

NGFS Climate Scenarios: Bridging Climate Realities with Policy Action*

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Abstract

The Network for Greening the Financial System (NGFS) was established in 2017 as a coalition of central banks and supervisors committed to addressing climate-related financial risks and advancing sustainable finance practices. A cornerstone of the NGFS's work is the development of climate scenarios, which serve as vital tools for translating the complex realities of climate risks into macro-financial assessments. First launched in 2020, the NGFS scenarios are uniquely designed to facilitate climate stress testing and assess the economic and financial implications of climate risks. The NGFS scenarios are structured around two complementary time horizons: long-term scenarios (to 2050) and short-term scenarios (to 2030). The long-term scenarios, now in their sixth iteration, provide strategic insights into the interplay between transition and physical risks over extended timeframes. Meanwhile, the short-term scenarios, introduced in 2025, offer a novel approach to assessing the immediate macro-financial consequences of climate risks, focusing on four distinct pathways that explore transition and physical risks.

As public goods, NGFS scenarios provide a globally consistent framework for climate scenario analysis, complete with comprehensive guidance and technical documentation to ensure accessibility and transparency. By bridging the gap between climate realities and macro-financial assessments, the NGFS climate scenarios empower central banks, policymakers, and financial institutions to better understand vulnerabilities, assess risks, and design effective policy responses. As climate change increasingly impacts economies and financial systems, the NGFS scenarios remain an indispensable resource for fostering resilience and advancing global efforts to address the challenges of a warming world.

Keywords: NGFS climate scenarios, climate risk assessment, macro-financial impacts, transition and physical risks, climate stress testing, financial stability, financial sector toolkit.

1. INTRODUCTION

The Network for Greening the Financial System (NGFS) was established in 2017 as a voluntary coalition of central banks and supervisors aimed at addressing analytical challenges and exchanging best practices in sustainable finance. Initially launched by eight founding central banks and supervisory authorities, the NGFS has grown rapidly. By 2026, its membership has expanded to over 150 members and 20 observers, reflecting its global reach and influence. Over

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nearly a decade, the NGFS has evolved into a geographically diverse network, incorporating climate and financial risk perspectives from a wide array of jurisdictions.

In its early years, the NGFS focused on building awareness by enhancing the understanding of climate-related financial risks, sharing supervisory and central banking practices, and analysing the implications of climate risks on financial stability. A significant turning point came with the shift from raising awareness to developing quantitative tools for measuring and analysing climate risks. A key milestone in this journey was the launch of the inaugural NGFS climate scenarios in 2020. Importantly, the NGFS prioritises analytical work and the provision of free tools to support the advancement of the climate agenda among central banks and supervisors, rather than participating in policy discussions.

Over time, the NGFS has substantially broadened its thematic focus. Its work now encompasses a wide range of topics related to climate and nature-related financial risks, including adaptation. This expanded scope underscores the NGFS's commitment to advancing the integration of sustainability considerations into financial systems worldwide.

Climate scenarios represent a flagship product of the NGFS. Much like the evolution of the NGFS itself, these scenarios have progressively advanced over the past few years. Initially focused on mapping long-term climate pathways, they have since evolved to provide a deeper understanding of climate change as a source of macro-financial risk across various time horizons. They are other global climate scenarios, such as the pathways offered by the IPCC or the International Energy Agency. However, what sets the NGFS scenarios apart is their unique design, specifically tailored to meet the needs of the financial sector, with a particular emphasis on enabling climate stress testing.

The NGFS climate scenarios provide an analytical bridge to translate the reality of climate risks into macro-financial assessments. By transforming observed climate events into robust, data-driven frameworks, NGFS scenarios enable users — central banks, policymakers, and financial institutions — to assess the wide-ranging implications of climate risks. These scenarios are not forecasts or predictions but represent a subset of plausible pathways defined by narratives that are intended to be policy relevant at the time of their development.

The NGFS climate scenarios are more than just analytical tools — they are a public good. Accessible to all, they provide global consistency, offering a common reference point for climate scenario analysis. The scenarios are delivered as part of a comprehensive toolkit that includes technical documentation, explanatory notes, and a user guide to ensure that they are practical, transparent, and easily applicable.

