

Climate Scenarios for the Financial Sector

The NGFS workstream

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カーボンニュートラル移行の加速に向けた総合知に基づく社会シナリオ研究事業, オンラインセミナーシリーズ

Outline

- NGFS platform
- NGFS Scenarios
 - Scenario matrix
 - **Protocols for each phase**
- Output
- Research teams
- **Review process**
- **Users of scenario results**



NGFS platform

- At the Paris “One Planet Summit” in December 2017, eight central banks and supervisors established the **Network of Central Banks and Supervisors for Greening the Financial System** (NGFS)
 - as of today, **138** central banks and supervisors and 21 observers
 - on a voluntary basis
- contribute to the development of environment and climate risk management in the financial sector, and to mobilize mainstream finance to support the transition toward a sustainable economy



NGFS platform



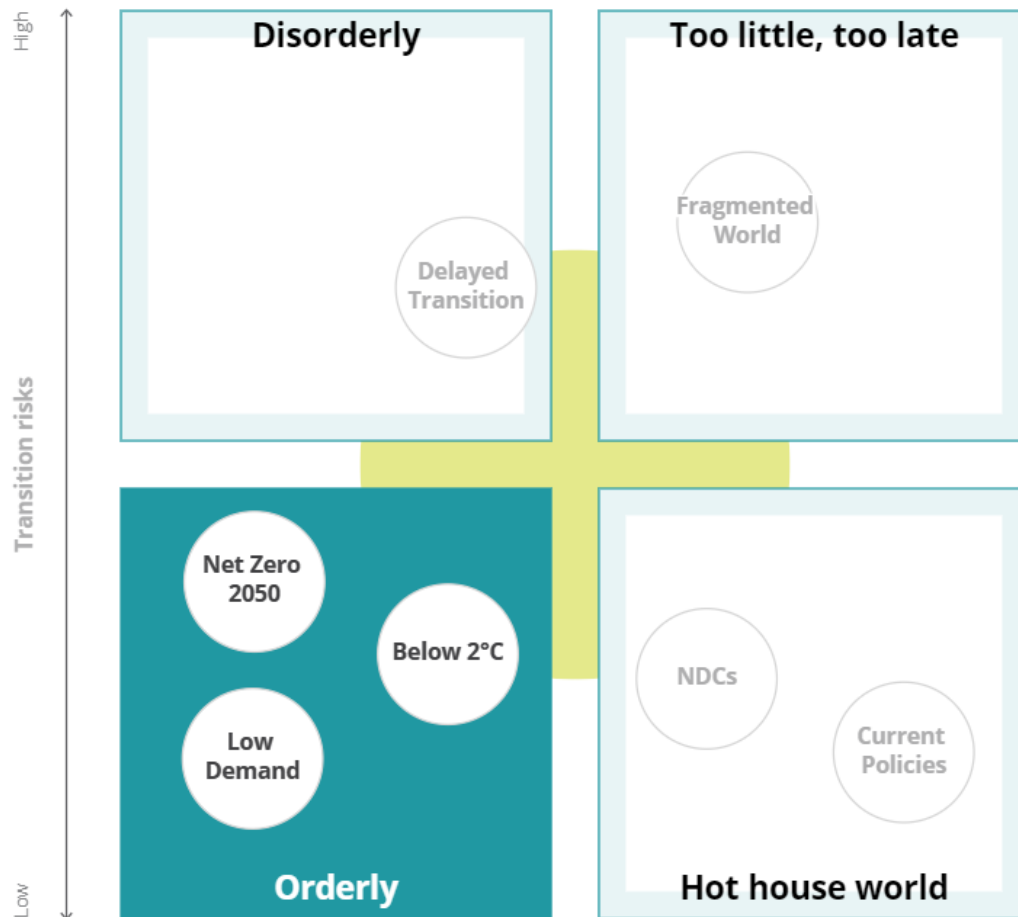
NGFS platform



The screenshot displays the Bank of Japan website. At the top left is the Bank of Japan logo with the text '日本銀行 BANK OF JAPAN'. Below it are language options: '日本語' and 'English', with 'English' selected. A dark blue navigation bar on the left contains the following items: '» [About the Bank](#)', '» [Outline of the Bank](#)', and '» [Outline of the Bank](#)' with a right-pointing arrow. The main content area features a large image of a classical building courtyard. Below the image is a dark navigation bar with a search icon and the breadcrumb trail: 'Home > [About the Bank](#) > [Climate Change](#) > [NGFS publishes the NGFS Climate Scenarios](#)'. The main headline reads 'NGFS publishes the NGFS Climate Scenarios'.

