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CLIMATE RISKS IN CHANGING ECONOMIC CONDITIONS

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This paper was prepared by the Financial Stability Department.

Please send your comments regarding the issues outlined in this consultation paper and your suggestions before 10 February 2023 to: mmm1@cbr.ru, sidorovskiy@cb.ru, musaelyanda@cbr.ru.

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EXECUTIVE SUMMARY

1. This report discusses climate risks – the potential risks which may arise in consequence of climate change (physical risks) or measures to minimise the fallout from climate change (transition risks).
2. Among the key factors behind Russia’s high degree of exposure to transition risks are its highly carbon intensive economy and the predominance of exports with large carbon footprints. The high degree of exposure to physical risks is a result of several geographical factors, such as the multiple climatic zones to which the country’s region belong, and that include the vast Arctic area, most exposed to climate change.
3. The speed at which the annual average temperature in the territory of the Russian Federation has been growing since the middle of the 1970s is almost three times the global average, in a sign that a more powerful realisation of both chronic and acute physical risks is possible.
4. Climate risks are expected to affect the Russian corporate sector most of all. This will lead to a decrease in revenue and an increase in operating and capital costs and the cost of debt financing, entailing higher debt loads for the most carbon-intensive businesses.
5. The restrictive measures implemented by the group of hostile states have driven a refocus of Russian exports on Asian markets. Asian countries are somewhat behind western countries in terms of the climate agenda; while they have yet to introduce cross-border carbon regulation, the European Union (EU) intends to begin its rollout in the next few years. This factor, combined with high potential demand for energy from Asian countries, is set to temporarily mitigate transition risks for Russia.
6. In the long term however, the energy transition, the growing share of electric modes of transport, and the rollout of carbon regulation around the globe are all expected to lower demand for energy and carbon-intensive products. This may render the current commodity export model of the Russian economy obsolete. Coupled with the national economy’s widening gap in the advancement of new industries and green technologies, this will significantly increase the transition risks in the 2030s.
7. Today, the global standard-setters and regulators are making strong efforts to design approaches to the practice of assessing and integrating climate risks by financial institutions. These approaches, although still only recommendations, are increasingly becoming part of supervisory processes.
8. The integration of climate risks by financial institutions should encompass three key areas: corporate governance, risk assessment, and information disclosure.
9. A major problem in climate risk analysis and stress testing at financial institutions is insufficient data. High-quality risk assessment is impossible without consistent, detailed, and uniform disclosures of data. At this juncture, financial institutions could probably address this problem by incentivising customers to disclose information related to sustainable development, as well by requesting such information from customers and collecting qualitative and quantitative data independently from public sources.
10. Given the current restrictions on the publication of sensitive information, the Bank of Russia will have to ensure the availability of information, including that related to sustainable development, which is one of its tasks for the near future. Such information is indispensable in investor decision-making. It is also needed to ensure fair prices for financial instruments and the efficient operation of the financial market. The Bank of Russia will continue to develop a methodological framework to cover both non-financial and financial institutions. Moving forward, once global

standards for the disclosure of information on sustainable development are in place, a number of provisions may become part of regulation.

11. The Bank of Russia's microprudential approach envisages measures to incentivise banks to finance green and adaptation projects.
12. The macroprudential impact may amount to incentives for major companies to disclose their exposure to climate risks and the measures being taken to mitigate them. Macroprudential measures can be used if necessary, but only after regulatory relaxations for the banking sector have been rolled back.

INTRODUCTION

Climate change and environmental degradation are invariably among the biggest challenges of this century. At the 27th UN Climate Change Conference held in November 2022, world leaders and representatives of global organisations announced that the fight against climate change is tantamount to a battle for human survival. The risks caused by climate change, unprecedented in terms of probability and expected losses, already pose an all-too-real threat to the world.

This report focuses on climate risks in changing economic conditions. In recent decades, the speed of climate change has dramatically increased due to man-made factors, most of all including greenhouse gas emissions (**climate physical risks**). According to the World Meteorological Organisation, the last eight years have been the hottest period since meteorological records began. Climate change of this scale has increased the frequency, intensity, and geography of natural disasters.

According to Roshydromet,¹ climate warming in Russia in the 21st century has run substantially ahead of average global warming rates. Physical risks can manifest themselves in the form of natural hazards in the short term or as accumulated climatic changes in the long term. Russia has in recent years seen an increased magnitude of natural fires, with the affected areas having tripled in 12 years. Droughts and floods have also been growing in intensity. A significant proportion (60–65%) of Russian territory is permafrost, the melting of which can release large volumes of greenhouse gases and change landscapes. This will in turn destroy transport routes or mining sites, entailing disruption in production chains. This will all combine to have a negative impact on companies operating in those regions and their creditors.

National decarbonisation programmes bring new risks – climate transition risks. The ensuing losses are not the result of climate change but of public sector actions aimed at controlling such change (e.g. enforcing cross-border carbon regulation, or the carbon border adjustment mechanism (CBAM), technological development, changing the energy consumption mix). In countries with a significant share of carbon-intensive exports in GDP, such as Russia, the problems of brown companies may pose a threat to economic growth and the stability of the financial system.

In the context of escalating geopolitical risks, the group of hostile states have prioritised the short-term objective of weaning themselves off Russian energy resources over green transition objectives. The ongoing rollback to ‘dirty’ technologies, including mounting coal generation, is set to complicate the energy transition for the whole world. According to the Global Carbon Project, emissions from fossil sources are estimated to rise in 2022 by 1% over the previous year.² Given current trends, the UN Environment Programme projects a 10.6% increase in greenhouse gas emissions by 2030 relative to 2010 and a 2.5–2.8% increase in global temperatures by the end of the century.³ Seeking to ward off such negative effects, countries will have to expedite their low-carbon transition programmes in the medium term. At the same time, the high prices for hydrocarbons work as a further incentive for investment in renewable energy sources (RES), which is set to give a boost to the energy transition.

Short-term transition risks for Russia were related to the EU’s enforcement by the mid-2020s of its CBAM. However, these risks are losing relevance in the context of sanctions as exports are being redirected to Asian countries where climate targets are less ambitious. This being the case,

¹ Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet): *The Third Roshydromet Assessment Report on Climate Change and Its Consequences in the Russian Federation. 2022.*

² P. Friedlingstein et al., *Global Carbon Budget, 2022.*

³ *2022 NDC Synthesis Report.*

however, efforts will still have to be made over the medium term to reduce the carbon footprint of Russian exports with a view to sustaining their competitiveness. Otherwise, Russian exporters will face a stronger decline in revenues, and the quality of their loans will deteriorate.

The Bank of Russia views climate risk management involving control of its impact on the financial sector as a key task within its remit on sustaining financial stability.

This report aims to communicate the position of the regulator on the matter and collect the opinion of the professional community about appropriate approaches to climate risk management by financial institutions and the possible regulation of climate risks of the financial sector. The report is expected to raise awareness among investors, financial consumers and all stakeholders about climate risks and their impact on the financial sector.

The report's first chapter outlines the new set-up of climate risks for the Russian economy in terms of modified transition risks and increasing exposure to physical risks, as well as the channels through which they feed into the financial sector. The second chapter is focused on access to information in the current economic environment and summarises the global best practices in the financial sector's integration of climate risks. The third chapter presents the strategic climate agenda of the Bank of Russia and the Government of the Russian Federation and tenable approaches to the incorporation of climate risks in financial regulation.

Please send your comments regarding the issues outlined in this consultation paper and your suggestions before 10 February 2023 to: mmm1@cbr.ru, sidorovskiy@cb.ru, musaelyanda@cbr.ru. There are plans to formulate recommendations for financial institutions based on discussions of the report with regard to the recognition of climate risks and to draft regulatory changes.

1. NEW SET-UP OF CLIMATE RISKS FOR THE RUSSIAN ECONOMY

The sanctions instituted in 2022 by hostile countries have put the Russian economy under pressure that is in essence similar to the expedited realisation of transition risks. Instead of the CBAM, which has been implemented since the mid-2020s for several product groups,¹ Russian exporters have confronted EU embargoes on coal, metallurgical products, oil and petroleum products.² Russian exporters are rapidly refocusing on Asian markets. Such a strategy temporarily helps mitigate transition risks considering that this part of the world is currently slightly behind Europe in the green agenda.

However, despite all the changes in the course of 2022, climate risks still pose a significant threat over the medium and long term. This is explained by the following factors:

- 1) There are expectations for a decline in global demand for key Russian exports beginning from the second half of the 2020s.
- 2) Exports are likely to be only partially refocused from hostile to friendly countries and domestic markets.
- 3) Trading countries are tightening requirements for product reporting related to carbon footprint, with a misalignment emerging between Russian and foreign regulation.
- 4) China and other Asian countries are likely to enact a cross-border carbon mechanism between the late 2020s and early 2030s. The passthrough is expected of CBAM-related costs to the supply chains of friendly countries.
- 5) The technological gap is widening, in part possibly due to high-tech import restrictions, triggering a potential rise in the costs of energy efficiency projects and of carbon footprint reduction, or resulting in such initiatives being cancelled.

Box 1. Concept, classification and sources of climate risks

Environmental risks are part of sustainability risks¹ which include ecological and climate risks.

Ecological risks are the likelihood of losses related to the effects of environmental degradation, including the excessive consumption of natural resources. These risks include, but are not limited to, emissions of air pollutants, waste management, water management, and threats to biodiversity.

Climate-related financial risks are potential risks that may arise from climate change or the mitigation response.² Based on the source of negative effects, climate risks are divided into two categories: physical and transition risks.³

Climate physical risks are associated with natural phenomena arising from climate change. Climate physical risks are broken down into acute risks, related to sudden events, and chronic risks, related to long-term changes in climate conditions.

Acute physical risks are triggered by extreme natural phenomena (drivers) including those of a meteorological nature (droughts, hard frosts, hurricanes, storms, and tornadoes), hydrological nature

¹ Sustainability is the mode of development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

² BCBS Climate-related financial risks – measurement methodologies. April 2021.

³ Some documents also discern liability risks, i.e. the risks of financial losses arising as a result of legal costs and payment of compensations and fines as a result of physical and transition risks.

¹ Specific CBAM parameters are now being finalised by the European Commission, the EU Council, and the European Parliament.

² The oil embargo is limited to seaborne oil. The embargo on petroleum products becomes operational on 5 February 2023.

(floods, mudflows, tsunamis, subsoil waterlogging, change in ground-water level, abrasion of sea coasts and water reservoirs), geophysical (earthquakes, volcano eruptions, landslides, collapses, avalanches, frost-induced ground distortion, thermokarst, and thermal erosion), natural fires (forest, steppe, peat, and underground fires of fossil fuels), and others. An increase in the average temperature may increase the frequency, intensity and destructive power of extreme acts of nature.

Chronic physical risks are marked by the gradual long-term accumulation of climate change effects. They can manifest themselves in the form of the following factors: rising ocean levels, increasing average air temperatures, and changes in land (soil, subsoil, and landscape) condition, in atmosphere (air environment), hydrosphere (water environment), and biosphere.

Climate transition risks are associated with the transition to a low-carbon economy, including measures by policy makers and regulators to counter climate change.

Transition risks are marked by several drivers. Regulatory and legal drivers relate to governmental policies aiming to reduce the adverse effects of climate change, regulations and restrictions (for example, the EU switching from 2030 away from vehicles with internal combustion engines), the introduction of carbon taxes, environmental standards, requirements for sustainability disclosures including related to energy security.

Key technological drivers are low-carbon technologies, including resource-saving and closed-cycle technologies.

Behavioural drivers show up in growing preferences of consumers, business partners, and investors to more environmental friendly products and suppliers.

At this juncture, advanced economies have made a commitment to reaching carbon neutrality (net zero greenhouse gas emissions) largely by 2050. Governments will use economic and administrative tools to honour these commitments by tilting the energy mix in favour of renewable energy sources, developing technologies that reduce and capture greenhouse gas emissions, and by upgrading energy efficiency and absorption capabilities of ecosystems. At the end of October 2021, the Government of the Russian Federation approved the Strategy for Social and Economic Development of the Russian Federation with Low Greenhouse Gas Emissions until 2050. Its target scenario assumes that carbon neutrality will be achieved by no later than 2060.

The corporate sector followed governments and investors in setting decarbonisation targets. According to a report by [Climate Action 100+](#) (an investor-led initiative that brings together companies accounting for 80% of global industrial greenhouse gas emissions), a little more than half of the world's largest companies intend to achieve carbon neutrality by 2050.

The global financial sector also enables expedited capital flows from brown to green sectors, accelerating the global energy transition. An increasing number of global institutional investors and financial institutions are taking into account their environmental footprints, carbon regulation and technological transition factors. They set limits on investment in carbon-intensive sectors and ramp up investment in environmental projects and green securities. A number of global insurance companies, pension and investment funds have by now stopped investing in businesses with significant environmentally unfriendly operations.⁴ With the tight sanctions having essentially frozen capital flows between Russia and the global market, operations of global investors are having no direct bearing on the national financial sector. However, domestic investors, who are now playing a major role in the Russian market, may soon begin to shun brown companies, too.

⁴ *Financial Stability Review No 2(19) 2021 Q2–3. Global investor strategies with regard to brown and green investments, p. 50–51.*

1.1. Transition risks. New reality

In previous years, the rollout of the EU carbon border adjustment mechanism, looming in the mid-2020s, worked as the key channel of transition risks for Russia. However, the 2022 sanctions have led the risks of restriction for Russian exports to materialise in short order. The EU plans to cut 90% of imports of Russian oil and petroleum products between late 2022 and early 2023; on 10 August 2022, the EU banned imports of Russian coal and other solid hydrocarbons. Furthermore, [the EU now bans](#) the import of steel products, gold, cement, wood and some fertilisers. The US, the UK, Japan and South Korea have also imposed restrictions on individual products of Russian exports.

According to mirror statistics, recent quarters have seen a relatively successful pivot of exports away from the US, the UK and Switzerland to India, Turkey and Brazil. Rising prices have sent the value of exports to China and the European substantially higher, but their volumes have overall remained steady. Once the EU sanctions have been fully enforced, the adverse impact may be partially offset by new oil export contracts with Asian consumers. Nevertheless, the pivot to Asian markets is being complicated by both logistics (the lack of gas pipelines, for example) and the potential decline in demand as importing countries enact policies aimed at transforming their energy consumption mix towards carbon neutrality.

Despite mounting geopolitical tensions, the long-term carbon neutrality commitments of advanced economies remain in place. Specifically, the recently passed US Inflation Reduction Act envisages a large-scale programme to support green energy and transport (**Box 2**).

Box 2. US Inflation Reduction Act and its implications for the climate agenda

The 2022 Inflation Reduction Act aims to reduce the US budget deficit and inflation; it involves reducing healthcare costs of households, incentivising the development of clean energy, and increasing tax revenue collected from large companies. Aiming to fight climate change, the law expands household access to clean energy by providing tax incentives and compensation, as well as by encouraging the advancement of environmentally friendly technologies in the US. Among the aforementioned measures are benefits to households installing solar panels, wind generators, or other renewable energy-based equipment; incentivised purchases of electric cars and energy-efficient household appliances, and upgrades of energy efficiency of homes. Furthermore, businesses are offered tax and other incentives to boost investment and develop electricity generation from renewable energy sources (RES) and zero-emission energy sources, including from nuclear power plants. The US seeks to encourage the production of critical raw materials (including rare metals and rare earth elements), environmentally friendly hydrogen, and components for the construction of renewable energy projects and energy storage facilities, to name just a few. The new law imposes fees on oil and gas companies for non-compliance with the methane emission minimum, royalties on recoverable methane, while allocating funds to reduce methane emissions. In addition, funds will be directed to mitigate climate change effects, i.e. to restore forests and provide water supply in times of droughts, among other measures.

The climate measures under the law are expected to bring greenhouse gas emissions down by about 40% by 2030 vs 2005, reducing social costs of climate change by \$1.9 trillion by 2050. Required funding will total \$369 billion – to be spent on the development of clean energy and the programme to combat climate change in the coming decade.

