Finance Watch

Making finance serve society

Towards a climate-resilient banking sector

A macroprudential buffer to address climate-related risks

A Finance Watch Report

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Author: Thomas Larible
Editor: Robert Nosker
Graphics and typeset: Ilaria Ballarini
Cover photo: Adobe Stock

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Executive summary

The effects of climate change are increasingly felt around the world. More frequent floods and droughts, intensifying hurricanes and cyclones, and earlier heatwaves are clear signs of its growing impact on society. With the risk of crossing irreversible climate tipping points now widely recognised in the scientific community, many countries committed under the 2015 Paris Agreement to limit global warming to well below 2°C above pre-industrial levels, ideally 1.5°C, implying profound transformations within their economies.

Both the physical impacts of climate change and the transition to a low-carbon economy translate into financial risks for banks. Their effective management is essential to safeguard the stability of the banking sector and ensure a resilient financial system capable of supporting the critical financing needs of European economies.

This report presents evidence of the **increasing trend of global warming** based on climate science literature, as well as **the resulting physical and transition-related risks for the banking sector**. It discusses the current gaps in climate risk management within banks, and the complexity of using environmental scenario analysis as a forward-looking tool to assess the risk and define appropriate risk mitigation measures. Despite significant advancements over the past years, in particular under the auspices of the Network for Greening the Financial System, scenario analysis still remains in its infancy.

This report argues that **financial supervisors and regulators should implement a precautionary systemic approach to ensure the stability of the banking sector**. This approach would safeguard against the current limitations of scenario analysis while also acting as a complementary measure to capture and address the systemic dynamics of climate risk, such as its radical uncertainty, irreversibility and global dimension.

To this end, **the report proposes a climate macroprudential capital buffer that could be calibrated to capture transition risk and physical risk in the banking sector**:

- A transition risk component would address the current gap in risk quantification – defined as the difference between historical data-based risk weights and expected risk weights accounting for forward-looking evidence of transition risk.
- A physical risk component would provide additional loss-absorption capacity to the banking sector, proportional to the growing risk associated with the current global temperature trajectory.

The aggregate buffer would apply only to the exposures to companies in carbon-intensive sectors failing to take timely and appropriate action to transition their business to reduce its emission impact. **The proposed scope of the buffer would target exposures subject to high transition risk while avoiding any adverse impact**

on exposures that contribute to the mitigation of future physical risk. Furthermore, this climate buffer could be phased in progressively by first targeting fossil fuel exposures, and then expanding to other carbon-intensive sectors and activities subject to high transition risk.

Key recommendations

1 A precautionary macroprudential capital buffer should be introduced to address the systemic dimension of climate risk and complement the existing microprudential framework. An institution-specific approach is not sufficient to address systemic climate-related risks, and the current microprudential framework remains too nascent to comprehensively capture all climate risk drivers.

2 The climate buffer should be designed to bolster banks' loss-absorption capacity against growing climate-related risks. It should address both transition risk and physical risk using forward-looking metrics to adequately capture their nature.

3 The climate buffer calibration methodology should be defined at the highest possible level of supervision, within the European Union and, prospectively, internationally, ensuring harmonisation across all jurisdictions. At EU level, the European Systemic Risk Board, in cooperation with the European Banking Authority and the European Central Bank, should issue recommendations proposing a methodology for a climate buffer. Final implementation should remain with the national financial supervisors, the National Competent Authorities, to account for specificities of national economies.

4 The climate buffer should target the bank exposure most vulnerable to climate risk and be phased in gradually to avoid any unintended consequences. First, it should focus on fossil fuel exposures that are clearly identified as a major source of risk and progressively cover exposures to carbon-intensive companies and activities that aren't showing sufficient progress in transitioning.

Introduction

Climate change is no longer a distant threat. It already impacts society and is accelerating,[1] posing systemic risks to the global economy and financial stability. The banking sector, as a cornerstone of economic activity, faces unprecedented challenges from both the shift to a low-carbon economy (transition risk) and extreme weather events and long-term environmental degradation (physical risk). Despite growing recognition of these risks, the current banking prudential framework remains inadequate to address their unique characteristics: acceleration, irreversibility, and radical uncertainty.

The long-term effects of climate change are a critical blind spot for economic modellers. This limitation is particularly concerning, as future risks depend largely on present actions. Without reliable data and projections, there is a significant probability that the right decisions will be overlooked or delayed. Additionally, the banking sector plays a crucial role in climate risk mitigation. Given its central position in the financial system, the banking sector significantly influences the future structure of the economy and, consequently, its own financial risks. This is often referred to as the endogenous dimension of financial risks in the banking sector. For climate risk, this aspect is essential to designing the right response to the threat that climate disruption poses to the financial sector.

To address the global dimension of climate change impact and to facilitate the systemic change needed to alleviate future disruption, financial authorities must consider macroprudential tools. These instruments have been created to target systemic risks that fall outside the scope of financial institutions' own risk management. They offer additional protections against risks considered as possible drivers of global distress across the entire financial sector. So far, supervisors have not used the available macroprudential tools to address climate-related risks, justifying this inaction by the lack of data and precise risk measurements. Instead, the authorities have engaged in explorative climate scenario analysis, mostly relying on microprudential tools (such as banks own risk management and supervisory review) to deal with climate risk.

This report argues that a macroprudential tool, such as a climate macroprudential capital buffer (hereinafter climate buffer), is urgently needed to safeguard financial stability. Such a buffer would not only strengthen banks' resilience to climate shocks but also encourage them to mitigate climate-related risk by reducing their exposure to activities that contribute to global warming. By integrating forward-looking indicators and calibrating capital requirements based on climate science, this tool can help prevent the build-up of systemic risk and ensure the long-term stability of the financial system.

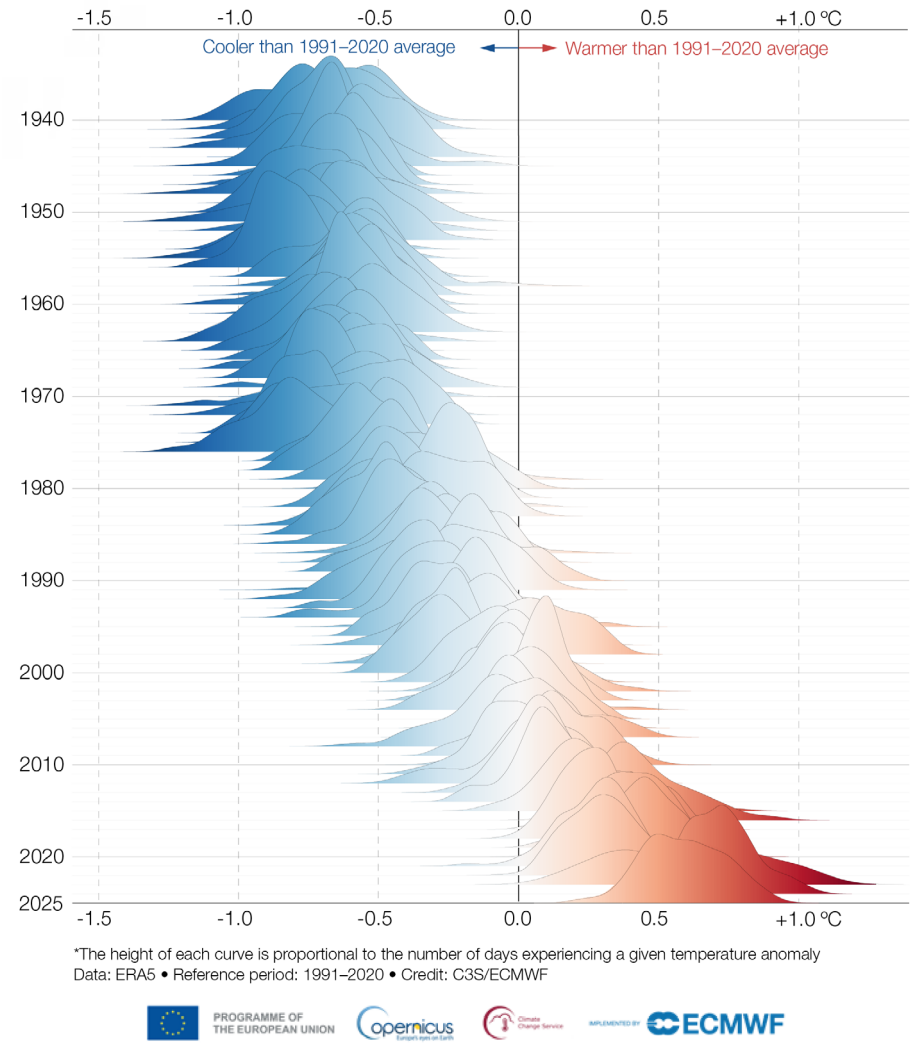
1 Intergovernmental Panel on Climate Change. *AR6 Synthesis Report*, 2023.

