Climate Risk Analysis in FSAPs

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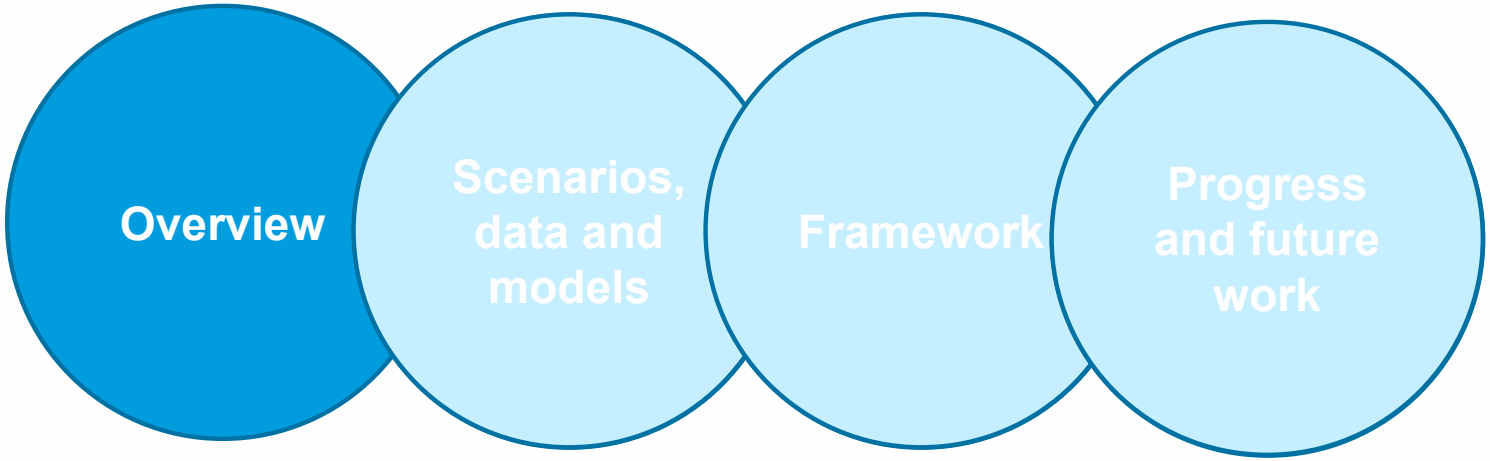
Syllabus


