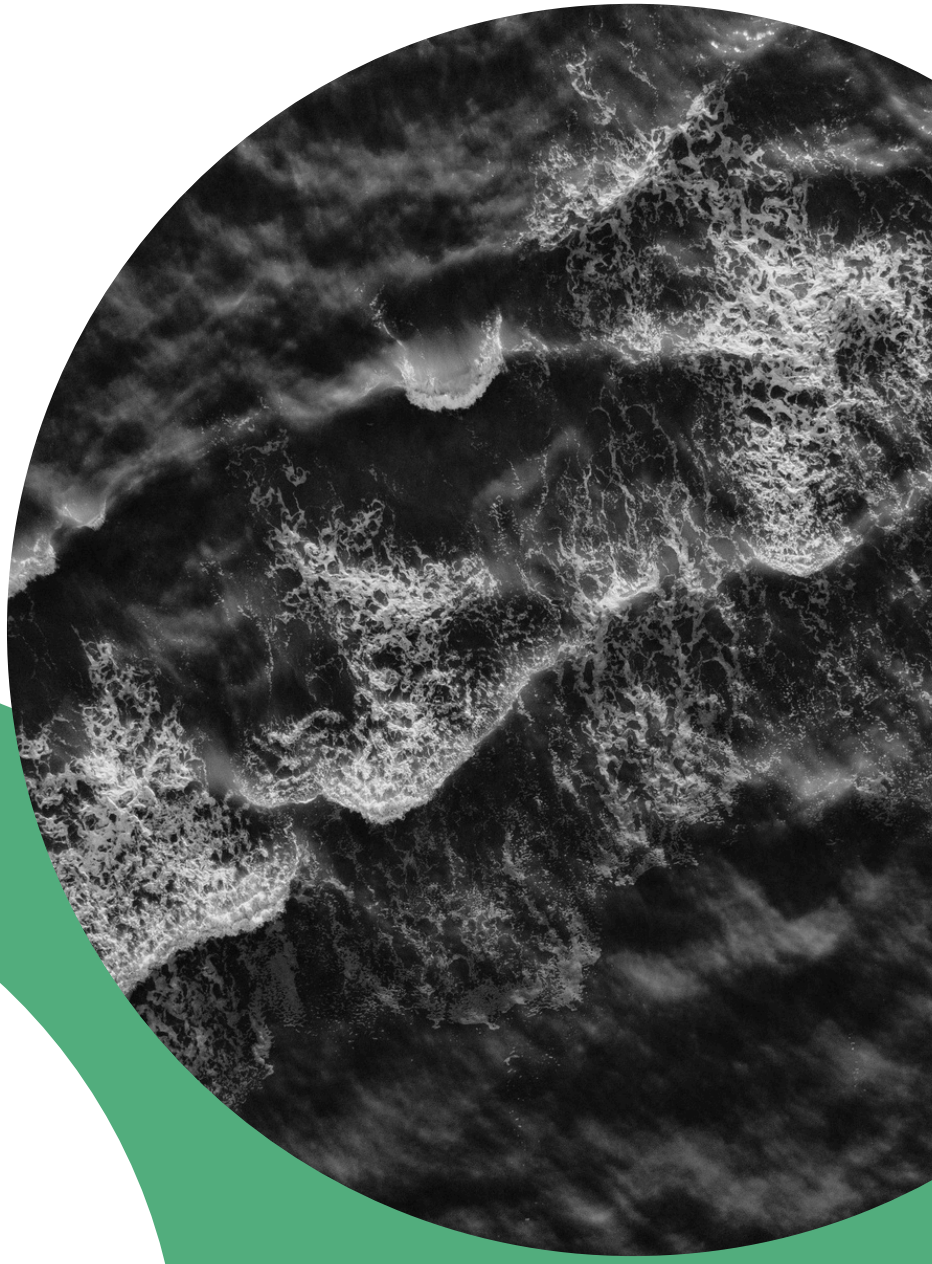
Report of the C-ESG Risk Roundtable

Climate & Environmental Scenario Workstream



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Introduction

Sustainable finance has become a key priority for European banks. As billions of Euros are required for reaching the European Union (EU) sustainability goals, European banks play a crucial role in the transition. Management of financial risks is seen as a key element of this transformation of the EU economy to reach net zero targets.

Banks, as well as supervisors, recognize that **environmental factors could be a source of financial risk,** and stepping up efforts to ensure that such risks are properly identified, understood, measured and managed.

To achieve this, **banks are well advanced in the process of revisiting their internal systems, models and processes,** particularly those related to data collection, risk management and financing approval processes. As the risk profile of banks' portfolios are reflective of those of their clients, to mitigate the risk, banks are also rapidly deepening engagement with clients to understand their transition plans and assist them in the necessary business transformation.

However, **while banks are making tangible progress, they are facing numerous operational and implementation challenges,** many of which are neither originated, nor inherent to the banking industry. While some will need to be addressed at the level of individual organisations, others will benefit from collaborative approaches and collective solutions and discussions among banks, regulators and supervisors.

To further strengthen the dialogue within the banking sector and to facilitate the discussion with the European Central Bank (ECB), a **high level Environmental, Social, and Governance** Risk Roundtable (C-ESG Risk RT) was set up in February 2023 by the European Banking Federation (EBF) under the existing CEO Roundtable with the participation of 13 European banks, and the EBF and the ECB as observers.

The C-ESG RT is focusing on climate and environmental risks with the objective to discuss current practices, identify gaps and promote pragmatic and practical approaches, including interim solutions, that will be shared with the entire banking industry to support and facilitate their implementation efforts and enhance harmonization where relevant and possible.

Since its inaugurating meeting in February 2023, the C-ESG Risk RT identified several areas to work on in the following workstreams:

- Data Workstream
- Scenario Analysis – ICAAP – Risk materiality Workstream
- Physical Risk Workstream
- Collateral Workstream
- Transition Planning Workstream
- Climate and Environmental Credit Risk Data and Modelling Workstream

The intermediary results of the Workstreams' (WS) deliberations have been presented publicly via a series of EBF webinars and made available on the EBF website[1] in the format of thematic papers. A yearly update is envisaged for some of the papers, notably for the Scenario Analysis – ICAAP – Risk Materiality one

The views in these papers reflect the discussions of the WS members (contributors) and any suggestions in these publications are done on a **voluntary nature**. The sole purpose of the initiative is to identify existing gaps and approaches shared by the WS members and further share such experience and knowledge to increase the level of collective awareness and deepen future dialogues on these topics that are expected to further evolve over time.

Individual institutions are free to consider the relevance of a particular approach for potential implementation within their own organization.

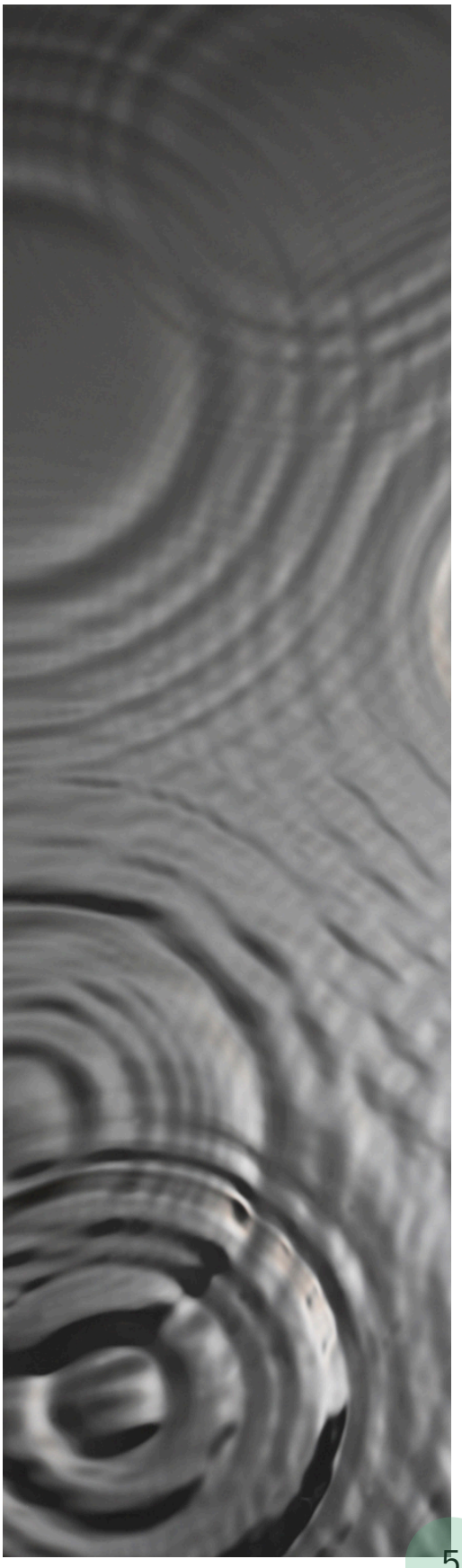
[1] https://www.ebf.eu/uncategorized/ebf-set-up-a-high-level-environmental-social-and-governance-risk-roundtable-c-esg-risk-rt-with-13-european-banks/

Objective and scope of this report

This report is the result of the **collaborative work of the members of the Climate Scenario Analysis (CSA) and the Environmental Scenario Analysis (ESA) sub streams of the Scenario analysis Analysis – ICAAP – Risk materiality Workstream** facilitated by BNP Paribasin its role as chair of the WS and with the participation of the ECB and the EBF in an observing capacity.

