client/project exposure to climate-related risks³⁹

Factor	Indicator
Emissions	Greenhouse gas emission ⁴⁰ measured by the total greenhouse gas emission ratio of the client/project and total assets,

³⁸ Activities related to renewable energy sources, energy efficiency, sustainable water management, clean transportation, waste management, production of organic products, etc. are usually considered green activities. The European Taxonomy explicitly states that the production of electricity from fossil fuels and the production that uses such energy cannot be considered as a green activity.

³⁹ EBA Report on Management and Supervision of ESG risks for credit institutions and investment firms (EBA/REP/2021/18).

⁴⁰ According to the Greenhouse Gas Protocol of the World Resources Institute and the World Council for Sustainable Development, the emission of greenhouse gases is classified into three categories:

- Level 1 emissions include direct greenhouse gas emissions from sources owned or controlled by the entity,

	weighted exposure value of carbon-intensive sectors, carbon footprint, carbon intensity, etc.
	Emission of air and water pollutants
	Policies or initiatives on the use or reduction of fossil fuel use
	Compliance with the goals of the Paris Agreement
Energy efficiency	Energy consumption in gigawatt hours (GWh)
	Use of renewable energy sources
Waste production	Production of dangerous substances
	Recycling, measured as % of non-recycled waste or through analysis of policies or initiatives to reduce waste generation
Biodiversity and ecosystems	Presence or activities in geographic areas or industries affected by land degradation, dependent on biodiversity and ecosystems, or inhabited by endangered organisms
Physical (hazard) danger	Presence or activities in geographic areas that are or are likely to be affected by heat waves, water shortages, floods, land erosion, fires

It should be borne in mind that this is not a comprehensive list of all factors and indicators that can be used by banks. Namely, the banks that apply this method are expected to constantly improve and change the evaluation indicators. Also, the application of individual factors by each bank will depend on the characteristics and nature of the client/project. Hence, the previous list can serve as a good guideline for banks to identify factors and indicators that correspond to the risk profile of clients or projects that banks support or intend to support, in accordance with their business strategy.

2) **Climate-related risk scores and ratings for each client** of the banks, which have similar characteristics as the previous method, but imply the application of more detailed data regarding the location, supply chains and other data relating to the client himself/herself. In practice, these ratings are mostly used as a corrective factor to the credit ratings that banks develop internally for the purposes of credit risk management or that banks use from third party sources (such as credit rating agencies).

3) **Climate-related risk measurement models**, among which the so-called integrated assessment models (IAMs) are commonly used. These models aim to link the drivers of climate-related risks to macroeconomic variables. They are commonly used to link projections of the drivers of transition risks and greenhouse gas emissions and the impact on economic growth. The disadvantage of these models is that they do not consider acute physical risks and only take into account physical hazards that have occurred in the past. Also, these models do not take into account technology and policy changes, nor the adaptation of economic entities to climate change.

4) **Climate Value at risk** as a measurement method that enables the application of the traditional VAR framework in order to determine the impact of climate change on banks' balance sheets. Thus, this measurement method, which is applied at the level of the bank's entire portfolio, measures the impact of climate change on the value of the bank's assets in a precisely defined period of time with a precisely defined probability in precisely defined climate scenarios. Although these methods have been present for a longer period as instruments for

-
- Level 2 emissions include indirect emissions of greenhouse gases that result from the use of purchased energy,
 - Level 3 emissions include all indirect emissions of greenhouse gases that are not included in level 2, and which occur in the entire production process of the entity, including both upstream and downstream emissions.

measuring other bank risks, the experience of their application for the purposes of measuring climate-related risks is much shorter.

In addition to these methods for measuring and monitoring climate-related risks, scenario analyses, stress testing or sensitivity analyzes can also be used for these purposes, which will be discussed in section II.2.4 II.2.4 Stress testing of these Guidelines.

The main disadvantage of all the previously mentioned methods for measuring the climate-related risks concerns the inadequacy or the short database related to climate change and its impact. In order to overcome this shortcoming, the banks' efforts shall be aimed at building an appropriate database, first of all by increasing the data and information that their clients will provide related to their exposure to climate-related risks, the activities that undertake to reduce that exposure (for example the (non)existence and content of the clients' transition plans), data on the activity to which the client belongs, the location where the client performs their activities, the characteristics of the supply chain and so on.

II.2.3 Incorporation of climate-related risks into existing risk management practices

Considering that climate-related risks can directly or indirectly affect other risks to which banks are exposed in their operations, banks are expected to adequately take into account the impact of climate-related risks in the management of credit risk, market risk, operational risk, liquidity risk or other risks.

Credit risk

Banks are expected to understand the impact that climate-related risk drivers have or may have on credit risk exposure and to take it into account at all stages of the approval and monitoring of credit exposures. Starting from 1 January 2025⁴¹, banks will be obliged in the credit risk management policy and/or in other internal acts to identify, measure, control or reduce and monitor credit risk (rules, procedures, etc.), to determine the way in which they take into account the impact of climate-related risks in credit risk management. This will entail establishing clear policies and procedures for timely identification, measurement, assessment, monitoring, reporting and control or mitigation of the impact of climate-related risk drivers on the bank's exposure to credit risk⁴². These drivers should be evaluated throughout the lifetime of the credit exposures.

In the assessment, banks may also take into account the way the clients - legal entities manage climate-related risks, assess the risk profile of the activity to which the client belongs, assess the client's transition plans, determine whether the client has environmental practices manipulation, etc. This assessment should be properly taken into account, both when determining the creditworthiness of the client, that is, the quality of the project, and during its monitoring and evaluation of the change in the creditworthiness of the client, that is, the quality of the project. For the purposes of this assessment of legal entities, banks could design and establish appropriate procedures for:

- collecting data on client climate goals, especially in terms of reducing the carbon footprint;
- assessment of the sustainability of the client's funding sources;

⁴¹ Decision on the methodology for credit risk management (Official Gazette of the Republic of North Macedonia No. 57/2023).