Overview
Scenarios, data and models
Framework
Progress and future work

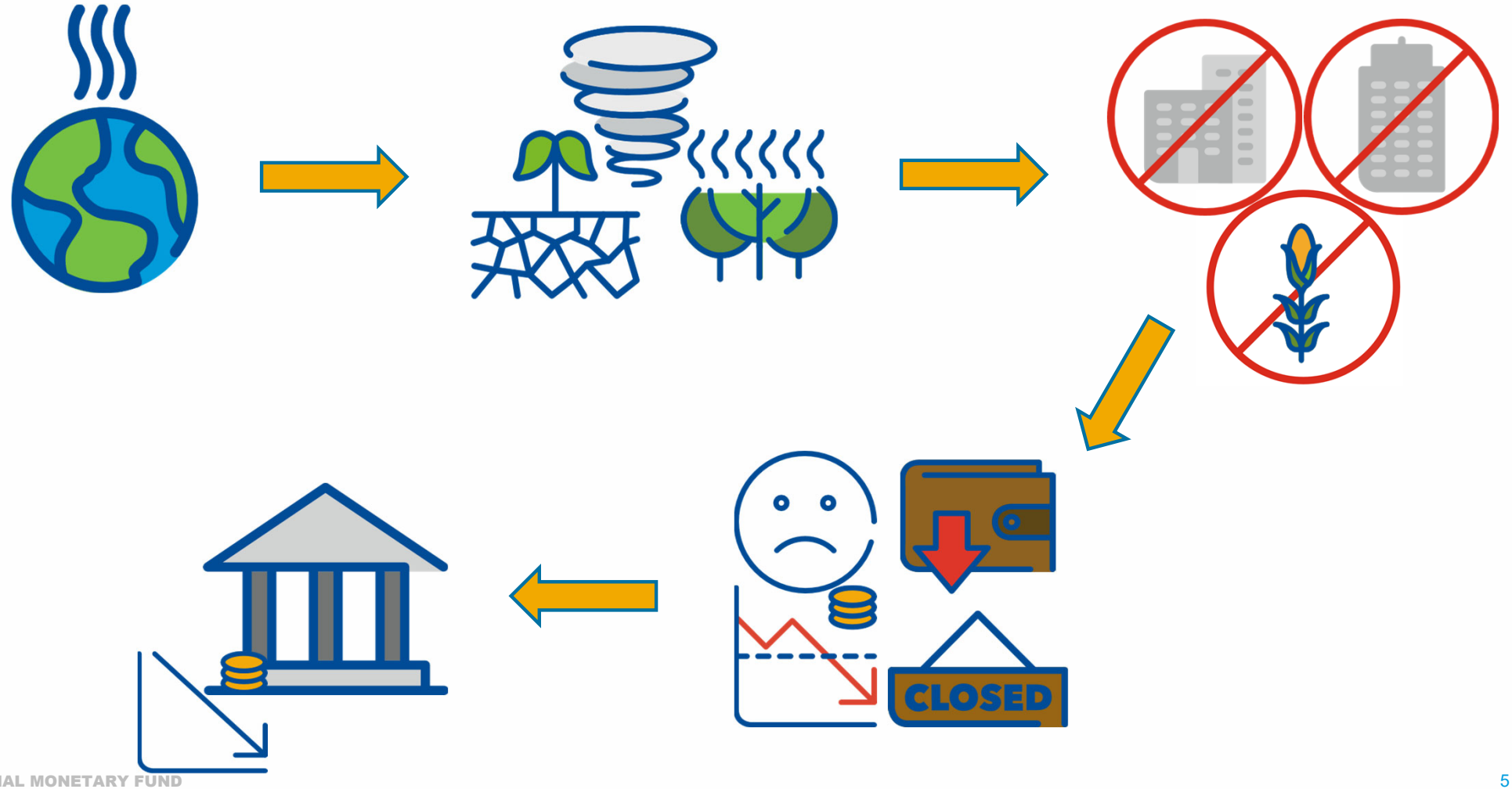
a) Understand pressure points for the financial system due to climate change and the transition to a low-carbon economy