There is a risk however that this law – enacting a number of protectionist restrictions – may make for non-market competition in the market for environmentally friendly technologies. The fiscal relief under the law is intended to encourage the production of materials for environmentally friendly technologies in the US, including batteries, components for solar and wind generators, as well as for such technologies as carbon capture systems and electrolysis cells used in hydrogen production. The Inflation Reduction Act also promotes the use of other domestically produced materials such as US-manufactured steel for wind power energy.

The law establishes a minimum share of critical raw materials for electric vehicles (in value terms) that must be produced or processed in the US and states that are party to the free trade agreement (or which are processed for reuse in a North American country). Effective from 2027, the share of such raw materials must total no less than 80% (before 2024, 40%). A similar requirement applies to battery components fully manufactured or assembled in a North America country beginning in 2029 (before 2024, such battery components had to be at least 50% manufactured or assembled there). The benefits do not apply to purchases of electric vehicles whose batteries are made of raw materials or components extracted or produced by a 'foreign entity of concern'. Its criteria ban suppliers from some countries, primarily Russia and China.

EU officials have voiced concern over the US law, warning of the risk of a trade war. Their cause for concern is investment flight and the fact that a number of climate-friendly technology-based production facilities are moving to the US, as well as the rising shortage in the EU of key components and raw materials for RES. This led to the establishment in October 2022 of a joint US-EU task force to work through issues with this law.

The national programmes to reduce carbon emissions and tighten environmental policies will continue to put Russian companies at risk of financial loss, that is create transition risks over a mid and long-term horizon. Three most relevant processes are in view.

1. Renewable-based generation is becoming more cost-effective as conventional energy resources are costly. This will lead renewable-based generation to supplant the conventional methods of generation, reducing global demand for coal and natural gas. According to a McKinsey forecast,³ global coal consumption is on course to peak in the coming years and nosedive thereafter. At the same time, the 2022 geopolitical developments will force Western countries to wean themselves off gas as an intermediate source of energy in transit to RES. According to the International Energy Agency, if current energy policies are to deliver, global demand for natural gas will rise by a mere 5% between 2021 and 2030 (**Box 3**).

Box 3. World Energy Outlook, a report by the International Energy Agency

The 2022 energy crisis demonstrated that the global energy system is highly unstable in the face of external economic and geopolitical shocks. At the same time, the report's authors argue that the lack of stability has nothing to do with carbon neutrality goals. Of crisis-hit regions, some with the advanced use of RES enjoy lower electricity prices.

Many countries are making efforts to overcome the fallout from the crisis. Some seek to diversify fuel suppliers, while others are working towards a structural transformation of their energy systems, which includes the green transition.

The International Energy Agency (IEA) presents three energy transition scenarios.

1. The Stated Policies scenario is based on current energy policies.
2. The Announced Pledged scenario assumes that all short-term and long-term goals for carbon neutrality are met.
3. The Net Zero Emissions by 2050 scenario assumes that the goal is met whereby the average global temperature stabilises at +1.5°C relative to pre-industrial levels.

The Stated Policies scenario suggests a 50% rise in annual global investment in clean energy to \$2 trillion by 2030. For the successful delivery of the Net Zero Emissions by 2050 scenario, relevant annual investments should amount to \$4 trillion by 2030.

The agency expects coal to decline over the course of several years, demand for natural gas to reach a plateau by the end of this decade and demand for oil to stabilise in the 2030s at 103 million barrels per day (b/d).

If the Net Zero Emissions by 2050 scenario materialises by 2050, demand for oil will drop to 75 million b/d by 2050. The decline will chiefly occur on the back of advances in electric vehicles. Specifically, the

³ McKinsey & Company, *Global Energy Perspective 2022* (April 2022).

IEA expects the share of passenger electric cars in sales of new cars to increase from 10% in 2021 to 25% by 2030 in the case of the Stated Policies scenario, and to 60% by 2020 in the case of the Net Zero Emissions by 2050 scenario.

Aggregate demand for fossil fuels is in for steady decline in 2030–2050: their share in the global energy mix will shrink from the current 80% to 75% by 2030 and slightly over 60% by 2050. More aggressive steps towards the green transition would deepen the decline. At the same time, under the Stated Policies scenario, at least \$470 billion will need to be invested through 2030 in the development of new fields and maintenance of current assets, and up to \$300 billion under the Net Zero Emissions by 2050 scenario. Conventional energy sources are set to be supplanted by liquid biofuels. According to IEA forecasts, their production will grow from 2.2 million barrels of oil equivalent per day (boe/d) in 2021 to 3.4 million boe/d by 2030 (according to the Stated Policies scenario) or up to 5.7 million boe/d (under the Net Zero Emissions by 2050 scenario).

Given current geopolitical conditions, the IEA believes, natural gas has lost its edge as a fuel for transition to clean energy, which suggests the looming end of the era of rapidly growing global demand for gas. If the Stated Policies scenario comes to pass, global demand for natural gas will grow 5% between 2021 and 2030 (compared to a 20% increase between 2011 and 2020) and subsequently will remain flat through 2050. Under the Net Zero Emissions by 2050 scenario, demand for gas will decline 20% by 2030 and 75% by 2050. At the same time, IEA analysts in the World Energy Outlook 2021 report assume that if the Stated Policies scenario materialises, demand for natural gas will increase 15% by 2030 relative to 2020; in the case of the Net Zero Emissions by 2050 scenario, demand will fall approximately 6–7% by 2030 on the back of a significant decline in gas demand in advanced economies.

The projected drop in gas demand in the 2022 report is based on the assumption that, on the one hand, advanced economies will implement a switch to RES and, on the other hand, they will be unable to ramp up gas imports due to high prices. Expedited implementations of green initiatives in this decade will lead to a 20% drop in demand for natural gas and oil in EU countries and a 50% drop in demand for coal. Also, were the Announced Pledged scenario to materialise, demand for gas in the EU would fall 40% to 180 billion m³ – on the back of expanding capacities of wind and solar generation. Concurrently, demand for gas in Asia is projected to rise 20% by 2030 to 120 billion m³. About 70% of this increase will be imports of liquefied natural gas.

IEA analysts project Russian exports of pipeline gas to EU countries to drop from 174.3 billion m³ in 2021 to 75 billion m³ in 2022; exports will decline by 2030 by another 60 billion m³ (the Stated Policies scenario) or drop to zero (the Announced Pledged scenario). The IEA further predicts that Russian gas supplies to China, in the Stated Policies scenario, will grow from 10 billion m³ in 2021 to 50 billion m³ in 2030. IEA estimates provide for Russia's gas output, consistent with the Stated Policies scenario, to shed 155 billion m³ by 2030 vs 2021 and, consistent with the Announced Pledged scenario, 210 billion m³. The IEA also assumes that the sanctions restricting access to technology and equipment will cause Russian oil output to drop by 2 million b/d by 2030 relative to 2021 (the Stated Policies scenario), that is, the decline in output will total 2.5 million b/d by 2030 (Announced Pledged scenario).

According to IEA forecasts, Russian exports of fossil fuel will not return to 2021 levels in any scenario, since the pivot to Asian markets is limited. By 2030, this will send Russia's share in global energy commodity exports down by a third to 13% (from 20% in 2021). If the Announced Pledged scenario comes to pass, Russia's share in the global gas market will drop by half to 15% (from 30% in 2021) and even to 10% if a more aggressive green transition plays out. The US and the Middle East will replace Russia in global markets.

Given the current unprecedented surge in coal and gas prices, alternative energy takes centre stage. According to [BloombergNEF](#), the global benchmark levelised cost of electricity for new-build wind and solar projects in the first half of 2022 jumped 7% and 14% YoY respectively. This being the case, wind and solar power projects were 40% more profitable than new coal and gas power plants, considering the price of carbon under carbon regulation and fuel costs (gas prices have more than doubled to date, and coal prices have more than quadrupled).

These developments propelled the IEA to upgrade its outlook for global growth in renewable energy capacity to 8% in 2022 and 2023, to slightly more than 300 W per year, totalling about

80% of net growth in all types of power supply⁴. According to the IEA, China will be able to achieve targets for new-builds of renewable energy through 2030,⁵ while the projected increase in alternative energy in the EU in 2021–2023 is comparable to power plants powered by Russian gas.

2. Electrification of transport will reduce global demand for oil. Global sales of electric cars have tripled in the last three years, while in 2021 their shares in China and the EU were 16% and 17% of total sales respectively.⁶ According to the IEA forecast, subject to the scenario, the share of electric cars on the world's roads will total between 10% and 20% by as soon as 2030. This will reduce oil consumption⁷ by 3.4–4.6 million b/d (i.e. by 3.5–4.7% of the current output) to significantly increase electrical power consumption. McKinsey predicts⁸ global oil consumption to peak in 2024–2027 at 101–104 million b/d and to begin to decline thereafter.

3. Carbon pricing in domestic markets will combine with tighter cross-border regulation to increase the costs of carbon-intensive production. At the moment, 47 countries have [set](#) various types of fees for greenhouse gas emissions to cover approximately 23% of global emissions. Moving forward, some countries are bound to introduce carbon border adjustment mechanisms to prevent carbon leaks⁹ and sustain the competitiveness of energy-intensive industries over carbon tax-free imports. The rollout of cross-border carbon regulation or a tightening in environmental regulation in one country will spill over to another (even if they do not have direct trade links) through the broad supply chain, with carbon tax costs passing on to the direct emitter of greenhouse gases. This may come in the form of, for example, a discount that Asian markets may set on Russian carbon-intensive raw materials used to make products bound for the EU and subject to the CBAM.

Alternatively, national systems might merge and apply across the globe. At the G20 Sustainable Finance Working Group in June 2022, G7 representatives pushed for the introduction in the near future of a global carbon tax (€60 per tonne). The cause was also promoted by the head of the IMF at the 27th UN Climate Change Conference, who advocated such a tax as high as \$75 per tonne of CO₂ equivalent by 2030.¹⁰ In a number of articles,^{11,12} IMF analysts make the case for the rise in the average effective price to this level (in constant prices of 2018), suggesting the price range should be between \$25 (for low-income countries) and \$225 (for advanced economies). Revenues from carbon regulation would be allocated to national climate change programmes including programmes to support RES, low-carbon industries, transport, infrastructure, and transfers to low-income households.¹³

Over the horizon of 2030–2050s, the Russian economy is set to become heavily exposed to the aforementioned processes, owing to the high share of fuel and energy in its GDP and the high carbon footprint of its exports. Russia is the fourth country by the volume of carbon dioxide emissions, running one of the most carbon-intensive GDP in the world – two to three times that of a European country.¹⁴ Also, energy commodity and energy-intensive products account for two thirds

⁴ IEA. *Renewable Energy Market Update. Outlook for 2022 and 2023*. May 2022.

⁵ 25% of primary energy consumption from renewable sources, provided that CO₂ emissions peak by 2030.

⁶ IEA. *Global Electric Vehicle Outlook 2022*. June 2022.

⁷ Oil is understood to be liquids, i.e. crude oil, liquid biofuels and synthetic fuels.

⁸ McKinsey & Company, *Global Energy Perspective 2022*. April 2022.

⁹ [Carbon leakage](#) is an increase in greenhouse gas emissions in one country driven by lower emissions in another.

¹⁰ [EXCLUSIVE COP27: IMF chief says \\$75/tonne carbon price needed by 2030 \(Reuters, 07.11.2022\)](#).

¹¹ Parry I. et al., *Proposal for an international carbon price floor among large emitters* (2021).

¹² Chateau, J. et al., *Economic and Environmental Benefits from International Cooperation on Climate Policies* (2022).

¹³ For details, see IMF, *World Economic Outlook: Managing Diverging Recoveries* (2020); IMF and G20, *Reaching Net Zero Emissions* (2021).

¹⁴ According to the United Nations Global SDG Database, Russia is in fifth place by carbon intensity of GDP (0.48 kg per US dollar).

of the country's total exports;¹⁵ a full redirection of sales of Russian hydrocarbons including gas to friendly countries is now at risk – which grows if the energy transition accelerates.

With time, the vulnerability of the Russian economy to transition risks is likely to increase for a number of reasons. First, the effects of sanctions may trigger the comeback of outdated technologies, which runs counter to the goals of energy efficiency and decarbonisation. Second, the re-orientation of exports may require new foreign technologies, with the group of hostile countries previously accounting for 50–70% of all imports of components and equipment. Already, the break with foreign partners significantly pushed back the deadlines and performance indicators of some projects, in particular in the field of liquefied natural gas. Third, with most green technologies being

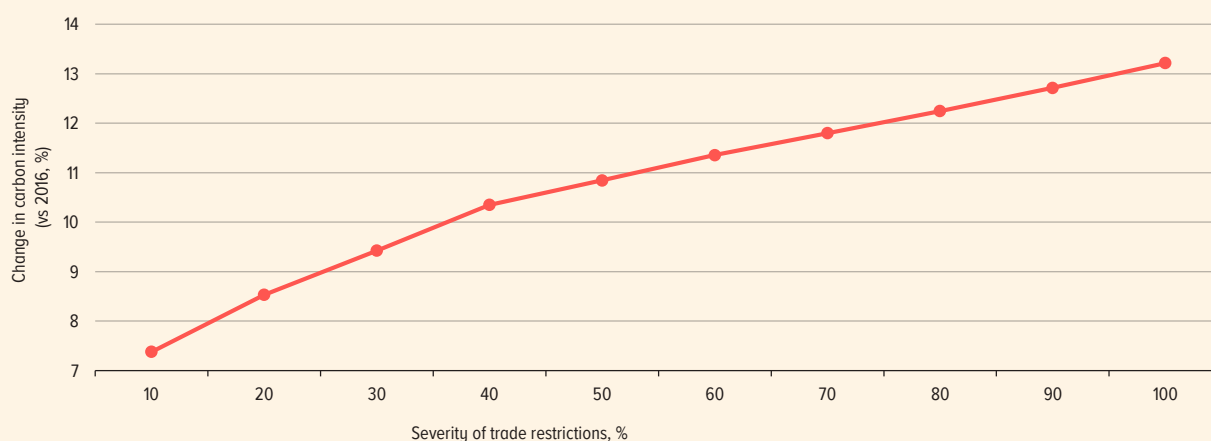
Box 4. Trade restrictions and the climate agenda: scenario analysis

The 2022 restrictions on Russian exports and imports may put profound pressure on the short and long-term distribution of economic activity. The effects of trade restrictions were explored by Bank of Russia staff. Their article 'Trade restrictions and the structural transformation: the case of Russia'¹ examines a general equilibrium predictive model (RuClimateCGE) modified to account for physical restrictions on exports and imports.

The scenario analysis results are broadly varied, since the effects are marked by a strong dependence on the severity of trade restrictions. For a better understanding of these effects, the analysis assumed the unlikely scenario of drastic changes in the trade pattern.² It can be concluded that the decline in the supply of various fuels on the back of shrinking production is less than a drop in the demand, which sends domestic prices of carbon-containing fuels lower, resulting in increased carbon intensity of production and, consequently, carbon intensity of real GDP as trade restrictions come into play. In this setting, Russia faces further obstacles to deliver on its climate policy goals under the Strategy for Social and Economic Development of the Russian Federation with Low Greenhouse Gas Emissions until 2050.

CARBON INTENSITY OF RUSSIA'S REAL GDP CHANGES AS TRADE RESTRICTIONS TAKE EFFECT (%)

Figure 1



Source: article 'Trade restrictions and the structural transformation: the case of Russia' (the release is planned for 2023).

¹ The release is planned for 2023.

² Although highly unlikely in real life, the following assumptions about changes in the trade pattern proved illustrative: a decline in Russian exports (in real terms, vs the base year): oil, gas and petroleum products 0–70%, metals 0–50%, chemical products 0–30%, wood products 0–20%, agricultural products 0–20%, and electrical power 0–95%. The fullest implementation of trade restrictions cuts imports of basic investment goods by 70% and imports of intermediate goods by 30%.