⁴² When measuring and monitoring the effects of climate-related risks on credit risk, they can use the approaches and methods specified in section II.2.2 Identifying, measuring and monitoring climate-related risks of these Guidelines.

- assessment of clients' willingness to direct their investments in sustainable projects and activities.

As could be seen in the previous chapter, one of the more significant microeconomic channels for the transmission of the impact of climate-related risks on bank's clients is through the reduction in the value of collateral. In that context, banks are expected to take into account the place (physical location) where the collateral is located, as well as the energy efficiency of the real estate used as collateral.

The monitoring of concentrations in the bank's portfolio that may result from exposure to physical and transition climate-related risks is of particular importance in credit risk management. These concentrations can be by activity, by type of project/credit exposure, by collateral or by geographic area. As for any other type of concentration in the loan portfolio, banks are expected to establish appropriate exposure limits and/or strategies to reduce concentrations, taking into account the impact that these concentrations can have on the overall risk profile of the loan portfolio (part of the risk appetite statement). For these purposes, banks can use the factors and indicators shown in Table 2 **List of factors and indicators for assessing client/project exposure to climate-related risks** of these Guidelines, can make appropriate changes in the criteria for approving credit exposures or require mandatory coverage of exposure to climate-related risks through the use of guarantees or insurance.

Box 3 Greenwashing

One of the side effects of efforts for an efficient and timely transition to a sustainable economy is the phenomenon known as greenwashing, which, although it has existed for more than 20 years, is becoming the focus of greater attention with the potential to negatively affect investor confidence and the general public. Given the increasing demand for sustainable products and the need to keep up with the competition, the greenwashing may occur at any stage of the sustainable financing process. It can be caused by the following drivers:

- **Market competition** – In response to consumer and investor pressure, entities can offer and present more sustainable products and services than they actually are.
- **Regulatory requirements** - Pressure to comply with climate policies established at the national or global level or to comply with the requirements of regulatory authorities to adequately manage climate-related risks can lead to greenwashing, especially in conditions of limited or inadequate oversight of the application of these policies or requirements. Also, the lack of an appropriate legal framework and appropriate "punishments" can result in greenwashing.
- **Control from non-governmental organizations and the media** – Non-governmental organizations and the media have an active role in the control and detection of greenwashing practices. Entities who know that they are subject to such control can publish information only about those activities that are aimed at ensuring sustainability, and ignore or not publish data about activities that are harmful to climate change or the transition to a green economy. For example, entities can publish data that they "offset" their carbon footprint by investing in green products while continuing to perform harmful activities.
- **Imperfect information** – Limited or inadequate information about the environmental activities of the entity or about the asset can result in greenwashing.
- **The entity itself** – Internal organizational structure, ethics and governance can be drivers of greenwashing in case there are work positions or bodies that have an "ESG" or "sustainable" products that are labeled as green or sustainable, but without

establishing appropriate sustainable policies at the entity. The lack of or inadequate code of ethics, lack of clearly assigned responsibilities and prescribed standards of behavior can also contribute to greenwashing.

Market risk

In terms of market risk management, banks are expected to take into account that climate-related risks can lead to potential changes in the supply of and demand for financial instruments, that is, affect their value. Considering the low level of exposure of domestic banks to market risk, it can be expected that the impact of climate-related risks will not be of material importance on the management of this risk. However, banks should have an awareness and understanding of how climate-related risks can impact market risk exposure.

Liquidity risk

To ensure adequate liquidity risk management, banks are expected to consider the direct and indirect impacts of climate-related risks on their liquidity and assess whether these risks could have a significant impact on net cash outflows and/or the liquid asset. It should be taken into account that the bank may be exposed to cash outflows as a result of both types of climate-related risks (transitional⁴³ and physical risks⁴⁴).

If the impact seems to be significant, banks should incorporate that impact when determining the required internal liquidity and into their liquidity risk management process, taking into account the requirements of the Decision on the methodology for liquidity risk management⁴⁵.

Operational risk

According to Annex 6 of the Decision on the methodology for risk management, banks shall be obliged to identify and assess all material events which represent or may represent exposure of the bank to operational risk. As it was pointed out in the previous chapter of these Guidelines, the physical climate-related risks can have a direct impact on both the bank's property and the infrastructure it uses to perform financial activities. Hence, within the Business Continuity Plans, banks shall assess the possibility of timely and efficient continuity of their undisturbed operation and of their systems and processes in disturbed working conditions caused by weather disasters. This assessment shall refer above all to the most important services, systems and processes for the operation of the bank, as well as to include the services that the bank uses from third parties, i.e. to take into account the exposure of third parties to climate-related risks.

The litigation risks and greenwashing are another example of operational risks to which banks can be exposed (for more details see Box 1 Litigation risks and Box 4 Greenwashing). In this context, one should also take into account the exposure of the bank to the reputation risk, that is, the (in)ability to comply with the legislation, the new technologies, changes in consumer behaviour and expectations of investors, etc.

⁴³ For example, the introduction of carbon tax may cause the customer's cost to rise, lower income and negative cash flow, which would mean withdrawal of funds invested in the bank in the form of deposits, use of the approved credit lines or growth of crediting requirements by the bank.

⁴⁴ In case of severe weather events, customers can withdraw their funds from banks for covering the damages from those weather disasters on their property.

⁴⁵ Official Gazette of the Republic of North Macedonia No. 146/20 and 57/23).

II.2.4 Stress testing rules

The Decision on the methodology for risk management defines the obligation for the bank to perform stress testing that should correspond to the nature, the type and the scope of the financial activities it performs or will perform and which encompasses all material risks it is or it will be exposed to, including the possible interaction between individual risks. Risks that are not material for the banks' operations may be excluded from the stress testing, and the banks should have a written document which shall contain the reasons for not including those risks in the stress tests. Banks should appropriately apply such requirements from the Decision on the methodology for risk management to climate-related risks, if they are determined to be material, especially in terms of their impact on other risks to which the banks are exposed.