b) Enhance risk management for the resilience of the financial system

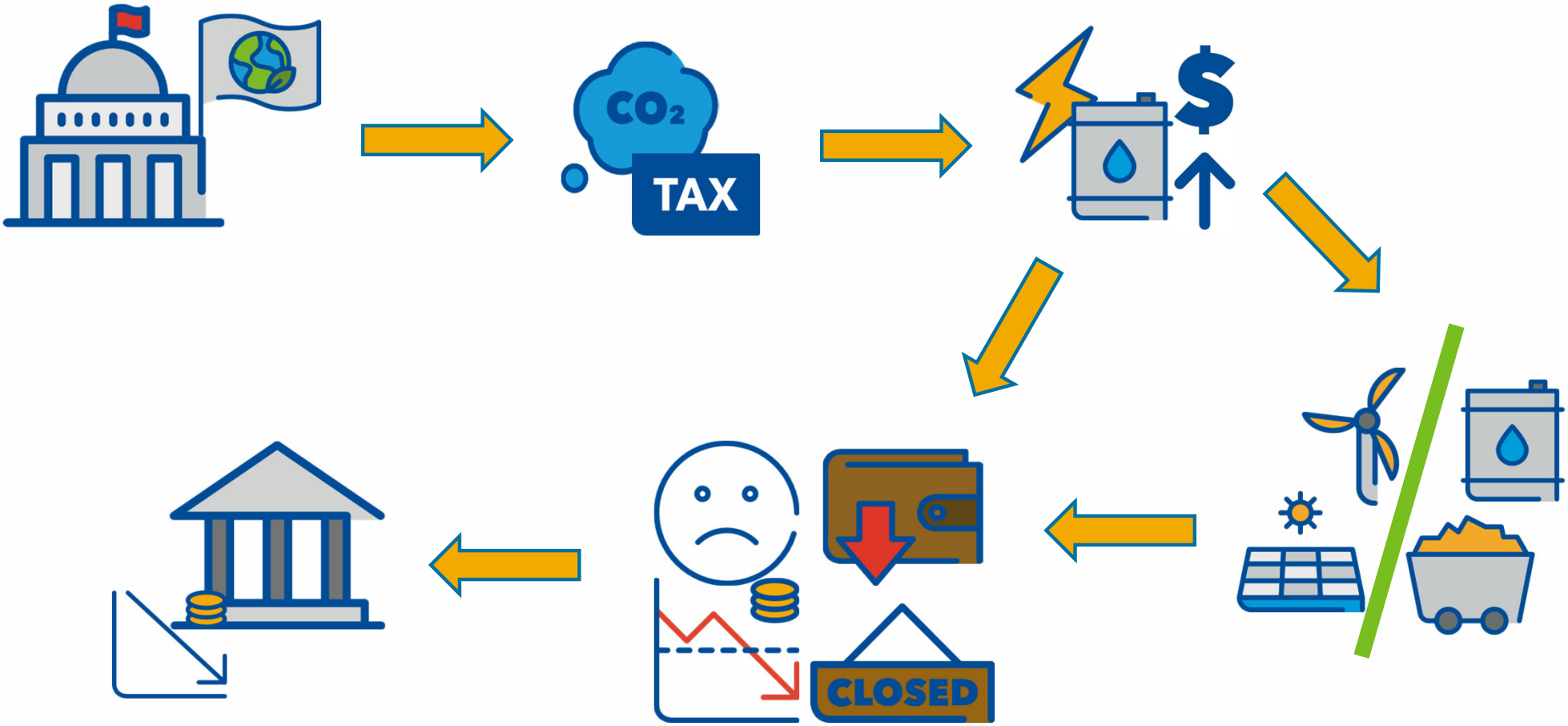
Special characteristics

- Medium-term and long-term horizon
- Higher uncertainty
- Sectoral and geographic diversity
- New data and models
- New types of risk: **Physical risk** and **Transition risk**