I. The climate crisis

A. Key indicators of climate change and its evolution

Climate change can no longer be ignored. For decades now, climate scientists have been warning society of a global crisis if the carbon footprint of economies does not decrease. At first, the danger felt distant, and the uncertainty around climate change forecasts encountered scepticism. But the reality of climate change is demonstrating that it is still one of the most important problems facing humanity (Figure 1). It is becoming clear that it will not only alter living conditions but also exacerbate existing societal tensions.[2]

Figure 1: Distribution of daily global surface air temperature anomalies (°C) 1940-2025[3]



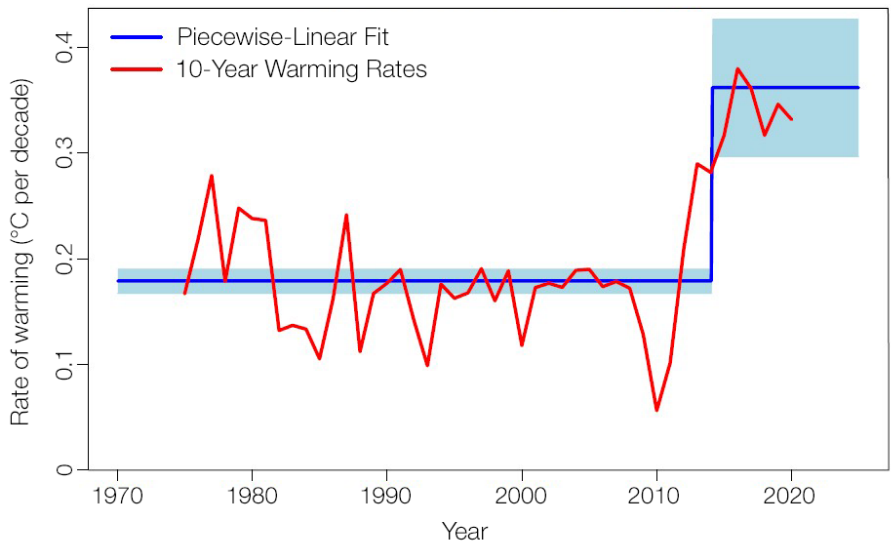
2 United Nations. *Five ways the climate crisis impacts human security*.

3 Copernicus Climate Change Service. *2025 Global Climate Highlights*, page 4, January 2026.

According to the Copernicus Climate Change Service, 2025 was the third-warmest year on record with global temperatures reaching +1.47°C above pre-industrial levels, tied with 2023 (+1.48°C) and just below 2024 (+1.6°C).[4] The current trajectory of global warming is undeniable and accelerating faster than previously anticipated (Figure 2).[5] In 2015, when the Paris Agreement was signed, linear extrapolation suggested that the world would reach 1.5°C of warming (as a 30-year average) by 2042. However, the same methodology applied just a decade later, in December 2025, projected that this threshold will be breached as early as 2029, 13 years sooner than expected.[6] This rapid acceleration is not only evident in temperature data, but also reflected in the growing frequency and intensity of natural disasters worldwide. Over the past years, the world has witnessed a surge in extreme weather events:

- Devastating floods, such as the 2021 European floods, as well as events in Spain in 2024, Pakistan in 2022 and Brazil in 2024
- Destructive hurricanes and cyclones, such as in India in 2020, Mayotte in 2024 and Jamaica and the Caribbean in 2025
- Large-scale wildfires in the United States in 2025, Canada in 2023-2024, Australia in 2019-2020, Europe in 2025 and the Amazon in 2024
- Droughts, such as in Europe in 2022, or Africa in 2021-2023 and 2024-2025
- Heatwaves breaking records every year[7]

Figure 2: Rate of global warming (°C per decade) 1970-2025[8]



4 Copernicus Climate Change Service. *2025 Global Climate Highlights*, January 2026.

5 Foster, G., and Rahmstorf, S. *Global warming has accelerated significantly*, 2026.

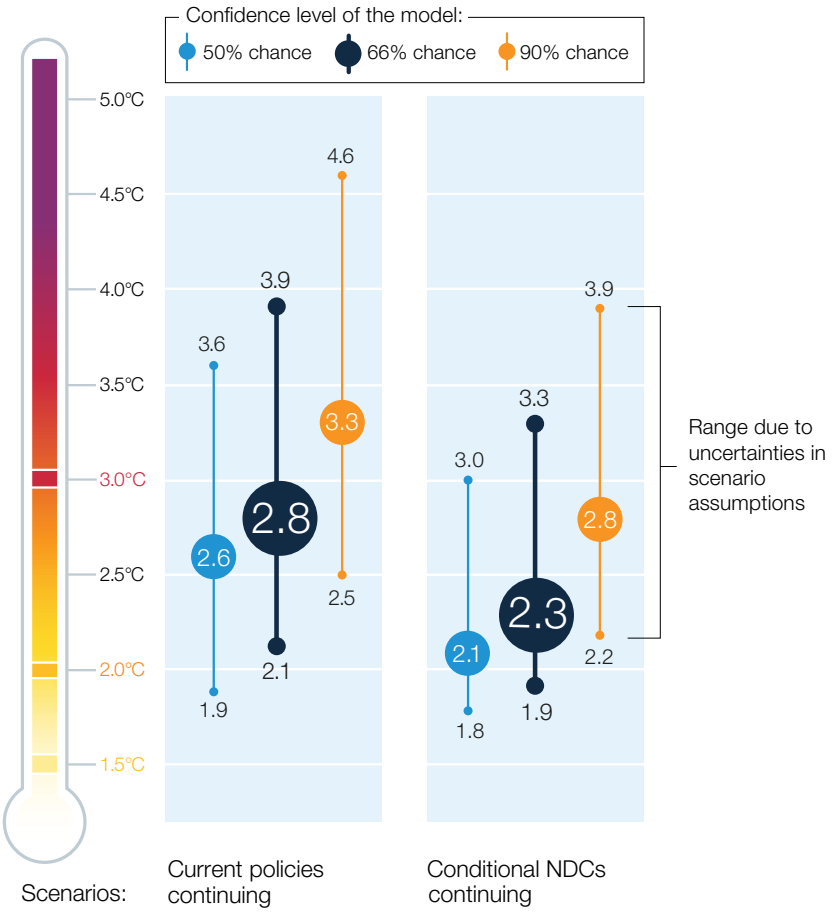
6 Copernicus. *C3S global temperature trend monitor*.

7 Statista. *The World's Record Heat Waves*, July 2025.

8 Potsdam Institute for Climate Impact Research. *Significant acceleration of global warming since 2015*, March 2026.

Under the current trajectory, global temperatures are projected to rise by 2.8°C by the end of the 21st century (Figure 3), far exceeding the Paris Agreement goal of limiting warming to 1.5°C, and even breaching the 2°C upper limit.

Figure 3: Peak warming over the 21st century (°C) relative to pre-industrial levels[9]



B. Climate tipping points

According to the Global Tipping Points Report 2025, "The world has entered a new reality. Global warming will soon exceed 1.5°C. This puts humanity in the danger zone where multiple climate tipping points pose catastrophic risks to billions of people."[10]

The current warming trajectory could have devastating consequences for societies, the economy, and the financial system, potentially triggering a climate-related financial crisis if not adequately anticipated. Climate scientists have repeatedly warned that the climate could undergo permanent and irreversible changes if critical tipping points are breached.

9 UN Environment Programme. *Off target*, November 2025.

10 Global Tipping Points. *The Global Tipping Points Report 2025*, October 2025.

For example, the collapse of ice sheets would lead to catastrophic sea-level rise, radically transforming coastal regions and displacing millions. The potential collapse of the Atlantic Meridional Overturning Circulation (AMOC) would tremendously alter weather patterns in Europe, potentially disrupting agricultural systems.

Some of the most important climate tipping points are as follows:

- **Antarctic ice sheet collapse:** It is the irreversible recession of glaciers and ice shelves from the Antarctic driven by warming oceans and air temperatures. Fewer glaciers grow during winter and more melt during summer. Due to global warming, this shrinking effect is amplified, leading to a more rapid sea level rise.[11] Moreover, the Antarctic surface acts as a reflector, sending solar heat back into space. Thus, its reduction could accelerate global warming, leading to a self-reinforcing (snowball) effect.
- **Amazon rainforest dieback:** The Amazon rainforest relies on a self-sustaining water cycle in which rainwater is recycled back into the atmosphere via trees. Global warming and deforestation beyond a critical threshold can disrupt this water cycle. As atmospheric moisture declines, the tropical forest permanently transitions into a savannah ecosystem. This transformation affects not only the forest itself but also agricultural land, as reduced rainfall undermines crop viability. The Amazon Rainforest dieback would also impact other regions of the world by altering large-scale atmospheric circulation patterns.[12]
- **Atlantic Meridional Overturning Circulation Collapse:** The AMOC is the system of ocean currents that circulates water within the Atlantic Ocean, bringing warm water north and cold water south. This process is highly sensitive to changes in sea temperatures and salt concentration in key parts of the ocean, both of which are affected by global warming. A further slowdown or a collapse of the AMOC could have major repercussions for South America, Africa and Europe, altering their precipitation patterns and temperatures, disrupting food supply and economic systems.[13]

Scientists are unequivocal that breaching these tipping points would permanently alter the world as it's known. While the exact timing and scale of disruption remain uncertain, one fact is clear: the likelihood of crossing these thresholds increases as Earth experiences increasingly prolonged warmer global temperatures. Climate models indicate that key tipping points could be triggered at lower temperature thresholds than previously thought (Figure 4). Under the current 2.8°C warming trajectory, the world risks breaching multiple tipping points with profound cascading effects on billions of people and global ecosystems.