The objective is to share **yearly updates on the current practices and targeted evolutions on Climate and Environmental scenario analysis, internal capital assessment and risk materiality analysis, stemming from discussions and progress amongst participating banks.** The initial **focus in 2024 has been on Climate risk factors, while in 2025, an Environmental Scenario Analysis substream has been launched to extend the analysis to environmental concerns.**

The understanding of common building blocks as well as discrepancies, including structural differences (due, among other things, to gaps in risk profiles or corporate values), identification of clear challenges with proposed short-term solutions, public dissemination of observed practices and learnings are amongst the key objectives of the WS.



Key outcomes

Climate scenario analysis is on the rise.

Recent scientific studies confirm that, without strong mitigation actions,the increase in the frequency and severity of climate events will lead to losses for the economy as a whole including the financial sector. Moreover, a **disorderly or misaligned transition between economic blocs would likely lead to shocks to businesses, individuals and, consequently, the financial sector,** both as a result of increased credit losses, as well as market shocks and an increase in legal disputes.

Financial supervisory authorities are concerned about both, the impact on the soundness of financial institutions, as well as the systemic consequences of no or erratic transition. Moreover, the expectations of financial markets and of the various stakeholders are strong in terms of quantifying the financial consequences of the various possible alternatives to date. European supervisors have announced ambitious action plans and are acting upon the initial steps meticulously.

Financial institutions, such as banks, insurance companies and asset managers, are under pressure, both internally and by their external stakeholders, to extend their communication on the impact of climate risk factors and **to pursue the integration of this analysis into the corporate strategy and risk management.** This is **particularly relevant in Europe**, given the relatively consensual alignment of political views on climate goals and the high banking intermediation level (80% of the economy still goes through bank balance sheets). EBA Guidelines on ESG risk management will be in force as of the 11th of January 2026 and a draft version of EBA Guidelines on ESG Scenario Analysis has been released in January 2025.

In a context of extreme uncertainty and significant legal risk, the CSA substream shares a view that the analysis of climate scenarios is a relevant tool for climate risk mitigation as it enables banks to assess risks based on concrete scenarios. Making strategic choices conditional to a given scenario reduces the risk of making unmanageable commitments. Given existing obligations to report sustainability commitments, disclosing impact analyses based on a set of anchor climate scenarios, financial institutions can limit their responsibility to managing transmission channels towards financial risks to which they are materially exposed.

Implementing a robust climate scenario analysis, however, requires important prerequisites to ensure reliable, comprehensible and comparable analyses for external stakeholders.

These prerequisites include:

- the **availability of granular data** to describe current exposure to risk factors and its evolution in the past to capture dependencies between climate transmission channels and banking financial risks, with the need to set a sourcing strategy between internal and external channels and for external between public sources versus commercial ones;

- the **ability to produce or enrich external climate reference scenarios** which are scientifically credible (International Energy Agency or Network for Greening the Financial System) with the capacity to assign probability of occurrence to reference scenarios covering both short term horizons (provisioning, financial planning) and mid-long term horizons (transition planning, strategic analysis);

- the **ability to identify the material climate risk factors** for the institution and the portfolio areas most exposed to these risk factors **with their associated transmission channels towards financial risks of the institution, building also progressively, through data analysis, a challenge of expected versus observed transmission channels;**

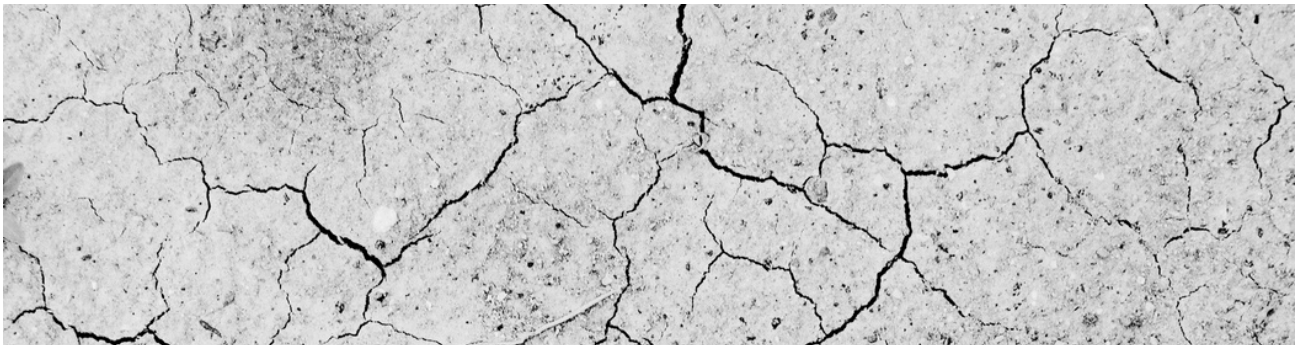
- the **formalisation of the evolution of the institution's strategy in the various climate scenarios** in order to project the deformation of the balance sheet and in particular its exposure to the different types of clients and locations, as well as the financed emissions;

- the **modelling of the impacts of climate risk factors, through relevant transmission channels, on the financial risks of institutions, keeping a clear understanding of hypothesis retained, with data analysis progressively enabling a challenge of these underlying hypothesis;**

- **communication approaches adapted to the different target audiences** (supervisors, financial markets, trade associations, lobbyists, general public,...)

Given the complex nature of the above prerequisites and their dependency on exogenous dynamics (e.g., Corporate Sustainability Reporting Directive deployment schedule to obtain client data (at least those that remain in the scope) willingness of regional authorities to invest in the anchor scenario building)**, a high degree of heterogeneity in the practices of institutions beyond what can be explained by differences in risk profiles.... This could undermine the clarity of communication** on the materiality of climate risk factors and the adaptation strategy of institutions. Harmonized practices already emerged on scenarios even if they are still to be improved (NGFS and IEA providing anchor scenarios). However, more progress needs to be anticipated.

Some parts of the climate scenario analysis framework, particularly on methodological and data subjects, need to be further equipped with good practices and common conventions. Financial **institutions must pursue** collaboration, which is envisaged in further work of the CSA sub stream. The way in which the results of scenario analyses are communicated is also a pedagogical challenge, for which good practice needs to emerge.



Through their various climate stress testing exercises, which have been conducted since 2020, **supervisors have the opportunity to gradually constitute a reference analysis framework, that banks can use as a key input to construct their institution-specific stress testing frameworks.** The proposals of the Banque de France (2020) and those of the European Central Bank (2022) showed high consistency.

In accordance with the Strategy for Financing the Transition to a Sustainable Economy, in 2024 the European Commission tasked the European Supervisory Authorities (ESAs), the European Central Bank (ECB) and the European Systemic Risk Board (ESRB) to conduct a one-off climate risk scenario analysis to assess the resilience of the EU financial sector to withstand climate-related shocks and to support the green transition even under conditions of stress.

The exercise assumed full implementation of the Fit for 55 package as planned and that its objectives will be achieved by 2030. 'Fit for 55' refers to the commitment of all EU Member States to transition to a climate-neutral economy by 2050 and to reduce emissions by at least 55% by 2030, compared to 1990 levels. The exercise was the first EU-wide climate stress test for the financial sector. This broad scope recognised the importance of interlinkages across the entire financial system and the real economy, which can amplify financial stress. At the same time, other economy-wide effects, not considered in the analysis here, may help mitigate vulnerabilities. The cross-sectoral EU-wide joint exercise is therefore an important tool for understanding how climate-related risks can affect financial stability and the financing of the transition.