¹⁵ According to the Federal Customs Service of Russia for 2021, in value terms.

of foreign origin, the exit of a number of foreign companies from the Russian market¹⁶ is set to limit decarbonisation opportunities.

As a result, the Russian economy stands to exhaust its current commodity export model over the long-term horizon as the technological gap widens. Over time, this will send export and budget revenue lower, entailing a drop in the country's share of global GDP and in household incomes.

Box 5. Climate Agenda in Asia

The study covers ten jurisdictions: China (including Taiwan), the Republic of Korea, Japan, India, Vietnam, Indonesia, the Philippines, Thailand, Pakistan and Malaysia (although Korea and Japan are among the hostile countries group limiting foreign trade with Russia, the intense economic interaction with all of them justifies the analysis of the whole region).

All the countries but the Philippines and Pakistan are intent on achieving carbon neutrality mainly by 2050; the exceptions are China (by 2060), Indonesia (by 2060) and India (by 2070). Thailand intends to achieve carbon neutrality (net zero CO₂ emissions) by 2050, and net zero emissions of all greenhouse gases by 2065. Indonesia, having announced its goal of achieving carbon neutrality by 2060, engaged the IEA to develop a national strategy. The strategy [was presented](#) at the G20 Energy Transition Ministerial Meeting in September 2022.

According to the IEA,¹ the energy mix of almost all the countries under study is dominated by oil and coal, while the share of renewables is negligible. However, all the countries have until 2030 to significantly increase the share of renewables: by 30% (China) and up to 60% (Republic of Korea) – by lowering the share of oil and phasing out coal.

Emissions trading systems

Emissions trading systems (ETS) specify a cap on emissions and penalties if the cap is exceeded. We can see the emergence of a market for emissions trading allowances (in tonnes of CO₂ equivalent). As a rule, companies reducing their emissions by more than their caps act as sellers and those exceeding their caps are buyers.² The system works in the Republic of Korea and China, as well as in India and Japan (in the latter two, it is operated by individual states/prefectures).

[The Korean ETS](#), launched in 2015 (K-ETS), covers 684 companies and tracks both direct emissions (Scope 1) of greenhouse gases and those related to electricity production (Scope 2). National financial intermediaries (third parties) have access to the secondary market for trading in emissions permits: since December 2021, twenty such companies have been admitted to the carbon market. The Korean ETS is open only to residents; emissions allowances are distributed by the government (directly or at an auction) to companies obliged to join the ETS.

[China's national ETS](#) was launched in mid-2021 (with a number of pilot projects having been implemented since 2013) and covers only one sector to date – electricity generation by coal and gas plants. The system accounts for about 40% of all China-produced CO₂ emissions (of the 2020 volume). Allowances are allocated based on the national method of comparative analysis, whereupon the calculated average carbon intensity of key sectors and products are compared with that of individual issuers. Each issuer within the ETS is entitled to allowances that are equal to its confirmed emissions. A company that successfully reduces the [carbon intensity](#) of its production sells the surplus.

Carbon tax

As of the end of August 2022, national carbon regulation is in effect in [Japan](#) and [Thailand](#).

Japan imposed a carbon tax on fossil fuels back in 2012. The tax depends on the environmental impact and is collected in several stages: in the course of production or import and in transportation from the

¹ [IEA website](https://www.iea.org/countries) (<https://www.iea.org/countries>) provides benchmarking data for all the countries under study.

² *The International and Comparative Law Research Centre, the Centre for Strategic Research, and the Centre for Economic Infrastructure. The effects of various forms of carbon price for reduction in greenhouse gas emissions and for social and economic development (2022).*

¹⁶ In particular, in spring 2022 Enel, Vestas and Fortum – major players in the renewable energy market – announced their exit from Russia.

plant or when the purchase transaction is made. The carbon tax rate has increased gradually to the current 289 yen (approximately \$2.2 per tonne of CO₂). The unit tax rate for each type of fossil fuel is calculated to account for the carbon content percentage. The tax revenue is spent to reduce greenhouse gas emissions in the energy sector, which accounts for a significant part of domestic emissions.

Thailand has imposed a tax on carbon-intensive raw materials and environment-damaging finished products (oil, cars, motorcycles). The tax rate depends on the level of CO₂ emissions. Market players are subject to the Polluter Pays principle: the carbon tax is levied on producers of environment-damaging products in respect of environment-damaging raw materials. As regards vehicles (excise tax on cars with an internal combustion engine specifically pertaining to the part of the tax dependent on the level of emissions), tax costs pass on to consumers, with the rate priced in finished products. Regulation is expected to be expanded to cover carbon-intensive production as well as coal and gas.

In Indonesia, Malaysia and Taiwan, a carbon tax is due to be introduced in 2023–2025. Moving forward, other countries are poised to enact carbon regulation, since the introduction of a national ETS is known to trigger carbon leakage. Nevertheless, major greenhouse gas issuers (India and China) have yet to announce the intention to impose a carbon tax in the near future.

Asian countries have yet to define their positions on cross-border carbon regulation. Certain non-price restrictions include various labelling programmes whereby products are optionally labelled with the green mark. These, among others, include GreenPro (India), Green Mark Program (Taiwan), and Green Choice Philippines (the Philippines).

Requirements for sustainability disclosures

In most of the countries under study, sustainability reporting is mandatory for public companies with listings on national exchanges (Japan, India, Vietnam, Indonesia, Taiwan, and the Philippines). In Japan, companies must disclose such information in accordance with TCFD³ recommendations. In India and the Philippines, regulators have developed their own standards based on international rules (TCFD, GRI,⁴ SASB⁵). In China, the Republic of Korea and Malaysia, the disclosure of sustainability information, while still a recommendation, is to become mandatory from 2025.

Strategies adopted by financial institutions

Some financial institutions in Asia are adopting sustainable development policies intended to reduce or fully roll back financing for brown projects.⁶ Similar approaches are likely to be adopted by increasingly more financial institutions in the future.

The climate agenda of Asian countries is overall slightly less challenging, with none of them planning to achieve carbon neutrality before 2050, and they are somewhat lagging behind western countries. Nevertheless, the energy transition in Asia is very likely to accelerate and bring tighter regulation for several reasons. On the one hand, this development is driven by the need to deliver on national plans for carbon neutrality, which have been in the works over the past few years. On the other hand, as western countries make audacious upgrades to their nationally determined contributions (NDCs), Asian countries exporting their products to the West will be forced to respond.

³ Task Force on Climate-related Disclosures.

⁴ Global Reporting Initiative.

⁵ Sustainability Accounting Standards Board.

⁶ For example, [Federal Bank Limited](#) (India), [Rizal Commercial Banking Corporation](#) (the Philippines), [Cathay United Bank](#) (Taiwan), [E.Sun Financial Holding Company](#) (Taiwan).

1.2. Climate physical risks. Increasing dangers

Climate transition and physical risks are closely interrelated in the long term. The more aggressive the decarbonisation policies, the higher the transition risks and lower the physical risks in the future (certainly, the long lag of the impact of climate change policies means that physical risks are initially poised to increase). Conversely, a deferred green transition may substantially amplify future physical

risks and increase the frequency of natural disasters, resulting in the melting of permafrost, rising ocean levels and other climate changes – for all the reduction in greenhouse gas emissions.

All the aforementioned climate physical risks are relevant to Russia. According to Roshydromet,¹⁷ global warming is heterogeneous in space and season: the rate of growth of average annual temperatures in the territory of Russia after the mid-1970s is almost three times the global average, while spring warming in Western Siberia is three times faster than winter warming.

The total annual number of hazardous hydrometeorological phenomena (hazards) has remained unchanged over the last ten years compared to the previous decade, with their frequency increasing (**Box 6**) and the potential damage becoming increasingly more significant. The temperature of the upper layer of permafrost soils is growing in many cryolithic areas;¹⁸ some regions are marked by growth in the depth of seasonal melting. Particular concern is the ice-melting rate of the Arctic Ocean.¹⁹

The effects of climate physical risks, among others, were defined by the Intergovernmental Panel on Climate Change:

- storm surges, coastal floods and rising sea levels may result in loss of life and personal injuries and may damage infrastructure in low-lying coastal areas;
- abnormal meteorological events can cause disruptions in infrastructure networks, power supply, water supply, healthcare, and emergency response services;
- extreme heat can increase the risk of death and disease incidence, especially among vulnerable urban communities;
- warming, droughts, floods, volatile and extreme precipitation can dent food security and disrupt food systems;
- inadequate access to drinking water and water for irrigation, reduction in agricultural productivity in semi-arid areas may result in loss of income and means of living;
- reduced biodiversity in marine and coastal ecosystems can undermine ecosystem services²⁰ supporting human life in coastal zones, especially in the tropics and the Arctic.

According to the Atlas of Mortality and Economic Losses,²¹ extreme meteorological, climatic and hydrological phenomena (1970–2019) were behind more than 11,000 disasters globally that killed more than 2 million people and were responsible for \$3.64 trillion worth of damage. Given the great damage that physical risks would bring, the key outcome of the 27th UN Climate Change Conference was the [decision](#) to create the ‘loss and damage fund’ for vulnerable countries affected by climate disasters, to be financed by advanced economies.

Climate risks manifest themselves through traditional financial risks. For example, as natural disasters become more frequent, rising damages pass on to the balance sheets of insurance and reinsurance companies, while uninsured losses are borne by households, enterprises and governments. They may make a potential cascade effect on the entire financial system including the stock market, banks and non-bank financial institutions. Damage resulting from floods or wind storms can devalue assets pledged as loan collateral or lead to a complete loss of property, triggered among others by the realisation of credit risks related to mortgages. Growth in capital costs of maintaining production infrastructure due to the melting of permafrost can drive growth in total debt and, accordingly, in corporate debt loads. A decline in revenue and margins on the back of supply disruptions caused by natural hazards may also result in increased debt loads (Subsection 1.3).

¹⁷ 2021 Report on Climate Specifics in the Russian Federation, Moscow. The Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet), 2022).

¹⁸ The upper layer of the earth's crust where rock formation and soils are marked by negative temperatures and existing or possible underground ice.

¹⁹ Report on climate risks in the territory of the Russian Federation. The Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet), 2017).

²⁰ Ecosystem services are benefits that people gain from ecosystems (Millennium Ecosystem Assessment, 2005).

²¹ WMO Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970–2019) (WMO-No. 1267).

Total losses from the realisation of physical risks can lead to disruption in supply chains, pressuring corporate margins and individual assets and undermining stability in the financial sector and ultimately overall economic performance.

Currently, the lack of information on the realisation of physical risks makes it difficult to formulate an effective and holistic approach to their assessment. With still relatively low penetration rates of property insurance in Russia, there are no long time series for the realisation of risks of natural disasters and their fallout. Russian National Reinsurance Company (JSC RNPC) is working to set up an information centre to deal with floods and earthquakes. The Bank of Russia plans to set up, among other things, a process of collecting statistical and topographical information on the platform of JSC RNPC. Such databases would create opportunities to develop tools for quantitative assessment of climate risks, enabling a correct assessment of the risks of extreme natural phenomena and natural disasters.²²

Box 6. Occurrence of climate physical risks in Russia

Acute risks materialise in the short and medium term, while chronic risks emerge only in the long term, which is why it is difficult to assess their occurrence and scale.

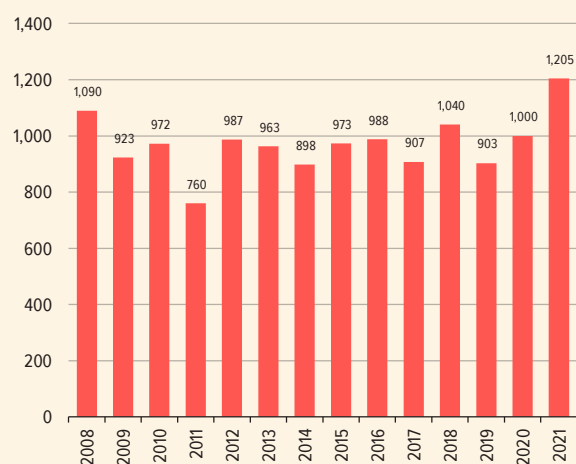
A hazard is a realisation of an acute risk. Between 760 and 1,205 cases of hazards were recorded in 2008–2021, with their all-time high registered in 2021. The total number of hazards was up 21% in 2021 vs 2020, with hazards that cause significant damage to the economy and households having grown 12%. Such hazards have been on an upward trajectory since 1996.

The key natural emergencies with the greatest damage to the economy include fires, floods and droughts. These natural phenomena emerge in consequence of hazards, especially in spring and summer.

According to the Federal Agency for Forestry, natural fires have been growing in scale in Russia. As an illustration, areas affected by fires were up threefold between 2009 and 2021.¹ The severity of floods is rising too. In its hydrological reviews, Roshydromet reports a higher frequency of cases in 2022 of water

NUMBER OF HAZARDOUS HYDROMETEOROLOGICAL PHENOMENA

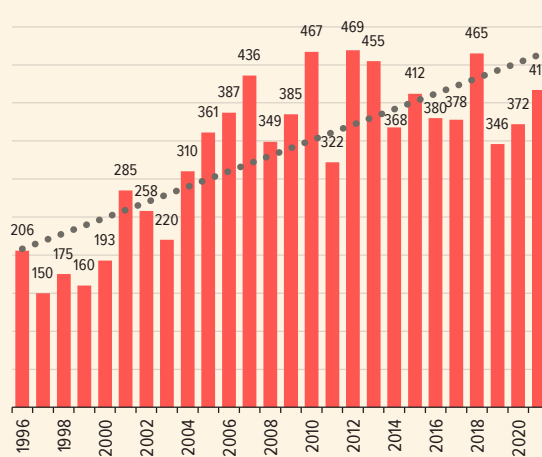
Figure 2



Source: Report on Climate Specifics in the Russian Federation (Roshydromet).

NUMBER OF HAZARDOUS HYDROMETEOROLOGICAL PHENOMENA WITH DAMAGE TO THE RUSSIAN ECONOMY AND POPULATION

Figure 3



Source: Report on Climate Specifics in the Russian Federation (Roshydromet).

¹ In part due to the inclusion of the Arctic zone in the fire service area.

²² Guidelines for the Development of the Russian Financial Market in 2023–2025.

rising beyond the mark signalling an adverse event² (the number of such cases has remained steady throughout 2020–2021). Also, higher intensity has been shown by droughts: based on Roshydromet data since 2012, the moisture content of agricultural lands has been in decline while aridity has been rising.

² Roshydromet's hydrological reviews of spring floods cover three years (2020, 2021 and 2022). These reviews provide a colour estimate of the hydrological situation by observation point, river and constituent entity in line with the following categories: water level below the flood plain (green), water level above the flood plain (yellow), above the adverse event mark (orange), and above the hazardous event mark (red).