Scenario matrix

aiming at providing a **common reference framework**

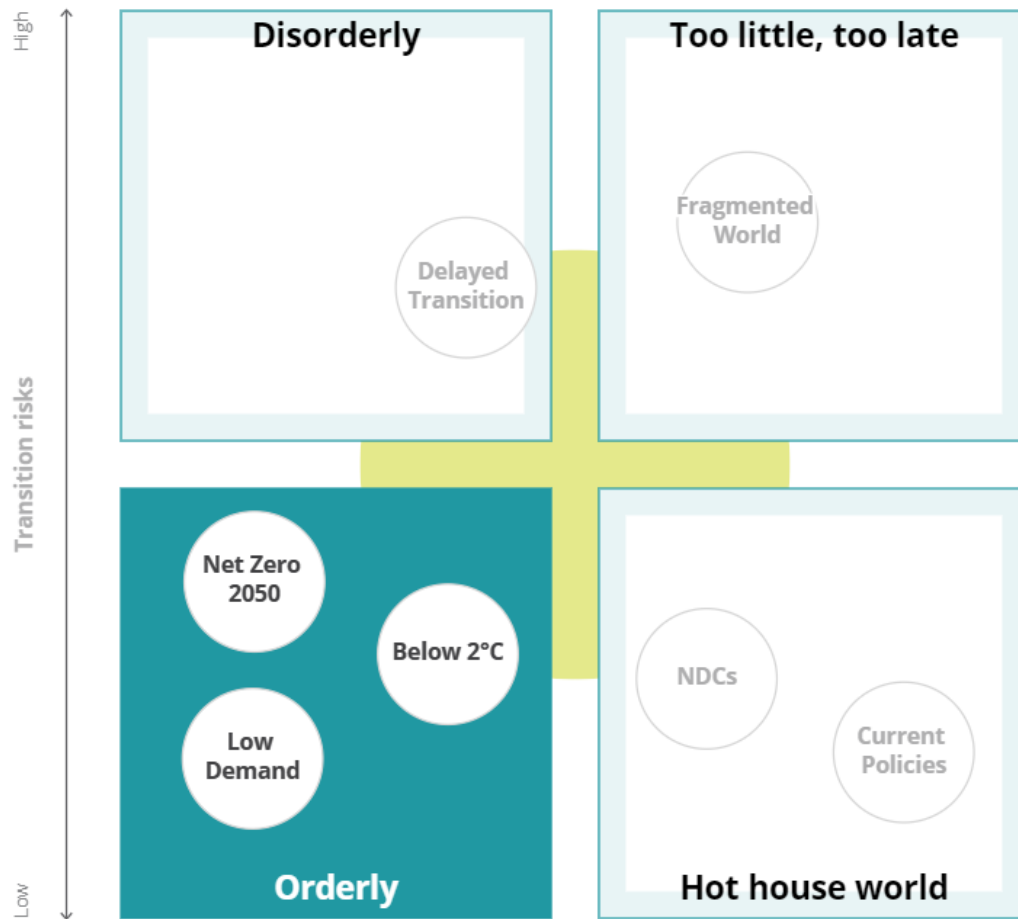


orderly and disorderly transition **x** sufficient and insufficient global efforts

- **Orderly** scenarios assume climate policies are introduced early and become gradually more stringent.
- **Disorderly** scenarios explore higher transition risks due to delayed or divergent policies across countries and sectors.
- **Hot house world** scenarios assume that globally efforts are insufficient to halt significant global warming.
- **Too-little-too-late** scenarios assume that a late and uncoordinated transition fails to limit physical risks.

Scenario matrix

aiming at providing a **common reference framework**



orderly and disorderly transition **x** sufficient and insufficient global efforts

- Main policy scenarios
 - **Current Policies**
 - **NDCs**
 - **Below 2 degree**
 - **Net Zero 2050 (1.5 degree scenario)**
 - Net zero with low demand

Scenario matrix

Disorderly

Delayed Transition assumes annual emissions do not decrease until 2030. Strong policies are needed to limit warming to below 2°C. Negative emissions are limited.

Too-little
too-late

Fragmented World assumes a delayed and divergent climate policy response among countries globally, leading to high physical and transition risks. Countries with net zero targets achieve them only partially (80% of the target), while the other countries follow current policies.

Orderly

Net Zero 2050 limits global warming to 1.5°C through stringent climate policies and innovation, reaching global net zero CO₂ emissions around 2050.*

Below 2°C gradually increases the stringency of climate policies, giving a 67% chance of limiting global warming to below 2°C.