In addition, Luis de Guindos, Vice-President of the ECB, and Frank Elderson, Member of the Executive Board of the ECB and Vice-Chair of the Supervisory Board of the ECB shared in the ECB Blog their willingness to cover Climate & Environmental risk factors in their future stress tests:

"Moving forward, it is essential that our stress tests remain rigorous and insightful, given their importance in safeguarding the resilience of European banks. Systemic risks like those posed by climate change and nature degradation are often not fully captured in traditional models, underscoring the need to continuously adapt our stress-testing frameworks. We will incorporate such elements in our future stress test exercises to ensure that they remain reliable and that banks are well-equipped to weather even the strongest of headwinds. This will help protect the stability of our financial system".

Environmental scenario analysis lags behind climate scenario analysis for the following reasons

- No anchor forward-looking scenario set has been yet made available even though the Taskforce for Nature Financial Disclosure and the Network for Greening the Financial System are collaborating on it;

- the complexity of environmental transmission channels and the scarcity of available comprehensive data sources make data aggregation much more challenging compared to climate matters;

- the materiality assessment of environmental risk factors is penalized by the lack of historical data and the complexity of transmission channels for forward-looking impact assessments.

Recent scientific studies confirm however that, without strong action to reduce environmental risk, the decline of ecosystem services ('categories of Nature's contribution of people') will continue, leading to losses for the economy as a whole including the financial sector. Moreover, a **disorderly action between economic blocs would likely create shocks to businesses, individuals and, consequently, the financial sector,** both as a result of increased credit losses, as well as market shocks and an increase in legal disputes.

In a context of extreme uncertainty and significant legal risk, the ESA sub streamshares a view that the analysis of environmental scenarios is a promising tool for environmental risk mitigation but key building blocks are still missing to enable banks to conduct afull-fledged analysis. The ESA substream will continue contributing to the identification of means to progressively build or adapt necessary components to run meaningful environmental scenario analysis to underpin the risk management.

Entire parts of the environmental scenario analysis framework, particularly on scenario and data subjects, need to be equipped with good practices and common conventions. Financial institutions must further cooperate with the possibility of exploiting certain collaborative arrangements, which is envisaged in further work of the ESA substream. The way in which the results of scenario analyses are communicated is also a pedagogical challenge, for which good practice needs to emerge.

Through its first environmental stress testing exercise conducted end 2023**, the ECB took the opportunity to gradually constitute a reference analysis framework, that banks can use as a key input to construct their institution-specific stress testing frameworks.** This initiative delivered a first top-down impact assessment that however, due to data limitations and modelling choices, produced unproportionally high impacts on projected banking cost of risk. Joint discussion and work is needed between banks and their supervisor to further enhance the first framework. The WS will continue engagement with the ECB and between banks to further advance the risk management practices.

Thematic synthesis factsheets

The CSA substream is sharing a second version of its thematic synthesis factsheets (see next page) of the existing practices and remaining challenges on seven building blocks of climate scenario analysis:

- Climate scenario design
- Climate risk identification and transmission channel selection
- Climate data concerns
- Credit risk quantification
- Market and counterparty risk quantification
- Operational and business risk quantification
- Incorporation into strategic processes

The ESA WS is sharing a **first version** of its thematic synthesis factsheets of the existing practices and remaining challenges on five building blocks of environmental scenario analysis:

- Environmental scenario design
- Environmental risk identification and transmission channel selection
- Environmental data concerns
- Environmental risk quantification
- Incorporation into strategic processes

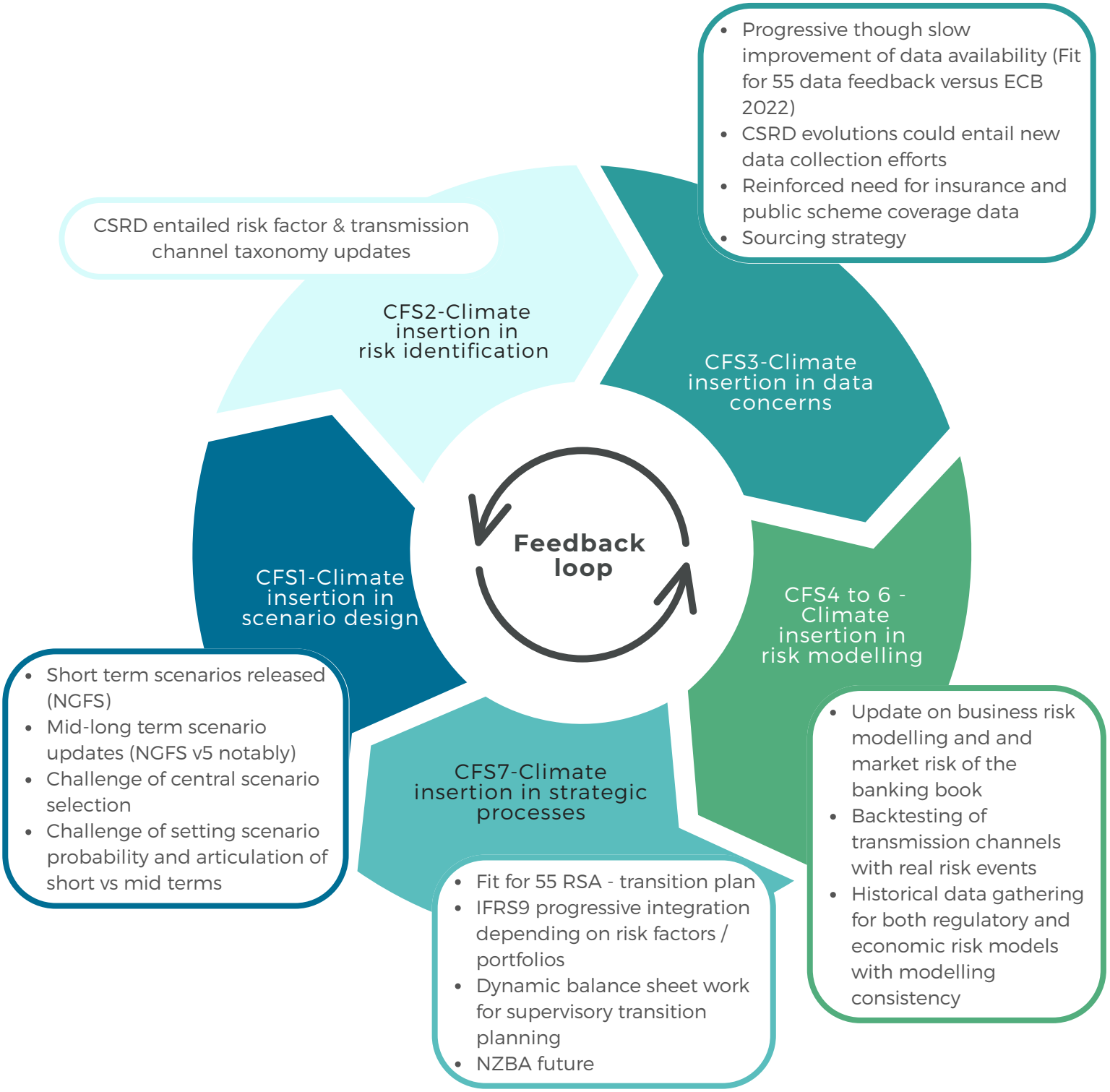
These thematic synthesis factsheets will be updated yearly for both climate and environmental risk factor analysis.

Climate FactSheets

C-ESG Risk Roundtable Climate Scenario Workstream

Version July 2025

Latest enhancements of Climate Scenario Analysis Fact Sheets (CFS)



CFS1 — Climate scenario design

What is at stake?

- Due to the complexity of building consistent climate and macroeconomic projections, financial institutions leverage external climate scenario providers (notably the Network for Greening the Financial System-NGFS and the International Energy Agency-IEA) but need to expand the information available to meet their specific analysis needs.
- Depending on the analysis run, different severities, risk factor coverages and horizons for scenarios are needed. A selection of the most appropriate anchor scenario has to be done to ground the storyline developed for the analysis.
- Understanding the limitations and the key sensitivities of anchor climate scenarios is also required for risk management purposes.
- Uncertainties on climate transition post 2024 US elections exacerbate the difficulty of selection of the baseline institution for transition planning.