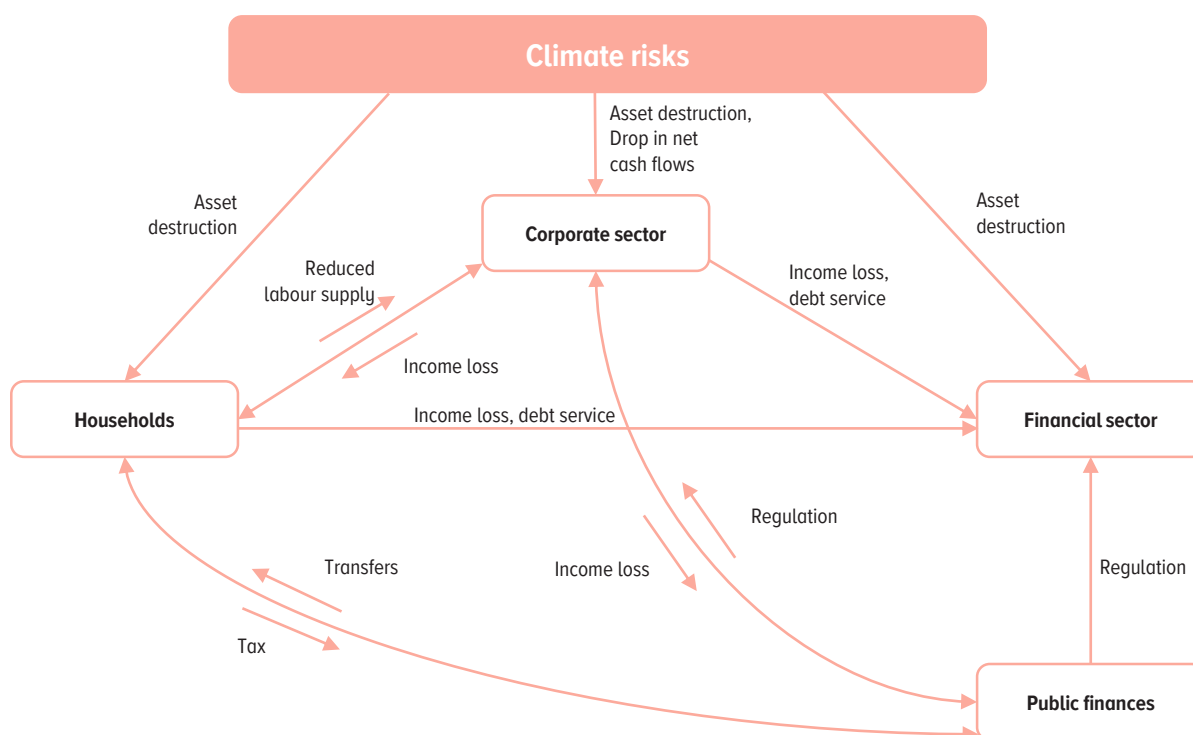
1.3. Climate risks and financial stability

Through direct and indirect channels, climate risks affect economic entities: the corporate, financial, and public sectors and households by impairing assets, reducing income, triggering the need to introduce regulation or changing the labour market, among others (Figure 4).

The core conduit of climate risks to the economy and financial stability is the corporate sector with its passthrough effects on other entities (households, the financial and public sectors). This effect particularly shows in an economy with highly concentrated debt incurred by corporate borrowers that are heavily exposed to climate risks.

IMPACT OF CLIMATE RISKS ON THE ECONOMY

Figure 4



Source: Bank of Russia.

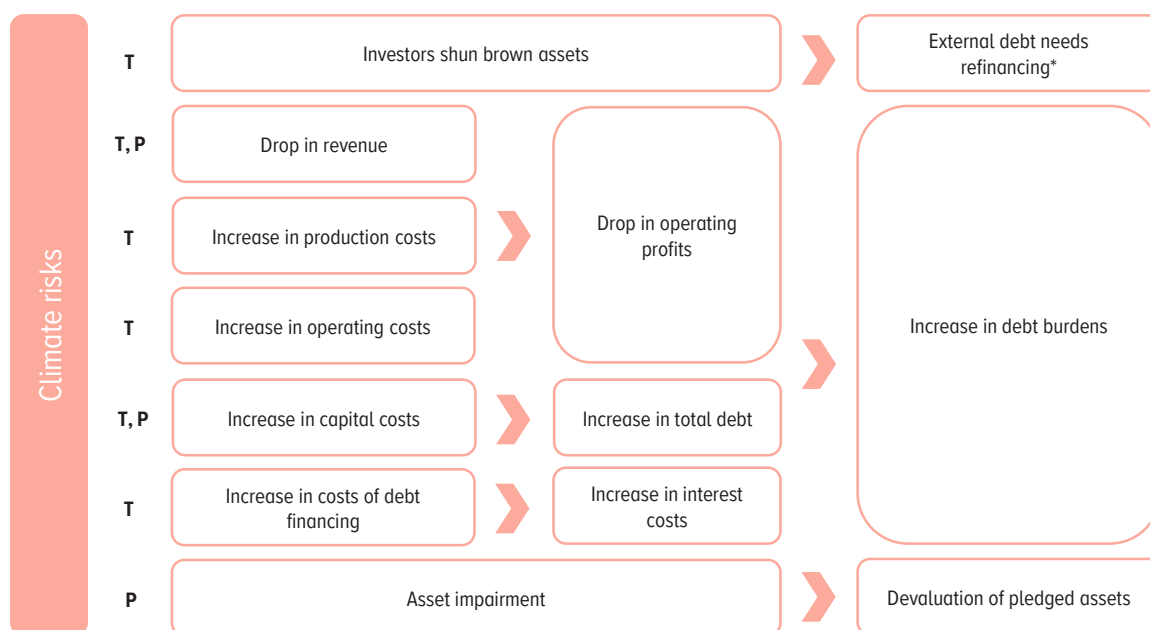
Impact of climate risks on the corporate sector

There are several channels through which climate risks simultaneously feed into the corporate sector (Figure 5).

Physical risks can occur as one-time events (for example, a mine destroyed by a flooding) and regular phenomena (annual fires caused by high temperatures). They disrupt business processes,

IMPACT OF CLIMATE RISKS ON THE CORPORATE SECTOR

Figure 5



P – Physical risks
T – Transition risks

* The risk has materialised.

Source: Bank of Russia.

cause a decline in revenue (following loss of the source of income), an increase in capital costs (needed to restore the infrastructure) and asset devaluation (since the damage reduces the value of corporate assets, affecting balance sheets and market indicators).

Three key drivers are behind transition risks: climate policy, technological innovation, and changes in consumer preferences and expectations. Corporate policies aiming to neuter the impact of climate risks (upgrading equipment to reduce the carbon footprint of products), as well as technological innovations (carbon capture, utilisation and storage technologies) require more capital costs and additional investment to pursue the climate agenda. Changes in regulation in the context of climate change policies (for example, setting up an emissions trading system) entail a drop in revenue among other things, necessitating more investment to reduce the carbon footprint of products. Technological breakthroughs (safe-to-use carbon capture, carbon capture, utilisation and storage or generating cheap green energy) are expected to bring about structural changes that will come with further investment. Changing customer preferences will put negative pressure on corporate cash flows and trigger the need for additional investment to deliver on climate strategies and mitigate transition risks.

Up until 2022, one of the key channels through which the global climate agenda impacted on Russian exporters was the external debt channel, with many major companies being financed mainly from abroad, whereas western investors are now reducing their exposure to the risks of brown companies. Following the imposition of sanctions, this channel is losing relevance, but domestic creditors and investors, which also seek to diversify risks, are becoming increasingly relevant.

As a result, materialising cumulative climate risks will not only undermine financial performance, but will also push up debt burdens, devalue assets and increase the costs of fund raising for corporates.

Impact of climate risks on the financial sector

Climate risks affect the financial sector directly as physical and transition risks, but the main impact is indirect and comes in the form of influence on borrowers (Figure 6).

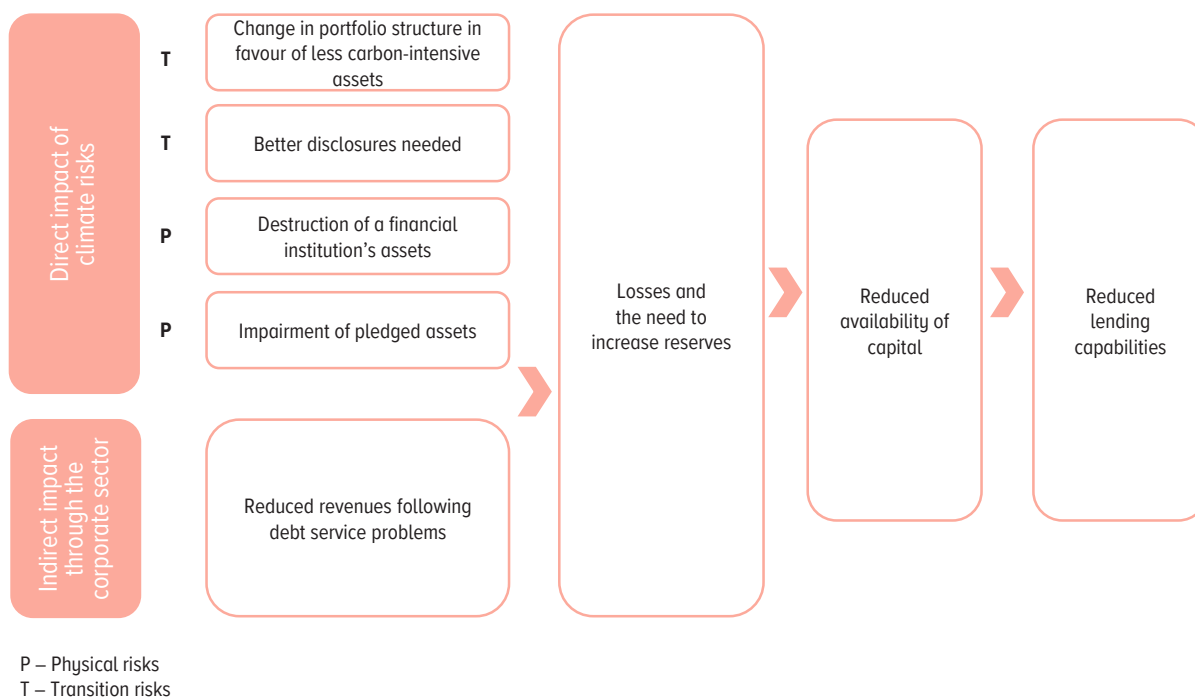
Physical risks may directly affect corporate portfolios (through devaluation of assets following a climate disaster), corporate capital (destruction of offices of a financial institution following abnormal weather conditions) or borrowers by impairing collateral (assets destroyed by a climate disaster). Transition risks materialise primarily as a drop in revenues of financial institutions as borrowers struggle to meet their debt servicing obligations, as well as through the need to overhaul the portfolio structure to capture more reliable borrowers.

Overall climate risks affect banks and non-bank financial institutions in traditional risk categories.²³

1. **Credit risk.** A number of borrowers may struggle to service their debt (a higher PD – Probability of Default) with partial collateral depreciation, which would be the bank's losses in the case of borrower default (LGD – Loss Given Default). Banks would therefore run higher credit risks.
2. **Market risk.** Financial institutions may have to operate in conditions marked by high volatility or a declining value of financial assets including as a result of changes in investor preferences. As emerging physical risks emerge or carbon neutrality policies are enacted, technological innovations and investor, customer and consumer sentiment can all lead to a sharp devaluation in financial assets. For example, investors may show higher demand on borrower securities, which they consider to be greener and 'climate-smart'. Conversely, companies with heavy exposure to climate risks, as well as their financial instruments, are facing a drop in demand, which lowers the value of equity and bonds in financial sector portfolios.

IMPACT OF CLIMATE RISKS ON THE FINANCIAL SECTOR

Figure 6



Source: Bank of Russia.

²³ *The green swan. Central banking and financial stability in the age of climate change. BIS, January 2020.*

3. *Liquidity risk.* The energy transition and adverse natural phenomena can affect the liquidity of financial institutions. When brown assets are used as collateral to raise funding, their sale in the face of strengthening transition risks may become a challenge, putting pressure on financial institutions with massive brown investments. In addition, if a bank's financial standing deteriorates as a result of the realisation of credit or market risks, the bank may struggle to refinance its obligations. Materialising physical risks can lead to a sharp increase in the demand of financial institutions for liquidity, forcing affected economic entities to withdraw deposits and solicit more loans.
4. *Operational risk.* Materialising physical risks may lead to interruptions in telecommunications services, loss of fixed assets and retirement from the labour force, or create other operational risks for financial institutions. The impact of the energy transition on operational risks can materialise primarily as risks of reliable energy supply.
5. *Legal and reputational risks.* Financial institutions face reputational risks when financing or providing services to companies or projects that are environmentally unfriendly or that negatively affect climate. The negative perception of environmentally unfriendly operations may have adverse implications for the ability to maintain business relations, capture and retain customers. Failure to meet commitments under greenhouse gas reduction strategies will also have an adverse effect on financial institutions. Financial companies may also have to deal with lawsuits related to their environmentally unfriendly practices of the past.
6. *Insurance risk.* Insurance and reinsurance companies may become exposed to this type of risk if they underestimate insurance product risks as the occurrence and scale of adverse natural phenomena grow; this is often the case in the field of green and transition technologies due to lack of data. Furthermore, a tightening in state policies may provide for higher fines related to environmental damage.

Physical and transition risks also create **systemic risks for the financial sector, which can materialise in the medium and long term:**

- *Tightened and more focused requirements for exposed industries and major companies.* With overseas funding unavailable due to sanctions, growing risk concentrations for the Russian banking sector and the broader financial system originates from industries exposed to transition and physical risks. The Russian banking sector is traditionally marked by a very sharp focus on major corporate borrowers and the trend expected to continue.
- *Contagion effects within the financial sector.* Even if individual financial institutions may escape direct exposure to substantial climate risks, such risks may still mount on the back of spillover effects: for example, holders of debt of financial institutions that are directly exposed to transition or physical risks may face impairment of their portfolios.
- *Contagion effects between the financial and other sectors.* The intense interrelationship of sectors results in the problems of one sector amplifying the problems of others, with feedback effects. For example, compromised fiscal stability entails negative revaluation of government bonds in the portfolios of Russian banks, alongside increased costs of borrowing in the broader economy.
- *The risks of a bubble emerging in the market for green assets.* A bubble may emerge in the market for green assets if investors show excessive demand for such assets. Also, market players may overestimate the long-term competitiveness of green technologies.

2. ADVANCING CLIMATE RISK ASSESSMENT IN THE FINANCIAL SECTOR

A proper assessment of climate risks requires consistent, detailed and uniform disclosure of data on emissions and measures being enacted to reduce environmental effects, as well as other types of data. The lack of such data is a major problem in climate risk analysis and stress testing. Over the past few years, financial regulators have been closely watching disclosures of climate-related information by public financial and non-financial institutions. In this vein, the Bank of Russia has consistently elaborated recommendations for climate disclosures. However, in the face of unprecedented sanctions enacted in 2022, Russian companies and the financial sector were allowed to limit the publication of financial statements to protect sanctions-sensitive information, to the effect that non-financial statements are no longer fully disclosed. Some companies are carrying on with sustainability disclosures, but the practice of disclosures in corporate reports has overall deteriorated. A further adverse effect came from the exit of western information providers. Over the next few years, Russian issuers will have to strike a balance between minimising sanctions risks and disclosing the necessary information about their exposure to climate risks.

2.1. Newly balanced disclosures

At the moment, we are seeing the emergence of harmonised approaches to climate disclosures. The International Sustainability Standards Board plans to issue two first standards in this field¹ in early 2023. IFRS² S1 'General Requirements for Disclosure of Sustainability-related Financial Information' and IFRS S2 'Climate-related Disclosures'.

In November 2022, the European Parliament adopted the Corporate Sustainability Reporting Directive (CSRD), according to which all large companies, issuers whose shares are admitted to public trading (except for micro-sized businesses) and foreign companies operating in the EU will be required to disclose how their operations recognise sustainability issues including climate change issues. The document supersedes the Non-Financial Reporting Directive (NFRD) and expands the scope of companies covered by the disclosure obligation (from 11,700 to 49,000) and the list of such information. The CSRD passed its final stage of approval and came into force in December 2022. Under the directive, companies will be required to disclose information in accordance with technical sustainability reporting standards (ESRS)³ starting from 2025–2029 (depending on company size).

The Bank of Russia has also consistently implemented measures aimed at developing sustainability disclosure practices in public companies. The regulator published recommendations for public joint-stock companies as to which aspects of their operations related to sustainable development be disclosed,⁴ alongside regulator-recommended responsible investment principles.⁵ One of them is the principle 'How investors should approach responsible investment and disclose information on their working approaches'.

A Bank of Russia monitoring study of disclosures by public companies whose shares are included on the quotation lists of exchanges (further, PJSCs on the QL) found that GRI, SASB, TCFD and other

¹ The exposure drafts were published in March 2022.

² International Financial Reporting Standards.