A dual horizon approach: long-term and short-term perspectives

The NGFS scenarios are structured across two complementary time horizons: the long-term (spanning to 2050) and the short-term (spanning to 2030). Together, these horizons provide a comprehensive framework for both strategic planning and climate stress testing.

NGFS long-term scenarios

The long-term scenarios are a well-established element of the NGFS framework, with five vintages already released and a sixth in development. These scenarios explore the interplay between transition and physical risks under varying levels of climate policy ambition and physical risk. They are primarily designed for strategic planning, offering insights into structural trends and transformations that shape economies over decades.

NGFS short-term scenarios

First released in May 2025, the short-term scenarios represent a novel addition to the NGFS climate scenario analysis toolkit. These scenarios focus on four distinct pathways through 2030, providing a more immediate perspective that aligns with actionable policy horizons. Their primary value lies in their ability to quantify the macro-financial consequences of climate risks within a nearer-term timeframe.

The short-term scenarios are particularly well-suited for carrying out climate stress tests. By operating within a “what if?” framework, they help users assess vulnerabilities and resilience in the face of immediate climate risks. This perspective is critical in the face of increasingly frequent climate shocks.

2. INNOVATIONS IN CLIMATE RISK MODELLING

The NGFS short-term scenarios represent a significant advancement in climate risk assessment. They incorporate several innovative features that enhance their analytical depth and usability.

1. Integration of multiple dimensions

The scenarios combine climate policies, extreme weather events, macroeconomic developments, and sectoral dynamics into a unified framework. This multidimensional approach provides a comprehensive view of climate risk impacts, capturing both direct effects (e.g., physical damage) and indirect consequences (e.g., financial spillovers).

2. Compound physical risk modelling

Recognizing the increasing frequency and severity of extreme weather events, the scenarios account for sequences of shocks. These compounded events — such as consecutive simultaneous heatwaves, droughts, and wildfires or storms and floods — amplify the economic and financial disruptions, creating cascading effects across regions and sectors.

3. New climate-to-macro transmission channels

The scenarios introduce critical-mineral supply bottlenecks as a new transmission channel. As the global economy transitions toward net-zero pathways, the demand for minerals like lithium, cobalt, and rare earths increases. Bottlenecks in mineral supply chains could exacerbate transition costs and destabilise sectors reliant on clean energy technologies.

4. Baseline alignment with IMF forecasts

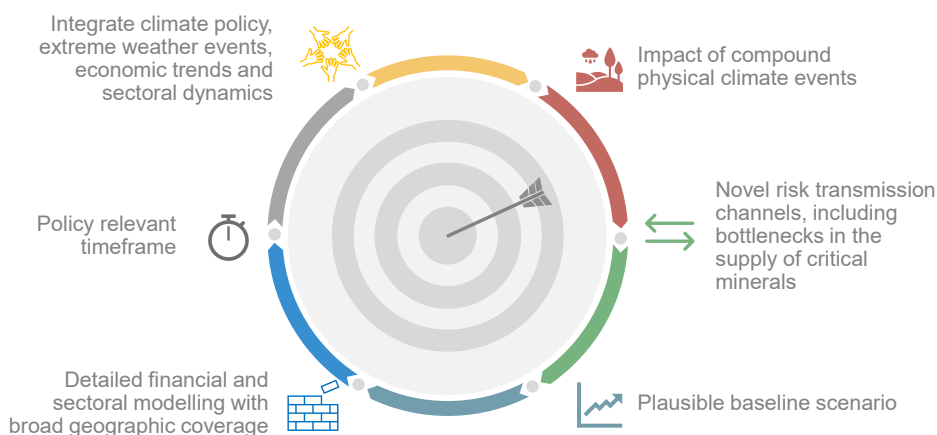
By anchoring the scenarios in globally recognized macroeconomic outlooks, such as those provided by the International Monetary Fund (IMF), they enhance their credibility and relevance. This alignment ensures that the scenarios reflect real-world economic conditions and policy commitments, making them more applicable for practical decision-making.

