

Integration of climate risk considerations into credit and stress test models

ECB Industry Outreach



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Directorate General Horizontal Line Supervision Stress Test Experts Division

Good practices report - overview

Expectation 11 of the ECB Guide on climate & environmental (C&E) risks

"Institutions with material climate-related and environmental risks are expected to evaluate the appropriateness of their stress testing with a view to incorporating them into their baseline and adverse scenarios"

The good practices report is based on the information collected in the 2022 ECB Climate risk Stress Test (CST) and aims at:

Identifying **good practices** that should be considered as **minimum standards** for the industry Differentiating practices according to banks' **level of advancement,** thus applying the **proportionality principle** and indicating the first steps to be taken Providing banks with suggestions and examples to help them overcome challenges Providing also examples of weak practices that should be avoided Improving consistency of practices and contributing to the dialogue within the banks Helping banks and supervisors prepare for future CST exercises (also in the context of ICAAP)

Challenges in data availability and climate risk modelling

Availability of data and information

Data issues affecting modelling approaches and quality of results

- Higher granularity: sectoral breakdown, counterparty specific and loan level data
- New climate-related variables needed:
 - emission data: availability, discrepancies across providers and quality of proxies
 - Energy Performance Certificate (EPCs): heterogeneity in the regulation across EU countries leads to lack of data
- Lack of information related to calibration of physical risks impact
- Reliability of portfolio level analysis is distorted due to insufficient historical data.
- Lack of **risk mitigants** data led to exclusion from loss projections

Models

Existing stress test models not designed to account for climate risks

- New approaches needed to adjust for climate risk factors (e.g. energy prices, carbon taxes)
- Higher level of granularity needed (e.g. sectoral level, EPC rating, counterparty level)

New requirements affect comparability with previous stress tests on macroeconomic aggregates as well as validation of new models

Long-term horizon

Reliable projections of risk parameters over a 30 year horizon is challenging:

- Short-term nature of the available credit risk models
- Financial metrics, transition plans etc. at counterparty level require granularity of models
- Dynamic balance-sheet assumption requires to develop a precise strategy on the evolution of the business mix

Great deal of uncertainty for long-term projections

Greenhouse gas (GHG) emission data

Actual data should always be preferred when available



- Combination of manual search from sustainability and annual reports and use of data providers
- Reliance on additional data providers to fill in gaps
- Direct engagement with counterparties via submitted questionnaires

Different estimation methodologies have been put in place by banks when actual data is not available, categorized according to the following hierarchy (Partnership for Carbon Account Financials – PCAF – methodology):

- 1. Physical activity-based emissions
- 2. Economic activity-based emissions
- 3. Other methods

Good practices



- Waterfall logic with different estimation approaches
- Inclusion of physical activity-based factors
- Specificities of sectors/subsectors and counterparties at a very granular level, considering differences within sectors
- Validation of data: informed choice of providers and cross-checks of data

- Calculation of averages and definition of comparables based on broad samples and macro sectors
 - \rightarrow representativeness issue
- X Scope 2 (S2) and scope 3 (S3) proxies based on S2/S1 and S3/S2 emissions ratios from reference counterparties → characteristics of each scope are not considered

Energy Performance Certificate data

Actual data should always be preferred when available



- **Request EPC data at loan** origination or when carrying out annual review or modifying a loan
- Retrieve from public **EPC** registers where publicly accessible
- Instruct valuers to collect the EPC data as part of the collateral valuation review



Estimation methodologies

making the results skewed.

Climate risk modelling

Modelling approaches

The assessment and quantification of climate-related risks regarding their potential impact on banks' exposures requires new modelling approaches and tools to account for the particularities of climate-related risks

Combination of existing stress test models with newly developed climate risk models to **capture the sectoral/EPC level or counterparty-specific impact of climate-related risk factors** is observed, whereby granularity and complexity of modelling approaches increases with level of advancement:

- Sectoral models capture transition risk at sectoral level based on existing regular credit stress test infrastructure enhanced with additional components and breakdown. They include at least one climate-related variable, usually CO2 price
- **Counterparty-level models,** first starting with a subset of counterparties identified as the most vulnerable to climate risks
- Asset class dimension included into counterparty-specific models

Long term modelling approaches: integration of banks' de-carbonization commitments into the projections through dynamic balance sheet approaches. Long term loss projections should be interpreted as a qualitative yardstick for the direction of travel rather than as a robust quantitative measure, but they are of strategic relevance and should not be neglected

Climate risk modelling

Short-term models



Sectoral models (bare minimum)

- Combination of direct and indirect transmission channels:
 - Indirect channels: adaptation of existing macroeconomic models or creation of new ones with a higher granularity and new variables (e.g. GVA, GDP, unemployment rate, RRE and CRE price shocks) to account for the sectoral dimension
 - Direct channels: new models with inclusion of the impacts of relevant climate related variables (e.g. carbon price, GHG emissions) on PDs at sectoral level
- External models are also used to estimate the impact of direct transmission channels: banks should ensure that the models include information that matches their needs (i.e. sectoral exposures, counterparty coverage)

Counterparty models (advanced approaches)

- Adaptation of corporates' key financial metrics to reflect impact of relevant climate variables and recalculation of PDs
 - Channels: counterparties' profits and liabilities, operational costs, scenario-adjusted financials, vulnerability metrics or stranded assets
- Development of climate/environmental risk classification of counterparties, to adjust PDs and/or to inform strategic choices and exposure projections for long-term scenarios:
 - Transition risk metrics: qualitative assessment of clients' willingness and ability to transition and quantitative assessment of the impacts of climate-related risks
 - Physical risk metrics based on location of the collateral, credit risk parameters and impact of extreme events
- Use of macroeconomic models to estimate a systemic risk factor (indirect channel) which feeds into the PD calculation