³ European Sustainability Reporting Standards.

⁴ Bank of Russia Information Letter No. IN-06-28/49, dated 12 July 2021, 'Recommendations for a Public Joint-stock Company to Disclose Non-financial Information Related to Its Operations'.

⁵ Bank of Russia Information Letter No. IN-06-28/111, dated 15 July 2020, 'Recommendations for the Implementation of Responsible Investment Principles'.

international standards for sustainability disclosures were already applied by a number of Russian companies in their 2021 reports, but the practice was limited to major non-financial companies. Corporate approaches to collecting data on exposure to transition risks are non-uniform, as are approaches to the integration of ESG factors and sustainability issues that enable the assessment of relevant risks. This is why regulatory requirements aimed at minimising climate effects on financial stability are hard to draft and enact.

Even in the current geopolitical situation, discussions are ongoing around possible sustainability disclosures by both financial and non-financial institutions. In line with a decision by the Government of the Russian Federation made to minimise the fallout of sanctions pressure, securities issuers and insiders exempt from the requirement of disclosing sensitive information until 1 July 2023. In this vein, as decided by the Bank of Russia Board of Directors, limits on disclosures also apply to financial institutions. About half of public companies whose shares and/or bonds are admitted to organised trading have to various degrees adjusted down their disclosures including financial statements.⁶

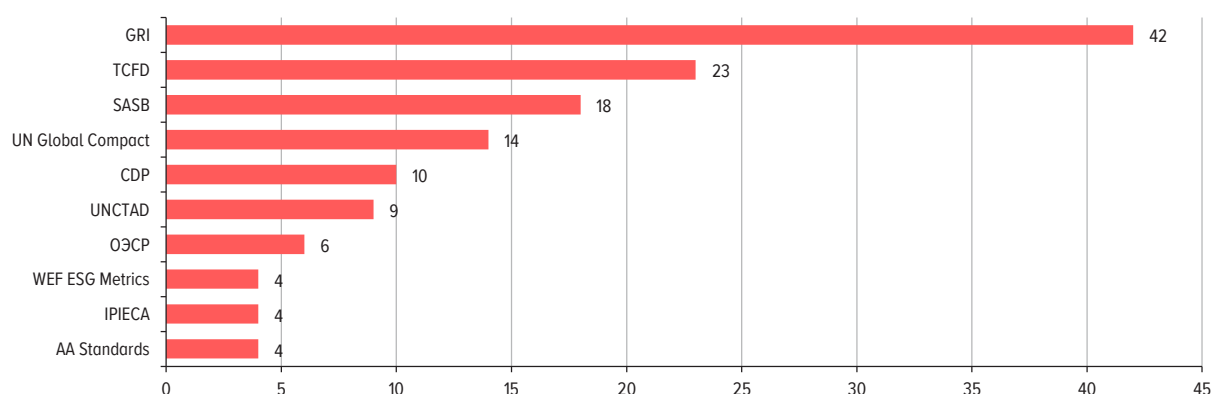
At the same time, the right of limited information disclosure is a temporary measure that does not reverse the general principle of information transparency in the financial market. Disclosures are indispensable to the development not only of sustainable financing instruments and of fundraising for sustainable development, but also to capital flows subsequently allocated to projects aimed at technological sovereignty and economic modernisation.

The near-term agenda of the Bank of Russia includes the goal to ensure the availability of information, including on sustainability, which is critical to investment decisions, to enable fair pricing of financial instruments and an effective financial market, consistent with priorities set by the Government of the Russian Federation. The Bank of Russia will make further efforts towards refining a methodological framework that would cover both non-financial and financial institutions.

The release of recommendations for sustainability disclosures by financial institutions is planned for 2023 in the form of a Bank of Russia letter of information. Overall, the efforts to encourage detailed disclosures will assist in fuller integration and mitigation of climate risks. The results of public consultation will define the subsequent recommendations to financial market participants.

TEN MOST COMMON INTERNATIONAL STANDARDS FOR SUSTAINABILITY DISCLOSURES OF PUBLIC JOINT STOCK COMPANIES WITH SHARES ON QUOTATION LISTS OF EXCHANGES (PJSCS ON THE QL)*

Figure 7



* In accordance with the monitoring study of sustainability disclosures by PJSCs on the QL in 2021. Annual reports, which included sustainability information and/or sustainability reports of 69 PJSCs were considered. Note. PJSCs on the QL can use several global standards simultaneously.
Source: Bank of Russia.

⁶ Financial statements are understood to be consolidated financial statements (financial statements) and/or accounting (financial) statements.

The Bank of Russia intends to monitor their implementation, taking into account their potential integration into statutory requirements.

Moving forward, once global standards for sustainability disclosures are in place, a number of provisions may become part of regulation.

2.2. Integration of climate risks by financial institutions

In effect, all recommendations by global organisations and national regulators for the treatment of climate risks are based on the principle of integrating climate-related risks into risk management systems of financial organisations. Financial institutions must have the toolset to enable the identification, assessment, monitoring and management of climate-related risks.

Regulators around the world are largely taking a soft approach to how financial institutions should recognise climate risks. This approach encourages financial institutions to undertake stress tests on different time horizons to assess climate change effects and analyse the impact of climate risks on credit, market, operational and liquidity risks. Examples here are Bank of Russia recommendations for insurers⁷ and individual financial market participants⁸ with regard to climate risks.

Tight regulation (statutory requirements) is less common, but in recent years many regulators have either announced plans to introduce ([Canada](#), the [USA](#)) or have introduced ([Switzerland](#), [New Zealand](#), Brazil, [Hong Kong](#)) such requirements for climate disclosures.

Box 7. How foreign regulators encourage integration of climate risks by their supervised entities

Over the past few years, **international organisations** have made significant progress in **developing standards for how climate risks must be treated** by financial institutions: the Network for Greening the Financial System (NGFS), [as an association of central banks and supervisory bodies – for financial institutions](#), and the Basel Committee on Banking Supervision (BCBS) – for [banks](#), the IAIS – [for insurers](#), the International Organisation of Securities Commissions (IOSCO) for [asset managers](#), and the International Organisation of Pension Supervisors (IOPS) – for [\(pension funds\)](#). International organisations are chiefly focused on corporate governance, strategic planning and risk management systems (including stress testing). Industrial standards are adjusted to the specifics of a sector of the financial market (e.g. underwriting principles for insurance companies). In 2022, a Financial Stability Board (FSB) [report](#), recommended that regulators in the shortest possible timeframe set out the scope of information that is critical to successful supervision related to climate risks and that future regulatory approaches take into account **the systemic impact of climate risks on the financial sector**. Furthermore, the International Sustainability Standards Board (ISSB) unveiled in spring 2022 draft [global requirements](#) for capital market participants to disclose information on climate and sustainability risks management and strategies to mitigate them. In addition, the NGFS is working to design universal **stress test scenarios¹ for regulators and financial institutions' climate risks**. The scenarios include both a gradual and unforeseen transition to a low-carbon economy (for example, following a drastic change in market conditions), as well a scenario assuming inaction to slow climate change.

Based on recommendations by international organisations, **many national regulators** have begun to integrate climate risks into their supervisory processes. According to a NGFS [survey](#) of 53 supervisory bodies, already 78% of respondents in 2021 incorporated climate risks in their supervisory practices.

The principles governing climate risk integration into corporate governance are fairly uniform, assigning this responsibility to a board of directors (supervisory board) and cascading it to responsible employees. A number of countries already have stringent requirements for corporate governance to take

¹ The scenarios are updated as macroeconomic conditions change. The [scenarios](#) were last updated in September 2022.

⁷ Bank of Russia Information Letter No. IN-015-53/1, dated 12 January 2021, 'On Factoring in Climate Risks'.

⁸ Bank of Russia Information Letter No. IN-015-38/64, dated 17 August 2021, 'On Factoring in Climate Risks in the Activities of Certain Financial Market Participants'.

into account climate risks. For example, in [China](#) for banks and insurers, in [Great Britain](#) for major retirement benefit schemes, and in [Hong Kong](#) for major asset managers.

Regulators are publishing recommendations for their supervised entities (e.g. [the EU](#)) or requirements ([Hong Kong](#)) for climate risks to be integrated into risk management systems and stress tests. The Prudential Regulation Authority of the Bank of England (PRA) was the first to [release](#) such recommendations for banks and insurance companies in April 2019. Thereafter, regulatory expectations regarding climate risk management were published by multiple other regulators including the [European Central Bank \(ECB\)](#), [BaFin](#), MAS ([for banks, insurers](#), and [asset managers](#)). Also, **regulators themselves conduct stress tests for climate risks of their supervised entities**, based on a top-down (the EU, Korea, Japan) and bottom-up methods (e.g. Hong Kong, France, South Africa). NGFS scenarios are applied in [22 supervisory stress tests](#). In making strategic decisions, financial institutions across the globe are **recommended to develop a clear understanding of the implications of climate-related risks for their business environment over different time horizons** (for example, based on scenario analysis or stress tests). This is the case of recommendations in the [EU](#), statutory requirements in [Finland](#), pending requirements in [the US](#), and supervisory expectations in [Canada](#).

Further details on approaches by international organisations and regulators to climate risk assessment are presented in the Appendix.

Prerequisites for the effective integration of climate risks into risk management systems⁹

It is advisable for organisations to structure their climate risk management on the basis of their general risk management principles.

The appropriate awareness of shareholders (participants), board (supervisory board) members, members of executive bodies and key executives about the organisation's exposure to climate risks helps in its most effective integration into the risk management system. The understanding of the causes for climate change and assessments of the current situation and future developments alongside their implications for corporate operations in the short, medium and long term are the starting point for the climate agenda of both the board of directors (supervisory board) and executive bodies.

The defining role in climate risk management is best played by the board of directors (supervisory board). It must articulate the common vision and relevance of the climate agenda for the organisation and make strategic decisions on how climate risks are integrated in business procedures and corporate practices (including strategic and business planning, budgeting, investment and project management, operations). To ensure an in-depth understanding of the climate agenda, the board of directors (supervisory board) may choose to delegate climate agenda issues to its committees (the risk committee, audit committee, strategy committee, etc.).

Executive bodies should play a key role delivering on the corporate climate agenda and be responsible for adopting new practices in climate risk management and their integration in operational and business processes.

In the absence of the board of directors (supervisory board), the key role in formulating principles and approaches to climate risk management may be assigned to executive bodies operating in close interaction with shareholders (participants).

Key principles underlying the integration of climate risks in risk management systems

Interconnections. Integrating climate risk is impossible without collaboration across the whole organisation. The interconnection principle suggests that all structural units participate in

⁹ Based on: [Task Force on Climate-related Financial Disclosures Guidance on Risk Management Integration and Disclosure \(2020\)](#).

the integration of climate risks into operational processes and risk management, supporting and developing relevant functions.

Temporal Orientations. Physical and transition risks should be analysed in the short, medium and long term for the purposes of operational and strategic planning, possibly beyond standard planning horizons.

Proportionality. The integration of climate risks into existing risk management processes should be proportionate to management of other corporate risks, the materiality of its exposure to climate risks and implications for the corporate business strategy.

Consistency. The methodology used to integrate climate risks should be used consistently within a company's risk management processes to support clarity on analysis of climate risk effects and their changes over time.

Integrating climate risks into risk management processes: first steps

The Bank of Russia believes that the effort to integrate climate risks into current risk management processes of financial institutions is best broken down in the following steps.

Step 1. Develop general internal documents outlining the concept of climate risks and the potential consequences of their realisation for the organisation and its partners.

Step 2. Assign structural divisions responsible for the integration of climate risks and process adjustment needed to integrate climate risks into risk management processes.

Step 3. Integrate climate risks into the current list of risks the organisation monitors and governs. Compare then climate risks to current categories and types of risks (to establish for which of them climate risks are relevant). Alternatively, the organisation may classify climate risks as a separate risk category.

Step 4. Adjust current processes and key components of the risk management system based on the results of previous stages and the description of climate risks.

Box 8. Integrating climate risks: best global practices in the financial industry

Multiple surveys and studies¹ suggest that global financial institutions are taking greater action to incorporate climate risks in their operations. This largely comes as a result of regulators' climate-related supervisory expectations with regard to financial institutions.

According to a [survey of approaches to climate risk management](#)² at least 91% of 78 largest financial institutions³ view climate change not only as a risk but also as an opportunity. The climate agenda is expected to affect corporate strategies, current financial products are projected to adjust to new conditions as new products and services come into the market. Already, some 70% of respondent companies rely on scenario analysis for their climate risk assessment.

In another [analysis](#) conducted by GARP in 2022 based on data of the previous survey, 25% of companies were found to be most advanced in the field of climate risk management⁴ and profiled as follows:

1. The board of directors in all the companies has assigned responsibility for effective supervision of climate risks; no less than four times a year, it reviews climate-related documents outlining the alignment of its portfolios with zero carbon goals, corporate approaches to financing, insurance and investment in the most carbon-intensive industries, and strategic risks and opportunities for the company.

¹ Global research conducted by independent companies; reviews covering individual jurisdictions or regions (Asia, Europe) to assess the alignment of climate risk practices of financial institutions with regulatory expectations.

² The survey was conducted in 2021 by the Global Association of Risk Professionals (GARP) Risk Institute.

³ It covered 47 banks, 20 asset managers and 11 other financial institutions (insurance companies, infrastructure organisations) providing services across the globe. Assets of the financial institutions surveyed total about \$46 trillion; assets under management total about \$36 trillion.

⁴ The companies were assigned climate risk leaders status. The survey was carried out in 2022 on the basis of data previously obtained.

2. The companies' business operations take into account both types of risks: transition and physical risks.

3. The companies have specific targets/thresholds for effective risk management.

An [EU study into how European banks take into account climate and environmental risks](#)⁵ found that the EU banking sector's practice of climate change and environmental risk management has yet to meet statutory requirements. Climate and environmental risk management practice is in place at over 85% of banks that are now able to measure their exposure to climate risks, assign responsibilities within the organisation, operate key performance and risk indicators, and devise mitigation strategies for certain risks. However, the methodological frameworks in such practices remain immature. Most banks (96%) are chiefly focused on risk distribution by region and portfolio, accounting for all significant risk factors; although about 55% of banks have indeed developed climate and environmental risk management policies and procedures, they have yet to implement such policies and procedures in relation to their portfolios or loan approvals. The ECB highlights the best management practices in the field of climate and environmental risks:

- scientifically sound medium and long-term climate goals of organisations are captured in corporate governance, risk management systems and risk appetite;
- advanced and detailed methods for data collection for quantitative risk assessment are developed and applied;
- capital adequacy assessment based on scenario analysis is in place;
- climate and environmental risks are part of internal rating models.

Banks have until the end of 2024 to become fully compliant with the ECB's supervisory expectations.

Asian countries show a wide variance in how financial institutions take into account climate risks in their corporate governance, risk management and business strategies. According to a [study](#)⁶, current efforts being made by major Asian banks are inadequate to deliver on national climate policy goals. Overall, 88% of respondents confirm the presence of sustainability modules in reporting. Nevertheless, many banks still fail to differentiate climate risks as a separate major risk category: climate risks were on the risk registers of only 10 (31%) out of 32 banks covered by the survey (mainly banks in Japan, Thailand and Malaysia).

The following findings were confirmed by a number of detailed studies in **Singapore** in 2021 that covered [banks](#), [insurance companies](#) and [asset managers](#):

1. Financial institutions assess existing climate risks in relation to their portfolios. Some have developed road maps with quantitative targets to improve risk management processes. They seek to ramp up sustainable financing or insurance.

2. Scenario analysis and stress testing are increasingly wider used at financial institutions. Most banks have begun preliminary assessments for the resilience of their business models to climate risks. The use of scenario analysis is less common among asset managers.

In **India**, an early 2022 [survey](#) of 34 major banks showed that less than one-third of banks have a strategy to implement ESG principles in their operations and to expand the portfolio of sustainable financing; this number of banks also integrated climate risks in their working risk management systems. However, about 56% of banks have developed such a strategy, or have plans to.

