EUROPEAN CENTRAL BANK

BANKING SUPERVISION

Good practices for climate and nature risk management

Observations from the ECB's five-year climate and nature risk programme (2020-25)

May 2026

Contents

1 Introduction

1.1 Background

With the publication of the ECB Guide on climate-related and environmental (C&E) risks ("the Guide") in November 2020[1], the ECB set out the view that institutions should take a strategic, forward-looking and comprehensive approach to considering climate and nature (C&N) risks.[2]

Institutions were then asked in early 2021 to perform a self-assessment of their current practices against the expectations set out in the Guide and to inform the ECB of their implementation plans to improve the management of C&N risks. In 2022 the ECB launched a thematic review, which involved conducting deep dives into institutions' C&N risk strategies, as well as their governance and risk management frameworks and processes. Following these exercises, the ECB set institution-specific deadlines for achieving full alignment with its expectations by the end of 2024.[3]

During this thematic review, the ECB identified a set of good practices for the management of C&N risks. These were drawn from a range of significant institutions with different business models and sizes. Since then, European institutions have made significant strides in addressing the risks stemming from the ongoing climate and nature crises. Institutions now have an increasing number of advanced practices in place to identify, monitor and manage C&N risks (Chart 1).

The European Banking Authority's Guidelines on the management of Environmental, Social and Governance (ESG) risks (EBA Guidelines on the management of ESG risks) have been applicable to institutions other than small and non-complex institutions since 11 January 2026. The European Banking Authority (EBA) highlights that "the Guidelines specify requirements regarding the internal processes and ESG risk management arrangements that institutions should have in place in accordance with the Capital Requirements Directive (CRD6)".[4] Some of the C&N risk management capabilities further articulated in these Guidelines already featured in the ECB's 2022 thematic review and the subsequent monitoring of follow-up deadlines.

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1 "ECB Guide on climate-related and environmental risks – supervisory expectations relating to risk management and disclosure", ECB, November 2020.

2 Past publications referred to climate-related and environmental risks, or C&E risks. Going forward, the ECB will use the term "climate and nature-related risks" or more simply "climate and nature risks". The terms "environmental risks" and "nature-related risks" (or "nature risks") should be considered as interchangeable for the purpose of this publication.

3 "ECB sets deadlines for banks to deal with climate risks", *press release*, ECB, 2 November 2022.

4 See "The EBA publishes its final Guidelines on the management of ESG risks", *press release*, EBA, 9 January 2025.

Chart 1

Banks' alignment with ECB supervisory expectations on climate- and nature-related risks

Source: ECB.
Notes: Chart shows the level of maturity of individual institutions' practices aligned with the 2022 C&N risks thematic review assessment grid. For consistency purposes, progress is measured against what constituted basic, emerging and leading practices in 2022. Outcomes focus on the soundness of institutions' practices and do not represent the overall comprehensiveness of practices across all exposures. This means, for example, that an institution is ranked dark green if it has a leading practice in place, even if that leading practice relates only to a subset of its exposures. The same holds true for light green: this classification indicates that an institution has emerging practices in place, even if those emerging practices relate only to a subset of its exposures. In other words, the chart does not say anything about the percentage of assets covered by leading or emerging practices.
In 2022, 25% of institutions had no practices in place, 54% had basic practices in place for at least some exposures, 18% had emerging practices in place for at least some exposures, and 3% had leading practices in place for at least some exposures.
By the end of 2024, 5% of institutions had no practices in place, 17% had basic practices in place for at least some exposures, 22% had emerging practices in place for at least some exposures, and 56% had leading practices in place for at least some exposures.

1.2 Objective

This report is a key supervisory publication that shares observations and good practices illustrating different ways in which significant institutions could strengthen their management of C&N risks, particularly in light of the ECB Guide and the EBA

Guidelines on the management of ESG risks. It originally served as a compendium to the ECB report on the results of the 2022 thematic review on C&N risks.[5] The ECB has decided to update this good practices report to reflect the progress that significant institutions have made since 2022, considering also that the EBA Guidelines on the management of ESG risks are now applicable.

With this compendium, the ECB aims to respond to the wish expressed by institutions for detailed insights into how others have designed specific risk management processes and procedures for C&N risks and how they have addressed some of the challenges relating to C&N risks.[6]

The ECB conducted a broad update of the good practices based on the progress made by institutions in meeting the interim and final deadlines set by the ECB following its thematic review. For the first interim deadline in March 2023, institutions were asked to have a sound materiality assessment in place. The second interim deadline, set for the end of 2023, concerned the integration of C&N risks into institutions' governance, strategy and risk management. For the final deadline at the end of 2024, institutions were asked to include C&N risks in their stress testing and internal capital adequacy assessment processes (ICAAPs).

Most of the newly added good practices concern nature risks. This publication strives to make a significant contribution in this area, given that methodologies and approaches are still in their infancy. Other significant additions relate to prudential transition planning, physical risks and managing reputational and litigation risks.

With the updated good practices, the ECB also provides more concrete examples that might support smaller institutions. These include ICAAP approaches (Section 4.6), nature risk tools and information (Chapter 5), and physical risk quantification approaches, information and tools (Sections 4.6.7 and 3.5.1). A broad range of different approaches with varying degrees of sophistication are described throughout this report. While some of these might not be sufficiently sophisticated for larger institutions and/or institutions with more material exposures to C&N risks, they have the potential to improve the risk management capabilities of smaller and/or less exposed institutions in a proportionate manner.

Institutions may also wish to consult the ECB's report on good practices for climate and nature-related risk stress testing, which was originally published in 2022 and has been updated alongside this compendium. The report on climate and nature-related stress testing focuses primarily on stress testing and risk modelling, whereas this report covers observed practices related to strategy-setting, governance and risk appetite, and risk management.[7]

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5 "Banks gearing up to manage risks from climate change – results of the 2022 thematic review on climate-related and environmental risks", ECB, November 2022.

6 To provide context for the good practices described in the next chapters, pull quotes on the left-hand side recount existing general guidance. The pull quotes also highlight more detailed existing guidance where this helps users of the report understand the good practices.

7 See "ECB report on good practices for climate and nature-related risk stress testing", ECB, May 2026. Good practices also feature in other ECB publications, such as the 2023 report entitled "The importance of being transparent – a review of climate-related and environmental risks disclosures practices and trends".

The examples of measures and practices described in this report are illustrative only, and are not intended to be exhaustive. They have no legally binding effect and do not describe or establish new legal or regulatory requirements. An institution may be fully compliant with the applicable regulatory framework without implementing any of the specific examples set out in this report, provided that it has implemented other measures and practices that are more appropriate to its particular risk profile, business model and circumstances.

The good practices outlined in this compendium do not set supervisory expectations or standards. They serve merely as illustrations that could help institutions make progress in managing C&N risks taking into account proportionality, materiality and institution-specific circumstances. The practices are not necessarily replicable, and they may have been amended and/or augmented with comparable practices from other institutions for illustrative purposes. The numbers shown in the figures of this report are for illustrative purposes only. The methodologies, scenarios and reference frameworks mentioned in this report may no longer be relevant or may cease to be relevant in the future. The ECB also emphasises the evolving nature of good practices and expects these to mature over time. The current update is based on information observed by the ECB up to the end of 2024 and reviewed in 2025 as part of the monitoring of the thematic review follow-up deadlines.

1.3 Overview of good practices

The 2022 thematic review showed that a group of institutions were deploying advanced practices in one or more areas. This report describes in detail a selection of observed good practices at significant institutions within the Single Supervisory Mechanism. The original report comprised a total of 26 good practices, drawn from over 25 different institutions.

Some 18 of the original good practices have been updated with information that complements the original practices (marked as having “New information” in Table 1). Dedicated good practices have been added for ICAAP and nature risk management, thus expanding the respective original practices from 2022. In addition, five new good practices have been added (marked as “New” in Table 1). Targeted information on nature risks has also been added to several original good practices that in 2022 were limited to climate risks (see, for instance, Chapter 3 on governance and risk appetite).

The newly added good practices – whether complementing existing ones or newly added – are drawn from more than 60 different institutions, representing more than half of the institutions directly supervised by the ECB. Many of the newly added good practices have been drawn from smaller institutions. The fact that the newly added good practices have been observed in so many more institutions than in 2022 shows that the sector has become more innovative in addressing the prevailing challenges related to climate change and environmental degradation.

Table 1

Observed good practices described in this report

Section	Subsection	Number	Topic	Expectation
Business strategy	Strategic approaches	2.1.1	Prudential transition planning [**New information**]	2
		2.1.2	Target-setting [**New information**]	2
		2.1.3	Transition products [**New information**]	2
	Strategic steering tools	2.2.1	Client engagement	2, 7.4
		2.2.2	Client transition plans [**New information**]	2, 7.4
Governance and risk appetite	Management body	3.1.1	Governance framework [**New information**]	3, 3.2, 5.2
	Remuneration	3.2.1	Remuneration policies [**New information**]	4.3
	Organisational structure	3.3.1	Second line of defence [**New information**]	5.4, 5.5
		3.3.2	Third line of defence [**New information**]	5.6
	Risk appetite	3.4.1	Key risk indicators [**New information**]	4, 4.2
		3.4.2	Risk appetite in transition planning [**New**]	4
		3.4.3	Physical risks in the risk appetite framework [**New**]	4
	Reporting	3.5.1	Data governance, processes and collection [**New information**]	6.1, 6.2, 6.4
		3.5.2	Internal risk reporting	6.3
Risk management	Materiality	4.1.1	Transmission channels	1, 7.1
		4.1.2	Materiality assessments	7.2, 7.3
		4.1.3.1	Materiality thresholds [**New information**]	1, 7, 7.2, 7.7, 8.4, Principle 4(ii) (ECB ICAAP Guide)
		4.1.3.2	Material risk concentrations [**New**]	7, 8.4
	Due diligence	4.2.1	Data collection [**New information**]	7.5, 8.1
		4.2.2	Controversies [**New information**]	7.5, 9.2
		4.2.3	Insurance data collection and monitoring [**New**]	7.5, 8.1
	Risk classification	4.3.1	Credit risk [**New information**]	8.2, 8.4
		4.3.2	Market risk	10
		4.3.3	Operational risk	9
		4.3.4	Reputational and litigation risk [**New**]	9
	Collateral valuations and pricing	4.4.1	Loan pricing [**New information**]	8.5, 8.6
		4.4.2	Collateral valuations [**New information**]	8.3
	Expected credit losses and impairments	4.5.1	Loss-tagging for physical risks [**New**]	7.3
		4.5.2	Expected credit loss calculations and impairments [**New**]	Article 74 CRD
	Capital adequacy	4.6.1	Capital adequacy and portfolio analysis [**New**]	7.6
		4.6.2	Capital adequacy statement [**New**]	Principle 2 (ECB ICAAP Guide)
		4.6.3	Normative perspective and mutual information [**New**]	Principle 3 (ECB ICAAP

Section	Subsection	Number	Topic	Expectation
				Guide), para. 43 (ECB ICAAP Guide)
		4.6.4	Economic perspective [**New information**]	Principle 3 (ECB ICAAP Guide)
		4.6.5	Considering longer time horizons [**New**]	Paras. 44/50 (ECB ICAAP Guide)
		4.6.6	Additional capital costs in product pricing [**New**]	8.5, 8.6
		4.6.7	Physical risk quantification [**New**]	7.3
Nature-related risks	Materiality assessment	5.1.1	Identifying exposures [**New**]	1, 7.1
		5.1.2	Risk-driver deep dives [**New**]	1, 7.1
		5.1.3	Scenario analysis [**New**]	1, 7.1
	Governance and risk appetite	5.2.1	Risk appetite [**New**]	4
		5.2.2	Sectoral policies [**New**]	4
	Due diligence and risk classification	5.3.1	Client assessment [**New**]	7.2, 7.5, 8.2
		5.3.2	Internal scoring [**New**]	7.2, 7.5, 8.2
		5.3.3	Project funding [**New**]	7.2, 7.5, 8.2
	Risk mitigation	5.4.1	Client and debtor engagement [**New**]	7.4, 7.6, 8.3, 8.5
		5.4.2	Credit and investment decisions [**New**]	7.4, 7.6, 8.3, 8.5
	Capital adequacy	5.5.1	Capital adequacy [**New**]	

Notes: Good practices flagged to have “New information” have been updated since 2022 to include information that complements the original practices. Good practices flagged as “New” are new compared with the original publication of this report in 2022.

2 Business strategy

This section describes good practices for integrating C&N risks into institutions' business strategy.

Building on Section 4.1, which describes how institutions identify material C&N risks, this section illustrates how institutions have translated awareness of their exposure to transition risks and physical risks into a strategic approach to managing them (Section 2.1), and identifies which strategic steering tools are used in this regard (Section 2.2).

Table 2
Good practices for business strategy

Section	Topic	Description	Expectation
Strategic approaches	Prudential transition planning [**New information**]	Managing risk via prudential transition planning	2
	Target-setting [**New information**]	Scenario choices for target-setting	2
	Transition products [**New information**]	Transition finance products and services	2
Strategic steering tools	Client engagement	Maintaining and exiting client relationships	2, 7.4
	Client transition plans [**New information**]	Assessing the maturity of client transition plans	2, 7.4

2.1 Strategic approaches

Institutions have been refining their approaches since 2022, relying on prudential transition planning to build longer-term resilience via business growth and focused risk management efforts.[8]

The updated good practices show that institutions use their risk appetite and strategy to steer their portfolio through forward-looking and client-specific capabilities.

Institutions have developed a deeper understanding of the technologies they finance. These capabilities allow them to better understand their own risk profiles and those of their clients. They then differentiate their risk appetite depending on the technologies financed, with a view to ensuring consistency with their transition plans and targets.

Beyond climate transition risks, institutions also reflect physical risks in their transition planning efforts. In addition, it is understood that practices for managing nature-related transition risks are typically connected to institutions' commitments to

[8] The expressions "prudential transition planning" and "transition planning" are used interchangeably in this report and refer to transition planning as set out in the EBA Guidelines on the management of ESG risks.

achieving a net positive impact on nature, and to a lesser degree related to actively managing the risks stemming from institutions' financed activities.

2.1.1 Good practice for prudential transition planning
Thinking ahead – managing risk via transition planning

Expectation 2
When determining and implementing their business strategy, institutions are expected to integrate climate-related and environmental risks that impact their business environment in the short, medium or long term.

Institutions draw a link between their assessment of material transition risk drivers, strategic targets, risk appetite framework and risk management tools. They use this integrated framework as an input when rolling out their range of transition finance products.

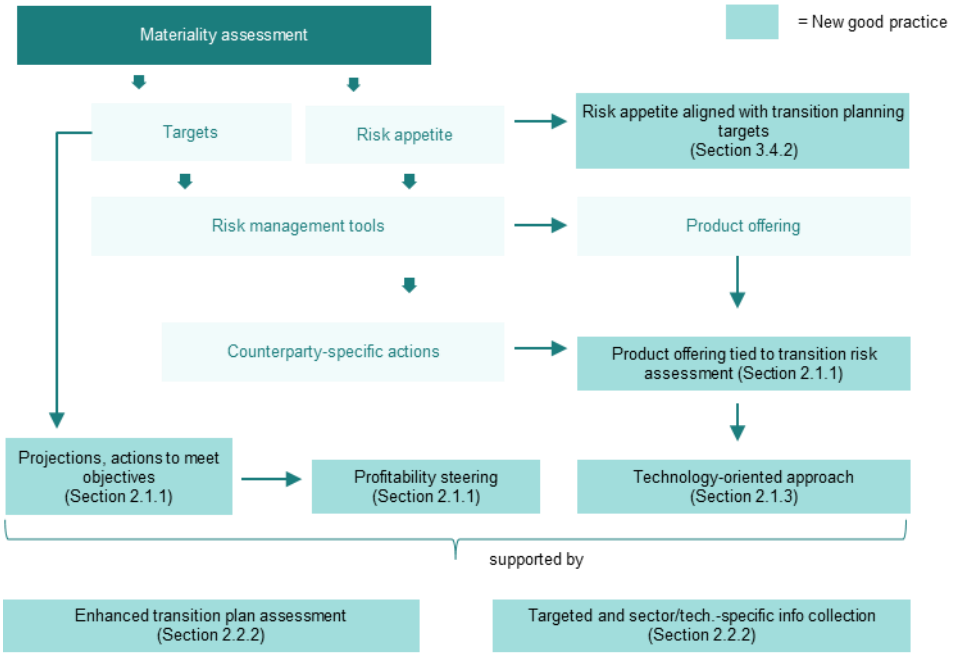
The updated good practices show that institutions have developed more advanced strategies to steer their portfolios towards strategic targets across different levels, for instance at portfolio, sectoral or client level. Institutions rely on client-specific data and simulation tools to project their progress towards strategic targets. When these projections reveal misalignment, they take, among other steps, counterparty-specific actions or use their transition planning-related key risk indicators and limits (see point 4 of this section).

In addition, institutions adopt differentiated profitability targets to support growth strategies in transition technologies or sectors and to strengthen their competitive positioning in markets where they expect growth. They also refine their product range by linking it to both transition risk and physical risk assessment outcomes.

These practices are underpinned by client transition plan assessments using sector- and technology-specific information. On the basis of these assessments, institutions evaluate the risks to which they might be exposed due to the technologies their clients employ. For instance, these risks might stem from the transition risks of conventional technologies or from novel features of transition technologies (see Sections 2.1.3 and 2.2.2).

Figure 1

Stylised and non-exhaustive example of the transition planning risk management cycle



1. Materiality assessment

Before setting targets, institutions assess the materiality of their exposure to transition risks (see Section 4.1). They set targets for areas of material risk exposure and/or for segments of the supply chain that play a key role in the energy transition more broadly.

For instance, an institution might classify sectors according to the materiality of its exposure at default to them. The institution then sets targets for the sectors that it identifies as being most subject to transition risks and that are most relevant for its portfolio exposure and/or for the transition more broadly. It might then go on to set targets for the reduction of financed emissions or the emissions intensity of its physical production in these sectors for the near and medium term, such as 2025 and 2030. These targets are set with the aim of achieving the institution's long-term objectives. Such objectives might be to respond to transition risks arising from the transformation expected under the European Climate Law, from technological developments, from stakeholder preferences, and, where relevant, from commitments entered into by the institution.

2. Strategic targets and risk appetite

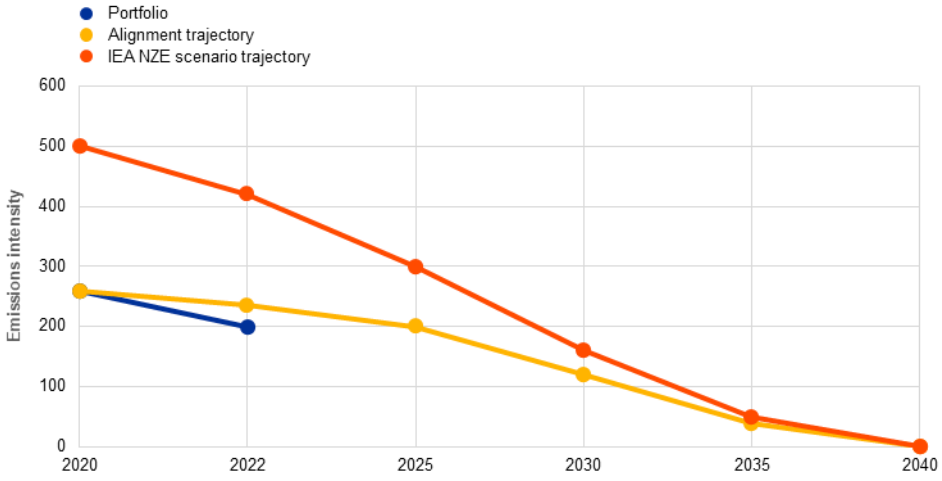
In a next step, institutions bolster their targets via monitoring mechanisms and taking action that has portfolio allocation implications. For instance, one institution has established key performance indicators (KPIs) reflecting its short, medium and long-

term targets and cascaded them down to individual business lines. In addition, institutions define key risk indicators (KRIs) that are coherent and consistent with their medium-term and long-term objectives.

One institution has translated its portfolio alignment metrics and targets into KRIs. Some of these KRIs measure the emissions intensity of the institution's exposures to certain sectors. The KRIs track the alignment of the emissions intensity in the institution's portfolios with the transition trajectory the institution intends to follow. A KRI breach is triggered each time the emissions intensity exceeds the alignment trajectory.

Chart 2

Stylised example of a KRI tracking the alignment of the emissions intensity of exposures with the institution's transition trajectory



Notes: IEA NZE refers to the Net Zero Emissions (NZE) by 2050 scenario of the International Energy Agency (IEA), which describes a narrow but achievable pathway for the global energy sector to achieve net-zero CO_2 emissions by 2050, using technology roadmaps.

Newly added good practice

Para. 112 of the EBA Guidelines on the management of ESG risks

Institutions should monitor the implementation of their plans using monitoring processes and metrics in line with Section 5.7 and Section 6.3.4. Institutions should perform regular projections to assess their ability to achieve their targets.

3. Projections to monitor and steer progress against targets

Institutions have developed approaches to project progress towards their strategic targets using forward-looking, client-specific data, such as production plans. When such data are not available, proxies or vendor data are used as an intermediate step. The projection outcomes are, among other uses, reported to the management body and integrated into the business environment scan.

For example, one institution creates five-year projections of its metric measuring aggregated client misalignment levels based on client production plans against its misalignment policy (see Figure 2). The policy addresses the most misaligned clients by tracking them against a predefined threshold (e.g. a percentage deviation from the chosen pathway). As such, the threshold functions as a mechanism to monitor client convergence towards the institution's strategic targets. The institution applies the same methodology used to provide input for its other alignment-related risk management practices, such as PACTA. Assuming a static balance sheet with the start-year portfolio composition as the cut-off, these projections inform the institution's appetite for transition risk.

Another institution has set intermediate portfolio alignment targets to achieve its longer-term objective of aligning its portfolio with the Paris Agreement and has reflected them in its risk appetite framework. For instance, to achieve one of these intermediate targets, the institution's risk appetite framework contains quantitative exposure limits that chart an exposure reduction path to the target date. The limits are complemented by attention thresholds. The limits and attention thresholds apply to the institution's exposure to clients in its thermal coal power generation portfolio that are not able to transition within the relevant timeframe. For all other portfolios, the institution maintains its approach of supporting clients in their transition.

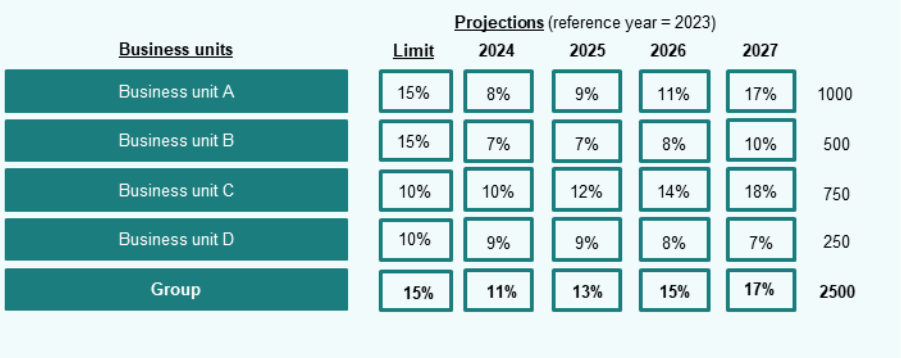
Institutions also rely on simulation-based tools to approximate the impact of proposed transactions on both the client's decarbonisation pathway and, as a consequence, the institution's envisaged portfolio pathways. One institution analyses all transactions exceeding a specified absolute limit with corporate clients operating in high transition risk sectors. By employing variables such as credit exposure, client emissions and the impact of the client on the institution's financed emissions, the institution estimates the impact of these transactions on its GHG metrics. If the impact is above certain predefined thresholds, a dedicated escalation procedure is initiated. More precisely, a specialised workstream analyses how the transaction fits into the client's transition strategy and the regulatory environment in which the client operates, and triggers a discussion with the relevant business functions of the institution. For instance, a transaction triggering a temporary exceedance of the institution's overall sectoral decarbonisation target might still move ahead if it enables the client to align with the relevant jurisdiction's pathway and, as a result, mitigates policy-driven transition risks for the institution.

Other institutions work with dedicated carbon budgets per business line that they have to manage alongside other business KPIs. This gives institutions a degree of flexibility to accommodate transactions associated with high financed emissions, as long as the overall budget is managed.

Figure 2

Stylised and simplified example of a KRI tracking material client misalignment in a forward-looking manner, taking into account clients' production plans

Misalignment metric measuring aggregated client misalignment levels against the bank's misalignment limit policy



Notes: The figure shows the projected percentages of clients above the misalignment threshold for individual business units and the group as a whole over a five-year horizon (reference year: 2023). The "Limit" column indicates the maximum percentage tolerated by the institution. The "Projection" columns (2024–2027) show forecasts for each business unit and for the overall group. The "Portfolio" column provides the start year portfolio exposure size for context.

Newly added good practice

4. Actions to meet transition planning targets and limits

Institutions take action when their projections show that they are unable to meet their transition planning objectives with the targets and limits currently set. For instance, several institutions review and recalibrate their transition planning-related KRIs and limits to take into account sector and jurisdiction-specific developments (see Sections 2.2.2 and 4.3.1). They then adjust their strategy accordingly.

Specifically, one institution observed that its current exposure to coal in the secondary energy (i.e. electricity production) mix is too high when compared with the intermediate targets it has set for its coal phase-out target. To adjust the trajectory, the institution decided to tighten the limit and the early warning indicator for its associated KRI. Another institution also links sector-specific policy actions to the coal sector thresholds that it has tightened as part of its risk appetite framework. Examples of these actions include the non-renewal of contracts with clients that do not have a reliable transition plan in place after a certain period of client engagement.

Moreover, institutions have introduced new KRIs for additional, hard-to-abate sectors, such as steel and aviation. These KRIs steer their portfolio by limiting exposure to clients with underdeveloped transition plans, whilst acknowledging that sectoral decarbonisation technologies encompass those that are challenging to decarbonise (see the updated good practices in Section 2.1.3 on transition products). Other institutions have replaced existing metrics to enhance monitoring, such as by focusing on absolute instead of relative coal exposure values.

Newly added good practice

Para 101 of the EBA Guidelines on the management of ESG risks

Institutions should ensure that short-, medium- and long-term objectives and targets interact and are well-articulated. This includes ensuring that long-term objectives, such as commitments to achieve net-zero GHG emissions, translate into medium-term strategies (e.g. medium-term sectoral policies or growth targets for business lines) and that short-term financial metrics or targets (e.g. profitability indicators, cost of risk, KPIs, KRIs, risk limits, pricing frameworks) are coherent and consistent with the medium-term and long-term objectives.

5. Profitability steering

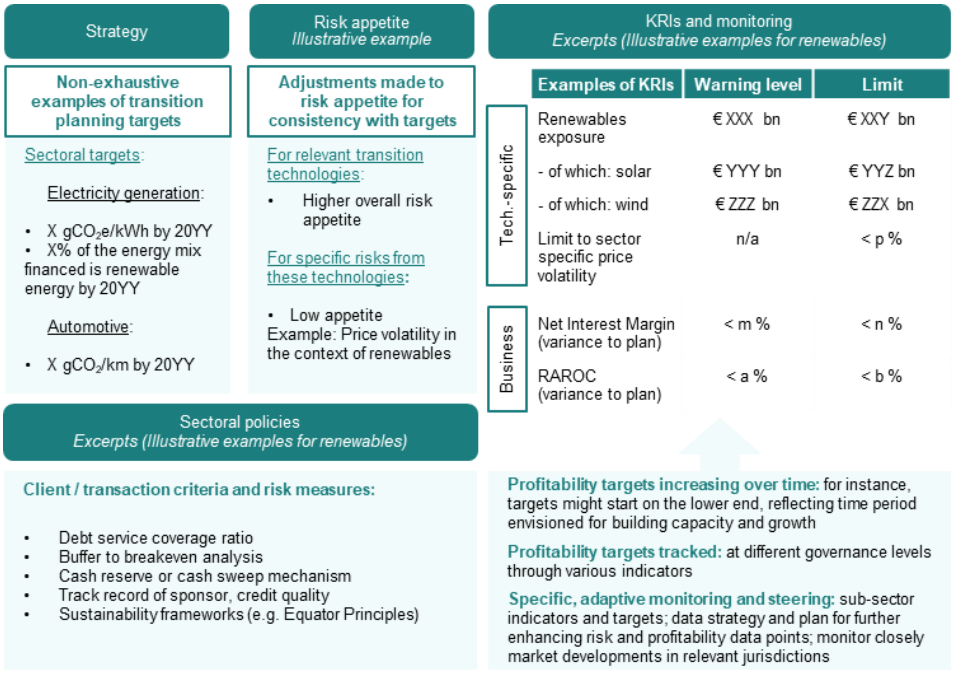
Institutions have made progress in further embedding their transition planning approaches into wider organisational frameworks and processes. For example, to align with their overall transition planning objectives, institutions have adopted differentiated profitability targets that increase over time to support growth strategies in specific transition technologies or sectors. In some cases, institutions might forgo immediate profitability to build capacity and growth over the medium term in financing these transition technologies. As these practices are still in their infancy, they might not yet cover an institution's full exposure to material transition risks or the full range of transition technologies they wish to finance. To expand coverage, institutions following these practices are now preparing to use similar approaches to those described here to broaden their financing of additional transition technologies.

For instance, as shown in Figure 3 below, one institution has detailed its actions to implement sectoral targets. For the power generation sector, it intends to increase the financing of renewable technologies. Rather than seeking immediate profitability, it forecasts profitability metrics, such as return on tangible equity (RoTE) and risk-adjusted return on capital (RAROC) over different time horizons encompassing a forward-looking view of more than five years. The institution expects low initial profitability and high scale-up costs to support higher returns as financing volumes increase.

As also shown in Figure 3, these approaches are supported by a dedicated data strategy and risk appetite framework aligned with the specific risks of the sector and the technology. As further described in Section 3.4.2, this adjusted risk appetite is aimed at enabling institutions to meet their transition planning targets, by allowing them to seize business opportunities while staying within their overall risk appetite.

Figure 3

Stylised and simplified example of adjusting risk appetite to leverage business opportunities and steer profitability accordingly



These visuals show how institutions' targets are reflected in their risk appetite and profitability objectives. By leveraging transition planning targets defined in their strategy, institutions adjust their risk appetite, such as by adopting a higher risk tolerance for specific technologies aligned with their goals. Moreover, they develop detailed sectoral policies to outline their risk appetite and establish clear criteria for assessing financed activities or counterparties. To ensure alignment with their objectives, institutions monitor progress against predefined KRIs, including profitability metrics. They also continuously evaluate progress towards their targets.

6. Risk management tools

Targets and attention thresholds are integrated into institutions' monitoring and escalation arrangements that require remedial action in the event of breaches. One institution specifically takes counterparty-specific actions for clients that are not aligned with the institution's portfolio trajectory. The institution takes into account the level of advancement of clients' transition plans when determining whether a client is misaligned with its portfolio trajectory.

If a client is misaligned, the institution enters into a dialogue with the relevant client in order to steer it onto a transition path that is in line with its trajectory. If this dialogue is not successful, the institution has procedures in place to outright reduce the exposure to the client or terminate renewable contracts.

Newly added good practice

Updates since 2022

More recently, institutions have expanded their capabilities so as to reduce the need to terminate the relationship in the case of corporate clients. They do this by:

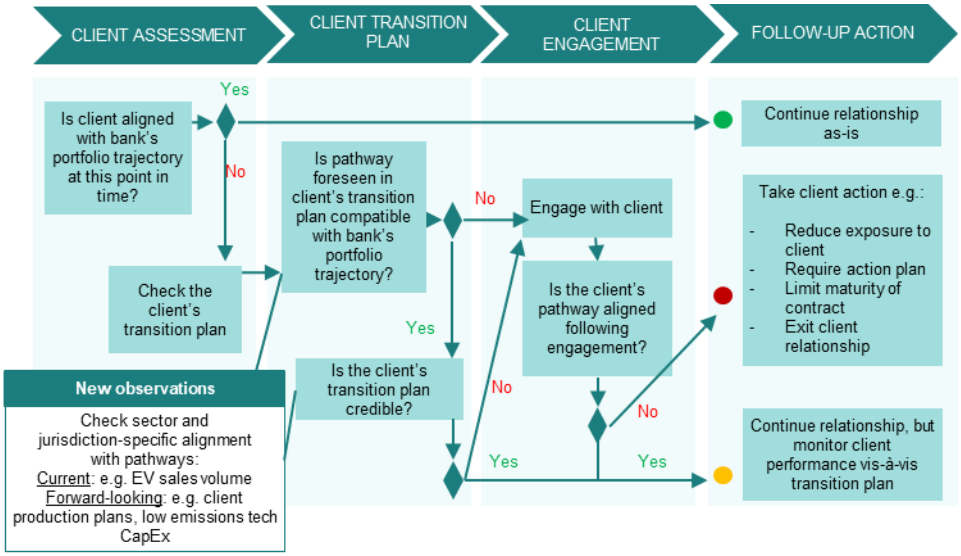
- obtaining a more thorough understanding of the client's risk profile in terms of the technologies it invests in (good practice 2.2.2 on client transition plans);

- increasing their ability to finance clients' transition activities and technologies in order to improve their risk profile (next subsection on product offering and good practice 2.1.3 on transition products).

Moreover, institutions' assessment of client transition plans is embedded in their risk classification frameworks (good practice 4.3.1).

Figure 4

Stylised example showing how clients' transition plans are taken into account when assessing their alignment with the institution's portfolio trajectory



7. Product offering

Institutions also adjust the product offering for clients subject to elevated transition risks. For instance, an institution might offer transition finance products to clients in the context of its client engagement discussions. Another institution uses a transition risk scorecard methodology in the due diligence carried out during credit origination for clients active in sectors with elevated transition risks. The result of the assessment is used to offer specific products to clients to support them in the transition.

Newly added good practice

Updates since 2022

Institutions have refined their client engagement practices by tying the types of products offered to corporate clients to the transition risk assessment outcome (see also good practice 4.3.1). One institution uses this product offering within its broader strategy to meet its targets for reducing the emissions intensity of its exposures to sectors subject to elevated transition risk (see also good practice 3.4.2). This approach works as follows:

- The institution conducts a transition risk assessment that leads to a client score as part of its risk classification methodology. In this assessment, the institution

considers, among other factors, the client's transition plan, particularly its production plans (see good practice 4.3.1).

- For clients in the highest transition risk score bucket, only products aimed at reducing their transition risk profile can be offered. More precisely, these are products used to finance activities classified in the institution's product catalogue as "sustainable" or "transitional" (see good practice 2.1.3 on transition products).
- For clients placed in a high (but not the highest) transition risk bucket, a predefined elevated share of new financing is allocated to products aimed at reducing their transition risk profile.

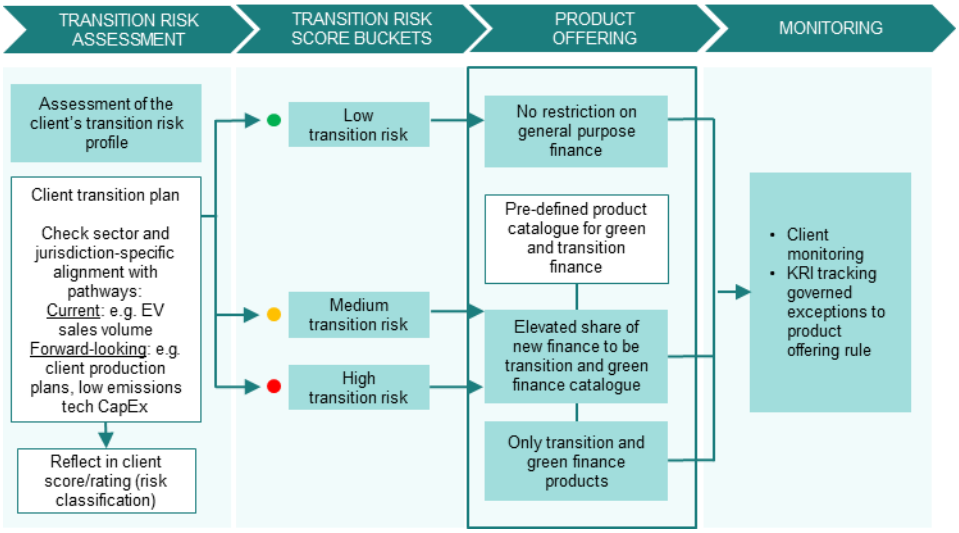
The institution limits the automatic exclusion of clients on the margins of scores who are capable of transitioning, and considers other factors influencing credit decisions, such as strategic client relationships. At the same time, the institution has a dedicated process in place to manage, limit and monitor exceptions to the outcome of the score-tied product offering strategy. Predefined rules and procedures underpin this process, namely:

- *In-depth ex ante review* to ensure that the exception is appropriate. This includes, among other elements, a review of the client's progress towards its transition targets and of its policies and procedures related to these targets.
- *Ex post controls* by the second line of defence to verify the accuracy of the in-depth review and the consistency between this review and the product offering. The corresponding KRI tracks and limits decisions that are inconsistent in this regard.

Another institution's credit strategy requires advisory support for clients placed in high transition risk score buckets through the development of tailored client transition plans prepared by the institution and then implemented by the client in order to receive financing. The mitigating measures outlined by the institution in this plan are reflected in a set of KPIs for the sustainability-linked loans provided by the institution. This could, for instance, relate to investments in renewable energy or CapEx associated with transition risk mitigation.

Figure 5

Stylised and simplified example of tying the product offering to the outcomes of client transition risk assessments to improve the risk profile of higher-risk clients



Notes: The figure shows a simplified example where the client's transition risk profile is assessed through an evaluation of the client's transition plan (see good practice 2.2.2), which is reflected in the client's risk classification (see good practice 4.3.1) and then used to inform differentiated product offerings (see good practice 2.1.3), including related monitoring arrangements.

Newly added good practice

Para. 102 of the EBA Guidelines on the management of ESG risks.

The transition planning process of institutions should aim at managing material ESG risks, in particular environmental transition and physical risks identified on the basis of a robust, regularly updated materiality assessment of ESG risks.

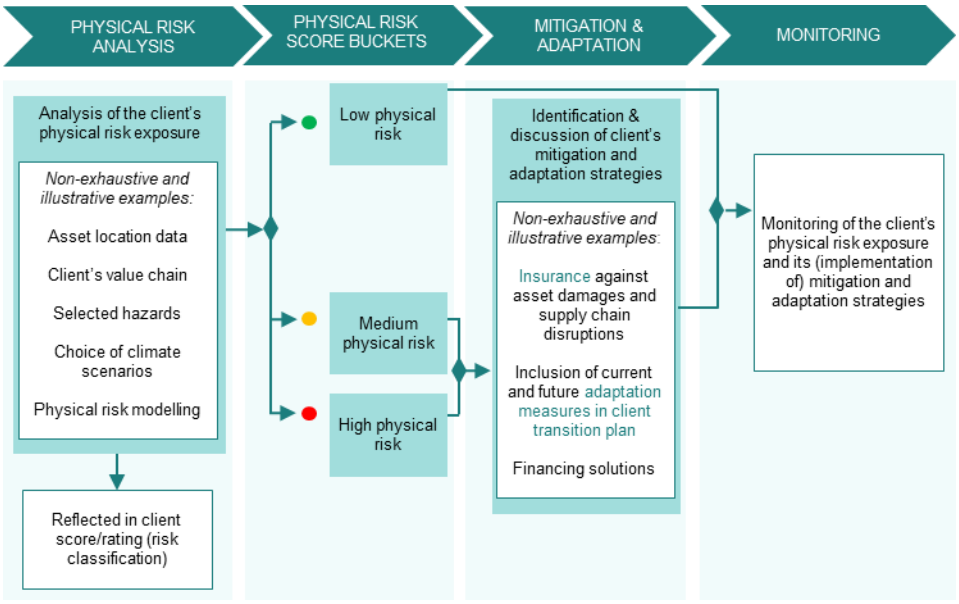
8. Client engagement on physical risks

Since the publication of this compendium in 2022, the ECB has observed that transition planning is also beginning to be used as a means of managing institutions' exposure to physical risks. Institutions are now beginning to engage in a structured dialogue with corporate and SME clients in sectors with elevated physical risks. These initial practices typically focus on physical risk impacts on collateral. The dialogue draws on the institution's internal analysis of the client's physical risk exposure, such as by using asset location data and value chain considerations. Institutions use physical risk questionnaires as one of several inputs to measure the client's physical risk exposure and its mitigation and adaptation capacity (see Section 4.2.1).

Institutions use the outcomes of this analysis to assign the client to a corresponding physical risk score bucket. Based on the physical risk score bucket assigned, institutions inform clients about resilience and adaptation measures they might implement, such as insurance coverage and the inclusion of adaptation measures in the client's transition plan (see Section 2.2.2). Institutions have established monitoring processes to track the client's physical risk exposure and the implementation of the mitigation and adaptation measures. This includes the introduction of relevant KRIs, for instance on physical risk mitigation (see also Section 4.2.3).

Figure 6

Non-exhaustive and illustrative example of physical risk client engagement



Note: The Figure shows a simplified example of an institution's assessment of its client's physical risk exposure (see good practice 4.2.1), how this is reflected in client physical risk score buckets, the identification of mitigation and adaptation measures (see good practice 2.2.2), and the related monitoring (see the good practice in Section 4.2.3).

2.1.2 Good practice for target-setting

Making a difference – scenario choice for target-setting

2.1.2.1 Target-setting for climate-related risks

Expectation 2
When determining and implementing their business strategy, institutions are expected to integrate climate-related and environmental risks that impact their business environment in the short, medium or long term.

Institutions are integrating C&N risks in their strategic target-setting process. Considering their transition planning and transition finance frameworks and taking into account the ability of specific counterparties to transition, they frequently exclude new financing of particularly harmful and therefore potentially risky exposures such as coal mining, thermal coal power generation and companies operating in the oil and gas sector, typically prioritising coal-related activities. Existing exposures in these areas are phased out. The table below illustrates observed practices in this regard (see also Section 4.2).

Table 3

Non-exhaustive examples of observed practices related to exclusions

Sector	Scenario	Exclusion	Year
Coal	n/a	Full phase-out.	2030
Coal	n/a	Full phase-out. Intermediate milestone: Exclusion of companies with > 5 GW installed capacity (power generation) or > 10% revenue or power generation from coal. Exclusion of companies with new coal projects (exception: credible exit strategy by 2030 and no new coal projects or assets beyond 2030).	2030
Coal	IEA SDS	Full phase-out of coal mining.	2040
Oil and gas	n/a	No more direct financing, insurance or advisory services for exploration and extraction of new oil and gas fields.	n/a
Oil and gas	n/a	Complete phase-out (exception: companies with credible exit strategy by 2040 and no new oil or gas exploration projects or assets beyond 2030).	2030
Power generation	IEA NZE 2050	Phase-out of financial services to power generation clients with > 10% revenues from thermal coal.	2030
Power generation	IEA SDS	Phase-out of thermal coal power generation.	2040
Power generation	n/a	No new energy companies with thermal coal capacity and run-down of all legacy loans when coal-based capacity of mixed energy companies > 25%.	n/a

Disclaimer: Inclusion of an observed practice in this table does not mean that the ECB has assessed whether the mentioned metrics and targets are sound or not.

Institutions that are more advanced in integrating transition risks into their business strategy typically also set short, medium and long-term targets. These targets show how the institution's portfolios have to evolve over time in order to meet the longer-term objectives and ensure long-term resilience. Frequently, institutions use targets with the aim of gradually reducing their financed emissions or intensity of physical production along a chosen scenario pathway.