Low Demand assumes that significant behavioural changes - reducing energy demand - in addition to (shadow) carbon price and technology induced efforts, would mitigate pressure on the economy to reach global net zero CO₂ emissions around 2050.*

Hot house
world

Nationally Determined Contributions (NDCs) includes all pledged targets even if not yet backed up by implemented effective policies.

Current Policies assumes that only currently implemented policies are preserved, leading to high physical risks.



Protocol for each phase

- Recent policy changes
 - e.g., NDC goal changes
- Recent global shocks
 - e.g., Ukraine war
 - e.g., Post-COVID green recovery
- Updates in near-term IEA reports/national yearbooks
- Recent changes in GDP/POP projection
 - e.g., new SSPs
- Topics of each phase
- Vetting criteria

Protocol for each phase



- Aiming at a common reference framework
 - less protocol-specific constraints compared to national scenarios
- Putting more emphasis on recent or near-term (2025-2030) changes
- No research priorities on non-climate policies
 - looking at the long-term impacts of specific mitigation options in specific regions is usually not necessary
 - e.g., the hydrogen society in Japan, the circular economy in EU
 - default settings for all options
 - solar and wind (SE, capacity, capacity addition), BECCS, fossil phase-down (SE, PE), CDR, electrification rate, hydrogen/ammonia/methanol, sector-level demand
 - near-term and post net-zero carbon prices

Output

- Annual release
 - 5 phases by 2024
 - open access to external users (NGFS Climate Scenarios Data Set reaching **13k** views in Phase 4)
- Transition and economic variables are made available in the [NGFS Scenarios Database](#)
- Climate variables can be explored through the NGFS [Climate Impact Explorer](#)
- Key data and resources can be explored interactively on the [NGFS portal](#)

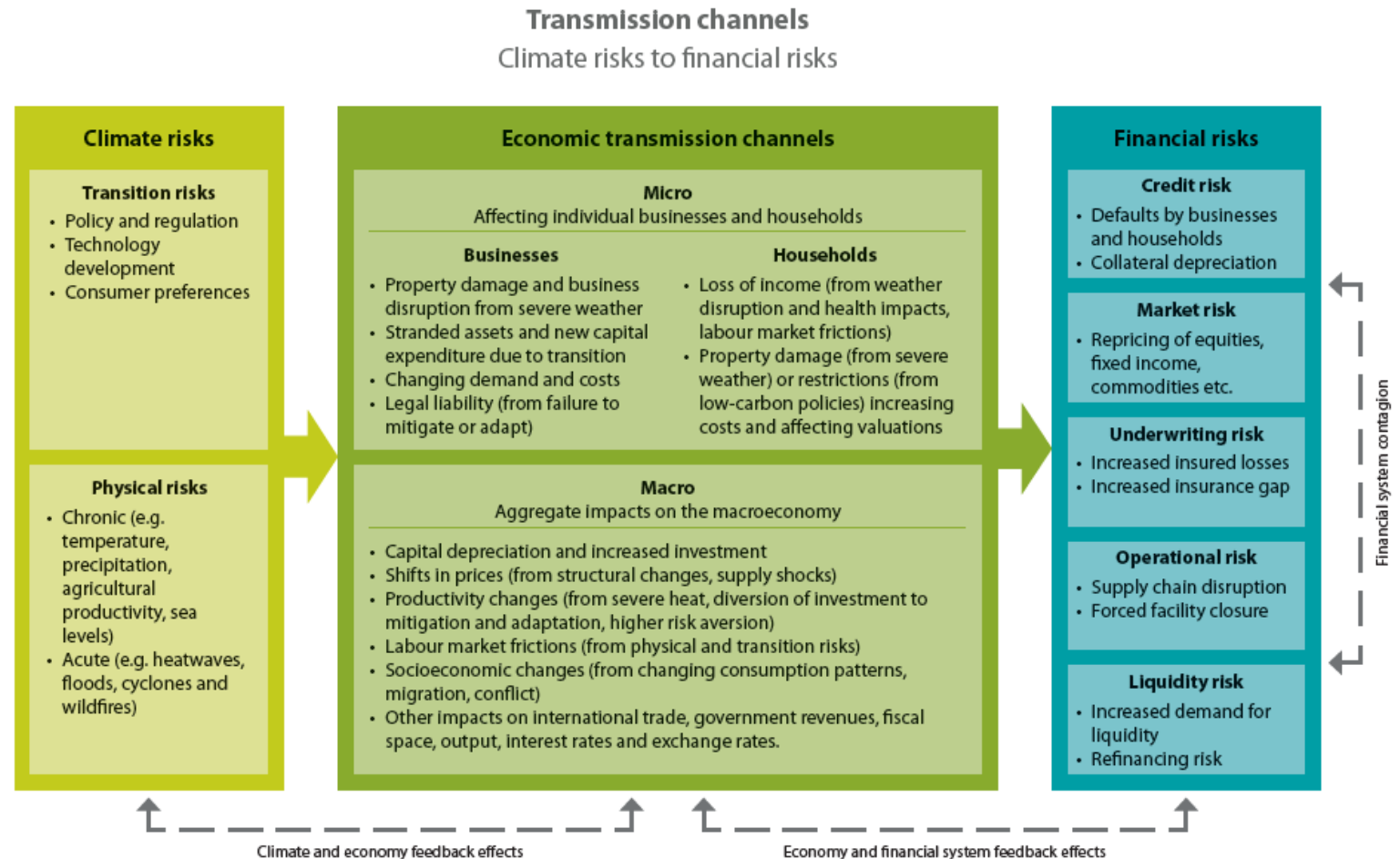
Modules	
1	High-level overview
2	REMIND-MAGPIE
3	MESSAGEix-GLOBIOM
4	GCAM
5	NiGEM
6	Chronic physical risk
7	Acute physical risk
8	Country downscaling
	Technical Appendix