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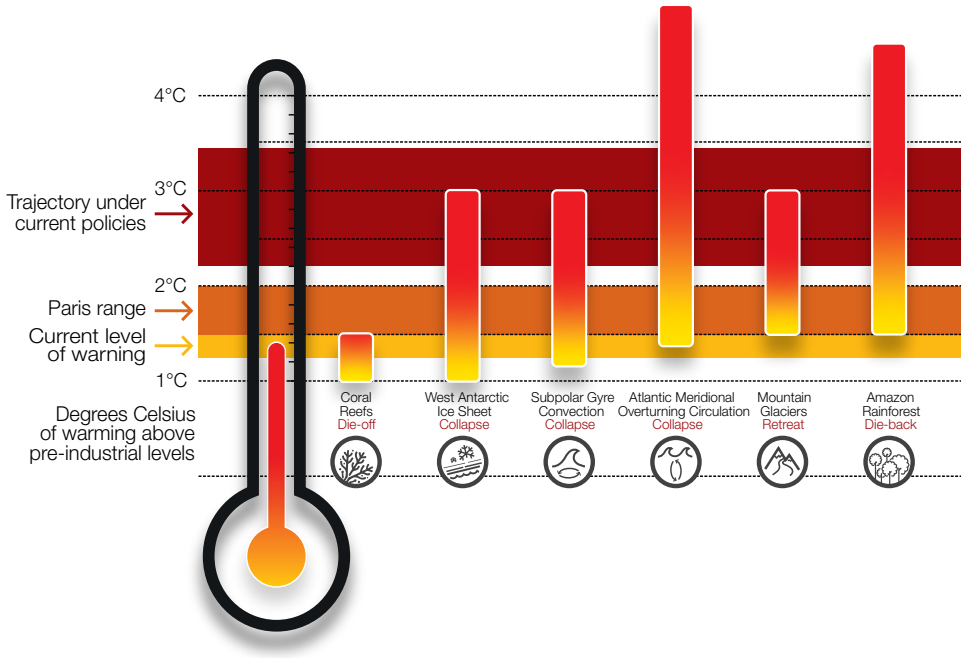
11 Antarctic and Southern Ocean Coalition. *Antarctic ice and rising sea levels*.

12 Global Tipping Points. *Report 2023*.

13 Global Tipping Points. *The Global Tipping Points Report 2025*, page 243, October 2025.

Figure 4: Range of global warming putting at risk different climate tipping points[14]



Perhaps most alarmingly, scientists warn that tipping points may be interconnected. For instance, ice sheet collapse could accelerate global warming, which in turn could trigger the collapse of the AMOC, even if human greenhouse gas emissions are reduced during this period. Given these risks, precautionary action is required to minimise the probability of reaching any climate tipping point, and to prepare for the irreversible changes that may already be underway.

14 Global Tipping Points. *The Global Tipping Points Report 2025*, page 5, October 2025; Armstrong Mckay, D. et al. *Exceeding 1.5°C global warming could trigger multiple climate tipping points*, September 2022.

II. Climate risk

A. Definition of climate risk

Climate-related risk is mainly described by two categories[15]:

- **Transition risk:** financial risk arising from the shift to a low-carbon economy, driven by policies promoting sustainable economic activities, technological disruption, and shifts in companies' market share due to changing customer preferences.
- **Physical risk:** financial risk stemming from extreme weather events and long-term environmental degradation. Financial risk arising from local natural disasters is defined as acute, while risk stemming from gradual, lasting and irreversible climate change effects such as sea level rise, increased frequency of natural disasters, and shifts in precipitation patterns, is defined as chronic.

In recent years, financial experts have strengthened their understanding of climate risk, drawing on insights from climate science. The main characteristics of climate risk are as follows:

- **Radical uncertainty:** The probability distribution of climate risk-related losses lies beyond current comprehension. This creates a paradox: while it is certain that climate change is occurring and could disrupt the economy, the absence of stochastic understanding makes it impossible to accurately anticipate the scale of the future losses.
- **Irreversibility[16]:** Unlike cyclical economic downturns, climate change is permanent. Once tipping points are crossed, the resulting environmental and economic damages cannot be reversed. This differs from other financial risks, where an upturn typically follows a downside and public policies can step in to reverse the economic dynamic (as shown during the COVID period).
- **Global dimension:** Global warming will impact every aspect of society and all jurisdictions, resulting in widespread health issues, economic losses, social tensions, and political instability. No other financial risk matches this magnitude or breadth of impact.
- **Asymmetric impacts:** Despite being driven by a global trend, climate risk will translate into different local shocks. Global warming will not affect all regions uniformly, as some will warm faster than others. Regions also differ in their vulnerability to specific climate events, such as heatwaves, wildfires, floods, or hurricanes. Climate risk will also not be uniform across economic sectors, as some will be more sensitive to transition risk than others.

15 A third category is also often identified: litigation risk. But most of the financial impacts from climate change are expected to be through transition and physical risk transmission channels.

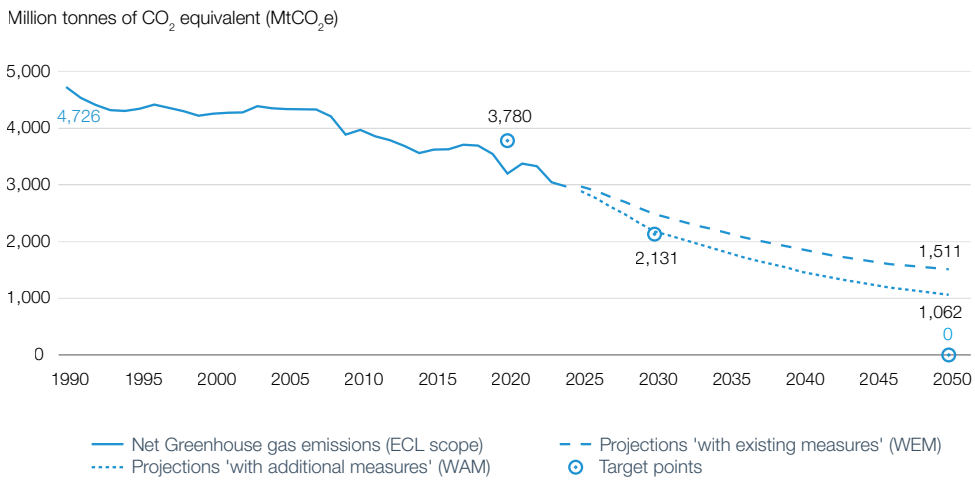
16 Intergovernmental Panel on Climate Change. *Climate change 2023 synthesis report: Summary for policymakers*, B.3.2 page 18, C.1.3 page 24.

- **Temporal interdependence:** The magnitude of climate risk in the long term will depend on actions taken in the short term. An orderly and timely transition will reduce the magnitude of future transition and physical risk, while continued carbon-intensive investments may increase long-term physical risk. This causal aspect between short-term actions and long-term impacts is central to climate risk mitigation.

B. The evolution of climate risk in the EU

Transition risk. Despite significant improvements in energy efficiency and reductions in greenhouse gas (GHG) emissions, the EU faces an increased risk of missing its next climate target (Figure 5) as set by the EU Regulation 2021/1119 (i.e. the European Climate Law).[17] The European Scientific Advisory Board on Climate Change has called for additional measures to prevent any deviation from these climate objectives.

Figure 5: Progress towards achieving climate targets in the EU-27[18]



As European GHG emissions levels deviate from the Climate Law objectives, it places the EU on a delayed transition pathway, which, according to the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), increases economic losses compared to an orderly and timely transition. As a result of this deviation, the likelihood of an abrupt transition within the next five years is increasing, a course of events the NGFS examined through its Sudden Wake-Up Call scenario. Their findings indicate a significant rise in probabilities of default (PD) across many carbon-intensive sectors, amplifying overall transition risk.[19] Moreover, delaying the transition also increases the risk of reaching warmer temperatures, and consequently, more frequent

17 European Commission. *European Climate Law*.

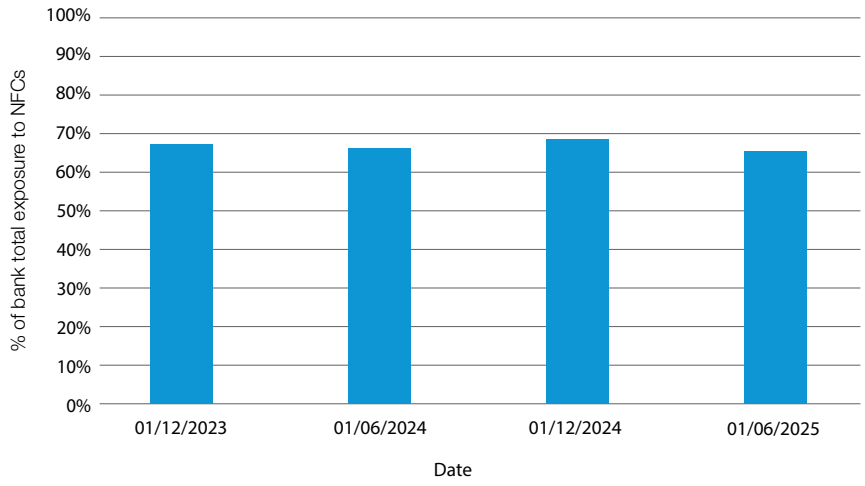
18 European Environment Agency. *Total net greenhouse gas emission trends and projections in Europe*, November 2025.

19 Network of Central Banks and Supervisors for Greening the Financial System. *NGFS Short-term Climate Scenarios for central banks and supervisors*, May 2025.

and intense climate-related disasters.