Targets are usually set based on forward-looking and science-based decarbonisation pathways, at times coupled with third-party validation mechanisms, such as the Science Based Targets initiative (SBTi). Generally, the sectors assessed by institutions as particularly sensitive to transition risk also tend to offer institutions the biggest opportunities in terms of providing transition finance and advisory services.

Institutions frequently apply the methodology developed by the Partnership for Carbon Accounting Financials (PCAF) for measuring financed emissions and the Paris Agreement Capital Transition Assessment (PACTA) methodology for forward-looking measurement of the alignment of portfolios along scenario-based transition pathways. Institutions couple these tools with (stress) scenario analyses to understand whether their envisaged strategic response is sufficiently resilient over longer time horizons in the face of the uncertainty surrounding climate-related risks.

The importance of scenario choice for target-setting

When institutions set alignment targets, they rely on transition scenarios that describe the decarbonisation trajectory of economic sectors over a certain period of time, mostly up to 2050 or beyond. Scenario choice has important consequences as transition scenarios differ significantly from one another. One of the key determinants is the level of ambition of emissions reductions required by the scenario for each sector.

The Paris Agreement provides that global warming is halted at well below 2°C above pre-industrial levels, and that efforts are made to limit global warming at 1.5°C. Accordingly, scenarios that describe the "well below 2°C" commitment, such as the International Energy Agency's (IEA) Sustainable Development Scenario (SDS), assume a greater remaining carbon budget and conversely require less severe emission reduction efforts than 1.5°C scenarios, such as the IEA's Net Zero Emissions (NZE) by 2050 scenario.

The ECB observes a considerable degree of variation among intermediate targets set for different sectors by institutions thus far. For instance, in the automotive sector, one institution's target for 2030 calls for an emissions intensity level of 58 g CO_2/km, whereas another institution's target calls for a level of 118 g CO_2/km (see the table below).

Table 4

Non-exhaustive list of observed metrics and targets

Sector	Metric	Metric type	Reference scenario	Targets	Target year (intermediate)	Target year (long-term)
Automotive	g CO2/km	Physical intensity	n/a	81 g CO2/km	2025	
				58 g CO2/km	2030	
	g CO2/km	Physical intensity	IEA NZE 2050	118 g CO2/km	2030	
	g CO2/vkm	Physical intensity	EU Regulation	70 g CO2/vkm by 2025	2025	
	kg CO2/km	Physical intensity	IEA NZE 2050	~0.1 kg CO2/km	2030	
				~0 kg CO2/km		2050
Aviation	g C02/passenger km	Physical intensity	IEA NZE 2050	~60 g CO2/passenger km	2030	
				~12 g CO2/passenger km		2050
Cement	kg CO2/t cement	Physical intensity	IEA NZE 2050	575 kg CO2/t cement	2030	
	t C02/t cement	Physical intensity	ISF-NZ	~0.5 t CO2/t cement	2030	
				~0.25 tCO2/t cement		2050
Commercial real estate	GHG emissions/m²	Volume trajectory	n/a	Reduce CRE portfolio GHG emissions by 36% per m² (2020 baseline)	2030	
	kg CO2/m2	Physical intensity	B2DS Global	Weighted average energy label "C"	2025	
				Weighted average energy label "A"	2030	
	kg CO2/m2	Physical intensity	Deltaplan DGBC	~0.35 kg CO2/m2	2030	
				0 kg CO2/m2		2050
Oil and gas	USD billions financed	Outstanding amount	IEA SDS	Reduction from USD 9.2 billion to USD 8.2 billion (2020 base year)	2025	

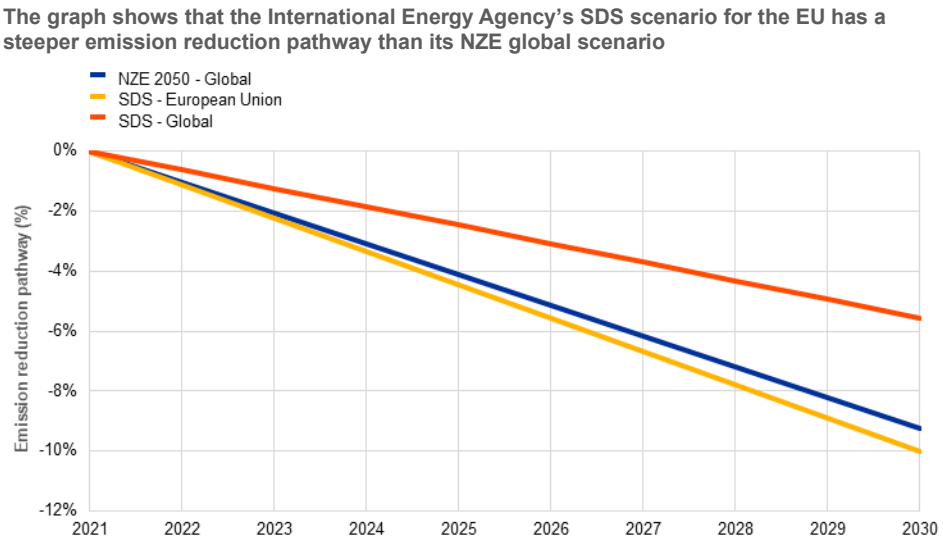
Sector	Metric	Metric type	Reference scenario	Targets	Target year (intermediate)	Target year (long-term)
	EUR millions financed	Outstanding amount	IEA NZE 2050	-12% outstanding amount (2019 base year)	2025	
				-19% outstanding amount	2030	
				-69% outstanding amount		2050
Power generation	Percentage of renewable energy generation	Volume trajectory	n/a	65% share of renewable energy generation in the portfolio	2030	
	kg CO2e/MWh	Physical intensity	IEA NZE 2050	120 kg CO2e/MWh	2030	
	t CO2e/MWh	Physical intensity	IEA NZE 2050	0.18 t CO2e/MWh	2025	
				0.11 t CO2e/MWh	2030	
	g CO2e/kWh	Physical intensity	IEA SDS	212 g CO2e/kWh	2025	
				67 g CO2e/kWh		2040
	Percentage of renewable energy generation	Technology mix	IEA SDS	45% share of renewable energy in the portfolio	2024	
	kg CO2e/MWh	Physical intensity	IEA NZE 2050	~160 kg C02/MWh	2030	
				0 kg C02/MWh		2040
Residential real estate	GHG emissions/m²	Volume trajectory	n/a	46% GHG emissions reduction per m2 (2020 baseline)	2030	
	Energy Performance Certificate (EPC)	Standards-based (taxonomy aligned)	B2DS Global	Weighted average EPC label "A"	2030	
	kg CO2/m2	Physical intensity	IEA NZE 2050	~20 kg CO2/m2	2030	
				~0 kg CO2/m2		2050
Shipping	Poseidon Principles	Alignment score	Poseidon Principles	Alignment difference of 0%	2030	
				Alignment difference of 0%		2050
Steel	kg CO2/t steel	Physical intensity	IEA NZE 2050	515 kg CO2/t of steel	2030	
	t CO2/t steel	Alignment score	IEA NZE 2050	Alignment score (Sustainable Steel Principles) of 0	2030	
				Alignment score of 0		2050
Various/all	t CO2e/MEUR	Carbon intensity	n/a	-43%	2030	
				Net zero		2050
	t CO2e	Absolute emissions	n/a	-43%	2030	
				Net zero		2050
	°C	Implied temperature score	n/a	2.3°C (scope 1 and 2 portfolio temperature); 2.1°C (scope 1, 2 and 3 portfolio temperature)	2025	

Disclaimer: Inclusion of an observed practice in this table does not mean that the ECB has assessed whether the mentioned metrics and targets are sound or not.

To a large extent, the level of ambition of the emissions reduction required by a given target date depends on the chosen transition scenario. Some transition scenarios also offer regional specifications that may differ significantly from the corresponding global scenario, thereby impacting the level of ambition of the emissions reduction required to meet targets (see the following chart and table).

Chart 3

Stylised example of emissions reduction pathways for coal-fired power plants under the IEA SDS and IEA NZE 2050 scenarios (including EU regional specification under the IEA SDS scenario)



The required emissions reduction effort for an institution to reach its targets also depends on the starting point of its portfolios at the base year. Institutions with a lower level of financed emissions at the base year have to reduce them by less to reach a given target (see the following table for a comparison of commonly used scenarios for target-setting by sector and the different levels of ambition needed in terms of relative financed emissions reduction versus the institution's chosen base year).

Table 5

Non-exhaustive examples of commonly observed scenario choices by institutions and resulting levels of relative financed emissions reduction versus the base year

Sector	Automotive			Cement			Power			Steel		
Scenario	B2DS	IEA NZE	IEA SDS	B2DS	IEA NZE	IEA NZE	IEA NZE	IEA NZE	IEA SDS	IEA SDS	B2DS	IEA NZE
Δ emissions base year to 2030 target (%)	-24.31	-46.36	-39.47	-21.31	-17.27	-51.81	-26.74	-50.45	-50.82	-35.32	-38.89	-22.56

Institutions demonstrate awareness of the importance and consequences of their scenario choice for target-setting. For example, when setting its own targets, one

institution with a net-zero commitment analysed the scenarios most commonly used by peers. It found that not all of them are compatible with a net-zero commitment. Consequently, the institution opted for a scenario that it believes to be more ambitious and in line with a net-zero trajectory. For similar reasons, another institution with a net-zero commitment discontinued the scenario it had previously been using and moved to one that it deems to be in line with its net-zero objective.

The ECB has further detailed key aspects of the observed practices used to select decarbonisation pathways in its 2024 publication on "Risks from misalignment of banks' financing with the EU climate objectives" (see Section 3.3 of that publication).[9]

2.1.2.2 Target-setting for nature-related risks

Newly added good practice

Expectation 2
When determining and implementing their business strategy, institutions are expected to integrate climate-related and environmental risks that impact their business environment in the short, medium or long term.

Institutions are now integrating nature-related risks into their strategic target-setting process. The ECB has observed that these nature-related targets are often aligned with institutions' commitments to creating positive environmental impacts, with less of an emphasis on active nature risk management.

To begin with, institutions frequently define key performance indicators that relate exclusively to the risk drivers to which they are most exposed due to their business model. Other institutions define broader key performance indicators covering several risk drivers, sometimes together with climate. They take a tailored approach by cascading down these targets to the relevant portfolios (e.g. corporate loans; investment banking) and associated risk drivers (e.g. deforestation; water scarcity).

One institution also adopts a bottom-up approach and requires all of its business units, covered by a group-wide nature-related KPI, to define one or more operational KPIs in their annual planning process. A specialised committee on environmental risks, directly reporting to the management body, is responsible for streamlining these targets across the group, and monitoring their implementation. The final policies are approved by the management body.

The ECB has observed that risk-related metrics such as risk sensitivity indicators and legislation alignment indicators are still in the process of development. Nonetheless, some institutions have adopted standards-based targets as intermediate steps, which reflect market expectations regarding nature-related practices and sometimes nature-related policies. As such, they show how good practices are gradually evolving to integrate nature-related risks and potential transition pathways in institutions' strategies. Table 6 below describes some observed practices.

9 "Risks from misalignment of banks' financing with the EU climate objectives – assessment of the alignment of the European banking sector", ECB, January 2024.

Table 6

Non-exhaustive list of observed nature-related targets and KPIs

Type	Sub-type	Example of KPI
Biodiversity impact	Positive impact	One institution's strategic target is to achieve a net positive impact on biodiversity through its financing and investment activities, measured in potentially disappeared species (PDF).
	Net impact	Some institutions aim to increase the share of their lending labelled as environmentally beneficial according to the EU taxonomy. KPIs apply at the balance sheet level, or more specifically at the portfolio or credit policy level.
Risk sensitivity	Transition sensitivity	One institution assesses and scores the real estate that it funds through diverse environmental criteria, including soil surface sealing and the use of recycled materials in the construction, and aims to have 30% of its commercial real estate portfolio labelled as green.
	Physical sensitivity	One institution aims to improve the water efficiency of its financing, measured in cubic metres per million euro invested.
Alignment	Alignment with industry standards	One institution has defined targets for the companies in its asset management portfolios to comply with No Deforestation, No Peat, and No Exploitation (NDPE) policies. The target date varies according to the sectors covered.
	Alignment with policy objectives	One institution measures the impact of its real estate funding on soil artificialisation and has a "net-zero artificialisation"[10] objective, explicitly mirroring the national objective defined in the country where it operates.

One institution has adopted a strategic target to achieve a net positive impact on biodiversity through its financing and investment activities in the medium term. It uses the open-source Partnership for Biodiversity Accounting Financials (PBAF) approach, which provides guidance to financial institutions on biodiversity impacts. Using this approach, it has developed a methodology that combines a quantitative footprint calculation and a qualitative analysis. The institution's net biodiversity footprint is calculated by considering the negative impact, the avoided negative impact and the positive impact on biodiversity of all loans and investments. The result is expressed as a number of hectares where all biodiversity is lost. The approach maps the impact of investment categories to biodiversity impact categories and identifies investments in companies that are highly dependent on biodiversity. The institution estimates its net biodiversity impact and sets a specific reduction target, which leads to a quarterly risk indicator tracking improvements in the biodiversity impact. A yearly target for impact reduction is set and monitored quarterly by the social impact committee, which is headed by the Chief Risk Officer.

As an example of the operationalisation of portfolio targets on nature-related risks, one institution quantifies the impact of land cover changes on local ecosystem services from financed projects in its positive-impact funds, with the aim of maximising its net positive impact. The institution follows the following steps:

1. **Information gathering:** information is gathered on the land cover type of the project location, matched with land cover categories and values from ESVD (Ecosystem Services Valuation Database). The institution (i) selects the necessary information from the ESVD for the biome under scrutiny and the

[10] "Net-zero artificialisation" of soils refers to the objective of reducing gross soil artificialisation and renaturating artificial land to compensate for unavoided artificialisation. Soil artificialisation is defined as any process involving the loss of natural, agricultural or forest areas resulting in a change in soil use and structure.

affected ecosystem services, (ii) excludes outliers, and (ii) computes averages of ecosystem service valuations.

2. **Investment project assessment:** based on these estimates, the institution assesses its investment project by using projections of its impacts on ecosystem services. The institution first calculates the total economic value (TEV) of the ecosystem under its current state and under a project scenario, i.e. an estimate of the potential maximum sustainable use of each ecosystem service at the location. The institution also calculates the net present value (NPV) of the project to reflect its time horizon.

3. **Testing results:** the institution applies different discount rates to account for the discrepancy in time horizons between financial projects and environmental changes.

4. **Identification of (net) investment impact:** the impact assessment is detailed at the ecosystem service level. The institution uses this information to identify potential negative impacts even when the overall impact is positive (see the "Wheat production" and "Total" lines in the stylised example provided in Figure 7).

5. **Identification of stakeholders:** the institution also identifies the stakeholders benefiting from ecosystem services and those affected, either positively or negatively, who could be involved in the planning and decision-making related to the investment project.

The institution does not use the study to value biodiversity itself but rather to estimate the scale of its impact on ecosystem services, many of which are not priced by the market. It identifies its positive and negative nature-related impacts in order to monitor its progress and identify what it needs to improve to meet the strategic targets of its nature-related fund.

Figure 7

Stylised example of an outcome table for the assessment of project impact on ecosystem services and their monetary value

(total economic value (TEV) of the farm in 2025 in euro)

Ecosystem services	Current state: conventional agriculture	Project scenario: conversion to permaculture	Impact of the project
Provisioning services - total	100,000€	140,000€	+40,000€
Wheat production	100,000€	0€	-100,000€
Vegetable production	0€	80,000€	80,000€
Berry bushes production	0€	10,000€	10,000€
Fruit tree production	0€	50,000€	50,000€
Regulating services – total	14,000€	36,000€	22,000€
Carbon sequestration	14,000€	30,000€	16,000€
Soil fertility maintenance	0€	6,000€	6,000€
Supporting services - total	600€	4,000€	3,400€
Habitat	500€	2,000€	1,500€
Maintenance of local genetic diversity	100€	2,000€	1,900€
Cultural services - total	200€	1,800€	1,600€
Education and science	0€	1,500€	1,500€
Opportunities for recreation and tourism	200€	300€	100€
Total	114,800€	181,800€	67,000€

2.1.3 Good practice for transition products
Finance in transition – transition finance products and services

Expectation 2
When determining and implementing their business strategy, institutions are expected to integrate climate-related and environmental risks that impact their business environment in the short, medium or long term.

Compared with 2022, institutions have adjusted their transition products and services, further embedded them into their strategies and incorporated nature-related considerations. Particularly noticeable are practices aimed at financing clients and activities that are not yet fully sustainable, for instance in hard-to-abate sectors (often referred to as “transition finance” as opposed to “green finance”). The remainder of this section describes current good practices that institutions use to address some of the challenges related to transition finance and to build commercial scale in this field.

Newly added good practice

Updated good practices concerning climate risks

The updated good practices show that institutions now take a technology-focused approach to transition finance, combining product frameworks, sector-specific strategies and technical expertise. Moreover, as mentioned earlier, financing decisions are linked to client transition plan assessments (see Section 2.2.2) and structured eligibility criteria. Financing products thus form an integral part of the way institutions implement their prudential transition planning objectives.

As a first step, institutions adopt technology-oriented approaches to inform strategic product development (see Table 7). More precisely, they:

- create policies and processes with definitions of the products and client activities they intend to finance (e.g. defining what they mean by “transition finance”);
- establish related portfolio allocation strategies;
- build expertise to identify business opportunities in the field of transition technologies;
- use a variety of products and services reflecting technology-specific considerations.

Institutions then use these strategic products to proactively support their clients in developing, adopting and scaling transition technologies. They take a sectoral approach, using their technical expertise to build an understanding of mature and nascent technologies and embedding this expertise in risk management strategies as well as financial products.

Table 7

Non-exhaustive examples of observed practices adopting a technology-oriented approach to inform strategic product development

Institutions with a technology-oriented approach to inform strategic product development put in place…
…a framework for transition financing to:
develop transition finance/loan frameworks with clear definitions that distinguish between “already sustainable” and “transition” lending
…a strategy for transition financing to:
match mature and nascent technologies based on sectoral decarbonisation pathways with differentiated financing strategies (e.g. lending vs project finance vs venture debt vs venture capital)
…expertise to assess risks and opportunities by:
for instance, establishing dedicated financing units with diverse skillsets
including sector experts (e.g. power generation, low-carbon innovations) in the decision-making process to identify commercially viable proposals, reflecting deep sector and transition dynamics expertise
…criteria to design sustainable and transition finance activities that:
focus on transitional activities: consider detailed client transition plans and sector-specific eligibility criteria, best available technologies (BATs) as the minimum standard
…products and advisory services in the form of:
tailored products and advisory or financing services for corporates and retail clients, as well as public-private risk-sharing options

Transition and sustainable finance frameworks

Institutions with these proactive, technology-oriented approaches start by setting transition financing guidelines.

One institution differentiates “already sustainable” and “transition” lending based on the nature and purpose of the technologies employed or developed by its clients. For instance, technologies that it classifies as “already sustainable” are those that contribute to sustainable and efficient buildings or renewable energy. Meanwhile, technologies defined as “transition” are intended to support clients in reducing emissions in high-emitting industries (see the subsection on criteria for defining sustainable and transition finance activities”).

The institution further splits transition loans into “use of proceeds” and “general purpose”. For “general purpose” transition loans, the institution requires case-by-case transition plan assessments, with lending decisions based on sector-specific criteria. For example, in the transport sector, it looks, among other factors, at electrification of existing diesel- or steam-powered rail transport or operational efficiency measures in on-ground freight transport. With these assessments, the institution aims to align financing with sectoral decarbonisation pathways.

Strategies for portfolio allocation to transition and sustainable activities

Institutions also tailor their risk appetite to specific transition technologies and are preparing to expand their approaches to additional technologies (see Section 3.4.2).

In terms of portfolio allocation strategies, one institution takes a strategic approach by aligning with sector-specific pathways and technology maturity. It applies differentiated strategies:

- *Mature technologies* (e.g. renewables, EVs): the focus is on scaling and capital deployment.
- *Nascent technologies* (e.g. green hydrogen): venture debt is used to support high-risk innovation critical for long-term decarbonisation.

By understanding sector-specific needs and technology maturity, the institution manages transition risks and traditional credit risk considerations while positioning itself to capture business opportunities arising from emerging technologies.

Some of the transition planning products are often used in *blended finance* structures, which combine public and private capital and use risk-sharing schemes to finance transition technologies (see Table 11).

Institutions have also started to use *venture* debt instruments as a means of financing transition technologies. With these instruments, institutions intend to provide financing to startups in the early stages of their growth that typically do not yet have profitability indicators (e.g. EBTIDA), have little collateral, or have an insufficient cash flow history to obtain traditional lending products.

Table 8

Non-exhaustive list of technologies and activities contributing to emissions reductions observed in institutions’ transition finance frameworks

Sector	Technologies and activities
Automotive (transport)	Electric vehicle (EV) manufacturing and adoption
	EV charging infrastructure
	Battery recycling and reuse
	Decarbonisation of automakers and automotive supply chains
Aviation	Sustainable aviation fuel (SAF) production and adoption
	Efficiency improvements in airline operations and existing aviation infrastructure
	Development of hydrogen propulsion and next-generation aircraft
	Scaling SAF supply chains with stakeholders

Sector	Technologies and activities
Cement (heavy industry)	Low-carbon cement chemistries, carbon capture, utilisation and storage (CCUS) deployment in cement production
	Shift towards alternative fuels
	Material efficiency and design innovation
Chemicals	Electrification of chemical production processes
	R&D and adoption of bio-based
	Low-carbon feedstocks
	Hydrogen as a feedstock and other decarbonisation strategies
Energy supply	Renewable energy (solar, wind, hydro)
	Grid modernisation and energy storage solutions
	Carbon capture, utilisation, and storage (CCUS)
	Hydrogen development and deployment
Food, forests & land use	Regenerative agriculture
	Sustainable farming practices
	Supply chain traceability and sustainable land management
	Adoption of precision agriculture technologies
Iron, steel & aluminium	Hydrogen-based direct reduction of iron (DRI) plants and electric arc furnaces
	CCUS in steel and aluminium production
	Recycling and circularity in metals manufacturing
Mining	Electrification of mining equipment and vehicle fleets
	Integration of renewable energy at mining sites
	Responsible mining practices
Real estate	Energy efficiency retrofits and green building construction
	Adoption of net-zero building codes and standards
	Use of sustainable construction materials
	Installation of heat pumps and smart energy controls
Shipping	Retrofits and new builds for vessels using low-carbon fuels (e.g. biofuels, biohydrogen, renewable gas)
	R&D in zero-carbon shipping technologies
	Operational efficiency upgrades and partnering with ports as well as shipping companies to develop green shipping corridors

Disclaimer: Inclusion of an observed technology in this table does not mean that the ECB has assessed whether it is sound or not.

Embedding technical expertise and sector-specific knowledge

As shown in Table 8, institutions are building specialised expertise in transition technologies to increase portfolio allocation in this field. One institution has set up an internal platform of experts tasked with identifying new materials and processes that reduce emissions for each sector to which it is exposed and in which it intends to grow its business. It uses this expertise to support clients through its venture capital, financing and advisory services, depending on the maturity classification of the technologies (see above).

Another institution builds sector-specific expertise by hiring climate and clean technologies experts. Finance experts, engineers and sector specialists collectively assess complex projects such as clean power, grid upgrades and carbon capture. Another institution has established a clean technology financing unit, bringing

together financial and technical specialists to grow its business in renewable energy, energy efficiency and innovation-driven climate solutions.

These institutions use this expertise to underwrite early-stage, capital-intensive projects that are often seen as too risky, allowing them to better assess and price the risks associated with these projects. For instance, they might find that default rates associated with mature transition technologies (e.g. renewables) are lower than those of conventional technologies; or they might find that short-term risks associated with decarbonisation technologies in high-emitting sectors are compensated by longer-term growth prospects. The institutions use the information gathered in each transaction to build further internal expertise and experience which are then fed into the decision-making process of subsequent transactions.

Criteria for defining sustainable and transition finance activities

Structured approaches also support high-emitting, hard-to-abate sectors in aligning with decarbonisation goals. For example, one institution provides loans for emission-reducing projects with measurable impacts and requires detailed client transition plans and sector-specific eligibility criteria.

Several institutions use best available technologies (BATs) as a minimum eligibility requirement to assess whether the projects to be financed will be effective in reducing emissions. Defined by the EU Industrial Emissions Directive, BATs represent the most advanced methods for minimising emissions at the sector level. One institution incorporates BATs into sustainable finance criteria, while another requires BAT compliance during project finance approval.

While Table 8 provides an overview of transition technologies, Table 9 shows how institutions embed these technologies into concrete eligibility criteria for transition planning products. Institutions often classify transition planning products using standardised criteria, similar to those set out in the EU Taxonomy. These criteria are commonly applied to clients willing and able to transition, such as those that have a transition plan in place but are not yet aligned with the targets set out in that plan. Institutions monitor and steer the volume of products that meet such criteria through KRIs (see Section 3.4.1).

Table 9

Non-exhaustive list of observed criteria used by institutions to design transition finance products

Sector	Activities covered	Criteria	Additional transport and underground storage of CO_2 criteria* applicable
Power generation	Construction or operation of electricity generation facilities	*Summary of strategic goals defined by institutions:* Financing of facilities with relatively low life-cycle GHG emissions, seeking options to equip them with carbon capture technologies and with plans in place to move away from fossil fuels by 2030. *Observed technical screening criteria:* - Life-cycle GHG emissions from the generation of electricity using fossil gaseous fuels < 100 g CO_2e/kWh; and - Carbon capture technologies that enable an economic activity contributing to climate change mitigation to operate within the carbon	Yes

Sector	Activities covered	Criteria	Additional transport and underground storage of CO_2 criteria* applicable
		intensity threshold in the technical screening criteria defined by the EU Taxonomy; and - A plan in place to replace fossil gaseous fuels with renewable and/or low-carbon gaseous fuels by 2030.	
Automotive	Purchasing, financing, renting, leasing and operating of passenger cars and light commercial vehicles	*Summary of strategic goals defined by institutions:* Financing of zero-and low-emission cars and vans. *Observed technical screening criteria:* Until 31 December 2025 with emissions < 50g CO_2 per km.	
Iron and steel	Steel in electric arc furnaces (EAFs) producing EAF carbon steel or EAF high-alloy steel	*Summary of strategic goals defined by institutions:* Financing of electric arc furnaces (EAFs) with high steel scrap input ratios and use of low-emissions fuels. *Observed technical screening criteria:* Depending on the type of steel produced, the input of steel scrap relative to final product is as follows: ≥ 70% for high-alloy steel, or ≥ 90% for carbon steel (e.g. direct reduced iron to electric arc furnace facilities using, for example, biogas or hydrogen fuels and electricity from renewable energy sources).	Yes Yes
	Iron and steel by-products, intermediate products and/or final products manufactured	*Summary of strategic goals defined by institutions:* Financing of iron and steel manufacturing with GHG emissions below defined thresholds for specific products within the manufacturing process. *Observed technical screening criteria:* Where GHG emissions, after deducting emissions assigned to the production of waste gases, do not exceed the following values: Hot metal = 1.331 tCO_2e/t product; Sintered ore = 0.163 tCO_2e/t product; Coke (excluding lignite coke) = 0.144 tCO_2e/t product; Iron casting = 0.299 tCO_2e/t product; Electric arc furnace high-alloy steel = 0.266 tCO_2e/t product; Electric arc furnace carbon steel = 0.209 tCO_2e/t product.	
Cement	Manufacture of grey cement clinker	*Summary of strategic goals defined by institutions:* Financing of grey cement clinker manufacturing with GHG emissions below defined thresholds. *Observed technical screening criteria:* < 0.722 tCO_2e per tonne of grey cement clinker.	Yes Yes
	Manufacture of cement from grey clinker or alternative hydraulic binder	*Summary of strategic goals defined by institutions:* Financing of cement or alternative binder manufacturing with GHG emissions below defined thresholds. *Observed technical screening criteria:* < 0.469 tCO_2e per tonne of cement or alternative binder manufactured.	
Aviation	Manufacturing, repairing, maintenance, overhaul, retrofitting, design, repurposing, or upgrading of aircraft	*Summary of strategic goals defined by institutions:* Financing of aircraft manufacturing meeting ICAO emissions standards, with certification for full sustainable aviation fuel use from 2028 onwards. *Observed technical screening criteria:* (a) until 31 December 2027, aircraft other than those produced for private or commercial business aviation meeting the margins specified below and limited by the replacement ratio to ensure that delivery does not increase the worldwide fleet size: - For take-off mass between 5.7 t and 60 t, 11% below ICAO standard; - For take-off mass between 60 t and 150 t, 2% below ICAO standard; - For take-off mass >150 t, 1.5% below ICAO standard); (b) from 1 January 2028 to 31 December 2032, aircraft meeting the technical screening criteria set out above that are certified to operate on a 100% blend of sustainable aviation fuels.	

* Where CO2 that would otherwise be emitted is captured for the purpose of underground storage, it is transported and stored underground, CO2 leakage of carbon transport methods are limited to ≤ 0.5 %, and carbon sequestration sites comply with internationally recognised standards.
Disclaimer: Inclusion of an observed criterion in this table does not mean that the ECB has assessed whether it is sound or not.

Newly added good practice

Good practices applying to nature risks

Institutions have also developed their transition products for nature-related frameworks that operationalise international sustainability objectives and regulatory nature-related classification systems. In the good practices observed by the ECB, the institutions' frameworks are based on the Sustainable Development Goals or the EU Taxonomy. They are detailed at the sector level, with both qualitative and quantitative criteria to determine which projects, entities and assets are sustainable and aligned with the transition strategy.

For nature-related areas not yet covered by the applicable regulation, institutions typically complement their own frameworks with international standards and best practices defined by international conventions (e.g. they refer to the Stockholm Convention on Persistent Organic Pollutants, the Rotterdam Convention on Certain Hazardous Chemicals and Pesticides in International Trade, or the Ramsar convention on Wetlands).

Their frameworks cover a variety of financing activities:

- **Project finance:** institutions assess the alignment of both the projects being funded and those of project managers (e.g. the green or sustainable bond issuer) with their framework. They typically analyse the issuance documents of the project, the project manager's sustainability framework, and third-party opinions. Some institutions also require a minimum level of transparency. Even if a project has a positive impact, institutions have processes in place to help align the project managers with minimum sustainability standards, typically through exclusion criteria, in order to limit the risk of greenwashing (e.g. avoiding the financing of green-labelled projects of entities whose broader activities have significant negative sustainability impacts).
- **Corporate finance:** institutions assess the nature-related profile of the company receiving funding. A positive screening covers the company's climate- and nature-related performance and impact management. To be eligible under the nature-related framework, companies must be among the best performers within their sector (best-in-class) and/or in absolute terms (best-in-universe). Additionally, institutions perform negative screenings and exclude companies from the framework when their revenues linked to products and services with a negative impact are above a given threshold (e.g. where more than 5% of the company's revenues come from environmentally harmful products).
- **Investments (positive impact funds):** institutions assess the alignment of the funds' objectives and management policies with their own framework. A first quantitative screening is carried out to assess the environmental profile of the funds. In a second stage, a qualitative screening with interviews takes place, allowing institutions to comprehend the environmental strategy of the funds.

Based on these screenings, the institutions select the funds whose profiles are the closest to their own sustainability policy.

Products and advisory services

Institutions have developed various products and advisory services to help clients transition to a low-carbon economy as part of their strategies to manage transition risk. While mainly targeting corporates, institutions also provide services for retail clients, especially in energy efficiency and real estate. The tables below describe observed transition planning advisory services and products.

New information included in the table

Table 10

Non-exhaustive list of observed transition planning advisory services

Generic description of advisory service	Main aspects	Addressees of advisory service
Structured client dialogue	Institutions enter into a structured dialogue with their corporate clients with the aim of supporting them in their transition. Institutions provide expert advice to clients on their transition, including by benchmarking them against their peers, and offer dedicated products. In this context, institutions also carry out their climate-related risk due diligence assessments and collect client or asset-level data.	Corporate clients, including SMEs
Commercial and residential real estate energy efficiency advice	Institutions inform clients about options available to them to increase the energy efficiency of their commercial real estate and offer financial products for this purpose. Such options might include alternative solutions to reduce electricity consumption. Institutions also offer clients information on energy efficiency legislation. For retail clients, institutions have put in place online platforms to inform them about concrete steps they could take to make their home more energy efficient, such as by retrofitting it. Institutions also offer in-depth advice via dedicated sustainability-trained client-facing staff.	Corporate and retail clients
Green mobility	Institutions provide information to their clients on the potential energy savings by renewing their car fleet (for corporate and SME clients) or switching to a more efficient personal vehicle (for retail clients). Institutions also offer leasing products for alternative mobility arrangements for clients' employees (e.g. bicycles).	Corporates, SMEs and retail
Climate and nature diagnosis	Some institutions offer climate and nature consultancy as a free service while seeking to gain valuable information, as part of the client engagement policy, or as an additional service. One institution has developed a tool for its clients in the agriculture sector to self-diagnose their practices, their dependencies on ecosystem services, and their impact on biodiversity. Based on this diagnostic, they obtain advice and concrete action examples to reduce their environmental impact. This tool can also be used by local government clients to diagnose the state of biodiversity in their territory, and to compare the performance of different agriculture practices.	Corporate clients, including SMEs

New information included in the table

Table 11

Non-exhaustive list of observed transition planning products

Generic description of product	Main aspects	Corporate/retail
Blended finance mechanisms	Some institutions collaborate in blended finance mechanisms to invest in innovative projects related to climate change and/or the environment. They work with other financing institutions, government agencies and international organisations to finance large-scale environmental projects, notably in emerging markets, and share the risks.	Corporate
Green bonds and sustainability-linked bonds	Some institutions assist their corporate clients in issuing bonds to fund their projects with a positive climate and/or environmental impact. They often apply the Green Bond Principles and Sustainability-Linked Bond Principles of the International Capital Market Association. The allocation of funds and the associated projects are monitored through regular reports. A third-party opinion on the environmental impact of the project, and/or certification that the funds have been allocated to the projects, is in some cases used to reinforce transparency.	Corporate

Generic description of product	Main aspects	Corporate/retail
	Green Bonds: the proceeds are used solely "to finance or re-finance, in part or in full, new and/or existing eligible Green Projects that are aligned with the four core components of the Green Bonds Principles". Eligible Green Projects relate to renewable energy, energy efficiency, pollution, biodiversity, clean transportation and climate change adaptation, among others.* Sustainability-Linked Bonds: the financial and/or structural characteristics of the instrument change if the issuer meets predefined sustainability objectives within a set timeline.**	
Green loans and sustainability-linked loans	Some institutions apply the Loan Market Association's Green Loan and Sustainability-Linked Loan Principles. Green loans: "any type of loan instrument made available exclusively to finance or re-finance, in whole or in part, new and/or existing eligible projects." The Loan Market Association foresees several components that such loans have to comply with. Among others, the loan proceeds have to be used for eligible projects only (e.g. renewable energy, zero emission vehicles, heat networks, new buildings, building renovations, biodiversity conservation, waste management, water treatment and climate change adaptation).*** Sustainability-linked loans: "any type of loan instruments and/or contingent facilities (such as bond lines, guarantee lines or letters of credit) which incentivise the borrower to achieve ambitious, predetermined sustainability performance objectives."**** Other institutions apply a similar concept through instruments to incentivise the borrower to improve its external environmental, social and governance (ESG) rating. Part of the profit margin on the loans might be donated to sustainable or charity projects.	Corporate
Payments for ecosystem services	Some institutions are experimenting with new financial products similar to carbon credits. They provide funding to their clients for the preservation of ecosystem services by supporting other stakeholders willing to finance and subsidise nature preservation (e.g. avoided deforestation, nitrogen emission reduction) when they are not able to fully avoid and reduce their own negative impact. The payments compensate for the costs of nature preservation, or for the profit that could have been generated in the absence of protection measures.	Corporate
Sustainability-linked supply chain loans	These instruments are not targeted at the institution's own clients, but at the suppliers in the client's value chain. The institution cooperates with its clients to offer favourable financing conditions to the client's suppliers, provided that the latter improve their businesses in terms of environmental impact. Performance is monitored.	Corporate
House renovation loans	Special-purpose loans for energy efficient house renovations, sometimes supported by a government scheme. Example: Clients buy real estate with a low-scoring EPC label. They use a loan to increase the EPC label within a certain time period. One institution reduces the interest rate applied to mortgages over the course of its duration if the borrower upgrades the unit to an energy efficient EPC label prior to the interest rate reset date.	Retail
Thematic investment funds	Funds for thematic investment with a positive impact on the climate transition, on climate resilience and/or biodiversity protection.	Retail
Green mortgages	Loans for the acquisition of real estate with high energy efficiency standards, or more broadly, high sustainability standards (e.g. using recycled building materials or limiting the consumption of fresh water). Institutions often apply preferential mortgage terms and interest rates, sometimes also supported by government schemes.	Corporate and retail
Investment advice	One institution verifies the extent to which the assets that its private clients invest in contribute to achieving climate goals in order to stimulate portfolio choices aligned with the Paris Agreement.	Private banking

Notes: * International Capital Market Association, "Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds", June 2021; ** International Capital Market Association, "Sustainability-Linked Bond Principles: Voluntary Process Guidelines", June 2020; *** Loan Market Association, "Green Loan Principles: Supporting environmentally sustainable economic activity", December 2018; **** Loan Market Association, "Sustainability-Linked Loan Principles: Supporting environmentally and socially sustainable economic activity", March 2022.

2.2 Strategic steering tools

Institutions use client engagement as a steering tool to assist them in implementing their strategic approaches as part of their wider prudential transition planning

approaches. They enter into a structured dialogue with clients subject to elevated transition risks to steer them towards a trajectory aligned with the institution's envisaged portfolio pathways. In doing so, institutions take clients' transition plans into account. As mentioned earlier (Section 2.1.1), institutions have also started to engage with their clients on physical risks.

Where a client does not yet meet the institution's requirements, the continuation of the client relationship is subject to the client taking remedial action. For instance, the institution and the client concerned might draw up an action plan that is then regularly monitored. In this context, institutions also offer specific products to support the client in transforming its business model (see also the updated good practices in Sections 2.1.1 and 2.1.2).

The previous section outlines how client engagement fits into institutions' prudential transition planning approaches. This section provides a more in-depth view of structured client engagement processes and the assessment of clients' transition plans.

2.2.1 Good practice for client engagement
Walking a tightrope – maintaining and exiting client relationships

Expectation 2
When determining and implementing their business strategy, institutions are expected to integrate climate-related and environmental risks that impact their business environment in the short, medium or long term.

Expectation 7.4
Institutions are expected to adopt a strategic approach to managing and/or mitigating climate-related and environmental risks in line with their business strategy and risk appetite, and to adapt policies, procedures, risk limits and risk controls accordingly.

Institutions enter into a structured dialogue with clients that they find to be subject to elevated transition risks and that may be misaligned with the institution's targeted portfolio trajectory. This dialogue is embedded in institutions' client due diligence process.

Institutions do not automatically divest from – but rather engage with – clients that may not yet fully meet their requirements. Such engagement is subject to the condition that the client is willing and able to align itself with the institution's requirements within a given timeframe. Depending on the level of risk associated with the observed misalignment, the institution may, for instance:

- reduce limits or exposure to the client;
- reduce the loan tenor;
- adjust client ratings following its rating system;
- ask clients to implement time-bound action plans;
- exit the client relationship.

In one institution, the decision to actually engage with a client follows a pre-established process that is embedded in the institutions' sustainability governance framework. Following a climate-related risk assessment by the first line of defence and an opinion by the second line of defence, a dedicated committee decides whether client engagement can commence. The committee comprises members of the institution's management body and several business areas, including the first and second lines of defence. The committee monitors progress made on client

engagement actions on a quarterly basis. Abandoning the client relationship is established as a possible outcome of the process and institutions have meanwhile expanded their capabilities to reduce the need to terminate client relationships (see Section 2.1.1). The steps involved and the outcome of the client engagement process are shown in the following table.

Table 12

Overview of the client engagement process

Actions and deliverable	Responsible unit/body	Description
1. Engagement starts	Dedicated committee	A dedicated committee decides whether engagement with the client can commence, considering the views of the first and second lines of defence. This decision is based on an assessment of whether the client is willing and able to meet the institution's requirements.
2. Engagement objectives	First line of defence, in consultation with the second line of defence	Following the decision to engage with a client, engagement objectives and a deadline are set. After meeting the objectives, the client has to be aligned with the institution's requirements. The deadline has to be set in the near-term and cannot exceed a predefined amount of time.
3. Client information	First line of defence, in consultation with the second line of defence	The client is informed of the above. In addition, the client is informed of the repercussions of not meeting the engagement objectives and the ensuing decision of being considered misaligned with the institution's requirements.
4. Client action plan	First line of defence, after consulting the second line of defence and the client	Detailed and verifiable actions are drawn up.
5. Quarterly updates	First line of defence, second line of defence and dedicated committee	The first line of defence monitors whether the client is progressing according to the client action plan. An opinion by the second line is required. The dedicated committee is informed, discusses and approves the progress update.
6. Assessment	First line of defence, second line of defence and dedicated committee	At the end of the engagement period, the first line of defence assesses the client's performance vis-à-vis the engagement objectives and whether it is now aligned with the institution's requirements. An opinion by the second line of defence is required. The dedicated committee is informed and decides whether the client engagement process can be closed.

2.2.2 Good practice for client transition plans
Making progress – assessing the maturity of client transition plans

Newly added good practice

Expectation 2
When determining and implementing their business strategy, institutions are expected to integrate climate-related and environmental risks that impact their business environment in the short, medium or long term.

Expectation 7.4
Institutions are expected to adopt a strategic approach to managing and/or mitigating climate-related and environmental risks in line with their business strategy and risk appetite, and to adapt policies, procedures, risk limits and risk controls accordingly.

Para. 90 a) of the EBA Guidelines on the management of ESG risks
The first line of defence should be responsible for establishing a dialogue with counterparties about their own transition strategies and assessing consistency with the institution's objectives and risk appetite, based on clear engagement policies as set out in paragraph 109 e(i). To this end, institutions should ensure that relevant staff possess sufficient expertise and capabilities to assess the extent to which the transition strategies of counterparties, including their transition plans where available, will enhance their resilience to ESG risks and align with the institution's targets.

General observations

Institutions enter into a structured dialogue with large greenhouse gas (GHG)-emitting clients to assess whether the relationship can be continued, to support them in establishing or strengthening their transition plans and to provide financing to improve their risk profile (Sections 2.1.1 and 2.1.3). Since this compendium was first published in 2022, assessments have expanded beyond the level of maturity of client transition plans. They now feed the risk classification of clients (Section 4.3.1) and are integrated in the institution's risk management processes and transaction decisions (see, for example, the good practice for product offering in Section 2.1.1).

Updated client engagement good practices

The ECB has observed that institutions with good practices have further enhanced their client transition plan assessments, which now cover more specific elements to assess the alignment of the client's transition plan with the institution's chosen pathways, the likelihood of client (mis-)alignment, and sectoral pathways. Such assessments currently concern mostly large corporate clients and are ultimately aggregated at portfolio level. The enhanced granularity underpinning this assessment gives institutions a more detailed technology-level understanding of clients' risk profile. Institutions transparently document their methodology.

Instead of assessing clients' transition plans on a stand-alone basis, institutions with good practices use these assessments as one of several inputs for their client transition risk scores and client engagement strategy. They also leverage them to monitor exposures to clients with underdeveloped transition plans (see Sections 4.3.1 and 2.1.1).

