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ISDA: Climate Risk Scenario Analysis for the Trading Book Phase 4 - NGFS Short-Term Scenarios

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Executive Summary

- The ISDA paper addresses a critical gap in climate risk analysis for financial institutions by focusing on **short-term climate scenarios** (three-to-five-year horizons) and their applicability to the **trading book**.
- While most existing climate scenarios emphasize long-term horizons (often 30 years or more), supervisory expectations and market risk management frameworks increasingly require **near-term, market-consistent shocks** that can be integrated into trading book stress testing, capital planning and risk governance.

At a Glance

Keywords: Climate Risk, Market Risk, Scenario Analysis

01

NGFS Short-Term Scenarios

Introduction

Model Inputs and Assumptions

Key Uncertainties

NGFS Model Output Data

Scenario Impacts and Benchmarking

NGFS Short-Term Scenarios 1/5

Introduction

NGFS short-term scenarios

The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) short-term scenarios are explicitly designed to assess **near-term climate risks** over a three-to-five-year horizon, bridging the gap between long-term climate pathways and the shorter horizons relevant for market risk management.

They aim to integrate **transition risks**, **physical risks** and **macro-financial dynamics**, providing a structured framework for supervisors and financial institutions.

The NGFS emphasizes that these scenarios represent a **first iteration** and should be viewed as a work in progress. Users are encouraged to consider realism, tail risks and coverage limitations. From a trading book perspective, this caveat is particularly important, as financial markets tend to reprice risks abruptly and non-linearly, often in advance of realized economic impacts.

The paper underscores that scenario usability depends heavily on the **specific use case**.
Accordingly, it highlights considerations that are particularly relevant when applying the NGFS scenarios to trading book portfolios, rather than banking book or strategic planning exercises.

NGFS Short-Term Scenarios 2/5

Model Inputs and Assumptions

Model Architecture

The NGFS short-term scenarios are generated using a **multi-model framework** comprising three distinct models:

- **GEM-E3**, a computable general equilibrium model used to assess macroeconomic impacts of policy and energy system shocks;
- **CLIMACRED**, a climate credit risk model estimating sector-level default probabilities and cost of capital under transition and physical risks;
- **EIRIN**, a stock-flow consistent macro-financial model capturing interactions between households, firms, banks, and governments.

While this architecture allows for broad variable coverage, the models were **not calibrated as a fully integrated ensemble**, which limits internal consistency. Moreover, none of the models simulate **financial market microstructure or investor behavior**, a key limitation for trading book applications.
Key modeling assumptions include exogenous carbon prices, stylized physical shocks (often calibrated as 1-in-50-year events), and simplified expectation formation mechanisms. Importantly, the models do not capture liquidity effects, market sentiment, or feedback loops that are central to market risk.

Key Assumptions and Input Shocks

Anchoring to Long-term Pathways	The short-term scenarios are anchored to long-term NGFS pathways such as **Net Zero 2050, Delayed Transition** and **Current Policies**. This ensures narrative consistency but may understate the probability of sudden, non-linear events that are particularly relevant for trading portfolios.
Macroeconomic Baselines	Baseline projections are sourced from the **IMF World Economic Outlook** (October 2023 and April 2024 vintages). While policy-consistent, these baselines are already dated and exclude explicit geopolitical risks. The paper therefore emphasizes analyzing shocks **relative to baseline**, rather than in absolute terms.
Climate and Energy Policy Assumptions	**Policies** are assumed to be **known**, **binding**, and **credible**, including **explicit carbon pricing** and **sector-specific investment trajectories**. This removes the possibility of policy surprise, which historically has been a major driver of market volatility. Users are encouraged to critically assess whether assumed policy speed and technological progress are realistic.
Physical Risk Assumptions	Physical risks in the DAPS scenario are modeled as **stylized**, **region-specific events** without catastrophic tail risks, tipping points, or clustering effects. **Spillovers** across regions and sectors are **limited**, suggesting that physical risks may be understated relative to plausible worst-case outcomes.
Monetary and Financial Policy Responses	Policy rates are modeled using **stylized**, **rule-based reactions**, with **no allowance for unconventional measures** or surprise actions. Given recent market experience, this is identified as a significant limitation for trading book realism.

NGFS Short-Term Scenarios 3/5

Key Uncertainties

The paper highlights that climate scenario analysis is subject to **exceptionally high uncertainty**, due to limited historical precedent and strong dependence on assumptions.

*To address this, ISDA develops a **qualitative heatmap** comparing NGFS assumptions with plausible alternatives across eight dimensions, including **technological change**, **geopolitical risk**, **climate tipping points**, **regulatory coordination**, and **monetary policy responses**.*

*Each alternative is assessed in terms of its **impact severity** and **probability** relative to the NGFS baseline. Several alternative assumptions - such as compounded physical and transition risks, faster technological change, or aggressive monetary responses - are judged to be **high impact**, even if their probability within a five-year horizon is medium or low.*

*The **heatmap** is presented as a **practical tool** to help banks tailor NGFS scenarios to their own risk appetite, regulatory context, and portfolio composition, particularly when designing stress tests that aim to capture tail risk.*

NGFS Short-Term Scenarios 4/5

NGFS Model Output Data

The paper identifies several **data limitations** that constrain the direct usability of NGFS outputs for trading book analysis:

a. **Policy rate** data are available only **at a regional level**, necessitating country proxies.

b. **Sectoral gross value-added data are missing**, limiting sectoral economic analysis.

c. **Equity** and **credit shocks focus** primarily on **negative impacts** to high-carbon sectors, with limited representation of positive shocks to low-carbon sectors.

d. **Certain sectors are excluded** from negative shocks if already phased out in the baseline, introducing methodological bias.

e. **Annual reporting frequency is insufficient** for short-horizon market volatility analysis.