5. Detailed sectoral and geographical modelling

The scenarios offer granular insights into financial and sectoral impacts, with broad geographical coverage. This level of detail allows policymakers and institutions to assess localized risks while understanding their global implications.

Figure 1

Key innovative features of Phase I of NGFS short-term scenarios released in May 2025



Source: NGFS.

2.1. A broad spectrum of climate risk assessment

The first generation of the NGFS short-term scenarios examined four distinct narratives, divided into two categories: transition risks and physical risks. Each scenario offers unique insights into the economic and financial consequences of different climate trajectories.

Transition risks

- *Highway to Paris:* This scenario envisions a smooth, technology-driven, and globally coordinated transition to net-zero emissions. Carbon tax revenues are efficiently allocated to finance green research and development, enabling gradual emissions reductions with minimal economic disruption. By 2030, global GDP loss is limited to 0.5%, and unemployment rises by just 0.7 pp. Some regions like Europe benefit from the transition due to its ambitious starting climate policies in place, serving as an example of how early action can yield positive outcomes.
- *Sudden wake-up call:* A delayed and abrupt policy shift in 2027 leads to a disorderly transition. Inefficient use of carbon tax revenues and surging carbon prices create inflationary pressures, financial strain, and heightened risks for unprepared carbon-intensive industries. By 2030, global GDP drops by 1.3%, while unemployment increases by 1.3pp.

Physical risks

- *Disasters and policy stagnation:* Severe weather events disrupt affected economies and cause spillovers through trade and finance. Regional GDP losses peak at 12.5% in Africa and over 7% in South America. Even regions not directly impacted experience reduced trade, investment, and financial spillovers, particularly in capital-intensive sectors like agriculture and energy.
- *Diverging realities:* This mixed scenario combines physical and transition risks. Advanced economies (North America, Europe, Oceania, and parts of Asia) remain on track with ambitious climate policies, while other regions face extreme weather events and fail to implement further climate policies. Global supply chains suffer disruptions, mineral shortages drive up transition costs, and recurring disasters lead to global GDP losses exceeding 2.8%, with unemployment rising by up to 1.7pp.

2.2. Key economic takeaways from NGFS short-term scenarios

The NGFS scenarios yield several key insights into the economic trade-offs associated with climate risks and policy actions:

- **Orderly transitions reduce costs**

Early and coordinated policies, as seen in the Highway to Paris scenario, minimize economic disruption and financial risks through efficient capital reallocation. This scenario demonstrates the benefits of proactive climate action and global cooperation.

- **Disorderly transitions amplify risks**

The Sudden Wake-Up Call scenario underscores the risks of delayed action. Abrupt policy shifts lead to inflation, financial strain, and unemployment, particularly in high-emission industries that are unprepared for rapid adjustments.

- **Extreme weather events cause substantial losses in the near-term**

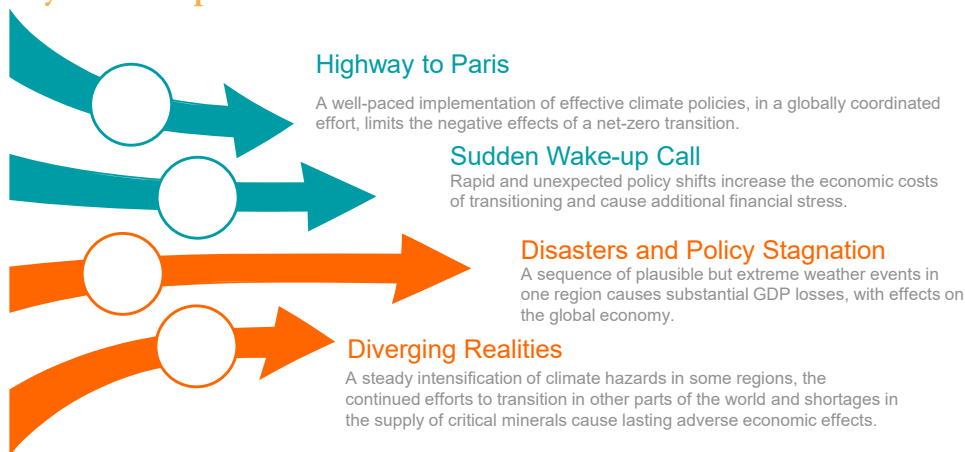
Extreme weather events may lead to substantial GDP losses and strongly affect some economic sectors. Furthermore, the Disasters and Policy Stagnation scenario illustrates how localised shocks can ripple through interconnected economies.