Updated data collection good practices

To support the enhanced client transition plan assessments, institutions collect client-specific information from various sources (e.g. external providers, public information on the client and its sustainability reporting, client questionnaires, client transition plans, client production plans and further alignment information, such as that obtained from the PACTA tool used for portfolio alignment purposes). These data inform client engagement, credit approval and loan decisions (see Sections 2.1 and 4.1.3), enabling, among other things:

- Risk insight: a deeper understanding of the client's transition risks.
- Competitive financing: solutions tailored to sustainable and transition technologies (see Section 2.1.3).

The table below provides an overview of relevant elements observed in client transition plan assessments, together with examples of data points collected to support these assessments.

Table 13

Stylised, non-exhaustive and simplified list of criteria underpinning, and information feeding, the client transition plan assessments performed by institutions

Element	Advanced client transition plans	Intermediate client transition plans	Client transition plans in the starting phase	Examples of data points collected to support assessment
Alignment of client transition plan with institution chosen pathways				
Targets	Defined for the short, medium and long term (net zero) and for Scope 1, 2 and 3 emissions and/or the physical intensity of emissions and/or production volumes (across all relevant categories)	Defined for the short, medium and long term (well below 2 degrees or net zero) and for Scope 1, 2 and 3 emissions and/or the physical intensity of emissions and/or production volumes (not across all relevant categories)	Defined for the short, medium or long term (without temperature pathway) and for Scope 1 and 2 emissions and/or the physical intensity of emissions and/or production volumes	▪ GHG reduction targets (% of emissions), including base and target years, scope of emissions and intermediate targets ▪ Other transition targets (such as a methane reduction target)
GHG metrics	Historic, current and projected future Scope 1, 2 and 3 emissions and/or the physical intensity of emissions and/or production volumes (across all relevant categories)	Historic, current and projected future Scope 1, 2 and 3 emissions and/or the physical intensity of emissions and/or production volumes (not across all relevant categories)	Historic, current and/or projected future Scope 1, 2 and 3 emissions and/or the physical intensity of emissions and/or production volumes not provided by the client	▪ Last reported (audited) Scope 1, Scope 2 and Scope 3 GHG emissions ▪ SOx emissions, NOx emissions, and particulate matter air emissions ▪ Levels of Scope 1, Scope 2 and Scope 3 GHG target emissions for the emission target year(s)
Likelihood of client-level (mis-)alignment				
Plans and actions	▪ Concrete actions taken to achieve emissions reduction targets ▪ Future actions planned to achieve emissions reduction targets with defined expected outcomes ▪ Estimates of the resources needed to implement the actions	▪ Concrete actions taken to achieve emissions reduction targets ▪ Future actions planned to achieve emissions reduction targets ▪ No estimates of the resources needed to implement the actions	No concrete actions taken and future actions planned to achieve emissions reduction targets	▪ Existence of a transition plan in the company's strategy ▪ Existence of an allocation of (green) CapEx to implement the actions included in the plan ▪ Assessment of the company's activities against EU Taxonomy environmental objectives ▪ Investment in low-carbon technologies (such as renewable energy sources (RES) and carbon capture, utilisation and storage (CCUS)) ▪ Current or planned investments in systems for wastewater reduction or prevention of water contamination ▪ Existence of procedures to reduce pollution
Governance	▪ Transition risk considered when planning the business strategy ▪ Dedicated individual/committee responsible for executing and overseeing the transition plan	▪ Transition risk considered when planning the business strategy ▪ No dedicated individual/committee responsible for executing and overseeing the transition plan	▪ Transition risk not considered when planning the business strategy ▪ No dedicated individual/committee responsible for executing and overseeing the transition plan	▪ Persons/committees responsible for implementing the transition plans ▪ Existence of management incentives linked to transition targets
Reporting	▪ Fully consistent with external framework/reporting standards (e.g. TCFD, ISSB, SBTi) ▪ Disclosed emissions are audited	▪ Partially consistent with external framework/reporting standards (e.g. TCFD, ISSB, SBTi) ▪ Disclosed emissions are not audited	▪ Not consistent with external framework/reporting standards (e.g. TCFD, ISSB, SBTi) ▪ Disclosed emissions are not audited	

Institutions with good practices also gather sector-specific data, especially for clients classified as high transition risk (Section 4.3.1). This approach relies on technological knowledge of sectoral transformations and is used by institutions to support prudential transition planning by, among other things:

- analysing technology maturity to tailor products (Section 2.1.3);
- assessing client transition plans (this section and Section 4.3.1);
- monitoring progress against targets in line with institutions' risk appetite (Section 2.1.1);
- engaging with clients based on the findings (Section 2.2.1).

Institutions use these practices to gain an edge in identifying risks, delivering financing solutions, and thereby expanding business opportunities.

Table 14

Non-exhaustive overview of observed sector-specific indicators used by institutions in their client transition plan assessments

Sector	Assessment of the specificity of the client's transition plan in terms of sector-specific actions	Examples of data points collected to support assessment
Coal mining	Plans to: ▪ Limit the development of new mines or the expansion of existing mines ▪ Reduce coal mine waste gas and fugitive methane emissions ▪ Invest in decarbonisation activities, e.g.: renewables, biofuels, and electric powered options, displacing diesel from the mining fleet	▪ Current or future plans to diversity the business model away from mining, including the % of forecast revenues diversified from mining over the next five years ▪ Steps taken to reduce the environmental impacts of mineral extraction, especially those located in or near protected areas or areas of high biodiversity ▪ % of mine sites where acid rock drainage can occur/is under treatment/has been remediated ▪ Steps taken to reduce water consumption and ensure its quality ▪ Measurement of the % of restored land
Oil and gas	Plans to: ▪ Limit the exploration and development of new oil and gas fields ▪ Reduce non-emergency flaring and venting and fugitive methane emissions ▪ Invest in clean technologies to reduce Scope 1 and Scope 2 emissions ▪ Consider future levels of demand for oil and gas among clients, including the use of oil and gas products (Scope 3 emissions)	▪ Oil and oil products revenue share (% from exploration, extraction, distribution, or refining of oil fuels) ▪ Natural gas and natural gas products revenue share (% from exploration, extraction, manufacturing, or distribution of gaseous fuels) ▪ Plans to diversify the business away from oil and gas-related activities, including % of revenue diversified from oil and gas-related activities in the past year and over the next five years ▪ Use of leak detection and repair (LDAR) or other methods to find and fix fugitive methane emissions from oil and gas production activities ▪ Measurement of CapEx on clean energy technologies and related R&D expenditure
Power generation	Plans to: ▪ Reduce fossil fuel power generation ▪ Invest in carbon abatement power generation and renewable technologies ▪ Invest in renewable energy, energy storage and other enabling infrastructure, such as a flexible electricity grid	▪ Share of revenue corresponding to the % of electricity generation with a GHG intensity of more than 100 g CO_2e / kWh ▪ Current or future plans to shift power generation towards renewable power generation, including an indication of both the total installed capacity and only the share coming from renewable sources (planned over the next five years) ▪ (Undergoing) replacement of simple-cycle gas turbine (SCGT) plants with combined-cycle gas turbine (CCGT) plans, including the current total installed capacity and only the share coming from combined-cycle gas turbine plants ▪ Steps taken to reduce the environmental impacts of generation plants, especially those located in or near protected areas or areas of high biodiversity

Institutions enhance data quality by obtaining third-party opinions (e.g. audited C&N reports, external ratings) and referencing external frameworks to ensure the use of robust methodologies.

Institutions also take data quality into account when assessing their clients' transition plans. For example, one institution applies lower weights to less reliable data points in its client (transition) rating that ultimately feeds into the client risk classification. For instance, a seemingly low risk client may be classified in a higher risk category. The reasoning is that this responds to potential blind spots the institution may be exposed to owing to data quality issues.

Table 15 shows a non-exhaustive list of frameworks commonly used by institutions to collect the relevant information themselves or to support their clients in providing the information mentioned in the prior two tables.

Table 15

Non-exhaustive list of frameworks referenced by institutions in their information/data collection

Theme	External framework
Quantification of emissions	Commonly observed: ▪ GHG Protocol methodology ▪ ISO 14064-1:2018 standard ▪ Commission Recommendation 179/2013 on the use of common methods to measure GHG performance following a life-cycle approach Others include more specific methodologies, some of which are response options in CDP's Climate Change Questionnaire, such as: ▪ Country-specific methodologies, e.g. the French methodology for greenhouse gas emissions assessments by companies (ADEME) ▪ Sector-specific methodologies, e.g. Monitoring and Reporting Regulation (MMR) under the European Union Emissions Trading System (EU ETS) – General guidance for aircraft operators
Quantification of energy consumption	Commission Guidelines on non-financial reporting: Supplement on reporting climate-related information
Alignment of targets	IEA NZE
Validation of targets	▪ SBTi (Science Based Targets initiative) ▪ ACT (Accessing Low Carbon Transition) from ADEME
Low carbon technologies needed	IEA NZE
Transition plan	CDP Technical Note: Reporting on Climate Transition Plans
EU Taxonomy	Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment
Governance	TCFD – Governance
Oil and gas	▪ Sustainability Accounting Standards Board (SASB) standard: Refining and Marketing – Code EM-RM-410a.1 ▪ IEA NZE Scenario for 2025, 2030 and 2050
Coal mining	▪ Sustainability Accounting Standards Board (SASB) standard for the metal and mining industry ▪ IEA NZE scenario for the mining sector
Automotive/Steel/Cement	IEA NZE scenario for each sector
Aviation	▪ Sustainability Accounting Standards Board (SASB) standard for the airline industry ▪ IEA NZE scenario for the aviation sector

Disclaimer: Inclusion of an observed framework in this table does not mean that the ECB has assessed whether it is sound or not.

3 Governance and risk appetite

This section describes good practices related to institutions' governance and risk appetite frameworks as well as associated data governance and internal risk reporting processes for managing climate and nature-related risks.

The previous section outlined good practices of institutions related to the strategic approaches and steering tools they use to manage climate and nature-related risks. This section focuses on how institutions have embedded their risk management strategies and processes into their organisational set-up. Sections 3.1, 3.3 and 3.4 describe how institutions that manage risk with a strategic approach incorporate the target-setting process and roll-out of corresponding implementing actions into their governance frameworks, organisational structure and risk appetite framework. They support their strategic and risk-related decisions with enhanced data governance and internal risk reporting frameworks (Section 3.5) and reflect their strategic and risk management approaches as well as commitments they have voluntarily made in their remuneration policies (Section 3.2).

Table 16

Good practices in governance and risk appetite

Section	Topic	Description	Expectation
Management body	Management body [**New information**]	Steering on business strategy and commitments	3, 3.2, 5.2
Remuneration	Remuneration policies [**New information**]	Aligning remuneration policies with climate-related objectives	4.3
Organisational structure	Second line of defence [**New information**]	C&N risks and the second line of defence	5.4, 5.5
	Third line of defence [**New information**]	Embedding C&N risks into internal audit reviews	5.6
Risk appetite	Key risk indicators [**New information**]	Pointing forward with key risk indicators	4
	Risk appetite in transition planning [**New**]	Aligning risk appetite with transition planning targets	4
	Physical risks in the risk appetite framework [**New**]	From weather hazards to risk limits	4, 4.2
Reporting	Data governance [**New information**]	Governance, processes and collection of C&N-related risk data	6.1, 6.2, 6.4
	Internal risk reporting	Internal reporting on climate-related risks	6.3

3.1 Management body

Institutions have allocated responsibilities within the management body and/or sub-committees for climate-related risks. Frequently, they establish dedicated committees to assist the management body in designing and implementing the institution's climate-related risk management strategy and risk management

framework. These committees also provide advice on voluntarily making and implementing commitments.

Institutions have set up governance arrangements that allow for top-down and bottom-up discussions involving all relevant functions. This allows them to obtain business-line input and support for strategic decisions and subsequent implementation. Before voluntarily making commitments, institutions expressly consider the human and financial resources needed to implement the commitment and make adjustments accordingly.

3.1.1 Good practice for governance frameworks
Leading the way – steering on business strategy and net-zero commitments

Expectation 3
The management body is expected to consider climate-related and environmental risks when developing the institution's overall business strategy, business objectives and risk management framework and to exercise effective oversight of climate-related and environmental risks.

Expectation 3.2
The management body is expected to consider the knowledge, skills and experience of its members in the area of climate-related and environmental risk in its assessment of the collective suitability of such members.

Expectation 5.2
Institutions are expected to ensure that the functions involved in managing climate-related and environmental risks have the appropriate human and financial resources.

Institutions are integrating C&N risks in the organisational set-up of the management body. For example, in one institution the management body approves the institutions' environmental strategy and risk management framework along with the corresponding policies, and oversees their implementation. In the discharge of its duties, it has to take into account the commitments voluntarily made by the institution, such as its net-zero pledge. The CEO is responsible for embedding the institution's environmental policy into its day-to-day operations and processes.

A dedicated committee advises the management body on environmental matters. According to the institution's policies, the members of the committee must have an appropriate level of knowledge and experience in this area. In addition, the majority of its members have to qualify as independent directors. Meetings are held at least on a quarterly basis. The committee's tasks are directly linked to the oversight function of the management body vis-à-vis the institution's environmental strategy and risk management framework. It provides advice on:

- the need to make changes to the environmental strategy and implementing policies;
- the institution's net-zero commitments;
- the appropriateness of the institution's risk appetite framework in view of its environmental strategy;
- the adequacy of its risk management processes with respect to C&N risks.

Other institutions have set up committees to deal with more technical aspects, such as green bond committees. For instance, one institution issues green bonds using the Green Bond Principles developed by the International Capital Markets Association.[11] The institution has set up a dedicated green bond committee that verifies compliance with these principles and the institution's corresponding internal policy. For instance, it checks whether a given transaction is aligned with the

[11] "Green Bond Principles: Voluntary Process Guidelines for Issuing Green Bonds", International Capital Market Association, June 2021.

institution's green bond policy and oversees the allocation of the proceeds in accordance with the policy. The committee draws its members from various business areas and levels of hierarchy. It meets at least on a quarterly basis.

As another example, one institution entrusted its dedicated committee with the mandate to advise the management body on high-risk clients and investment decisions.

Top-down and bottom-up integration

One institution's governance structure also foresees arrangements that allow for top-down and bottom-up discussions involving all relevant functions, including the business lines operating in the main geographies in which the institution is present. To this end, a collective decision-making body has been established which:

- discusses the institution's strategy related to its net-zero commitments and prepares decisions in this regard that are then discussed by the institution's dedicated sustainability committee. This way, strategic discussions on environmental matters and, in particular, on commitments are fed with views from the ground up;
- verifies the extent to which the institution's environmental strategy is integrated into its daily operations. To this end, it prepares proposals on changes, for instance, to credit policies as well as products and services. This means that the institution's environmental strategy trickles down via the relevant functions.

Financial and human resources

When evaluating the appropriateness of their human and financial resources for managing C&N-related risks, institutions consider their strategy, risk management framework, commitments and regulatory developments. Where gaps are identified, the institutions allocate budget and increase staffing accordingly.

For instance, prior to publicly announcing a net-zero commitment, one institution considered the human and financial resources needed to implement that commitment. Another institution allocates dedicated financial resources to C&N-related needs arising from its strategy and commitments as well as from its risk management objectives and regulatory developments. The budget relating to the institution's C&N-related strategy and commitments encompasses a variety of projects (for instance, the institution's continued refinement of its client engagement strategy and work on nature-related risks, such as biodiversity loss). This budget is subject to regular monitoring.

Knowledge and experience: collective suitability and training

Newly added good practice

Assessments of the knowledge, skills and experience in C&N-related risks as part of the collective suitability of members of the management body are carried out in the following instances: (re)appointments, on an ad hoc basis whenever there is a significant change that could potentially affect collective suitability, or periodically, for example on a yearly basis. Institutions use the suitability matrix attached to the joint

EBA/ESMA Guidelines on the assessment of the suitability of members of the management body and key function holders[12] for the annual self-assessment of the management body. They also use a questionnaire based on that matrix.

In addition to general questions on climate change, institutions delve deeper into, for example, the transition to a sustainable economy and transition risks, C&N risks, and physical risks.

Table 17

High-level overview of collective suitability assessments for C&N risks

Practice	Feature	Details
Frequency/trigger for assessment	Planned	Following a (re)appointment
		Periodically (e.g. yearly)
	Ad hoc	Whenever there is a significant change that could potentially affect collective suitability
Roles covered	Management body	Executive functions
		Supervisory functions
Topics covered in the assessment	Generic approach	Climate change
	Specific approach	Transition to a sustainable economy and transition risks, nature risks and physical risks

Knowledge and experience: training

Newly added good practice

Institutions use the assessment results to plan training for members of the management body to increase their understanding of C&N-related risks.

Training provided to members of the management body covers, for example, the meaning of net-zero emissions for financial institutions and technical aspects such as portfolio alignment methodologies. Moreover, some institutions view knowledge and experience on C&N risks as a prerequisite for members of the management body, particularly those assigned to dedicated committees.

Institutions also offer training programmes on climate science and its impact on the banking system and specific sectors to all employees. These programmes are tailored based on their roles and areas of expertise. Furthermore, institutions use a set of dedicated KPIs to steer employee participation in relevant trainings.

In particular, institutions rely on transition planning training to enable:

- *employees* to use the new and broader set of data used for this purpose;
- *decision-makers* to understand insights generated by the institution's risk management tools and frameworks.

[12] See "Joint ESMA and EBA Guidelines on the assessment of the suitability of members of the management body and key function holders under Directive 2013/36/EU and Directive 2014/65/EU", European Securities and Markets Authority and European Banking Authority, July 2021.

These transition planning training sessions target specific subjects such as transition planning targets or client engagement approaches. They also cover client transition plan assessments and provide employees with sector-specific expertise.

The following table provides some examples of observed training initiatives and their target audience.

Table 18

Non-exhaustive list of observed climate-related risk training initiatives offered by institutions to members of their management body and/or employees

Type of training	Description	Type of training
Climate- and environmental-related general aspects		
Climate change science concepts	Understanding GHG emission principles, accounting and measurement	Management body
Climate change – regional and/or worldwide consequences	Climate principles and issues	Employees
Biodiversity risk	Introduction (planetary boundaries, main threats to nature and their drivers) Economic relevance Biodiversity regulation Impact for banking institutions: • biodiversity financial transmission channels • investment opportunities • focus on sectoral issues (e.g. agriculture) Impact on the institution's strategy: • development of a dedicated sectoral biodiversity weaknesses barometer, differentiating between physical and transition risks • biodiversity impact, nature-related solutions support	Management body
Climate and environmental legislation broken down by business line	• United Nations agreements • European regulation • C&N risk regulatory guidelines	Employees
C&N risks for the financial sector		
Consequences of climate-related risks for the institution	Climate change regulation in the geography in which the institution operates and how it affects the institution's clients: • Identification of physical and transition risk drivers • Energy transition issues tailored to the various countries in which the institution operates • Impact of C&N risks on regulatory own funds to fulfil the board's governance role over capital adequacy assessments (IRB approach) • Carbon capture and storage, carbon credits and other emissions mitigation techniques • Physical risk assessment approaches	Management body, key function holders
Regional developments in environmental regulation and related challenge	Targeted training on: • energy transition • food system transition	Employees
Institution's climate-related risk strategy		
Institution's specific climate-	Main climate and nature risk policies of the institution (climate risk management strategy, integration of	Employees

Type of training	Description	Type of training
related risk strategy	climate risks in credit process, business environment scan) Implementation of C&N policies	
Institution's climate and nature risk prudential requirements	Climate-related prudential requirements and how the institution addresses them: • Materiality assessment: legal background, process, conclusions and impact on the institution's risk strategy • Business environment scan: legal background, main objectives and conclusions • Integration of C&N risks into ICAAP and ILAAP	Employees
Greenwashing risk	The institution's greenwashing mitigation strategy and processes	Employees
Transition planning		
Developing a transition plan	Overview of a transition plan and related issues: • Climate risks and business landscape • Portfolio evaluation and comparison, identification of key climate risks and risk assessments Understanding the impact on the institution of technical aspects, such as financed emissions, emissions associated with activities enabled through, for example, advisory, underwriting or off-balance-sheet services (facilitated emissions): • Carbon footprint assessment • Development of targets according to a predefined pathway • Scenario choice principles	Management body
Clients' transition plan	The institution's strategy to assess clients' transition plans (policies and tools used by the institution): • Client engagement approach • Training on energy transition challenges for clients in the institution's main areas of geographical exposure • Sector-specific issues, such as the energy transition or the food system transition	Management body, CEO, key function holders
Evaluation of a client transition plan	Gathering and evaluating information. Area covered: • Client engagement approach • Decarbonisation strategies • Transition plan assessment framework • Gathering of information necessary for the client transition plan assessment • Sector-specific expertise to enhance the assessment of client transition plans in line with sector-specific needs and circumstances	Employees

3.2 Remuneration

Institutions have integrated climate-related KPIs into their remuneration policies. In 2022, this was generally the case for remuneration policies applying to members of the management body only. Since then, institutions have expanded the integration of climate-related KPIs into the remuneration policies applying to all employees.

These KPIs are directly linked to commitments voluntarily made by institutions, particularly net-zero emissions pledges, and to their strategic risk management

approach. Since 2022, institutions have made further progress in reflecting their strategic risk management approach in their remuneration policies. They have also calibrated the integration of climate-related aspects in remuneration policies to the positions to which they apply. For example, climate-related KPIs integrated into the variable remuneration schemes of heads of internal control functions – such as the head of the risk management function, the head of the compliance function and the head of the internal audit function – reflect their functional objectives.

Institutions have also begun to adjust the remuneration policies applying to all staff, such as by including environmental targets in their variable remuneration component.

3.2.1 Good practice for remuneration policies
Net-zero, not zero incentives – aligning remuneration policies with climate-related objectives

Members of the management body

Expectation 4.3
Institutions are expected to ensure that their remuneration policy and practices stimulate behaviour consistent with their climate-related and environmental (risk) approach, as well as with voluntarily commitments made by the institution.

Institutions are integrating C&N risks into the variable remuneration components for members of the management body and base these variable remuneration components on KPIs that track whether predefined targets have been met. Often, the KPIs span several financial years. Pay-out is deferred until after the reference period.

Institutions align such multi-year KPIs with the implementation of their commitments and their strategic approach to managing climate-related risks. Remuneration policies might, for instance, provide incentives to meet the institution's targets for reducing the emissions intensity of its exposures to sectors subject to transition risk. The following table outlines examples of observed KPIs.

New information included in the table

Table 19

Non-exhaustive list of observed climate-related remuneration KPIs

Type of climate-related remuneration KPI	Description	Annual or multi-annual
Financed emissions reduction targets	Emissions intensity reduction targets are met at portfolio level.	Multi-annual
Meeting alignment or other strategic targets at sectoral or technology level	2030 targets at portfolio level aligned with a publicly available pathway (e.g. for thermal coal or power generation exposures).	Multi-annual
Product targets for lending	Amount of "sustainable" or "green" finance loans facilitated in line with the institution's product catalogue.	Annual and multi-annual
Product targets for investment	Percentage of "green" assets under management (AuM) to total AuM in line with the institution's product catalogue.	Annual and multi-annual
Target-setting	A variable remuneration incentive is triggered based on the number of science-based targets set by the institution.	Multi-annual
Policy targets	The institution meets predefined milestones as per its C&N-related risk management strategy (e.g. adopting certain policies within the institution).	Annual and multi-annual
Rating targets	The institution achieves a predetermined level of sustainability ratings from a set pool of rating agencies.	Annual

One institution has several climate-related KPIs in place that provide incentives for the implementation of its net-zero commitment and achievement of its strategic risk management approach. Incentives are not binary (i.e. target met or not met), but instead apply at different levels depending on whether:

- targets are not met: the variable remuneration component does not apply;
- targets are met: the variable remuneration applies at a minimum level;
- targets are exceeded: the variable remuneration component applies beyond the minimum level in proportion to the level of excess performance and up to a maximum factor.

The variable remuneration is paid out based on the weighted average of the incentive levels achieved for each KPI at the end of the reference period and subject to a deferral period.[13]

[13] The example given is meant to illustrate observed practices regarding how institutions weight KPIs within variable remuneration schemes and apply deferral mechanisms to enhance alignment with long-term objectives.

Table 20

Stylised example of KPIs and related incentive levels

Climate-related net-zero KPI	Additional notes	Incentive level	Description
Amount of "green" finance issued	Overall target set for the following X amount of years	Target is not met	0% of variable remuneration component
		Target is met	100% of variable remuneration component at minimum level
		Target is exceeded	Up to 1XX% of variable remuneration component at minimum level, proportional to target excess
Percentage of emissions intensity reduction in portfolio	Overall reduction target set for 20XX versus baseline year 20YY (in line with the institution's transition trajectory)	Target is not met	0% of variable remuneration component
		Target is met	100% of variable remuneration component at minimum level
		Target is exceeded	Up to 1XX% of variable remuneration component at minimum level, proportional to target excess

Newly added good practice

Key function holders

For heads of internal functions, climate-related KPIs within variable remuneration schemes are tied to achieving specific control objectives. These KPIs may include the integration of climate risk considerations into the risk management framework or the loan granting process via specific climate-related client due diligence procedures. For example, KPIs for the head of internal audit might focus on reviewing the adequacy and effectiveness of the processes in place to manage climate and nature risks.

For instance, one institution developed a range of risk-oriented KPIs that include, among others, the refinement of the climate stress-testing methodology to consider the impact of climate risks on corporate and mortgage exposures or the development of a tool to measure the level of physical risk over the short, medium and long term, specifically for key material risk drivers in the geographies where the institution operates.

Newly added good practice

Employees other than key function holders

Beyond the management body and key function holders, institutions also integrate C&N risks into the variable remuneration components of all employees who receive variable remuneration, further reflecting C&N risk management considerations across all levels of the institution.

In general, KPIs for both management and employees are linked either to the implementation of the institution's strategy or to the contribution to the institution's risk management process. While institutions use similar KPIs for both, the KPIs for employees are typically broken down into objectives aimed at attaining strategic targets. These objectives are set for aspects that employees can influence. Typical examples relate to implementing the institution's various C&N policies.

Senior managers' variable remuneration C&N KPIs are usually implemented on a multi-annual basis. By contrast, KPIs in variable remuneration schemes for employees are typically set on an annual basis. This is in line with overall remuneration practices, where a multi-annual perspective mostly applies to the

management body and senior management. The ECB observes that C&N KPIs for employees generally carry a lower weight in the variable remuneration scheme than those applicable to members of the management body.

Table 21

Non-exhaustive list of observed climate-related remuneration KPIs pertaining to employees

Type of climate-related remuneration KPI	Description	Annual or multi-annual
Exposure targets	Share of credit exposures to high-emission sectors	Annual
Financed emissions reduction targets	Emissions intensity (at the relevant scope set out in the institution's strategic targets) reduction targets at sector and/or geography level	Annual
Product targets for lending	Amount of "sustainable" or "green" loans facilitated	Annual
Product targets for asset management	Percentage of "green" assets under management (AuM) to total AuM	Annual
Implementation of the institution's transition plan	Predefined milestones as per the institution's transition planning process (e.g. adopting certain policies within the institution)	Annual

Notes: The examples shown are usually part of institutions' wider ESG remuneration policies. In addition, as highlighted in the EBA Guidelines[14] on sound remuneration policies, for employees, "the criteria used to measure risk and performance should be linked as closely as possible to the decisions made by the identified staff member". Hence, the listed examples may not apply to all positions and staff members and are meant for illustrative purposes. The displayed examples of frequencies are meant to illustrate observed practices regarding how institutions determine the frequency of incentives.

One institution has several climate-related KPIs in place that reflect the achievement of targets for the issuance of "green" loans and bonds. The definition of "green" products" used to set C&N-related KPIs aligns with the institution's overarching product catalogue (see Section 2.1.3). The institution has a process in place to monitor compliance with these KPIs, including verification by an external provider.

Moreover, some institutions reflect their strategic objectives for specific technologies (such as solar or wind power) in their remuneration KPIs. These institutions set specific KPIs for certain employee categories to reflect the degree of achievement of these strategic objectives (e.g. loan issuance volumes to finance these technologies), in line with their risk appetite.

3.3 Organisational structure

Already in 2022, institutions had made significant progress on integrating C&N risk practices across all layers of the organisation. In the first and second lines of defence, responsibilities and roles are allocated for the management of C&N risks. The risk management function is, for example, involved with all higher-risk transactions and has the power to veto these transactions. The compliance function is responsible for a wide range of activities, including carrying out checks on the institution's product offering. Tasks and responsibilities in the second line of defence also encompass mitigation of the risks associated with greenwashing.

[14] See paragraphs 227-228 of "Guidelines on sound remuneration policies under Directive 2013/36/EU", EBA, December 2021.

Internal audit reviews cover a wide range of topics. These include the institution's climate-related strategy, governance and risk management policies, as well as its readiness to voluntarily make commitments and subsequent compliance therewith. This section describes observed good practices related to the organisational structure of institutions.

Since 2022, institutions have further integrated tasks and responsibilities concerning nature-related risks across the three lines of defence.

3.3.1 Good practice for the second line of defence
Second in name only – climate-related risks and the second line of defence

Expectation 5.4
Institutions are expected to define the tasks and responsibilities of the risk management function for identifying, assessing, measuring, monitoring and reporting climate-related and environmental risks.

Expectation 5.5
Institutions are expected to define the tasks and responsibilities of the compliance function by ensuring that compliance risks stemming from climate-related and environmental risks are duly considered and effectively integrated in all relevant processes.

Institutions have defined the tasks and responsibilities of the risk management function for identifying, assessing, measuring, monitoring and reporting C&N risks. These tasks cover a wide range of activities, such as providing expert opinions on client transactions and developing institutions' risk management policies. Other examples of observed tasks include the development and roll-out of institutions' methodologies for portfolio alignment assessments (e.g. using PACTA), measuring financed emissions (e.g. using PCAF) and the environmental footprint of the balance sheet. The compliance function is typically tasked with ensuring compliance with C&N-related laws, rules, regulations and standards, including in relation to products offered by the institution. Against the backdrop of regulatory developments and commitments it has voluntarily made, one institution found, for example, that there is an increasing need to mitigate the risk of greenwashing. The institution adopts a quantitative approach to assessing the possible consequences of this risk. Following this assessment, follow-up actions are defined, which relate, among other things, to staff knowledge and expertise, data and methodologies, governance and internal control frameworks.

The institution has included a definition of greenwashing risk in its risk taxonomy, identified possible sources of that risk and defined roles and responsibilities within its organisational structure for its mitigation. In particular, for the second line of defence, the institution has included greenwashing risk considerations into the governance framework for its products and services. In addition, dedicated compliance checks are carried out (see the updated approaches in Sections 4.2.3, 4.3.4 and 4.6.4 for more details).

The table below provides non-exhaustive and high-level examples of the tasks and responsibilities assigned to the risk management and compliance functions related to the management of C&N-related risks. Since the publication of this compendium of good practices in 2022, institutions have expanded some of the practices described below to nature-related risks.

New information included in the table

Table 22

Non-exhaustive list of examples of tasks carried out by the risk management and compliance functions

Function	Type of task	Description
Risk management function	Expert opinion on client transactions	Analyses and provides expert judgement on exposures to clients from high-risk industries.
	Recommendations for risk mitigation	Makes recommendations for risk-mitigating actions for transactions assessed as high-risk.
	Veto right	Can veto transactions assessed as high-risk.
	Methodology development: Risk management policies	Prepares and maintains the institution's climate-related risk management policies (e.g. exclusion policies).
	Methodology development: Portfolio alignment	Develops and rolls out the institution's methodology for portfolio alignment assessments (e.g. using PACTA).
	Methodology development: Financed emissions	Develops and rolls out the institution's methodology for measuring financed emissions (e.g. using PCAF).
	Methodology development: Impact on nature	Develops and rolls out the institution's methodology for measuring the net financed impact on nature (e.g. using biodiversity footprint tools).
	Methodology development: Client questionnaires	Develops and rolls out the institution's C&N-related client questionnaires for due diligence and data collection purposes.
Compliance function	Monitoring developments	Monitors legislative and regulatory requirements concerning C&N-related risks. Recommends changes to the institution's policies and coordinates the implementation of such changes.
	Compliance risk assessment	Performs compliance risk assessments taking into account C&N-related laws, rules, regulations and standards. Prepares and recommends follow-up actions. Reports the outcome of these assessments to the management body and/or its committees, including as regards residual risk.
	Advice on C&N strategy	Provides advice on the institution's C&N strategy. The compliance function is represented in dedicated committees, where established.
	Advice and checks on product offering	Provides advice and checks on the institution's C&N product offering, such as "green" products.
	Addressing and monitoring clients' C&N-related complaints	Creates and monitors a grievance mechanism for client complaints on both climate and nature-related topics. The compliance function performs an ex post review of the complaints to identify potential product or service-issues and directly handles some complaints.

3.3.2 Good practice for the third line of defence
No escape – embedding C&N risks into internal audit reviews

Expectation 5.6
The internal audit function is expected to consider in its reviews the extent to which the institution is equipped to manage climate-related and environmental risks.

Institutions have assigned roles and responsibilities of the internal audit function for C&N-related risks and included these risks in the multi-year audit plans approved by the audit committee. The table below provides a non-exhaustive list of examples of past and planned internal audit reviews concerning C&N-related risks. Since 2022, institutions have expanded some of the practices described below to nature-related risks.

New information included in the table

Table 23
Non-exhaustive list of past and planned C&N-related internal audit reviews

Topic	Description of internal audit review
Materiality assessment	Assessment of the consideration of C&N risks in the institution's materiality assessment.
Strategy	Review of the integration of C&N risks in the institution's business strategy, including at subsidiary and local level.
	Review of the controls established for actions aimed at achieving the institution's C&N-related targets.
	Review of the framework for calculating C&N-related KPIs.
Commitments	Assessment of the institution's readiness to implement commitments it intends to make voluntarily.
	Review of the institution's compliance with commitments.
Governance	Assessment of the performance of the governance structure as regards exercising effective oversight vis-à-vis the institution's management of C&N risks.
Organisational structure	Assessment of the performance of the organisational structure at subsidiary and local level as regards managing C&N risks.
Third-party data providers	Review of the institution's procurement policy to acquire C&N data from third-party providers, including in terms of understanding the methodologies and assumptions used by providers.
Regulatory framework	Alignment of the institution's policies and processes with the regulatory framework for C&N risks.
C&N-related policies	Review of the institution's C&N-related policies.
	Assessment of the level of compliance with the institution's C&N-related policies.
	Review of the consideration of C&N risks in transaction due diligence.
	Assessment of the institution's compliance with the Equator principles that it has signed up to.
C&N-related credit risk	Review of the degree of effectiveness of the C&N-related credit risk assessment process and the transparency of the underlying methodology.
	Review of the assessment of C&N risks in the real estate portfolio.
	Analysis of the impact of C&N risks on the institution's internal ratings models.
	Assessment of the level of the institution's compliance with its C&N-related loan origination policies, including related monitoring arrangements.
Product offering	Review of the institution's sustainable finance products and services, and of related internal policies.
	Review of the governance and internal control frameworks for the categorisation of loans as "green".
	Analysis of the impact of C&N risks on the institution's product development process.
	Review of the level of compliance of sustainable investment product policies and processes with regulatory requirements, including the related prevention of greenwashing.
Stress testing	Review of the institution's framework for climate risk stress testing.
Disclosures	Review of the institution's sustainability disclosures to assess compliance with regulatory requirements and the underlying methodologies adopted by the institution.

3.4 Risk appetite

Already in 2022, institutions had included granular and forward-looking C&N-related KRIs in their risk appetite framework (RAF). They had also improved the level of transparency regarding the methodology underlying their KRIs. For instance, recipients of internal reports were already informed about the limitations of existing indicators.

Moreover, clear escalation arrangements for when limits are breached were already in place back in 2022. For the most part, institutions do so by embedding C&N-related KRIs in their regular monitoring processes.

Institutions have started to align their risk appetite with their transition plans and targets since 2022 by differentiating their willingness to take on risk depending on the technologies or sectors being financed. They leverage the technical expertise gained from understanding transition technologies (Section 2.1.3). With this expertise they might, for instance, decide to adopt a higher risk appetite for specific technologies (such as after analysing their market dynamics), coupled with:

- dedicated limits to address risks that are specific to these technologies;
- policies and processes aimed at managing and mitigating these specific risks.

Moreover, since 2022, institutions have started to include KRIs on nature-related risks in their RAF and have made progress in defining KRIs to address material climate-related physical risks. They have also expanded the range of risk categories materially impacted by C&N risk drivers for which they adopt KRIs, going beyond credit risk. Lastly, institutions have enhanced the way they steer their KRIs across different levels of the organisation, cascading them from the management body down to the operational level.

3.4.1 Good practice for risk appetite
Losing appetite – pointing forward with key risk indicators

Expectation 4
Institutions are expected to explicitly include climate-related and environmental risks in their risk appetite framework.

Institutions have started in 2022 to develop granular and forward-looking KRIs. For instance, one institution established KRIs based on the alignment of its portfolios with a chosen transition trajectory. The KRIs track on an ongoing basis whether the institution's exposures are misaligned with the transition trajectory portrayed by the scenario the institution has used. Another institution has established indicators based on the financed emissions in its portfolios.

Beyond quantitative KRIs, institutions have also established KRIs that monitor the roll-out of or level of adherence to C&N-related risk management policies, such as credit risk assessment processes. These KRIs do not measure an institution's exposure to risk, but rather its performance in terms of rolling out C&N-related risk management policies throughout the organisation. The establishment of these KRIs

may be driven by internal checks that find cases where the institution's climate-related policies has not been adhered to.

For instance, one institution has in place a dedicated credit risk assessment for climate-related risks. The outcome of the assessment triggers the initiation of client engagement efforts with clients exposed to elevated climate-related risks. The institution has established a corresponding KRI to monitor the share of its portfolio that is not yet covered by this credit risk assessment, defining limits and attention thresholds.

Transparency about methodology and limitations underlying quantitative indicators

Institutions with quantitative KRIs describe, for instance, the reasoning for the calibration of quantitative limits, the factors considered and the underlying methodologies. In addition, institutions' internal reports are transparent about the limitations of their KRIs. The recipients of internal reports might, for example, be informed of the time horizon covered by indicators and whether the horizon used fully reflects the long-term nature of C&N-related risks.

Institutions also define whether KRIs comprise only on-balance-sheet or also off-balance-sheet exposures. For instance, one institution identified limitations regarding the scope of its existing climate-related KRIs and decided to extend them to also cover off-balance-sheet exposures.

Monitoring and escalation arrangements

The way in which institutions monitor the compliance of their actions with their risk appetite typically follows the established procedures. For instance, an institution might use a red, amber, green approach, where "red" denotes risk appetite breaches, "amber" attention thresholds and "green" alignment with the risk appetite. For red and amber levels, the institution pre-defines roles and responsibilities, deliverables (such as the potential need to draw up a remediation plan) and related approval processes, reporting lines and timelines. Where climate-related indicators are subject to dedicated escalation arrangements, these are clearly documented.

Observations since 2022

Newly added good practice

While almost every institution considers itself materially exposed to C&N-related credit risk, many institutions have also identified material C&N risk drivers that impact other traditional risk categories such as market risk, liquidity risk, operational risk, legal and liability risk, and reputational risk (see Section 4.1.1). Since 2022, institutions have also been expanding the KRIs to include these risk categories, beyond credit risk. Moreover, the ECB has observed that, since 2022, institutions have been expanding their KRIs to account for material nature-related risks.

The table below provides a non-exhaustive overview of observed C&N-related KRIs across various risk categories.

New information included in the table

Table 24

Non-exhaustive list of observed C&N-related KRIs for various risk categories

Risk category	Indicator type	Definition	Description
Strategic risk	Transition finance indicators	Share of the institution's exposures meeting the "sustainable" and "transition finance" criteria it has defined	One institution has included an indicator in its RAF that tracks the share, relative to total assets, of the institution's exposures that meet its criteria for "sustainable" and "transition finance". The limit requires this share to exceed a predefined percentage, with an attention threshold set above the limit. The indicator is used to steer the institution's approach to transition finance (see Section 2.1.3).
Credit risk	Portfolio (mis)alignment	Thresholds for misalignments along transition trajectory	One institution has established KRIs based on its transition trajectory. These KRIs include misalignment thresholds that are regularly monitored and reported. The thresholds move along the transition trajectory of the relevant sectors, based on the scenario the institution has used. If the sectoral portfolio exposure is above the trajectory at a given point in time, the threshold is breached and escalation arrangements are triggered in line with the institution's established governance processes.
Credit risk	Financed emissions	Financed emissions in the lending and investment portfolios	One institution has included in its RAF an indicator relating to financed emissions in its lending and investment portfolios. The methodology underlying the metric is documented.
Credit risk	Quantitative limit at sectoral level (absolute amount)	Credit risk exposures to sectors exposed to elevated climate-related risks	One institution has established a quantitative limit for sectors exposed to elevated climate-related risks. The limit is set at an absolute level (i.e. a predefined amount) and covers both transition and physical risk drivers. Predefined attention thresholds have been set below the limit. The methodology applied to set and calibrate the limit is documented. The institution is transparent in acknowledging that the limit does not yet integrate a longer-term risk perspective. One institution has defined limits on the impact of its financed activities on nature for high-impact sectors, calculated in Potentially Disappeared Fraction of Species (PDF)[15]. Additionally, it has defined concentration risk limits for corporate exposures to activities with at least one environmental pressure classified as having a potentially high or very high risk impact; and for corporate exposures with at least one high or very high sectoral dependency on an ecosystem service.
Credit risk	Quantitative limit at sectoral level or at counterparty level (relative amount)	Credit risk exposures to sectors exposed to elevated C&N risks	One institution has established a quantitative limit for sectors subject to elevated C&N transition risk as a percentage of all corporate exposures. There are predefined attention thresholds set below the limit. Another institution defined growth limits to its banking activity in high-risk sub-sectors.
Credit risk	Quantitative limit at geographic level (absolute amount)	Credit risk exposures to geographies exposed to elevated climate-related risks	One institution has established a quantitative limit for geographies exposed to elevated climate-related risks. The limit is set at an absolute level (i.e. a predefined amount) and covers both transition and physical risk drivers. Predefined attention thresholds are set below the limit. The methodology applied to set and calibrate the limit is documented. The institution is transparent in acknowledging that the limit does not yet integrate a longer-term risk perspective. One institution has defined risk limits for the concentration of real estate collateral in areas subject to environmental risks, expressed in absolute loan value, covering both climate- and nature-related risk drivers. Another institution has defined limits on the share of mortgage collateral located in areas sensitive specifically to soil subsidence. One institution that has defined a geographical risk limit, primarily focused on climate risk drivers, has expanded its methodology to include areas exposed to soil erosion in the agriculture sector.
Credit risk	Quantitative limit at client or counterparty level (absolute or relative amount)	Credit risk exposures to clients and counterparties exposed to high climate- and nature-related risks	One institution has set a limit on the share of high-risk counterparties in its portfolios. Another institution has defined limits on the number of clients that do not comply with its internal C&N risk policy, and which do not have action plans to comply to this policy within three years.

[15] See the definition of Potentially Disappeared Fraction of Species (PDF) in Section 5.1.1.