Output

Physical risks affect the economy in two ways.

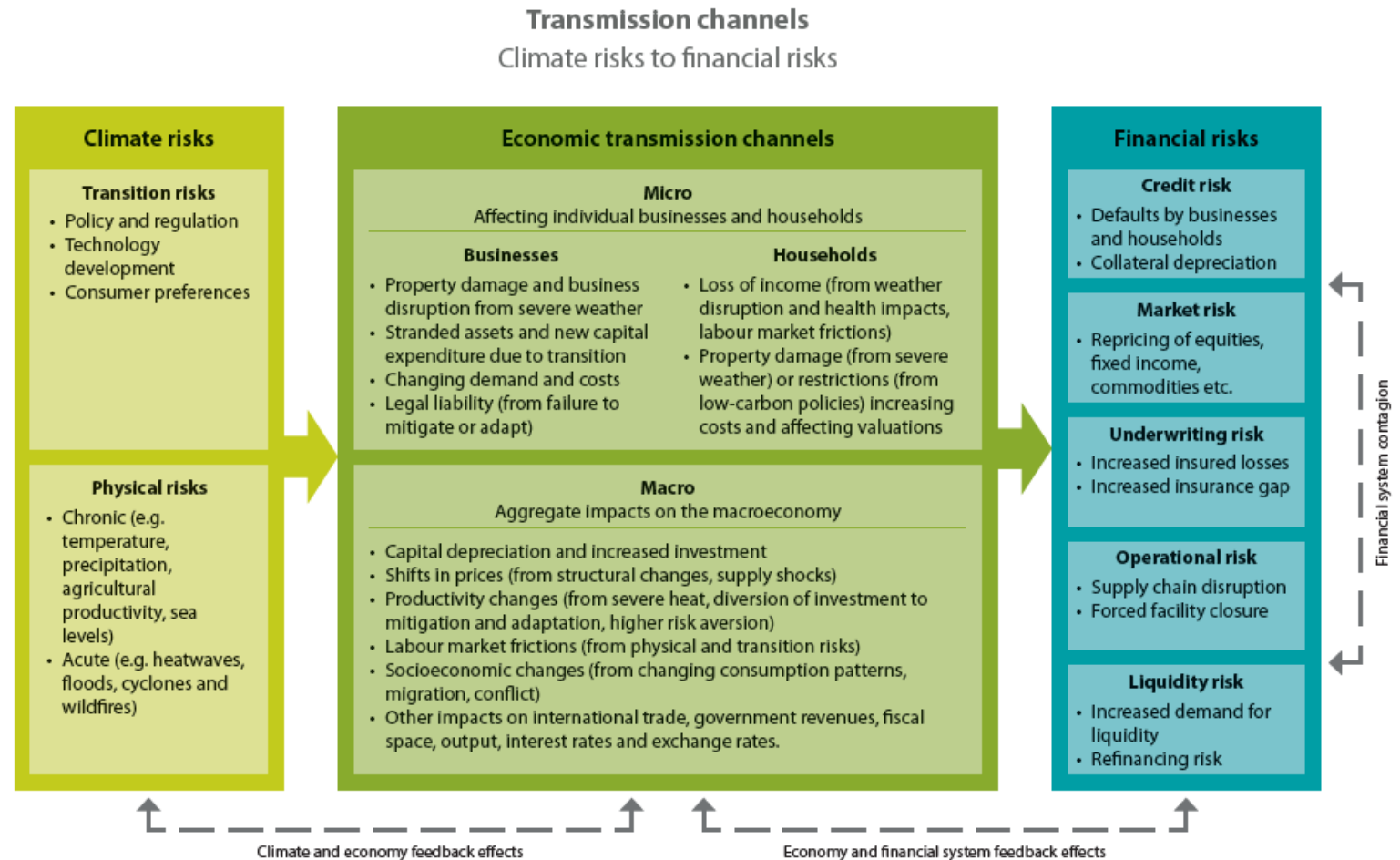
- **Acute impacts** from extreme weather events can lead to business disruption and damages to property, reduction of agricultural yields and/or of labour productivity. These events can increase underwriting risks for insurers, possibly leading to lower insurance coverage in some regions, and impair asset values.
- **Chronic impacts**, particularly from increased temperatures, a rise in sea levels and precipitation changes, which may affect labour, capital, land and natural capital in specific areas. These changes will require a significant level of investment and adaptation from companies, households and governments.