Physical risk



Transition risk



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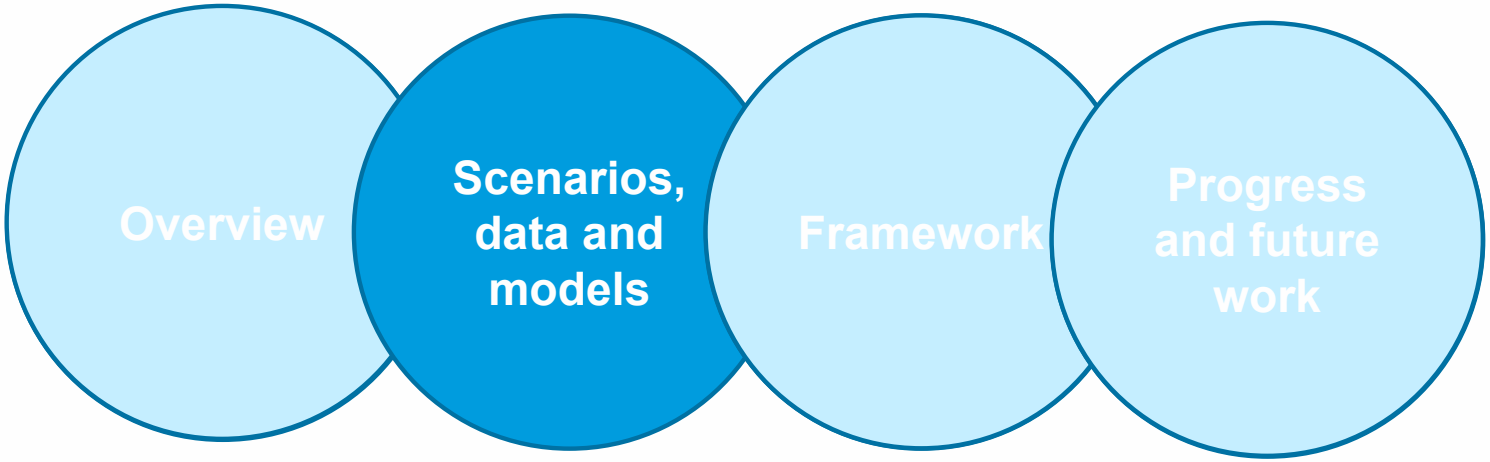
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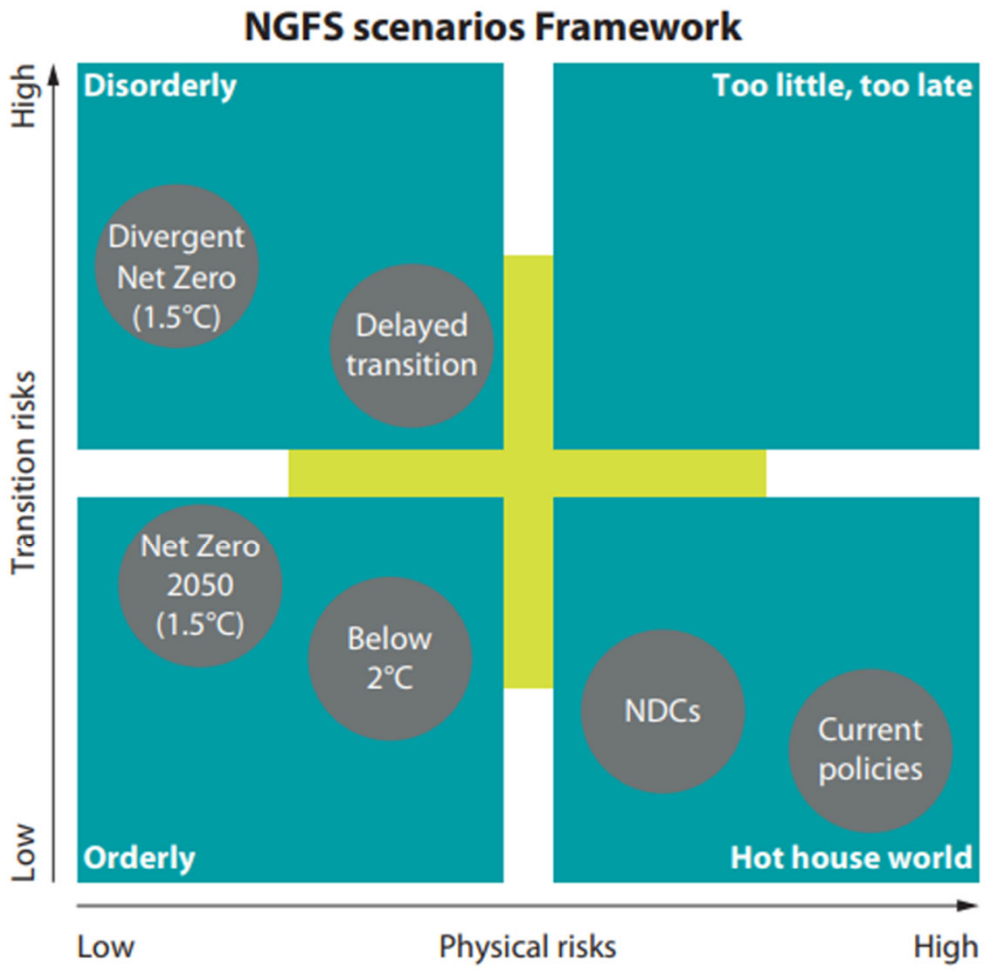
Representative Concentration Pathways (RCPs)

- **Emission and temperature paths**
- **Introduced by IPCC**
- **Adopted by NGFS**



Positioning of scenarios is approximate, based on an assessment of physical and transition risks out to 2100.