Risk category	Indicator type	Definition	Description
Credit risk	Quantitative limit at the risk-driver level	Credit exposures to specific C&N risk drivers	One institution has defined risk limits on its exposure to specific risk drivers related to targeted sensitive portfolios. For public authorities funding, it uses a limit based on the area of green surface, which functions as an indicator of heat stress and biodiversity loss. When lending to water authorities, it uses a limit based on surface water quality, which serves as an indicator of both physical risk (e.g. drinking water) and transition risk (e.g. misalignment with the targets set in the Water Framework Directive).
Credit risk	Share of low-emitting loans	Percentage of loans to corporates with a low emissions profile	One institution has set limits and attention thresholds in the event that the loans in its corporate portfolio granted to companies classified as low-emitting drop below a predefined share of its overall corporate loan portfolio. The institution has documented the methodology for classifying loans, including the scope of emissions considered.
Credit risk	Share of non-insured collateral	Percentage of non-insured residential real estate collateral in medium and high-risk areas	Several institutions have set limits on the percentage of non-insured residential real estate (RRE) collateral located in areas exposed to material physical risk hazards identified in the institutions' materiality assessments. The limits apply to newly approved loans and/or the entire portfolio and are used by institutions to monitor the effectiveness of the mitigation measures included in their lending policies.
Credit risk	Quantitative limit at sectoral level or at counterparty level (relative amount)	Credit risk exposures to sectors exposed to elevated physical risks	One institution has established a quantitative limit for sectors in its corporate portfolio that are considered to be exposed to elevated physical risks. A limit is set using (i) material physical risk hazards by sector, (ii) an assessment of sector-level sensitivity to these hazards, and (iii) an estimation of the potential financial impact (percentage of expected cashflows) of such hazards over a long-term horizon. See Section 3.4.3 for further information.
Market risk	Limit of investments in sectors with high C&N risk	Reduction of marketability of investments made in sectors with high C&N risks	Value of securities purchased by the legal entity from issuers belonging to high and medium-high C&N risk-rated sectors as a share of the total value of the group's portfolio.
Liquidity risk	Deposits vulnerable to physical risk-induced bank runs	Risk of liquidity reduction due to bank runs induced by climate-related physical events	Share of retail deposits weighted by geographical area (e.g. predefined administrative units) subject to material climate-related physical risk hazards compared with total retail deposits.
Operational risk	Coverage of C&N data	Possibility of inaccurate risk-taking due to incomplete information	Percentage of real estate assets without an EPC assessment.
Operational risk	Events disrupting the institution's normal operations	Impacts of physical climate events on the institution's operations	One institution has established a quantitative limit on the physical impact of climate change on the institution's operations. To calibrate the limit, the institution goes beyond historical losses and uses scenario analysis to assess the future impact of physical climate-related risk events on its operations.
Operational risk	Client complaints related to ESG	Risk to operations caused by C&N-related client complaints	Number of newly recorded complaints received from the institution's clients related to the institution's conduct in relation to ESG topics.
Reputational risk	Share of borrowers with high reputational risk	Reputational risk in the C&N field driven by clients	Share of borrowers with a high reputational risk for C&N factors. One institution assesses reputational risk at the exposure level during the onboarding process through a qualitative analysis. This analysis specifically considers factors such as supply chain risks and legal disputes.

Steering C&N risk with KRIs defined at relevant management levels

Newly added good practice

Expectation 4.2
Institutions are expected to develop appropriate key risk indicators and set appropriate limits for effectively managing climate-related and environmental risks in line with their regular monitoring and escalation arrangements.

The ECB observes that institutions develop and monitor related KRIs at different management levels, reflecting their specific organisational set-up and risk profile. In the practices observed, institutions do so to allocate ownership of the respective risks within their organisation, increase the coverage of material C&N risks, and improve the follow-up process for heightened risk.

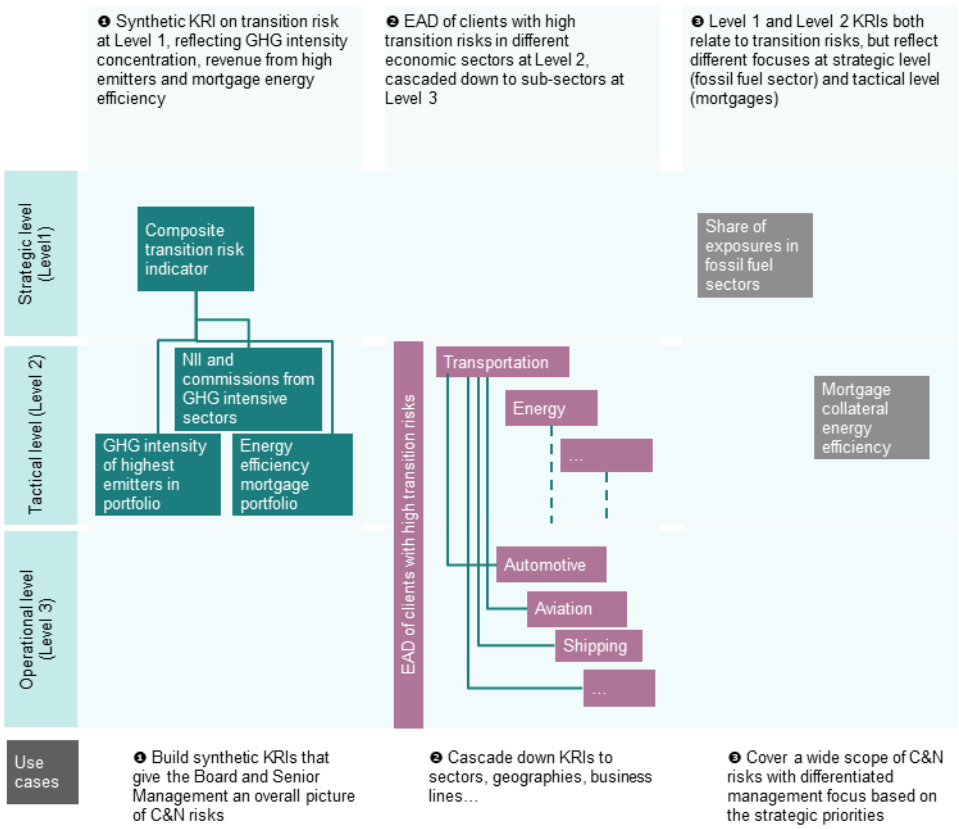
Institutions typically refer to the different levels or functional units to which KRIs are allocated as “levels”, “strategic levels” or “tactical levels”. These terms are used in the following description for purely illustrative purposes.

One institution increased the alignment of its risk appetite statement with its strategic objectives; it elevated a climate-related KRI previously monitored at the tactical level (“level 2” KRI, monitored by the risk committees) to the strategic level (“level 1” KRI, presented to the management body).

Another institution defines, at the strategic level (“level 1”), a synthetic KRI capturing different dimensions of the transition risk faced by the institution. The various components of this synthetic KRI are monitored at the tactical level (“level 2”). At other institutions, tactical climate-related KRIs at “Level 2” are cascaded down to the operational level (“Level 3”). Another observed practice is to cover different material C&N risks with KRIs defined at various levels (see Example 3 in the 8). One institution focuses its strategic indicator on exposures in the fossil fuel sector and its level 2 indicator on the energy efficiency of mortgage collateral.

Figure 8

Stylised and non-exhaustive examples of how C&N KRIs are defined at different governance levels and their related use cases



3.4.2 Good practice for risk appetite in transition planning Completing the cycle – aligning risk appetite with transition planning targets

Newly added good practice

Expectation 4
Institutions are expected to explicitly include climate-related and environmental risks in their risk appetite framework. Institutions are expected to have in place a risk appetite framework (RAF) that considers all the material risks to which the institution is exposed, that is forward-looking, in line with the strategic planning horizon set out in the business strategy and that is reviewed regularly (see also paragraph 21 of the ECB Guide to the internal capital adequacy assessment process (ICAAP)).

Para. 86 of the EBA Guidelines on the management of ESG risks

Institutions should ensure that their plans and targets are well integrated into their business strategies and that they are aligned and consistent with their risk and funding strategies, risk appetite, ICAAP and risk management framework.

Institutions adjust their risk appetite with a view to ensuring consistency with their transition plans and targets. In doing so, they differentiate their risk appetite according to the specific types of business activities and transition technologies they intend to prioritise in line with their transition planning targets.

Institutions start by gaining a deep understanding of the technologies that are relevant to meeting their transition planning targets (see Section 2.1.3 on transition products). They might then set a higher appetite for financing these technologies. At the same time, they put a set of predefined conditions in place to keep the specific risks posed by these technologies within their appetite.

For instance, one institution has set several targets for the power generation sector (e.g. in terms of the emissions intensity of its portfolio and the share of renewable energy in the energy mix it finances). The institution has set a high appetite for specific renewable energy technologies to grow its business and meet its targets. This higher appetite means that the institution aims to increase its exposures to these technologies and is willing to accept lower initial profitability and higher scale-up costs to increase financing volumes (see Figure 3 and the sub-chapter on profitability steering in Section 2.1.1). The institution found that these technologies expose clients to specific risks (namely, electricity spot market price volatility), which, in turn, create potential risks for the institution by potentially affecting the repayment capacity of the clients concerned. The institution therefore set a dedicated appetite for this risk, which it manages via specific actions set out in its sectoral policies (see the following bullet points). Moreover, it established a dedicated limit for price volatility to implement this low appetite for risk.

To manage the risks to which these technologies expose their clients while increasing financing volumes, institutions might, for instance:

- build an internal loss and default database to identify actual versus perceived risks for specific technologies (e.g. renewables);
- assess each company's expertise in these technologies and prioritise those with the most experience;
- review projects to verify the existence of revenue protection mechanisms (e.g. (corporate) power purchase agreements);
- support (prospective) clients in identifying public-private risk-sharing mechanisms;
- arrange loan syndication efforts;
- connect (prospective) clients with suppliers from its existing client base, including those it has financed as part of its effort to build expertise in transition technologies (see Section 2.1.3);

- ring-fence financing through special-purpose vehicles (SPVs) managed by a dedicated business unit and use the experience gained from these transactions to build in-house expertise (see Section 2.1.3 on transition products).

3.4.3 Good practice for physical risks in the risk appetite framework Dealing with extremes – from weather hazards to risk limits

Newly added good practice

Expectation 4
Institutions are expected to explicitly include climate-related and environmental risks in their risk appetite framework. Institutions are expected to have in place a risk appetite framework (RAF) that considers all the material risks to which the institution is exposed, that is forward-looking, in line with the strategic planning horizon set out in the business strategy and that is reviewed regularly (see also paragraph 21 of the ECB Guide to the internal capital adequacy assessment process (ICAAP)).

Institutions have expanded their approaches to integrating climate physical risks into their risk appetite framework. One institution, for instance, does this by tailoring the process for defining KRIs to the nature of its various portfolios.

For instance, for its *real estate portfolio*, the institution has established the following bottom-up process to set hazard-specific KRIs at the local level:

- **Identification of material hazards:** building on its materiality assessment, the institution identified the material physical risk hazards for the main countries featured in its commercial and residential real estate portfolios.
- **Identification of relevant exposures:** as a next step, it measured the current percentage of commercial and residential real estate assets exposed to each of the material physical risk hazards.
- **Setting KRIs:** it then set the corresponding KRIs in order to limit high exposure to such hazards.
- **Monitoring and escalation:** when the KRIs are breached, a review of the effectiveness of the institution's mitigation policies is triggered.

For its *corporate portfolio*, the has institution established a top-down process for setting a KRI to manage its exposure to corporate clients vulnerable to material physical risk hazards (see Table 24 in Section 3.4.1). Due to the complexities associated with the geographically diverse operations of its corporate clients, the approach taken by the institution is not based on individual locations, but instead relies on clients' operational activities, combining:

- **Material physical risk hazards by sector:** based on the institution's physical risk assessment and complemented with common open data sources.
- **Sensitivity analysis:** estimating the extent to which each sector could be impacted by the material physical risk hazards.
- **Impact estimation:** assessing the potential financial consequences of the material physical risk hazards as a percentage of expected cash flows, over annual intervals for the next ten years and at longer intervals up to 2050.

Institutions have also established KRIs to monitor the level of insurance protection in their portfolios (see Table 24 in Section 3.4.1).

3.5 Data governance and internal risk reporting

Institutions are devising approaches to developing reporting frameworks for C&N risks. Typically, these approaches consist of three main components: a data gap analysis, a data collection strategy, and a data management and reporting framework. This section describes observed good practices at each of these stages.

Already in 2022, the most advanced institutions typically developed C&N-related data strategies aimed at compliance with their BCBS 239 approach[16] and which are integrated into their established data governance and quality policies. They perform data gap analyses that, in addition to disclosure requirements, also take into account their risk management needs (including for internal risk reporting purposes), business objectives and commitments, if any.

Institutions collect C&N-related data from a variety of internal and external sources, establishing hierarchies that typically favour actual client data and leverage proxies when client data are not available or reliable (e.g. when they might be outdated). They roll out questionnaires to collect and/or supplement client- or asset-level data from a broad scope of clients (see also Section 4.2). When acquiring data from third-party providers, institutions assess the providers in terms of the methodologies and assumptions they use and the quality of their data. Ultimately, institutions take steps to make their IT infrastructure fit for purpose and apply intermediate solutions to allow for the immediate use of existing C&N-related data, where appropriate.

Since 2022, institutions have made significant progress in identifying the specific data they need, particularly for transition planning purposes. For instance, when assessing client transition plans, institutions collect the information they consider most relevant for the purpose of identifying risks and financing opportunities (see Section 2.2.2). Institutions have also found ways to mitigate data quality issues. They identify them (see the updated good practice in Section 3.5.1) and, for instance, assign different weights to the information depending on its quality in their client risk assessment (see Section 2.2.2). In addition, institutions have made progress in obtaining targeted physical risk and nature risk data, often leveraging publicly available scientific sources (see the updated good practices in Sections 3.5.1, 5.1.1 and 5.1.2).

[16] "Principles for effective risk data aggregation and risk reporting", Basel Committee on Banking Supervision, January 2013.

3.5.1 Good practice for data governance
Diving into data lakes – governance, processes and collection of C&N-related risk data

Expectation 6.1
Institutions are expected to develop a holistic approach to data governance for climate-related and environmental risks.

Expectation 6.2
As climate-related and environmental risks have distinctive characteristics, institutions are expected to consider adapting their IT systems to systematically collect and aggregate the necessary data in order to assess their exposures to these risks.

Expectation 6.4
An institution is expected to be able to generate aggregated and up-to-date climate-related and environmental risks data in a timely manner.

Institutions have put in place governance structures to support their C&N risk-related data strategy. This architecture is typically centralised, with institutions frequently establishing dedicated steering committees to oversee their C&N-related risk data strategies.

In one institution, the dedicated steering committee is chaired by a member of the institution's management body. Other members include several business areas, including risk functions, and representatives of local subsidiaries. The committee's decisions are binding upon all group entities and range from setting data gathering priorities to the use of specific metrics and methodologies. It also monitors the institution's data collection efforts. When carrying out its tasks, the steering committee has to take into account, among other things, the commitments voluntarily made by the institution.

Another institution places its dedicated steering committee at the helm of several work streams. The work streams cover various topics, such as foundational definitions for C&N-related data, IT infrastructure and the procurement of data from third-party providers. Several business areas, including risk functions, are involved in the work streams.

Institutions assess budget needs for their C&N-related data strategies. They allocate resources when gaps are identified.

Institutions take as a benchmark for their approach the Basel Committee on Banking Supervision's "Principles for effective risk data aggregation and risk reporting" (BCBS 239). They aim to align their C&N risk data strategy with the approach to following these principles. Institutions also put in place several layers of control for data quality checks and integrate C&N-related data in their established data governance and quality processes.

Data gap analysis

Under the aegis of their (centralised) governance arrangements, institutions have conducted a data gap analysis of C&N risks. The starting point is typically an assessment of their data needs. Alongside upcoming disclosure requirements, this analysis covers the institution's: (i) risk management needs, including for internal risk reporting purposes, (ii) business objectives, and (iii) commitments, to ensure comprehensive coverage of their assessment.

Once data needs have been identified, institutions carry out a data gap analysis. This gap analysis also covers an institution's IT infrastructure and risk data aggregation capabilities. One institution also scrutinised its own processes for possible barriers to effective data collection. For instance, it found that its internal processes do not always provide clarity about when client-level data has to be collected in the context of client transactions.

1. Data collection: Data sources

To overcome data gaps, as a first step, institutions develop tools to track the status of the data gaps, for example a centralised data catalogue. In addition, they typically try to identify synergies across various initiatives within the group or entity to overcome the observed gaps.

Table 25
Stylised and simplified example of a C&N-related data catalogue

Data type	Description (metric and methodology)	Data level	Collection deadline	Gap	Action (in case of gap)	External sourcing?	Responsible workstream
Scope 1, 2 & 3 financed emissions	Metric: CO_2 tonnes. Methodology: client emissions data and data on sectoral average emissions	Client	DD-Month-202X	Yes	Roll out client questionnaire; supplement with PCAF data	Partially (name of provider)	Name of workstream
Total financed emissions		Client	DD-Month-202X	Yes			
Exposure to client	Gross carrying amount	Instrument	DD-Month-202X	No	N/A	N/A	Name of workstream
Fuel type of vehicle	Transport fuel (e.g. gasoline)	Instrument	DD-Month-202X	No	N/A	N/A	Name of workstream
Building construction year	Year construction finalised	Instrument	DD-Month-202X	No	N/A	N/A	Name of workstream
Building floor	Floor level	Instrument	DD-Month-202X	Yes	Roll out client questionnaire	No	Name of workstream
Building EPC	EPC label of building	Instrument	DD-Month-202X	Yes	Roll out client questionnaire; supplement with external data	Partially (name of provider)	Name of workstream

Institutions collect C&N-related data from a variety of internal and external sources. Internally, institutions might source information on:

- the industry code of a given client, the exposure to this client and the maturity of the underlying instruments;
- C&N-related data at the client or asset level, such as GHG emissions or EPCs, which institutions can obtain via client questionnaires (see Section 4.2).

Institutions complement internal information with external data sources. Typically, institutions make use of several external data sources, including: (i) client disclosures, (ii) publicly available or open-source data bases, tools and registers, and (iii) third-party data providers. An institution might, for instance, use open-source tools to collect C&N risk information, including for small businesses, for example as part of the calculation of PACTA portfolio alignment.

The following table shows a hypothetical example of an institution's data sources. The overlaps of data sources it shows could mean, for example, that the institution might supplement client or asset-level data sourced through questionnaires with a public or third-party provider.

Table 26

Stylised and hypothetical example of a fictional institution's data sources

High-level data type	Internal	Client questionnaire	Client disclosure	Public	Third-party provider
Industry code	■				
Client GHG emissions		■	■	■	■
EPC of collateral		■		■	■
Client transition plan		■	■		
Flood risk exposure		■		■	■

Institutions have established hierarchies of data sources using actual client data supplemented by verified external data. Where neither of these are available, they use proxies as an interim solution. One institution, for instance, has used proxies to calculate the financed emissions of its full loan portfolio, describing limitations of the proxy-based approach which it uses as a starting point.

Institutions typically prioritise work on some of their sustainability-related data projects. The prioritised projects cover data that institutions urgently need for their wider sustainability efforts, including climate-related risk management tools. For instance, one institution prioritised data projects associated with its efforts to calculate financed emissions and assess the alignment of its portfolio with the goals of the Paris Agreement.

Newly added good practice

2. Data quality checks: high-level approaches

To improve data quality, institutions have also started to cross-check information from various sources. For example, one institution compares clients' self-reported estimates of alignment with a given pathway with estimates provided by rating agencies. Institutions also assign data quality scores depending on the source of the data (see Section 2.2.2).

3. Data collection: client questionnaires and support for data collection

Institutions typically use dedicated C&N risk questionnaires to collect client or asset-level data (see Section 4.2). Small and large institutions alike use such questionnaires to collect data from a wide range of clients. For instance, one institution extended its use of client questionnaires to include transactions with SMEs. Institutions with mortgage lending portfolios use client questionnaires to collect information on collateral. In terms of process, institutions typically embed the use of client questionnaires within their wider due diligence and client engagement procedures.

Newly added good practice

4. Data collection: nature risk

Some institutions also complement this data collection through their positive-impact product offerings. In partnership with other stakeholders such as NGOs, farming organisations and insurance companies, one institution has developed several tools to measure and monitor biodiversity and soil quality directly on site. It provides these new tools to its clients operating in the farming sector, which in turn provide environmental data to the institution. The indicators obtained cover, for instance, the client's landscape management as well as soil quality and its biological, physical and chemical properties. Such data collection allows some clients to access green-labelled financing on favourable terms (see also Table 11 in Section 2.1.3).

Additional approaches that institutions have used to overcome data gaps for nature risks are set out in Chapter 5 (see for instance Sections 5.1.2 and 5.1.3).

5. Data collection: third-party providers

5.1. Good practices applying to all C&N risk drivers

Institutions tend to rely on a combination of internal and external data. External data are often procured from third-party providers. One institution carries out an assessment of its data providers, covering aspects such as data completeness and data quality. For instance, it observed limitations related to these aspects for one potential provider. Another institution drew up a catalogue of the data-related criteria it uses to evaluate third-party providers. These criteria include the granularity of the data for both transition and physical risks, as well as the scenarios and time horizons used by providers in their methodology (see the table below for a non-exhaustive overview of observed assessment criteria).

Yet another institution includes the procurement of data from third-party providers in its internal audit plan. The corresponding review by the internal audit function found that the institution needs to increase its understanding of the sources, data and methodologies used by data providers.

Table 27

Non-exhaustive list of criteria used to assess third-party data providers

Type of criterion	Description of criterion
Data quality	Data completeness
	Data quality
Granularity of data	Coverage of acute and chronic physical risk drivers
	Geographical coverage of risk drivers
	Geolocation of assets, aggregation capabilities for companies with multiple locations
Data output	Level at which the exposure assessment is performed (e.g. asset level)
	Type of exposure metric used (e.g. loss metrics, absolute amount or percentage of overall asset value)
Methodology	Scenarios used by data provider and alignment with IPCC projections
	Time horizon covered by the forward-looking projections
Data provider	Responsiveness of data provider
	Cost

Newly added good practice

5.2. Good practices applying to physical risks

Institutions have developed more advanced strategic approaches to address their physical risk data needs.

Where institutions acquire data from third-party vendors, they typically have structured selection processes in place. The table below outlines an observed example of such a practice where the institution has implemented a multi-step approach to gather more granular physical risk data.

In parallel, the institution continues to leverage local data sources to complement vendor insights and obtain more granular information.

Table 28

Non-exhaustive overview of a structured vendor selection process to source physical risk information

Steps	Description
1. Use cases	Determination of use cases, e.g. risk identification, credit risk management, client engagement
2. Data requirements	Establishment of data requirements for geographies, hazards, scenarios, financial impact projections and other aspects that meet institutions' use cases
3. Assessment	Detailed data collection from, and assessment of, potential vendors across several dimensions, such as coverage and data granularity, to evaluate alignment with data requirements
4. Selection	Benchmarking (e.g. granularity, coverage) and in-depth discussions (e.g. to understand limitations of methodologies) with the most promising potential vendors to decide on final vendor selection
5. Integration	Integration of vendor data (e.g. translating it into use cases, adjusting IT infrastructure, testing, and updating of relevant guidelines and policies)

Another institution leverages the stress test outcomes of physical risk scenarios to prioritise data collection for risk management within precise geographical areas subject to elevated risks. For instance, for flood risk, the institution classifies financed assets for which granular data are not available according to the maximum risk level

within the assigned geographical area. Where the financed assets are located in a high flood risk area, the institution pursues targeted physical risk data strategies, such as requesting more specific geographical data from external data providers and during loan origination.

Another institution relies on publicly funded EU platforms to source more reliable and granular data on hazards. Institutions are developing expertise in processing and using data from open sources. Rather than being applied in raw form, institutions transform and complement this data with additional inputs, for instance from third-party vendors, to produce geographically detailed hazard metrics and more refined projections. Institutions then use these metrics and projections as inputs for risk assessments.

Table 29

Non-exhaustive overview of observed open data sources used by institutions

Data source	Description
Copernicus Climate Change Service (C3S) & Climate Data Store	Provides historical climate indicators, reanalysis datasets on past extreme weather patterns and climate projections produced by the European Centre for Medium-Range Weather Forecasts (ECMWF), under multiple scenarios (RCP/SSP). Institutions use this platform to generate hazard maps at asset or regional level and to estimate future hazard probabilities and severities.
Joint Research Centre (JRC) – DRMKC Risk Data Hub	Centralises and standardises risk, damage and loss data at European level (link). Contains information on several hazards. Developed by the European Commission to support risk assessment. Institutions use it as a source of historical records of floods, storms, wildfires and extreme temperatures, as well as geocoded data on past damages and economic losses.
European Environment Agency (EEA)	Provides standardised hazard indicators. Climate-ADAPT also contains data on expected climatic changes and future projections, the vulnerability of regions and sectors (e.g. infrastructure, population density and land cover), adaptation case studies and options, adaptation planning tools, and EU policy. Institutions use it to identify hotspots of physical risk across the EU and to overlay portfolio exposures.
Corine land use database	Provides standardised data on land usage and morphology at EU level. The dataset, launched by the European Commission and available on the Copernicus website or in the EEA datahub, provides territorial insights by providing information on urban, industrial and commercial areas, port and airport facilities, etc. Institutions use it for validation purposes (e.g. to create a benchmark sample) and to understand vulnerability, which is an essential complement to hazard assessments.
Various scientific international data sources	World Resource Institute – Aqueduct Water Risk Atlas; GFDRR – ThinkHazard!; World Bank – Climate Change Knowledge Portal; IPCC Interactive Atlas; NOAA.

Disclaimer: Inclusion of an observed open data source in this table does not mean that the ECB has assessed the soundness of the way in which it is applied in specific risk management approaches of institutions.

Operational solutions and IT infrastructure

Institutions establish internal procedures and infrastructure solutions to ensure that all C&N-related data, whether sourced internally or externally, are available and assigned with a golden source or single version of the truth. For instance, an institution might prepare a data dictionary, assign responsibilities for data collection and define the golden source, as well as outline control procedures, quality indicators and data remediation processes.

Institutions frequently opt for a centralised IT platform encompassing all of their sustainability-related data. This platform functions as a repository for data that are sourced both internally and externally. It also operates as a reference mechanism to establish a single source of truth for data that have been sourced and internally quality controlled. With a view to ensuring immediate usability of data already collected, one institution has rolled out a temporary IT solution pending completion of the work on the final infrastructure.

3.5.2 Good practice for internal risk reporting
On the radar – internal reporting on C&N risks

Expectation 6.3
An institution's risk reports are expected to convey the impact of climate-related and environmental risks on its business model, strategy and risk profile.

Institutions typically align their practices for internal reporting on C&N-related risks with their risk appetite frameworks (e.g. they report on the institution's C&N-related KRIs and limits), risk management tools (e.g. they report on the development of risk scores assigned to clients via the institution's dedicated credit risk assessment tool) and C&N-related business strategy (e.g. they report on the institution's performance vis-à-vis its KPIs and targets). Moreover, institutions inform the management body of developments that may impact the institution's risk profile and business model (e.g. media reports on specific clients).

Institutions typically integrate C&N-related risk reporting in their established risk management reports and follow the regular reporting frequency. C&N-related risk reporting to the management body typically takes place on a quarterly basis, with some internal reports being produced more frequently, for instance on a monthly basis.

Some institutions take intermediate steps to put the management body and senior managers in a (starting) position to make informed decisions. For these intermediate reporting practices, they focus on C&N-related risk exposures to which they find themselves to be materially exposed and for which they have already developed risk indicators. Recipients of the reports are informed that these initial reports will be expanded with additional indicators and metrics.

New information included in the table

Table 30
Non-exhaustive and stylised examples of frequently observed internal risk reporting items

High-level item reported or risk type	Frequency
Transition risk KRIs	Quarterly
Physical risk KRIs	Quarterly
Operational risk KRI	Quarterly
Reputational risk indicators	Monthly
High GHG emitting loan exposures	Monthly
Portfolio alignment: Misalignment across sectors	Annual, moving to quarterly
Institution's performance vis-à-vis C&N-related targets	Quarterly
Financed emissions (dashboard)	On demand
Portfolio alignment (dashboard)	On demand
C&N-related credit risk assessment tool scores	Quarterly
Market risk: Transition scenario assessment (price shock)	Quarterly
Liquidity risk (undrawn facilities subject to climate-related risks)	Quarterly
Risk concentrations (see Section 4.1.3.2)	Quarterly

4 Risk management

This section addresses good practices related to the risk management framework and associated processes to monitor and mitigate C&N risks. It starts with the materiality assessment, describing institutions' risk identification procedures to inform their judgement on materiality. The focus then shifts to the ways in which institutions are managing C&N risks that are material – or likely to be material. This section describes various types of risk monitoring and mitigation tools that institutions can use to manage C&N risks.

Table 31

Good practices for risk management

Section	Topic	Description	Expectation
Materiality	Identification of risk drivers [**New information**]	Transmission channels	1, 7.1
	Identification of exposures	Materiality assessments	7.2, 7.3
	Determination of materiality	Materiality thresholds [**New information**]	1, 7, 7.2, 7.7, 8.4, Principle 4(ii) (ECB ICAAP Guide)
		Material risk concentrations [**New**]	7, 8.4
Due diligence	Data collection [**New information**]	Data-driven due diligence of (new) clients	7.5, 8.1
	Controversies [**New information**]	Assessing clients for potentially controversial activities	7.5, 9.2
	Insurance data collection and monitoring [**New**]	Integrating insurance protection data	7.5, 8.1
Risk classification	Credit risk [**New information**]	Classifying debtors via a scorecard and/or integration in PD-rating systems	8.2, 8.4
	Market risk	Classifying exposures to transition risk in the trading portfolio	10
	Operational risk	Assessing physical risks to business continuity	9.1
	Reputational and litigation risk [**New**]	Managing C&N-related reputational, liability and litigation risks	9
Collateral valuations and pricing	Loan pricing [**New information**]	Integrating C&N risks into loan pricing frameworks	8.5, 8.6
	Collateral valuations [**New information**]	Reflecting C&N risks in the valuation and management of collateral	8.3
Expected credit losses and impairments	ECL and impairments calculations [**New**]	Determining expected credit losses for impairment and unexpected credit losses from C&N risks	Article 74 CRD
	Loss-tagging for physical risks [**New**]	Initial approaches to tagging physical risk-driven losses	7.3
Capital	Capital adequacy and portfolio analysis [**New**]	Allocating capital for material C&N risks as part of the ICAAP	7.6
	Capital adequacy statement [**New**]	Substantiating the level of capital needs for C&N risks in the institution's capital adequacy statement (CAS)	Principle 2 (ECB ICAAP Guide)
	Normative perspective [**New**]	Capital adequacy assessment for C&N risks in the normative perspective and implementing mutual information between the economic and normative perspectives	Principle 3 (ECB ICAAP Guide), para. 43 (ECB ICAAP Guide)
	Economic perspective [**New information**]	Determining the capital needed for climate-related risks in the economic perspective across various risk categories	Principle 3 (ECB ICAAP Guide)
	Long-term horizon [**New**]	Solutions that institutions are starting to use to extend their usual planning horizon	Paras. 44/50 (ECB ICAAP Guide)
	Additional capital costs into product pricing [**New**]	Including additional capital costs into product pricing	8.5, 8.6
	Physical risk quantification [**New**]	Using available tools and targeted approaches to quantify acute physical risks more granularly	7.3

4.1 Assessment of materiality

To conduct their assessment of materiality, institutions typically develop a well-informed understanding of all relevant C&N risk drivers and assess the ways in which – i.e. through which transmission channels – these could affect the prudential

risks they are exposed to (Section 4.1). By means of a risk identification process, institutions then assess which risk drivers are – or are likely to be – material in view of their (concentrations to) exposures. To determine materiality, the institution leverages qualitative and quantitative approaches to assess the level of risk against a predetermined materiality threshold (Section 4.1.3.1). The outcome of the materiality assessment informs the required follow-up actions for integration of C&N risks in the risk management framework (Section 4.1.3). This section describes observed good practices at each of these stages in the assessment of materiality of C&N risks. Typically, these observed practices are part of the institutions' risk identification procedure under the ICAAP framework.

Since 2022, good practices have been updated with respect to the identification of material reputational and litigation risks (Section 4.1.1.1), the updating of materiality assessments (Section 4.1.2.1), and the identification and management of material concentrations (Section 4.1.3.2). Updated good practices also concern nature-related risks as drivers of traditional risk categories (Section 5.1).

Table 32

Good practices in materiality assessments

Section	Topic	Description	Expectation
Identification of risk drivers	Transmission channels [**New information**]	Mapping out risk drivers to identify transmission channels	1, 7.1
Identification of exposures	Materiality assessments	Risk assessment methods to assess materiality of exposures	7.2, 7.3
Determination of materiality	Materiality thresholds [**New information**]	Setting materiality thresholds and follow-up actions	1, 7.2, 7.7, Principle 4(ii) (ECB ICAAP Guide)
	Material risk concentrations [**New**]	Revealing material risk concentrations	7, 8.4

4.1.1 Identification of risk drivers

Currently, more than 90% of institutions supervised by the ECB consider themselves to be materially exposed to C&N risks as drivers of existing risk categories, distinguishing between the various drivers of transition and physical risks.[17] The extent and granularity of identified risk drivers and the mapping of transmission channels vary across institutions. Advanced practices take into account the full spectrum of risk drivers stemming from climate change and environmental degradation, considering where possible their distinctive characteristics, such as their forward-looking nature. Typically, this mapping of C&N risk drivers and transmission channels is reflected in institutions' risk inventory.

[17] See Elderson, F., "Banks have made good progress in managing climate and nature risks – and must continue", *The Supervision Blog*, ECB, 11 July 2025.

In the updated good practices, institutions have made progress in identifying material reputational and litigation risks (Section 4.1.1.1) and nature-related risks (Section 5.1) as drivers of existing categories of risk.

4.1.1.1 Good practice for transmission channels
Seeing the forest from the tree – mapping climate- and nature-related risk drivers

Expectation 1
Institutions are expected to understand the impact of climate-related and environmental risks on the business environment in which they operate, in the short, medium and long term, in order to be able to make informed strategic and business decisions.

Expectation 7.1
Institutions are expected to have a holistic and well-documented view of the impact of climate-related and environmental risks on existing risk categories.

The risk management framework should encompass on-balance-sheet risks and off-balance-sheet risks, with appropriate consideration of both financial and non-financial risks, both for risks that the institutions is currently exposed to and for risks that the institution may be exposed to going forward. Institutions are responsible for implementing a regular process for identifying all material risks and including these in a comprehensive internal risk inventory.

To determine the materiality of C&N risks, institutions have developed a bottom-up risk identification process to identify relevant risk drivers. This annual procedure is organised as follows.

The risk identification procedure relies on internal and external sources of knowledge. Internally, institutions identify relevant departments along first, second and third lines of defence with specific expertise on C&N risks. Externally, the institution relies on scientific literature, climate scenarios (e.g. scenarios developed by the Intergovernmental Panel on Climate Change (IPCC) or the Network for Greening the Financial System (NGFS)) and publications from internationally renowned bodies. These inputs are used to generate an overview of relevant risk drivers related to climate change and environmental degradation. The table below outlines a non-exhaustive list of observed risk drivers.

Table 33
Non-exhaustive list of observed primary risk drivers

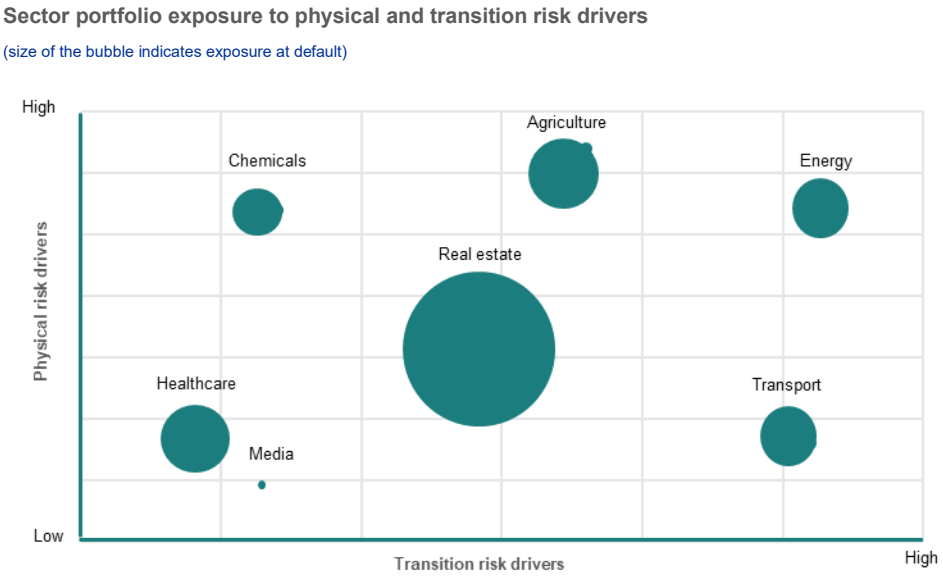
Physical risk drivers		Transition risk drivers	
Climate-related risk	**Nature risk**	**Climate-related risk**	**Nature risk**
Heat waves and wildfires	Earthquakes, volcanos	Environmental taxation and subsidies	
Droughts	Over-fishing, illegal fishing vessels, controversial practices or aquaculture techniques	Regulatory requirements (e.g. sustainability certificates, disclosures)	
Riverine and sea floods	Water stress and pollution	Behavioural changes of consumers, suppliers, employees	
Hail, storms and hurricanes	Soil pollution by hazardous materials, excessive fertilisation, soil erosion (overexploitation)	Behavioural changes of investors	
Rising sea levels	Deforestation and unconventional site clearance	Technological developments	
Changing rainfall patterns	Animal welfare (controversial living conditions, use of chemicals)	Energy and transport policies (e.g. reduction of CO_2 emissions)	Ban of certain environmentally damaging materials/chemicals
Reduced soil productivity	Invasive species/disruption of natural systems	Geopolitical fragmentation	Animal testing rules
Lack of sunshine and wind	Biodiversity loss (loss of flora/fauna)		

As a next step, institutions develop a process to determine which risk drivers could potentially have a material impact on their risk profile and operations (for example, in terms of financial losses, business disruptions or legal claims and reputational damages). Following the initial identification of risk drivers, one institution uses heatmapping to determine the severity level of each of the identified physical and

transition risk drivers for each of the sectors in which it is active (using the most granular NACE sector classification). Each driver – for example flood risk, resource scarcity or biodiversity loss – receives a severity level for each of the NACE sectors onto which it is mapped. The judgement on the expected level of severity within the next five years is informed by available data sources (e.g. emissions data, re-insurance data for extreme weather events, third-party ratings) and expert judgement by sector specialists. The overall severity for physical risks and for transition risk for each sector is decided by the highest sub-risk driver score. Dedicated interviews and workshops are organised with sector specialists to get a comprehensive view of the risks and trends. The outcome of the heatmapping exercise informs the institutions' follow-up actions in terms of measuring the materiality of the risks and allocating relevant resources within the organisation (see also the good practice for setting materiality thresholds in Section 4.1.3.1).

Chart 4

Stylised visualisation of heatmap results to identify which risk drivers are material



Newly added good practice

Identifying material reputational and litigation risks from climate transition and physical risk drivers

One institution assesses the materiality of climate-related reputational risks by evaluating two key variables: impact and probability. The institution first identifies the main reputational risk drivers derived from climate transition and physical risk factors before assessing each risk driver in terms of its probability of occurrence and potential impact. The impact variable measures the potential consequences of reputational risk events for the institution, with components such as (i) stakeholder behaviour, (ii) event sensitivity, and (iii) recurrence:

- The stakeholder behaviour assessment aims to determine how adverse events may influence stakeholders' trust or engagement with the institution, and is

carried out using external sources of information, such as the reports of NGOs or global organisations.

- Event sensitivity analyses the significance of specific reputational risk drivers for different stakeholders, using indicators derived from double-materiality surveys that link impacts, risks and opportunities to the reputational risk drivers.
- Recurrence evaluates the frequency of risk events based on historical data obtained from internal and external sources, including NGO reports and internal reporting.

For all these components, the evaluation follows a scale from “low” to “very high”. The institution enhances the assessment by including a geographical and sectoral analysis:

- For the *geographical analysis*, various dashboards and indicators from third-party data providers are used. A correction factor is then applied to the external data, accounting also for the level of exposure.
- The *sector analysis* is based on the institution’s portfolio of exposures to sectors carrying potential reputational risk.

The results are presented in a heat map showing reputational impacts by risk driver, sector, climate scenario and time horizon, and then flow into the determination of materiality (see good practice 4.1.3).

Another institution relies on diagrams to study the relationship between climate-related reputational and litigation risk transmission channels and traditional risk categories and estimates the percentage these transmission channels contribute to the respective risk category.

4.1.2 Identification of exposures

Institutions are exposed to C&N risks through their exposures to, inter alia, corporates, small and medium-sized enterprises (SME), households and sovereigns. Depending on the type of exposure, different qualitative and quantitative approaches are used to assess the materiality of the risks. Institutions typically rely on proxy-based quantification methods to identify pockets of risk based on both client data and externally sourced data. Leading institutions supplement such initial analyses with a variety of more advanced assessment methods to estimate the level of risk more accurately, including portfolio alignment approaches, sensitivity analysis and financed emissions. The observed practices described in this section include some of the qualitative and quantitative approaches that institutions use to determine the materiality of C&N risks.

4.1.2.1 Good practice for materiality assessment
Getting your feet wet – risk assessment methods to assess the materiality of exposures

Expectation 7.2
Institutions are expected to comprehensively include climate-related and environmental risks in their assessment of materiality for all of their business areas in the short, medium and long term under various scenarios.

Expectation 7.3
Institutions are expected to adequately quantify the climate-related and environmental risks that the institution is exposed to.

Depending on the type of exposure and risk driver in scope, institutions deploy different qualitative and quantitative approaches to assess the materiality of the risks. To overcome data gaps, institutions use proxy-based quantitative information. More advanced institutions use scenario analyses to assess the impact on either probability of default (e.g. through changes in client revenues/costs) or loss given default (e.g. through changes in the value of collateral) for exposures with credit risk or loss estimates for exposures with market risk and operational risk. The tables below provide a selection of observed analyses with varying levels of complexity used to assess materiality for climate physical and transition risk drivers. Nature risk assessment methods beyond climate are further detailed in Section 5.1 below.