EU banks' sustainability-related disclosures as of June 2025 (Pillar 3 ESG disclosure) reveal a persistent trend: two-thirds of European Economic Area (EEA) banks' exposure to non-financial corporates (NFCs) is linked to activities contributing to climate change, making them highly sensitive to transition risk (Figure 6). This level of exposure is of systemic scale. For comparison, the EU real estate sector represents 23% of total EEA exposure to NFCs in June 2025. It is the sector primarily targeted by macroprudential measures currently in place due to its systemic relevance across many Member States.

Figure 6: Evolution of the share of EU/EEA bank exposures to NFCs in sectors highly contributing to climate change (excluding environmentally sustainable exposures)[20]



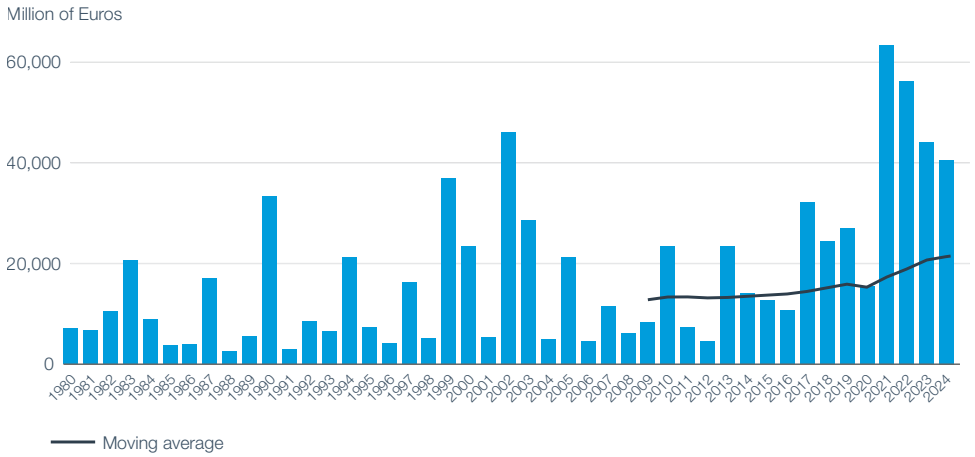
Physical risk. The global warming trajectory of 2.8°C is likely to trigger several climate tipping points, risking catastrophic irreversible losses. While these losses have yet to be quantified under a specific scenario, they are expected to far exceed current estimates of physical risk. Such losses are likely to lie beyond those projected in the NGFS' «hot house world» scenarios, which already reveal significant GDP losses in the short term.[21]

Looking at economic losses from past natural disasters in EU Member States, a clear increasing trend is evident (Figure 7). The 30-year average of economic losses was 14.6 billion EUR in 2015 when the Paris Agreement was signed, and reached 22 billion EUR in 2024, a rise of 50%. This trend is more than likely to accelerate in the coming years, increasing the risk of value depletion in banks' portfolio assets.

20 *EBA ESG Dashboard*. Transition Risk - NFCs. Data extracted from Pillar III ESG disclosure of EU/EEA banks.

21 Ranging from 6% in Asia up to 12.5% of GDP for Africa in Disasters and Policy Stagnation *NGFS short term scenarios*.

Figure 7: Annual economic losses caused by climate-related events in EU Member States 1980-2024[22]



Moreover, in 2021, the European Central Bank (ECB) evaluated that 30% of euro area banking system credit exposures to NFCs were "subject to high or increasing risk due to at least one physical risk driver".[23] This indicator is only a lower bound of what the damage from physical risk could be in the future. Indirect impacts, such as supply chain disruptions and productivity losses, as well as compounding effects (i.e. the non-linear impacts arising from the materialisation of two or more severe events), remain out of scope of most climate risk assessments in the banking sector.

C. Addressing climate risk in the banking sector

a. Approach at institution level

As global warming intensifies, climate risk remains in a build-up phase, meaning its materiality will increase in the coming years. This dynamic means that risk indicators based on historical data are, at best, insufficient, and at worst, misleading. The current prudential framework and risk management methodologies are strongly driven by quantitative methods, backtested using historical data. This approach is unable to capture the full spectrum of climate-related risk.

To overcome current limitations, EU policymakers and supervisors have adopted forward-looking practices to be applied at institution level. Starting in 2027, EU banks will need to assess their resilience to climate events (both transition and physical risks), using climate stress tests for the short-term horizon and climate resilience analysis for the medium- to long-term horizon (at least 10 years). Climate stress tests are quantitative exercises where several severe but plausible scenarios are applied to a bank's exposures. This exercise evaluates whether a bank will still be able to operate under conditions of stress (i.e. remain solvent by maintaining its regulatory required

22 European Environment Agency. *Annual economic losses caused by weather- and climate-related extreme events in the EU Member States*, December 2025.

23 European Central Bank. *Climate-related risks to financial stability*, May 2021.

capital). In contrast, climate resilience analysis will allow banks to test their business forecasts against alternative climate scenarios to assess the potential impact of different climate events on their profitability. The objective is to give banks an agile tool to anticipate potential risks and opportunities related to climate-related events.

Although climate scenario analysis is a step forward in the management of climate risk, this framework needs time to mature. First, this approach is likely to be more advanced within large banks than small and non-complex institutions (SNCIs), leading to a lack of harmonised practices and hard-to-compare results. At the same time, SNCIs could be more sensitive to climate-related risks as their portfolios are less geographically and sectorally diversified. Further, even for large banks, the exercise is highly complex. Collecting data, such as ESG-related counterparty data and transition plans, and integrating it into climate scenarios and risk models will be challenging. The European Banking Authority (EBA) has recognised that climate data remains insufficient to cover the entire scope of bank exposure.[24] For climate scenario exercises to be insightful, banks will need to understand climate risk transmission channels between climate events and financial impacts, include second-round effects, assess compounding effects and overcome the actual limitations of climate risk modelling.[25]

Moreover, current climate scenarios face criticism from the climate science community.[26] Climate scientists highlight that climate impacts will be non-linear, compounding with other risks, and mostly defined by extreme events rather than changes in average climate indicators. These dimensions remain underestimated in current climate scenarios, which focus on GDP impacts through linear damage functions without considering the impact of cascading risks or irreversible climate tipping points. Moreover, current models also overestimate the capacity of society to adapt to the climate crisis, leading to overly optimistic future indicators. This does not fit the definition of sufficiently severe scenarios under existing requirements for bank stress testing exercises.

From the financial supervisor's perspective, assessing risks and issuing recommendations to supervised institutions will also be challenging in the first years of implementation. The absence of benchmarks for climate scenarios and stress test exercises, the heterogeneity of banks' business profiles and the complexity of climate risk will require a high degree of judgement and are likely to make decisions contestable.

A robust microprudential approach to climate risk will require significant work by both financial institutions and supervisors in order to improve understanding of climate risk. The necessary improvements include accessible and harmonised data, up-to-date information concerning current and possible future transition pathways, model development to account for climate-related dynamics, as well as compensating risk management measures to account for current modelling limitations (margins of conservatism,

24 European Banking Authority. *Report on data availability and feasibility of common methodology for ESG exposures*, February 2025.

25 Finance Watch. *A safer use of climate scenario analysis by banks*, May 2025.

26 Abrams, J. et al., *Recalibrating Climate Risk*, January 2026.

overlays or qualitative measures) arising from the radical uncertainty of climate change. This will require time and transparent exchange among all stakeholders to develop a robust and credible framework to manage climate risk exposure effectively and safely.

Finally, risk management tools at institution level will not capture the systemic dimension of climate risk and the impacts of the longer-term trend of global warming, as the current time horizon of prudential requirements is limited to 5 years for the stress test part and 10 years for the climate resilience analysis. While there is general acknowledgement that climate risk could threaten the stability of financial institutions and the financial system as a whole, no macroprudential measures have been implemented so far.

b. The systemic dimension of climate risk

While idiosyncratic risks are specific to a single institution and could lead to its failure, systemic risks threaten the stability of the entire financial system, potentially triggering credit crunches, investment crises and economic downturns. The role of macroprudential authorities is to identify systemic financial risks and implement preemptive measures to limit banks' exposure sensitive to identified systemic risk drivers (e.g. concentration limits or borrower-based measures) or to request banks to build additional capital to cover possible losses from a systemic shock (capital buffers).

Systemic risk is commonly defined as a risk that impacts the functioning of the entire financial system if it materialises. Unfortunately, this is a retrospective definition, which is not helpful to financial supervisors, as it identifies a risk as systemic when it is too late to implement safeguards. Given the past experiences of systemic failure, the ECB has identified three primary forms of systemic risk[27]:

- **Contagion risk:** the spread of instability from one institution to others
- **Systemic shock:** a simultaneous material shock impacting all institutions at once
- **Minsky moment:** the unravelling of long-standing imbalances within the system

These identifications have permitted financial authorities to monitor the emergence of possible systemic risk in the financial sector by focusing their analysis on three dimensions:

- **Size:** the size of the exposure affected by a shock can give rise to a systemic risk.
- **Riskiness:** a shock can be severe enough to significantly affect market, credit or liquidity risk. Current practice considers historical losses and forward-looking approaches, such as stress tests.
- **Interconnectedness:** a shock impacts directly or indirectly multiple financial actors. Authorities also need to consider whether the materialisation of the identified risk in the banking sector could lead to spillover effects to other financial market actors.

