



Just in Time



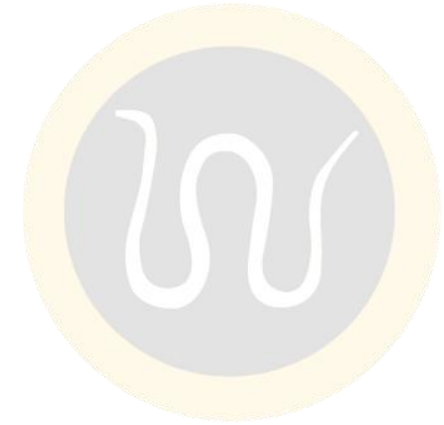
ECB Report on Good Practices for
Climate and Nature-related Risk
Stress Testing

June 2026



Executive Summary

- The [ECB's report](#) provides a comprehensive **overview** of the **evolution of climate and environmental** stress testing within the European banking sector.
- The report builds on the **ECB's 2022 Climate Risk Stress Test (CST)** and the **supervisory follow-up exercises** conducted between 2023 and 2025.
- It aims to support banks in strengthening their methodologies, data infrastructures, governance arrangements, and modelling capabilities for climate and nature-related risks.
- The publication is particularly relevant in light of the forthcoming **EBA Guidelines on environmental scenario analysis**, which will apply from January 2027.



At a Glance

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Keywords: Climate risk, Stress test



01

Introduction



Introduction

The ECB's 2022 Climate Risk Stress Test was designed primarily as a **learning exercise** intended to accelerate banks' development of climate stress-testing capabilities. It formed part of a **broader supervisory strategy** alongside thematic reviews and risk management assessments.

The ECB observed **significant inconsistencies** across banks during the 2022 exercise. Institutions faced difficulties in **several areas**:

- 1 Developing **coherent climate stress-testing frameworks**
- 2 **Integrating climate variables** into risk models
- 3 Obtaining sufficiently **granular emissions data**
- 4 **Collecting EPC information**
- 5 **Assessing physical risk exposures geographically**

The report explains that **supervisory expectations** were subsequently **reinforced** through remediation plans and institution-specific deadlines. By 2025, considerable progress had been achieved, although **material deficiencies still existed in many institutions**.

A **major development** highlighted is the **emergence of the EBA Guidelines on environmental scenario analysis**, applicable from 2027. These guidelines are intended to **standardise supervisory expectations for climate scenario analysis and integrate environmental risks into prudential stress testing**.

The ECB clarifies that the report:

- is illustrative rather than prescriptive
- does not create legally binding obligations
- reflects practices observed up to the end of 2024

02

Screening Approach for Best-in-Class Identification



Screening Approach for Best-in-Class Identification

This section explains **how** the **ECB identified "good practices"** among supervised institutions.

The assessment relied heavily on the **three modules** of the 2022 Climate Risk Stress Test:



Module 1 – Qualitative Framework Assessment

- This module evaluated:
- governance structures;
 - stress-testing methodologies;
 - climate scenarios;
 - integration into internal risk management.

Module 2 – Climate Metrics and Carbon Exposure

- This module assessed:
- exposure to carbon-intensive sectors;
 - financed emissions;
 - banks' ability to collect actual versus estimated emissions data.

Module 3 – Bottom-Up Loss Projections

- This module focused on:
- transition risk impacts;
 - physical risk impacts;
 - credit risk transmission channels;
 - long-term scenario modelling.

The ECB selected **best-performing institutions** through both **quantitative** and **qualitative assessments**.

Criteria included:

- accuracy of emissions estimates
- sophistication of climate risk transmission models
- use of granular geolocation data, and
- consistency between stress scenarios and projected risk parameters.

The chapter also explains that the **2026 update** of the report places greater **emphasis on**:

- **physical risk methodologies**
- **long-term modelling approaches**
- **emerging practices** for nature-related risks

The **ECB** explicitly acknowledges that **methodologies** remain **highly heterogeneous** across institutions and that **practices are still evolving**.

03

Climate Stress-testing Frameworks



Climate Stress-testing Frameworks

This section examines **how** advanced institutions **design** their **internal climate stress-testing frameworks**.

Scope of Climate Stress-Testing Frameworks

The ECB identifies **materiality assessment** as the **cornerstone of framework design**.