As a relatively new activity that is expected to be performed by the banks⁴⁶, when establishing an appropriate framework for stress testing⁴⁷ the effects of climate change, the banks may consider and familiarize with the scenarios that have already been developed by the relevant international institutions, such as the scenarios from the NGFS, the IPCC, the International Energy Agency (IEA), the Task Force on Climate-Related Financial Disclosure (created by the Financial Stability Board), etc. The Basel Committee on Banking Supervision identifies the following possible objectives of climate scenario analyses: 1) exploring the impact of climate change and the transition to a low carbon economy on the bank's strategy and the resiliency of its business model, 2) identifying relevant climate-related risk drivers, 3) measuring bank's vulnerability to climate-related risks and estimating exposures and potential losses, 4) diagnosing data and methodological limitations in climate risk management and (5) informing the adequacy of the bank's risk management framework, including risk mitigation and/or reduction options⁴⁸.

Banks may choose to use the scenarios developed by the relevant international institutions or they may use them as a basis for developing their own scenarios, adapted to the bank's risk profile and their business environment. Regardless of the approach, the whole process usually consists of four steps:

- 1) Selection of scenarios for determining the effects of climate change (climate scenarios);
- 2) Connecting the impact of each of the scenarios with the risks to which the bank is exposed – credit risk, market risk, operational risk, reputational risk, etc.;
- 3) Assessment of the activity's and/or client's sensitivity to those risks;
- 4) Determination of aggregate exposure and potential losses for the bank for each of the defined scenarios.

When choosing the climate scenarios, it should be ensured that both transition and physical risks are included. Regarding the scenarios that includes the transition risks, the focus is on determining the effect on the activities that are most sensitive to these risks, such as companies from the energy sector, companies that are engaged in the production of fossil fuels or that depend on fossil fuels (such as the automotive industry). In general, climate scenarios for transition risks may be grouped by the effect of climate change and the type of transition. In the first case, the starting point is usually a precisely determined increase in the

⁴⁶ Based on the analysis carried out by the European Banking Authority, the development of scenario analyses and stress testing is still at an early stage of development among European banks. Only 15% of the banks that participated in the analysis pointed out that they perform scenario analyses (EBA Report on management and Supervision of ESG risks for credit institutions and investment firms, 2021).

⁴⁷ This term includes separate techniques that can be used to determine the possible impact of climate change and the risks associated with it on the banks' operations: scenario analyses, stress tests and sensitivity analyses.

⁴⁸ Principles for the effective management and supervision of climate-related financial risks, June 2022, Basel Committee on Banking Supervision.

global average temperature in relation to a certain reference period (below or above the goals of the Paris Agreement) and the movements in greenhouse gas emissions and their concentration in the atmosphere are determined. Scenarios according to the type of transition include assumptions about the way in which greenhouse gas emissions are reduced (orderly or disorderly transition).

Scenarios related to physical risks are aimed at determining the impact of physical hazards on precisely defined groups of exposures (for example, on mortgage loans). At the same time, the scenarios related to physical risks should include both acute and chronic risks. Chronic risks such as rising temperatures or changes in precipitation can have an impact on economic activity and productivity, while acute risks (extreme weather events) can cause damage, disrupt normal operations and reduce real estate values. The impact of extreme weather events is significantly greater, which is why they attract more attention, and banks should be able to assess the probability that their clients will be affected by those events (they have an impact on a certain group of clients who are located in regions that can be affected by these extreme events). On the other hand, the risks of long-term climate change are characterized by a gradual impact on the financial potential of all banks' clients, which is why they should be properly taken into account when choosing climate scenarios.

Banks shall use the conducted stress testing as a tool for determining the impact of climate change on the business strategy and assessing the resilience of the business model, determining the risk appetite, identifying the drivers of climate-related risks that are significant for the operation of the bank, determining the data needed to manage the climate-related risks, as well as determining the possible options for mitigating or reducing the impact of climate-related risks. Banks should use the results from stress testing for appropriate changes in the business model and improvement of the bank's market position by offering products and services to clients and activities with low emission of greenhouse gases or products and services that would help clients to adapt to the new reality more easily.

It should be borne in mind that stress testing related to climate change does not have all the characteristics of traditional stress tests that are performed for managing the other risks. First of all, the time horizon is usually much longer, given the fact that negative impacts from climate-related risks are expected to occur in the medium to long term. Thus, the scenarios for the effects of climate-related risks can cover a time period of up to 30 years, while the banks' strategies usually refer to a period of one to five years. Also, traditional stress tests refer to the entire portfolio of the bank, while climate scenarios are usually targeted at a specific category of exposure, usually the one that is considered to be the most sensitive to climate change.

II.2.5 Information system

The lack of data to identify and measure climate-related risks is one of the main challenges banks are facing when incorporating these risks into the overall risk management system. When adapting the banks' information systems for the needs of climate-related risks, it is essential to assess in which of the existing reporting forms one can incorporate data on climate change factors. This primarily refers to the possibilities for expanding the existing reports and data related to the approval and monitoring of credit exposures. For the purposes of monitoring exposure to climate-related risks, banks may use qualitative questionnaires in order to determine the degree of exposure of clients to these risks. These qualitative analyses could provide a basis for further quantitative analyses.

The establishment of an adequate and efficient reporting system becomes even more important for banks that intend to develop internal methods for identifying the so-called "green assets". The banks shall use the data from the information system primarily for determination of the criteria for asset classification and for proper allocation of the assets/exposures from their portfolio.

In this context, during the development of an appropriate reporting system for the climate related risks and the risks associated with them, banks may take any of the following actions:

- investing in an appropriate database and strengthening existing systems for easier identification, collection and verification of the necessary data;
- active communication with clients in order to provide additional data that will allow a better understanding of their risk profile from the aspect of climate change and their transition plans (if available);
- development of qualitative and quantitative indicators for measurement, monitoring and reporting regarding climate-related risks.