Table 34
Selection of observed risk assessment methods to inform the climate materiality assessment

Risk driver	Complexity	Type of analysis	Portfolios in scope	Description
Physical risk	Low	Exposure analysis	Wholesale	An institution identifies physical risk drivers by sector based on the work of an international climate research agency. It assigns a sensitivity score from very low to very high to each sector taking into consideration the vulnerability of the specific economic activities (e.g. power generation) to a physical vulnerability (e.g. drought). It does so by geography, creating a sector-geography matrix of impact scores. It subsequently maps its exposures to the associated matrix and adds up its exposures by sensitivity score to produce a first heat map of geographies and physical risk drivers. The heat map is used to determine areas for deeper analysis.
	Medium	Sensitivity analysis	Trading portfolio (equity, FX, commodity)	An institution develops several stress scenarios to assess and quantify the impact on profit and loss (P&L) of extreme weather events (i.e. droughts, heatwaves, floods) for its trading book. Each scenario considers different shocks based on historical events (e.g. large/small sell-off; interest rate and FX shocks, credit spreads). A sensitivity-based simulation is performed to model the impact of shocks on individual positions, aggregating the results to determine the impact on P&L and solvency position at portfolio level.
	Medium	Business continuity analysis	Business operations and IT servers	An institution identifies relevant physical risk events affecting its personnel, data, services and facilities, and uses forward-looking flood, drought and wildfire maps from external data providers. Formulating several scenarios, the institution then assesses which of its office buildings, recovery sites and third-party vendors (e.g. data centres) may be exposed to those risk events and forms a qualitative conclusion on the materiality of the risks for each of its operations.
	High	Collateral analysis	Commercial and residential real estate	An institution performs a location-specific risk analysis to quantify physical risks using geospatial mapping and local geographical characteristics (e.g. building type, the type of surrounding terrain, the features of the construction, (public) transport routes). Using natural hazard maps (e.g. for floods, droughts and wildfires), the model constructs vulnerability curves for building type clusters at postal code level. This allows the institution to calculate risk estimates, also taking into account any general hazard protection and/or building-specific mitigation that may be in place. These risk estimates are translated into expected damages and losses to the collateral portfolio.
Transition risk	Low	Exposure analysis	Commercial and residential real estate	An institution maps its exposures to buckets of energy performance certificates and breaks these down into clients with low, medium, high and very high risk using its internal classification system. This provides an overview of exposures to high-risk clients that may be particularly affected by rising energy costs and/or may have limited means to invest in renovation measures.
	Low	Country analysis	Sovereigns	An institution evaluating the risk that a country could accumulate payment arrears on its external debt due to climate risks. The methodology is built on publicly available data sources for transition risk (e.g. dependence on energy imports, CO_2 emissions per capita,

Risk driver	Complexity	Type of analysis	Portfolios in scope	Description
				energy production mix, energy intensity of GDP) and physical risk (e.g. agriculture share in GDP, share of population living below a given elevation). The analysis also takes into account countries' climate policy frameworks. The assessment yields a view of the concentration of exposure to sovereigns with elevated climate risks.
	Medium	Qualitative scenario analysis	All	An institution assessed reputational risks, including those related to potential greenwashing and financing of polluting industries. The institution defined a set of scenarios and mapped the possible affected stakeholders (e.g. investors, clients, authorities and interest groups) and the P&L area that would be most affected. In a second step, the institution quantified, based on expert judgement, and considering historical loss figures, possible losses that could arise using specific case studies. The experts individually estimated lowest, highest and median plausible values for losses within a given confidence level. These were discussed and adjusted in dedicated workshops before they were aggregated to produce a quantitative approximation.
	High	Portfolio alignment	Commercial and residential real estate	An institution uses a carbon risk real estate risk monitoring tool to measure whether its real estate portfolio is aligned with EU decarbonisation scenarios. In addition to data on a building's energy consumption, the institution collects relevant climate risk metrics for each collateral (e.g. building type, renovation measures, building materials, EPCs, public transport connections). An institution assesses the likelihood of collateral becoming non-compliant with EU regulations (i.e. a stranded asset) and develops a view on materiality for its real estate portfolios.

4.1.3 Determination of materiality

The good practice below describes the thresholds that institutions have used in this context and the follow-up actions taken in direct response to identified areas of material risk. These follow-up actions should be read in conjunction with other good practices set out in this report.

4.1.3.1 Good practice for setting materiality thresholds

Better an egg today than a hen tomorrow – setting materiality thresholds and follow-up actions

Expectation 1
Institutions are expected to understand the impact of climate-related and environmental risks on the business environment in which they operate, in the short, medium and long term, in order to be able to make informed strategic and business decisions.

Expectation 7.2
Institutions are expected to comprehensively include climate-related and environmental risks in their assessment of materiality for all of their business areas in the short, medium and long term under various scenarios.

To form a final judgement on materiality, institutions typically develop a threshold against which the outcome of the materiality assessment is assessed (see good practice 4.1.2.1 for an overview of such assessments). These thresholds can be quantitative or qualitative, depending on whether a quantitative assessment of materiality is feasible. Amongst other things, the following threshold types have been observed in the context of C&N risks. Depending on its solvency and liquidity position, the institution sets a maximum threshold for each of the threshold types.

- Capital impact – the level of capital at risk in the normative (e.g. Common Equity Tier 1 ratio) and economic perspective (e.g. economic capital).
- Liquidity impact – the level of net outflows in the normative (e.g. liquidity coverage ratio) and economic perspective.

- Qualitative assessment – the qualitative assessment of the risk event and its expected impact in terms of adverse consequences for the institution's reputation or ability to be compliant.
- Concentrations – the size of the exposure that is affected by the risk event relative to total exposure. Risk concentrations can lead to material impact under relatively mild market conditions (see also the newly added good practice in Section 4.1.3.2 on material risk concentrations).

After the determination of materiality, institutions take a variety of actions to ensure that their risk management framework and processes effectively address these material risks and a strategic approach is adopted to ensure the resilience of their business model. The table below provides a non-exhaustive list of observed practices in this regard.

Table 35

Non-exhaustive list of observed follow-up actions after determination of materiality

Type of action	Description
Risk inventory	Institutions update risk inventory with any newly identified material C&N risk drivers. This includes a mapping of the various C&N risk drivers, their transmission channels and theoretical impact on prudential risk categories.
Sector policies and strategies	The materiality assessment is used to inform sector policies and strategies. For example, by deciding to reduce exposure to certain climate-sensitive activities, client types or sectors and/or increase exposure to climate-resilient ones.
Risk appetite limits	The materiality assessment is used to recalibrate sector limits in the risk appetite statement. For sectors that are sensitive to physical and/or transition risks, the institution deploys haircuts to the institution's exposure at default sector limits. These haircuts range from 5% to 10% depending on the level of sensitivity.
Stress testing	The materiality assessment is used for a re-assessment of the risk coverage in the institution's standardised stress tests as well as may trigger ad hoc stress test on specific C&N risk drivers.
Capital allocation	Institutions allocate economic capital specifically to the management of material transition and physical risk drivers. In the various cases, economic capital is allocated to either credit, market or operational risk, typically based on the outcome of climate-related scenario analyses (e.g. NGFS scenarios, business continuity scenarios). In some cases, institutions have decided to reflect C&N risks as part of the management buffer, in the normative perspective (see Section 4.6 for updated good practices on ICAAP).

Newly added good practice

Expectation 7.7
Institutions are expected to explicitly include climate-related and environmental risks in their risk appetite framework.

Principle 4(ii) (ECB ICAAP Guide)

Taking a comprehensive approach, including all relevant legal entities, business lines and exposures, the institution is expected to identify at least annually risks that are material, using its own internal definition of materiality. This risk identification process is expected to result in a comprehensive internal risk inventory.

Regularly updated risk inventory

Institutions adopt several approaches to update their materiality assessments. Common approaches include processes to regularly enhance these assessments as institutions use improved methodologies and data (for instance, institutions work to refine approaches that take into account the complexities of material risk concentrations (see Section 4.1.3.2)).

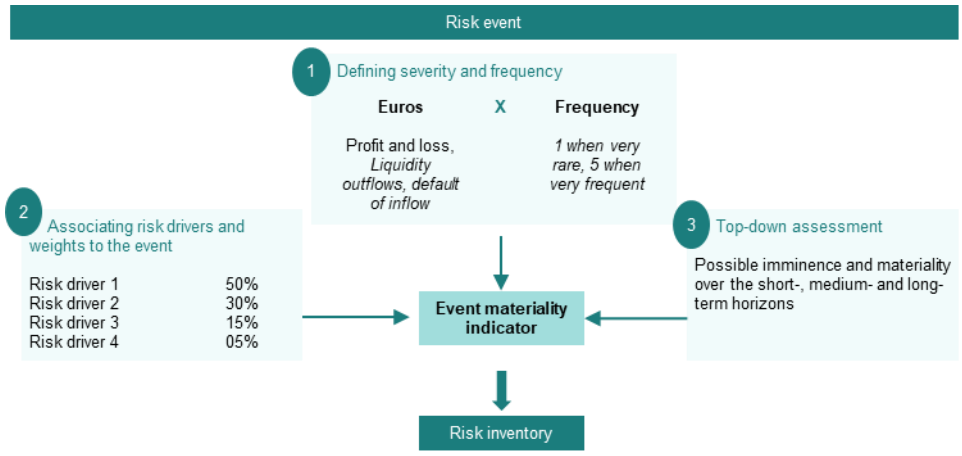
In addition to these common processes, one institution has integrated C&N risks into its bottom-up risk reporting process to continuously update its materiality assessment (see Figure 9). It uses this process to determine the materiality of certain risk events and to monitor the evolution of risk driver impacts, as well as their relative importance.

First, for each potential and documented risk event, risk owners must input event data into a centralised platform, indicating the severity and the frequency of such

events. The final materiality indicator is the product of the severity in euro and the frequency score. Second, each risk event is associated with one or several risk drivers that favour, trigger or aggravate the risk event. When several risk drivers are associated with one event, weights are attributed to the drivers to reflect their explanatory force. Consequently, for a given risk event, it is possible to distribute the risk event's materiality across each of the underlying C&N risk drivers. Lastly, the materiality assessment is complemented by a top-down assessment of the possible imminence of the risk event and of the trend in the risk event's materiality over several time horizons. The bottom-up and top-down assessments are combined into a risk inventory and into heat maps of the main risks, which feed into the Internal Capital Adequacy Assessment Process (ICAAP) and Internal Liquidity Adequacy Assessment Process (ILAAP).

Figure 9

Stylised representation of a risk identification process based on risk events



Sector policies and strategies

One institution assesses the materiality of the impact of climate change and environmental degradation on its business environment, regularly performing deep dives, including with a specific focus on the impact of policy and regulation for each of the key sectors it is active in. The outcomes are integrated in the materiality assessment and business strategy. The business strategy is integrated in the institution's policies and procedures, with regard inter alia to the due diligence of counterparties (e.g. supply chains analysis), the data aggregation processes (e.g. for the energy performance of buildings, the CO_2 emissions of vehicles, the carbon footprint calculations for SMEs and corporates) and client engagement (e.g. requiring realistic phase-out plans from the coal sector). The table below describes observed practices in this regard.

Table 36

Stylised example of institutions' strategic response to material risk by sector

Sector	Identified C&N risks	Strategic response [New information]
Energy	Elevated risk of stranded assets among fossil fuel industries Strategic risk associated with rapid deployment of renewable energy sources, driven by technological innovation Rising exposure of clients to extreme weather (e.g. floods)	Strategic targets and product offering rules to improve risk profile of high-transition risk clients;, risk-based phase-out plan from coal Enhance expertise to understand risks specific to renewables projects and associated strategy to expand financing of related technologies, such as wind, solar, smart grids and charging infrastructure for electric vehicles For institutions that provide insurance products, broadening the offer of such products against damages caused by extreme weather events and incentivising their uptake to overcome data gaps related to changes or cancellations of external insurance policies
Commercial real estate and mortgages	Elevated transition risk due to comparative inefficiency of buildings (collateral)	Estimate the carbon footprint of individual clients based on gas and light bills to support targeted increases in credit for building renovation and energy performance measures Strategic targets and adjusted product offering to improve risk profile of energy-inefficient buildings (taking into account their energy performance), monitoring build-up of transition risk in the portfolio (% of energy-inefficient buildings financed) Provide support tools for clients to monitor and optimise the energy consumption of homes
Transport	Elevated transition risk associated with public incentives and increasing market sentiment for electric vehicles Elevated transition risk associated with carbon pricing of transport, emissions regulation of vehicles and planned prohibition of ICU vehicles	Engagement with transportation clients relying on broadly inefficient vehicles to develop a tailored business proposition Developing credit and insurance products tailored to electric vehicles and accessories, such as charging stations, solar panels and home batteries
Agriculture	Elevated credit risk due to, inter alia, droughts and heat waves reducing crop yields, sea temperature rises affecting fisheries Elevated transition risk associated with regulation and pricing of air, water and land pollution	Adopting biodiversity criteria in the credit policy, restricting financing to activities which impact protected areas Advisory and financial support for sustainable investments, with a focus on more climate-resilient cultivations, new irrigation technologies, geographical diversification, installation of renewable energy technologies

4.1.3.2 Good practice for identifying material risk concentrations
Crossing the boundaries of risk silos – revealing materiality from risk concentrations

Newly added good practice

Expectation 7

Institutions are expected to incorporate climate-related and environmental risks as drivers of existing risk categories into their risk management framework, with a view to managing, monitoring and mitigating these over a sufficiently long-term horizon, and to review their arrangements on a regular basis. Institutions are expected to identify and quantify these risks within their overall process of ensuring capital adequacy.

Furthermore, they are expected to pay particular attention to concentrations within and between risk types that climate-related and environmental risks may cause.

Expectation 8.4

Institutions are expected to monitor and manage credit risks in their portfolios, in particular through sectoral/geographic/single-name concentration analysis, including credit risk concentrations stemming from climate-related and environmental risks, and using exposure limits or deleveraging strategies.

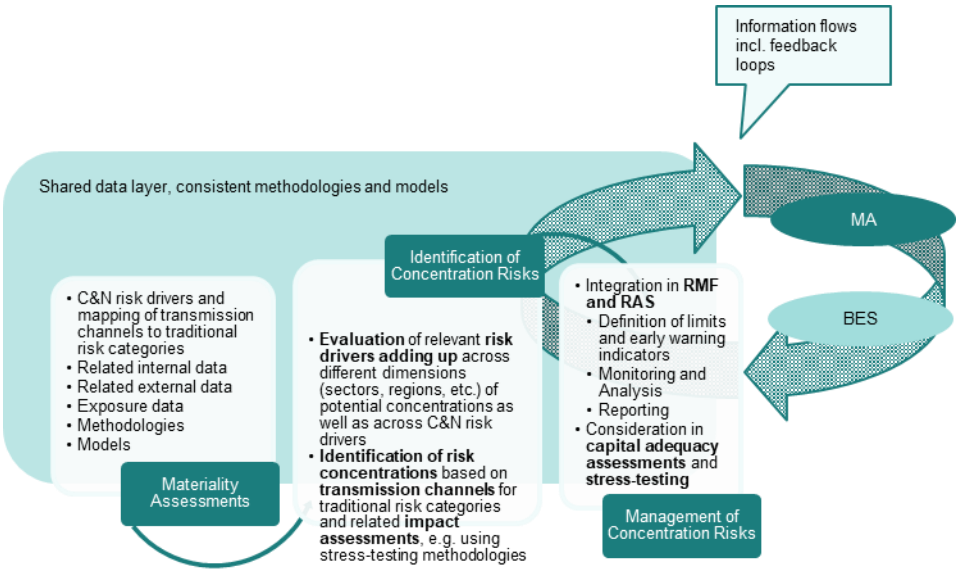
Institutions that consider C&N-related concentrations in their materiality assessment demonstrate an awareness of numerous complex interrelations that exist between different C&N-related risk drivers, as well as the interconnections between traditional risk categories. Institutions that apply these good practices conclude that impacts related to C&N risk drivers that are not identified as material when considered in isolation – such as at the level of a single climate-related risk driver or traditional risk category – can be material when assessed in combination. For instance, commonalities in transmission channels (see also Section 4.1.2.1) shared between different exposures and/or related collateral may lead to impacts on one or more traditional risk categories, such as credit and market risk, materialising in parallel. The reason for this is that all exposures sharing these common dimensions would be affected by the same C&N-related risk event(s).

Governance and embedment into materiality assessment and business environment scan

Institutions integrate C&N risk concentration analyses into the materiality assessment (see also Section 4.1.2.1) and business environment scan processes. They take into account feedback loops based on the outcomes of the concentration assessment, as shown in Figure 10. Concretely, institutions that identify areas of material risks related to concentrations not revealed at the level of a single C&N-related risk driver or traditional risk category enhance the outcome of their materiality assessment by defining the respective risk driver(s) and related traditional risk categories as material for the time horizon(s) shown by the assessment to be relevant. Institutions with good practices that have defined additional C&N risk drivers as relevant for their business activities have enhanced their business environment scan practices to comprise and specifically address these drivers.

Figure 10

Stylised example of institutions' governance and procedures for assessing risk concentrations and how these are embedded in the overall materiality assessment (MA) and business environment scan (BES)



Institutions with good practices in identifying how C&N-related risk drivers contribute to material risk concentrations build on:

(i) the full set of C&N risk drivers identified as part of the materiality assessment; and

(ii) a mapping of relevant transmission channels to each of the traditional risk categories and the corresponding dimensions of related concentration risks, as outlined below in Figure 11.

Figure 11 shows the foundation of institutions' materiality assessments that can be considered good practice, combining a bottom-up view that identifies all relevant transmission channels, maps C&N risk drivers to exposures and assesses the respective impacts on traditional risk categories at the exposure level, with a top-down perspective that aggregates potential impacts across different dimensions, such as sectors, collateral or geographies, for each of the traditional risk categories. Building on these results, institutions assess materiality by considering any risk concentrations revealed on the basis of the aggregated C&N risk-related potential impacts for each of the traditional risk categories. Institutions perform this type of assessment not only by aggregating impacts along relevant dimensions within each traditional risk category, but also across categories.

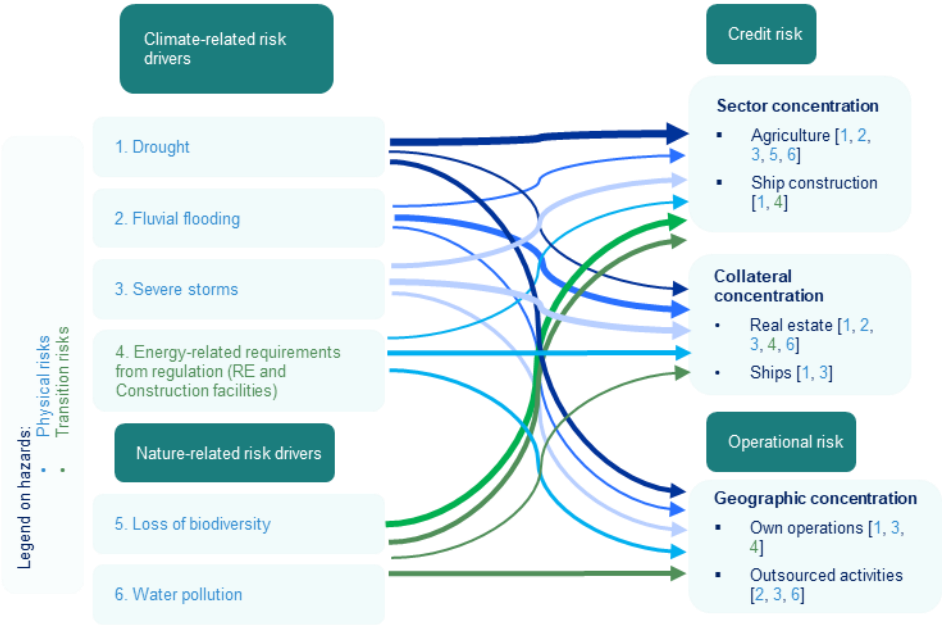
For instance, as shown in Figure 11, climate-related risk drivers such as drought and severe storms may result in higher credit risk for an institution's clients active in sectors such as agriculture and shipping (sector dimension), while the shipping

sector is also subject to risk concentration when it comes to collateral (collateral dimension). Furthermore, fluvial flooding may impact the credit risk to which the institution is exposed through its agriculture exposures, as well as through real estate collateral, while potential impacts on operational risks might add to the institution's overall risk exposure due to its own operations and outsourcing.

Institutions applying these practices might conclude that, even though each potential impact may be below the materiality threshold, an assessment that aggregates across C&N risk drivers and traditional risk categories demonstrates that the institution is materially exposed to C&N risks. For stylised examples on how these assessments and aggregations can be put into practice, see the tables below in the section titled "Specific aspects of the integration into risk management".

Figure 11

Stylised and non-exhaustive example of observed practices for assessing potential impacts of C&N risk drivers on different traditional risk categories through concentrations across different dimensions



Notes: The dimensions observed relate to sectors, regions, single names, products, collateral types and guarantees as well as large exposures. The size of the arrow indicates the magnitude of the concentration in the dimension concerned.

Institutions applying good practices for assessing the materiality of C&N risk-related concentrations typically:

- Use quantitative data and qualitative information, as well as forward-looking methodologies, such as dedicated assumptions for different scenarios that consider the combined impacts of C&N risk drivers on portfolios (e.g. for sectors such as shipping or agriculture). They also combine qualitative narratives and corresponding quantitative implications as part of scenario analysis in stress-testing.

- Perform dedicated assessments of risk concentrations covering all time horizons defined by the institution for the short, medium and long term as defined in the institution's materiality assessments, irrespective of the degree of materiality assessed in isolation.
- Have evaluation tools that aggregate data from various sources in their IT infrastructure, allowing for assessments across different concentration dimensions relevant to the institution's business model and risk profile across different traditional risk categories. These tools also allow the institution to consider physical and transition risks in combination. Institutions define their data and IT strategy so that adjustments can be made to the assessment, identification and evaluation of material risk concentrations in response to changing needs (e.g. in view of external developments). Institutions consider, for instance, dimensions such as sectors, geographical regions, single names, products, collateral types and guarantees, and/or large exposures.

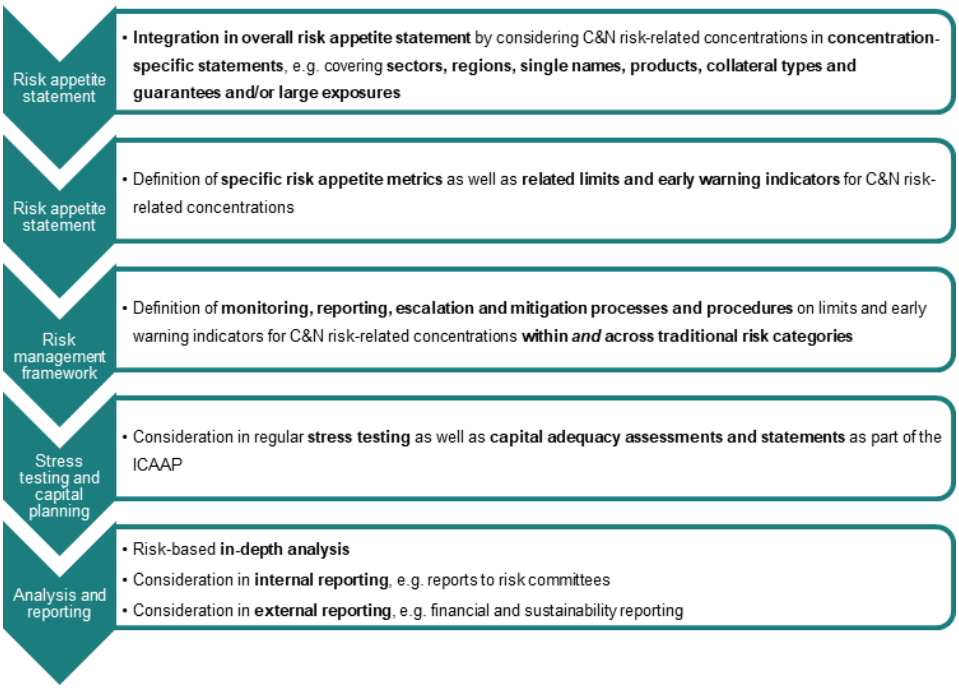
Institutions often base their assessments on stress-testing methodologies, reflecting a consistent approach in terms of the parameters used and the level of judgement regarding materiality.

Assessment of materiality and integration into risk management

Institutions with good practices integrate C&N-related risk concentrations into their risk management frameworks (RMF), including concentration-specific key risk indicators (KRIs) and thresholds. For example, they may limit their sector exposure subject to material drought-related risks, or their exposure to collateral vulnerable to flooding. Furthermore, institutions consider the impacts of C&N-related risk drivers leading to material concentration risks in stress-testing and capital adequacy assessments – including by using scenarios catering to areas of higher risk concentration and specifically addressing high-risk areas in the capital adequacy assessment. They do this, for instance, by modelling impacts on major assets serving as collateral, as well as the financial impacts on corporates and their value chains.

Figure 12

Stylised and non-exhaustive overview of efforts made by institutions to integrate concentration risks into RMF and RAS and further processes for stress-testing, capital adequacy assessments and various reporting purposes



For areas of higher concentration risk or continuous increases over time, institutions perform in-depth quantitative and qualitative analyses. They use the findings and insights into prevailing concentration risks to define potential risk-mitigating or strategic responses for internal risk reporting and to inform external reporting and disclosure, depending on materiality and related internal or legislative requirements.

Institutions with good practices incorporate the following into their management reporting: (i) information derived from dedicated in-depth analyses targeting areas with higher concentration risks (the sectors described in the example given below); and (ii) the strategic implications of potential responses, as part of management and mitigation measures to decrease the risk from concentrations as well as any strategic implications for the business model and related strategy going forward (see examples in the following sub-paragraph).

Figure 13

Stylised and non-exhaustive example of how institutions conduct in-depth analysis and integrate risk concentrations into their monitoring and reporting as part of their RMF

Specific aspects of the integration into risk management

Institutions with good practices consider different C&N risk drivers occurring simultaneously. These institutions find that, while impacts from C&N risk drivers may not simply add up, they often show interrelations and tend to magnify each other (e.g. drought and loss of biodiversity). This, in turn, amplifies the potential financial impact on institutions' exposures (see the following non-exhaustive and simplified examples).

These institutions also find that C&N risk drivers may compound the vulnerability of the affected assets to traditional risk drivers and that typical strategic responses, such as divesting investments in the event of an increase in transition risks due to policy changes, may be harder to implement. This might be the case because such investments are not typically traded in active markets, while the valuation impact from the heightened transition risk would make it even harder to find a buyer, potentially leading to the need to sell at a steep discount.

The first example below regarding credit risk across climate-related and nature risks considers *concentrations within the traditional risk categories* while jointly assessing C&N risk drivers. While the first table shows concentrations by sector, the second one shows concentrations by geographic regions. Institutions carry out these analyses for each traditional risk category and for each time horizon in line with their materiality assessment process.

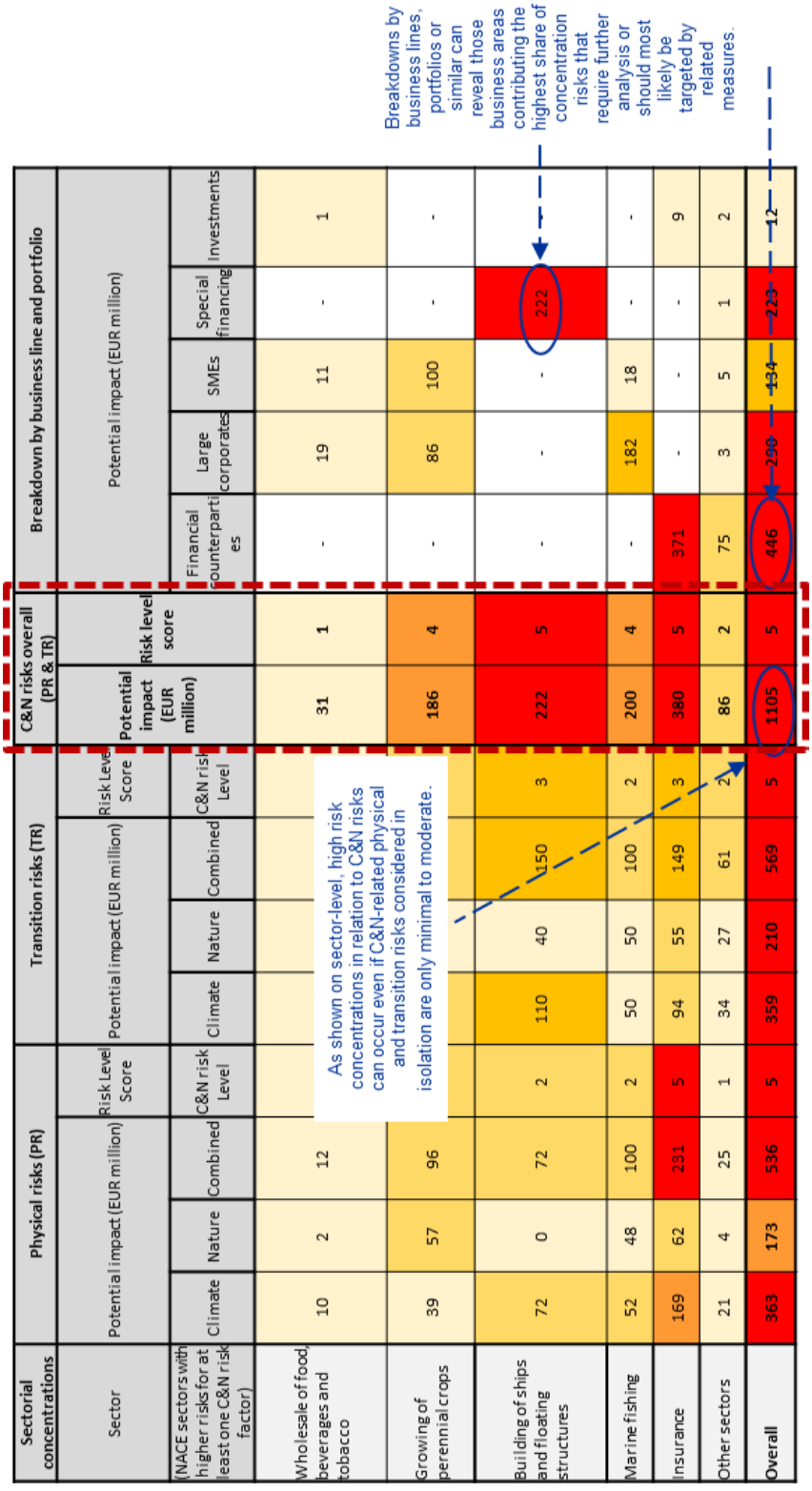
Institutions perform the same or similar types of analyses to assess concentrations across further dimensions of risk concentrations, such as single names, products, collateral and guarantees, and/or large exposures. Institutions also include critical third-party providers in their assessment.

The tables below show several stylised examples. Institutions use various approaches to tailor the processing of risk information to different risk management needs and reporting purposes. They might, for instance, add relative amounts to

allow for a comparison between the potential impact of a C&N risk driver on a given sector and the institution's overall exposure to that sector.

Table 37

Different stylised and non-exhaustive examples of institutions' assessments of material risk concentrations by sector and region within traditional risk categories



Regional concentrations*	Physical risks (PR)				Transition risks (TR)				C&N risks overall (PR & TR)		Breakdown by business line and portfolio				
Region	Potential impact (EUR million)			Risk level score	Potential impact (EUR million)			Risk level score			Potential impact (EUR million)				
(Regions with higher risks for at least one C&N risk factor)	Climate	Nature	Combined	C&N risk level	Climate	Nature	Combined	C&N risk level	**Potential impact (EUR million)**	**Risk level score**	Financial counterparties	Large corporates	SMEs	Specialised financing	Investments
Region 1	27	1	28	1	44	3	47	1	**75**	**2**	6	25	39	2	3
Region 2	89	152	241	5	49	151	200	4	**441**	**5**	207	153	12	20	49
Region 3	46	2	48	1	43	7	50	1	**98**	**2**	41	1	3	39	14
Region 4	51	3	54	2	45	10	55	2	**109**	**3**	26	8	32	40	3
Region 5	105	43	148	3	47	14	61	2	**209**	**5**	31	12	9	157	-
Other regions	16	1	17	1	42	2	44	1	**61**	**2**	16	12	4	7	22
Overall	**334**	**202**	**536**	**5**	**270**	**187**	**457**	**5**	**993**	**5**	**327**	**211**	99	**265**	91

* Including risks related to third-party providers where relevant

Legend:

Potential impact	Risk level	Potential impact (EUR million) (e.g. capital, P&L, etc.)	Materiality threshold (e.g. threshold of >150)
Minimal	1	≤ 50	No
Moderate	2	> 50 and up to 100	No
Medium	3	> 100 and up to 150	No
High	4	> 150 and up to 200	Yes
Very high	5	> 200	Yes

These institutions define mitigating short-term measures or strategic adjustments, such as:

- enhancing requirements for insurance or guarantees;
- diversifying business while reducing relative exposure to higher risk exposures over time; or
- limiting new business to exposure that is collateralised by a certain type or quality of asset.

Institutions assess material risk concentrations at the counterparty level for steering purposes. They also break down concentrations by business lines, portfolios or similar dimensions to reveal those business areas generating the highest share of material risk concentrations for further analysis or targeted measures to be considered and potentially implemented at the business unit level. Furthermore, institutions enhance their analyses by breaking down their exposures into sub-portfolios or certain products that carry instrument-specific risks. This might include, for example, long-term and less liquid investments, leveraged finance loans or SME exposures.

Table 38

Stylised and non-exhaustive example of institutions' assessment of risk concentrations by sector across traditional risk categories

Sectorial concentrations	Overall C&N risks combined (PR & TR)																Breakdown by business line and portfolio					
Sector	Credit risk		Market risk		Liquidity risk		Reputational/ legal risk		Operational risk		Strategic risk		Overall risk		Limit-monitoring	Pot. Imp. (EUR million)					
(Sectors with higher risks for at least one C&N risk factor)	Pot. Imp. (EUR million)	Risk level score	Pot. Imp. (EUR million)	Risk level score	Pot. Imp. (EUR million)	Risk Level Score	Pot. Imp. (EUR million)	Risk level score	Pot. Imp. (EUR million)	Risk level score	Pot. Imp. (EUR million)	Risk level score	Pot. Imp. (EUR million)	Risk level score	Limit-breach sector concentration	Financial counterparties	Large corporates	SMEs	Special financing	Investments
Wholesale of food, beverages and tobacco	31	1	16	1	9	1	72	2	83	2	7	1	218	5	-	-	132	79	-	7
Growing of perennial crops	186	4	7	1	109	3	12	1	79	2	5	1	398	5	-	-	129	269	-	-
Building of ships and floating structures	222	5	14	1	147	3	49	1	188	4	84	2	704	5	4*	-	-	-	704	-
Marine fishing	200	4	11	1	23	1	67	2	52	2	2	1	355	5	-	-	284	71	-	-
Insurance	380	5	107	3	92	2	28	1	33	1	59	2	699	5	-	586	-	-	-	113
Other sectors	86	2	17	1	23	1	5	1	16	1	1	1	148	3	-	92	21	12	9	14
Overall	1105	5	172	3	403	5	233	5	451	5	158	4	2522	5	4	678	566	431	713	134

*based on a limit of 700

Institutions assess the impact of relevant C&N risk drivers on *traditional risk categories considered jointly*, i.e. in combination, to capture the potential overall impact on P&L and capital arising from C&N-related risk drivers across different time horizons. In view of the complexities and uncertainties this entails, institutions might use a simplified approach by adding up potential impacts from risk drivers and categories with the aim of striking a balance between avoiding double-counting of C&N risk-related impacts and underestimating non-linearities and correlations. Institutions with good practices refine their assessments accordingly, as the data landscape, knowledge of transmission channels and methodological approaches to reflecting interlinkages between climate and nature physical risks evolve.

Similarly to Table 37, the analysis in Table 38 is carried out for each time horizon in line with the institution's materiality assessment. Institutions apply the same type of analysis by assessing concentrations along further dimensions, such as geographic regions, single names, products, collateral and guarantees, and/or large exposures.

4.2 Due diligence

Institutions have established client due diligence procedures that address C&N risks. Such procedures are often the first interaction institutions have with their clients on C&N risks. Typically, institutions perform a screening of the client in relation to exclusion criteria set in lending policies, then proceed with collecting relevant data through client questionnaires. Thereafter the institution forms a view on the level of risk and makes a subsequent credit decision (for example on granting credit or intensifying monitoring). More advanced practices take a granular approach that is fully integrated into the risk management framework which also covers existing clients, while more basic practices tend to stay more general and focus only on new clients.

Some institutions use the due diligence procedure to form a view on the level of credit risk the client has, while others take an approach from a reputational risk point of view. The former case is covered in the first good practice described in this section, while the latter is addressed by the second good practice.

Since 2022, institutions have been enhancing their approaches to better understand their clients' exposure to physical risks, including insurance coverage (Sections 4.2.1 and 5.1.3), and to reputational risks (Section 4.2.2). Institutions have also made progress in assessing client-specific risk attributes and in using these assessments as part of their transition planning processes (Sections 2.1.1 and 2.2.2).

4.2.1 Good practice for data collection
Better safe than sorry – data-driven due diligence of (new) clients

Expectation 7.5
Institutions are expected to conduct a proper C&E due diligence, both at the inception of a client relationship and on an ongoing basis.

Expectation 8.1
Climate-related and environmental risks are expected to be included in all relevant stages of the credit-granting process and credit processing.

Several institutions have developed advanced approaches to embedding C&N risks into their client due diligence and lending policies. These typically consist of the following steps:

1. Lending criteria

The starting point for integrating C&N risks into client due diligence and lending policies is generally to establish lending criteria for sectors and/or activities that are in line with the institution's risk appetite. Such criteria can take the form of exclusion criteria used to determine which activities are deemed non-acceptable to finance from a C&N risk perspective, or phasing out criteria incorporating a forward-looking perspective by setting long-term targets to limit concentration or to phase out certain types of exposure. By applying such risk-based lending criteria, institutions start to manage their appetite for C&N-related risks. Examples of these types of criteria are as follows:

- Exclusion criteria: For example, no financing of companies that rely on coal for more than 25% of their energy mix.
- Phasing out criteria: For example, setting targets to phase out exposures to certain CO_2-intensive sectors by a set date, thereby also limiting the maximum loan duration for new debtors.

2. Data collection and risk assessment

For clients not excluded from financing based on these criteria, the institution continues the due diligence by performing a client-level risk assessment. In order to develop such a view, the institution puts in place in a client questionnaire to collect the client and asset-specific data needed to assess relevant transition and physical risk drivers. This includes both quantitative and qualitative risk data. The table below provides a non-exhaustive overview of observed practices in this regard.

Table 39

Non-exhaustive list of data items collected to inform risk assessment during due diligence

Type of data	Data	Description	Targeted risk driver
Quantitative data	Current and projected total GHG emissions	An estimate of the total current and projected GHG emissions of financed assets broken down by Scope 1, 2 and 3 emissions (e.g. tCO_2 or tCO_2e/t produced product)	Transition risk (e.g. policies and regulations)
	Fossil fuel dependency	Production, processing, distribution, storage, or combustion of fossil fuels (percentage of revenues/production volumes)	Transition risk (e.g. policies and regulations)
	Geographical location data	Granular data on the geographical location of financed assets and/or main client activities (e.g. postal codes)	Physical risk (e.g. flooding)
	Energy consumption intensity	An estimate of the energy consumption of clients (e.g. gigawatt hours – GWh), including a split of the share of (non-)renewable sources	Transition risk (e.g. policies and regulations)
	Water consumption intensity	An estimate of the water consumption of client activities in million m3	Physical risk (e.g. water stress)
	Energy performance certificate	EPC for both residential and commercial real estate	Transition risk (e.g. market sentiment or regulation)
	Sustainable building certificate	Sustainability certificate for construction projects (e.g. BREEAM or LEED)	Transition risk (e.g. market sentiment or regulation)
Qualitative data	Adverse media check	Is debtor involved in controversies related to climate change and/or nature degradation?	Reputational and liability risk
	Assessment of impact of C&N regulations	Does the debtor assess the impact of upcoming regulations related to climate change and nature degradation?	Transition risk (e.g. policies and regulation)
	Adherence to sustainability reporting	Does the debtor adhere to sustainability reporting standards (e.g. CSRD)?	Reputational and liability risk
	Implementation of C&N risk policies	Does the debtor have policies in place that address key possible C&N risk issues occurring in its operations?	Transition and physical risks (e.g. biodiversity loss)
	Production, use or disposal of chemicals	Does the debtor produce, use or dispose of chemicals?	Transition risk (e.g. consumer preferences)
	Time-bound emission reduction plans	Does the client have time-bound plans in place to align its GHG emissions with, for example, the Paris Agreement objectives?	Transition risk (e.g. policies and regulations)

Institutions then leverage such data sources to form a view of the level of risk, often translating this view into client-specific C&N risk ratings, including transition plan/transition risk ratings. Such ratings typically indicate risk differentiation (for example, high, medium or low risk). This also allows the institution to rank clients along certain dimensions, such as sector classification, and thereby assess a given client relative to its peers.

Since 2022, institutions have, among other efforts, enhanced the information they collect for transition planning purposes, for instance to enable them to assess their clients' transition plans (see Section 2.2.2). Institutions have also enhanced the way they tie their product offering to the risk classification of their clients as part of their transition planning processes (see Section 2.1.1).

Newly added good practice

Updates relating to physical risks

In addition, several institutions have started to collect more specific data on physical risk in order to classify corporate clients based on their physical risk exposure and

mitigation and adaptation capabilities. To this end, institutions use client questionnaires that capture, for example:

- location and specifications of the main assets and infrastructures;
- mitigation and adaptation measures taken and planned (see also good practice 2.2.2 on client transition plans);
- information on the integration of physical risk in the supplier selection process and on post-disaster replacement of the client's main suppliers.

In some cases, the questionnaires are tailored to sector-specific aspects. For companies in the power sector, for example, institutions collect:

- address-level information on power plants and transmission lines;
- information on recent hazard impacts, such as water shortages.

The responses inform the transaction-level or client-level risk assessment. Where clients do not yet sufficiently address the physical risks identified, the credit decision is subject to specific conditions, such as the uptake of mitigation measures. One institution integrates physical risk considerations directly into the overall client-level risk assessment. Where mitigation and adaptation plans are assessed as inadequate in addressing material impacts arising from physical risks, a downgrade of the client's risk assessment is considered.

3. Acceptance criteria and portfolio thresholds

As a next step, institutions determine whether the level of C&N risk is acceptable and in line with their risk appetite. Certain institutions will not finance debtors with a high C&N risk classification, while others will make credit-granting dependent on the involvement of specific C&N risk experts or link specific conditions to the loan contract (e.g. risk mitigation through requiring an insurance or ensuring that a transition plan is in place).

At portfolio level, some institutions have put in place threshold levels for the overall acceptance of clients with poor C&N risk classifications. Such relative thresholds prescribe the percentage of clients within a specific loan portfolio for which a poor C&N risk rating can be accepted. These thresholds are in addition to absolute limits on acceptance of clients with poor C&N risk ratings.

4. Ongoing review

Following the start of a client relationship, the due diligence process is repeated on a regular basis. The periodicity is generally determined by the institution based on the risk classification of the client. In addition to performing an ongoing C&N risk review for new clients, many institutions also perform a review for existing clients.

4.2.2 Good practice for controversial activities
Hard to gain but easy to lose – assessing clients for potentially controversial activities

Expectation 7.5
Institutions are expected to conduct a proper C&E due diligence, both at the inception of a client relationship and on an ongoing basis.

Expectation 9.2
Institutions are expected to evaluate the extent to which the nature of the activities in which they are involved increases the risk of a negative financial impact arising from future reputational damage, liability and/or litigation.

One institution has a framework in place to identify and evaluate potentially controversial economic activities related to C&N factors on an ongoing basis. This framework of due diligence procedures is organised in the context of managing C&N-related reputational risks arising for the institution. It identifies the activities of its clients that present such reputational risks. The approach taken involves the following steps:

1. Identification

The front officer is responsible for making an initial assessment of the reputational risks for the institution associated with confirming or continuing a client relationship. This assessment comprises a check of the client against reputation-sensitive exclusion factors, a list of economic activities typically associated with significant adverse environmental impact, verification of the existence of negative news in the media and identification of possible future controversies related to C&N factors.

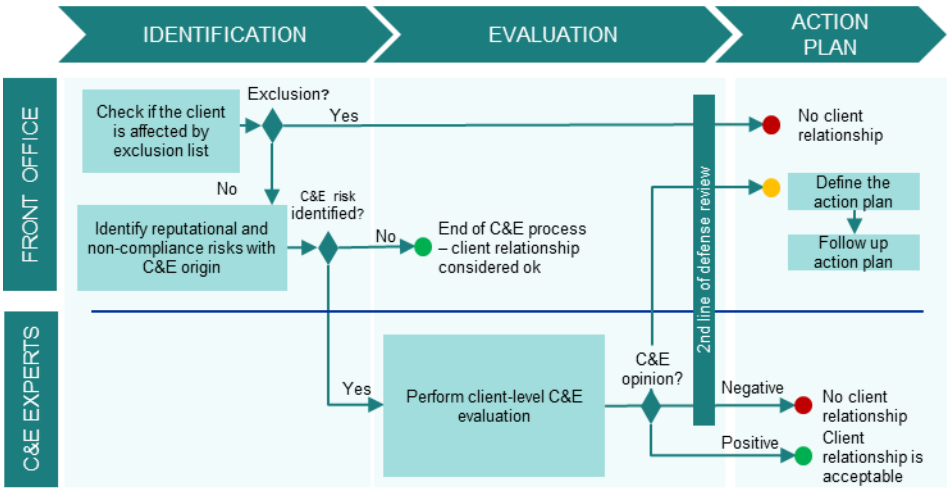
2. Evaluation

If concerns are identified, a detailed evaluation is performed by a C&N risk expert. This includes among others:

- checking the compliance of the client with the institution's commitments, sectoral standards and best practices;
- determining the severity of existence of negative news (e.g. convictions, legal proceedings and judicial/criminal complaints of a C&N nature);
- determining the severity of possible controversies (e.g. local experts are employed to assess whether upcoming local regulation and policies may trigger future controversies).