Physical risk data

- Global temperature
- Sea level rise
- Hazards
  - Precipitation, Cyclones, Floods, Droughts, Wildfires, Heatwaves

Transition risk data

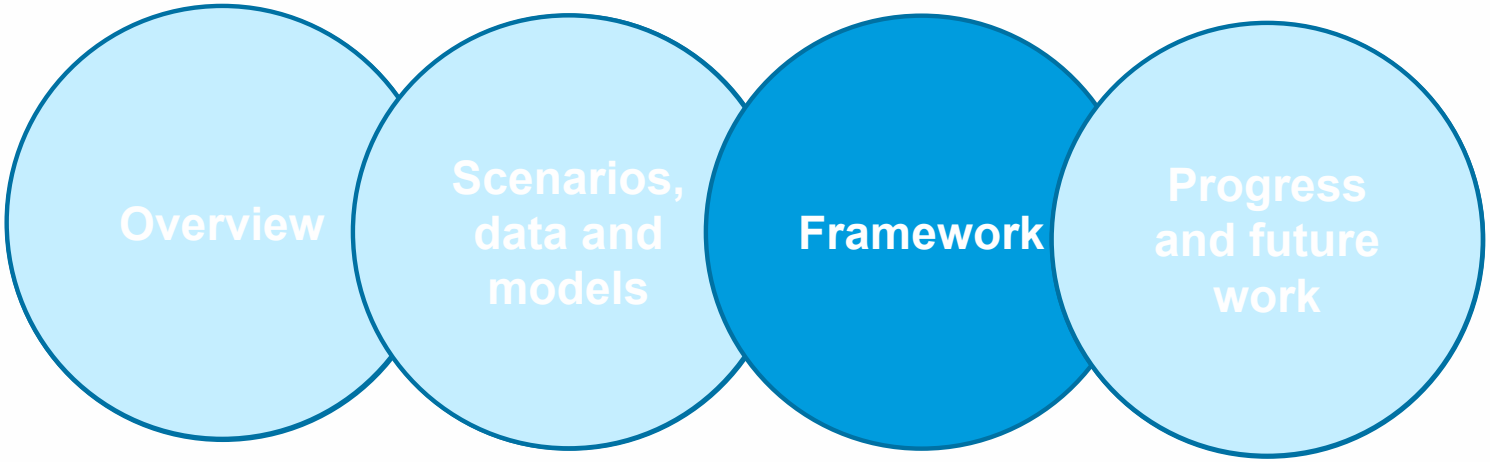
- Corporate specific emissions
  - Projections
  - Reduction targets
- Temperature alignment
- Renewables
- Energy mix
- Fossil fuel reserves
- Energy prices

Macro-models with build-in climate risk components

- Econometric models
  - E.g. National Institute's Global Econometric Model (NiGEM)
- Computable general equilibrium (CGE) models
  - E.g., Environmental Impact and Sustainability Applied General Equilibrium (ENVISAGE)
- Climate – DSGE models
- Integrated assessment models (IAM)
  - E.g., Integrated Model to Assess the Global Environment (IMAGE)