II.3 Organizational risk management structure

The establishment of an appropriate organizational structure for risk management also implies the definition of the competences of the bank's bodies and the persons involved in risk management, as well as a clear delimitation of the competences and responsibilities between the persons and organizational units that perform risk-taking activities and the persons and the organizational units that perform risk management activities. The role of the Supervisory and Management Board of the bank is crucial for the entire process of risk management, which is also confirmed by the requirements defined in the Banking Law, the Decision on good corporate governance rules for banks and the Decision on the methodology for risk management. The Supervisory Board adopts the business policy and development plan and monitors their implementation, and together with the Management Board determines the risk appetite, establishes and monitors the implementation of the risk management system and establishes and promotes the corporate culture and values in the bank.

Taking into account this role of the supervisory and management board, when the materiality of climate-related risks is determined, it is expected to constantly build their capacities for understanding these risks. The assessment of the understanding and knowledge of climate-related risks is expected to be part of the collective assessment of the knowledge and experiences of the members of the Supervisory Board for independent oversight of the bank's operations. In this context, it is expected that climate-related risks will be adequately included in the banks' training programs, both for the members of the Supervisory and Management Board, and for all other persons involved in the management of these risks.

International practice shows different ways of including climate-related risks in corporate risk management, depending on the nature and type of activities performed by banks and the exposure or potential exposure to these risks. Typically, the risk management function is the most common 'choice' for monitoring climate-related risks. Also, banks may appoint special persons responsible for climate-related risks, who enter directly to the management⁴⁹ or supervisory bodies of the banks, and may also form special boards for managing these risks, which consist of the most important functions in the bank related to risk management, but may also include external experts with significant knowledge of climate change issues. Regardless of the way of including climate-related risks in the organizational structure of the

⁴⁹ The supervisory authority of the United Kingdom requires from financial institutions that the person who will be responsible for managing the climate related risks is part of the senior management of the financial institution, that is, he/she is a person who is subject to the suitability criteria.

banks, the competences for their management should be clearly defined in the internal acts of the banks.

The role of the three control functions is a particularly significant aspect in the inclusion of climate-related risks in the risk management system. The monitoring of climate-related risks by the risk management function, and especially of the transmission channels on other risks to which the bank is exposed, enables the appropriate incorporation of the effects of these risks into the bank's decision-making process. The risk management function is also expected to assess the benefits and potential application of different methodologies for measuring climate-related risks. The risk management function should be involved in this process from the beginning, in order to enable climate-related risks to be properly taken into account when establishing the risk appetite.

Changing policies and legislation regarding climate change and ensuring sustainable development increases the risk of litigation against banks, reputational risk or, in general, the risk of non-compliance with regulations/policies. Monitoring these risks is one of the basic tasks of the compliance function with regulations, which should propose appropriate activities for compliance of the bank's operations with the regulations, as well as assess the impact of possible changes in the legislation related to climate change on the bank's operations. It should also be taken into account that according to the Decision on the methodology for risk management (item 23), the compliance function together with the risk management function have a key role in the assessment of the risks arising from the introduction of a new product, activity or system and their impact on the risk appetite and the bank's risk profile. This assessment should also take into account climate-related risks, if the introduction of the new product, activity or system can affect the bank's exposure to those risks or the level of transfer of those risks to other risks to which the bank is exposed.

The internal audit function is expected within its controls to assess the bank's readiness to manage climate-related risks, taking into account changes in the risk profile, in the bank's products and services, and in the business environment. For the implementation of all these activities of the control functions related to climate-related risks, banks shall possess adequate and professional human resources, which implies timely and permanent training of the persons involved in the performance of these functions.

In addition to the previous aspects of the organizational structure of climate-related risks management, banks are expected to consider the possibility of taking these risks into account in the remuneration policies. Namely, aligning the banks' reward policies and practices with their climate strategic goals and risk appetite, may encourage behavior that would help achieve those goals.

II.4 Inclusion of climate-related risks in ICAAP and ILAAP

The inclusion of climate-related risks in the processes of determination of internal capital and internal liquidity should be implemented at least when it comes to material risks identified on the basis of internally defined criteria, but also after undertaking the activities related to their involvement in the risk management process, in accordance with the expectations listed in section II.2 Risk management process of these Guidelines. As it was pointed out earlier, when determining the materiality of climate-related risks, banks should consider the long-term nature of these risks.

For the purposes of ICAAP, the bank can classify climate-related risks (if it considers them to be material) as risks that are not fully covered by the regulation of the National Bank on the

methodology for determining capital adequacy (for example: as a result of the effect that the physical risks have on the bank's credit risk exposure) or as risks from the external environment (for example: effects on the bank's operations due to changes in the legislation related to climate change).

Having in mind that these are risks for which regulatory treatment is not foreseen by the regulation of the National Bank on the methodology for determining capital adequacy, banks may use internal methods for measuring climate-related risks, which were discussed in section 0 II.2.2 Identifying, measuring and monitoring . In addition, when determining the internal capital and the internal liquidity requirements, the bank may include the material climate-related risks in the stress testing performed in accordance with the expectations set forth in Chapter II.2.4 Stress testing rules of these Guidelines and the rules defined in the Decision on the methodology for risk management.

III. Conclusion

The purpose of these Guidelines is to provide explanations and guidelines for banks regarding the National Bank's **expectations** for managing climate-related risks. This relates to the following:

- 1) banks are expected to recognize the potential changes in their business environment as a result of climate change and to adjust their business strategy in order to adequately include those changes and their impact on operations in the long term. In this context, banks are encouraged:
 - to determine climate strategic goals that would enable banks to adequately deal with climate change in the short, medium and long term.
 - to develop and establish appropriate transition plans on the basis of which the bank will be able to determine and monitor the way of meeting the climate strategic goals;