In addition, **NGFS scenarios lack comprehensive market risk factor coverage**, including government bonds, swaps, FX, and commodities, motivating the development of ISDA-consistent market risk shocks.

NGFS Short-Term Scenarios 5/5

Scenario Impacts and Benchmarking

The **NGFS short-term scenarios** are **benchmarked** against recent **supervisory** and **industry stress tests**.

*The comparison shows that NGFS scenarios are **policy-coherent but relatively mild**, with GDP impacts that are **back-loaded** and smaller in magnitude than those in central bank stress tests.*

*From a **trading book perspective**, this implies that NGFS scenarios are better suited as **directional anchors** rather than standalone stress scenarios. Front-loading and amplification are often necessary to align them with observed market dynamics and supervisory expectations.*

02

2025 Market Risk Factor Shocks

Scenario Selection and Narratives

Translation to Trading Book Shocks

2025 Market Risk Factor Shocks 1/2

Scenario Selection and Narratives

Following a survey of ISDA working group members, **two scenarios** were selected:

SWUC

Sudden Wake-up Call (SWUC)

A severe transition risk scenario characterized by abrupt policy tightening, a sharp rise in carbon prices, and rapid reallocation of capital.

DAPS

Disasters and Policy Stagnation (DAPS)

A physical risk scenario featuring sequential extreme weather events leading to capital destruction and productivity losses.

These scenarios were chosen to provide **clear differentiation** between **transition** and **physical risk channels**.

2025 Market Risk Factor Shocks 2/2

Translation to Trading Book Shocks

Given that NGFS scenarios unfold over multiple years, ISDA develops a methodology to translate them into **12-month shocks** suitable for trading book analysis. This involves identifying the **peak impact year** in each scenario (2027 for DAPS, 2028 for SWUC) and front-loading those shocks into a one-year horizon.
This approach reflects the forward-looking nature of financial markets and aligns with existing market risk stress testing practices.

Macroeconomic Shocks

Macroeconomic shocks are derived directly from **NGFS outputs**, with GDP shocks at the country level and inflation and policy rate shocks at the regional level. The analysis highlights distinct patterns:

- In **SWUC**, GDP declines sharply around the policy shock year, with heterogeneous impacts across countries.
- In **DAPS**, emerging economies experience larger GDP shocks, particularly during dry physical events.

Policy rate and inflation dynamics differ markedly between scenarios, reflecting their underlying narratives.

Impact Assessment

Market risk shocks are derived using a combination of direct **NGFS outputs** and **expansion models** covering:

- Sectoral and country equities
- Credit spreads
- Government bonds and swaps
- Breakeven inflation
- FX
- Commodities

Shocks are produced at one-year horizons and scaled to shorter liquidity horizons using term structures from earlier ISDA phases.

Impact Assessment

To address model uncertainty and the lack of historical precedent, ISDA incorporates **expert judgment** through a structured crowdsourcing process. Banks review modeled shocks and provide quantitative and qualitative feedback. Final shocks are determined using the median of submissions, rounded to standardized intervals.
This process enhances robustness and ensures that shocks are perceived as **credible and usable** by market practitioners.

03

Results

Results

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Equities

Under SWUC, equity prices decline significantly across all regions, with the largest impacts in carbon-intensive sectors such as coal, mining, and electricity.
Under DAPS, equity impacts are more moderate but broader, with particularly severe effects in emerging markets.

Credit

Credit spreads widen substantially in SWUC, especially for carbon-intensive sectors, reflecting increased default risk.
In DAPS, credit impacts are again more pronounced in less developed economies and physically exposed sectors.

Rates

SWUC leads to upward shifts in yield curves and breakeven inflation, driven by higher inflation and tighter monetary policy.
DAPS produces smaller and more ambiguous rate impacts, with divergent views among practitioners regarding flight-to-quality effects.

FX and Commodities

FX impacts are generally modest in both scenarios, reflecting limited interest rate differentials.
Commodity impacts, while not fully detailed in the truncated sections, are linked to GDP and inflation dynamics and are more pronounced under transition risk.

04

Conclusions & Take-Aways

Conclusions & Take-Aways

The NGFS short-term scenarios represent a **significant step forward** for near-term climate risk analysis but are **not sufficient on their own** for trading book applications. Institutions are encouraged to use them as a foundation, supplemented by expert judgment, amplification, and alignment with supervisory stress testing practices.

1. **NGFS short-term scenarios fill a critical gap** between long-term climate pathways and trading book horizons.
2. **Model assumptions and data limitations** constrain direct applicability to market risk.
3. **Transition and physical risks exhibit distinct transmission channels** and should be analyzed separately.
4. **Front-loading and amplification** are necessary for trading book realism.
5. **Expert judgment and crowdsourcing** materially enhance robustness.
6. **NGFS scenarios are best used as directional anchors**, not standalone stress tests.

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