Which practices are shared between CWS members?

- CSAWS members predominantly design or expand climate scenarios for supervisory stress testing and ICAAP (Internal Capital Adequacy Assessment Process) use cases.
- CSA WS members predominantly use NGFS scenarios, with Oxford Economics, or other external scenario expansion providers such as the National Institute of Economic and Social Research, to complement the coverage of their risk drivers (notably sectoral value addition trajectories).
- In the absence of external references, additional considerations are included by financial institutions (e.g. projections of potential greenwashing sanctions, insurance coverage, public support).
- Physical risk factor projections at asset location granularity is also leveraging external service offers.
- Climate market risk scenarios will start to be designed expanding short term NGFS stress scenarios.

Which remaining challenges have been identified?

- Selecting the most relevant reference scenario is a common concern - should it be an orderly 1.5°C trajectory or on the contrary a disorderly transition?
- The use of three Integrated Assessment Models (IAMs) by the NGFS for long term scenarios and other models for short-term scenarios will raise consistency issues between analysis horizons.
- Macroeconomic and sectoral granularity should also be enhanced (including in real estate per Energy Performance Certificate-EPC category).
- There is a need for a clear and harmonized CO2 price definition, differentiating its “fiscal” and its “regulation” parts. Tax levels are expected to be very different.
- Chronic physical risk factors’ integration should be enhanced to provide detailed projections and associated macroeconomic impacts.
- Long-term scenarios are challenging to fully describe since they require sufficient information to assess the strategy implemented by banks over a long horizon (evolution of financing mix, of its sectoral mix, of geographical locations and of the residential emission mix notably).
- Although indirect effects of extreme natural events are recently embedded in the fourth NGFS phase, further developments are required in order to better include and model impacts of acute physical events. A common list of most relevant hazards should be identified for European countries with highest level of geographical granularity. A comprehensive list of transmission channels to banking financial risks would also help framing consistent analysis.

What is coming next?

- In “recognized” climate risks scenarios, space is also missing for what is seen as known unknowns, i.e. biodiversity losses and geopolitical tensions.
- The scenarios construction is key not only because their credibility is at stake, but also because the physical and transition risks they induce are drivers of a wide range of risk types, whether financial or non-financial. Business risk, reputational risk, strategic risk, default risk, credit concentration risk, legal risk, and of course regulatory risks are the ones of which the materiality relation from the climate and environment risks is the highest.
- Various horizons of projection have also to be handled to serve both risk management, planning and strategic thinking. Keeping plausible scenarios at the various horizons is a prerequisite to build a reliable and transparent scenario analysis practice.
- Being able to assess limitations and key sensitivities of anchor climate scenarios requires new scenario exploration tools.
- NGFS short-term scenarios recent disclosure demand additional analysis by the banks to select relevant scenarios for short-term risk analysis. For ICAAP usage, adaptations of this first version of scenarios will be required to keep them severe but plausible.

CFS2 – Climate insertion in risk identification

What is at stake?

- There is a consensus to acknowledge that a better understanding of the transmission channels, which explain the way climate risk drivers could create a direct or indirect damage to financial institutions, would enhance the ability to seize the possible impacts of ESG risk drivers and improve the capacity to model the impacts of those drivers.
- Up until now, no official, nor relevant and complete taxonomy of the ESG-related transmission channels exists, neither in the industry nor in regulatory requirements.
- One of the objectives to be pursued is to create dashboards to display the transmission channels that have to be used in the modelling at the crossing of risk types and ESG risk drivers. This would enhance the transparency and comparability on climate risk modelling.

Risk identification key concepts are shared between the CSA WS members

- Climate aspects are captured in the risk identification process of the institutions. This process consists in identifying risk events to which institutions are exposed and the risk drivers that are favoring / triggering / aggravating the identified risk events.
- A materiality indicator is given to each risk event using the severity of the risk event and a probability that is inferred from the couple frequency / imminence of the risk event. Those individual materialities can be aggregated along and across various axes.
- Moreover, because the risk driver(s) favoring / triggering / aggravating the risk event are being allocated a weight in percentage corresponding to the importance of their contribution, it is possible to distribute the risk event's materiality on each of the underlying risk drivers, thus obtaining and individual materiality contribution for each risk driver.

List of the ESG [and E&C]-related risk drivers included in the risk driver taxonomy

Level 2 risk driver	#	Level 3 risk driver	
Climate change physical risk drivers	1	Physical impacts of acute climate change phenomena	C & E
	2	Adaptation to acute climate change phenomena	C & E
	3	Physical impacts of chronic climate change phenomena	C & E
	4	Adaptation to chronic climate change phenomena	C & E
Climate change transition risk drivers	5	Transition to a low carbon economy - Policy changes	C & E
	6	Transition to a low carbon economy - Technological changes	C & E
	7	Transition to a low carbon economy - Behavioural changes	C & E
Nature-related risk drivers	8	Impacts on biodiversity & ecosystems	C & E
	9	Mismanagement of dependencies on natural resources and ecosystem services	C & E
	10	Impacts & dependencies on freshwater, marine & coastal resources, and ecosystems	C & E
Nature-related risk drivers	11	Pollution and hazardous chemicals	C & E
	12	Failure in waste management & recycling	C & E
	13	Invasive alien species	C & E
Social risk drivers	14	Violation of local communities-related human rights	
	15	Non-respect of consumers rights	
	16	Violation of workforce-related rights	
	17	Inadequacy with social sentiments and expectations	
Governance risk drivers	18	Inadequate governance regarding management of E & S risks	C & E
	19	Non-compliance with corporate governance frameworks or codes	
ESG related liability consequences	20	ESG related liability consequences	C & E

What are climate transmission channels?

- Climate transmission channels are causal chains that explain how climate risk drivers give rise to financial and non-financial risks that impact financial institutions directly or indirectly through their clients, counterparties and other stakeholders, the assets they hold and the economies and environments in which they operate.
- The CSA WShas proposed a first "manageable" ESG transmission channels' taxonomy, i.e., not too detailed but sufficiently comprehensive to cover all kinds of possible transmission channels.

ESG transmission channel taxonomy

Level 1 ESG Transmission channel	#	Level 1 ESG Transmission channel
Regulation, norms & politics	1	Carbon price or carbon tax
	2	Energy performance / EPCs
	3	New ESG-related regulations
	4	Sanctions & fines
	5	Political decisions
Social, health & legal	6	Changes in expectations, habits or behaviours
	7	Damage to the reputation
	8	Dispute, claims, legal proceeds
	9	Morbidity (disease, pandemics…) & mortality
	10	Social unrest
	11	Migration of populations
Physical & financial assets	12	Physical asset damage / destruction
	13	Increased volatility or shift in prices or values
	14	Lower financial asset performance
	15	Stranded assets or workers
Microeconomics	16	Losses of business opportunity
	17	New capital expenditures / Increased costs
	18	Operational disruption (excluding supply chain)
	19	Supply chain disruption
	20	Lower production
	21	Lower productivity
	22	Impact on wealth and / or solvency
Others	23	ESG-related technological change
	24	Availability and costs of risk transfer to insurance & re-insurance

What is coming next?

- A crossing of the transmission channels with the climate risk drivers has been performed. It consisted in appreciating, for each of the risk drivers, which of the 24 transmission channels could play a role in the causal chain leading to the materialization of a financial or non-financial risk. Out of the 312 (24x13) possible combinations, 201 have been deemed possible. Going forward, this crossing / mapping has to be further challenged.
- Presenting the transmission channels retained in the effective modelling of financial risks, following the format presented hereafter (in the case of business risk).