27 European Central Bank. *The concept of systemic risk*, December 2009.

Concerning climate risk, relevant financial authorities have already acknowledged its systemic dimension.[28] The size of assets exposed to climate risk is substantial, and the riskiness of climate change has been highlighted by climate scientists and climate modelling work, where many transmission channels into the economy and financial system have been identified. Finally, the interconnectedness of the EU financial sector is not specific to climate risk, but it is amplified by at least two of its effects: the current underestimation of climate risk in both banks and non-banking financial institutions and the widening of the insurance protection gap, which aggravates the risk of asset repricing.[29]

c. European climate stress test exercises

In 2024, the European Supervisory Authorities (ESAs), the ECB, and the European Systemic Risk Board (ESRB) conducted a climate risk scenario analysis exercise assessing the resilience of the financial system to climate shocks related to the implementation of the EU Fit-for-55 package of policies.[30] Named the "one-off fit-for-55 climate scenario exercise",[31] this stress test was run using a top-down methodology and a static balance sheet assumption for a time horizon of eight years. The exercise covered banking, insurance, institutions for occupational retirement provision (IORPs) and investment fund sectors. The different scenarios used were as follows:

- **Baseline scenario:** EBA stress test 2023 baseline[32] + NGFS Nationally Determined Contributions (NDCs) scenario
- **First Adverse scenario (A1):** Baseline scenario + "Run on Brown" scenario starting in 2026 (a sharp re-adjustment of asset prices for exposures highly exposed to transition risk)
- **Second Adverse scenario (A2):** EBA stress test 2023 adverse scenario[33] + NGFS NDCs scenario + "Run on Brown" scenario starting in 2026

In addition to the transition shock included in the NGFS NDCs scenario – namely the increase in energy expenses (leading to lower corporate profits) and the increase in green investments to reduce carbon emissions (leading to higher leverage) under an orderly transition – supervisors also added a "Run on Brown" shock (RoB). In the RoB, the financial sector is running away from the brown industries, leading to financial constraints for brown firms (i.e. highly emitting firms), either through the withdrawal of funding or the increased cost of financing. Thus, the RoB impacts the profitability of brown firms, increasing their financial constraint.

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28 European Central Bank/European Systemic Risk Board. *The macroprudential challenge of climate change*, July 2022;

29 European Central Bank. *Physical risks and the role of insurance in risk mitigation*, March 2026.

30 Fit for 55" refers to the commitment of all EU Member States to transition to a climate-neutral economy by 2050 and to reduce emissions by at least 55% by 2030, compared to 1990 levels.

31 European Central Bank. *Fit-for-55 climate scenario analysis*, November 2024.

32 European Banking Authority and European Systemic Risk Board, *Macro-financial scenario for the 2023 EU-wide banking sector stress test*, 2023.

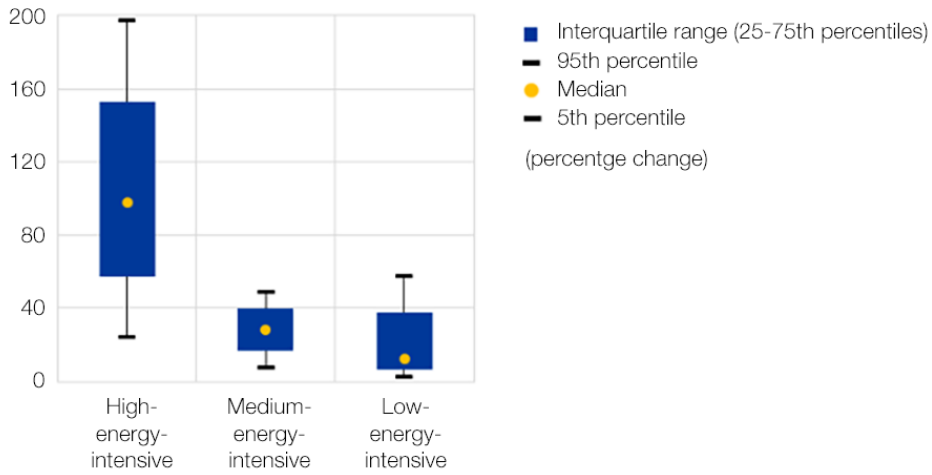
33 Ibid.

For the purposes of this report, the focus is on the banking sector part of the exercise. Under the first adverse scenario, direct losses in the banking sector are EUR 50 billion higher than in the baseline scenario, representing 0.5% of total EU banks' total risk exposure amount (TREA). Under the second scenario, the adverse macroeconomic environment does not seem to amplify the losses from the RoB. The stress test accounted for system-wide amplification of risk.

The main insight was that systemic transition risk is sector-dependent. While transition policies will impact certain sectors of the economy more strongly, this exercise did not cover residential mortgages, which represent a large part of banks' portfolios (21% of total loans in EU/EEA[34]) and are likely to be impacted by transition policies (Energy Performance Certificates indicators can be used as a risk indicator). Further, no physical stress event has been tested to assess the compounding effect between transition risk and physical risk. Hence, the results of the exercise delivered only limited insights into the overall scale of risk affecting the system.

The sectoral dependence of transition risk has been confirmed by another exercise conducted by the ECB in 2025.[35] In its analysis, the ECB showed that high energy-intensive firms are the most affected by a transition risk scenario (NGFS NDCs scenario), with PDs of such firms increasing by a median of 91%, while firms in medium energy-intensity sectors show a more moderate median rise of 28% (Figure 8b). For some of the most energy-intensive firms, the PD increased by 200% over the three-year horizon of the NDCs scenario. The results of this exercise show that European banks should have, on average, an additional buffer of 0.74% in their Common Equity Tier 1 (CET1) ratio to fully cover the transition risk losses from the NDCs scenario.

Figure 8: Change in NFC PD under the transition risk stress scenario[36]



34 European Banking Authority. *Loans and advances*, Dashboard.

35 European Central Bank. Integrating climate risk into the 2025 EU-wide stress test: the effects of climate risks for firms, November 2025.

36 Ibid.

The results of both exercises represent a lower bound of potential losses due to transition risk for the European banking sector. These insights of likely risk underestimation, coupled with the insights from climate science as to the devastating consequences of unmitigated climate change, call for timely and precautionary action to address the risk.

To conclude, climate scientists have warned of the tremendous impacts of climate change, while financial experts have identified a growing trend in climate risk, even though their results have not demonstrated its systemic dimension yet, mostly due to limitations in data availability and modelling capabilities. Nevertheless, financial supervisors should act in accordance with the Precautionary Principle detailed in Article 191 of the Treaty on the Functioning of the European Union by implementing preventive measures to address climate risk[37]:

”The precautionary principle enables decision-makers to adopt precautionary measures when scientific evidence about an environmental or human health hazard is uncertain and the stakes are high”, The European Commission’s Precautionary Principle: Definitions, applications and governance.[38]

As per the evidence presented in Chapter 1, financial authorities should follow the Precautionary Principle by proactively requesting banks to build up loss-absorption capacities to mitigate climate-related systemic risk.

37 *The Treaty on the Functioning of the European Union*.

38 European Commission. *The precautionary principle*, December 2015.

III. The need for a climate macroprudential capital buffer

Financial authorities have acknowledged the need for a macroprudential approach to complement the institution-specific microprudential measures and address the systemic dimension of climate risk:

- "As climate change is likely to represent a systemic risk for the financial sector, potential macroprudential tools or approaches would complement microprudential instruments", Financial Stability Board, *Supervisory and Regulatory Approaches to Climate-related Risks*.[39]
- "A macroprudential counterpart can provide a powerful complement, broadening the scope to common exposures, propagation within the financial sector and feedback loops between the real economy and the financial sector", ECB/ESRB, *Towards macroprudential frameworks for managing climate risk*.[40]

A. Principles of an effective climate macroprudential capital buffer

Numerous recent policy publications[41] have elaborated on the principles of an effective climate macroprudential capital buffer:

Additional loss absorption. Climate-related systemic risk remains a blind spot in the current prudential framework, as no macroprudential capital buffer has been implemented so far either in the EU or other jurisdictions. Global warming will likely modify the current historical distribution of financial risks, leading to increased potential unexpected losses faced by banks.[42] Additional capital requirements to cover this increase would be needed at the macroprudential level, as a microprudential approach does not cover the full dimension of climate risk, as discussed in Chapter 2.

Addressing the build up of climate risk. At the systemic level, supervisors should also consider the endogenous aspect of climate risk, i.e. the impact of European banks' investments on the building up of climate risk. An orderly and timely transition mitigates the impact of climate risk on the banking sector. Therefore, macroprudential authorities should design the climate buffer to remove the current underpricing of risk and encourage banks to make decisions that facilitate an orderly transition. This preventive dimension complements the loss-absorption capacity of the buffer. Banks

39 Financial Stability Board. *Supervisory and Regulatory Approaches to Climate-related Risks*, October 2022.

40 European Central Bank/European Systemic Risk Board. *Towards macroprudential frameworks for managing climate risk*, December 2023.

41 Bartolomeu, L. et al. *The Macroprudential Response to Climate Systemic Risk: Four Essential Pillars*, 26 February 2026; Ikeda, S. & Monnin, P. *Principles for Addressing Climate Systemic Risks with Capital Buffers*, 10 October 2024; Hiebert, P. and Monnin, P. *Climate-related systemic risks and macroprudential policy*, August 2023; D'Orazio, P. and Popoyan, L. *Fostering green investments and tackling climate-related financial risks: Which role for macroprudential policies?*, 2019.