- **Transition costs may increase due to severe weather event materialising elsewhere**

In the Diverging Realities scenario, advanced economies face higher costs due to mineral shortages and supply chain disruptions, while less developed regions struggle with extreme weather. This dynamic widens economic gaps and creates asymmetrical outcomes.

Figure 2

Key results of phase I of NGFS short-term climate scenarios



Source: NGFS.

2.3. Physical risks materializing in the short-term

One of the critical contributions of the NGFS short-term scenarios lies in their ability to quantify the macroeconomic impacts of simultaneous, very severe physical climate risks. These scenarios leverage a storyline-based approach to address a fundamental challenge in modelling the joint occurrence of extreme weather hazards which are plausible but for which historical data is scarce or insufficient.

By relying on a storyline approach, the NGFS short-term scenarios overcome modelling challenges and combine individual extreme weather hazards into a coherent sequence. The storyline approach does not claim that the specified sequence of disasters represents the most likely outcome. Instead, it offers a plausible and internally consistent stress scenario designed to explore vulnerabilities and transmission mechanisms within the economy and financial system. This approach is designed for stress testing, where the objective is not to predict the most probable future but to assess how resilient economies and financial systems would be in the face of severe yet plausible climate shocks.

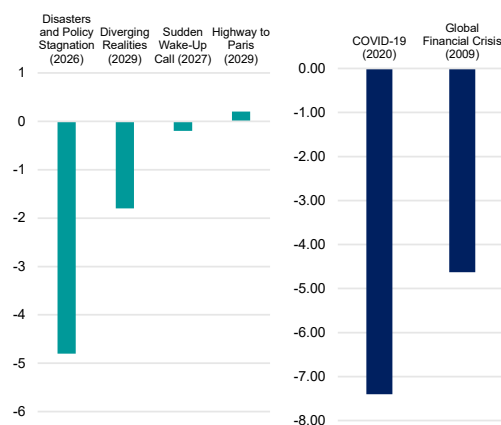
The storyline approach becomes even more relevant as extreme weather events grow in frequency and severity due to the accelerating impacts of climate change. Climate risk is increasingly recognized not as a distant environmental concern but as an immediate financial risk with tangible macroeconomic consequences. For instance, Europe — the fastest-warming region globally — faces significant exposure to physical climate risks despite its commitment to ambitious

Figure 3

Impact of physical risk in the phase I of NGFS short-term scenarios

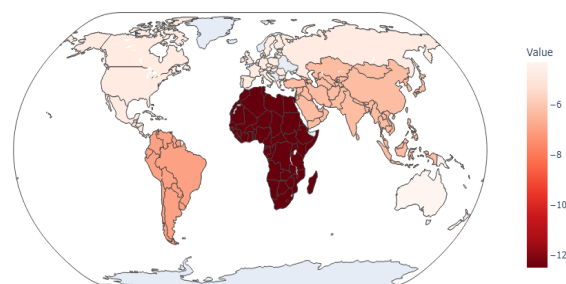
Climate Disasters Could Rival Economic Impact of Global Financial Crisis

(left chart: EU GDP, difference to baseline, %)
(right chart: EU GDP, difference to IMF WEO forecast, %)



Compounding Weather Events Threaten All Economies

(GDP growth, Disasters and Policy Stagnation scenario, difference to baseline, %)



Source: NGFS.

mitigation policies. Economic losses in the region could amount to 5% of GDP by 2030 due to severe weather events, including heatwaves, droughts, wildfires, storms and flooding.

3. ENHANCING THE NEXT GENERATION OF SHORT-TERM SCENARIOS

The short-term scenarios developed by the NGFS during Phase I were a significant milestone in assessing the macroeconomic and financial impacts of near-term climate risks. However, since the conceptual note underpinning these Phase I narratives was finalized in autumn 2023, the world has significantly changed. To ensure continued relevance, these narratives must be updated to fit the current geopolitical landscape.