Other types of models

- **Satelite-models** to estimate impact of climate risk on exposure level and gauge the effects on assets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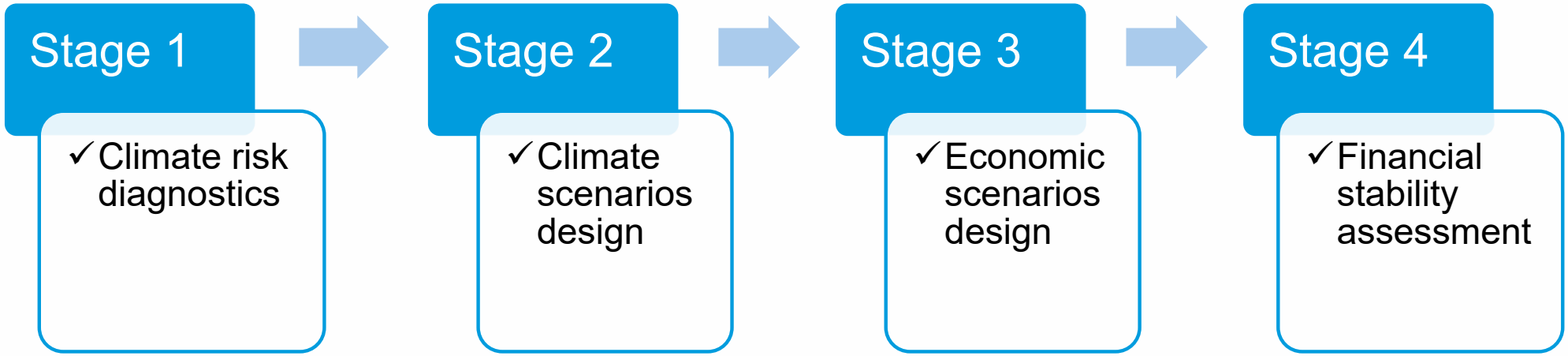

Stage 1
✓Climate risk diagnostics
Stage 2
✓Climate scenarios design
Stage 3
✓Economic scenarios design
Stage 4
✓Financial stability assessment

I. World climate risk HeatMaps development

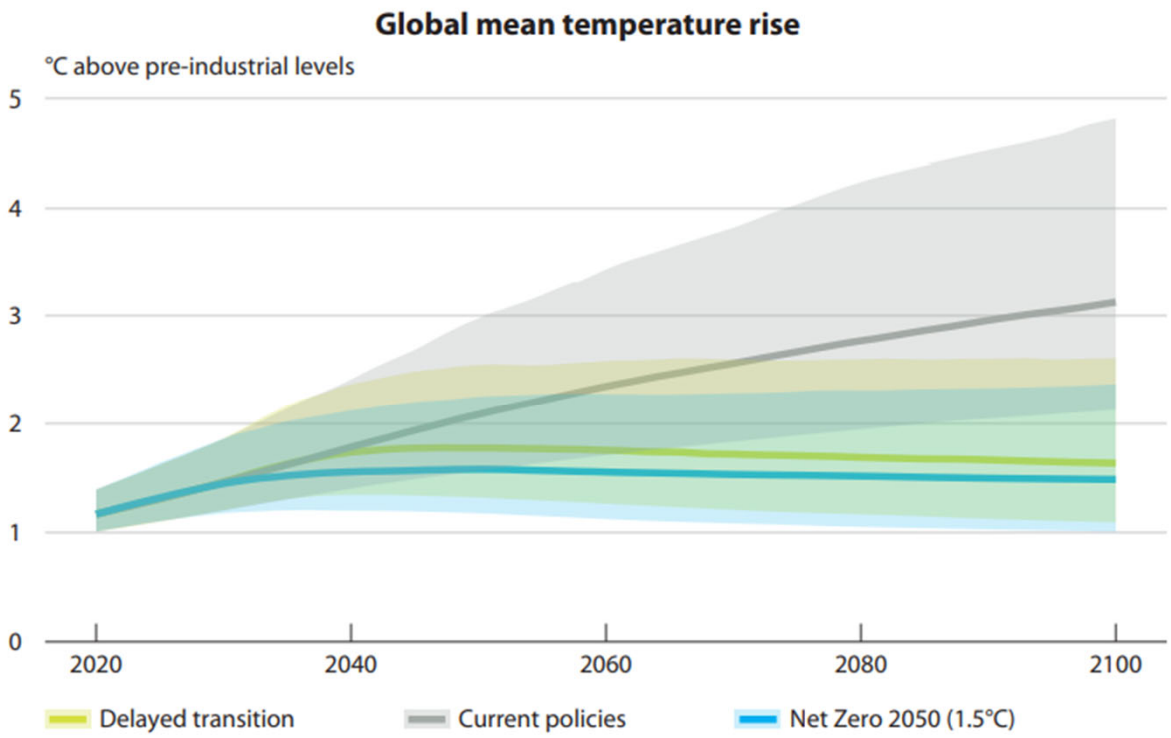
II. Identification of country specific climate related risks and vulnerabilities