42 Holscher, M. et. al. *Climate Change and the Role of Regulatory Capital: A Stylized Framework for Policy Assessment*, October 2022.

contributing to the build-up of climate risk would face higher capital requirements, while those aligning with sustainable transition objectives would benefit from lower requirements. This approach is close to the Countercyclical capital buffer (CCyB) defined in the Basel Framework. When cyclical systemic risk is increasing in the upturn of the cycle, the relevant authorities can request banks to increase their capital buffers to strengthen their resilience against potential future losses related to periods of stress (downturns of the cycle). This buffer can also help curb excessive credit growth during financial upswings, proactively mitigating risk buildup.

Forward-looking indicators. Climate change is an unprecedented event which will lead to unprecedented decisions. The magnitude of disruption and severity of climate risk depend on past and current actions, as well as on future ones. Relying solely on historical data to calibrate or assess the severity of this systemic risk would lead to an underestimation. Forward-looking indicators, such as those based on transition plans and future investments in sustainable and transitioning activities, the projected global warming trajectory, locked-in GHG emissions and climate scenarios, deliver valuable complementary insights into current exposure to climate-related risks.

International consistency. Climate risk depends on local specificities and global trajectory. Changes in local climate patterns are influenced by global warming and, thus, the global trend should be monitored by macroprudential authorities when setting a climate buffer. Applying a methodology relying on internationally available metrics would also facilitate the implementation of the buffer in all jurisdictions and provide a level playing field, reducing cross-border arbitrage.

Gradual and dynamic approach. Gradual implementation of the buffer by financial authorities would help avoid undesirable side effects in terms of asset repricing or impacts on companies' access to finance. Financial authorities should avoid targeting exposures that contribute to the sustainable transition and thus face lower transition risk. Therefore, a gradual and targeted approach would be needed when developing precise indicators to assess the climate risk dimension of each exposure. A first possible step could be to target fossil fuel activities and exposures excluded from EU Paris-aligned Benchmarks,[43] which can be easily identified.

B. Expanding macroprudential indicators to capture climate-related risks

Macroprudential authorities use indicators to identify and evaluate the level of systemic risk in the financial sector. Most of these indicators are backward-looking, cover only classical macroeconomic dimensions and do not consider climate-related information. This report argues that expanding the set of indicators to include climate risk drivers could bring valuable additional information to assess the systemic risk implications of climate change for the financial sector. The following indicators should be considered:

43 *Commission Delegated Regulation (EU) 2020/1818*, Article 12.

a. Global warming trajectory

"The risk of activating Earth system tipping processes exists at current levels of global warming and increases with every 0.1°C and every year of overshooting the globally agreed goal of 1.5°C." *The Global Tipping Point Report 2025*.[44]

The first indicator of climate systemic risk is the global warming level. The probability of having more severe and frequent physical events is tied to the increase in global temperature. The probability of breaching climate tipping points positively correlates with the level of warming above 1.5°C and the number of years overshooting this limit. In addition, larger deviations from the 1.5°C pathway could result in a more abrupt transition to reach the agreed climate objectives. Therefore, the global warming trajectory can be a good indicator to calibrate the preventive component of a macroprudential capital buffer. As in the case of the credit-to-GDP indicator used to calibrate the CCyB, which assesses the magnitude of a systemic shock in the financial system, temperature increase acts as an indicator of the severity and magnitude of looming systemic physical risk.

At a confidence level of 90% and considering current NDCs, this indicator currently indicates a peak of 2.8°C of global warming by 2100 (Figure 3), reaching 1.5°C in 2029, leading to a period of at least 61 years above 1.5°C in the 21st century.

b. Banking sector alignment with the net-zero trajectory

Macroprudential authorities could use bank portfolio alignment metrics to assess whether, and to what extent, the implied trajectory of the banking sector as a whole is deviating from EU Climate Law objectives. The ECB conducted a climate exercise in 2023 to assess whether the EU banking sector was aligned with the Net-Zero trajectory.[45] The ECB used the open-source Paris Agreement Capital Transition Assessment (PACTA) methodology, which provides an estimation of whether a bank portfolio is aligned with a Net-Zero trajectory. This methodology focuses on the loan book and on 6 sectors (mostly fossil fuel-related), but could be further extended to include sectors such as shipping or aviation. This framework assesses the deviation over a five-year time horizon, which provides a good estimate of banks' loan portfolio alignment with the Paris Agreement trajectory.

In 2023, the ECB found that 90% of the EU banking sector was misaligned.[46]

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44 Global Tipping Points. *The Global Tipping Points Report 2025*, page 15, October 2025.

45 European Central Bank. *Risks from misalignment of banks' financing with the EU climate objectives*, January 2024.

46 Ibid.

c. Financed emissions

European banks are required to report their Scope 3 financed emissions. Medium and large banks will continue to report emissions under the Corporate Sustainability Reporting Directive (CSRD) and under their Pillar 3 ESG disclosure. Unfortunately, it is likely that SNCIs will only report this information voluntarily,[47] meaning that macroprudential supervisors might lack this data. A macro-level assessment of banking sector financed emissions will still be insightful without full SNCI information, as most of the bank exposure in the EU is concentrated in the biggest EU banks. Further, the methodology used to calculate financed emissions can be limited in assessing transition risk. Banks usually rely on the Partnership for Carbon Accounting Financials (PCAF) framework which tends to underestimate a bank's share of its counterparties' emissions.[48] Macroprudential authorities should carefully account for this possible underestimation when using the emissions indicator. The financed emissions numbers could be compared on a year-on-year basis and benchmarked with the EU GHG emission reduction objectives. A larger deviation from emissions reduction objectives will translate into higher transition risk.

According to the Net Zero Finance Tracker,[49] the emissions financed by the European banking sector have remained constant since 2020, even though they would have needed to decrease to match the future GHG emission objectives in the EU.

d. Economy alignment

An assessment of the current decarbonisation trajectory of each Member State (or at EU level) would be a valuable indicator of its vulnerability to transition risk. The larger the deviation of a given jurisdiction from the Paris Agreement trajectory, the more severe the impact it would face from policy changes required to realign with the climate goals. Where necessary, this assessment could be broken down at sectoral level by evaluating a specific sector against a transition pathway benchmark. Macroprudential authorities could also rely on transition plan implementation indicators, such as the percentage of companies developing a transition plan aligned with Paris Agreement objectives in the relevant jurisdictions.

Climate Analytics and NewClimate Institute have developed a Climate Action Tracker[50] showing that, although the EU has set ambitious Net Zero targets for 2050, the current policies and NDCs are still insufficient to reach those objectives.

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47 SNCI have to disclose a simplified template without accounting for their financed emission.

48 Reclaim Finance. *Targeting Net Zero*, September 2024.

49 Net Zero Finance Tracker. *Financed Emission dashboard*.

50 *Climate Action Tracker*.

European macroprudential authorities could also rely on the European Commission's sectoral decarbonisation pathways[51] to monitor the alignment of specific sectors.

e. Climate risk mismanagement

Macroprudential authorities should assess the current level of understanding and management of climate risk by the individual institutions. The complexity, the lack of data and the reliance of current risk models on historical data may lead to climate risk underestimation. This inadequate management could lead to a Minsky moment and the unravelling of climate risk imbalances, amplified throughout the financial system, including banks and NBFIs. Macroprudential authorities should closely work with microprudential supervisors to assess the maturity of banks' climate risk management practices.

Several reports have shown that climate risk is still underestimated in financial institutions.[52]

f. Interconnectedness and insurance coverage

Physical risk in the banking sector will be exacerbated by the widening of the insurance protection gap (defined as the share of uninsured economic losses caused by natural catastrophes[53]), as well as by increases in insurance premiums in certain geographical areas due to higher disaster-related costs. This gap will automatically increase the risk borned by banks, as it will weaken the financial position of companies and borrowers through higher insurance costs and declines in the value of companies' assets and collateral, which constitute the main transmission channels. The evolution of the insurance protection gap should be monitored by banking authorities through EIOPA's dashboard on the insurance protection gap for natural catastrophes.[54]

Several countries already face insurance protection gaps for certain natural disasters, such as floods in Central Europe or earthquakes in Southern Europe.[55]

To conclude, the ESRB should monitor the evolution of climate-related systemic risk through these different indicators at EU level. The ESRB could add a climate risk section to its risk dashboard and issue recommendations on risk mitigation. This would

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51 European Commission. *European Climate Law-aligned EU sectoral decarbonisation pathways*.

52 UN Environment Programme. *Bridging Climate and Credit Risk*, July 2025; European Central Bank. *Banks have made good progress in managing climate and nature risks – and must continue*, July 2025.

53 EIOPA. *Policy options to reduce the climate insurance protection gap*, April 2023.

54 EIOPA. *Dashboard on insurance protection gap for natural catastrophes*.

55 Ibid.

facilitate a harmonised approach to managing such risks across European Member States. National competent authorities would then monitor climate risk indicators in their specific jurisdictions to account for their national specificities.