Business Risk - Transition risk related modelling

		Transmission channels	Inclusion in the modelling
Regulation, norms & politics	1	Carbon price or carbon tax	●
	2	Energy performance / EPCs	○
	3	New ESG-related regulations	●
	4	Sanctions & fines	○
	5	Political decisions	○
Social, health & legal	6	Changes in expectations, habits or behaviours	●
	7	Damage to the reputation	●
	8	Dispute, claims, legal proceeds	○
	9	Morbidity (disease, pandemics…) & mortality	
	10	Social unrest	○
	11	Migration of populations	○
Physical & financial assets	12	Physical asset damage / destruction	
	13	Increased volatility or shift in prices or values	●
	14	Lower financial asset performance	○
	15	Stranded assets or workers	●
Microeconomics	16	Losses of business opportunity	●
	17	New capital expenditures / Increased costs	○
	18	Operational disruption (excluding supply chain)	
	19	Supply chain disruption	○
	20	Lower production	○
	21	Lower productivity	●
	22	Impact on wealth and / or solvency	○
Others	23	ESG-related technological change	○
	24	Availability and costs of risk transfer to insurance & re-insurance	○

Transmission channel that is not relevant for the modelling
○ Transmission channel that is relevant for the modelling but not retained in the model
● Transmission channel that is relevant for the modelling & retained in the model

CFS3 – Climate insertion in data gathering

What is at stake?

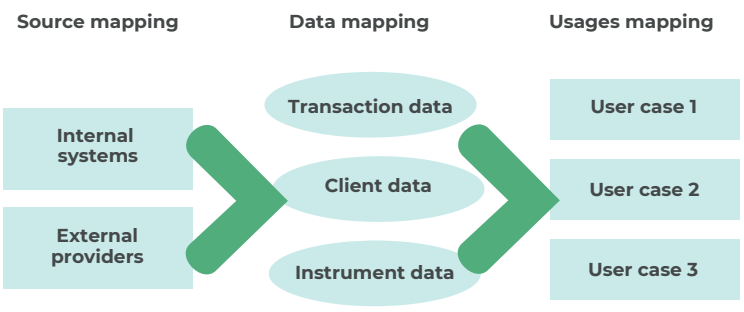
- Fast extension of data needs with climate matters demands a recurring process for new data onboarding on which common practices could be shared.
- When data is partially or not available, discrepancies in proxies (which are ways of producing an approximation of the data needed) can create structural biases in the risk analysis. Sharing of proxies could limit these undue discrepancies, as done by ECB pursuant the 2022 ECB Climate Stress Test. Updating of data availability benchmarks (as done with Fit for 55 exercise) help institutions in the adaptation of their data strategy.
- Improvement of data coverage will enhance risk analysis relevance, so data sharing initiatives should be promoted, seeking to limit commercial data provider dependencies.
- Scenario analysis can provide relevant analysis for risk materiality assessment enabling prioritization of data sourcing and operational insertion.

What are common challenges?

- Climate data needs have very heterogeneous levels of availability:
  - Some of them such as Energy Performance Certificates do not exist in some countries and where existing, have wide discrepancies in standards.
  - Others, such as greenhouse gas emissions, will progressively gain in availability and quality with the implementation of Corporate Sustainability Reporting Directive for Europe (only for largest corporates). Extension to other regions of the world with similar standards will be challenging.
- Pragmatic workarounds are necessary, either to complement the limited data coverage or to add information levels not readily available (building resilience for example), but within institutions and across the industry common solutions and standards are not set. The wide range of "shortcutting options" creates information noise due to the absence of standardization of practices.
- Climate data gathering heavily relies on external data providers which are costly and do not always provide full transparency on their information sourcing and shortcutting practices.

Which best practices can be shared?

- Within institutions, an ESG data supply chain would:
  - Consolidate and give all stakeholders a global view on data required for ESG use cases at Group and function levels.
  - Embark businesses on ESG data gathering to ensure an efficient and consistent sourcing strategy, prioritize data sourcing strategy efforts and integration into central ESG data platform.
  - Steer the identification of ESG critical data to be placed under close data governance and quality framework and documented in the ESG critical data dictionary.
  - Support internal and external communication on global Group ESG data strategy.
- An ESG data mapping is critical to share within all levels of the institution data sources and their usages, data understanding and anticipation of upcoming requirements.



What is coming next?

- Fast evolving ESG data needs requires a recurring process for new data onboarding on which common practices could be shared.
- When data is partially or not available, discrepancies in "workabouts" can create structural biases in the risk analysis. Sharing common solutions could limit these undue discrepancies.
- Improvement of data coverage will enhance risk analysis relevance so data sharing initiatives should be promoted, seeking to limit commercial data provider dependencies.
- Criteria for criticality of ESG data have to be enhanced to encompass multiple dimensions of analysis (regulatory requirements, business case uses, expert driven analysis).
- Scenario analysis can provide relevant analysis for risk materiality assessment entailing prioritization of data sourcing and operational insertion.
- CSRD evolutions including post-omnibus could entail significant revisions of the data strategy of credit institutions for ESG matters.

CFS4 — Climate insertion in credit risk modelling

What is at stake?

- Climate risk factors have to be covered in credit risk stress testing frameworks to cope with new regulatory requirements and support the ESG strategy
- Starting from the solutions originally developed for 2022 ECB Climate Stress Test, the framework has to keep on being enhanced to meet extending scope of expectations
- A fully integrated and comprehensive approach has to be maintained
- Multiple scenarios over different time horizons have to be assessed at different levels of the organization

What are common challenges?

- Methodology for climate risk factors on corporates covers both direct and indirect credit risk impacts by combining counterparty and sectoral analyses.
- Reliable projections of risk parameters over long term horizon require to develop dynamic balance assumptions on exposure distribution:
  - Sectoral reallocation to reflect bank strategy and ESG commitments (e.g. Net Zero) in various climate scenarios
  - Exposure dynamic defined at individual level when available (e.g. Large Corporate)
  - Gradual shift of RE exposure toward better EPC classes
- Climate risk for households is channeled both through market value of real estate and the investments for renovations, required by upcoming EU or national regulations, combined with energy shocks also impacting household income/solvency.
- Compared to corporate segment, the methodology for measuring impacts of climate-related risk on households is relatively less advanced and it is being investigated.
- Lack of data and poor guidance hinders full incorporation of risk mitigants'effects (private insurance, national catastrophe schemes, other public

Which best practices can be shared?

- A mapping of credit portfolios with climate related transmission channels is leveraged from risk identification process.
- A combination of existing credit stress test models with climate risk models are used to measure the impacts of selected transmission channels in various scenarios.
- Internal risk parameter models are fully leveraged given their statistical grounding. They rely on scoring functions combining financial ratios with other qualitative features. Models run with financial ratios are projected with scenario conditional transmission channel impacts, keeping all other qualitative features equal.
- Dynamic balance sheet modelling combines sectoral level activity projections (through the expansion of macroeconomic trajectories) with sectoral credit demand and the institution's strategy.
- For physical risk modelling, the building block structure is similar but with a scenario component that describes climate hazard at location level. The treatment of corporate exposures with multiple locations and complex value chains, as well as the role of insurance are "work in progress.

What is coming next?

- The main building blocks are identified, and for most of them implemented in a first version, but numerous areas of improvement remain, including on scenario design, notably for adverse scenarios on short-term horizon.
- The projections of green investments, with associated technology shifts, with the associated modelling of banking dynamic balance sheets (also incorporating bank commitments) need to be reinforced.
- Further developments are expected on the inclusion of physical risk impacts (acute and chronic) on corporate Probabilities of Default, where more detailed data are needed on geographical location of production sites and supply-chain disruptions.
- The modelling of climate change financial impacts on households lacks data on "rest to live" sensitivities to climate transmission channels (among which residential energetic performance investment needs).
- Data gathering and modelling need to accelerate on the evolution of insurance coverage and state support for mitigating losses from physical risk factors.
- Inclusion of climate risk in sovereign exposures are at early stages. More detailed guidance and common methodology would be welcome in this context.
- Compounding of transition and physical risk factors remains at an early stage both from a scenario design standpoint and from a modelling one.
- More broadly, feedback loops and correlations with other risk (liquidity, market, operational) remain to be explored.

CFS5 — Climate insertion in market and counterparty risk modelling

What is at stake?

- Stress testing is a key tool in understanding and managing climate impacts on market and counterparty risks.
- Trading book exposure to sudden announcement or expectation of changes to carbon taxation is seen as the dominant potential source of market volatility.
- To reflect a relevant shock for market risk, the time horizon has to be accelerated compared to existing long-term scenarios.
- The design choices for the stress test scenarios need to combine emerging industry best practices and stress tests need to be tailored to the specificities of the institution's portfolio.

What are common challenges?