Moreover, Phase I was primarily an experimental exercise, and the NGFS is committed to leveraging user feedback to improve the next iteration of its scenarios. Users have identified areas for enhancement, notably pointing out that some scenarios—such as “Disasters and Policy Stagnation,” which depicts an extreme physical risk scenario—lacked statistical plausibility due to the unrealistic stacking of severe shocks within compressed timeframes. Similarly, other scenarios, like the smooth transition narrative “Highway to Paris,” have grown increasingly disconnected from today’s fragmented geopolitical reality.

To address these concerns, the NGFS aims to develop a revised set of narratives that enhance realism, policy relevance, and applicability across diverse contexts. Guided by user feedback, the updated scenarios will focus on the following objectives:

- Reflecting intensifying weather hazards: Future narratives will reflect the growing frequency and severity of climate-related events, ensuring alignment with the current climate realities.
- Adapting to shifting geopolitical dynamics: Scenarios will account for evolving geopolitical conditions and the reduced momentum of climate policies in some regions.
- Expanding applicability through recurring but less extreme shocks: By examining the cumulative impacts of recurrent physical shocks—such as those driven by El Niño and La Niña cycles—scenarios will offer a more comprehensive understanding of climate risks that unfold progressively over time.
- Exploring risk amplification mechanisms: Scenarios will delve into how climate risks intersect with adverse macro-financial conditions, highlighting systemic vulnerabilities and cascading effects that amplify risks.
- Enhancing usability and accessibility for stakeholders: Improved transparency, tailored guidance, and capacity-building initiatives will make the scenarios more actionable and user-friendly for a wide range of stakeholders.

Building on these objectives, the NGFS intends to explore four revised narratives in its second vintage. These narratives aim to provide a comprehensive demonstration of macro-financial impacts:

- i. Localised climate events: A scenario focused on acute climate shocks geographically concentrated, offering insights into their immediate economic consequences at local level.
- ii. Cumulative impacts across regions: A scenario examining the broader, less severe physical shocks that unfold gradually across multiple economies.
- iii. Transition risk with macro-financial amplification: This scenario moves beyond stylised climate policy shocks to include adverse macroeconomic conditions and financial stress, presenting a new perspective on stress dynamics.
- iv. Combined transition and physical risks: A scenario that explores diverging climate policy ambitions, integrating the interplay between physical and transition risks alongside financial and supply chain disruptions.

Figure 4

Proposed narratives for exploration in Phase II of NGFS short-term climate scenarios



Source: Own elaboration.

4. APPLYING THE NGFS SCENARIOS

The NGFS scenarios are designed as a starting point for climate scenario analysis. Their users are expected to adapt them to their specific needs. While the scenarios provide consistency and comparability, users shall make sure that the scenarios reflect local circumstances.

Despite their strengths, significant data and modelling gaps remain. For example, more granular subnational projections of physical risks are needed for localized risk assessments. Additionally, there is insufficient data to evaluate the impacts of climate risks on households and real estate in a globally consistent framework. Yet, these are critical sectors for financial stability. Addressing these gaps will be key to enhancing the relevance and utility of future generations of NGFS scenarios.

5. CONCLUSION: TURNING CLIMATE SCENARIOS INTO POLICY ACTION

The NGFS climate scenarios are an indispensable tool for translating the complex realities of climate change into actionable insights. By providing a structured, globally consistent framework, these scenarios bridge the gap between observed climate risks and effective policy responses.

The NGFS short-term scenarios offer a valuable tool for understanding vulnerabilities, exploring transmission mechanisms, and designing policy responses to emerging risks to better prepare for the immediate economic impacts that a warming world may bring. As the NGFS continues to refine and expand its scenarios—addressing data gaps, enhancing plausibility, and incorporating broader risk dynamics—they will become even more essential for tackling the macro-financial challenges posed by climate change.

Ultimately, the NGFS scenarios emphasize the urgent need to treat climate risk not as a distant environmental concern but as an immediate and pressing macro-financial stability issue. In a world increasingly shaped by climate change, the NGFS scenarios are an essential resource of the financial sector's toolkit.