⁵ The ECB survey in 2022 covered as many as 186 banks (107 major banks supervised directly by the ECB and 79 smaller banks supervised by national regulators) with 25 trillion euros worth of total assets.

⁶ This survey was conducted in 2021 by Asia Research and Engagement (ARE), a consultancy. Covered were 32 banks operating in nine Asian markets: China/Hong Kong, Indonesia, Japan, South Korea, Malaysia, the Philippines, Singapore and Thailand. Their aggregate assets are worth \$33.5 trillion with \$18.6 trillion worth of loans issued.

Integrating climate risks into existing risk management systems

Certain characteristics of climate risks explain the need for new requirements in risk management. The proposed practices are grounded in established approaches¹⁰ and relate to all the five risk management functions.

1. Data collection

- Collecting data on direct and indirect exposure of the organisation to climate risks: arranging the process. To arrange the data collection process, both external publicly available sources of information (business partner reports on exposure to climate risks, open data on occurrence of natural disasters) and questionnaires for business partners of the financial institution may all be used.

Given the lack of qualitative and quantitative climate data (Section 2.1), it is advisable that financial institutions request information directly from clients and borrowers to assess their risks and then the financial institution's. Data collected should be of value to both climate and environmental risk assessments since companies handle this task holistically. The model list of indicators is shown in Tables 1 and 2. This approach can be integrated into the management system.

Normalised values of indicators help companies juxtapose borrower risks in an industry by comparing such indicators as the intensity of greenhouse gas emissions, pollutants, water consumption, and energy efficiency. At the same time, the analysis of changes in absolute indicators makes it possible to assess the effect of measures being implemented to reduce the environmental fallout, based on how long the borrower has taken these risks into account, whether indicators are declining, and how significant the decline is. The presence of quantitative targets suggests that the organisation is deeply committed to delivering risk mitigation measures. Combined with qualitative indicators, this helps understand the environmental and climate profile of borrower risks thanks to a comparable database of indicators.

Importantly, not all financial institutions (e.g. non-state pension funds) can poll companies (whose risks they accept) in the manner of banks directly interacting with borrowers. This highlights the need to raise the quality of disclosures in order to improve data collection and for subsequent identification of risks.

¹⁰ For example, *Supervisory and Regulatory Approaches to Climate-related Risks*, Financial Stability Board (2022), *Good Practice Integration of climate-related risk considerations into banks' risk management*, DNB (2019), *Climate change. Managing a new financial risk*, Oliver Wyman & IACPM (2019).

LIST OF QUANTITATIVE INDICATORS TO BE REQUESTED FROM BORROWERS FOR ENVIRONMENTAL RISKS ASSESSMENT *Table 1*

No.	Indicator description	Unit of measurement
Quantitative indicators to be presented as a time series of values for the longest possible period of time, in annual terms		
1	Scope 1, 2 and 3 greenhouse gas emissions*	tonne CO ₂ equiv.
2	Normalised greenhouse gas emissions (by activity and geography)	tonne CO ₂ equiv. per product
3	Emissions of pollutants (type specified) into the atmosphere	t
4	Normalised emissions of pollutants into the atmosphere (type specified)	tonne per product
5	Total amount of energy consumed/generated (by source)	J
6	Normalised energy consumption (by source and activity)	J per unit of production**
7	Water use (by source)	m ³
8	Volume of reused water	m ³ or % of total use
9	Waste water discharged into water bodies and on the ground	m ³
10	Waste, hazard class I–V*** (if any)	t
11	Percentage of waste, hazard class I–V*** (if any)	% of total raw materials used
12	Percentage of recycled raw materials (if any)	% of total raw materials used
13	Areas contaminated ('disturbed land'****) as a result of business operations	ha
14	Remediated land area	ha
15	Penalty for negative environmental impact	RUB
16	Fines paid in the year for breach of environmental legislation	RUB
17	Compensation paid in the year for negative environmental impact/damage	RUB
18	Investment in efforts to mitigate negative environmental impact	millions of rubles
19	Investments in projects related to clean energy (nuclear, gas, hydrogen, based on renewable sources)	millions of rubles
20	Costs of environmental protection	millions of rubles
21	Probability of physical risks emerging in the company's footprint	%

* The most widely recognised Greenhouse Gas Protocol (GHG Protocol), is the recommended standard to calculate greenhouse gas emissions. Scope 1 data is the recommended minimum, considering that the practice of collecting information and reporting on greenhouse gases is in early stages of development.

** Disclosures on the use of green energy (nuclear, gas, hydrogen generation, generated from RES) are also recommended.

*** Federal Law No. 89-FZ, dated 24 June 1998. 'On Production and Consumption Waste', Order of the Ministry of Natural Resources and Environmental Protection of the Russian Federation No. 536, dated 4 December 2014 'Approval of Criteria for Waste Classification Into I-V Hazard Classes Based on Its Negative Environmental Effects'.

**** 'Disturbed land' (Form 2-TP, reclamation) is land affected by field development; contaminated a result of a leakage in transit of oil, gas, and petroleum products; affected in construction; in reclamation; in logging; in exploration; in the course of industrial and solid household waste disposal.

Source: Bank of Russia.

LIST OF QUALITY INDICATORS TO BE REQUESTED FROM BORROWERS FOR ENVIRONMENTAL RISK ASSESSMENT

Table 2

No.	Description of qualitative information
1	Non-financial disclosures in accordance with Bank of Russia recommendations and/or global standards (including TCFD and GRI)
2	ESG(E) ratings assigned, with relevant reports
3	Information on technological equipment (best available technologies)
4	Pre-action claim letters by environmental authorities
5	Policy to reduce greenhouse gas emissions and achieve carbon neutrality
6	Policy of reducing air pollutant emissions
7	Policy of reducing waste water discharge
8	Quantitative targets for lower greenhouse gas emissions
9	Quantitative targets for lower air pollutant emissions
10	Targets for lower waste water discharged into water bodies
11	Energy efficiency and energy conservation plans
12	Renewable energy plans
13	Plans to reduce intensity of water consumption, increase water reuse
14	Waste management plans, I–IV hazard class waste
15	Plans to increase recycling or disposal of waste
16	Biodiversity conservation plans
17	Investment in technologies reducing carbon footprint of products/water consumption/air emissions/hazardous waste, etc.
18	Investment in carbon capture, storage and disposal technologies*
19	The organisation has a criterion for assessing/selecting its suppliers (business partners) taking into account their environmental impact
20	Assessment of negative environmental impact of suppliers (business partners)
21	Assets in areas potentially affected by physical risks (droughts, floods, permafrost, fires, etc.)
22	Presence and level of detail of an asset protection policy for areas potentially affected by physical risks (droughts, floods, permafrost, fires, etc.)
23	Details of integration of climate risk and climate-related opportunities into corporate governance, including activities of management bodies, strategic planning, risk management systems, internal control and internal audit

* CCS – Carbon Capture and Storage, CCU – Carbon Capture and Utilisation and CCUS – Carbon Capture Utilisation and Storage.
Source: Bank of Russia.

2. Risk identification

1. Map out climate risks to identify potential risk concentrations by industry or region.
2. Conduct climate scenario analysis to ensure more balanced strategic business decisions are made. The objective of this practice is to identify new risk drivers in the short and long term. The scenarios in the analysis should cover both the standard business planning cycle (3–5 years) and longer-term horizons (5+ years).
3. Create an internal scoring map to assess the exposure of business partners to climate risks.
4. Compose the list of organisation-declared intentions in the climate agenda.

3. Risk assessment

1. Analysis of compliance with and/or performance against targets of the financial institution (and its clients) for a lower climate impact to minimise loss of clients.
2. Conducting stress testing to assess the materiality of climate risks (for banks, as part of ICAAP¹¹). Stress scenarios should include change trajectories for both physical and transition risk factors. Supervisory climate stress testing is under way at the Bank of England and the ECB. For

¹¹ Internal capital adequacy assessment processes.

CRITERIA FOR ASSESSING PORTFOLIOS OF FINANCIAL INSTITUTIONS

Table 3

No.	Indicator description	Unit of measurement
1	Quantitative indicators to be presented as a time series of values for the longest possible period of time, in annual terms	
1.1	Proportion of brown assets in the portfolio without climate transition strategies	% of total portfolio
1.2	Proportion of green assets in the portfolio	% of total portfolio
1.3	Carbon intensity of the portfolio, calculated as the sum of average weighted assets in the greenhouse gas emissions portfolio (Scope 1), divided by the book value of the portfolio*	
1.4	Share of ESG rated assets**	% of total portfolio
2	Qualitative indicators	
2.1	Policy including targets for a reduced proportion of brown assets without climate transition strategies	
2.2	Policy including targets for lower carbon intensity of the portfolio	

* The carbon intensity of an investment portfolio is measured by assets, and that of an insurance portfolio, by premiums.

** At the current stage, it is important that ESG rating is decoupled from the rating level, since the service is usually provided to companies with due regard for sustainability issues in their business

Source: Bank of Russia.

example, it was found in 2022 that most euro zone banks needed better recognition of climate risks in their internal models (for details, see the Annex).

3. Develop a methodology to assess the correlation between the carbon footprint of clients and climate risks of the financial institution. Financial institutions' exposure to climate risks is quantified by the following measurements:

- regulatory impact: the extent to which clients are directly subject to climate regulation (e.g. a cross-border carbon adjustment mechanism);
- impact of changes in preferences: the extent to which customers may be affected by changes in household and business preferences in relation to the use of carbon-intensive products;

Power of passthrough: the extent to which the client's climate risk can pass on to the financial institution through financing (for example, whether the impact emerges in the timescale of funding).

Assessments are best made on a periodic basis.

4. Risk mitigation

Implementation of measures to mitigate or avoid climate risks beyond the risk appetite of the organisation. Such measures should be developed in response to the financial institution's internal assessment of climate risk concentrations it is exposed to.

For example:

- tighter requirements (LTV – Loan-To-Value) for property used collateral that fails to meet sustainability criteria, or insurance of such collateral;
- the reasonable requirement for business partners / borrowers whose production directly depends on weather conditions that they insure themselves against extreme weather events (e.g. seasonal droughts); the existence of such an insurance policy may have relevance for the amount of the loan rate;
- mitigating the physical risk affecting the operations of the financial institution. The company can diversify its critical functions geographically (e.g. with regard to servers and data centres) by locating them in different regions in order to reduce risks that may affect operations (e.g. related to floods).

5. Risk monitoring

1. Integration of climate risk indicators into non-financial disclosures. These indicators should be objective and measurable metrics commensurate with the organisation's risk appetite (e.g. the concentration of carbon-intense assets, the carbon footprint of the overall portfolio and its components).

2. Integration of climate-related risk assessment into due diligence and customer and transaction approval processes. Such a climate risk assessment covers any physical and transition risks of the client and the way they can translate into any reputational risks to the financial institution.

3. POTENTIAL APPROACHES TO INCORPORATING CLIMATE RISKS IN REGULATION

As the economy undergoes transformation and adapts to new conditions, climate risks remain relevant given the fast pace of climate change, the occurrence of physical risks and the highly likely acceleration of energy transition policies and green agendas overseas. The introduction of a cross-border carbon adjustment mechanism may propel new economic partners to introduce a tax similar to the CBAM, which will eventually affect the Russian economy and its financial sector.

For all the risks to the climate agenda from sanctions pressure and the current economic situation, the forced accelerated transformation of the Russian economy may well bring a number of ‘greening’ opportunities. The Bank of Russia’s view on this matter is aligned with the position of the Government of the Russian Federation in that the climate agenda is invariably relevant to Russia and efforts need to be made for climate risks to be assessed and factored in.

In the context of advancing national and carbon border adjustment mechanisms around the globe, Russia has yet to complete the rollout of statutory disclosures of emissions information and its allowance experiments, as well as begin administering the circulation of carbon units (**Box 9**). Over the next decade, one of the most pressing issues will be netting domestic carbon payments when calculating fees under a carbon border adjustment mechanism, so the immediate task is to build a system consistent with the international legal framework to harmonise carbon regulation and enable the netting of carbon units.

Box 9. Development of carbon regulation in Russia

The Government of the Russian Federation approved on 29 October 2021 the Strategy for Social and Economic Development of the Russian Federation with Low Greenhouse Gas Emissions through 2050¹ (hereinafter – Strategy). The Strategy assumes an inertia and target scenarios, which differ in sets of measures to decarbonise the national economy. In the target scenario – which is preferred – the key objective is to ensure competitiveness and sustainable economic growth in the context of the global energy transition, striking a balance by no later than 2060 between man-made greenhouse gas emissions and their absorption.

The legal framework for national carbon regulation is Federal Law No. 296-FZ, dated 2 July 2021, ‘On Limiting Greenhouse Gas Emissions’ (Law No. 296-FZ). Russian carbon regulation is aimed at minimising the negative impact of production by reducing greenhouse gas emissions, including through climate projects. Their verified results are carbon units and emissions allowances (currently, as part of the experiment²).

Law No. 296-FZ establishes a procedure for setting targets for greenhouse gas emission and for assessing performance against such targets³ for the whole national economy and its individual industries, for obtaining reliable information on greenhouse gas emissions in economic and other operations of regulated entities,⁴ and for disclosure of reliable information to all stakeholders.

¹ Russian Federation Government Directive No. 3052-R, dated 29 October 2021 ‘Approval of the Strategy for Social and Economic Development of the Russian Federation with Low Greenhouse Gas Emissions through 2050’.

² Federal Law No. 34-FZ, dated 6 March 2022, ‘On an Experiment to Limit Greenhouse Gas Emissions in Certain Constituent Territories of the Russian Federation’ (Law No. 34-FZ).

³ The target for lower greenhouse gas emissions for the Russian economy is set taking into account the absorption of greenhouse gases by forests and other natural environmental systems.

⁴ Legal entities and individual entrepreneurs whose operations involve greenhouse gas emissions with a weight equivalent to at least 150,000 tonnes of carbon dioxide annually up to 1 January 2024, and to at least 50,000 tonnes of carbon dioxide annually up to 1 January 2024 (Part 1, Article 7 of Law No. 296-FZ) and those meeting the criteria specified in Russian Federation Government Resolution No. 355, dated 14 March 2022, ‘Criteria for Classifying Legal Entities and Individual Entrepreneurs as Regulated Entities’.

Law No. 296-FZ also sets out incentives to efforts being made to reduce greenhouse gas emissions and increase their absorption through government support of climate projects (specific measures are currently under development). All entities have the right to execute climate projects, according to Law No. 296-FZ. At the same time, statutory criteria are set for climate projects⁵ and ensure that confirmed (verified) information on their results⁶ is included in the carbon unit register.

In order to implement the provisions of Law No. 296-FZ, statutory acts of the Government of the Russian Federation regulate a register of greenhouse gas emissions,⁷ procedures for submitting and verifying reports on greenhouse gas emissions,⁸ for issuing emission units and for their transactions in the register,⁹ and for setting register operator fees.¹⁰

Delivery of measures provided by Law No. 296-FZ will see Russia reduce a man-made impact on the global climate system and its carbon footprint.

Experiment. The Sakhalin Region was the first constituent entity to begin the net zero experiment. It commenced in September 2022. Sakhalin Region aims to achieve carbon neutrality by 31 December 2025, with different timeframes for other participating constituent entities of the Russian Federation. The region is operating a special programme¹¹ aimed at decarbonisation and a transition to negative net emissions.

The experiment is intended to test a number of methods and approaches to monitoring and treating greenhouse gas emissions, delivering climate projects, accounting for and managing the circulation of carbon allowances.¹² Pursuant to Law No. 34-FZ, a regulatory framework has been developed to establish the period for emissions stocktaking,¹³ the procedure for classifying legal entities and individual entrepreneurs as regional regulated entities,¹⁴ the procedure for calculating and charging penalties for breach of allowances;¹⁵ several Government resolutions regulating the allowance framework were updated.