Climate risk modelling

Long-term models

Bare minimum practices

 Simplified approaches consider sectoral pathways, reconstructing models to have at least one sectoral variable

 Projection of exposure evolution depending on the scenario and internal strategy



- Projection of financial & emissions data at counter
- Projection of financial & emissions data at counterparty level and reflection of portfolio characteristics
- Risk parameters for the full-time horizon with year-to-year frequency, based on the starting point portfolio embedding scenario-conditional rating deterioration and exposures reallocation and growth
- Integration of strategic plans and commitments with respect to different transition pathways:
 - Exposures projections account for expectations on how sectors will be affected by different transition pathways and banks' and clients' strategic transition plans
 - Development of internal climate metrics to measure vulnerability of exposures in highly affected sectors and to evaluate alignment of counterparties with decarbonization pathways
- Very advanced approaches include extrapolation of ECB and NGFS datasets using general equilibrium models to enrich available pathways with additional variables

Supervisory expectations

Climate and environmental risks will remain key priorities of the ECB and other European authorities: banks are expected to properly manage them by the end of 2024 and over time they should be fully integrated into prudential risks categories.

Supervisory climate stress tests:

- will remain a key tool to further incentivize banks' efforts to build up relevant capabilities, seize the potential impact of climate-related risks
- could be used as an input to capital adequacy assessment, depending on future availability of sufficient granular sustainability data and advancement in banks' stress testing models

Closing data gaps will remain key: customer relationships and regulatory developments* will help in this direction

It is crucial that banks develop **transition plans fully integrated into their strategies** and that build on their **counterparties' transition pathways** which then can be used to estimate potential climate-related losses

Preparatory work for **reviews of banks' transition planning capabilities** and **readiness for** environmental, social and governance (**ESG**) **related mandates** is expected in the sixth Capital Requirements Directive (CRD VI)

Climate stress test within the supervisory perspective

2022 climate stress test exercise is **part of a broader set of supervisory activities** on the topic climate-related risks

- The Guide on climate-related and environmental risks lays down ECB's expectations with respect to management of climate and environmental risks
- The thematic review of banks' climate-related and environmental risk management practices seeks to comprehensively assess how banks have incorporated these risks into their strategy, governance and risk management frameworks and processes.
- Climate risk stress test and thematic review are complemented by deep dives (e.g. commercial real estate) and on-site missions.



2022 climate stress test: set-up and objectives

Questionnaire and peer benchmarks (Modules 1&2)

- 104 significant institutions
- Rationale: All significant institutions (SIs) are being assessed as part of the regular climate risk assessments and will be subject to the new EBA Pillar 3 requirements (including requirements close to metrics in Module 2)

Bottom-up projections (Module 3)

- 41 significant institutions
- Rationale: Proportionality principle being applied to factor in different levels of preparedness of the banks

Objectives

- Contribute to the overall Supervisory Review and Evaluation Process (SREP) in a qualitative way. It was not a capital adequacy exercise
- Joint learning exercise to enhance banks' and supervisors' ability to assess climate-related risk
- Make more information available on climate risk stress-testing
- Prepare banks for the upcoming regulatory changes¹⁾
- Leverage on ECB's stress-testing approach
- Support other ECB/SSM Banking supervision initiatives, e.g. thematic review

 EBA's report on Environmental Social Governance (ESG) risk management and supervision, i.e. inclusion of ESG in SREP and stress-testing.

Follow-up work to supervisory initiatives

The ECB is providing banks with additional tools and recommendations to **support banks in their** journey of aligning with supervisory expectations on C&E risk management:



Criteria applied to select banks

Criteria defined to group banks per module and level of advancement:	
Module 1	 Within the 43 banks with a CST framework in place, selection of the ones with the best sub-scores on: Block 1: general climate stress test framework and other processes including climate-related factors Block 4: CST methodology Block 5: scenarios and types of risks included
Module 2	 Within the 104 banks participating in Module 2, selection of the ones with the following criteria: Metric 1: banks that do not use proxies to split interest income and fee and commission income at NACE 2-digit sector level for at least 90% of reported income, are consistent with the 2022 CST methodology (instruments included in volumes, inclusion of NFC exposures, treatment of holding companies) and without major data quality issues Metric 2: For actual data, banks showing the highest share of actual data to compute S1-S2 and S3 GHG emissions, conditional on having a number of reported counterparties higher than the business model median. For proxies, banks reporting the closest estimated S1,S2 and S3 emissions to a benchmark source or identified as best in class by M2 experts during execution phase
Module 3	 Within the 41 projecting banks, selection of the ones with the following criteria: Short-term scenarios: banks which sufficiently reflect the scenario-implied GVA shocks in the PDs for the most carbon-intensive sectors (expert judgment) Short-term modelling: banks which properly transmitted transition risk in the adverse scenario showing PD changes between the ST disorderly and baseline scenario (above lower quartile) Short-term impairment losses: banks which show higher relative impairment losses in the adverse scenario across all years and are above the lower quartile of this distribution Flood risk transmission: banks which properly transmit physical climate risk from LTVs to LGDs comparing the adverse and baseline scenarios (expert judgment) Long-term balance sheet approach: banks which elaborate on the ECB expectations on the long-term modelling in terms of strategy, business environment, EPC evolvement, and credit risk parameters (expert judgment)