- Climate risk stress testing for the trading books is a novel topic with very few regulatory and supervisory guidelines, as well as limited industry knowledge and experience.
- Given the complexity of risk driver interactions in trading books, only instantaneous shocks can be handled with different position liquidity being managed by the differentiation of shock horizons.
- Calibrating short-term market shocks due to a climate risk event poses significant challenges given the lack of historical data and of relevant literature.
- There is also no evidence of any significant correlation between the time series of carbon price and the price of financial assets, making the link between carbon price shocks and financial shocks quite challenging.

Which best practices can be shared?

- The risk identification process can be leveraged to provide the selection of transmission channels relevant for the trading positions of the institution.
- To design relevant short-term market scenarios, different approaches can be followed. Model-based shock derivation can be used (ongoing ISDA climate scenario initiative). Alternatively historical analysis can also be considered, by looking at the behaviour of more vulnerable versus less vulnerable assets during historical events relevant for climate transition and/or energy policy to calibrate shocks based on the moves observed.
- For an institution, scenario design should combine idiosyncratic scenario features with industry best practice scenario design.
- Business As Usual (BAU) trading book stress testing already covers spikes in commodity energy prices or interest rate credit spread widenings that are key transmission channels of transition risk factors.

What is coming next?

- Learnings as of today from market risk run exercises point to significant further work, both on scenario design and on relevant approaches for risk quantification.
- Finalized supervisory climate scenario analysis of the trading book has shown up to now limited impacts due to a combination of reasons:
  - Limited shocks concentrated on most exposed sectors to the transition
  - Balanced sectoral exposures in trading books
  - Partial coverage of trading books (only securities with associated hedges) generating fake open positions
- Designing relevant climate scenarios for the analysis of the trading books is the highest upcoming challenge, with ongoing initiatives launched by the NGFS and ISDA. Leveraging these joint initiatives will maintain a global consistency in climate impact analysis on the various institutions' trading books.

CFS6 — Climate insertion in operational and business risk modelling

What is at stake?

- Climate risk factors have to be covered in operational and business risk stress testing frameworks to cope with new regulatory requirements and support the ESG strategy.
- Operational risk transmission channels are notably climate risk impacts on the buildings of the institution, but also potential disruption of critical services due to acute physical risk events.
- Business risk transmission channels could be generated by revenue concentration on a client / sector / geographical area being affected by climate risk events. Climate strategic choices could also entail balance sheet and revenue attritions.
- No supervisory exercise has framed a framework yet.
- A fully integrated and comprehensive approach has to be maintained.
- Multiple scenarios over different time horizons have to be assessed at different levels of the organization.

What are common challenges?

- Guidelines have been issued by supervisors and regulators, but no detailed quantitative assessment approach is available so far on the impacts of climate on both operational and business risk.
- Extremely limited data is available to work on sensitivities to climate transmission channels.
- Regulatory evolution, with the switch to CRR3, will challenge the Potential Incident framework put in place for regulatory capital calculation.
- For business risk, transmission channels remain to be more precisely defined and should be shared between banks and supervisors to build on a common and solid ground.

Which best practices can be shared?

- A mapping of institution activities with climate related transmission channels can be leveraged from risk identification processes.
- For operational risk modelling, institutions, which already have an Advanced Measurement Approach for capital need assessment, can leverage their inventory of Potential Incidents (PIs). PIs provide a forward-looking assessment of potential operational losses, and their likelihood and severity can be stressed depending on scenarios considered.
- Scope of risks covered includes typical physical risk events (damages impacting the Bank's own buildings or data centers resulting in an activity loss and repair costs). To some extent it also covers potential transition risk events linked to greenwashing type of losses (belonging to the more generic type of mis-selling incidents).

What is coming next?

- Business risk is a key dimension when dealing with climate scenario analysis, even if the systematic measurement is not yet in place for most institutions.
- The topic is often being covered by qualitative or expert assessments, but an introduction in the more systematic framework is needed.
- One of the first components of a systematic framework is the modelling of the institution's dynamic balance sheet (in consistency with credit) under climate scenarios with two dimensions:
  - The financing of the transition, generating increased exposures on some sectors and for the renovation of buildings, with potentially some margin compression depending on the financing market trends;
  - The alignment to bank commitments and potential loss of revenues on emitting sectors, especially for hot house scenarios.
- Reputation and litigation risks on climate matters remain challenging to calibrate as potential incidents given the lack of effective observations.

CFS7 — Climate insertion in strategic processes

What is at stake?

- Institutions are expected to understand how climate risks affect their business environment in the short, medium and long term to inform their business strategy.
- The institution's business strategy and its implementation is expected to reflect climate risks, for example by setting and monitoring key performance indicators (KPIs) that are cascaded down to individual business lines and portfolios.
- Institutions are expected to adopt a strategic approach to managing and/or mitigating climate risks in line with their business strategy and risk appetite, and to adapt policies, procedures, risk limits and risk controls accordingly.
- ECB is increasingly expecting the integration of climate stress testing results into bank's business strategy and governance

What are common challenges?

- Through continuous improvements in climate scenario analysis methodologies and the integration of outputs in various aspects of their operations, banks and regulators can contribute to building a more resilient and sustainable financial system.
- Several banks have already directly integrated the outcomes of climate stress tests into their risk management processes, notably through their IFRS9 provisioning but also in their economic capital monitoring. However, many entities, which are already including climate risk indicators into their business strategy and governance framework, still need to integrate them with the usage of climate risk stress testing output.
- There is a tradeoff of including climate stress testing results automatically in credit decisions and strategies, leading also to potential disadvantages, especially in a context of disorderly transition.

Which best practices can be shared?

- Climate stress test results on a long-term basis, i.e. impact of transition and physical risk on corporate client's probability of default, should be considered as input of the credit risk strategies at sectoral level
- Sectoral steering signals already embed short term transition risk score.
- For short and mid-term horizons, remaining consistent with the portfolio durations, materiality analysis of transition and physical risk factors, notably through climate scenario analysis, should trigger the need for the adaptation of client's credit risk parameters in forward-looking measures (credit internal capital, expected credit losses…).
- The integration of climate matters in IFRS9 Expected Credit Losses done by most institutions over 2024, combined with progressive climate matters coverage in pillar 2 decisions, entails mechanically the handling of climate in profitability steering for the normative perspective.
- The integration of climate matters both in IFRS9 Expected Credit Losses and in the economic capital & liquidity of an institution ensures proper handling of climate in profitability steering for the economic perspective.

What is coming next?