Institutions with **advanced approaches**:

- assess which portfolios are materially exposed to climate risks;
- incorporate all relevant asset classes; and
- tailor frameworks to their specific business models and geographies.

Leading banks also use **complementary analytical tools** such as:

- climate heat maps;
- sectoral deep dives; and
- geographic vulnerability assessments.

*These tools help institutions **determine** which **sectors** or **regions** are **most sensitive** to transition or physical risks.*

Climate Risk Scenarios

Advanced institutions include:

- both transition and physical risks;
- multiple transition pathways; and
- several time horizons.

Most banks rely heavily on **NGFS scenarios**, typically including:

- orderly transition;
- disorderly transition; and
- “hot house world” scenarios.

Good practices include:

- tailoring physical risk scenarios to geographic exposures;
- supplementing public scenarios with internally developed ones; and
- aligning pathways with scientific climate projections such as IPCC scenarios.

The ECB notes **increasing sophistication** in institutions' use of:

- long-term horizons (20+ years);
- acute versus chronic physical risks;
- and sector-specific scenario customisation.

Balance Sheet Approaches

The ECB distinguishes between:

- **static balance sheet approaches**, suitable for short-term resilience analysis; and
- **dynamic balance sheet approaches**, useful for long-term strategic analysis.

Advanced institutions increasingly use **dynamic balance sheet assumptions** that:

- incorporate client transition behaviour;
- reflect strategic reallocation decisions; and
- model sectoral changes over time.

Some banks apply:

- exposure-level allocation methodologies;
- subsector analysis; and
- geographic allocation techniques.

*The ECB cautions, however, that **greater granularity alone does not automatically ensure robustness**.*

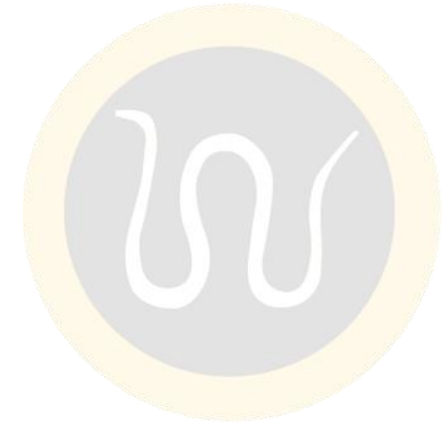
04

Data Requirements for Climate Stress Testing

Internal Data Needs

Emissions Data

Energy Performance Certificate (EPC) Data



Data Requirements for Climate Stress Testing 1/3

Internal Data Needs

This section focuses on one of the most **significant obstacles in climate stress testing: data availability and quality.**

Sector Classification

Banks were required to **map exposures** to 22 **carbon-intensive NACE sectors**.

Good practices included:

- collecting sector information at onboarding;
- using centralised data warehouses;
- maintaining mappings aligned with NACE classifications; and
- implementing consistency checks with FINREP reporting.

The ECB highlights the **importance** of **centralised registries** and **harmonised coding systems**.

Geolocation Data

Physical risk modelling requires **highly granular geolocation data**. **Advanced institutions:**

- maintain loan-level location information;
- map collateral to precise coordinates; and
- allocate exposures at asset level rather than broad regional level.

Good practices include:

- integrating Eurostat and GIS tools;
- assigning NUTS level 3 classifications; and
- using conservative assumptions where information is incomplete.

The ECB increasingly views granular geolocation as a **prerequisite for robust physical risk modelling**.

Data Requirements for Climate Stress Testing 2/3

Emissions Data

The ECB observed **widespread dependence** on **estimated emissions** due to **lack of actual disclosures**.

Actual Data Collection

Good practices included:

- direct engagement with counterparties;
- manual extraction from sustainability reports; and
- use of multiple external providers.

Advanced banks:

- actively encourage clients to disclose emissions;
- integrate emissions collection into loan origination; and
- verify alignment with recognised standards such as the GHG Protocol.

Estimated Emissions Methodologies

The report dedicates substantial attention to **estimation methodologies**, referencing the Partnership for Carbon Accounting Financials (PCAF) framework. Observed methodologies included:

- physical activity-based estimations;
- economic activity-based emission;
- sector averages;
- comparable-company proxies; and
- hybrid waterfall approaches.

The ECB criticises **simplistic one-size-fits-all approaches** and instead favours:

- sector-specific methodologies;
- granular counterparty-level estimates; and
- differentiated treatment of scopes 1, 2 and 3 emissions.