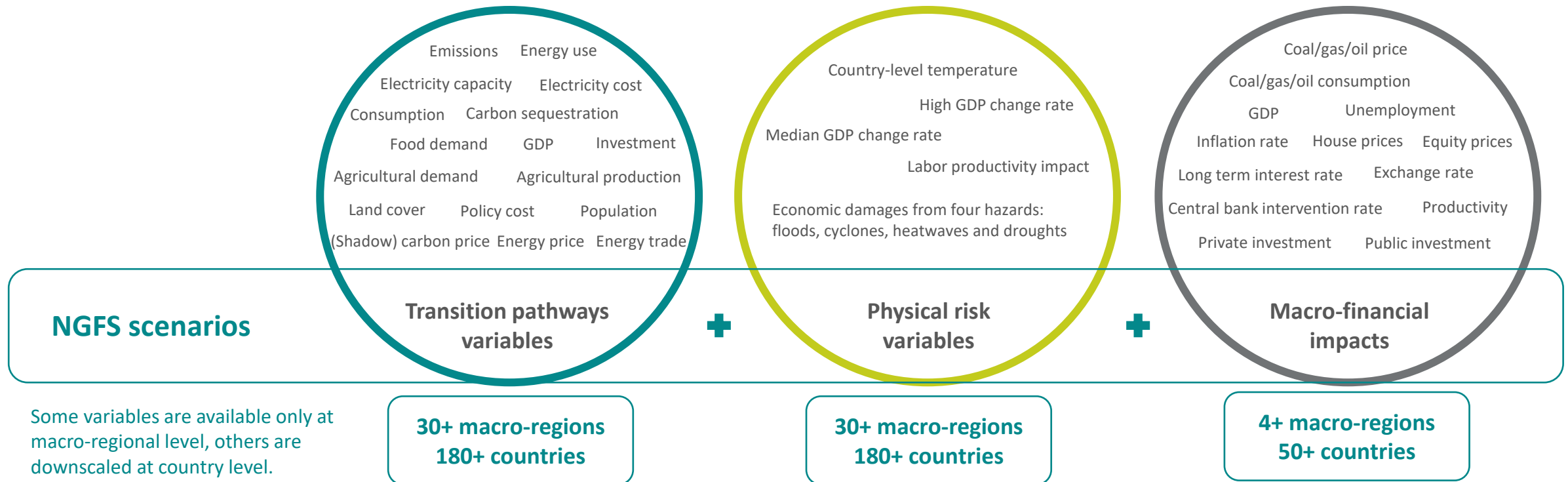
Output

Transition risks will affect the profitability of businesses and wealth of households, creating financial risks for lenders and investors.

They will also affect the broader economy through investment, productivity and relative price channels, particularly if the transition leads to stranded assets.