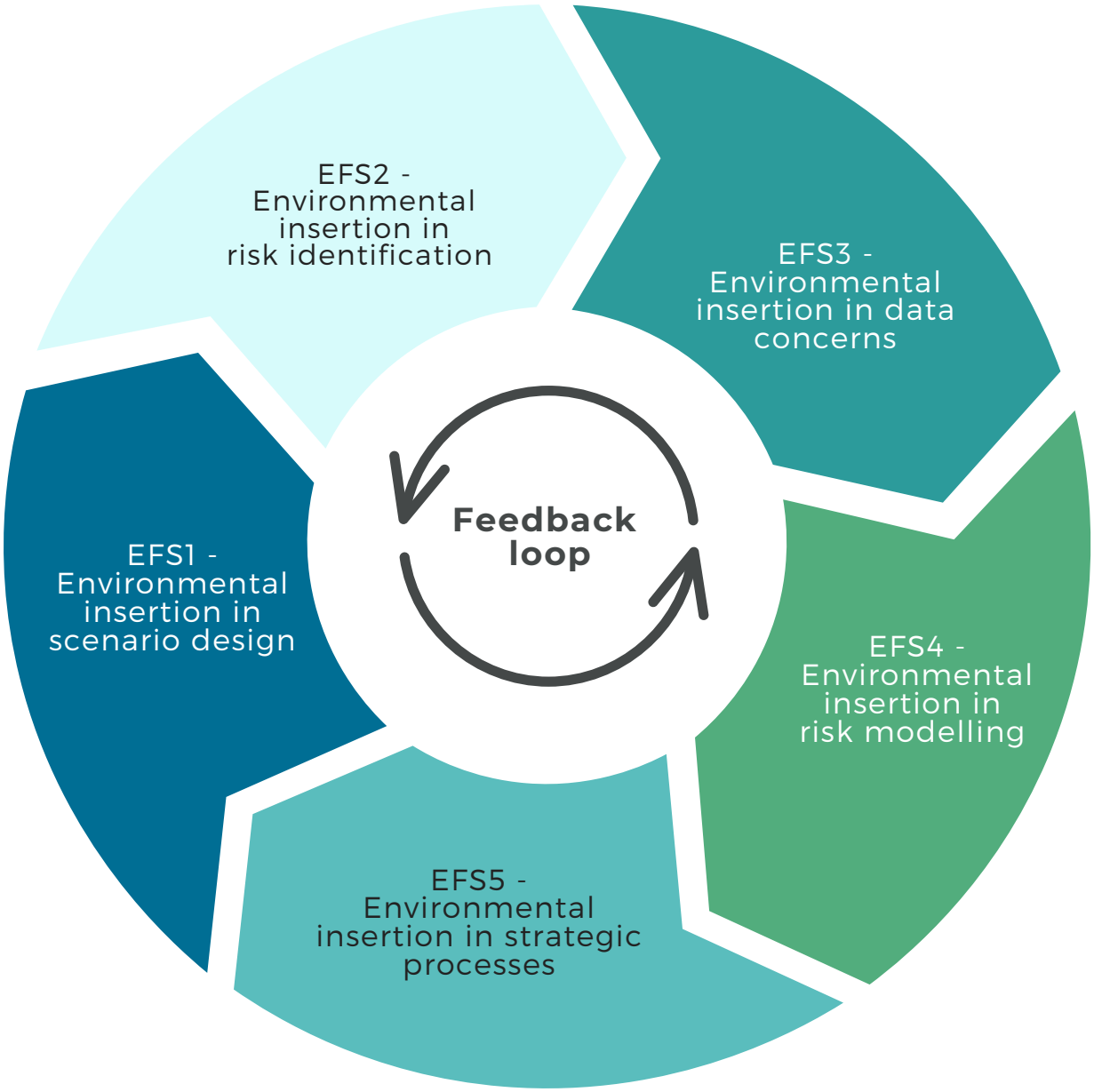
- Considering the various plausible scenarios and the associated transition and physical risks, banks will be in a position to take actions (strategic, business model wise, and in terms of risk management or operations) that will add value in each of the possible futures. These include, but are not limited to:
  - A build-up of knowledge on climate is adamantly key to success across the various scenarios.
  - Assessing Capital Adequacy prepares the banks for financial risks increasingly impacted by physical or transitional risk drivers.
  - Communication internally and externally about a bank's position and the challenges of climate, as foreseen by current disclosure regulation.
  - More cooperation among financial institutions and potentially with supervisors through banking associations. This could include lobby work.
  - Act decisively towards clients, making clear what is expected and what is (eventually) no longer acceptable. Make this part of the financing operations.
- While it is commonly agreed within the industry that there is a need to pursue the IFRS9 and ICAAP evolutions to include climate-related risk factors, it would be desirable to have a certain level playing-field in terms of timeline and perimeter in scope.
- Transition planning will be systematically implemented for European institutions over 2025 to comply with EBA ESG Risk Management guidelines, leveraging extensively climate scenario analysis.

Environmental FactSheets

C-ESG Risk Roundtable Environmental Scenario Workstream

Version July 2025

Latest enhancements of Environmental Scenario Analysis Fact Sheets (EFS)



EFS1 Environmental scenario design

What is at stake?

- Due to the complexity of building consistent environmental and macroeconomic projections, financial institutions want to leverage external scenario providers (notably the Network for Greening the Financial System-NGFS) but no set of anchor scenarios is yet available.
- There is a need to connect environmental scenario components to macroeconomic and climate aspects for internal and supervisory holistic risk analysis.
- Depending on the analysis run, different severities, risk factor coverages and horizons for scenarios are needed. A selection of the most appropriate anchor scenario has to be done to ground the storyline developed for the analysis.
- Understanding the limitations and the key sensitivities of anchor climate scenarios is also required for risk management purposes.

Which practices are shared between ESA members?

- Limited practices have been identified due to most institutions waiting for the availability of external anchor scenarios.
- Few banks leverage existing NGFS climate scenarios that convey some environmental variables to ground their environmental scenario construction.

Which remaining challenges have been identified?

- Selecting the most relevant reference scenario is a common concern - should it be an orderly trajectory or on the contrary a disorderly transition?
- The use of three Integrated Assessment Models (IAMs) by the NGFS is initially meant to show that uncertainty prevails when building long-term climate and environmental risk scenarios.

What is coming next?

- Getting a first version of anchor environmental scenarios will trigger enhanced risk analysis efforts.
- The waiting approach to leverage climate anchor scenarios and to expand a first list of available environmental variables will be further investigated to set a common practice.
- The work of the Taskforce for Nature Financial Disclosures will be also closely monitored.

EFS2 Environmental risk identification and selection of transmission channels

What is at stake?

- There is a consensus to acknowledge that a better understanding of the transmission channels, which explain the way environmental risk drivers could create a direct or indirect damage to financial institutions, would enhance the ability to seize the possible impacts of environmental risk drivers and improve the capacity to model the impacts of those drivers.
- Up until now, no official nor relevant and complete taxonomy of the environmental-related transmission channels exists, neither in the industry nor in regulatory requirements.
- One of the objectives to be pursued is to create dashboards to display the transmission channels that have been used in the modelling at the crossing of risk types and risk drivers. This would enhance the transparency and comparability on environmental risk modelling.

Risk identification key concepts are shared between the ESA members

- Environmental aspects are captured in the risk identification process of the institutions. This process consists in identifying risk events to which institutions are exposed and the risk drivers that are favoring / triggering / aggravating the identified risk events.
- A materiality indicator is given to each risk event using the severity of the risk event and a probability that is inferred from the couple frequency / imminence of the risk event. Those individual materialities can be aggregated along and across various axes.
- Moreover, because the risk driver(s) favoring / triggering / aggravating the risk event are being allocated a weight in percentage corresponding to the importance of their contribution, it is possible to distribute the risk event's materiality on each of the underlying risk drivers, thus obtaining and individual materiality contribution for each risk driver.

List of the ESG [and E&C]-related risk drivers included in the risk driver taxonomy

Level 2 risk driver	#	Level 3 risk driver	
Climate change physical risk drivers	1	Physical impacts of acute climate change phenomena	C & E
	2	Adaptation to acute climate change phenomena	C & E
	3	Physical impacts of chronic climate change phenomena	C & E
	4	Adaptation to chronic climate change phenomena	C & E
Climate change transition risk drivers	5	Transition to a low carbon economy - Policy changes	C & E
	6	Transition to a low carbon economy - Technological changes	C & E
	7	Transition to a low carbon economy - Behavioural changes	C & E
Nature-related risk drivers	8	Impacts on biodiversity & ecosystems	C & E
	9	Mismanagement of dependencies on natural resources and ecosystem services	C & E
	10	Impacts & dependencies on freshwater, marine & coastal resources, and ecosystems	C & E

Level 2 risk driver	#	Level 3 risk driver	
Nature-related risk drivers	11	Pollution and hazardous chemicals	C & E
	12	Failure in waste management & recycling	C & E
	13	Invasive alien species	C & E
Social risk drivers	14	Violation of local communities-related human rights	
	15	Non-respect of consumers rights	
	16	Violation of workforce-related rights	
	17	Inadequacy with social sentiments and expectations	
Governance risk drivers	18	Inadequate governance regarding management of E & S risks	C & E
	19	Non-compliance with corporate governance frameworks or codes	
ESG related liability consequences	20	ESG related liability consequences	C & E

What are environmental transmission channels?

- Environmental transmission channels are causal chains that explain how environmental risk drivers give rise to financial and non-financial risks that impact financial institutions directly or indirectly through their clients, counterparties and other stakeholders, the assets they hold and the economies and environments in which they operate.
- The ESA has proposed a first "manageable" ESG transmission channels' taxonomy, i.e., not too detailed but sufficiently comprehensive to cover all kinds of possible transmission channels.