This evaluation leads to three possible decisions: i) start/continue relationship with the client; ii) start/continue the relationship with the client conditional on the fulfilment of certain criteria; iii) rejection of the client.

Figure 14
Stylised example of C&N reputational risk management approach for new clients



3. Action plan

An action plan is defined based on the risks identified. When the client relationship is confirmed with conditionality, follow-up actions may include requiring the client to adopt the best practices in its sector of activity or requiring it to improve its C&N practices to better align them with the commitments of the institution. In addition, the institution can restrict the depth of the business relationship with that client, or to certain specific affiliates of the client. For clients subject to such conditionality, an implementation schedule is defined in agreement with the client.

Newly added good practice

Updated approaches

Another institution conducts an annual C&N review of all its clients. As a first step, the front officer fills in a C&N-related questionnaire tailored to the client concerned. The client is then assessed not only regarding its C&N-related risk management framework and compliance with sectoral policies (if applicable), but also with regard to any pending controversies. The institution defines a controversy as any negative news that could translate into heightened reputational, operational or legal risks. The institution's policy contains detailed guidance on when a controversy is relevant for the institution, also taking into account any remediation measures taken by the client. In the case of material controversies, the matter may be escalated to a predefined internal function, such as the institution's corporate social responsibility office, and, as a second step, to a specific committee set up for that purpose. In addition, data on identified controversies are centrally collected and presented to the credit committee on a yearly basis.

Yet another institution requires its business lines to refer transactions that are considered material from a reputational C&N perspective to a specialised C&N team. The analysis conducted by the group team also addresses material controversies. The group C&N team then builds a profile, including a materiality assessment and an assessment of the associated reputational risks. Based on this assessment, the

group C&N team may either decline or approve the transaction, approve it with conditions, or escalate it to a dedicated risk committee. Furthermore, active client relationships are regularly overseen through tracking updates from NGOs, regular client assessments, and news monitoring tools.

Table 40

Stylised example of an institution's process for reviewing transactions for reputational risks, and deciding whether to approve, conditionally approve, or decline them

The transaction/client is reviewed for C&N risks, checking cross-sectoral and sector-specific exclusions (if applicable) and for any recent and material C&N controversies	If no exclusions apply, the transaction/client is checked against internal C&N policies to determine if C&N due diligence is required. If recent and material E&S controversies are identified, referral is required regardless of sector		C&N due diligence process, depending on:	Outcome of C&N due diligence	
Cross-sectoral policies: deforestation, human rights, World Heritage Sites.	Start regular due diligence process; or	If recent and material controversies are identified, a C&N due diligence is always required (irrespective of applicable sectoral policies), and the transaction/client is referred to the dedicated C&N team. Dedicated tools are also established to facilitate the process.	Defined list of high or enhanced risk sectors.	If material C&N risks are identified, the transaction/client is subject to a further, more detailed review by the dedicated C&N team. Further escalation is also possible or client engagement.	If no material C&N risks are identified, the C&N dedicated team provides recommendations on the next steps for the client/transaction, including potential conditions (e.g. mitigation measures, or post-transaction monitoring).
Sectoral policies & exclusions: oil & gas, mining, agriculture, coal, etc.	Start process to decide whether tailored C&N due diligence is required. The C&N due diligence is then carried out together with the dedicated C&N team.		Defined list of products (e.g. all types of lending, project finance).		
When exclusions apply, the transaction is stopped. It is also possible to consult with a dedicated team for further guidance if it is not clear whether/how exclusions apply.			Additional C&N considerations: use of proceeds, negative C&N-related news – other than ongoing litigation; activities within or close to World Heritage Sites; evidence of severe negative impacts on areas of high conservation value.		
			Project risk profile		
			Country of project and compliance with applicable C&N rules and regulations.		

4.2.3 Good practice for insurance data collection and monitoring Covered or exposed – integrating insurance protection data

Newly added good practice

Expectation 7.5
Institutions are expected to conduct a proper C&E due diligence, both at the inception of a client relationship and on an ongoing basis.

Expectation 8.1
Climate-related and environmental risks are expected to be included in all relevant stages of the credit-granting process and credit processing.

In view of the widening insurance gap[18], the ECB observes that institutions identify ways to collect data on the insurance protection of their exposures. Institutions take action when insurance coverage is unavailable or impossible to obtain, such as adjusting loan-to-value or debt-to-income thresholds, or considering alternative risk transfer mechanisms, such as umbrella insurance. The examples outlined below focus on the collection and monitoring of insurance data.

Loan origination policies

The ECB observes that institutions often conduct a general check at loan origination to verify whether insurance for the real estate collateral is in place. Apart from checking the amount and duration, certain more advanced institutions also look more deeply into the policies to check, for example, which hazards are covered.

Institutions with good practices draw a direct link between their materiality assessments and insurance requirements. In particular, these institutions require mandatory insurance for collateral against the physical risk events identified as material based on the materiality assessment.

For instance, where coastal flooding is identified as material for a specific part of the country's real estate portfolio, the local entity of an institution requires collateral insurance against coastal flood risk for client properties above a certain risk threshold (e.g. medium and high risk, based on the estimated probability of occurrence of coastal flooding). If collateral insurance against floods for such properties is not available and the expected costs associated with material physical risks are not fully incorporated into the collateral valuation, the institution reduces the loan-to-value ratio accordingly.

Other institutions integrate insurance into their risk appetite by establishing specific KRIs. For instance, one of these KRIs tracks the percentage of newly approved loans for which real estate collateral in medium- and high-risk areas is not insured against specific hazards.

Regarding the development of IT infrastructure to store insurance protection data, some institutions store these data in a centralised collateral system, in addition to other collateral attributes. They use this central storage solution to feed their risk identification and management processes.

Monitoring of data related to insurance coverage

To monitor insurance coverage, institutions set up their monitoring processes to detect potential changes in the insurance conditions and coverage of their real estate portfolios.

[18] See "Towards a European system for natural catastrophe risk management – the possible role of European solutions in reducing the impact of natural catastrophes stemming from climate change", ECB and EIOPA, December 2024.

One institution receives a report every year from an insurer who covers part of the institution's real estate collateral for its mortgage portfolios, containing information on possible reductions in insurance coverage or limitations on insurance conditions, together with recommendations on the actions to be taken.

Institutions also include limits in their risk appetite framework monitoring the level of insurance coverage for key physical risk hazards. They assess the extent to which they are permitted to request and receive such data from insurance companies across jurisdictions, noting differences.

Another institution actively engages with clients to request updated insurance information, including potential changes to the collateral insurance and to the terms of the insurance policy.

Different approaches based on the portfolios

Institutions adopt portfolio-specific approaches when implementing their practices to monitor insurance protection.

Residential real estate

For their residential mortgage portfolios, which are secured by real estate collateral, institutions have tailored approaches in place for the different countries in which they have exposures. This allows them to account for differences in, among others, exposures to different types of physical risk hazards, legal frameworks (such as requirements on mandatory insurance protection and data privacy protection rules) and national insurance schemes. For instance, in a country where one institution's residential real estate assets are very vulnerable to flood risk but where mandatory insurance covers only fire, the institution requires clients to take out additional insurance for real estate collateral that also covers flood risk. In collaboration with insurers, the institution checks on an annual basis whether the flood insurance covers high flood risk zones.

Commercial real estate

For their commercial lending portfolios, which are secured by real estate collateral, institutions have standard annual review processes in place and check the level of insurance coverage as part of these processes. For example, at one institution the approval process for commercial real estate project financing includes a physical risk assessment in the form of a score, which takes into consideration the extent to which the insurance policy covers material physical risks. This insurance coverage is then subject to annual monitoring once the financing has been approved.

This institution asks for evidence that the insurance premium has been paid and asks to be informed of any changes to, or cancellation of, the insurance policy. If the policy is cancelled, an ad hoc analysis takes place to decide on further action.

At the portfolio level, the institution conducts an in-depth review of the insurance coverage in high-risk zones identified through its physical risk analysis. In cases where high-risk zones are excluded, another ad hoc analysis is conducted to decide

on further action. In some cases, institutions take out umbrella policies to cover the uninsured part in the event of client default following a physical risk event.

Corporate finance

For their corporate finance portfolios, institutions include specific questions in their loan origination policies to determine the extent to which a company's assets are insured when assessing its exposure to physical risk. These questions typically concern the assets covered by insurance against both business disruption and asset damage caused by physical risks. Institutions use the results to complement their assessment of the company's exposure to physical risks, which is then taken into account in the credit decision. Similar to the approach for commercial real estate portfolios, institutions perform regular checks to verify whether there has been any change in the terms of the insurance policy, including any possible cancellation.

Table 41

Stylised and non-exhaustive example of portfolio-specific integration of insurance in physical risk assessments for credit decisions and monitoring measures

Portfolio	Physical risk assessment	Insurance requirements	Insurance coverage monitoring measures
Residential real estate	Real estate collateral (insurance) data, tailored to each geographical area (legal frameworks, insurance penetration, etc.)	Mandatory insurance for specific material hazards	Regular checks for exclusions of high-risk zones
Commercial real estate	Real estate collateral (insurance) data, tailored to each geographical area (legal frameworks, insurance penetration, etc.)	Mandatory insurance	Regular checks for insurance changes or cancellations
Corporates	Insurance coverage of companies' vulnerable assets and activities	Case-by-case basis	Regular checks for insurance changes or cancellations

4.3 Risk classification

Back in 2022, institutions had already developed a variety of ways to reflect C&N risks in the risk classification of clients. The most common of these are stand-alone client scorecards on C&N risks. In most cases C&N risks are embedded in the risk classification through qualitative and, increasingly, quantitative considerations. For some institutions, the C&N risk scorecards can trigger rating overrides in the PD models, thereby having an indirect impact on PD estimation. Other institutions have developed dedicated questionnaires from which they gather C&N risk-related information (see good practices in Section 4.2). The qualitative and quantitative input from these questionnaires, which in most cases covers transition risks and in some cases aspects of physical risks, is used to develop heatmaps to classify institutions' portfolios based on the level of C&N risk.

The good practices presented in this section describe risk classification systems related to credit, market and operational risk separately.

Since 2022, institutions have enhanced their risk classification procedures for transition planning purposes and have generally increased the depth of their

assessments, while also extending their coverage (Section 4.3.1). They have also made progress in classifying clients based on the extent to which they expose the institution to reputational and litigation risks (Section 4.3.4).

4.3.1 Good practice for credit risk classification
A calculated risk – classifying debtors via a stand-alone scorecard and/or integration into PD rating systems

Expectation 8.2
Institutions are expected to adjust risk classification procedures in order to identify and evaluate, at least qualitatively, climate-related and environmental risks.

Expectation 8.4
Institutions are expected to monitor and manage credit risks in their portfolios, in particular through sectoral/geographic/single-name concentration analysis, including credit risk concentrations stemming from climate-related and environmental risks, and using exposure limits or deleveraging strategies.

Paragraph 29 ECB Guide to internal models[19]
Where climate-related and environmental risk drivers are found to be relevant and material, institutions should include such risk drivers in their internal models approved for use for the calculation of own funds requirements for credit, counterparty credit, and market risk.

Many institutions have developed dedicated questionnaires from which they gather C&N risk-related information (see good practice 4.2.1). Some already have a risk differentiation system in place to classify clients from a C&N risk perspective. Typically, this is done by developing a stand-alone C&N risk scorecard for clients, for example featuring an adapted traffic light system with standardised levels (i.e. green, amber and red). The scorecard is then factored into the discussions on lending decisions and credit files in the respective credit committees. In some cases, the institution integrates the outcome of the client scorecard in its PD-rating system in a qualitative manner. For example, by setting concrete criteria that trigger a downward override of the PD rating if the scorecard is poor or through the integration of qualitative C&N-related findings in the business risk or business environment assessment component of the PD rating system. The identified practices are reviewed through the lens of the novel elements that C&N risks entail and the challenges they pose.

Stand-alone C&N scorecard

For example, one institution develops a stand-alone scorecard to classify its corporate clients for transition risk specifically. The scorecard consists of two weighted components: 1) a client awareness metric, and 2) a carbon transition metric. The former assesses to what extent the client is aware of C&N risks along four dimensions in line with the TCFD (governance, risk management, strategy, and metrics and targets). The latter assesses the threat of climate change to the client's business model and profit-generating capacity, addressing the client's current carbon intensity, medium-term outlook and adaptive capacity. The two scores are converted into a ten-point scale bundled in four categories (advanced, strong, moderate and poor). Depending on the applicable category, together with the client's PD rating, there are predefined follow-up actions. This could, for instance, consist of a requirement for the client to reinforce its decarbonisation plans, no increase in lending limits or a maximum maturity of three-five years for any financing to the client. The table below provides more details on the various components of the client scorecard.

[19] ECB Guide to internal models, ECB, July 2025.

Table 42

Stylised example of transition risk scorecard for corporate clients

Component	Sub-component	Client-level inputs for scorecard
Client awareness metric	Governance	Governance reporting in line with the TCFD standard Environmental risk rating by external, independent third party
	Strategy	Strategy disclosure in line with the TCFD standard Strategy in line with a 1.5 degrees Paris Agreement scenario Net-zero emission targets
	Risk management	The integration of climate-related risks in client's risk management in line with TCFD
	Metrics and targets	Disclosure of Scope 1, 2 and 3 GHG emissions Disclosure of targets to reduce risks stemming from climate change
Carbon transition metric	Current carbon profile	Exposure to hydrocarbon value chain Level of GHG emissions
	Medium-term sensitivity to transition risk	Client's sensitivity to technology, market and policy changes related to climate change, including in the context of its competitive positioning within its market
	Medium-term adaptive capacity	Client's ability to mitigate transition risk exposure in the medium term, specifically by assessing the degree to which transition risk exposure is reflected in robust CAPEX plans

Newly added good practice

Sector and jurisdiction-specific approach

Since this compendium was first published in 2022, the ECB has observed that institutions have developed more advanced ways of classifying their corporate clients with regard to transition risks. As highlighted earlier, these more advanced approaches are used by institutions to obtain a more detailed understanding of a client's risk profile, by looking at the technologies they use and invest in (see Section 2.1.1 and Section 2.2.2).

For example, the carbon transition metric in the transition risk scorecard described in Table 42 above has been further refined to include sector and jurisdiction-specific metrics for high transition risk sectors. More specifically, the carbon transition metric sub-components have been further refined to include the following metrics:

- The *current carbon profile* comprises metrics to measure the alignment with sectoral low carbon pathways, such as the sales volume of electric vehicles for the automotive sector or the production volume of Blast Furnace-Basic Oxygen Furnace (BF-BOF) for the steel sector (where a lower production volume is less prone to transition risk). Alignment with sectoral low-carbon pathways is measured through alignment methodologies such as PACTA.
- *Medium-term sensitivity to transition risk* is tailored to each jurisdiction and analysed through the targets and regulations that drive sectoral transition.
- *Medium-term adaptive capacity* is measured, among other factors, by the ambition of the client's sectoral targets and the level of R&D and CapEx dedicated to the development of low-emission technologies. Third-party data providers and client transition plans are used as inputs for this.

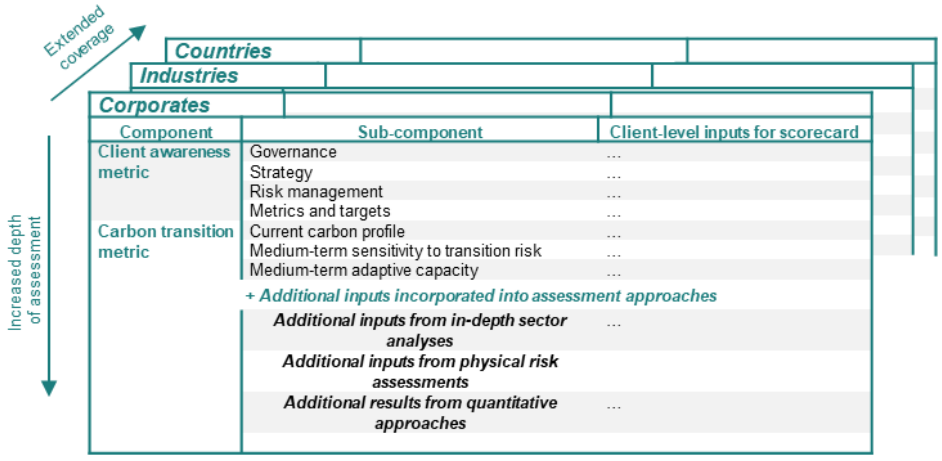
Where a high transition risk score is identified, sector-specific mitigation strategies integrated into sectoral policies are applied, considering client-specific aspects.

Based on the outcome of their materiality assessments, for the remaining sectors with low or moderate exposure to transition risk, institutions tend to follow a more general approach. The scoring is not based on sector-specific metrics, but takes into account the sectoral weighted average of transition risk, national mitigation policies, and the level of ambition and implementation of the client's transition plan. Building upon this scoring, institutions inform clients about their current low-carbon transition profile (and thus their elevated risk) and offer tailored suggestions on how the institutions' products and services can assist them in their transition. To track progress, institutions monitor their exposure to those clients with underdeveloped transition plans.

General progress since 2022

Since 2022, from a general perspective and thus not limited to transition planning, institutions have increased the depth of their assessments and extended the related coverage (see Figure 15).

Figure 15
Stylised depiction of how practices for credit risk classification have evolved since 2022



Newly added good practice

Increasing the depth of assessments

Since 2022, institutions have been conducting in-depth climate risk analyses of selected sectors to support the risk assessment of corporate clients. As part of its assessment of exposures to transition risks, one institution now produces detailed sector profiles to support the assessment of climate-related risks and opportunities for corporates operating in certain industry sectors. The institution selects the sectors covered in this analysis based on the sectors' criticality from a climate risk perspective, the relevance of the transition for the sector and the expected efforts required for its transformation, as well as the feasibility of conducting quantitative analyses. When building these sector profiles, the institution relies on its own sector experts and external experts.

The sector profiles include analyses of value chains with deep dives into the most relevant parts, the identification of decarbonisation levers, and decision trees to classify corporates into different levels of risks and opportunities. In the case of the real estate sector, the analyses also include approximations of refurbishment and modernisation costs and an analysis of the risk of real estate assets becoming economically unviable. For the chemical, transport, cement and steel sectors, the institutions conduct quantitative analyses on the costs of transformation. The sectoral analysis may also cover physical risk aspects where these are of high relevance to the sector.

Moreover, institutions are increasingly relying on quantitative approaches to risk classification. One institution uses a multifactor model to connect counterparty-specific climate-related data with financial risk factors in order to assess transition risks for listed creditors. Relevant climate-related inputs include Scope 1, 2 and 3 emissions, as well as transition plans and targets. Transition risk is assessed over a medium-term horizon of five years by comparing predicted equity prices, credit spreads and internal ratings across different NGFS climate scenarios to reflect different policy changes in response to climate risk.

Newly added good practice

Extended coverage of assessments

Aside from increasing the thoroughness of their C&N risk classification assessments, since 2022 institutions have also expanded the scope of their approaches. They have done so by implementing integrated and modular approaches that cover several exposure classes.

One institution has implemented a common framework with three different layers of scores to summarise a counterparty's vulnerability to physical and transition risks: scores for countries, industries and corporates.

Country scores are meant to capture drivers of physical and transition risk at a macro-geographical level, while industry scores, based on expert judgement, capture the financial materiality of C&N risks for the counterparty. Both are centrally updated to reflect evolving data sources and climate scenarios.

Corporate exposure scores are based on client questionnaires that capture the quality of disclosures, the credibility of targets and governance arrangements, as well as risks arising from the local geography. The scores are intended to be used for risk assessment and origination, stress testing, and alignment with the institution's strategic goals.

A modular design aims to make the scoring framework easier to use, simplify training needs, enable cross-checks for different scenarios, and ensure consistency across different processes relying on the scores, including risk assessment, stress-testing and strategic steering.

Integration into PD-rating systems

Another institution has integrated both physical and transition risks based on qualitative considerations in its PD rating systems for large corporate and real estate

clients. Its PD rating system includes an assessment of any reputational risks, liability risk and negative environmental impact of the client. The institution has developed a climate and nature risk questionnaire that collects qualitative and quantitative data on the client's risks related to climate change, animal welfare, waste and pollution, and land use. In addition to collecting this client data, the institution also considers environmental risk ratings of external providers, where available. Based on the outcome of this assessment, the client is classified as having a low, medium, high or very high risk of financial loss resulting from transition and/or physical risks. Formalised guidelines are implemented that prescribe specific conditions under which the results should be integrated in the reputational risks, liability risk and negative environmental impact component of the PD rating system. Depending on the level of risk for the client and its adaptive capabilities, this may lead to a downgrade of up to several notches of the PD rating.

Newly added good practice

Rating overrides and facilitating further integration into internal models used for regulatory purposes

Based on existing guidance, institutions have taken tangible steps to help facilitate the further integration of climate and nature risk drivers into their internal models. This may involve directly incorporating these risk drivers into the estimation of model parameters, or, where institutions do not have sufficient information on these drivers, introducing additional margins of conservatism or overrides in the final output of the rating assignment process.

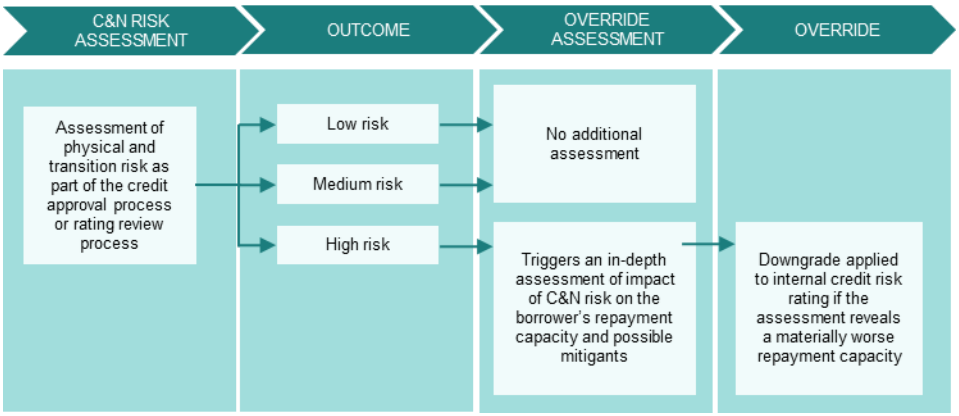
Steps taken by institutions include credit risk assessment and approval processes with clearly documented, formalised or automated rules to trigger overrides of internal credit ratings. Figure 16 below provides a stylised depiction of such processes. For example, one institution requires, as part of its credit approval process, that where a corporate client is assessed as high risk for either physical or transition risk and is unable to evidence the existence of relevant mitigants, the local business unit must consider an override of the PD rating to reflect the heightened C&N risk in the client's credit risk assessment. Relevant mitigants include, for example, insurance or governmental support for physical risk or the implementation of a credible transition plan by the client. The institution also imposes stricter requirements in the credit approval process for clients in sectors classified as high risk from a C&N perspective.

Another institution evaluates C&N factors capable of affecting a client's income and costs when assessing their repayment capacity to derive credit scores. For physical climate risks, the institution considers cases where a borrower's operations, clients or suppliers have suffered damage to assets or operations from acute physical risk events, or are beginning to experience negative financial impacts due to chronic trends. For transition risk, the institution considers whether the transition to a sustainable economy puts the borrower's operations, clients or suppliers at high risk of experiencing a drop in income or an increase in costs. The institution also considers nature-related factors, such as whether a borrower is experiencing negative financial effects as a result of their operations or value chain being either harmful to, or dependent on, vulnerable ecosystems.

A credit risk override may be applied if the assessment of C&N credit risks leads to the conclusion that the borrower's repayment capacity is materially worse than the model-calculated rating. Notably, the institution uses C&N-related overrides only for downward adjustments.

Figure 16

Stylised process for C&N risk assessment triggering a rating override



Another tangible step taken by institutions is the inclusion of override reasons or flags for C&N risks in their rating models, which allows them to monitor these risks and supports the development of datasets available for future model development. One institution has implemented an override reason that captures the impact of environmental, social and climate change risk. The institution accounts for these risks via overrides to the final rating outcome, as it considers that such risks are not adequately reflected in a borrower's balance sheet. Overrides are applied, inter alia, where environmental factors significantly influence a borrower's activity and creditworthiness.

Moreover, the institution conducts a more intensive analysis of a borrower's business model when the borrower is assessed as high risk with regard to C&N transition risk. This assessment considers risk indicators such as current and projected GHG emissions, the share of green capital expenditure, ESG-related data from rating agencies, or the borrower's sector.

Based on the results of this analysis, an override may be proposed. While such overrides are more likely to be used for downgrades, upgrades may also be considered in specific cases where transition risk is assessed as low and potential events or trends are expected to positively impact the borrower's revenues. An example of such events or trends is where a borrower has been investing heavily in green technologies, such as more efficient plants that reduce GHG emissions, thereby also helping to avoid potential future restrictions or fees on emissions.

When integrating C&N risks into internal models approved for the calculation of own funds requirements, institutions can also draw on modelling capabilities developed for climate-related risks in other applications, as well as on the data used in those models. Prominent applications include models on C&N risk in the context of the

ICAAP (see also Section 4.6) and climate stress-testing (see the updated report on good practices for climate-related stress testing).

4.3.2 Good practice for market risk classification

A trick of the trade – classifying exposures to transition risk in the trading portfolio

Expectation 10
Institutions are expected to monitor on an ongoing basis the effect of climate-related and environmental factors on their current market risk positions and future investments, and to develop stress tests that incorporate climate-related and environmental risks.

One institution has implemented a classification system to identify and monitor which positions or activities in the trading book (fixed income and equity portfolios) are the most exposed to C&N risks. The system focuses exclusively on transition risk. The approach taken consists of the following steps:

1. develop a risk classification of C&N risks at sector level;
2. aggregate activities and positions at sector level;
3. quantify transition risk in terms of mark-to-market exposure for each position based on its sector classification.

The institution uses a qualitative approach to identify sectors most exposed to transition risk. This approach considers four main sources of risk: i) political and legal risk; ii) technological risk; iii) risk of change in market dynamics; and iv) reputational risk.

Sectors are classified based on risk sensitivity and the time horizon within which the risk may manifest itself as follows:

- Sectors with very high sensitivity: positions which are expected to be materially affected by transition risk within a three-year period (e.g. coal and mining).
- Sectors with high sensitivity: positions which are expected to be materially affected by transition risk within a three to five-year period (e.g. automotive, air transport).
- Sectors with medium sensitivity: positions which are not expected to be materially affected by transition risk before five years (e.g. gas distribution and commercialisation).
- Sectors with low sensitivity: positions which are not expected to be materially affected by transition risk.

To improve the robustness of the classification, the institution calibrates the internally developed sector classifications by leveraging C&N risk scores and information from external data providers. The institution consulted the scores from the four main providers in the market, also evaluating the quality and homogeneity of the scores. The institution then adjusts its classification of sectors accordingly.

Based on each sector's sensitivity to transition risk, the institution derives the sensitivity to transition risk for each position or activity, and quantifies the mark-to-

market exposure of activities or positions with high or very high sensitivity to transition risk for each portfolio (fixed income and equity).

Table 43
Stylised example of the classification of sensitive positions or activities to transition risk

(EUR millions)

Positions EQ Portfolio	Fair value				
	Sensitivity – Very high	Sensitivity – High	Sensitivity – Medium	Sensitivity – Low	Total
Stock A	80.4	-	-	-	80.4
Stock B	-	50.6	-	-	50.6
Stock C	-	-	1.5	20.5	22.0
Stock D	10.5	-	-	2.3	12.8
Stock E	5.5	-	-	-	5.5
Total	96.4	50.6	1.5	22.8	171.3

Source: Based on documentation provided by the institution.

The institution revises the classification of sectors and positions or activities quarterly. The results of the classification are used to set a transition risk indicator, which is employed as a tool to make portfolio decisions on the reduction of exposure towards highly sensitive positions or activities.

4.3.3 Good practice for operational risk classification To be continued – assessing physical risks to the business continuity of operations

Expectation 9
Institutions are expected to consider how climate-related and environmental events could have an adverse impact on business continuity and the extent to which the nature of their activities could increase reputational and/or liability risks.

The institution assesses the impact of physical risks (e.g. major floods, natural disasters) on its operations within its operational risk framework, using forward-looking scenario analysis to quantify the risks from weather hazards. These scenario analyses are adjusted in a forward-looking manner to integrate the aggravation stemming from climate change (for example, using external data providers). The institution then uses this information to build a tool for the identification and classification of high risk exposures to business continuity disruptions.

The approach taken consists of the following steps:

1. Hazard

For each geographical region in which it is active, the institution identifies the main material physical risk events affecting its operations. For example, for the US region, the institution identifies wildfires, floods and hurricanes as the main material physical risk events. For this assessment, the institution makes use of external data providers.

2. Exposure

The institution then assesses which of its office buildings, recovery sites and third-party suppliers/providers (e.g. data centres) may be exposed to those risk events. It maps the location of these facilities onto wildfire, flood and hurricane hazard maps. The institution identifies four resource categories which can be affected by these events, namely personnel, data, services and facilities.

Table 44

Stylised example of classification of resource categories on a regional basis (for example, the United States)

	Risk event: Loss of operating environment			
Physical risk event	Lack of personnel	Loss of data	Loss of facilities	Loss of services
Wildfire risk	MEDIUM	LOW	HIGH	MEDIUM
Hurricane risk	MEDIUM	LOW	HIGH	MEDIUM
Flood risk	LOW	LOW	LOW	LOW
Total	MEDIUM	LOW	HIGH	MEDIUM

3. Vulnerability

A classification system is put in place with three levels, namely low risk, moderate risk and high risk. The institution identifies the office buildings, recovery sites and third-party suppliers/providers that are exposed to medium to high risk. For these cases, it may decide to relocate activities or implement actions mitigating the risks of potential damage to its operations from physical risks as follows:

(a) compile a high-risk location watchlist, used to determine in which region the institution should have contractual agreements (e.g. insurance policies, agreements with hotels in case of staff relocation, agreements with taxi companies) in place with third-party providers and building owners to manage such extreme weather events;

(b) define rules and set up procedures for personnel to follow should these events materialise (e.g. staff relocation, teleworking).

(c) conduct periodic updates of the risk assessment and risk-mitigating plans for each of the office buildings, recovery sites and third-party suppliers/providers (e.g. through ad hoc questionnaires).

4.3.4 Good practice for reputational and litigation risk classification Legally green – managing C&N-related reputational, liability and litigation risks

Newly added good practice

Expectation 9
Institutions are expected to consider how climate-related and environmental events could have an adverse impact on business continuity and the extent to which the nature of their activities could increase reputational and/or liability risks.

Institutions are establishing frameworks to manage C&N-related reputational, liability, and litigation risks, integrating these risks into their core risk management processes. These frameworks consist of dedicated policies, procedures, and units.

Table 45 provides an overview of the good practices on C&N-related reputational and litigation risk management set out in this report.

Table 45
Overview of good practices on C&N-related reputational and litigation risk management

Section	Topic	Description	Expectation
Risk appetite (3.4.1)	C&N-related KRIs for various risk categories	Dedicated KRI for reputational risk	4
Materiality assessment (4.1.1.1)	Transmission channels	Identification of material reputational and litigation risks from climate risk drivers	1, 7.1
Due diligence (4.2.2)	Controversial activities	Assessment of clients and transactions for reputational risks and potential controversial activities	7.5, 9.2
Risk classification (4.3.4)	Reputational and litigation risk classification	Reputational and litigation risk management	9
ICAAP (4.6.4)	Determining the need of capital for climate-related risks in the economic perspective	Integration of climate-related reputational risks into capital adequacy assessment and dedicated scenario analysis	7.6, Principle 3(iii) (ECB ICAAP Guide)

Reputational risk management

For instance, the institution has defined a reputational risk framework, created a reputational risk policy and established a dedicated sustainability team at group level. The sustainability team conducts due diligence specifically for C&N matters, monitoring risks at the client level and assessing C&N-related reputational risks throughout the client relationship.

Sectoral guidelines for affected industries further delineate thresholds and exclusions to address risks specific to high-impact sectors. Additionally, the institution follows a multi-dimensional decision-making approach that provides for a structured assessment, escalation procedures and the integration of C&N risks into existing risk categories, such as credit risk and client due diligence.

Enhanced due diligence is applied to clients in high-risk sectors. When predefined thresholds are met, decisions are escalated to a dedicated escalation forum comprising representatives from various units, the sustainability team at group level, or a reputational risk committee.

The institution's governance structure allocates responsibility for managing C&N-related risks across its lines of defence (see also Sections 3.3.1 and 3.3.2). All decisions and actions are documented in a dedicated reputational risk IT system that tracks risks, approvals and conditions set to mitigate reputational risks. Regular

reporting to the management body and its committees is in place, with updates also covering trends and developments.

Litigation risk management

The same institution has also implemented mechanisms for responding to and managing C&N-related litigation risks. These are integrated within the institution's standard defined processes and coordinated by its legal department. The litigation risk process (including climate litigation) involves establishing and continuously updating litigation and regulatory enforcement provisions and contingent liabilities in compliance with IFRS or applicable local accounting standards. The process is managed by a dedicated litigation team, which independently assesses the risks associated with contentious matters and recognises provisions and contingent liabilities accordingly. Litigation is tracked from the initiation of a legal process, such as a summons or complaint, while regulatory investigations may be initiated formally through subpoenas or other requests or informally via notices from authorities. Any such notices are referred to the legal department. The checks then involve identifying any immediate action that may be required and assessing whether the matter is significant, such as where the amount involved exceeds a material monetary threshold or where the case carries knock-on or reputational risk.

Significant matters are logged in a dedicated tracking system. Provisions, established by the dedicated litigation team, are recorded when the likelihood of an economic outflow is deemed probable and certain criteria are met, thereby affecting earnings and appearing on the balance sheet. Contingent liabilities are recognised when the likelihood of an outflow is possible, but it will not affect the financial statements or earnings.

The litigation team also develops projections of potential future costs not covered by provisions or contingent liabilities. These projections, along with other risk adjustments, are used for financial forecasting and operational risk modelling. The overall legal risk assessment information, which encompasses provisions, contingent liabilities and projections, is drawn up by the litigation team on a case-by-case basis, relying on internal and external expertise, jurisdictional knowledge, relevant precedents and other considerations, including dedicated C&N litigation risk scenarios.

Institutions also try to reduce their exposure to specific sources of climate-related litigation risk. They typically do so by using transition pathways aligned with the objective of achieving climate neutrality when setting targets for sectors that are key to the transition (see the subsection on strategic targets and risk appetite in Section 2.1.1, and Section 2.1.2.1).

4.4 Collateral valuations and pricing

This section covers good practices for the integration of C&N risk into loan pricing and collateral valuations.

In 2022, institutions were starting to integrate C&N risks into their collateral valuations and pricing processes. For many institutions, this process was still at an early stage of development, as it is usually conditional on the systematic collection of granular and forward-looking client data. For example, a group of leading institutions was using energy performance certificates of financed buildings to reflect C&N risks in both collateral valuations and pricing processes. In terms of pricing, some institutions had started to reflect these risks in their cost price calculations (via PD and/or LGD) and margin requirements. Similarly, a small group of leading institutions had started integrating C&N risk metrics into their collateral valuations, using both qualitative and quantitative methods (e.g. scores, haircuts and thresholds).

Good practices have continued to evolve since 2022, particularly in relation to collateral valuation. For loan pricing, institutions have made progress by including additional capital costs in product pricing as part of the ICAAP (see Section 4.6.6).

4.4.1 Good practice for loan pricing
Paying the price – integrating C&N risks into loan pricing frameworks

Expectation 8.5
Institutions' loan pricing frameworks are expected to reflect their credit risk appetite and business strategy with regard to C&E risks.

Expectation 8.6
Institutions' loan pricing is expected to reflect the different costs driven by C&E risks.

Several institutions have started to integrate C&N risks in their loan pricing frameworks in a systematic manner. This is done in at least two distinct ways. First, institutions reflect elevated C&N risks in the cost price calculations of their loan prices. This is, for example, done by integrating risk factors in the calculation of credit and funding costs. Second, institutions reflect C&N-related factors in the expected profit margin requirements of certain lending products. This is done to incentivise debtors who are reducing their exposure to C&N risks. The table below shows some examples of how institutions have been observed to integrate C&N risks in their loan pricing. In addition, institutions have made progress in including additional capital costs in product pricing as part of the ICAAP (see Section 4.6.6).

Table 46
C&N risk integration across loan price components

Price component	Sub-component	C&N risk integration
Cost price	Credit costs	Institution has C&N risk rating system that can indirectly impact the credit cost component of the loan price as risk managers can force a downwards override of the client rating if the C&N risk rating is poor.
	Funding costs	Institution offers green deposits (with fiscal benefits) for lower rates than for ordinary deposit products. This entails lower funding costs being passed on to lower rates for green lending products.
Commercial margin	Reduction	Institution offers green lending product with lower margin requirements, or sustainability-linked loans where interest rate discounts (in basis points) are dependent on the client meeting C&N risk targets.
	Increase	Institution offers sustainability-linked loans for which interest rate discounts are dependent on meeting C&N risk targets. If the C&N risk targets are not met, the margin requirement goes up (in basis points).

As described in the table above, one way to integrate C&N risks in loan pricing is to offer sustainability-linked loans. For these products, the loan terms for debtors are

conditional on achieving certain KPIs related to their C&N risk exposure. These KPIs are quantifiable and forward-looking in nature and address the debtor's core business and strategy. The targets are set at regular intervals with increasing thresholds, which are monitored by the institution. When targets are met, the debtor receives an interest rate discount; when targets are not met, this could lead to a rise in the interest rate. A key component of this approach is having an objective methodology to measure the KPIs by means of independent verification.

The table below outlines an observed example of such a practice. It concerns a product for a client that has in place a transition plan aimed at reducing its CO_2 emissions, energy use, water use and polluting emissions by a predefined amount by 2030 and achieving carbon neutrality by 2050, along with improving safety metrics. The KPIs set out in the loan contract are constructed in line with this transition plan.

Table 47

Stylised example of a loan contract with sustainability-linked KPIs and verification methods

KPIs	Description of KPI	Methodology/verification/ perimeter evolution	Adjustment of the interest margin
CO_2 equivalent Scope 1 and 2 emissions	Emission reduction pace of -x% per year to achieve the overall emissions reduction target by 2030 in line with the client's own ambitions.	The KPI is calculated according to the standard enacted by ISO 14044 and ISO 14064. Figures are audited by external auditors and published in the client's sustainability report or equivalent. Acquisitions by the client of other entities are excluded from the calculation of the KPI.	The facility margin is adjusted on a yearly basis depending on the client's performance vis-à-vis the two KPIs. For each KPI, a potential margin adjustment of +/- pre-set basis points is foreseen. The overall margin adjustment is determined by the sum of the margin adjustments for each of the KPIs.
Annual incident rate	KPI is fully achieved if the client's annual incident rate (safety metric) overperforms the sectoral benchmark (set by a third party) by a predefined percentage. KPI is missed if the client's annual incident rate underperforms the sectoral benchmark by more than a predefined percentage.	The sectoral benchmark is drawn up by a global body that convenes industry representatives. Figures are audited by external auditors and published in the client's sustainability report or equivalent. Acquisitions by the client of other entities are excluded from the calculation of the KPI.	

Other institutions have developed similar sustainability-linked products with KPIs that address C&N risks. The table below describes several of these observed practices, covering a variety of sectors.

New information included in the table

Table 48
Examples of sustainability-linked products by sector

Sector	Product	Characteristics of the KPIs	Adjustment of the interest margin
Shipping	Revolving credit facility	1. Carbon efficiency of the company's entire fleet measured by the weighted average Annual Efficiency Ratio (AER) per ship and to be aligned with the decarbonisation trajectory of e.g. the International Maritime Organization; 2. Alternative fuel mix of the fleet, measured as a percentage of biofuels used; 3. Sustainable recycling of ships, measured as a percentage of the fleet with the so-called Inventory of Hazardous Materials certification.	On a yearly basis, the margin is reduced by a pre-set amount of basis points if the client meets the annual AER targets. If these are not met, the margin is increased by a pre-set amount of basis points annually.
Energy	Bond	1. Scope 1 and 2 net GHG emissions by a given date (predefined amount of MtonCO_2e representing a reduction of xx% vis-à-vis a base year); 2. Renewable energy installed capacity by a given date (predefined amount of gigawatts).	The interest rate remains unchanged subject to the achievement of the KPIs. If one of the KPIs is not met, the interest rate is increased by pre-set amount of basis points.
Real estate	Revolving credit facility	1. GHG emissions of residential and commercial real estate; 2. Share of energy efficient buildings based on an environmental sustainability assessment standard; 3. Energy consumption per square metre.	The more KPIs the client meets, the higher the margin reduction up to pre-set basis points per annum.
Food and beverage	Loan	1. Share, by weight of product, of the coffee and palm oil purchased that is certified as responsibly sourced, as defined by recognised industry standards, such as the Roundtable on Sustainable Palm Oil (RSPO) and the Global Coffee Platform Equivalence Mechanism. There is one ratio per product. 2. Share of packaging which is reusable, recyclable or compostable, in tonnes of packaging sold.	The interest rate remains unchanged insofar as all the yearly KPIs are achieved. If one of the KPIs is not met, the interest rate is increased by pre-set amount of basis points.

4.4.2 Good practice for collateral valuations
Not at face value – reflecting C&N risks in collateral valuation and management

Newly added good practice

Expectation 8.3
Institutions are expected to consider climate-related and environmental risks in their collateral valuations.

Since 2022, institutions, in assessing the impact of C&N risks on collateral, have expanded their risk management and related procedures to look beyond real estate and transition risks. In summary, institutions with good practices:

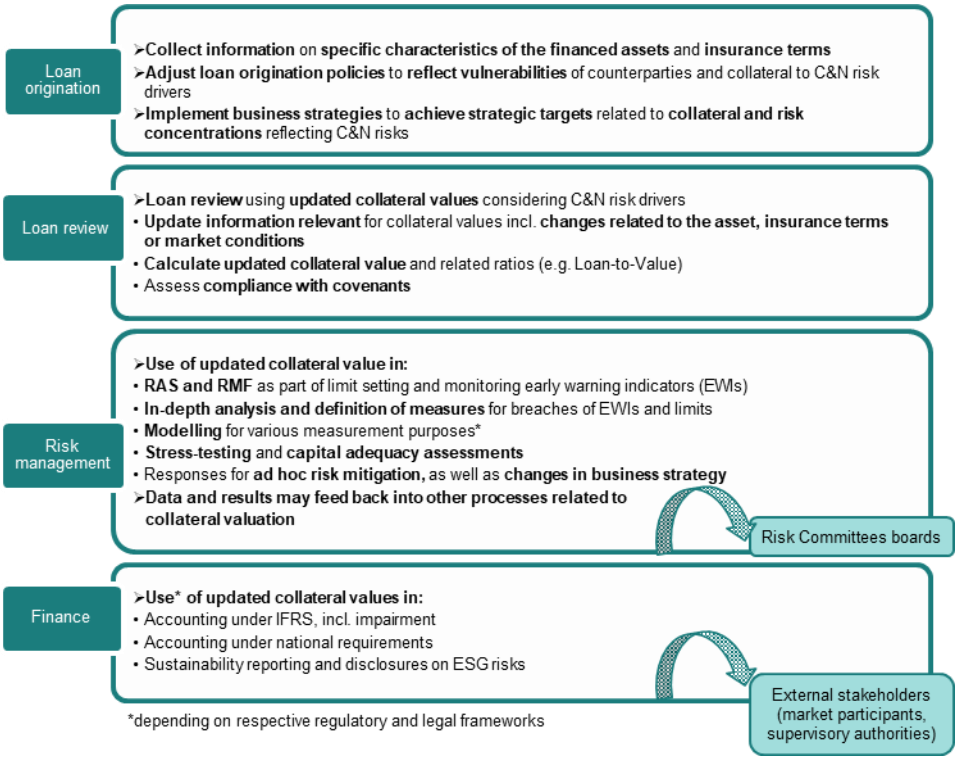
- Have enhanced their collateral valuation practices by incorporating processes and procedures that cover the entire scope of physical collateral relevant for their financing activities. They now reflect the technically distinguishing features of the various types of collateral.
- Use forward-looking methodologies that capture C&N risks and have enhanced the granularity of the information they collect to assess protection against physical risks.
- Consider updated collateral values in related processes across the institution, in line with applicable law and regulations.