Output

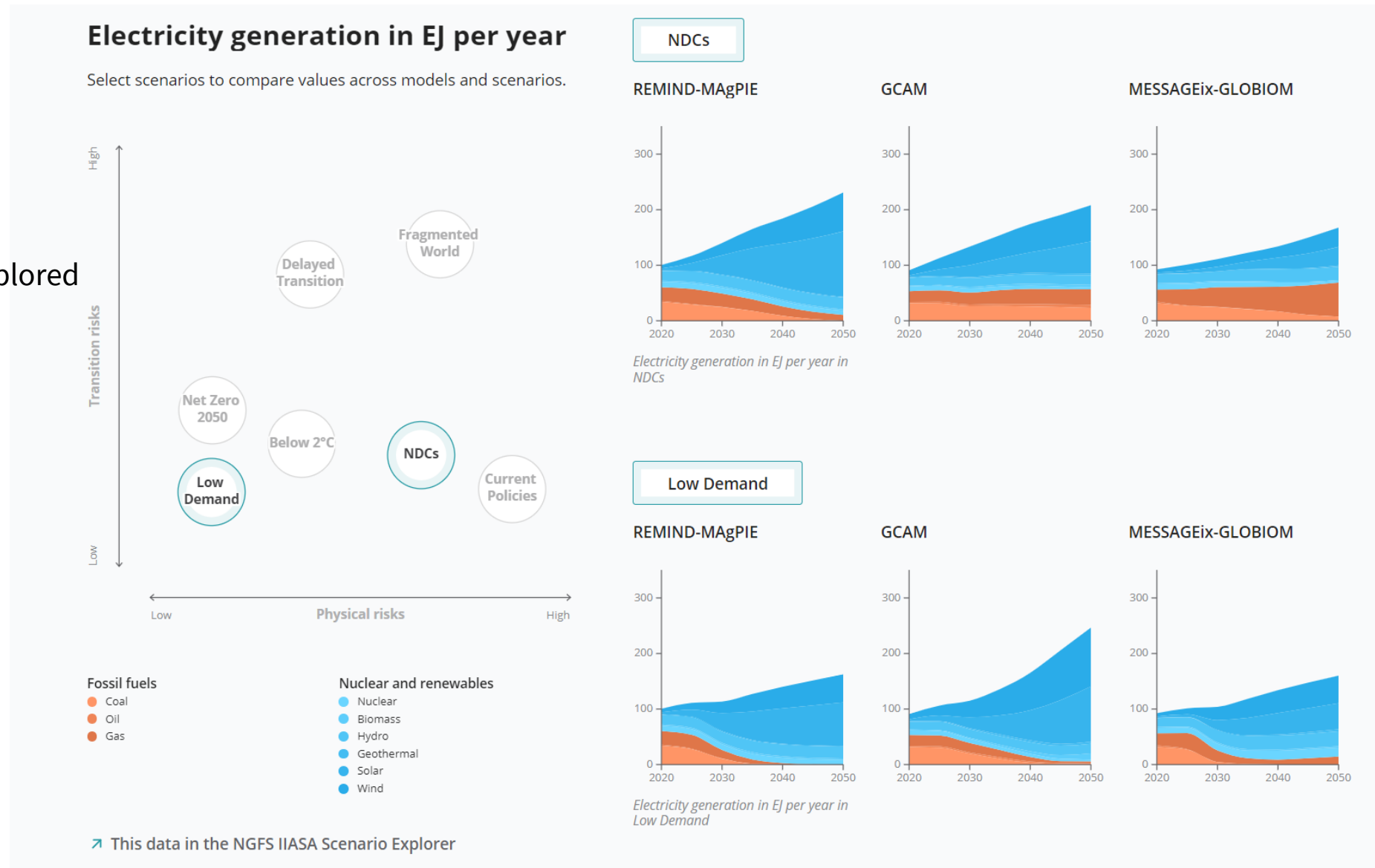


Output

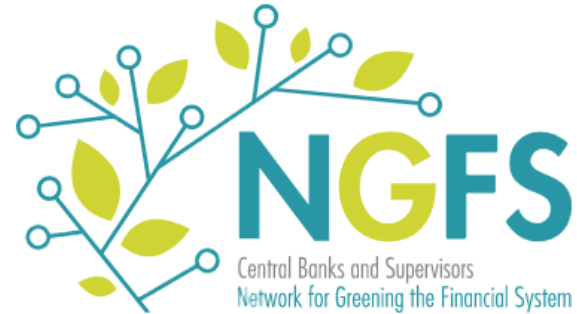
- Key indicators under all scenarios
 - Decarbonizing electricity
 - Electrifying buildings, industry and transport
 - Switching to carbon-neutral fuels
 - Storing and Removing CO₂
 - CCS, CDF
 - Improving energy efficiency across the economy
 - Decarbonizing agriculture, forestry and other land use
 - other GHGs

Key data and resources can be explored interactively on the [NGFS portal](#)

Latest release [here](#)