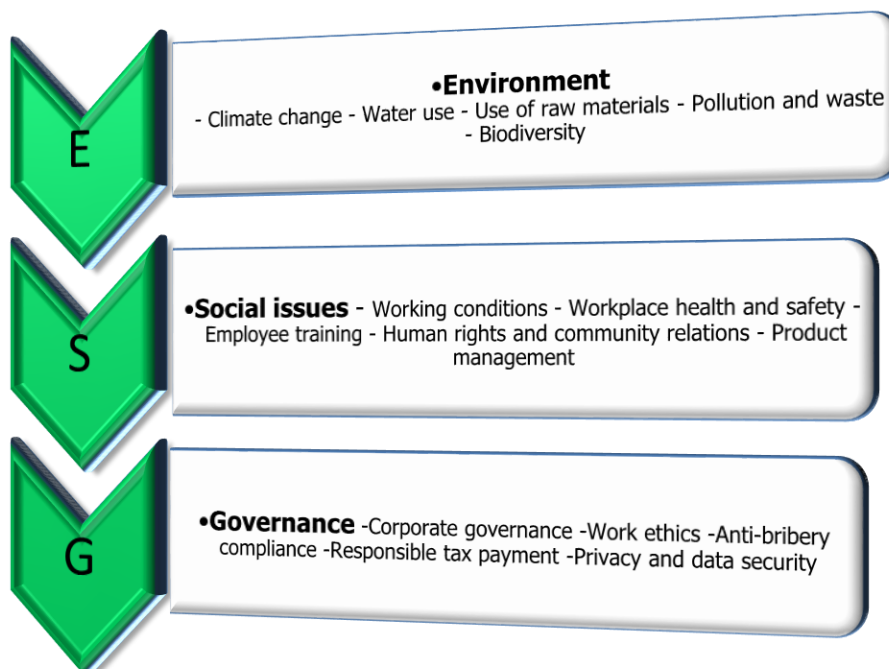
The achievement of strategic goals related to climate change should be supported by adequate financial and human resources;
- 2) it is expected that the banks will include the material climate-related risks in the risk management process. Although climate-related risks in most cases have an impact on the amount of existing risks to which banks are exposed, the nature and characteristics of these risks impose a need for appropriate adjustment and modification of the established risk management framework. Depending on the level of materiality of climate-related risks, banks are expected to:
 - ensure adequate identification of climate-related risks, by establishing an appropriate framework for the classification of assets or exposure to these risks;
 - identify the methods based on which they will be able to measure the exposure to the climate related risks, including determining quantitative or qualitative indicators of the exposure to these risks and their thresholds, as well as internal limits to limit that exposure;
 - direct their efforts towards identifying the necessary data and information for managing the climate-related risks and building an appropriate information system that will ensure the collection of that data;
 - ensure the inclusion of climate-related risks in the processes for determining internal capital and internal liquidity, if it is determined that is a matter of material risks, including through the appropriate use of stress scenarios, taking into account the characteristics of physical and transition climate-related risks;
- 3) banks are expected to establish an appropriate organizational structure for efficient management of climate-related risks, both from the aspect of assigning competences, and from the aspect of their inclusion in the internal control system. This implies not only the identification of the persons who would be involved in the management of climate-related risks and the determination of their competences, but also the appropriate building of their capacity.

Banks should take into account the expectations of the National Bank set in these Guidelines and to determine the actions they should take for the purpose of their appropriate incorporation into risk management processes and practices, by defining the time frame for their implementation. Within its supervisory activities, the National Bank will monitor the activities of the banks in relation to the management of climate-related risks and expectations given in these Guidelines. Based on these activities and observations, the National Bank will also assess the need for appropriate changes and improvements to the existing banking regulation for risk management, following international standards and practices in this domain.

Annex 1: ESG risks

Environmental, social and governance risks (ESG risks) are defined as negative impacts of environmental, social and governance factors on the bank's counterparties or on its assets.

Image 1 Examples of the scope of ESG risks



Environmental factors refer to the quality and functioning of the environment and ecosystems, including the factors related to the activities performed for achieving the predefined environmental goals⁵⁰. Climate change, biodiversity, energy consumption, pollution, waste management, etc. are considered environmental factors. Climate-related risks are the most significant part of environmental risks. Considering that these risks were covered in details in the first chapter of these Guidelines, in the continuation of this Annex greater emphasis is placed on social and management risks.

Social factors are related to the rights, interests and well-being of people and society. social factors include (in)equality, health, inclusion, labor relations, safety at work, etc.⁵¹. According to the European Banking Authority's Report on Management and Supervision of ESG Risks for Credit Institutions and Investment Firms⁵², social factors can be grouped into five areas:

- 1) Community / society - impact on the local community, especially on economically and socially underdeveloped parts, impact of products and services in rural areas, etc.
- 2) Employees / working conditions – trade union rights, minimum wage, forced labor, child labor, gender equality, remuneration policies, discrimination, training and development opportunities, health and safety at work,

⁵⁰ Such as the objectives defined in the Paris Agreement or the objectives defined by the EU Taxonomy.

⁵¹ The European Commission's document on the European Pillars of Social Rights provides a definition of social factors, identifying 20 principles that relate to equal opportunities and access to the labor market (including gender equality), ensuring equal working conditions (salary and appropriate work-life balance) and social protection and inclusion (child care, unemployment benefits, health care, access to basic services and minimum wage).

⁵² EBA Report on Management and Supervision of ESG risks for credit institutions and investment firms (EBA/REP/2021/18).

- 3) Customer relations - consumer protection, personal data security, right of customers to obtain data related to ESG factors, quality of customer relations,
- 4) Human rights – contribution to human rights measured through involvement in social projects, support of human rights, number of incidents related to the violation of human rights, etc.
- 5) Poverty / hunger – contribution to poverty reduction measured through participation in poverty reduction programs, offering employment opportunities to economically disadvantaged groups, etc.