Institutions typically consider several climate-related physical and transition risk drivers in collateral valuation and management. They have also started to consider

nature risks, such as biodiversity loss and environmental degradation (see Section 5.4.2 for further information on nature-related risks).

Figure 17

Stylised and non-exhaustive overview of the main steps observed in collateral valuation processes for different types of physical assets



Institutions implement data and information flows to ensure updated information is reflected consistently for collateral valuation across the various steps depicted in this figure.

General considerations

Institutions with good practices identify major transmission channels relevant not only for the borrower but also for the different assets serving as collateral (see also Section 4.1.3.2 for further information on identifying risk concentration, including for collateral). Institutions with these practices explicitly take into account collateral when identifying relevant C&N risk drivers by mapping the specific transmission channels. They do this to avoid overlooking material risk drivers when assessing the impact of different C&N risk drivers by asset type (e.g. by using a Sankey diagram; see Section 4.1.3.2).

In practice, institutions with good practices adjust their group-wide policies to require that all potentially relevant C&N risk-related impacts be considered in all types of valuations. At entity-level, related procedures implementing those policies often prescribe that internal and external appraisers or statistical models consider the technical specifications of the asset as well as any insurance or other risk mitigants over the lifetime of the loan (see above). Important considerations observed include:

- incorporating C&N transition and physical risks as part of the regular assessments of collateral valuation;
- considering the potential impacts of C&N risks on expected cash flows by changing the amount of any cash inflows and outflows as well as the probability and/or timing of their respective occurrence;
- considering the points described in the previous two bullet points respective consideration in risk management as well as in valuation processes for accounting and prudential purposes.

The table below provides an overview of relevant factors used by institutions to reflect C&N risks in the valuation and management of collateral.

Table 49

Non-exhaustive list of relevant factors for collateral valuation and management

Type	Risk drivers	Relevant factors
Collateral valuation	Physical risk	Forward-looking estimates of the likelihood of natural hazards (storms, floods, heavy rain, hail, hurricanes) Geospatial location data and object type (e.g. number of floors) Expected reinstatement costs for damage
	Transition risk	Energy efficiency certificates (e.g. EPCs) Sustainable building material certificates (e.g. BREEAM, MPG, DGNB) Technical specifications of any type of movable or immovable physical asset, to assess the impact of current and upcoming regulation relevant to the condition or use of the asset, e.g. distinguishing different sub-types of ships by energy source needed to operate them to assess the impact of regulation aimed at decarbonising the shipping industry
Collateral management and mitigation	Physical risk	Insurance schemes (e.g. flood insurance, building insurance, business disruption insurance), including terms such as cost and maturity or renewal dates of the contract, as well as conditions for reimbursement of damage claims Government or other public protection schemes
	Transition risk	Exclusions (e.g. no longer financing buildings located near protected areas, such as Key Biodiversity Areas, or projects not aligned with the Equator Principles)

Coverage of physical collateral

Institutions with more advanced approaches have enhanced their collateral valuation practices, starting with a scan of the entire stock of different asset types serving as physical collateral for different kinds of financing activities, such as various types of real estate, ships, aircraft or cars in asset financing, or onshore and offshore projects such as wind farms in project finance. Institutions use the resulting data infrastructure to identify all risk drivers needed to assess the potential impacts of C&N risks on each specific asset category, based on its type and, as the case may be, sub-type.

Figure 18

Non-exhaustive overview of physical asset types observed in collateral valuation processes

The respective valuation incorporates information on related C&N risk drivers into the modelling of their impacts on the expected cash flows associated with the asset. The main technical criteria that differentiate each asset type and sub-type determine which C&N risk drivers institutions assess depending on the relevant transmission channels. In practice, institutions differentiate collateral as follows:

- Energy efficiency labels and technical features. For instance, the type of energy used to operate the asset – typically electricity, gas or fuel from different sources.
- The purpose characterising the asset's use. For instance, in the case of ships, they may differentiate between cruise ships and bulk carriers, as well as different vintages operating with different technologies).

Based on these specifications, institutions tailor the information they collect to the jurisdictions and regions they operate in.

Asset types serving as physical collateral covered by good practices include:

- **For immovable collateral**: residential and commercial real estate, including the intended use (e.g. hotels, shopping centres, office space, etc.) and certifications typically required to operate the building for that purpose, as well as different types of project finance, such as onshore and offshore energy projects (e.g. solar and wind farms or hydropower facilities), along with non-energy-related projects such as toll roads, rail or similar infrastructure.
- **For movable collateral**: transport assets such as different types of ships and aircrafts, as well as different types of vehicles in the automotive sector, mainly distinguished by engine type and fuel used.

Institutions with good practices adjust their valuation policies and practices for all types of movable and immovable physical collateral and consider the impact of C&N risk drivers and any insurance in place.

Table 50

Non-exhaustive overview of examples of good practices among institutions regarding coverage of collateral valuation

Governance, processes and documentation for the valuation policies of different assets	All physical – immovable and movable – assets and specifications covered	Different types and methods of valuation addressed
Adjust collateral valuation practices to include a **stock-take of all assets**, including different **sub-types**, e.g. **ships with different energy consumption and uses, across group entities, business lines** and **portfolios** Identify **specific C&N risk drivers considered relevant**, based on a **mapping of transmission channels** for **each asset** and **relevant sub-types**, e.g. via **a Sankey diagram capturing the collateral dimension**, as described in Section 4.1.3.2 on risk concentration	Enhance **inventory of physical collateral**, e.g. through **asset-specific technical parameters, location-related information** and **insurance terms** Adjust **policies to ensure that information on insurance reflects the level of coverage** as a potential risk mitigant, e.g. via **requests to provide insurance terms and any subsequent changes** for monitoring purposes, or even **mandatory insurance**	Implement **specific measures** regarding the **work of external appraisers**, e.g. **instructions to consider C&N risks explicitly included in the mandate letter, contract adjustments**, or **due diligence on the appraisers' capacities** Enhance the **consideration of technical data** and improve **transparency from appraisers regarding the quality** of collateral values, e.g. by **requesting specific coverage in their reports** Increase the use of **asset-specific information** for a forward-looking perspective by gathering related data, e.g. when **defining parameters for stress-testing scenarios**

Valuation processes and procedures

General considerations

Institutions with good practices assess the potential impact of C&N risks using specific forward-looking information that reflects the classification of the asset and related insurance terms. Specifically, the information on the asset (sub-)types determines the granular information needs for forecasting parameters. Examples of this information relate to:

- different asset types (see above for different types of movable and immovable assets), including information on relevant subcategories and vintages;
- energy types (e.g. coal, various fuels, solar panels, gas) and consumption levels (efficiency ratios) needed to operate the assets;
- geolocation data for the assets' locations and major areas of operations, used to determine the information necessary for collateral valuation, e.g. to estimate the cash flows that can be achieved through the intended use of the asset, as well as any potential impact arising from transition risks in the relevant jurisdiction(s), or the probability and magnitude of damage due to physical risks in the area where the asset is to be used, including information on related coverage of risk drivers and events, including increases in insurance premia or potential terminations.

The level of granularity applied for technical distinctions depends on the information needed to identify the relevant transmission channels and assess the corresponding impacts of C&N transition and physical risk drivers across different time horizons.

As the data landscape is still evolving, institutions continue to rely on assumptions as an interim solution. Institutions with more basic approaches develop estimates, such as EPC labels for energy efficiency, while also anticipating future changes in

regulatory requirements and using proxies to estimate the resulting costs and their impact on valuations, potentially complemented by haircuts.

Consequently, these institutions develop estimates resulting in more generic approaches, such as haircuts (e.g. estimated using information on market transactions in similar assets), average costs associated with renovations, or losses observed in risk events in similar areas, considering the impact of certain metrics such as EPC labels or C&N-related risk scores as proxies to estimate the potential financial impact on the collateral value of the assets.

More advanced approaches consider a wider range of information on the property and its location and estimate the renovation costs needed to improve its energy efficiency, often to meet what is, or is expected to become, the minimum level required by legislation in the country concerned. For more information on how these practices are applied in real estate financings, see the dedicated subsection below.

As a result, more advanced approaches estimate the impact with more precision by taking into account, among other aspects, granular estimates of transformation costs related to loan-specific transition risk, or geolocation data to derive estimates of potential losses, including assumptions as to their magnitude and probability distribution. Some institutions also consider the default risk of any third party providing risk mitigation, such as insurance or guarantees, while specifically modelling the respective potential impacts of C&N risk drivers, thereby integrating C&N risks not only when considering the credit risk parameters of the corporate as the borrower but also those of the guarantor (e.g. by deriving information from credit spreads on traded debt instruments).

More concretely, one institution estimates credit losses to account for a public guarantee for recovery in the event of damage to housing caused by extreme weather events. Thus, the respective impact of C&N risks on credit risk considers the credit risk of the public guarantor providing the national guarantee scheme. In estimating the impact, the institution models the impact on GDP and on the guarantor-specific credit spreads to estimate PD and LGD accordingly. For more information on credit losses and impairments, see Section 4.5.

Table 51

Non-exhaustive overview of examples of good practices regarding collateral valuation methodology

Assess potential impact on collateral valuation, considering all relevant C&N risk drivers	Integrate relevant FLI on C&N risks into collateral valuation consistently	Quantify potential impacts using granular and asset-specific FLI
Incorporate all major risk drivers considered relevant, based on transmission channels for all major assets and sub-types (e.g. enhancing the assessment of physical risk for ships by factoring in the increased risk of severe storms and the increase in insurance premiums) **Assess the impact of C&N risk drivers, considering transition and physical risks (e.g. using information on protected areas or scores on natural degradation for real estate)**	**Consistently consider data and information generated** from various relevant procedures when assessing impacts (e.g. by **addressing insights from stress-testing on collateral value in capital adequacy assessments)** Assess **potential impacts** using assumptions on **different scenarios** and **reflect strategic actions** in a **forward-looking manner** (e.g. **estimating transition costs via CapEx or future potential damage costs)**	Assess **potential impacts using asset-specific criteria and risk mitigants** with **relevant granularity** regarding technical aspects and location (e.g. **considering location-specific information, energy efficiency indicators, insurance terms or third-party guarantees)** Develop **asset-specific forward-looking assumptions** regarding **developments of relevant external parameters** (e.g. **on potential changes in insurance premiums or coverage)**, based on data from various sources

Specific considerations regarding the information used

Institutions collect information on the insurance or guarantee schemes in place as part of their loan granting policies, including specific information on the terms and coverage for collateral valuation. They collect, update and incorporate all information on relevant contractual terms and the scope of insurance and other risk mitigants such as guarantees (see also Section 4.2.3). This typically includes the maturity of the contractual arrangements, pricing provisions and coverage (usually limited to certain physical risks and potentially under the caveat of pre-conditions), as well as the insurance provider or guarantor. Institutions use this information to assess and incorporate the coverage provided by insurance, while considering the potential impacts on collateral values in relation to different risk drivers.

For physical risk information beyond insurance coverage, institutions mostly use external data obtained from public sources and/or specialised third-party providers, which are then assigned to the relevant collateral portfolios based on information on the location of the property (see also Section 3.5.1 on data collection good practices for physical risks). Institutions also use specific tools or evaluation layers within their risk and reporting IT infrastructure to quantify physical risks to real estate and other physical assets through the probability of occurrence of a natural hazard (e.g. floods, hurricanes; see Section 4.6.7) or biodiversity loss, and the vulnerability of the real estate asset to the hazard in conjunction with its value (i.e. restoration costs).

This assessment is used to integrate physical risks into the valuation of collateral for all new financing. As part of the assessment, the institution performs a location-specific risk analysis to quantify physical risks, using geospatial mapping and local geographical characteristics (e.g. building type, the type of surrounding terrain, the features of the construction, (public) transport routes). Using natural hazard maps (e.g. floods, droughts, wildfires), the model constructs what are known as vulnerability functions to translate, for example, flood level distributions into probability distributions for damage ratios (i.e. the cost of repairing flood damage, as a percentage of house prices). With this approach, the institution calculates risk

estimates, also taking into account any general hazard protection and/or building-specific mitigation measures in place.

Technical specifications for movable and immovable assets are used to assess how related physical and transition risks may translate into expected damages, losses or a deterioration in asset quality. Some institutions factor transition and physical risks into the collateral valuation process by considering minimum requirements to be included in the valuation report for immovable and movable property, which may affect LGD and expected credit losses (see also Section 4.5.2).

In addition, as part of the collateral valuation process, some institutions may internally require mitigating measures (e.g. insurance protection or enhanced flood protection) to reduce the potential impact of climate-related risks on the collateral (see also the following subsections).

Assessment of transition risk for real estate collateral

For transition risk, institutions typically consider information on the energy efficiency of the property in three ways: (i) requesting borrowers to provide such data at loan origination; (ii) retrieving data from public registers when publicly accessible; and (iii) instructing the valuers to collect the EPC data as part of their collateral valuation review.

As a good practice, institutions have introduced mandatory requirements for collecting data on an asset's energy performance certificate (EPC) as part of their mortgage origination process, and have also implemented a set of IT requirements. The type of data now being collected goes beyond the EPC, with all underlying data points needed to qualify the energy efficiency of the buildings collected as well. For the existing stock, institutions with advanced practices adopt a mix of solutions to collect more data and use them in their risk management practices, ranging from external data providers and public databases to targeted client engagement. Additional information on good practices for collecting EPCs can be found in the ECB's Supervision Newsletter on "Climate-related data for the real estate sector: challenges and solutions".[20]

As regards forward-looking information, some institutions using more advanced approaches estimate the impact of the risks by estimating the transformation costs needed to improve the energy efficiency of the buildings for transition risks, or estimated losses using geolocation data, including assumptions on magnitude and probability distributions. Some institutions with more advanced approaches also look at the default risk of any third party providing risk mitigation, such as insurance or guarantees.

For the part of the portfolio for which data are not available or cannot be retrieved in any way, institutions estimate the missing data. Good practices on data estimation

[20] See "Climate-related data for the real estate sector: challenges and solution", *Supervision Newsletter*, ECB, November 2024.

can be found in the ECB report on good practices for climate and nature-related stress-testing.

Use of updated collateral values

Institutions following good practices use updated collateral values, as described above, in their loan origination and loan monitoring procedures, as well as in other areas considered relevant for risk management purposes. Consequently, institutions adjust processes and procedures related to, for instance, the risk management framework, including the risk appetite statement and internal risk-related reporting, as well as policies and procedures for stress-testing and capital adequacy assessments, to reflect the integration of C&N risks into collateral valuation processes. Furthermore, institutions with good practices consider updated collateral values for different reporting purposes, such as internal risk reporting and external publications prepared under different reporting and disclosure requirements outlined by their respective frameworks (see also Section 4.5.2 on ECL calculation).

Table 52

Non-exhaustive overview of examples of good practices regarding use of collateral valuation

Consider impacts on collateral values across the entire process chain	Use collateral values that reflect C&N risks across risk management and related practices	Address C&N risks related to collateral in risk appetite and business strategies
Adjust policies and procedures to consider updated collateral values across all areas of the process chain, e.g. in LGD in ECL calculation or sustainability reporting on risks **Integrate these elements into asset-level processes and procedures, including the data and IT infrastructure required for valuation processes (e.g. by enhancing data fields for asset specification and insurance details to collect and map the respective information on C&N risk drivers)**	**Integrate these values into the RMF and RAS**, including related monitoring and reporting, **stress tests and capital adequacy assessments**, as well as **accounting and prudential purposes** (e.g. **defining specific KRIs to address risks to collateral values, related risk appetite statements, dedicated scenarios)** Depending on context, **evaluate expected and unexpected losses under various scenarios** using FLI across different time horizons (e.g. **calculating impacts for adjustments of LGD)**	**Adjust credit policies and loan processes** to reflect the incorporation of C&N risks and their impact on collateral values (e.g. in **collateral classification and the use of loan-to-value (LTV) ratios for various purposes)** **Consider related material risk concentrations** and the **increase in physical and transition risks in business steering,** demonstrating **clear links to MA, BES** (e.g. by **addressing material collateral types specifically in BES and when defining risk appetite)**

4.5 Credit losses and impairments

This section describes initial approaches used to identify and record losses from climate risks (“loss-tagging”). The observed approaches are limited to physical risks. This section also describes good practices in estimating credit losses for different purposes, including impairment calculations.

4.5.1 Good practice for tagging physical risk-driven losses
Mounting losses – initial approaches to tagging defaults linked to physical risks

Newly added good practice

Expectation 7.3
Institutions are expected to adequately quantify the climate-related and environmental risks that the institution is exposed to.

Institutions are starting to implement approaches to identify and record credit defaults linked to physical risks (also known as "loss-tagging"). This process is used by institutions to capture and analyse an initial set of climate-related losses in a structured and consistent way, supporting risk management, supervisory reporting, and progressively facilitating the integration of such losses into institutions' credit risk models.

The following good practices focus on processes that the institutions have developed. At present, the approaches observed tend to be limited to extreme weather events and real estate collateral. They do not encompass all possible financially relevant developments of a borrower beyond default (such as their inclusion on a watchlist or where their rating is downgraded). In addition, the limited set of attributes considered may lead to underestimation, since, for now, defaults are typically only captured when insurance or government support fails to offset the impact of extreme weather events.

The remainder of this section describes an example of a structured process to tag defaults potentially associated with extreme weather events. The process begins with event detection, where defaults on loans secured by commercial and residential real estate collateral are monitored for occurrence shortly after an extreme weather event, such as a hurricane or flooding. Once a potential link is identified, credit risk experts conduct an ad hoc climate review and assessment to determine whether, and to what extent, climate factors contributed to the default. This includes evaluating property-level damage and classifying events as physical risk triggers. Given the challenge of attributing the extent to which losses or defaults are driven by physical risk factors, the institution has decided to tag defaults when physical risk factors are assessed to have materially contributed to the loss. This is based on predefined criteria and expert judgement.

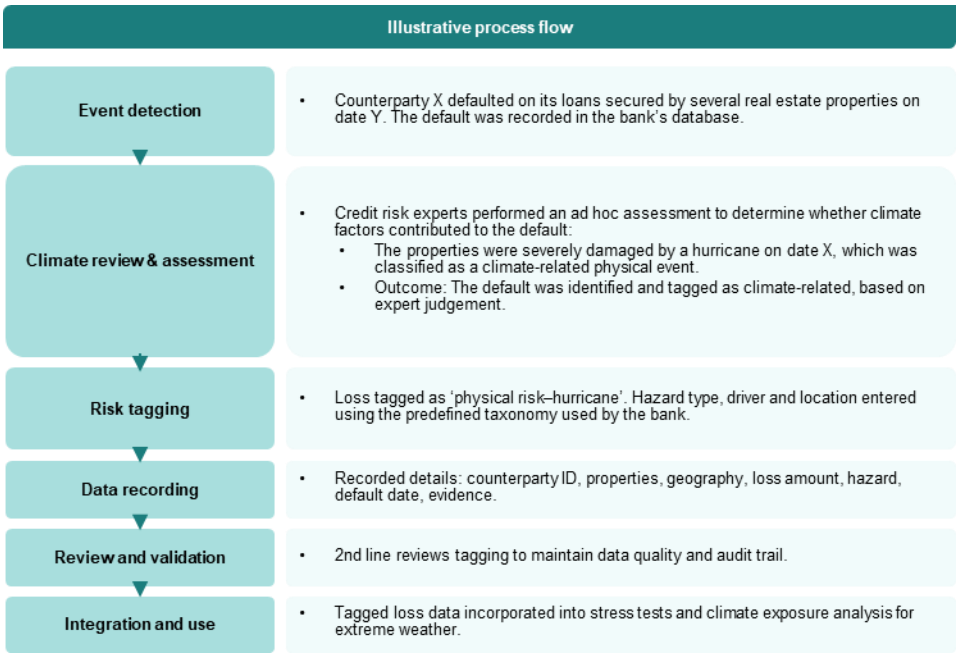
The confirmed climate-related default is then incorporated into a risk-tagging process, using a predefined taxonomy that captures key attributes such as sector, location, hazard type, driver and loss amount. The classification undergoes governance validation to increase accuracy, consistency and traceability. Details of the tagged default, including counterparty ID, property information, geography, hazard type, default date and supporting evidence, are recorded in the institution's database. A second review is then performed to verify the quality of the data and maintain an audit trail.

The tagged loss information is then integrated into broader risk management frameworks, feeding into stress-testing, climate exposure analysis and other risk models.[21]

[21] For additional information and considerations on loss-tagging, see Recommendation 3 of the "Report of the C-ESG Risk Roundtable Climate & Environmental (C&E) Credit Risk Data and Modelling", C-ESG Risk Roundtable, October 2025.

Figure 19

Illustrative process for loss-tagging related to physical risks



4.5.2 Good practice for determining expected credit losses for impairment and unexpected credit losses
Digesting novel risks – reflecting C&N risks in credit loss and impairment calculations

Newly added good practice

Article 74 CRD requires credit institutions to have ""adequate internal control mechanisms, including sound administration and accounting procedures ... that are consistent with and promote sound and effective risk management".

This section describes observed practices used to estimate credit losses for different purposes including impairment calculations. These observed practices do not necessarily reflect full alignment with all applicable regulations and accounting frameworks. They should be considered in light of the specific regulatory requirements to which each institution is subject, along with related guidance issued by the competent bodies in each jurisdiction.

Estimating losses – considering C&N risks in calculations for different purposes

General observations

At the core of institutions' processes and procedures for estimating the potential financial impacts of C&N risks are considerations regarding the calculation of expected credit losses (ECLs) used to reflect the estimated potential impact of relevant C&N risk drivers on credit risk in the balance sheet and profit and loss statement (P&L). The approaches observed to estimate ECLs while considering C&N risks usually build on methodologies and information used in stress-testing, reflecting assumptions about the development of C&N factors and their impacts on macroeconomic and asset-level parameters.

Requirements regarding loss estimation differ depending on the purpose, such as between accounting frameworks and the ICAAP. As accounting frameworks usually consider only *expected credit losses*, not unexpected ones, institutions adjust their calculations to incorporate only those estimations required for accounting purposes. They consider impacts on *unexpected losses* in stress-testing and capital adequacy assessments.

Generally, in considering the impact of C&N risk drivers on probability of default (PD), loss given default (LGD) and exposure at default (EAD) for ECL calculation purposes, institutions typically start by using credit risk-related information on parameters derived from determining capital demand under the Internal Ratings-Based Approach (IRBA) – when applicable to them – and from internal risk management practices. Relevant information for these purposes includes forward-looking information for different time horizons. This information is usually a combination of internal data collected by the institution, external data from public sources, private third-party providers, and the financial and sustainability reporting published by corporate clients (see also the good practices on data governance in Section 3.5.1).

Institutions with good practices, when estimating losses, aim to use information and apply methodologies consistently. Many institutions apply the information and methodologies that consider C&N risk drivers in stress-testing, and, based on the information derived from these analyses, estimate the impact on PD as well as LGD, which they then use for risk management purposes, including their materiality assessments. They then consider these estimates for accounting purposes (to the extent foreseen under applicable frameworks).

The updated parameters are then embedded in the estimation of credit losses to reflect C&N risks and are used in institutions' general stress-testing processes and procedures, among other uses. Furthermore, the resulting information on potential impacts on P&L and capital feeds into the assessment of capital adequacy as part of their ICAAP, including specific explanations of the effects of additional impairments and the related judgement in the capital adequacy statement (CAS).

In addition, institutions with advanced approaches separately assess the impact of C&N risks not only on expected but also on *unexpected credit losses*, to reflect severe downturn assumptions for use in adverse stress-test scenarios. They do this, for instance, by running specific Value at Risk (VAR) calculations to capture severe downturns and tail risks driven by C&N risks.

ECL calculation considering impacts on PD and LGD

Institutions face challenges in modelling the impact of C&N risks due to scarce historical information. Impacts not sufficiently captured in ECL modelling are usually recognised by institutions through the use of overlays. In this regard, when estimating the impact of C&N risks, institutions not only take into account *historical information* to derive assumptions about the future development of C&N risk drivers and their correlations with borrowers' credit risk, but also increasingly apply *expert assumptions* on the future development of C&N risk drivers. For instance, institutions

rely on scientific research or forecasts developed by experts such as insurance companies.

These approaches aim to address the fact that these novel risk drivers come with increased uncertainty regarding their magnitude and their correlation with PD and LGD, and typically non-linear distributions. Some institutions also build in-house expertise by employing technical experts in C&N sciences. Institutions with good practices continuously enhance the level of detail and granularity they apply in their estimation and calculation processes by using forward-looking information to reflect scientific and regulatory developments.

Generally, for impairment purposes, many institutions have integrated the potential impact on loan loss provisions based on macroeconomic modelling considering at least climate-related risk impacts. However, this approach alone lacks sensitivity since it is incapable of differentiating the nuanced sectoral impacts of C&N risks (see the publications linked in the footnote for further details).[22] Therefore, institutions with more advanced approaches carry out more comprehensive and granular assessments of the potential impacts of various relevant climate-related, but also nature-related, risks. Furthermore, they consider not only the macroeconomic environment but also sector- and borrower-specific circumstances (e.g. financial statements of corporate counterparties), as well as collateral-specific characteristics at the loan level.

More specifically, for the risk classification on which credit loss estimations are based, approaches among institutions to estimating PD range from basic to more advance practices. Basic models apply simplified assumptions regarding rating notch movements based on certain groups of counterparties depending on, for example, sector or geographical location. Institutions with advanced practices simulate the impacts of C&N risks scenarios not only at the macroeconomic level but also on the financial statements of the counterparties, and potentially on the collateral value at the loan level, in order to estimate the impacts on PD and LGD. These institutions assess the potential impacts of C&N physical and transition risk drivers on stage allocation and on the corresponding calculations.

Uncertainties

Some institutions take into account uncertainties by applying haircuts to collateral values. In the case of real estate, this might happen when information on EPC labels is incomplete and where conservative estimations have been made regarding the existing stock of collateralised loans. Some institutions have adjusted their scenarios when modelling various downside risks in their stress-testing framework to consider major transition-driven economic developments translating into policy shocks and related price impacts, as well as shocks from physical risks such as extreme weather events. Additionally, some institutions have defined dedicated scenarios to address the potential impact on their main collateral types (see also Section 4.4.2).

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22 See McCaul, E., "Overlays and in-model adjustments: identifying best practices for capturing novel risks", *The Supervision Blog*, ECB, 26 May 2023 and "IFRS 9 overlays and model improvements for novel risks – identifying best practices for capturing novel risks in loan loss provisions", ECB, July 2024.

Considering unexpected losses in capital adequacy assessments

General observations

To cover unexpected losses when identifying capital needs in the ICAAP, institutions estimate the potential likelihood and magnitude of downside risks using shock scenarios and methodologies such as Value at Risk (VAR) or the Vasicek model. Operationally, some institutions embed these considerations further, such as by adopting a dynamic balance sheet approach.

More specifically, in the context of external reporting, for those institutions that prepare consolidated financial statements under IFRS, the recognition of ECLs while using forward-looking information is required under IFRS 9 — Financial instruments.[23] Institutions with more advanced practices look at C&N physical and transition risk drivers as part of their impairment processes and procedures to reflect the potential impacts on the measurement of credit risk for accounting purposes. These institutions assess the potential impacts on the risk classification of the counterparty and related PD to identify significant increases in credit risk for adequate stage allocation, as well as for the corresponding ECL calculation.

Some institutions apply a combination of bottom-up and top-down approaches when incorporating forward-looking information to estimate the potential impact of C&N risks at the macro level, while also considering impacts at the level of the specific loan or issuance.

Counterparty-specific information

Several institutions have integrated C&N risk factors as potential triggers for identifying possible moves to watchlists as part of their credit file review process. Similarly to what was mentioned earlier when describing ECL calculations approaches, more advanced approaches take account of counterparty-specific information at the individual asset level (e.g. from the information that corporate clients report and disclose) to forecast the potential impacts of C&N factors on the debtors' financial statements. Several institutions combine modelling the impacts on the financial statements of corporates at counterparty level and extrapolating the resulting projections to other counterparties based on shared characteristics such as operating in the same sectors and regions.

Disclosure

As part of the notes to their financial statements as well as in their sustainability reporting, institutions with good practices separately disclose information on their chosen approach to integrating C&N risks into credit risk measurement and related ECL calculations, as well as the main assumptions they made. Institutions describe the assumptions and narratives they use in relation to C&N risk parameters, especially regarding macroeconomic scenarios, when preparing their financial statements, and disclose their material impacts separately. Furthermore, institutions

[23] The scope of the relevant impairment provisions covers financial assets measured on the balance sheet at amortised cost, debt instruments on the asset side measured at fair value through other comprehensive income, as well as certain financial guarantees and loan commitments.

with good practices establish links between financial reporting and sustainability-related reporting. Additionally, these institutions describe their approaches to integrating C&N risk drivers into credit risk management, providing details on their ECL calculations to allow the reader to understand the institution's approach in their Pillar 3 ESG reporting.

Considering C&N risks in relation to the impairment of tangible and intangible assets

Institutions with advanced practices, beyond accounting for C&N risks in ECL calculations for financial instruments, also incorporate the potential impacts of C&N risk drivers, including potential impairments, in the valuation of other asset types, such as goodwill as well as other intangible assets, institutions' own property, and investment property.

4.6 Capital adequacy and portfolio analysis

4.6.1 Good practice for capital adequacy and portfolio analysis In capital letters – allocating capital for material C&N risks as part of the ICAAP

Expectation 7.6
Institutions are expected to assess the impact of C&E risks on their capital adequacy from an economic and a normative perspective.

Institutions are now assessing capital adequacy in the context of C&N risks as part of their ICAAP, both in the economic and the normative perspectives, in accordance with the ECB Guide to the Internal Capital Adequacy Assessment Process (ICAAP)[24]. Typically, such assessments comprise scenario analyses to take into account forward-looking factors over longer time horizons. In many cases, institutions also integrate climate-related aspects into their risk quantification in the economic perspective, whereas this is typically not done in the normative perspective (in the context of a nascent Pillar 1 integration of C&N risks[25]). In some cases, however, institutions have decided to reflect C&N risks as part of their management buffer determination also in the normative perspective.

In addition to the good practices described in the 2022 publication, which outlined a selection of observed practices among institutions that include C&N risks in their economic risk quantifications, this chapter now also elaborates on how institutions typically decide on capital adequacy when considering C&N risks from the normative perspective. It also provides an overview of practices addressing persisting challenges relating to the time horizon. It likewise describes good practices for

[24] See Principle 3 of "Guide to the internal capital adequacy assessment process (ICAAP)", ECB, November 2018.

[25] For legal references on the integration of C&N risks into Pillar 1, please also refer to Article 208(3)(b) of CRR III. For additional material and guidance, see the "Report on the role of environmental and social risks in the prudential framework (EBA/REP/2023/34)", EBA, October 2023, and FAQ 7 of "Frequently asked questions on climate-related financial risks", Basel Committee on Banking Supervision, December 2022.

substantiating capital adequacy when considering C&N risks, as well as for integrating the resulting additional capital costs into the loan pricing framework.

4.6.2 Good practice for substantiating the level of capital needs for C&N risks in the capital adequacy statement (CAS)

Newly added good practice

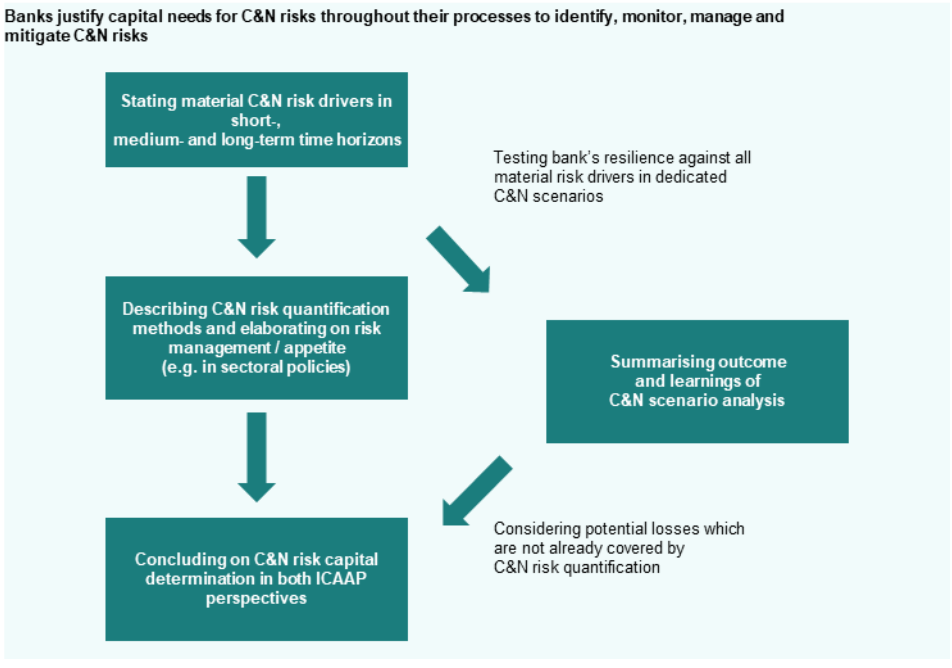
Principle 2(ii) (ECB ICAAP Guide) Each year the management body is expected to provide its assessment of the capital adequacy of the institution, supported by ICAAP outcomes and any other relevant information, by producing and signing a clear and concise statement, the capital adequacy statement (CAS).

Several institutions substantiate the level of capital needs from both a normative and an economic perspective as part of their CAS for climate-related risks, where these risks are material to the institution.

For example, one institution provides a clear narrative in its CAS linking risk assessments, scenario outcomes and capital needs. The institution summarises its framework for integrating C&N risks into the ICAAP, in line with evolving climate stress-testing methodologies. Moreover, the institution articulates how quantified risk impacts, derived from scenario analysis, are translated into internal capital demand. This includes explicit alignment between risk metrics (e.g. IFRS parameters such as PD and LGD, as well as operational loss estimates) and ICAAP capital components.

Figure 20

Non-exhaustive overview of a framework for substantiating the level of capital needs for climate-related risks in the institution's capital adequacy statement (CAS)



The institution also benchmarks the results of the current ICAAP framework against those of the previous year to justify changes in capital planning assumptions.

Institutions that hold capital buffers in the normative and economic perspectives usually substantiate the size of the capital buffers as part of the CAS (or related documents) by comparing them with the outcomes of scenario analyses that take

into account forward-looking factors. In their ICAAP documentation, institutions generally include a description of the scenarios, typically with separately formulated scenarios for transition and physical risks, and a calculation of the impact of the scenario on quantitative metrics, such as provisions, capital and profitability.

Some institutions are still developing economic capital models for climate-related risks. In the absence of such models, one institution has implemented an economic capital add-on that reflects potential credit losses from C&N shocks as well as potential revenue shortfalls. The add-on value was calibrated via estimated changes in PD and subsequent losses from carbon price shocks and physical risk events (aligned with a 99.9% quantile and a one-year time horizon). To substantiate its view that its capital base (including the dedicated add-on) is adequate to cover C&N risks, the institution also tested, using several C&N stress scenarios, whether climate stress impacts could be absorbed by its internal capital.

4.6.3 Good practice for capital adequacy assessment in the normative perspective

The following cases outline how institutions perform the capital adequacy assessment for C&N risks in the normative perspective and how they have started to exchange information between the economic and normative perspectives.

Newly added good practice

Principle 3 (ECB ICAAP Guide)
(ii) The institution is expected to implement a normative perspective, which is a multi-year assessment of the institution's ability to fulfil all of its capital-related regulatory and supervisory requirements and demands and to cope with other external financial constraints on an ongoing basis over the medium term. This includes the assessment of a credible baseline scenario and adequate, institution-specific adverse scenarios, as reflected in the multi-year capital planning and in line with the overall planning objectives of the institution.

One institution projected its capital ratios in the normative perspective along a NGFS scenario that was modified (e.g. with increased CO_2 prices) to capture the institution's vulnerabilities. The scenario also included the impacts of physical climate drivers on asset valuation. The institution calculated the impacts of credit loss provisions and risk-weighted assets over a five-year period to assess whether its planned capital trajectory would always be in line with the regulatory capital requirements. Another institution tailored the NGFS scenarios used in its normative perspective to include supply chain disruptions arising from physical risks. As a result of this assessment, the institution determined that the CET1 ratio might breach its risk appetite levels over the three-year normative perspective horizon. It then evaluated the financial impact of management actions aimed at restoring compliance with the risk appetite under each adverse scenario individually, including the climate one.

Para. 43 (ECB ICAAP Guide)
The normative perspective is expected to take into account all material risks affecting the relevant regulatory ratios, including own funds and risk exposure amounts, over the planning period. […] When assessing its capital adequacy under the normative perspective, the institution is expected to take into account all relevant risks it has quantified under the economic perspective and assess if and to what extent those risks may materialise over the planning period, depending on the scenarios applied.

Institutions derive additional insights for their capital adequacy assessment under the normative perspective by applying several adverse scenarios. For example, one institution projected its capital ratios over the next three years based on a variation of an NGFS scenario (modified to target the institution's vulnerabilities) and calculated the impact on the capital ratios, verifying that the capital requirements would not be breached. For further confirmation of its capital adequacy, it calculated the utilisation of its risk capacity and its CET1 ratio over a 10-year horizon under two modified NGFS scenarios.

Furthermore, institutions using the standardised approach have started to quantify their capital needs under the normative perspective. One institution, for example,

leveraged the economic perspective methodologies to quantify capital impacts under an adverse scenario in the normative perspective.

Institutions that assessed the impact of C&N risks on their capital ratios in the normative perspective have processes in place to determine whether additional capital should be integrated to address these risks.

Figure 21
Consideration of C&N risk via a forward-looking risk appetite framework

One institution calculated its CET1 ratio under a stress test scenario combining climate and macroeconomic factors with a five-year forward-looking perspective. The institution did so to determine whether its risk appetite thresholds would be breached over this period without the need to activate capital risk mitigation measures. The institution defined a list of possible management actions that could be taken if the thresholds were breached.

By contrast, some institutions consider C&N risks as a component of their capital management buffers[26]. One institution does so by leveraging on the Economic Capital process to evaluate potential capital needs in the normative perspective using a 1-in-20-year stress event.

Newly added good practice

Mutual information between the economic and the normative perspective

Principle 3 (ECB ICAAP Guide)
(iv) Both perspectives are expected to mutually inform each other […]

While full implementation of the principle of mutual information for C&N risks has not yet been observed, some institutions have started translating C&N impacts from one perspective into the other.

[26] For an overview of management buffers in the normative perspective, please see "ECB Guide to the internal capital adequacy assessment process (ICAAP)", ECB, November 2018, in particular paragraphs 40, 44, 45 and 46 and Figures 2, 3 and 4.

One institution is now computing the credit losses associated with an adverse climate scenario under the normative perspective. It then compares these losses with the total amount of capital held under the economic perspective for credit risk to assess whether additional capital is required. Conversely, another institution estimates the amount that would be required under the normative perspective to cover C&N risks, using, as a starting point, the economic impact of transition and physical risk drivers under adverse scenario simulations.

Meanwhile, another institution has defined risk appetite limits consistent with its overall CET1 capital targets for both the normative and the economic perspective, as part of its ICAAP framework. For the economic perspective, these thresholds are based on available economic capital calculated internally, whereas for the normative perspective, they are tied to CET1 capital levels. These limits serve as a basis for determining whether additional capital is required. Specifically, as with other risks, the institution evaluates the results of its worst-case climate stress test scenario against its predefined risk appetite thresholds to reach a conclusion on capital adequacy in adverse scenarios.

4.6.4 Good practice for determining the need for capital for climate-related risks in the economic perspective

Principle 3 (ECB ICAAP Guide) (iii) The normative perspective is expected to be complemented by an economic perspective, under which the institution is expected to identify and quantify all material risks that may cause economic losses and deplete internal capital. In accordance with this economic perspective, the institution is expected to ensure that its risks are adequately covered by internal capital in line with its internal capital adequacy concept.

Institutions perform capital adequacy assessments under both perspectives but hold additional capital for C&N risks typically only in the economic perspective. Several institutions have developed advanced ways of quantifying capital needs under the economic perspective. While typically relying on scenario analyses, institutions use different approaches for credit, market, operational (including reputational) and business model risks. In all of the cases outlined below, the institutions concluded their capital adequacy assessment with the decision to allocate additional economic capital specifically for C&N risks.

Credit risk in the capital adequacy assessment

In order to reflect the forward-looking nature of the risks, one institution leverages scientific climate pathway scenarios (e.g. NGFS and IPCC) to assess physical risks and transition risks. These scenarios are then used to simulate the stress impact on the institution's portfolios. For this, the institution employs a simulation tool that uses external data (e.g. asset-level data, price data) and client data to estimate the impact of the scenarios. Using this tool to model expected change to earnings before interest, taxes, depreciation and amortization (EBITDA), the institution can estimate the PDs at client level under the various scenarios by 2030 (taking into account the longer time horizon associated with C&N risks). These stressed client-level PDs are then aggregated to sector portfolio level, which allows the institution to generate sector-level heatmaps to identify which sectors are most impacted by C&N risks.

As a next step, the institution calculates the difference between the stressed portfolio PD and the baseline portfolio PD, which is the exposure at risk due to C&N risk. As the calculated difference surpassed the materiality threshold, the institution decided

to allocate a dedicated economic capital buffer for that amount of exposure at risk, addressing both transition and physical risks.

Operational risk (including reputational risk) in the capital adequacy assessment

In its ICAAP, one institution considers several climate-related risk drivers that could trigger material operational risks. To assess its capital adequacy, the institution's risk identification process identifies four scenarios that could materialise in the next 12 months.

Scenario 1: Damage to physical assets (e.g. floods).

Scenario 2: Business disruption and system failures (e.g. floods).

Scenario 3: Non-compliance with climate-related laws, rules and regulations.

Scenario 4: Reliance on outsourcing (considering e.g. floods).

For each of the scenarios, the institution develops loss estimates considering a range of hypothetical impacts that include the potential of remediation costs, legal costs, regulatory sanctions, client compensation, asset write-down and forgone revenue. These estimates are, in turn, supplemented by historical loss events and/or entity specific data. For example, when assessing the potential legal fees and regulatory sanctions resulting from non-compliance, the litigation team will look to appropriate internal and external loss data on litigation cases to help inform potential losses for such scenario. Based on the outcome of these scenarios, the institution concluded that two of these could lead to material risks to capital adequacy and thus decided to increase its operational risk economic capital buffer by the loss amounts estimated as part of those scenarios.