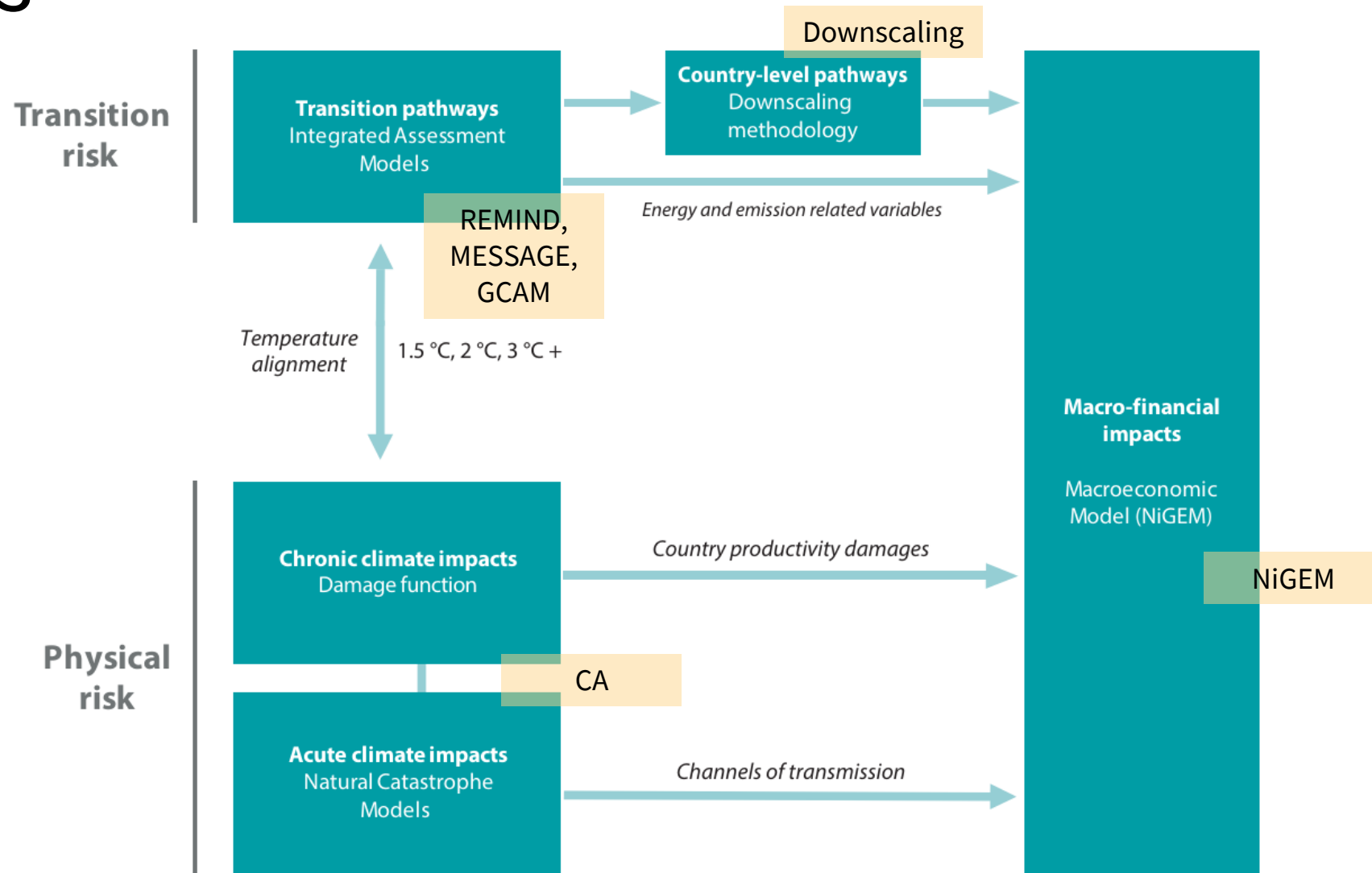


Teams



Comparison	Climate impacts	Transition pathways	Economic impacts
External research partners	Climate Analytics PIK	PIK UMD IIASA	NIESR
Models	Climate models participating in the ISIMIP project CLIMADA	REMIND-MAGPIE 3.0-4.4 GCAM 5.3+ MESSAGEix-GLOBIOM 1.1-M-R12	NiGEM v1.22 NGFS version IAMs (only GDP provided as an output in the database)
Inputs	Atmospheric concentrations of emissions and associated radiative forcing Economic exposure data for assessment of economic impacts	Constraints from an emissions budget and other climate policies at the global and regional level	Carbon tax prices and revenues, energy consumption, "useful energy", physical risk damage functions
Key assumptions and uncertainties	Physical relationships between various aspects of the climate system Changes in climate at the local scale	Technology costs. Inter-temporal optimisation (for REMIND-MAGPIE and MESSAGEix-GLOBIOM); dynamic recursive (for GCAM). Optimal government policy design and capital reallocation	Econometric relationships between variables hold. Rational expectations and perfect foresight
Outputs	Climate indicators (e.g. temperature, precipitation, river flow, agricultural yields, soil moisture) Economic indicators (e.g. direct losses from flooding and cyclones, area and population exposed to extreme weather)	Energy demand, energy capacity, investment in energy, energy prices, carbon prices, emissions trajectories, temperature trajectories, agricultural variables, water variables, GDP	GDP (and components), unemployment, inflation, productivity, personal disposable income, house prices, interest rates, exchange rates, equity prices, etc.
Time horizon	Time steps of 5 years, up to 2100 in Explorer Up to daily time steps for underlying ISIMIP data	Time steps of 5 years up to 2100 (10 years from 2060 onwards for REMIND-MAGPIE & MESSAGEix-GLOBOM)	Annual steps, up to 2050 (NiGEM)