Country-specific simulation aligned with NGFS scenarios

Physical risk: Extreme weather events and sea-level rise

Transition risk: Carbon prices, GHG emissions, and renewables

Sudden transitions ("Minsky moment"): Shocks to carbon prices, technological breakthroughs, and change in market expectations

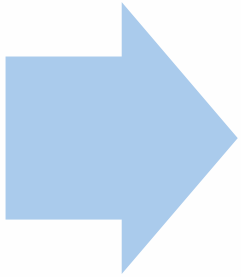


Source: IIASA NGFS Climate Scenarios Database, REMIND model.

From climate to the economy

Physical
- Damages
- Country temperatures

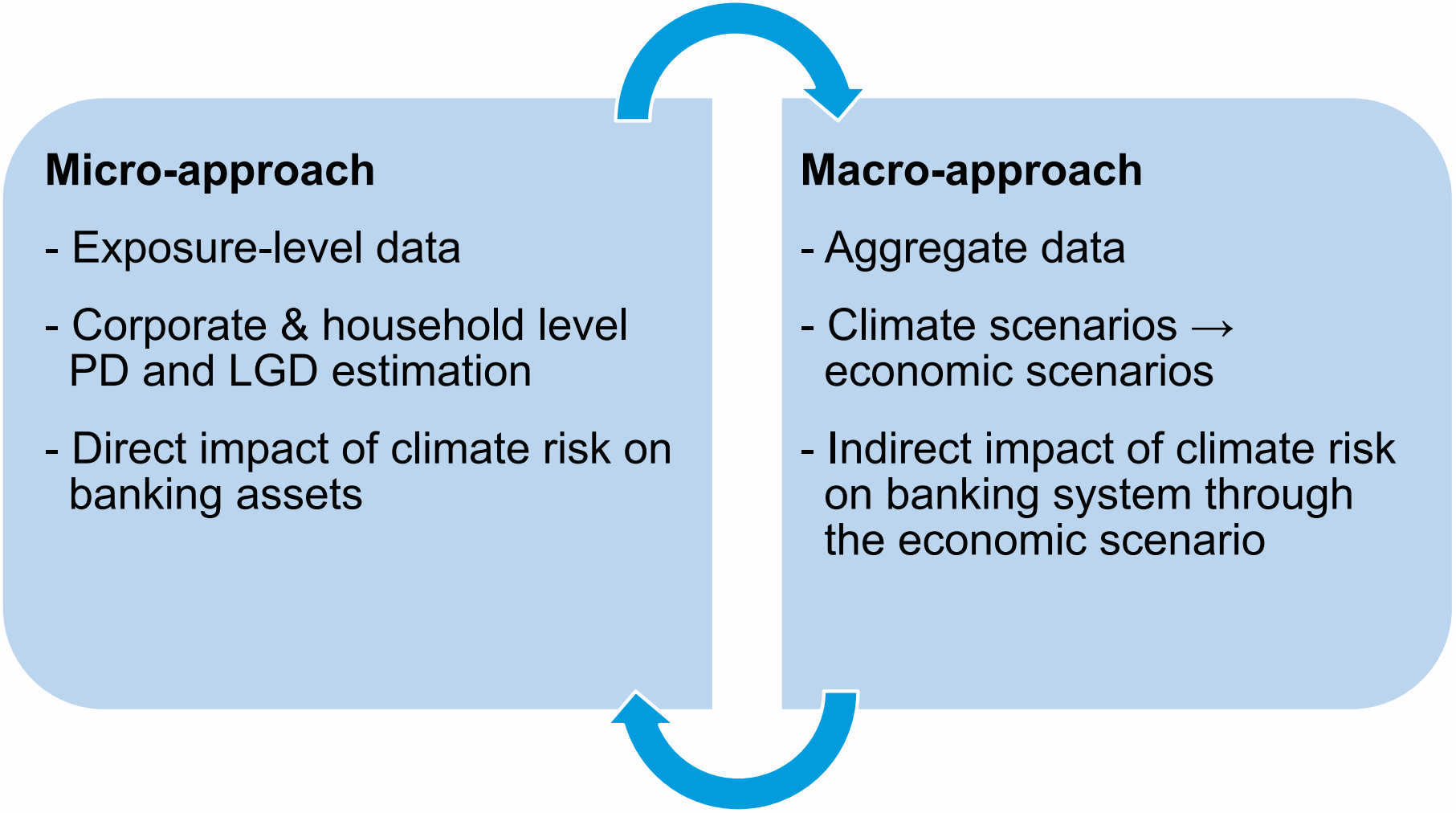
Transition
- Carbon taxation
- Energy prices
- Technological change