ESG transmission channel taxonomy

Level 1 ESG Transmission channel	#	Level 1 ESG Transmission channel
Regulation, norms & politics	1	Carbon price or carbon tax
	2	Energy performance / EPCs
	3	New ESG-related regulations
	4	Sanctions & fines
	5	Political decisions
Social, health & legal	6	Changes in expectations, habits or behaviours
	7	Damage to the reputation
	8	Dispute, claims, legal proceeds
	9	Morbidity (disease, pandemics…) & mortality
	10	Social unrest
	11	Migration of populations
Physical & financial assets	12	Physical asset damage / destruction
	13	Increased volatility or shift in prices or values
	14	Lower financial asset performance
	15	Stranded assets or workers
Microeconomics	16	Losses of business opportunity
	17	New capital expenditures / Increased costs
	18	Operational disruption (excluding supply chain)
	19	Supply chain disruption
	20	Lower production
	21	Lower productivity
	22	Impact on wealth and / or solvency
Others	23	ESG-related technological change
	24	Availability and costs of risk transfer to insurance & re-insurance

What is coming next?

- A crossing of the transmission channels with the environmental risk drivers has been performed. It consisted in appreciating, for each of the risk drivers, which of the 24 transmission channels could play a role in the causal chain leading to the materialization of a financial or non-financial risk. Out of the 312 (24x13) possible combinations, 201 have been deemed possible. Going forward, this crossing / mapping has to be further challenged.
- Presenting the transmission channels retained in the effective modelling of financial risks, following the format presented hereafter (in the case of business risk

To me updated???????

		Transmission channels	Inclusion in the modelling
Regulation, norms & politics	1	Carbon price or carbon tax	●
	2	Energy performance / EPCs	○
	3	New ESG-related regulations	●
	4	Sanctions & fines	○
	5	Political decisions	○
Social, health & legal	6	Changes in expectations, habits or behaviours	●
	7	Damage to the reputation	●
	8	Dispute, claims, legal proceeds	○
	9	Morbidity (disease, pandemics…) & mortality	
	10	Social unrest	○
	11	Migration of populations	○
Physical & financial assets	12	Physical asset damage / destruction	
	13	Increased volatility or shift in prices or values	●
	14	Lower financial asset performance	○
	15	Stranded assets or workers	●
Microeconomics	16	Losses of business opportunity	●
	17	New capital expenditures / Increased costs	○
	18	Operational disruption (excluding supply chain)	
	19	Supply chain disruption	○
	20	Lower production	○
	21	Lower productivity	●
	22	Impact on wealth and / or solvency	○
Others	23	ESG-related technological change	○
	24	Availability and costs of risk transfer to insurance & re-insurance	○

Transmission channel that is not relevant for the modelling
○ Transmission channel that is relevant for the modelling but not retained in the model
● Transmission channel that is relevant for the modelling & retained in the model

EFS3 – Environmental data concerns

What is at stake?

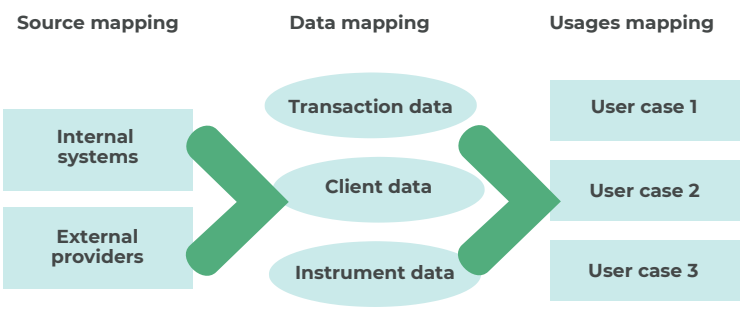
- Fast extension of data needs with environmental matters demands a recurring process for new data onboarding on which common practices could be shared.
- When data is partially or not available, discrepancies in proxies (which are ways of producing an approximation of the data needed) can create structural biases in the risk analysis. Sharing of proxies could limit these undue discrepancies, as done by ECB pursuant the 2022 ECB Climate Stress Test.
- Improvement of data coverage will enhance risk analysis relevance, so data sharing initiatives should be promoted, seeking to limit commercial data provider dependencies.
- Scenario analysis can provide relevant analysis for risk materiality assessment enabling prioritization of data sourcing and operational insertion.

What are common challenges?

- Low availability of Environmental data to cover the needs
- Workabouts are necessary, either to complement data coverage or to add information levels not readily available (building resilience for example), but within institutions and across the industry no common solutions to overcome non-avaialbility of data or standards are available The wide range of "shortcutting" options creates information noise due to the absence of standardization of practices.
- Environmental data gathering heavily relies on external data providers which are costly and do not always provide full transparency on their information sourcing and "shortcutting" practices.

Which best practices can be shared?

- Within institutions, an ESG data supply chain would:
  - Consolidate and give all stakeholders a global view on data required for ESG use cases at Group and function levels.
  - Embark businesses on ESG data gathering to ensure an efficient and consistent sourcing strategy, prioritize data sourcing strategy efforts and integration into central ESG data platform.
  - Steer the identification of ESG critical data to be placed under close data governance and quality framework and documented in the ESG critical data dictionary.
  - Support internal and external communication on global Group ESG data strategy.
- An ESG data mapping is critical to share within all levels of the institution data sources and their usages, data understanding and anticipation of upcoming requirements.



What is coming next?

- Increasing ESG related data needs demands a recurring process for new data onboarding on which common practices could be shared.
- When data is partially or not available, discrepancies in "shortcuts" can create structural biases in the risk analysis. Sharing common solutions(sortcuts) could limit these undue discrepancies.
- Improvement of data coverage will enhance risk analysis relevance so data sharing initiatives should be promoted, seeking to limit commercial data provider dependencies.
- Criteria for criticality of ESG data have to be enhanced to encompass multiple dimensions of analysis (regulatory requirements, business case uses, expert driven analysis).
- Scenario analysis can provide relevant analysis for risk materiality assessment entailing prioritization of data sourcing and operational insertion.
- CSRD adaptation and roll-out calendar will demand adaptations of data sourcing strategy.

EFS4 - Environmental insertion in risk modelling

What is at stake?

- Environmental risk factors have to be covered in risk stress testing frameworks to cope with new regulatory requirements and support the ESG strategy
- A fully integrated and comprehensive approach has to be maintained
- Multiple scenarios over different time horizons have to be assessed at different levels of the organization

What are common challenges?

- Practices of modelling environmental factor impacts on financial risks are quite limited so far.
- Most institutions leverage their risk identification framework to draw severe but plausible stress events and feed their internal capital frameworks.
- Absence of environmental anchor scenarios and limited data availability are critical common challenges for the institutions.

Which best practices can be shared?

- ECB has provided with its top-down 2023 exercise a first modelling framework, which could be leveraged upon with adaptations

What is coming next?

- On the short term, reinforce the risk identification frameworks to maintain a derived quantitative assessment framework on that basis.
- Pursue discussions between banks and the ECB on the learnings from the 2023 top-down exercise to design a more sophisticated modelling framework.
- Assess the calendar of availability of anchor scenarios covering environmental matters with climate and macroeconomic dimensions.

EFS5 -Environmental insertion in strategic processes

What is at stake?

- Institutions are expected to understand how environmental risks affect their business environment in the short, medium and long term to inform their business strategy.
- The institution's business strategy and its implementation is expected to reflect environmental risks, for example by setting and monitoring key performance indicators (KPIs) that are cascaded down to individual business lines and portfolios.
- Institutions are expected to adopt a strategic approach to managing and/or mitigating environmental risks in line with their business strategy and risk appetite, and to adapt policies, procedures, risk limits and risk controls accordingly.
- ECB expectations for the integration of environmental stress testing results into bank's business strategy and governance framework Are increasing.

What are common challenges?

- Through continuous improvements in environmental scenario analysis methodologies and the integration of outputs in various aspects of their operations, banks and regulators can contribute to building a more resilient and sustainable financial system.
- Several banks have not yet directly integrated the outcomes of environmental stress tests into their risk management processes due to the low level of maturity of the existing frameworks.
- Environmental risk factors are well integrated in risk identification and client assessment processes.

What proposal can be made for integration?

- Enhance availability of anchor scenarios and required data for risk modelling.
- Share between institutions on materiality assessments of environmental risk factors and the understanding of associated transmission channels.
- Share on observations of realized financial impacts attributable to environmental transmission channels.

What is coming next?

- On the short term, reinforce the risk identification frameworks to maintain a derived quantitative assessment framework on that basis.
- Pursue discussions between banks and supervisors on the learnings from the 2023 top-down exercise to design a more sophisticated modelling framework.
- Assess the calendar of availability of anchor scenarios covering environmental matters with climate and macroeconomic dimensions.