Advanced banks:

- combine several methodologies;
- apply validation checks; and
- cross-reference provider estimates with actual disclosures.

Data Requirements for Climate Stress Testing 3/3

Energy Performance Certificate (EPC) Data

EPC data are **crucial** for **real estate** portfolios.

EPC data

Good practices include:

- collecting EPCs at loan origination;
- requiring valuers to gather EPC data;
- using public EPC registries; and
- applying machine learning estimation models when actual data are unavailable.

The **ECB** emphasises:

- representativeness of training samples;
- transparency of methodologies; and
- governance controls over estimation models.

05

Integration of Climate and Nature-Related Risks into Credit Risk Models

Climate Risk Transmission to Credit Risk Parameters

Transition Risk Modelling

Physical Risk Modelling

Nature-related Risks

Long-Term Modelling Approaches and Modelling Risk Mitigation



Integration of Climate and Nature-Related Risks into Credit Risk Models 1/5

Climate Risk Transmission to Credit Risk Parameters

The ECB identifies **three broad categories** of **variables** used in **advanced climate risk models**:

Climate-Specific Variables

- carbon prices
- emissions trajectories
- sector decarbonization pathways

Climate-Related Macroeconomic Variables

- gross value added (GVA)
- real estate price shocks
- inflation
- unemployment

Traditional Macroeconomic Variables

- interest rates
- GDP growth
- credit spreads

The **ECB** stresses that **climate variables must be integrated into existing credit risk models** rather than analysed separately.

Integration of Climate and Nature-Related Risks into Credit Risk Models 2/5

Transition Risk Modelling

The report highlights major **progress** since 2022.

Probability of Default (PD) Modelling

Three levels of **accuracy**:

- ▲ **Sectoral models:**
 - *direct transmission channels* → inclusion of climatic variables
 - *indirect transmission channels* → development and/or adaptation of satellite models
- ▲ **Counterparty-level approaches** increasingly analyse:
 - profitability;
 - leverage;
 - stranded asset exposure; and
 - transition readiness.
- ▲ **Asset class-level modelling approach**
 - corporate and real estate exposure;
 - combining sector-level and firm-level balance sheet satellite models enables a holistic risk score.

Several banks also developed:

- climate risk scoring systems;
- vulnerability metrics; and
- weighted sustainability assessments.

Loss Given Default (LGD) Modelling

The ECB notes **substantial advances in integrating climate risks into LGD calculations**.

Observed practices include:

- incorporating stranded asset depreciation;
- linking EPC deterioration to collateral values;
- stressing loan-to-value ratios; and
- adjusting recovery rates dynamically.

Some **institutions model**:

- conditional relationships between PD and LGD;
- insurance coverage effects; and
- transition costs affecting collateral valuation.

Integration of Climate and Nature-Related Risks into Credit Risk Models 3/5

Physical Risk Modelling

The ECB observes that physical risk methodologies remain less mature than transition risk models but are developing rapidly.

Data Requirements

Advanced institutions:

- construct hazard-specific indicators;
- use forward-looking climate pathways;
- map assets at granular geographic levels; and
- integrate insurance coverage into damage assessments.

Data Requirements

The ECB distinguishes between:

Direct Channels

- destruction of assets;
- business interruption;
- collateral impairment.

Indirect Channels

- GDP decline;
- inflation shocks;
- labour productivity impacts; and
- supply chain disruption.

PD Integration

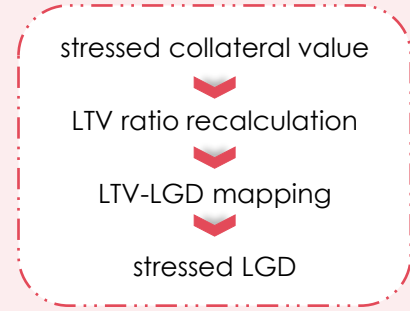
Advanced practices include:

- recalculating borrower financials after physical events;
- modelling revenue and leverage deterioration;
- updating rating systems; and
- integrating physical risk variables into satellite models.