C. Sectoral distinction

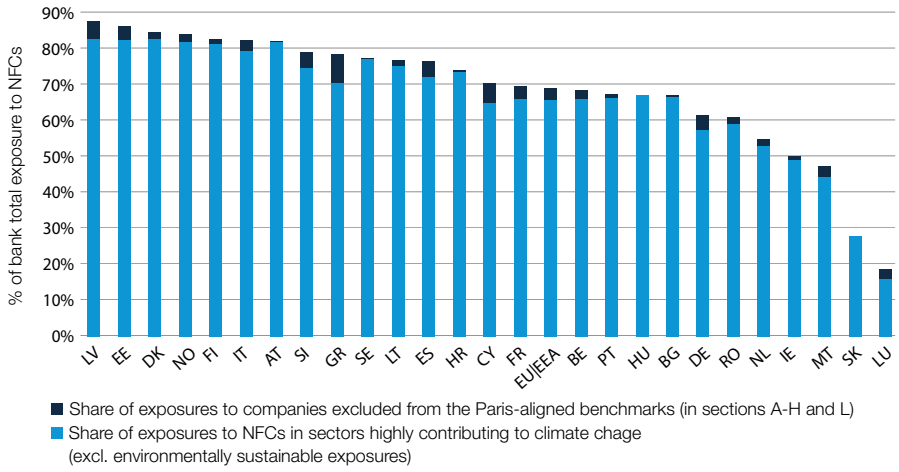
A climate macroprudential capital buffer should have a sectoral dimension to reflect the heterogeneity of climate risk. The implementation of the buffer across different sectors could be gradual and dynamic as the quality of climate risk metrics increases. When distinguishing between exposures subject to transition risk and exposures which contribute to the build-up of physical risk, it is necessary to consider:

- fossil fuel exposure that cannot transition and needs to be phased out to achieve the Paris Agreement objectives;
- carbon-intensive exposure that can transition and needs to align with a respective sectoral transition pathway.

The two categories would translate into different scopes of buffer application. Fossil fuel exposure is easier to identify, but it only represents a small fraction of banks' total exposure subject to climate-related risk. Targeting this exposure represents a lower bound for supervisors to address both transition risk and the build-up of physical risk.

A higher bound could be represented by targeting all exposures from sectors that contribute significantly to climate change and are not yet sustainable, i.e. environmentally sustainable according to Article 3 of Regulation (EU) 2020/852[56] (hereinafter "EU Taxonomy aligned") or otherwise aligned with Paris objectives. Such exposures represent 65% of the total exposure of EEA banks to NFCs (Figure 9). Considering this subset of exposure would provide a more prudent approach to addressing transition risk.

Figure 9. Share of bank exposures to NFCs in sectors highly contributing to climate change (excluding environmentally sustainable exposures) by EU/EEA countries.[57]



56 *Regulation (EU) 2020/852*.

57 *EBA ESG Dashboard*. Transition Risk - NFCs. Data extracted from Pillar III ESG disclosure of EU/EEA banks as of June 2025.

To assess transition risk at the systemic level more precisely, relevant authorities need to consider the sensitivity of banks' portfolios (i.e. companies to which the banks are exposed) to one of the transition risk drivers - sustainable policies, technological disruption or changes in market shares. Such sensitivity depends on the company's present activity, as well as its business planning. The transition risk of a given company could be inferred from its transition plan. The ability of a company to implement a credible transition plan aligned with the climate objectives defined at national and European levels will reduce the transition risk faced by its lenders, i.e. the banks. Authorities could leverage data from an internationally recognised database such as the Science Based Targets Initiative (SBTI) target dashboard.[58]

Therefore, to address transition risk at the systemic level and capture the most relevant exposures, it would be most appropriate to consider banks' exposures to firms that are deviating from sectoral pathways in addition to exposures to the fossil fuel sector. For this, financial authorities need to be able to distinguish banks' exposures to firms with a credible and aligned transition plan (i.e. firms that are transitioning, thereby reducing their vulnerability to transition risk) from those of laggard firms, which face higher transition risk. As stated by the FSB in 2025, transition plans are still at an early stage of development and face several limitations from the risk perspective. They are primarily designed for business strategy, are not always aligned with a risk perspective, lack harmonisation (due to the absence of global standards) and lack a mechanism to ensure their reliability.[59] These limitations should be overcome in the future. As banks need information on the climate risk of their counterparties for their own climate risk management,[60] counterparties' transition plans will be essential in this process. Banks' transition risk assessment derived from transition plans can then form a basis for macroprudential authorities to identify and target only the exposures that lack adequate transition progress.

D. Calibration of a climate buffer

Once clear indicators of climate risk have been established and targeted exposure has been defined, macroprudential authorities will have to define a clear methodology to calibrate an additional capital buffer to address climate-related systemic risk. This methodology must be defined at the highest possible level of supervision to ensure harmonisation amongst the different EU Member States and facilitate the implementation of the requirements by financial institutions. For this, EU authorities' competencies should be amended, and instruments for harmonising nationally determined buffers (O-SII, CCyB and SyRB) should be aligned at EU level, allowing for national variations where justified. The review should consider ways to simplify or automate

58 *SBTI dashboard*.

59 Financial Stability Board. *The Relevance of Transition Plans for Financial Stability*, January 2025.

60 European Banking Authority. *Guidelines on the management of environmental, social and governance (ESG) risks*.

reciprocity procedures between Member States[61]. The ESRB, with the support of the EBA and the ECB, could develop the methodology to harmonised approaches amongst national financial authorities.

It is worth reiterating that a climate buffer should meet two main objectives: provide loss-absorption capacity and prevent the build-up of systemic risk. To this end, this report proposes a buffer calibration methodology, where the climate buffer consists of two components: transition (loss-absorption) and physical (preventive) risk components. The loss-absorption component would be calibrated based on banks' exposure to fossil fuel-related activities and other activities that contribute significantly to climate change. The preventive component would be calibrated based on the deviation of the global emissions trajectory from the Paris Agreement objective. The resulting climate buffer (sCB) would therefore be sectoral and defined as follows:

$$sCB = sCB^{TransitionRisk} + sCB^{PhysicalRisk}$$

a. The transition risk component

The transition risk component is mainly a loss-absorption component. Its objective is to overcome the underestimation of transition risk in the computation of total risk exposure amount (TREA) at institution level. Such underestimation could provoke systemic repercussions due to the scale of exposure concerned, the magnitude of the shock and the interconnectedness of the financial sector.

This report argues that transition risk is actually underestimated at the microprudential level because traditional financial risk measurement methodologies focus largely on backward-looking indicators. To overcome this, Finance Watch proposes to calibrate the transition risk component of the sCB to match the actual transition profile of the targeted sectoral exposure. To estimate the gap between the expected amount of capital required to cover the systemic transition risk and the current level of capital requirements, the report starts with the definition of the total capital requirement (TC) for credit risk, using the Pillar 1 minimum capital ratio of 8%:

$$TC = 8\% * TREA$$

Under the standardised approach, TREA is computed for the targeted exposures (all targeted counterparties i) as follows:

$$TREA_{target} = \sum_{i} (RW_i * Exposure_i)$$

To simplify this equation, Finance Watch proposes to denote as RW_{target} the weighted average risk weight of the total targeted exposures $Exposure_{target}$ that will be subject to the application of the sectoral climate buffer by banks in a given jurisdiction.

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61 Finance Watch. *Finance Watch response to the Commission's targeted consultation on the competitiveness of the EU banking sector*, 7 May 2026.

$$TREA_{target} = RW_{target} * Exposure_{target}$$

The next step is to assess the gap between the actual capital requirement and the expected capital requirement to cover the systemic transition risk for the targeted exposure.

$$TC^{actual}_{target} = 8\% * RW^{actual}_{target} * Exposure_{target}$$

$$TC^{expected}_{target} = 8\% * RW^{expected}_{target} * Exposure_{target}$$

$$TC^{gap}_{target} = TC^{expected}_{target} - TC^{actual}_{target}$$

Finally, the appropriate level for the transition risk component of the climate buffer should correspond to the additional buffer rate needed to cover the total capital requirement gap.

$$TC^{gap}_{target} = sCB^{TransitionRisk} * TREA^{actual}_{target}$$

$$\Longrightarrow sCB^{TransitionRisk} = 8\% * \frac{RW^{expected}_{target} - RW^{actual}_{target}}{RW^{expected}_{target}}$$

This approach ensures there will be no overlap between the microprudential capital requirements and the additional climate buffer requirement. Once the targeted exposures are defined by macroprudential authorities, the following parameters should be set:

- The weighted average Pillar I credit RW of the exposures targeted by the macroprudential measures. Supervisors will be able to obtain this information from banks' supervisory reporting in the respective jurisdiction.
- The average expected credit RW of the targeted exposures, reflecting the risk carried by these exposures under an abrupt transition scenario. This RW could be defined through quantitative methodologies, such as stress tests, or via qualitative methodologies, taking into account recognised climate reports or international agreements.

Macroprudential authorities should first focus on fossil fuel exposures, as they present the highest and most clearly identifiable transition risk. Under the Paris Agreement, fossil fuel activities must be progressively phased out to achieve the objective of limiting warming to 1.5°C (or well below 2°C). Supervisory authorities have access to banks' supervisory reporting and will be able to identify these exposures precisely. They could rely on NACE sector classification (at the most granular level) and infor-

mation related to the alignment of the exposure with the EU Taxonomy. Qualitative adjustments in the definition of the final scope should also be considered by the authorities in case of specific counterparties. For example, a firm that only finances its sustainable activity through the EU banking sector and continues its fossil fuel expansion in other jurisdictions or through other financial intermediaries should be considered within the scope of a climate buffer. However, to support the transformation of the fossil fuel sector to more sustainable business models, dedicated subsets of exposures, such as project finance for renewable energy assets, could be exempted from the scope of buffer application.