Administration of circulation. Over-the-counter circulation of carbon units became possible following the enactment, on 1 September 2022, of the above governmental acts regulating the launch and processes of the carbon unit register. JSC Kontur¹⁶ was chosen to act as register operator. It is possible to open a register account, register a climate project and carry out register transactions using the Unified Portal of Public Services.

⁵ Order of the Ministry of Economic Development of the Russian Federation No.248, dated 11 May 2022 'Approval of Criteria and the Procedure for Classifying Projects Executed by Legal Entities, Individual Entrepreneurs or Natural Persons as Climate Projects; the Form and Procedure for Submitting Progress Reports on Climate Projects'.

⁶ Russian Federation Government Resolution No. 455, dated 24 March 2022, 'Approval of Rules for Verification of Results of Climate Projects'.

⁷ Russian Federation Government Resolution No. 830, dated 7 May 2022. 'Approval of Rules of the State Register of Entities Making Negative Environmental Effects'.

⁸ Russian Federation Resolution No. 707, dated 20 April 2022, 'Approval of Rules for Submission and Verification of Greenhouse Gas Emissions Reports, of the Form of a Greenhouse Gas Emissions Report, of Rules of the Carbon Unit Register, and Amendments to Certain Acts of the Government of the Russian Federation'.

⁹ Russian Federation Resolution No. 790, dated 30 April 2022, 'Approval of Rules of the Carbon Unit Register and of Carbon Unit Transactions in the Carbon Unit Register'.

¹⁰ Russian Federation Resolution No. 518, dated 30 March 2022 'Procedure for Setting Operator Fees for Carbon Unit Register Transactions'.

¹¹ Approved by the Government of the Sakhalin Region 23 November 2021.

¹² Verified performance against statutory greenhouse gas emission quotas.

¹³ Russian Federation Government Resolution No. 678, dated 16 April 2022, 'The Stocktaking Period for Greenhouse Gases Emissions and Absorption for the Purposes of the Balance of Greenhouse Gas Emissions and Absorption in the Sakhalin Region'.

¹⁴ Order of the Ministry of Economic Development of the Russian Federation No. 247, 6 May 2022 'Approval of the Procedure for Classifying Legal Entities and Individual Entrepreneurs as Regional Regulated Entities Participating in the Experiment of Limiting Greenhouse Gas Emissions in Certain Constituent Entities of Russian Federation'.

¹⁵ Russian Federation Government Resolution No. 1390, dated 5 August 2022 'Approval of Rules for Calculation and Collection of a Penalty for Breach of Greenhouse Gas Emission Quotas in the Experiment of Limiting Greenhouse Gas Emissions in the Sakhalin Region', and No. 1441, dated 18 August 2022, 'The Rate of a Penalty for Breach of a Greenhouse Gas Emission Quotas in the Experiment of Limiting Greenhouse Gas Emissions in the Sakhalin Region'.

¹⁶ Russian Federation Government Directive No. 367-R, dated 1 March 2022 'The Legal Entity to Act as Operator of the Carbon Unit Register'.

The efforts to formulate approaches to carbon unit trading involved a study into the legal nature of carbon units as a traded commodity and the potential use of Russian financial market infrastructure for the circulation of carbon units. On 26 September 2022, JSC National Mercantile Exchange conducted the first carbon unit purchase and sale transactions.

In a similar vein, the Bank of Russia intends to continue its efforts in pursuit of the climate agenda, focusing on transition risks and their reassessment in new conditions as well as on physical risks, the impact of which has yet to be understood. Currently, a stress test scenario is being developed with regard to resilience to transition risks in new conditions, with tests scheduled for 2023. Furthermore, the Bank of Russia continues to monitor companies for their performance against environmental targets by assessing corporate strategies in the most carbon-intensive industries and the practice of sustainability disclosures.

To fully account for climate risks, the financial system needs to have regulation in place. Further analysis and refining of approaches to disclosures and the integration of climate risks into risk management in the financial sector lays the groundwork for these risks to be appropriately integrated into prudential regulation.

Given the key role of the banking sector in the transformation and development of the Russian economy, the Bank of Russia believes that at this point in time the integration of climate risks is feasible only into banking regulation, and it should be based on a set of micro and macroprudential principles in the regulation of transition risks.

3.1. Prudential regulation of banks

The Bank of Russia's microprudential approach envisages measures to incentivise banks to finance green and adaptation projects. This suggests that in the near future, the regulator has no intentions to sanction banks for their lending to brown borrowers (since this would propel banks to dial back such loans). At this juncture, such a regulatory stance would aggravate the financial position of brown companies, narrow their green transformation opportunities and bring extra social and economic risks.

On the other hand, as Chapter 1 shows, transition risks are an example of systemic risk with the entailing interrelationship effects and potential contagion effects. Incidentally, the inadequate transformation of brown companies, in the case of an accelerated energy transition, may carry profound implications for the financial sector, the state budget and the broader economy. At the micro level, market players including financial institutions may underestimate these risks due to a lack of information. Such risks are therefore traditionally taken into account through macroprudential policy tools thanks to their tactical advantage – flexibility with requirements that may be updated depending on how the situation plays out.

However, as countries implement their policies of transition to a low-carbon economy, brown companies are confronted with higher risks. In the future, macroprudential add-ons to risk weights in cases of funding to brown borrowers may be warranted (for the calculation of capital adequacy ratios) in order to limit systemic risks. To implement this approach, reliable infrastructure will be needed to enable independent assessment of borrower climate profiles (to justify the add-ons). It is currently in early stages of development.

The macroprudential impact may amount to incentives (in the form of risk weight add-ons) for major companies to disclose their climate risk exposures and mitigating measures.

By doing so, companies will have the opportunity to develop and implement green transformation plans, while banks will be able to better understand and assess climate-related borrower risks. Such measures can be used if necessary, but only after regulatory relaxations for the banking sector have been rolled back.

A combination of micro and macroprudential approaches will ensure a balance between the need for funding for the green transition and the need to limit excess risks in the financial system. Meanwhile, brown companies may in this way skirt the counterproductive pressure which would slow the economic transition towards lower emissions.

A similar regulatory approach may suit the treatment of physical risks: supporting long-term initiatives of risk reduction, encouraging disclosures, and data accumulation will enable financial institutions to correctly assess and manage these risks.

Subsequent revisions in regulatory approaches are possible as global recommendations and standards are issued.

Box 10. Climate risks in macroprudential regulation: best global practices

Regulators have been focused to date on *defining supervisory expectations for risk management practices* at financial institutions and on the rollout of climate disclosure requirements. There are *no globally coordinated approaches as to how climate risks should be factored in with regard to financial institutions' capital*.

Across jurisdictions, among analytical tools being brought into practice are *climate scenario analysis and stress testing*.¹ Their results are being gradually expanded and put to use when systemic risks are monitored and forecast. However, their findings have not warranted the rollout of additional micro and macroprudential measures since regulators accept that their climate stress tests may bring an incorrect/incomplete assessment of risks and vulnerability indicators, following data gaps in data and methodologies as well because of the limitations of climate risk models.² Nevertheless, already a number of jurisdictions have taken on intensive studies into the feasibility of prudential measures.

For example, *the Bank of England's Prudential Regulation Authority (PRA)* is looking into potential regulatory improvements *in terms of capital requirements*.³ The regulator acknowledges that *current prudential regulation does not fully meet requirements for climate risks*. According to the regulator, significant gaps include inadequate action in follow-up of scenario analysis results, a poor understanding of transmission channels for physical and transition climate risks, and data gaps. To address these deficiencies, the PRA intends to take the following actions over the next few years:

- *as regards banks*, find the balance between Pillar 1 measures⁴ (better aligned with the global practice) and Pillar 2 measures (better aligned with the national practice);
- *as regards insurers*, update the methodology for calculating capital requirements and solvency (Solvency Capital Requirement);
- *as regards macroprudential policy tools*, explore the potential introduction of a specific capital buffer to adjust for climate risks and its subsequent expansion; develop climate scenarios for the purposes of buffer adjustment.

The ECB and the European Systemic Risk Board (ESRB), in an effort to integrate climate risks into regulation, are exploring the option of applying a systemic risk buffer, that is, introducing additional requirements for bank capital to mitigate systemic risks.⁵ This buffer can extensively apply to all banks or banking groups exposed to sectoral risks or risks related to asset location. This targeted measure can add to the resilience of financial institutions in the face of materialising climate risks and create incentives to reduce exposure to them.

The ECB also notes the feasible option of a thorough overhaul of Pillar 1 requirements to bridge the potential gaps in how climate risks are captured. This would involve introducing caps on loan-to-value

¹ According to data as of mid-2022, climate scenario analysis exercises were complete, being implemented or scheduled in 32 jurisdictions that are FSB and NGFS members.

² FSB-NGFS Climate Scenario Analysis by Jurisdictions: Initial findings and lessons, November 2022.

³ BoE/PRA Climate-related financial risk management and the role of capital requirements, October 2021.

⁴ See for further details of the pillars in line with Basel II.

⁵ [The challenge of capturing climate risks in the banking regulatory framework: is there a need for a macroprudential response?](#) ECB, October 2021.

ratios (LTV) for loans to highly exposed sectors, increasing risk weights and measuring the early warning indicators: probability of default (PD) and loss given default (LGD).

A joint ECB-ESRB report⁶ notes that none of the existing macroprudential tools can work to reduce systemic climate risks without preliminary calibration. The document analyses the potential set of macroprudential tools for the banking sector. In addition to the system risk buffer as described above, they include upper limits on concentrations and measures at the borrower level. Concentration limits are intended to limit banks' investment in carbon-intensive industries and regions that are highly exposed to physical risks. At the borrower level, additional LTV and DTI requirements⁷ would apply to new mortgages depending on how exposed the real estate is to physical and transition risks.

The insurance sector invariably lacks the practice of macroprudential tools to reduce climate risks. Insurance and reinsurance companies in the European are recommended to consider climate-related systemic risks in their own risk and solvency assessment (ORSA) processes.⁸ In addition, the European Commission proposed that the European Insurance and Occupational Pensions Authority (EIOPA) regularly reviews solvency and capital requirements for insurance companies pertaining to underwriting risks, which may arise following inappropriate assessments of natural disaster risks.

Further details on approaches by international organisations and regulators to climate risk assessment are presented in the Appendix.

⁶ *The macroprudential challenge of climate change. ECB/ESRB. July 2022.*

⁷ *DTI is the debt-to-income ratio of a borrower.*

⁸ *EC COM/2021/581 Proposal for a Directive of the European Parliament and of the Council amending Directive 2009/138/EC. September 2021.*

3.2. Incentives to the financing of green and adaptation projects with regard to long-term risks

Given the long-term nature of climate risks and the need for proactive investment in the energy transition, the Bank of Russia is exploring the feasibility of incentive-based regulation to be introduced to boost lending capacity and mobilise funds in the banking system to fund green and adaptation projects. In particular, the regulator is exploring the option of reduced risk ratios to apply to new loans and investment in bonds which provide funding to such projects.

The implementation of accommodative measures with regard to green and adaptation projects can be carried out in the logic of risk-sensitive incentive-based regulation. The Bank of Russia is designing its concept for projects aimed at technological sovereignty and structural adaptation of the economy.

This approach is grounded in the following principles:

1. Banks reduce their long-term risks by providing finance to projects that contribute to economic sustainability. Support of such activities is important from the prudential viewpoint.
2. The scale of regulatory incentives depends on project relevance and credit risk. Preference will be given to projects that are, on the one hand, conducive to meeting targets for development (in the case of green and adaptation projects – execution of the energy transition, achievement of carbon neutrality) and, on the other hand, the least risky for creditors.
3. To avoid the underestimation of risks, the scale of incentives should be limited, based on the margin of resilience of banks and their ability to top up capital independently.

Differentiation of projects by level of significance

A full-fledged rollout of regulatory relaxations for green and adaptation projects will need the involvement of the Government of the Russian Federation and relevant sectoral agencies. Incidentally, criteria will need to be developed to identify green and adaptation projects of priority subject to their contribution to achieving national environmental goals. The appropriate benchmark here could

be a reduction in emissions in absolute terms (the taxonomy sets only relative criteria for lower emissions, for example by 20% or per unit of production). Another option would be prioritising by industry. For example, priority would be given to renewable energy projects or green transformation initiatives in the most brown industries. Absent such criteria for priority setting, the Bank of Russia could opt to introduce limited relaxations for projects of medium significance. Otherwise, the volume of regulatory relief for higher priority projects could be more substantial.

Capturing credit risks

For a project, all other things being equal, the higher the credit quality, the lower the probability of contingent loss. Therefore, a risk-based approach to priority projects of high credit quality enables a more nuanced reduction in the risk weight.

In the future, an independent credit rating of the project may serve as the best credit risk indicator. Initially, before the national rating industry has matured, prudential approaches to credit risk assessment can be used to a greater extent.

If the decision to introduce benefits for green and adaptation projects is made, the Bank of Russia will work to ensure consistency in relief procedures under both the standardised and internal ratings-based (IRB) approaches to assessing credit risk and calculating required ratios.

Measures to reduce the potential costs of incentive-based regulation

Excessive incentives to green investment can however cause a number of problems. First, it is the problem of conventional or even brown assets being disguised as green (greenwashing). This can be prevented by a reliable taxonomy and criteria for project prioritisation, as well as by correct conclusions of verifiers. The practice of verifiers is still in early stages of development, both domestically and overseas. In Russia, requirements for a framework of verification of sustainable development projects and approaches to assessing their environmental effects are being elaborated by State Development Corporation VEB.RF.

Second, excessively incentivised investment in green assets could potentially trigger the emergence of bubbles in the market for green financing and increase borrowers' debt burdens. This may lead to the accumulation of toxic assets on banks' balance sheets and create sustainability risks for the financial system.

More so, in a significantly deteriorated economic situation, loan loss provisions under reduced risk weights may fail to match actual loan losses. Therefore, regulatory relaxations would need to come with a cap on incentives to limit the additional exposure banks will be able to accumulate thanks to relaxed capital requirements. At a system-wide level, such a cap could be in the form of, for example, a fixed proportion of capital of the banking system. Some banks may have to be further limited in their right to relaxations subject to their returns on capital (essentially the ability to independently top up capital), as well as the supervisory assessment of risk management quality.

3.3. Other tools for incorporating climate risks in banking regulation

For the climate agenda to become fully embedded in banking regulation, existing regulatory tools may need to be improved. In particular, updates will be needed to the principles of credit risk assessment of borrowers to capture impactful climate-related factors in their activities and the requirements for identification and assessment of business risks in banking (including strategic risks) within the ICAAP framework. In the context of these initiatives, borrowers' disclosures of their exposure to climate risks is essential. For example, the Bank of Russia recommended that banks currently using the IRB approach collect statistics on climate and environmental risks, assess their impact on the probability of default (PD) of borrowers, and – where such a dependence is confirmed, include these factors in the PD model.

Initially, before data for models being constructed have been collected, banks are recommended to lay down criteria for possible adjustments to borrower PD/rating – in line with adjustments based on expert opinions (for example, a procedure for changing the rating of debt when classifying exposures as a green or adaptation project). It is recommended that the option of such adjustments be explored within the framework of warning signals for exposures to environmental and/or climate risks that are fraught with mounting credit risks. The relevant recommendations are available on the Bank of Russia [website](#).

Concurrently, the Bank of Russia will need to enhance its monitoring function in the areas of capital adequacy analysis of the banking sector and individual credit institutions based on shock scenarios of climate change and/or carbon regulation and taking into account possible incentives to the financing of green and adaptation projects.

QUESTIONS FOR CONSULTATIONS

New set-up of climate risks for the Russian economy

1. Do you agree with the view that transition risks are highly relevant to the Russian economy in new conditions?
2. Which sectors of the Russian economy will in your view be most affected by global transformation?
3. Which physical risks in Russia are the most significant for the economy and the financial sector?
4. What are the key channels through which climate risks affect the Russian financial sector at the micro and macro levels?
5. Would you support the potential alignment of national carbon regulation with carbon regulation of other countries?