Teams



Review process: consortium internal

- Validation across modelers (REMIND, MESSAGE, GCAM)
- Tendency (checking variables sensitive to parameter variations or model principles?)
- **Short list (~50)** and long list (~800) of variables
 - primary/secondary/final energy, emissions, capacity, capacity additions, CCS, demand, GDP
 - by scenario, by region, by model, by phase, structure, historical, short-/long-term trajectories
- Historical years, especially when the baseline year changes
- Short-term and long-term trajectories
- Policy goals under **policy scenarios** (e.g., 2030 NDCs)
- Others
 - is this an outlier among all models (e.g., 60% different from model medium)?
 - is this very different from the last phase?
 - is this violating scenario definition (e.g., fossil import in o_1p5_lowdem higher than o_1p5)?
 - protocol specific

Review process: external feedback

- Workshops
- Calling for feedback
- Constantly after annual releases
 - from Github discussion or direct emails
 - especially downscaling results

COMMUNIQUÉS DE PRESSE

NGFS held its 2023 Annual Plenary Meeting, Asia-Pacific Outreach, and Workshop in Singapore

Publié le 27/04/2023

Paris, 27 April 2023

The Network for Greening the Financial System (NGFS) held its 2023 Annual Plenary Meeting, an Outreach Plenary session for Members from Asia and the Pacific, and a workshop on climate scenarios for Members from the Asia-Pacific region.

MEMO RELEASED

NGFS seeks public feedback on climate scenarios

Published on 02/06/2023

Paris, 6 February 2023

- Publicly accessible online survey on climate scenarios open until 27 February 2023
- All users and interested stakeholders are encouraged to participate and submit their feedback on the NGFS scenarios
- Key results will guide the NGFS scenario development work plan and ensure that the NGFS scenarios remain relevant and comprehensive for a continuously growing user base

The NGFS is launching its first user feedback survey on climate scenarios today, following the publication of the third vintage of the NGFS scenarios in September 2022.

As part of its ongoing effort to develop state-of-the-art climate scenarios that can support a large community of users, the NGFS seeks to learn from user experiences and welcomes suggestions for improvement. Therefore, scenario users and interested stakeholders from all sectors are encouraged to participate in the online survey accessible on the [NGFS website](#) over the next three weeks, until 27 February 2023. The NGFS will publish the key findings of the survey in Spring. This will serve as important input for the scenario development work plan.

"The NGFS scenarios are a global public good. They have enabled good progress in identifying and assessing climate risks in our economies and financial systems", says Ravi Menon, Chair of the NGFS and Managing Director of the Monetary Authority of Singapore. "The NGFS is committed to regularly updating and improving its scenarios to keep them relevant. We look forward to the feedback from a broader community of users beyond the NGFS membership."

Users of scenario results

- Usually they are (climate/energy/general) policy makers (national, etc.)
 - 明るく豊かなカーボンニュートラル社会の未来像への道筋を描く
- In financial scenarios, the users are quite specific
 - Central banks and supervisors
 - Banks
 - Asset owners
 - Asset managers
 - Insurers
 - Credit export agencies

Users of scenario results

- Interviews with users
 - Do you use any of the following when setting your targets?
 - absolute emission reductions compared to the reference year
 - relative emission reduction compared to the BAU scenario
 - reduction of emission intensity per unit of production
 - reduction of emission intensity per sectoral value added
 - As a banker/asset owner I need to ... so that... (e.g., as a bank I need the target to be aligned with IFRS requirements so that the scenario selection is aligned and complies with regulations in a jurisdiction)

Wrapping up

- NGFS is...
 - a network of central banks and supervisors for greening the financial system, contributing to the development of environment and climate risk management in the financial sector
- The scenarios...
 - aims at a common reference framework, providing the output of physical and transition risks by cooperating with different model teams
- The validation of NGFS scenario results opens to internal modelers and external users (banks).
 - NGFS has also been collecting feedback on scenario results under the open-access tools from the general audience across phases, as well the feedback on scenario design (or the evaluation of transition risks) through interviews, surveys, and workshops with financial stakeholders.

Thank you for your attention!