LGD Integration

Banks increasingly:

- apply collateral haircuts;
- model property-level damage;
- stress LTV ratios:



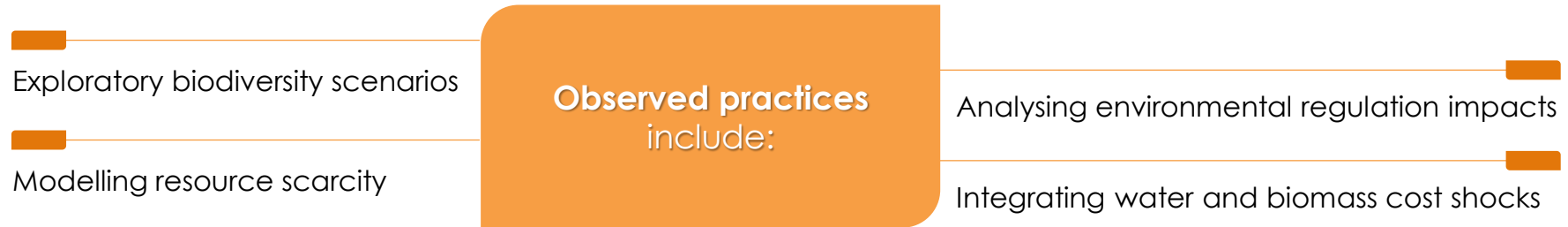
- estimate hazard-specific collateral impairment.

The **ECB** strongly emphasises the importance of **geographic granularity** because **physical risks are highly localised**.

Integration of Climate and Nature-Related Risks into Credit Risk Models 4/5

Nature-related Risks

Nature-related risk integration remains at an early stage.



The ECB identifies **two broad transmission channels:**

Physical Nature Risks

- water scarcity
- soil degradation
- ecosystem collapse

Transition Nature Risks

- environmental taxation
- biodiversity regulation
- changes in production standards

The report acknowledges that methodologies are **still nascent** and **highly exploratory**.

Integration of Climate and Nature-Related Risks into Credit Risk Models 5/5

Long-Term Modelling Approaches and Modelling Risk Mitigation

Long-Term Modelling Approaches

Traditional stress-testing frameworks are **not** naturally **suited** to long climate horizons.

Advanced institutions therefore:

- extend short-term models iteratively;
- recompute PDs annually;
- integrate credit spread dynamics;
- use external sectoral transition models; and
- perform sanity checks.

The ECB notes that **long-term modelling remains highly uncertain** but necessary for capturing transition pathways.

Modelling Risk Mitigation

Risk mitigants remain difficult to quantify consistently.

Observed approaches include:

- incorporating insurance coverage rates;
- applying conservative haircuts;
- excluding uncertain public insurance schemes; and
- using historical physical risk events for calibration.

The ECB warns that **reliance on insurance** may become **problematic** if climate events increase in frequency and severity.

06

Conclusion & Take-aways



Conclusion & Take-aways

Strategic Conclusions

- **Climate stress** testing is becoming a **core supervisory expectation**.
- **Transition risk methodologies** are significantly **more mature** than physical risk approaches.
- **Granular counterparty-level analysis** is emerging as the **industry standard**.
- **Physical risk** requires **high-quality geolocation** and **collateral data**.
- **Nature-related risk modelling** is still experimental but gaining **supervisory attention**.

Data and Modelling Conclusions

- **Emissions** and **EPC data** remain major **bottlenecks**.
- Banks increasingly rely on **sophisticated estimation techniques** and **machine learning**.
- **Dynamic balance sheet approaches** are becoming more **common** for long-term scenarios.
- **Integration of climate variables** into **PD** and **LGD** models is accelerating rapidly.

Supervisory Conclusions

- The ECB expects **continuous improvement** rather than static compliance.
- **Good practices** are evolving and will likely become more sophisticated over time.
- The forthcoming **EBA Guidelines will materially increase supervisory expectations** for environmental scenario analysis.

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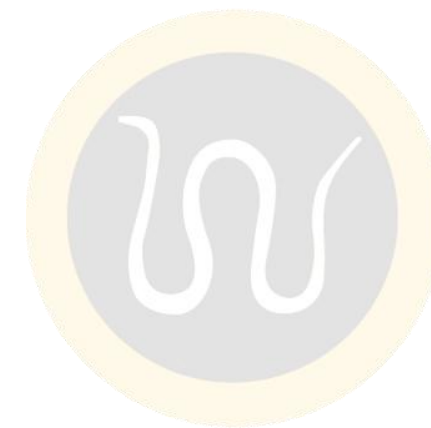
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