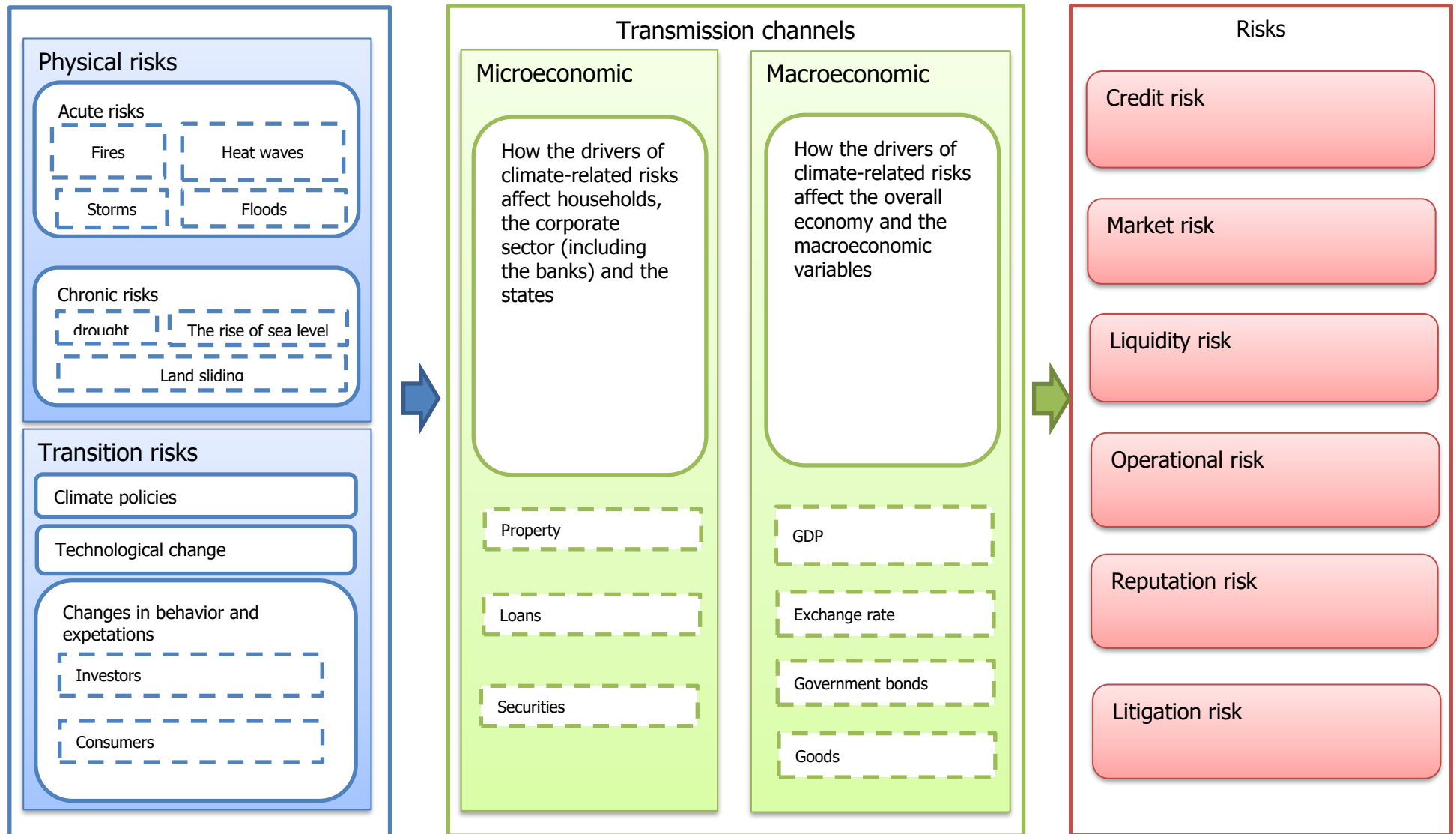
These factors become increasingly important in the business strategies and manner of operation of the banks and their counterparties. However, it should be taken into account that regardless of the attempts to define them in an international framework (primarily in the EU), social factors, and on that basis also social risks, are generally more difficult to identify compared to environmental factors and risks. Unlike environmental risks, drivers of social risks cannot be divided into physical and transition risks. The reason is the fact that, compared to environmental risks, it is much more difficult to predict the development of social norms, behavior and social policies. In addition, social risks can very often be caused by environmental risks. Continued deterioration of climate conditions, especially in economically disadvantaged geographic areas, may increase migration and social and political disturbances.

Governance factors refer to the transparency and legal compliance of the investment or entity, for example in relation to accounting rules and regulations, tax regulations, the regulation of shareholders' rights, etc. These factors include corporate governance practices, such as the responsibilities of executive bodies, their salaries and remuneration, auditing, internal control, board independence, shareholder rights, the existence of corruption, as well as the practices of incorporating environmental and social factors into policies and the procedures of the subjects. The European Banking Authority groups these factors into four areas:

- 1) Ethical issues – integrity, ethical behavior and values, bribery and corruption, responsibility and rule of law,
- 2) Strategy and risk management – establishing and monitoring the application of the strategy, internal control, policies and procedures for risk management,
- 3) Inclusion - discrimination determined through gender (in)equality, (non)acceptance of differences related to age, gender, minority groups, presence of these groups in management bodies, etc,
- 4) Transparency – publication of data and information related to corporate governance.

The governance risk shall denote the risk of loss to the bank arising from the current or future impacts of governance factors on the bank's counterparties or its assets. Similar to social risks, the drivers of governance risks cannot be characterized as physical or transition risks.