Macroeconomy
- GDP growth
- Infrastructure/human capital
- Productivity

Capital markets
- Equity prices
- Energy derivatives

Sectoral
- Profitability
- Default frequency


Micro-approach
- Exposure-level data
- Corporate & household level PD and LGD estimation
- Direct impact of climate risk on banking assets
Macro-approach
- Aggregate data
- Climate scenarios → economic scenarios
- Indirect impact of climate risk on banking system through the economic scenario

Challenges

General

- Long-term horizon
- Forecasts are not derived by historical data

Climate scenarios modelling

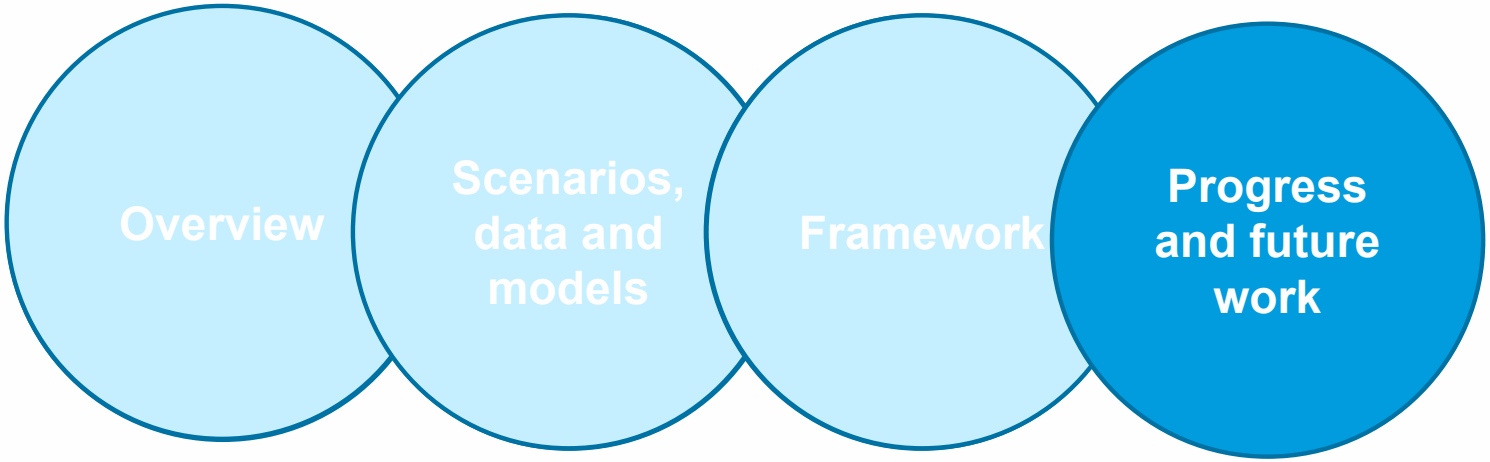
- Methodological complexity

Economic scenarios modelling

- Climate to economy linkage
- Sector and geographical specific focus
- Social and technological change

Data gaps

- High sectoral and geographical granularity is required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What has been done so far…

Bahamas

Philippines

Norway

Future steps