Under the methodology described above, this report proposes to set the climate buffer metrics as follows:

- Finance Watch has assumed the average ratings of fossil fuel exposures between AA and BBB[62], i.e. A, leading to an $RW^{actual}_{fossil\ fuel}$ equals to 50% accross all exposures. Financial authorities should be able to determine a more precise value of this weighted average RW.
- Regarding the expected size of transition risk, the report argues that climate stress tests still face too many limitations and could underestimate it. Therefore, Finance Watch proposes to rely on scientific evidence of the remaining carbon budget.[63] Following the scientific recommendation to remain below a trajectory of 1.7°C, Finance Watch has estimated that ⅚ of fossil fuel exposure would become stranded in the process of keeping global warming below this level.[64] It means that ⅚ of the current exposure is carrying a higher risk and should be assigned a risk weight of 150%. This leads to a $RW^{expected}_{fossil\ fuel}$ expected equal to 135%.[65]

Thus, macroprudential supervisors should set the transition risk part of the climate buffer for the fossil fuel exposure equal to:

$$sCB^{TransitionRisk}_{fossil\ fuel} = 8\% * \frac{135\% - 50\%}{50\%}$$

$$sCB^{TransitionRisk}_{fossil\ fuel} = 14\%^{66}$$

b. The physical risk component

A macroprudential approach to climate risk enables the targeting of climate-related financial risk build-up, most notably physical risk. Designing a systemic risk buffer

62 Finance Watch. *A trillion dollars of climate risk*, September 2025.

63 Foster, P. et. al. *Indicators of Global Climate Change 2024*, 2025.

64 Finance Watch. *A trillion dollars of climate risk* September 2025.

65 ⅚ * 150% + ⅙ * 50%.

66 Usually, macroprudential capital buffers have to be a multiple of 0.5%. Therefore, the actual value of 13.6 has been rounded up to 14.

component to account for these risks would also strengthen the resilience of banks investing in carbon-intensive sectors against uncertain physical events triggering systemic losses.

The endogenous component of climate risk (i.e. the increase in climate-related risks caused by financing decisions of the financial sector) is negligible at institution level but becomes significant at the systemic level. By targeting this dimension, macroprudential supervisors would account for the uncertainty and irreversibility of climate risk, which are completely outside the scope of the microprudential approach. Climate scientists warn that every degree of temperature rise above 1.5°C increases the risk of triggering irreversible changes. This level should be taken as a reference point for the buffer calibration.

The physical risk component, acting as a prevention component, will be similar to the mechanism of the CCyB. Based on scientific knowledge, the world is in the build-up phase of climate risk due to rising global temperatures. Banks contribute to this through the financing of carbon-intensive activities. The increase in physical risk due to the increase in global temperature requires that banks build loss-absorption capacity, capitalising against this risk until it is credibly mitigated. By targeting the same scope of exposure as for the transition risk component, namely carbon-intensive exposure, macroprudential authorities would also address the part of the physical risk build-up.

As in the case of the CCyB and as proposed in section two above, macroprudential authorities will need to monitor indicator(s) that reflect the potential systemic level of physical risk. For the calibration of the preventive component of the buffer, Finance Watch proposes to use the gap between the currently projected global warming and the risk-free target, defined in the Paris Agreement based on scientific consensus. The gap should correspond to the current deviation in degrees Celsius from a 1.5°C target expressed as a number of warming steps (the rounding function is used to ensure that the gap will be an integer).

$$sCB^{PhysicalRisk} = 0.5\% * Gap$$

$$with: \left\lceil \frac{max(projected\ global\ warming - target, 0)}{step} \right\rceil$$

This report proposes to use a step of 0.1, as it is used by climate scientists who calculate the increased risk of reaching climate tipping points for every 0.1°C of warming.[67] The definition of an adequate step should be determined in collaboration with the climate science community, such as the European Scientific Advisory Board on Climate Change. Based on the proposed methodology and the current projected global warming under NDCs, at a confidence interval of 90%, the Gap metric would equal:

67 Global Tipping Points. *The Global Tipping Points Report 2025*, October 2025.

$$Gap: \left\lceil \frac{max(2.8 - 1.5, 0)}{0.1} \right\rceil = 13$$

$$sCB^{PhysicalRisk} = 0.5\% * 13 = 6.5\%$$

In this example, targeting fossil fuel exposure, the final sCB rate would be:

$$sCB_{fossil\ fuel} = 14\% + 6.5\% = 20.5\%$$

The estimated climate buffer of 20.5% would represent the highest sectoral capital buffer rate currently applied in Europe (as implemented via the sectoral systemic buffer framework). However, the proposed buffer would target solely a small portion of the bank's total exposures, initially fossil fuel exposures, thus representing a small increase in the bank's total capital requirement. Based on EU banks' Pillar 3 ESG disclosure, the approximate total exposure excluded from Paris-aligned Benchmarks was 176 billion EUR in June 2025. This analysis applies the average risk weight used for the calibration (i.e. 50%) to estimate the targeted TREA. The proposed buffer would require European banks to build an additional capital of 18 billion EUR to address climate risk. Assuming that banks will not use their management buffer (i.e. their CET1 headroom available above overall mandatory capital requirements) to cover this increase, it would represent a small relative increase of around 1% of the overall volume of CET1 in European banks as of June 2025 (1650 billion EUR).[68] This increase could be funded gradually over several years, allowing banks to either use retained earnings or progressively reduce part of their fossil fuel exposure.

Transition risk related to the phase-out of fossil fuel activities does not represent the full extent of transition risk to which the banking sector is exposed. Similarly, activities beyond the fossil fuel sector contribute to the growing physical risk of climate change. To capture the broader spectrum of transition risk and physical risk buildup, the scope of a climate buffer could be extended to a wider set of exposures – namely, exposure to NFCs in sectors that contribute significantly to climate change. The list of sectors covered by this definition corresponds to sectors with NACE codes from A to H and section L, as defined by the European Commission in the Commission Delegated Regulation (EU) 2020/1818.[69] Macroprudential authorities have two options:

- Progressively increase the scope of the climate buffer to cover exposures to counterparties without a credible transition plan. This option will require close coordination with microprudential authorities in charge of auditing banks' climate risk management and their use of counterparties transition plans.
- Apply the climate buffer to the broader scope, while allowing banks to exclude carbon-intensive exposures when they provide clear, credible evidence that the counterparty has lower transition risk (e.g. a credible transition plan).

68 European Banking Authority. *Risk Assessment Report*, December 2025.

69 European Commission. *Commission Delegated Regulation (EU) 2020/1818*

In the EU, the sectoral climate buffer could be implemented through the Systemic Risk Buffer (SyRB) framework, which is a prerogative of national supervisors. This approach would enable national supervisors to consider the specific climate-related risks faced by the banking sector in their respective jurisdictions. The legislative definition of the SyRB in Article 133 of the Capital Requirement Directive[70] contains a reference to climate-related systemic risk: national supervisors may set a systemic risk buffer "in order to prevent and mitigate macroprudential or systemic risks, including macroprudential or systemic risks arising from climate change". Moreover, the SyRB can already be applied to a subset of exposures to target a specific systemic risk.

70 *Directive 2013/36/EU*.

Conclusion

The evidence presented in this report underscores an inescapable reality: climate change is not a distant threat, but a systemic risk to financial stability. The accelerating pace of global warming, the increasing frequency of extreme weather events and the looming threat of irreversible climate tipping points demand immediate actions from financial authorities.

The current microprudential approach to climate risk, while necessary, remains insufficient to address the scale and complexity of the risk. Worse, the limited insight and benign results of this approach could lead to a false sense of confidence, undermining the safeguards of the financial system against the materialisation of severe climate risks.

The systemic nature of climate change necessitates a macroprudential approach – a climate macroprudential capital buffer. This tool would not only increase the resilience of the banking sector to climate shocks but also act as an incentive for banks to mitigate their contribution to the build-up of physical risk. It represents a robust solution to mitigate severe consequences for the financial sector stemming from climate shock triggered by extreme climate events.

The calibration methodology for a climate buffer should be defined at EU level to ensure the robustness of the EU financial sector against climate risk. The European Systemic Risk Board, in collaboration with the European Banking Authority and the European Central Bank, should lead the development of this methodology, ensuring harmonised implementation among EU Member States. Final implementation would remain at national level to account for the economic and climate specificities of each national economy. The climate buffer should not be applied to all bank exposures, but should instead focus on the assets that are most at risk. To start, banks' fossil fuel exposures could be feasibly targeted as they carry the highest transition risk. The scope of buffer application could be gradually increased to other carbon-intensive sectors facing high transition risk, once supervisors have sufficient data to distinguish companies that are aligned with the Paris-aligned transition pathway from those that are not.

The precautionary principle must guide financial authorities. The irreversible and uncertain nature of climate risk demands proactive measures, particularly in the face of incomplete data or imperfect models. By ensuring the stability of its financial system, the EU could gain a competitive advantage, as more frequent and severe cases of climate risk materialisation globally could trigger a financial crisis. Financial authorities cannot afford to wait for certainty in the world of radical uncertainty. They must build resilience today to secure stability tomorrow.

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About Finance Watch

Finance Watch is an independently funded public interest association dedicated to making finance work for the good of society. Its mission is to strengthen the voice of society in the reform of financial regulation by conducting advocacy and presenting public interest arguments to lawmakers and the public. Finance Watch's members include consumer groups, housing associations, trade unions, NGOs, financial experts, academics and other civil society groups that collectively represent a large number of European citizens. Finance Watch's founding principles state that finance is essential for society in bringing capital to productive use in a transparent and sustainable manner, but that the legitimate pursuit of private interests by the financial industry should not be conducted to the detriment of society. For further information, see www.finance-watch.org.

Finance Watch
Rue des Colonies 56 box 3
1000 Brussels
T: + 32 (0)2 880 0430

www.finance-watch.org

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