Annex 2 Transmission channels for climate-related risks



Annex 3 Basel principles for managing climate-related risks⁵³

The principles proposed by the Basel Committee that would help banks to cope more easily with the challenges from climate-related risks are as follows:

- 1) Banks shall develop and establish a sound process for understanding and assessing the potential impacts of climate-related risk drivers on the business environment in which they operate. Banks shall take into account material climate-related risks that could materialize in different time horizons and incorporate them into business strategies and risk management systems.
- 2) Supervisory and governance bodies shall clearly assign responsibilities for the management and monitoring of climate-related risks to their members and/or boards and perform their ongoing oversight. Also, the responsibilities of all other persons in the bank involved in the management of these risks shall be clearly defined.
- 3) Banks shall adopt appropriate policies, procedures and controls that would be implemented throughout the bank, to ensure effective management of climate-related risks.
- 4) Banks shall incorporate climate-related risks into their internal control systems, across all three control functions, in order to ensure sound, comprehensive and effective identification, measurement and mitigation of risks.
- 5) Banks shall identify and measure climate-related risks and include those risks identified as material in the ICAAP and ILAAP, including in stress testing.
- 6) Banks shall identify, monitor and manage all climate-related risks that could significantly impair their financial position, including their capital and liquidity position. Banks shall ensure that the risk appetite and risk management take into account all climate-related risks that have been identified as material and establish an appropriate approach to the identification, measurement and management of those risks.
- 7) Climate-related risks shall be an integral part of the banks' information and reporting system, which should enable monitoring of climate-related risks that have been identified as material and providing timely and accurate information to the banks' supervisory and management bodies.
- 8) Banks shall understand the impact of climate-related risk drivers on the credit risk they are exposed to and ensure that credit risk management systems and processes take into account climate-related risks that have been identified as material.
- 9) Banks shall understand the impact of climate-related risk drivers on the market risk they are exposed to and ensure that market risk management systems and processes take into account climate-related risks that have been identified as material.
- 10) Banks shall understand the impact of climate-related risk drivers on the liquidity risk to which they are exposed and ensure that liquidity risk management systems and processes take into account climate-related risks that have been identified as material.
- 11) Banks shall understand the impact of climate-related risk drivers on the operational risk to which they are exposed and ensure that operational risk management systems and processes take into account climate-related risks that have been identified as material. Also, banks shall understand the impact of climate-related risk drivers on other risks (strategic, reputational or litigation risk) and establish appropriate instruments to determine their materiality.
- 12) Where appropriate, banks shall use scenario analyses to assess the resilience of their business models and strategies to different climate change scenarios and determine the impact of those scenarios on the overall risk profile. These scenarios shall include the

⁵³ Principles for the effective management and supervision of climate-related financial risks, June 2022, Basel Committee on Banking Supervision.

impact of physical and transition risks on credit risk, market risk, operational risk and liquidity risk in different time periods.

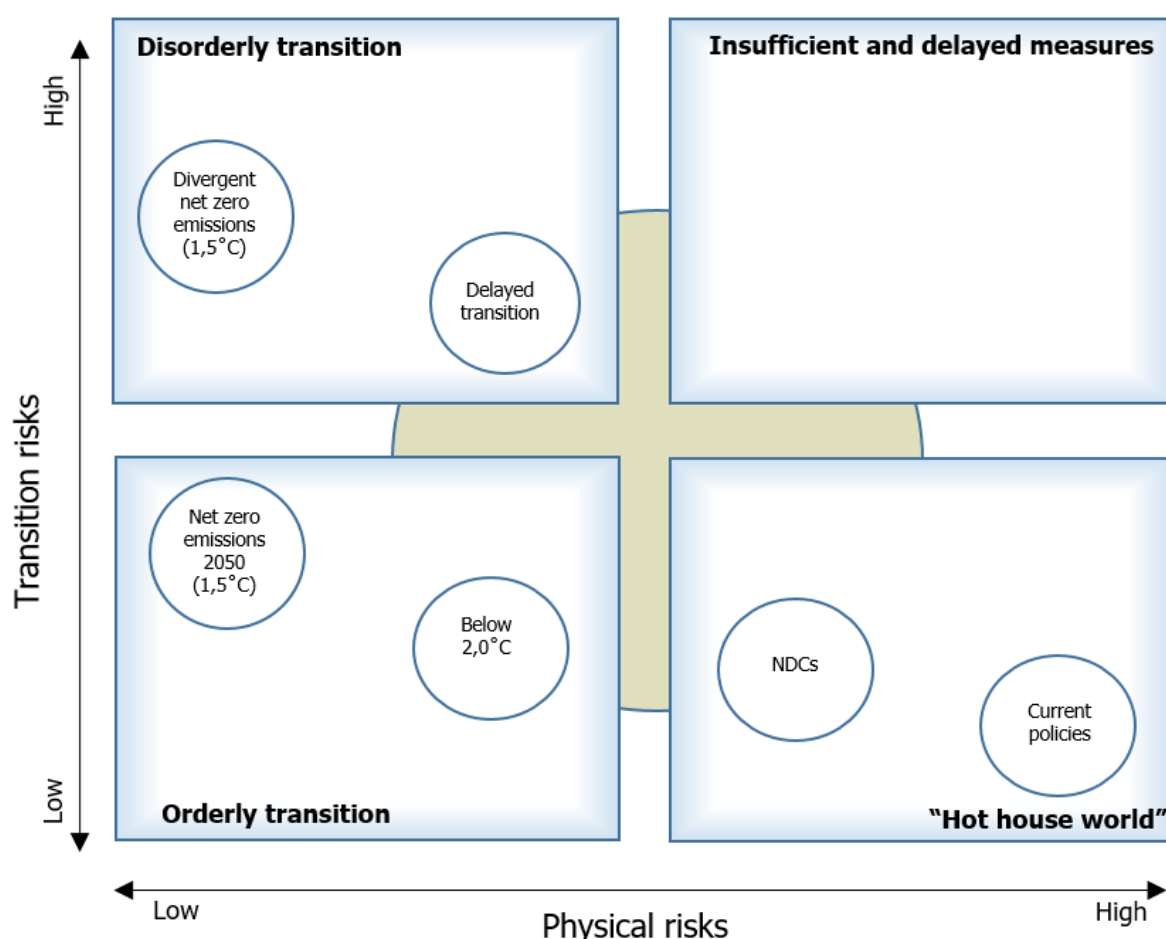
Annex 4 Expectations of the European Central Bank regarding the management of climate-related risks⁵⁴