Disclosure

6. Does your organisation disclose climate risk information? If it does, which global recommendations does it follow?
7. In current conditions, are there in your view sanctions risks related to sustainability disclosures, in particular disclosures of exposure to climate risks?
8. Do you support the idea of making global standards for sustainability disclosures part of regulation?

Integration of climate risks into the risk management systems of financial institutions

9. Do you support the proposed approaches to integrating climate risk into the risk management systems of financial institutions?
10. What information gaps do you find most critical to bridge to enable climate risk to assessments?
11. Do you support the Bank of Russia's efforts of constructing model scenarios and methods for climate risk assessment and their integration into existing stress tests?

Climate risk in regulation

12. Do you support the proposed approaches to regulating banks?
13. Should climate risks be captured only in banking regulation or also in the regulation of non-bank financial institutions?
14. Do you agree with the concept of limiting the risks of incentive-based regulation?
15. Do you think that incentivising disclosures through higher capital requirements should be limited to requirements for major companies? Is it advisable, in your opinion, to make up the list of such companies by the volume of assets, industrial affiliation or the amount of greenhouse gas emissions?

APPENDIX

Activities of international organisations

At the international level, relevant bodies setting standards for all sectors of the financial market have developed recommendations as to how financial institutions should take into account climate risks.

Central to the coordination of regulators and the development of recommendations on climate risk assessment and management is the **Network for Greening the Financial System (NGFS)**. For example, the NGFS has developed a set of scenarios for the evolution of transition and physical risks, which can be used to assess the exposure of the financial system to climate risks.

The Basel Committee on Banking Supervision (BCBS) published a [report](#) in April 2021 discussing channels through which climate and transition risks translate into financial risks of banks. The BCBS also [analysed](#) transmission channels for transition and physical risks in banking and the approaches to climate risk assessment by supervisors and banks themselves. As key findings of the study, it was highlighted that banks can already incorporate transition risks in their assessments of traditional financial risk categories, supervisors and banks are focused at the moment on short-term implications of transition risks.

In 2022, the BCBS [published](#) principles for the effective management and supervision of climate-related risks for banks and banking supervisors. The BCBS suggests that banks consider climate-related risks in their corporate governance, internal control systems, and risk management systems; include significant climate risks in capital adequacy and liquidity assessments and stress tests. According to the BCBS, banks should use scenario analysis to assess the resilience of their business models and strategies to several probable trajectories of the climate transition. Banking supervisors are advised to monitor the extent to which their supervised entities take into account climate-related risks in the aforementioned areas. The supervisor's response in cases when banks fail to meet regulatory expectations should be based on the principle of proportionality.

In 2021, the **International Association of Insurance Supervisor (IAIS)** [published](#) recommendations for the supervision of climate risks in the insurance sector. The document covers a range of aspects of the supervisory process and reporting, corporate governance, risk management, investment portfolios, and disclosure of information. The IAIS recommends that supervisors assess the materiality of climate risks for individual insurers (based on the principle of proportionality) and insurance as a whole, and identify the channels through which such risks spill over to the economy and the financial sector. It is recommended that insurance companies include climate risk assessments in their annual financial planning processes as well as in short and long-term strategic plans; underwriting policy and investment strategy should both recognise climate risks. Among other recommendations are those for climate disclosures.

In November 2021, the **International Organisation of Securities Commissions (IOSCO)** [published](#) a set of recommendations on sustainability-related practices, policies, procedures and disclosures in asset management. For example, regulators are supposed to develop recommendations for asset managers on how to take into account climate risks in corporate governance, risk management, and disclosures. Supervisory and enforcement tools are also needed to monitor and assess compliance with these recommendations. The recommendations are also aimed at eliminating greenwashing risk through increased transparency, comparability and consistency of sustainability disclosures.

In 2019, the **International Organisation of Pension Supervisors (IOPS)** [published](#) guidelines for regulators and supervisors of pension funds for the integration of ESG factors (in particular,

transition risks) into investment policy and risk management systems, as well as for disclosures. In line with the guidelines, regulators should make it clear in their supervisory expectations that the explicit integration of ESG factors into investment in pension funds and risk management processes is consistent with their fiduciary responsibilities. Regulators should also encourage the governing body or asset managers of pension funds to develop suitable scenarios to test investment strategies. The next step is the development in 2022 of policy guidelines for how principles should be embedded in approaches to investment and risk management in pension funds.

The Financial Stability Board (FSB) has taken on [studies](#) into the integration of climate risks into the operations of financial institutions, acting as the coordinator for standard-setters. The FSB [published](#) a report in October 2022 to lay down supervisory and regulatory measures aimed at reducing climate risks. Specifically, the FSB recommends that regulators in the shortest possible timeframes identify the needs for climate-related information alongside the list of data and metrics based whereupon climate risks will be monitored and assessed. Also, the FSB advocates the introduction of requirements for independent verification of climate data. Alongside the proposed micro-prudential regulation, the FSB recommends that regulators consider the potentially broader effects of climate risks on the financial system and expand the application of scenario analysis and stress testing to assess climate risks from the macroprudential policy standpoint.

The International Sustainability Standards Board (ISSB) [presented](#) in 2022 for public consultation basic requirements for information disclosures to be applied globally. The proposed standards for climate and sustainability disclosures set forth requirements for presentation of information about material risks and opportunities related to sustainability, which investors need for company valuations.

Regulatory approaches across jurisdictions

In the field of corporate governance, risk management systems and stress testing

In June 2022, the **China Banking and Insurance Regulatory Commission (CBIRC)** [issued](#) guidelines that specify the responsibility of a board of directors to develop a green financing strategy; senior management are mandated to formulate objectives, create appropriate mechanisms and processes, and explain the distribution of responsibilities. Furthermore, banks and insurance companies are placed under an obligation to provide incentives to green financing in their strategies, as well as to foster a low-carbon economy. ESG principles should be part of corporate governance and risk management processes, and improvements need to be made in approaches to disclosure of ESG risks and internal controls.

Effective from 1 October 2021, **UK** corporate pension schemes managing assets worth 5 billion pounds and more (about 380 billion rubles) [are obliged to](#) put in place a system of controls over climate risks and make assessments of climate risk effects on their investment and financing strategies. Climate risks should be embedded in risk management wherever possible. For pension assets, at least three benchmarks for greenhouse gas emission should be calculated and disclosed on an annual basis,¹ and a target should be set for at least one of such calculated benchmarks to meet over the course of ten years.

The Office of the Superintendent of Financial Institutions of Canada (OSFI), presented in its 2022 [consultation paper](#) supervisory expectations with regard to climate risk management at financial institutions:

- financial institutions should take into account the consequences of physical and transition risks in their business models and strategies; appropriate practices and tools for climate risk management should be in place;

¹ Scope 1, Scope 2 and Scope 3. The benchmarks to be calculated include total greenhouse gas emissions (in absolute terms), measures of emission intensity (carbon footprint), and an extra indicator (for example, estimated losses of the pension scheme following the realisation of climate risk – Climate VaR).

- procedures should be in place for assessing assets and liabilities that are exposed to climate risks; these risks should be managed in accordance with overall risk appetite;
- the impact of climate risks on critical operations should be neutralised;
- financial institutions should use scenario analysis to assess climate risk effects on the overall risk profile, strategies and business models (the OSFI is to craft a standardised methodology for scenario analysis and compare it with internal approaches of financial institutions).

The guide on climate-related and environmental risk of the **European Central Bank (ECB)** [recommends](#) an analysis of the impact of climate-related risks on credit risk, operational risk, market risk, and liquidity risk. The regulator expects banks – when formulating and implementing their business strategies – to consider climate-related risks as drivers of financial risks.

The European Banking Authority (EBA) in June 2021 [published](#) a report on management and supervision of ESG risks for credit institutions and investment firms, recommending the inclusion of ESG risks in business strategies, corporate governance and risk management. In particular, it is recommended that ESG factors be included in strategic business plans for at least ten years ahead and ESG risk-related limits be enacted in accordance with the institution's risk appetite.

The Financial Supervisory Authority (FSA) of Finland [has issued](#) amendments to regulations of investment funds. Specifically, asset managers are obliged to consider sustainability risks and sustainability factors.

The US Federal Deposit Insurance Corporation (FDIC) in 2022 [published](#) 'Statement on Principles for Climate-Related Financial Risk Management for Large Financial Institutions' (whose aggregate consolidated assets are worth more than \$100 billion). The principles provide for 'the framework for the safe and sound management of exposures to climate-related financial risks', including the implications for credit risk, liquidity risk and interest rate risk.

A discussion paper on climate risk and sustainable financing [issued](#) by **the Reserve Bank of India (RBI)** recommends that supervised entities put in place an appropriate corporate governance structure, a strategy for reducing climate change risks, and an effective climate risk management framework. The board of directors is identified as the body overseeing the development and implementation of the climate risk strategy, as well as the climate risk control and management system. To this end, financial institutions can alternatively set up a dedicated committee of members with the right competencies in the field of climate and sustainable development. To mitigate climate risks, financial institutions need to formulate clear strategies for climate risk management. Financial institutions are required to integrate financial risks related to climate change and environmental degradation into their risk management, mitigating through reliable risk management policies and procedures; they should clearly define the roles and responsibilities of their lines of business and divisions. The RBI also recommends that supervised entities develop short, medium and long-term climate scenarios for stress testing and rely on stress test results in their strategic decision-making process.

Regulations for major asset managers issued by **the Securities and Futures Commission of Hong Kong** [clarify](#) requirements related to climate risk management. Specifically, climate risks should be reflected in risk management systems and appropriate efforts should be made to identify, assess, manage and monitor material risks to each investment strategy or fund under management. To assess and measure climate risks, appropriate tools and indicators should be put in place. In addition, managers at major funds should develop a plan for the use of scenario analysis in assessing the resilience of investment strategies to climate risks.

In 2020, **the Monetary Authority of Singapore (MAS)** published three documents: one for [banks](#), one for [asset managers](#) and one for [insurance companies](#), which are intended to improve their resilience to environmental and climate risks. All the three sets of guidelines clarify MAS expectations for corporate governance, strategy, risk management, and disclosures related to environmental risk. The guidelines for asset managers are focused on portfolio building, and risk management (specifically, in the field of transition risks related to investments in companies with massive carbon

footprints), as well as relations with target companies. The guidelines for insurance companies contain recommendations on risk management, underwriting and investment.

In Germany, the Federal Financial Supervisory Authority (BaFin) [ordains](#) that all supervised entities (banks, insurance companies and asset managers) rely on their sustainability risk management on stress testing to see how well climate risks are factored in; they should identify the room for improvement of current procedures or explore the need for new procedures for relevant risk monitoring. Stress tests can include risk sensitivity analysis and scenario analysis to assess the institution's resilience to threats caused by transit and physical risks. Supervised entities map out trajectories for stress tests and analysis based on their own risk profiles. Organisations should consider several alternative scenarios based on a combination of forecasts.

In accordance with test methodology by the **European Insurance and Occupational Pensions Authority (EIOPA)** pertaining to transition risks of insurers and reinsurers, [published](#) in 2022, to assess climate-related financial risks, the asset classes to be analysed include government and corporate bonds, shares, real estate, and infrastructure investments. Each asset category is subject to a risk modelling methodology with the appropriate level of detail.

In the field of prudential requirements

The **EIOPA** in July 2021 [published](#) a discussion paper on a methodology for the potential inclusion of climate change in the Solvency II standard formula when calculating natural catastrophe underwriting risk. Solvency Capital Requirements (SCR) for protection against natural calamity risk should reflect expected the climate change effects. Insurers are advised to integrate climate change into the calibrated natural catastrophe (Nat Cat) module when the standard SCR calculation formula is calculated. Also, the methodology reflects the need to formalise an approach providing for an ongoing reassessment of catastrophe risk module parameters under Solvency II and their changes when necessary.

The European Banking Authority (EBA) in 2022 [published](#) a discussion paper on the role of environmental risks in the prudential framework for credit institutions and investment firms. Pillar 1 own funds requirements are not intended to cover all risks: they are complemented by required provisions based on loss estimates embedded in the accounting framework as well as additional Pillar 2 own funds requirements and macroprudential capital buffers. When considering the introduction of a dedicated treatment of environmental risk drivers, one first needs to evaluate is first necessary to assess the extent to which they are already reflected in the prudential framework.

The paper proposes a number of forward-looking methodologies for the treatment of risks that fall outside the scope of current EU capital requirements.

- *Credit risk*

Some cases may warrant the introduction of adjustment ratios for certain types of assets of which varied risk profiles are environmentally driven.

- *Market risk*

Financial instruments exposed to market risk are more likely to be exposed to environmental risks. Financial institutions may be put under the obligation to assess the environmental risk effects if their internal models fail to integrate such risks based only on historical data. This principle may also govern the standardised approach to market risk.

- *Operational risk*

In addition to the existing taxonomy, financial institutions should highlight environmental factors triggering operational risk losses. This will also help establish whether the portion of operational risk triggered by environmental effects is material and whether this risk is trending upwards.

- *Concentration risk*

This risk can be partially eliminated indirectly through the use of existing mechanisms, for example by expanded requirements for mandatory disclosure of assets exposed to environmental risks or by new risk concentration limits, which are to be carefully calculated and put into practice.

The National Bank of Hungary [unveiled](#) in 2021 its decision to expand its 'Green Preferential Capital Requirement Programme' to cover credit institutions providing green financing to the corporate sector and local authorities. According to the programme, banks may provide loans to the advancing electric car industry and agriculture in accordance with sustainability principles as well as financing other green projects contributing to environmental and climate sustainability. Banks active in green financing are entitled to a reduction in capital requirements of up to 1.5% of total at-risk assets.

In the field of disclosures

The Swiss Financial Market Supervision Authority (FINMA) in May 2021 [published](#) climate disclosure rules for banks and insurance companies. The requirements, based on TCFD recommendations, came into force on 1 July 2021 and initially applied to only large banks and insurance companies.

The New Zealand parliament [passed](#) legislation putting large financial institutions and listed companies under the obligation to disclose climate risk information in accordance with TCFD recommendations. According to government estimates, some 200 companies fall under the new requirements from 1 January 2023.

The Central Bank of Brazil established in September 2021 requirements for financial institutions to disclose qualitative aspects related to corporate governance, strategy and climate risk management in accordance with the TCFD approach. The next stage is to introduce in 2022 requirements for disclosure of quantitative aspects (performance against targets).

In 2021, **the Securities and Futures Commission of Hong Kong** [issued](#) 'Regulatory Requirements in relation to the Management and Disclosure of Climate-related Risks by Fund Managers' (whose assets equal or exceed \$8 billion for any three months in the previous reporting year). They are put under the obligation to make appropriate disclosures proportionate to the degree climate-related risks are considered in the investment and risk management processes, and include a description of the governance structure (roles and responsibilities of the board of directors and management), investment and risk management (how material climate-related risks are incorporated in investment management, and risk identification, assessment, management and monitoring processes). Large fund managers are additionally required to provide examples of how climate risks are managed alongside carbon footprint details of their investment portfolios (Scope 1 and Scope 2).

In 2022, a number of national regulators published draft regulations, intending to enact requirements for climate disclosures. For example, the **Office of the Superintendent of Financial Institutions of Canada (OSFI)** [published](#) for public consultation its draft guidelines explaining its supervisory expectations for climate risk management and climate disclosures. Climate disclosures must meet such criteria as relevance, completeness, clearness, clarity, objectivity, reliability, data comparability for multiple periods; disclosures must be aligned to the size and nature of operations of the financial institution. The guidelines lay down requirements for minimum annual disclosures based on TCFD recommendations (to be effective from late 2023).

In the **US, the Securities and Exchange Commission (SEC)** [proposed](#) in March 2022 improvements to climate-related disclosure requirements. Disclosure requirements are similar to the generally accepted TCFD disclosure processes and the Greenhouse Gas Protocol.

The Reserve Bank of India [recommends](#) that financial institutions annually disclose climate information by TCFD standards in their sustainability/annual reports or on corporate websites.