- 1) Banks are expected to understand the impact that climate-related risks and environmental risks on the business environment in which they operate, in the short, medium and long term, in order to be able to make appropriate strategic and business decisions;
- 2) When determining and implementing their business strategy, banks are expected to integrate climate-related and environmental risks that impact their business environment, in the short, medium and long term;
- 3) The management body is expected to consider climate-related and environmental risks when developing the bank's business strategy, business objectives, in the overall risk management framework and to exercise effective oversight of these risks;
- 4) Banks are expected to include climate-related and environmental risks in their risk appetite statement;
- 5) Banks shall determine the bodies/persons responsible for managing climate-related and environmental risks, taking into account control functions;
- 6) For the purposes of internal reporting, banks are expected to establish a reporting system for the aggregate level of exposure to climate-related and environmental risks with a view to enabling the management body to make informed decisions;
- 7) Banks are expected to incorporate climate-related and environmental risks into the management framework of other risks, with a view to managing, monitoring and mitigating these over a sufficiently long-term horizon. Banks are expected to identify and quantify these risks within the overall process of ensuring internal capital adequacy;
- 8) In their credit risk management process, banks are expected to consider climate-related and environmental risks at all stages of the credit exposure approval process and to monitor these risks in their portfolios;
- 9) Banks are expected to consider the impact of climate-related and environmental risks on the business continuity plan and on reputational or litigation risk;
- 10) Banks are expected to monitor, on an ongoing basis the impact of climate-related and environmental factors on their current market risk positions and future investments and to develop stress tests that incorporate climate-related and environmental risks;
- 11) Banks with material climate-related and environmental risks are expected to evaluate the adequacy of their stress testing, with a view to incorporating them into their baseline and adverse scenarios;
- 12) Banks are expected to assess whether material climate-related and environmental risks can cause net cash outflows or depletion of liquidity buffers. If the assessment indicates such outflows, banks are expected to include climate-related and environmental risks in liquidity risk management and and liquidity buffer calibration;
- 13) For the purpose of greater transparency, banks are expected to publish adequate and clear data and indicators on exposure to climate-related and environmental risks, taking into account the guidelines of the European Commission on non-financial reporting.

⁵⁴ Guide on climate-related and environmental risks: Supervisory expectations relating to risk management and disclosure, November 2020, European Central Bank.

Annex 5 Scenarios defined by the NGFS⁵⁵

In 2021, the NGFS developed six scenarios for climate-related risks and classified them into three categories, orderly transition, disorderly transition, and the "hot house world". Insufficient and delayed measures is the forth planned category, for which no scenarios have been developed. The following graph shows the connection of each of the four categories and the six scenarios with the physical and transition risks, taking into account the estimation of the movement of these risks until 2100.



Orderly transition - it is assumed that climate policies are introduced on time and gradually become stricter, which is in accordance with the Paris Agreement. Physical and transition risks are not so pronounced. This category includes two scenarios:

- Net zero emissions until 2050 - it is assumed to limit global warming to 1.5°C, by applying restrictive climate policies and technological solutions, reaching net zero emissions of carbon dioxide in the period around 2050;
- Below 2°C - assumes a gradual increase in the restrictiveness of climate policies, with a 67% chance of limiting global warming below the 2.0°C level.

Disorderly transition – scenarios in this category assume higher transition risks as a result of delayed climate policies or climate policies that are different in different countries and activities (for example, carbon prices increase sharply and belatedly, with not all countries equally committed to meeting the requirements from the Paris Agreement). The two scenarios in this category refer to:

⁵⁵ Source: [Green Financial System Network website](#)

- Divergent net zero emissions of carbon dioxide – it is assumed that net zero emissions will be reached in the period around 2050, but at higher costs as a result of the implementation of different policies in the various activities that cause a gradual reduction in the consumption of fossil fuels, primarily oil;
- Delayed transition – an annual emission that does not decrease until 2030 is assumed, which is why after this year serious policies are taken to limit global warming.

"Hot house world" - it is assumed that some countries implement climate policies, but efforts at the global level are not enough to stop global warming. This category also envisages two scenarios, as follows:




- Current policies - continuation of current climate policies is assumed, with no additional measures therefore minimal changes in carbon prices are assumed. The goals in the Paris Agreement are not being met, that is, the average temperature increase is above 2°C by 2050 and close to 4°C by 2100. It results in serious physical risks;
- NDCs – national targets are taken into account, but it is assumed that they are not supported by appropriate climate policies or legal solutions. The physical risks are less severe than the previous scenario, but are still above the targets in the Paris Agreement, with global average temperature rising above 2°C by 2050 and above 3°C by 2100.

In this category, transition risks are minimal or absent.

Insufficient and delayed measures (Too little, too late) – it is assumed that the measures are taken too late, while those measures have no impact on the reduction of temperature growth caused by climate change.

Transition type	Climate scenario	Physical risks	Transitional risks			
		Policy ambition	Policy reaction	Technological change	CDR	Policy variation
Orderly	Net Zero 2050	1.4°C	Immediate and smooth	Fast changes	Medium-high	Medium variation
	Below 2°C	1.6°C	Immediate and smooth	Moderate change	Medium-high	Low variation
Disorderly	Divergent net zero	1.4°C	Immediately but divergent	Fast changes	Low - medium	Medium variation
	Delayed transition	1.6°C	Delayed	Slow/fast changes	Low – medium	High variation
Hot house world	NDCs	2.6°C	NDCs	Slow changes	Low – medium	Medium variation
	Current policies	3°C +	None-current policies	Slow changes	Low	Low variation

The colors are indicators of whether a separate characteristic affects a lower or higher severity (risk) from a macrofinancial point of view:

	Low risk
	Moderate risk
	High risk

In 2022, the NGFS and the Financial Stability Board conducted a survey on the use of NFGS climate scenarios. 53 central banks and supervisory authorities from 36 countries participated in the survey. The survey showed that 75% of the respondents use the NFGS scenarios, in the most cases with the current policy scenario (30), the delayed scenario (26) and net zero emissions by 2050 (29). In 2022, the third revision of these scenarios was carried out, taking into account: new goals established by some countries, the latest trends in technologies for using renewable energy sources, the improvement of risk prediction models, etc.