Newly added good practice

Reputational risks in the capital adequacy assessment

Looking specifically at reputational risk, some institutions have integrated climate-related risks into their capital adequacy assessment by leveraging internal models or conducting dedicated stress scenario analyses. For instance, one institution has adopted an expert-driven approach to define and quantify reputational risk scenarios across several business lines. These scenarios include references to past reputational risk incidents that have occurred at other institutions. For example, within its asset management portfolio, the institution has developed a scenario centred on the reputational impact of greenwashing accusations. Similarly, for its retail portfolio, a scenario has been created based on the reputational damage that could arise from financing clients who fail to adhere to the group's sector policies, thereby tarnishing the institution's public image.

Another institution quantifies the economic capital required to cope with possible future reputational risks. The model for quantifying reputational risk involves identifying, via a simple regression, the relation between an institution's perceived reputation, estimated through a score, and the "idiosyncratic component" of the expected net profit (where "idiosyncratic component" means the part of the

institution's equity performance not explained by a standard Capital Asset Pricing Model approach). The estimated regression coefficient thus obtained represents the link between the reputation score and the institution's specific rate of change in its expected future earnings: a decrease in the "good reputation" lowers market expectations of future earnings or could point to future losses due to reputational events. The reputation score represents the main driver determining the final amount of economic capital required to cover this risk and is designed to be institution-specific.

Institutions have developed scenarios covering different events that have an impact on litigation and/or reputational risk.

For example, one institution has created five different environmental litigation scenarios that could have an impact via fines, litigation costs or settlements. These scenarios include: situations where the institution may face liability due to its financing of a project that causes environmental damage (and where, in an extreme situation, the client subsequently defaults); two scenarios relating to misrepresentations regarding the funds the institution manages or distributes (either for perceived greenwashing or underperformance of the funds due to their focus on sustainability); situations in which the institution's disclosures are challenged (due to inaccuracy or for failing to meet societal expectations); and one scenario where shareholders sue the institution due to a drop in market value caused by alleged environmental misconduct. For each scenario, the organisation performs a detailed quantification using a combination of internal and external data sources. The analysis provides an average risk estimate and gives potential extreme loss figures for each scenario.

Another institution relies primarily on a scenarios database developed by a private data provider. The scenarios mostly refer to greenwashing and cover situations such as the financing of carbon-intensive clients, misleading information regarding a product and misleading disclosures. It also has a scenario specifically referring to heightened legal risk due to shortcomings with regard to legal advice related to C&N factors. For each scenario, the institution then performs both a qualitative and a quantitative impact assessment. For the qualitative impact, scores from 1-5 are assigned to different subcategories. For the quantitative impact, the institution calculates expected losses expressed in millions of euro, taking into account publicly known events and fines, criteria for fines contained in relevant laws and expert judgement. For each scenario, the institution also assesses whether the scenario is material for the short, medium and/or long term.

Table 53

Example of scenarios

Scenario	Description
Greenwashing/misleading advertising	Scrutiny by regulators, activists or civil society amplifies reputational harm, potentially diminishing market perception and trust in the institution. Gaps in internal processes for reviewing marketing materials before publication increase the risk of such incidents occurring, potentially eroding public trust and exposing the institution to further scrutiny.
Failing to meet announced targets/transition ambitions	The institution announces climate-related targets but then fails to keep track of them, or, despite adhering to its announced targets, fails to meet the expectations of society. This leads to negative media scrutiny and reputational damage.
Deliberate client advisory misconduct	Losses arise when a client advisor deliberately misleads clients, resulting in regulatory investigations and damage to the institution's reputation. The resulting loss of confidence among clients may lead to reduced profitability and outflows of assets under management.
Financing climate-related disputes	The institution becomes involved in financing projects that cause environmental harm, leading to disputes with stakeholders and reputational damage. A similar scenario involves a client defaulting because of a climate dispute.

Market risk in the capital adequacy assessment

One institution assessed the effects of physical and transition risk on market risk (i.e. credit spread, interest rate, equity, commodity and exchange rate risk) for its trading book. The institution used scenario analyses for both physical and transition risk.

For transition risk, the institution derives scenarios primarily from publicly available sources (e.g. NGFS and IPCC). These scenarios are used directly as an input for a scenario analytics tool, which is further deployed to obtain a more granular internal scenario extension. From a portfolio coverage perspective, the institution includes all relevant market risk exposures (i.e. bonds, equity and derivatives). The scenarios cover different severity levels and include a baseline scenario (orderly transition scenario) and an adverse scenario (disorderly transition scenario). For the sensitivity analysis, the institution uses a sensitivity-based P&L simulation to understand the impact of selected C&N risk-related variables (e.g. carbon prices or credit spreads of affected sectors). The institution also models the possible impact of the stress event on volatilities and risk correlations.

For physical risk, the institution uses several stress test scenarios to assess and quantify the impact on P&L of extreme weather events for its trading book. The institution takes inspiration from extreme real-life weather events to define the scenarios (for example, a 2007 cyclone, 2012 Hurricane Sandy, 2017 southern-EU drought). For each scenario, it considers different shocks (for example, large sell-off, small sell-off, oil crisis, foreign exchange crisis, etc.). The institution considers a total of eight different scenarios including extreme precipitation, hurricanes, droughts, lethal heat waves, water supply issues, increase in average temperatures, and sea level rise. The positions considered are equities and securitised products, commodities, FX and rates. The stress impact is modelled by assuming sell-off against reduced prices.

Based on the results from both assessments of the impact of transition risk and physical risk, the institution designates a capital buffer for C&N risk for market risk. Results are further used for dynamic balance sheet planning and portfolio management.

Newly added good practice

Business model risk in the capital adequacy assessment

To assess potential threats to their viability, profitability, or sustainability arising from weaknesses or misalignments in their strategic positioning or external environment due to climate-related risks, some institutions consider these C&N risks in their internal model and via scenario analysis.

One institution, for example, assesses the adequacy of its C&N risk capital buffer based on its internal eco-cost value ratio (EVR) model, which puts the environmental impact of an undertaking into perspective relative to its price, on the understanding that a higher EVR also indicates higher P&L volatility. This model considers the institution's strategic plan – such as phasing out emitting assets or anticipating changes in client behaviour – and estimates potential shortfalls relative to expectations based on historical volatility. It is supplemented by an annual add-on to

the model to factor in the increasing impact of C&N risks on reputational risks. This add-on is determined on the basis of the most severe revenue impact from climate-related risks identified in the institution's scenario analysis results.

Another institution has developed a stress test to evaluate the potential impact of client exits stemming from unmet C&N commitments over a short-term time horizon. This stress test focuses on clients currently subject to engagement plans and assumes a linear phase-out of these clients. The institution projects the gross margin across all clients under this exit scenario, analysing both the aggregate impact and client-specific effects on gross margin. The analysis was further broken down by sector to provide more granular insights for the institution's business strategy. Based on the results, the institution assesses its resilience to C&N-related risks, particularly those associated with transition plans, and determines its capacity to effectively tackle such risks.

4.6.5 Good practice for considering longer time horizons

Newly added good practice

Paras. 44/50 (ECB ICAAP Guide) The ECB guide to the ICAAP highlights that institutions are expected to maintain a robust, up-to-date capital plan covering a forward-looking horizon of at least three years in both the economic and the normative perspectives.[27]

Recognising climate-related risks as medium to long term drivers, some institutions are starting to find solutions to extend their usual planning horizon[28] to better capture the impact of C&N risks in their capital planning.

In relation to the economic perspective, one institution extends its planning horizon for climate-related risks (from three to five years), assessing the cumulative impact of climate-related risks over a five-year horizon using scenario analysis based on one of the NGFS scenarios.

Another institution determined, as part of its materiality assessment, that climate-related risks have an impact only over the longer term horizon. In order to determine the average annual impact of climate-related risks, the institution divided the aggregated impact based on one NGFS scenario up to 2050 by the number of years remaining. After conducting back-testing on the climate stress test based on historical extreme climate events in the region where the institution operates, and adjusting expected losses to account for climate and environmental risks on a forward-looking basis, the institution decided to hold additional capital for climate-related risks in the economic perspective equal to the cumulative impact of climate risks over a five-year horizon.

A third institution frontloads the impact of the C&N risk drivers within the institution's risk horizon, while considering a longer time horizon in its valuation approach. More precisely, it considers PDs and LGDs projected for 2050 in respect of climate-related risks in its ICAAP quantification process. These projections are based on statistical trajectories and supplemented with add-ons derived from, for instance, NGFS and ECB climate scenarios. In this specific example, based on the institution's modelling

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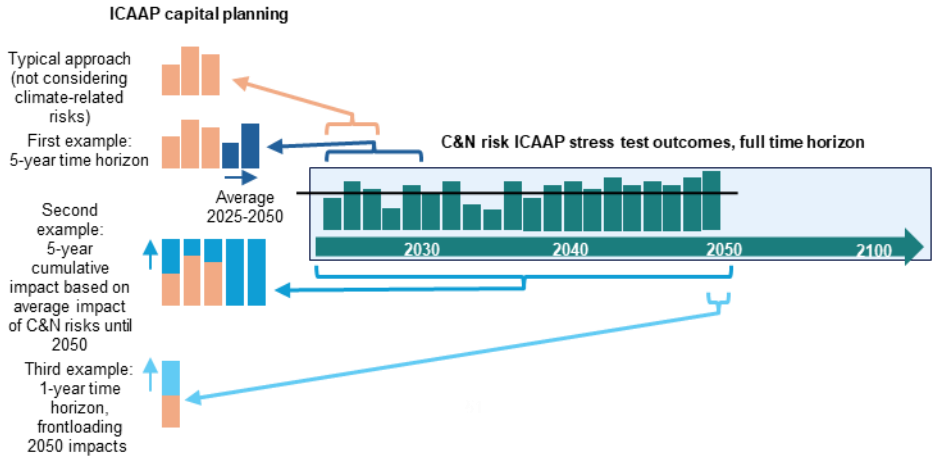
27 See paragraphs 44 and 50 and the glossary of "ECB Guide to the internal capital adequacy assessment process (ICAAP)", ECB, November 2018.

28 According to the ECB report on banks' ICAAP practices, the most frequent time horizon used for capital planning is three years under both perspectives, whereas the ECB Guide on the ICAAP expect banks to perform medium-term projections for at least three years only under the normative perspective.

choices in the scenario, the full impact of the long-term scenario – covering all material risk drivers – only takes effect in a certain year of the scenario.

Figure 22
Consideration of longer time horizons in internal capital planning



Turning to the normative perspective, one institution calculated the impact of a scenario (in this case based on the NGFS "Delayed Transition" scenario, adjusted for sectoral specificities) over the next three years to support its conclusion on capital adequacy from the normative perspective with regard to C&N transition risks. To further assess its capital adequacy, the institution projected this scenario as well as another one (based on the NGFS "Current Policies" scenario) over the next ten years, confirming that the CET1 ratio and the utilisation of internal capital would remain within the institution's risk appetite limits.

4.6.6 Good practice for including additional capital costs in product pricing

Newly added good practice

Expectation 8.5
Institutions' loan pricing frameworks are expected to reflect their credit risk appetite and business strategy with regard to C&E risks.

Expectation 8.6
Institutions' loan pricing is expected to reflect the different costs driven by C&E risks.

As outlined in Chapter 4.4.1, institutions have found ways to consider climate-related risks in their loan pricing framework by integrating climate-related risks into their C&N risk rating system, mostly via overrides that can indirectly affect the credit cost component of the loan rate. Institutions that decide to hold an additional capital add-on in the normative or economic perspective – for instance because they conclude, based on the outcome of the climate stress test in their capital adequacy assessment, that they are particularly vulnerable to specific climate-related scenarios – have also found ways to consider these additional capital costs in their (loan) pricing framework via, for instance, an adjustment of the loan rate.

These institutions adjust their loan pricing during the origination process or the periodic rollover of loan exposures, typically via a higher loan rate to take into account additional capital costs due to climate-related risks.

For instance, to incorporate climate-related capital costs into product pricing as part of the ICAAP, one institution considered – among other factors – the impact of C&N risks on RWAs and expected losses based on a short-term climate stress test scenario. The institution broke down the stress test impact by NACE sector and used a predefined threshold (at sector-level) to decide whether adjustments to the pricing were warranted. Based on the stress test outcomes, adjustments to the loan rate at sector level were discussed and decided by the pricing committee.

Another institution calculates its projected climate-related losses up to 2050, considering an adverse NGFS stress scenario, and incorporates these losses into its pricing policy (at counterparty level) via a higher loan rate to reconstitute its gross income margin. The projected climate-related losses are periodically reviewed and updated based on the results of new climate risk stress tests.

Table 54
Simplified examples of reflecting C&N capital costs in product pricing

	Methodology to identify additional capital costs	Incorporation of additional capital costs into the loan pricing framework
Example 1	Quantified impact on RWAs and ELs (per sector) from C&N risks based on a short-term scenario	Decision of the pricing committee at sectoral level based on stress scenario results, implemented via higher loan rate
Example 2	Quantified impact on P&L from long-term C&N risks considering an adverse scenario	C&N risks component within the credit risk cost to adjust the loan rate at counterparty level

4.6.7 Good practice for quantifying physical risks to assess capital adequacy

Newly added good practice

Expectation 7.3
Institutions are expected to adequately quantify the climate-related and environmental risks that the institution is exposed to.

Institutions, including smaller ones under the direct supervision of the ECB, have started to quantify physical risks more granularly, noting that observed practices focus on acute risks. This limited scope is not meant to signal that chronic risks are not relevant.

For instance, one institution assesses its exposure to physical risks from extreme weather events – such as floods and wildfires – across its collateral portfolio, covering both commercial and residential real estate. The assessment is performed at two levels: (i) single-asset level, exploring impacts for selected properties, which can then be mapped to vulnerability curves[29] (e.g. residential, tourism and commercial real estate); and (ii) at the aggregated NUTS3 regional level for commercial real estate collateral. The assessment methodology is based on three components: hazard, vulnerability, and exposure:

- **Hazard assessment:** the institution quantifies the probability and severity of climate-related events at each property's geographic location, using high-resolution hazard maps derived from historical meteorological data, satellite

[29] The institution defines a vulnerability curve as a function that links a given intensity of a physical hazard (e.g. flood water level) to the expected damage to a specific asset, taking into account the asset's unique structural and construction characteristics.

Earth observations, and advanced hydrological and climate models, including downscaled projections from the Copernicus Climate Change Service platform under the IPCC RCP 4.5 and RCP 8.5 scenarios for future horizons (see Section 3.5.1 for additional details on available open-source data used by institutions for hazard information).

- **Vulnerability assessment:** the institution then translates hazard intensity into expected losses using hazard-specific damage functions and vulnerability curves, which account for building characteristics such as construction material, floor location, and structural type, drawing from third-party providers' databases and empirical event data.

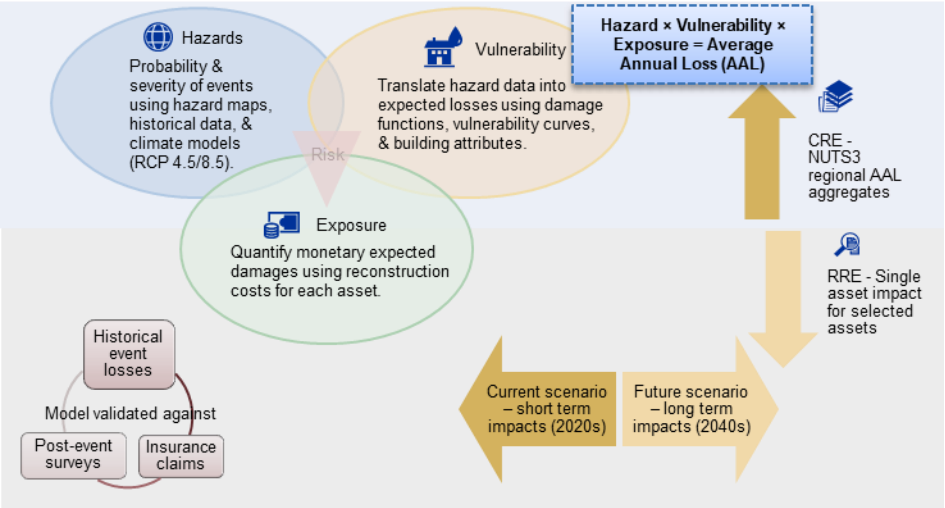
- **Exposure assessment:** to translate hazard and vulnerability into monetary terms, the institution measures the exposure based on the cost for reconstruction, reflecting what it would take to rebuild the property to its original structural and technical standards. This cost is independent of market values and is adjusted to current prices for materials and labour.

These components are combined to calculate average annual losses (AAL) for each property and aggregated at the NUTS3 level, thus providing a probabilistic estimate of expected annual economic loss due to physical risks from extreme weather events.

The institution performs data cleaning and imputation techniques to enrich its dataset, aiming for increased accuracy in geolocation and vulnerability estimation. Outputs are shown both as regional aggregates and as impacts at the individual asset level, across current and future (e.g. 2040s) scenarios. The expected annual losses are validated against historical event losses (see good practice 4.5.1 on loss-tagging), insurance claims and post-event surveys.

Figure 23

Non-exhaustive illustration of physical risk quantification components



5 Managing nature-related risks

This section describes good practices related to the monitoring, management and mitigation of nature-related risks, meaning environmental risks that go beyond climate change. The previous sections outlined good practices among institutions that are common to both climate and nature-related practices, noting that some of them are still specific to climate-related risks. Due to the specificities of nature-related risks, this section further elaborates on good practices for developing a nature-related risk management framework. It focuses on credit risk for loans, as well as asset management activities, which are the areas in which institutions have developed the most advanced practices at this stage. This does not mean that the impact of nature-related risks on other risk categories and portfolios is immaterial, nor that other instruments cannot be used to address these risks. Institutions' strategic approaches to dealing with nature-related risks are covered in Section 2.

The ECB observes that while many practices are not yet fully mature, many institutions have taken preliminary measures to tackle nature-related risks. In the absence of common methodologies to measure and address nature-related risks, they often focus on managing dependencies and impacts on nature. While a few institutions have managed to implement an overarching nature-related policy covering most of their business areas and portfolios, as well as the nature-related risk drivers to which they are exposed, most institutions have defined a more general approach to monitoring, managing and mitigating nature-related risks, complemented by more specific policies covering the most relevant risk drivers, geographies and/or sectors (see Figure 24). Consequently, while risk management measures do not necessarily cover exposures comprehensively, targeted policies allow institutions to account more granularly for nature-related and sectoral specificities. Targeted policies also allow institutions to prioritise key risk dimensions and focus their efforts (such as data collection, risk quantification and client engagement) on the most materially relevant exposures.

Despite the emergence of approaches for monitoring, managing and mitigating nature-related risks, the ECB observes that some practices are not yet fully geared towards quantifying and managing financial impacts. Some institutions rely primarily on sensitivity and dependency metrics for risk identification, which, while valuable for determining an exposure's vulnerability to nature-related events and policies, do not provide a quantification of the financial impact. Some institutions also use positive-impact tools rather than risk management tools to mitigate their exposures. These limits are highlighted by the institutions themselves, which consider these measures as intermediate steps towards quantifying and managing the financial impact.

As a first step, institutions conduct a general materiality assessment to identify the risk drivers, sectors and geographies to which they are most exposed and conduct in-depth assessments of risk drivers for critical exposures (Section 5.1). Based on the identification, and in some cases on the quantification, of nature-related risk exposures, institutions define their risk management framework, which they cascade

down through sectoral policies to manage risks in a targeted way (Section 5.2). They consequently define due diligence policies for all of their operations, with additional due diligence processes applying to high-risk clients or operations (Section 5.3). They further mitigate their risk exposure through general funding policies, and through sectoral policies and practices at debtor and client level (Section 5.4). Finally, some institutions integrate their nature-related risk exposure into their ICAAP (Section 5.5).

Figure 24

Stylised representation of observed nature-related risk management approaches

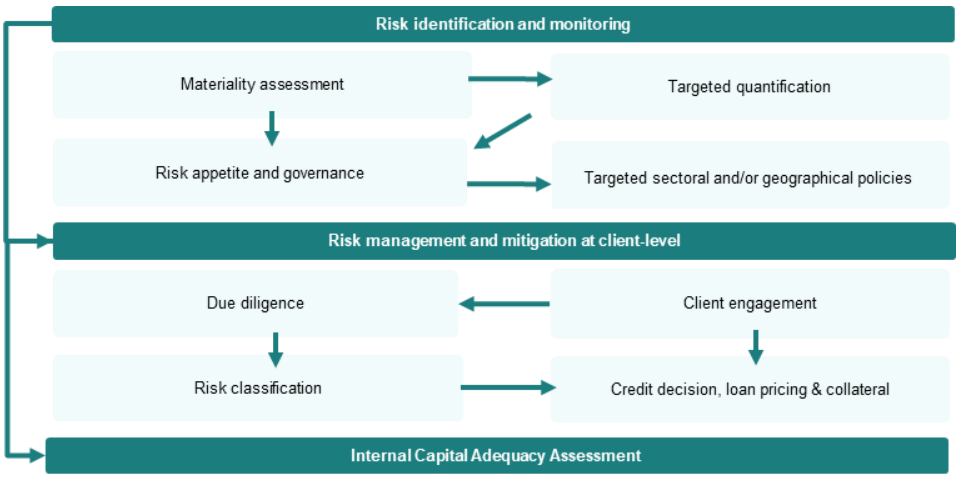


Table 55

Non exhaustive list of good practices for nature-related risk monitoring, management and mitigation

Section	Topic	Description	Expectations
Materiality assessment	Identify exposures [**New**]	Assessing exposure to nature-related risks	1, 7.1
	Risk-driver deep dives [**New**]	Conducting in-depth materiality assessments for sensitive sectors, geographies and risk drivers	1, 7.1
	Scenario analysis [**New**]	Testing the resilience of high-risk clients through scenario analysis	7.5
Governance and risk appetite	Risk appetite [**New**]	Defining the nature-related risk appetite	4
	Sectoral policies [**New**]	Cascading the risk appetite framework down through sectoral policies	4
Due diligence and risk classification	Corporate assessment [**New**]	Collecting and assessing data on clients and debtors	7.5
	Internal scoring [**New**]	Using an internal score to classify clients' nature-related exposure	7.5, 8.2
	Project funding [**New**]	Assessing the nature-related risk of projects funded and their sponsors	7.5
Risk mitigation	Client and debtor engagement [**New**]	Engaging with clients and debtors at risk of becoming misaligned with the nature-related risk appetite of institutions	7.4
	Credit and investment decisions [**New**]	Defining funding conditions, adapting loan pricing and defining collateral policy	8.3, 8.5
Capital adequacy	Capital adequacy [**New**]	Assessing capital adequacy for nature risks	7.6

5.1 Materiality assessment

Expectation 1
Institutions are expected to understand the impact of climate-related and environmental risks on the business environment in which they operate, in the short, medium and long term, in order to be able to make informed strategic and business decisions.

Expectation 7.1
Institutions are expected to have a holistic and well-documented view of the impact of risks on existing risk categories.

The ECB observes that institutions perform materiality assessments through sensitivity analyses rather than through risk quantification analyses. More advanced institutions perform a general materiality assessment (Section 5.1.1), which is complemented by specific risk-driver sensitivity analyses (Section 5.1.2) focusing on those geographies and/or sectors to which they are the most exposed. While these materiality assessments often do not quantify the financial impact of nature-related risks, institutions use them to identify their most relevant exposures, prioritise their nature-related policies accordingly and monitor their potential risk exposure. The most advanced institutions quantify the financial risk exposure of their most sensitive clients (see Section 5.1.3), although such risk analyses tend to be limited to a portion of material exposures.

5.1.1 Good practice for general materiality assessments
Seeing the forest for the trees – evaluating exposure to nature-related risks

Newly added good practice

Institutions typically start their nature-related materiality assessment by identifying exposures to sensitive geographies, nature-related risk drivers and economic sectors

(see Section 4.1 on materiality assessment). The tables below provide an overview of practices for materiality assessments specific to nature-related risks, as well as commonly used databases and methodologies.

While these sensitivity analyses do not fully meet risk quantification expectations, they serve as a first step towards defining an approach for identifying, monitoring and managing nature-related risks. These exposure assessments typically rely on general indicators and, while institutions do not interpret these figures in absolute terms, they use them to compare the magnitude of nature-related risk exposures across sectors and risk drivers. As a result, institutions can rank their largest exposures and sensitivities, and identify the most relevant risk drivers, geographies and sectors warranting further assessment.

Table 56

Non-exhaustive selection of sensitivity exposure analyses to inform nature-related materiality assessments

Risk driver	Type of analysis	Portfolios in scope	Description
Physical risk	Dependency analysis	All	Some institutions assess the dependencies of their balance sheet on ecosystem services. They link activities and supply chains to ecosystem services, the natural capital underpinning them, and the drivers of environmental changes affecting those services. This allows them to evaluate the state of ecosystem services, the degree of dependency of the economy on a given ecosystem service, and ultimately the financial loss that would result from the loss of such a service. As a result, institutions obtain an overview of the ecosystem services and natural assets on which their business environment most relies, and of the most sensitive economic sectors. They quantify the amounts and the share of their balance sheet that rely on these services, and the number and share of entities in their portfolio that highly rely on ecosystem services. One institution also analyses the share of non-financial corporate interest income that is highly dependent on ecosystem services. The most widespread tool used to perform this analysis is the ENCORE database.
Transition risk	Biodiversity footprint	All, or wholesale only	Some institutions compute their biodiversity footprint, i.e. they assess the positive and negative impact of their funding on the natural environment, with a view to assessing transition risk sensitivity. The impact results are then analysed in light of existing or potential policies to protect and restore nature. Aggregated biodiversity impact can be expressed as Potentially Disappeared Fraction of species (PDF) or as Mean Species Abundance (MSA).30 The impact can also be expressed in euro, reflecting the net present value of affected ecosystem services. Institutions convert the biodiversity impact to euro with reference to scientific and economic research quantifying the economic value of ecosystem services, and/or by using databases that compile the results of this research.

[30] MSA indicates local biodiversity intactness, comparing prevailing native species abundance with its abundance in an undisturbed ecosystem. It ranges from 0 (all the native species in the studied area are extinct) to 1 or 100 (all the native species are locally intact). This indicator is based on pressure-impact scenarios developed by GLOBIO. PDF indicates the percentage of disappeared species following environmental pressure, and is often expressed over time and space. It ranges from 0 (all the native species are intact) to 1 or 100 (all the native species in the studied area are extinct). The same PDF (e.g. 40) can be interpreted indifferent ways: 40% of the species have disappeared over 1 km2 in one year; or 20% of the species have disappeared over 1 km2 in two years.

Table 57

Non-exhaustive list of common open data sources and models used to assess dependencies and impacts on nature

Data source	Description
Biodiversity Intactness Index	The Natural History Museum of London published a Biodiversity Intactness Index (BII), which measures changes in terrestrial biodiversity in response to human pressures at the country, regional, inter-regional and global level. The BII was estimated in 2021 with spatio-temporal projections from 1970 to 2050 under five Shared Socioeconomic Pathways.
ENCORE	Exploring Nature Capital Opportunities, Risks and Exposure (ENCORE) is a UNEP tool designed to identify the ecosystem services on which economic sub-sectors depend, the associated natural capital, the main drivers of environmental degradation and the impact of these changes on ecosystem services.
Environmental Performance Index (EPI)	The Environmental Performance Index (EPI), from the Yale Center for Environmental Law & Policy, aggregates 58 environmental performance indicators and ranks countries on environmental issues such as biodiversity and habitats, forest protection, air pollution and water resources.
Ecosystem Services Valuation Database (ESVD)	The Ecosystem Services Valuation Database (ESVD) compiles academic studies and official reports on the monetary value generated by ecosystem services. It provides standardised monetary values for ecosystem services, accounting for their location, in 2020 dollars per hectare per year.
European Environment Agency	The European Environment Agency (EEA) publishes several datasets on the state of the environment, resources and the environmental impact of human activities. Among others, it publishes a database of protected areas at the European level (Natura 2000, the Emerald network) and at the national level in Europe.
Eurostat	Eurostat publishes environmental data, notably on emissions of greenhouse gases and air pollutants, energy use, water use, waste generation and biodiversity in protected areas. The data are available at the national level as well as at a more granular sectoral and/or regional level.
EXIOBASE	EXIOBASE models the environmental impact of economic activities, their supply chains and their resource extractions. The output can be expressed in physical or monetary terms.
Global Impact Database (GID)	The Global Impact Database (GID) of the Impact Institute provides data on the environmental impact of organisations, countries and sectors.
Global Biodiversity model for policy support (GLOBIO)	The Global Biodiversity Model for Policy Support (GLOBIO) models the impact of human pressures on biodiversity intactness. The outcome is expressed in Mean Species Abundance (MSA).
Integrated Biodiversity Assessment Tool (IBAT)	The Integrated Biodiversity Assessment Tool (IBAT) compiles data and provides derived indicators from the IUCN Red List of Threatened Species, the World Database on Protected Areas (WDPA) and the World Database of Key Biodiversity Areas (WDKBA).
ReCiPe	ReCiPe models the environmental impact of the complete life cycle of products. Based on physical indicators, it provides scores to assess the severity of this impact.
Swiss Re Institute	The Swiss Re Institute Biodiversity and Ecosystem Services (BES) Index measures the dependency of economic sectors on nature at country level, and the exposure of countries to declines in ecosystem services.
WWF Biodiversity risk filter	The World Wildlife Fund for Nature (WWF) Biodiversity Risk Filter provides data on sectors' impact and dependencies on biodiversity, taking into account geographical location and information on the state of local biodiversity.

Disclaimer: Inclusion of an observed open data source or model in this table does not mean that the ECB has assessed the soundness of the way in which they are applied in specific risk management approaches of institutions.

5.1.2 Good practice for risk-driver-specific materiality assessments Into the woods – performing more granular analyses for selected risk drivers

Newly added good practice

Based on the general nature-related sensitivity overview described in Section 5.1.1, more advanced institutions further assess their exposure to specific nature-related risks at both the portfolio and client level. The choice of risk drivers, geographies and/or sectors covered is based on the most significant exposures, as well as data availability, methodological developments and resources.

To conduct these targeted assessments, institutions use methodologies and assessment criteria that are specific to the risk driver and to the economic sector covered. They analyse financed entities and projects through life cycle assessments, combining quantitative and qualitative elements, as well as geographical and entity-level considerations (see Table 58). In doing so, they use national databases from governments or governmental agencies, as well as international databases from NGOs, international organisations and market initiatives (see Table 59).

Table 58

Non-exhaustive list of observed nature-related sensitivity assessments at the risk-driver level

Risk driver	Scope	Description
Biodiversity loss	All corporates	One institution identifies and monitors the presence of its corporate clients in protected areas, notably Natura 2000 sites, protected areas designated by national governments, and nature-related UNESCO sites.
	Industrial corporates	One institution measures the impact on biodiversity of its clients in the industrial sector through acidification and eutrophication. Impact is aggregated as Potentially Disappeared Fraction (PDF) of species per square metre per year.
	Agricultural corporates	One institution measures the impact on local fauna and flora of its clients in the agriculture sector. It assesses, in hectares, the areas subject to land use change and the areas covered by native vegetation. Additionally, it evaluates the number of species potentially affected by agricultural activity.
Deforestation	Corporates in sensitive areas	One institution analyses the deforestation policies of its corporate clients in sensitive areas. It combines several public datasets (CDP Forest, Forest 500 and SPOTT) and assesses their transparency, the traceability of their value chains, and their commitments to zero deforestation.
	Corporates in forest-related sectors	One institution has developed an index, in cooperation with a large forest manager, to measure biodiversity in forests. It studies the local ecosystem to identify the species, habitats and climate, which allows for targeted actions (e.g. reforestation with local species).
Land use change	Commercial and residential real estate	One institution identifies and monitors its real estate portfolio and collateral built on wooden piles (and thus sensitive to pile rot), as well as collateral in areas prone to soil subsidence, using governmental databases.
	All corporates	One institution identifies and monitors the land use intensity of its non-financial corporate clients in square kilometres of land used to produce one million euro of revenues.
Overexploitation of resources / resource availability	All corporates	One institution has defined a scorecard on circularity to account for certain nature-related risks that are not captured in its traditional Probability of Default (PD) models. The institution asks its non-financial corporate clients to fill in a questionnaire and collects data on their level of exposure to resource scarcity, on the circularity of their products, on the possibilities for making these products more circular, and on the experience of the clients' management teams with circularity topics. The scorecard is used by the first line of defence for client engagement purposes.
	Industrial corporates	One institution measures the tonnes of biomass, metal ores, minerals and fossil fuels extracted by its corporate clients to produce one million euro of revenues.
	Agricultural corporates	One institution assesses the risk exposure of its clients in the agricultural sector to environmental risks related to provisioning services. For instance, it assesses the availability of pastures throughout the year, as well as the soil quality of its clients' farming sites.
Water scarcity	Corporates in water-stressed areas	One institution exposed to water stress measures water withdrawals by its corporate clients in water-stressed areas.
	Agricultural corporates	One institution assesses the distance of its clients in the agriculture sector from watercourses (in kilometres) and the presence of aquifers on their agricultural land.
Waste management	All corporates	One institution analyses its loan portfolio exposure and income exposure to sectors whose waste levels are above the first quartile of EU waste production. One institution analyses the share of hazardous waste and of recyclable waste produced by all the non-financial corporate clients in its loan portfolio.

Table 59

Non-exhaustive list of common data sources, other than governmental databases, used by institutions to analyse specific risk drivers

Risk driver	Data source name	Description
Biodiversity – threatened species	IUCN Red List	The International Union for Conservation of Nature (IUCN) publishes an international Red List of threatened species, including information on their status, habitat type and location.
Deforestation	CDP Forest	The Carbon Disclosure Project (CDP) created a questionnaire as part of a voluntary disclosure framework, and an associated database, on forests.
	Forest 500	Forest 500 identifies and assesses 350 companies and 150 financial institutions that are highly exposed to deforestation. It scores them and updates its database with score breakdowns on a yearly basis.
	ZSL SPOTT	ZSL SPOTT assesses the ESG disclosure of commodity producers, processors and traders. It annually scores the transparency and policy comprehensiveness of palm oil, tropical forestry and natural rubber companies.
	TRASE	TRASE maps commodities to deforestation through agricultural supply chain analysis. It links the places of production to trading companies and to consumer countries. It provides measures of commodity-driven deforestation occurring in given regions, and of the exposure of supply chain actors to deforestation due to their sourcing habits.
Invasive species	Global Invasive Species Database	The Global Invasive Species Database, maintained by the International Union for Conservation of Nature (IUCN), lists 100 of the most invasive alien species worldwide, along with their location. It describes their impacts and potential management practices.
Land use	CORINE	The Coordination of Information on the Environment (CORINE) dataset provides harmonised information on land use and land cover in Europe.
Pollution	E-PRTR	The European Pollutant Release and Transfer Register (E-PRTR) provides information on releases of pollutants to air, water and land, as well as off-site transfers of pollutants present in wastewater and waste. Releases are required to be reported when they exceed a certain threshold and originate from one of the 65 activities listed in Annex I of Regulation (EC) No 166/2006. The register covers 91 pollutants, including greenhouse gases, heavy metals, pesticides and chlorinated organic substances. The data are also associated with geographical location and affected environment.
	Food and Agriculture Organization (FAO)	The Food and Agriculture Organization (FAO) provides environmental data at country level, such as nitrogen emissions and pesticide use.
Water scarcity and quality	Aqueduct Water Risk Atlas	The Aqueduct Water Risk Atlas creates global maps of current and future water risks such as floods, droughts and water stress.
	CDP Water	The Carbon Disclosure Project (CDP) has developed a voluntary disclosure framework and an associated database on water.
	WWF Water Risk Filter	The World Wildlife Fund for Nature (WWF) has developed a water risk assessment tool, which covers, among other matters, water scarcity, water quality and ecosystem service status. It provides data on these risk drivers to assess physical, regulatory and reputational risks under different scenarios.

Disclaimer: Inclusion of an observed open data source in this table does not mean that the ECB has assessed the soundness of the way in which it is applied in specific risk management approaches of institutions.

As an example, one institution conducted a targeted study on its clients' activities in the agricultural sector, their positive and negative nature-related impacts, as well as their dependencies.

- **Accounting for geographical and sectoral specificities.** The institution distinguishes different locations and their specificities, as well as agricultural practices among clients (e.g. whether fencing is used) to conduct its assessment.
- **Compiling data and addressing the data gap.** The institution uses quantitative metrics (e.g. distance to a water source for the crop in kilometres), notably drawing on national data sources on soil fertility and ground water availability. It uses qualitative statements where such measures are not

available (e.g. natural pastures are scientifically recognised for their positive impact on invertebrate fauna).

- **Identifying positive and negative impacts.** The institution also describes the potentially negative impacts of the respective clients' practices and assesses the impact on biodiversity by identifying the number of species from the IUCN Red List that could potentially be affected. In addition, the institution has identified good practices in the agriculture sectors from recognised NGOs and scientific studies.

As another example, some institutions analyse the land use change generated by their real estate portfolio, notably when financing new real estate (e.g. properties build within the past five years) or real estate developments:

- **Compiling data.** By using governmental databases that define land surface categories, these institutions typically distinguish between land that is initially not exploited (e.g. forest and semi-natural areas, wetlands, water bodies) from land that is already being exploited (e.g. artificial surfaces and agricultural land), and estimate the land use impact generated by their real estate portfolio.
- **Geographical specificities.** They also account for locations in or near a protected areas, and they verify the building permits and associated nature clauses in accordance with applicable law on nature preservation.
- **Risk exposure analysis.** To estimate the level of exposure to pollution risk factors in their real estate portfolios, the institutions analyse information on contaminated sites and components in the building and operating permits. Some institutions summarise their analysis by using risk indicators such as MSA.km2, and regularly monitor the aggregated impact of their real estate portfolio.

The ECB observes that the results of these assessments are often qualitative and focus on sensitivity exposures rather than financial impact quantification. Nonetheless, some institutions integrate the results into specific policies, notably sectoral policies and client due diligence policies.

5.1.3 Good practice for scenario analysis
Testing the waters – assessing the resilience of high-risk clients

Newly added good practice

The most advanced institutions quantify nature-related financial impacts, notably by using scenario analysis for high-risk clients operating in sensitive sectors and geographies. The ECB observes that most of these scenario analyses relate to the water scarcity risk driver and tend to cover a relatively small share of the sensitive sectors and clients included in the institution's portfolios. As a result, the risk quantification does not translate into general risk limits or risk management policies at this stage. Instead, the results feed into sectoral policies and into frameworks for engaging with clients on their sensitivity to specific nature-related risks and on the mitigation measures available to them.

One institution compiles risk exposure indicators for the assets of its clients in two sensitive sectors, and under two scenarios: the current baseline and a water scarcity scenario. It follows these steps:

- **Collecting data.** The institution aggregates the data at the client level and computes the share of operating capacity that is highly, or very highly, affected by water stress under the two scenarios.
- **Complementary qualitative analysis.** A qualitative analysis completes the clients' scorecards, based on their annual reports and transition plans. The institution looks closely at whether the client has identified water stress as a risk, reports on the location of operations or water consumption in stressed areas, has set water reduction targets, keeps records, and discloses its water consumption.
- **Analysing risk mitigants.** The institution also identifies the main mitigation measures and classifies their effectiveness, such as the recycling of water in the production process, the use of rainwater, and collaboration with other regional stakeholders affected by water stress.
- **Outcome.** The result is a client risk scorecard, with risk scores (from very low to very high) at the level of factories and production plants, accounting for the location of these assets, the technologies used and their sensitivity to water stress. The scorecards are used to adjust sectoral frameworks and to engage with clients on their sensitivity to water stress and the mitigation measures available to them.

Another institution uses a stress test scenario which simulates a three-month water curtailment period, with associated stoppages in production for companies located in sensitive areas. It analyses how the shock to the firms' turnover and costs affects internal ratings in the institution's models. It also calculates stressed risk-weighted assets (RWA) for its corporate loan book. Beyond credit risk estimations, the stress test allows the institution to analyse which characteristics among firms influence resilience to this water stress event.

One institution has conducted two nature-related risk scenario analyses of its non-financial corporate portfolios in relation to: (i) an environmental permit system change and the halt of clients' operations if they lose their permit because of harmful water pollution, nitrogen emissions and land use (in the absence of a government compensation scheme); and (ii) the introduction of a water pollution tax for companies. The scenarios are defined on the basis of EU Directives. The institution accounts for client location and classifies clients according to their ability to change location and the certainty of the location data. To conduct the analysis, it relied on internal data, publicly available data on nature-related risks, the state of nature, and economic statistics. The institution estimated exposures at default (EAD) per sector and risk driver.

5.2 Governance and risk appetite

Expectation 4
Institutions are expected to explicitly include climate-related and environmental risks in their risk appetite framework.

As a follow-up to the materiality assessment, institutions define their nature-related risk governance policies (see Section 3.1 above) and risk appetite (see Section 3.4 above, and Table 24 for a list of observed quantitative KRIs). The risk appetite of institutions often focuses on specific sectors identified as being the most sensitive in the materiality assessment (see Section 5.2.1). By defining targeted risk appetite, institutions are able to account for sectoral and/or geographic specificities, and to focus their risk management efforts on areas of material relevance. While institutions do not always quantify the financial impact of nature-related risks, they use sensitivity indicators as risk appetite metrics and apply sector- or client-level policies to ensure that they stay within their risk appetite (see Section 5.2.2).

5.2.1 Good practice for defining risk appetite
Branching out – integrating nature-related risks into the risk appetite

Newly added good practice

Institutions define their appetite for nature-related risks by using sensitivity indicators as risk proxies. Some institutions define their risk appetite to encompass several risk drivers, such as by defining exposure limits to highly sensitive counterparties or collateral. Other institutions define their risk appetite by using sensitivity indicators specific to the nature-related risk drivers that are material for the institution and/or the portfolio considered (e.g. water scarcity). An example of this is an exposure limit for clients who are not compliant with sector-specific nature-related policies, and who do not have a remediation plan in place to ensure compliance (see Section 5.2.2). Such a risk limit is associated with the monitoring of clients' nature-related performance with respect to the target.

The ECB observes that when defining relevant KRIs, some institutions first include nature-related risk indicators in their RAF for information purposes. They use this as a stepping stone to monitor nature-related risks and to cascade nature-related indicators into their traditional risk procedures. They associate these indicators with a plan to include limits in their RAF before a predetermined date, and to improve their methodologies and data collection processes.

The ECB observes that institutions define sectoral policies and associated underwriting and investment standards to stay within their risk appetite. They adjust their nature-related requirements to sectoral and geographical specificities, focusing on the most relevant risk drivers and relying on industry standards and practices to manage these risks.

5.2.2 Good practice for defining sectoral and client-level risk policies Sowing new seeds – transcribing risk appetite into specific sector- or client-level policies

Newly added good practice

Several institutions have implemented risk management practices focused explicitly on nature-related risk drivers.

The ECB observes that, as a first step, many institutions respond to broader nature-related risks by excluding from financing certain counterparties or activities that have an adverse impact on nature. Under an exclusion-based approach, institutions define, in their lending policies and/or risk appetite statements, certain controversial activities in relation to which they will not do business, as well as further areas of concern where business will only be conducted under pre-established guidelines. These controversial activities are typically aligned with internationally recognised conventions and standards aimed at preventing damage to world heritage sites, wetlands, endangered species and high conservation value forests. Hence, the exclusion approach is primarily used as a mechanism to filter out the most sensitive risk exposures, but it is not a core element of the nature-related approach.

More advanced institutions have defined several levels of sectoral and client policies to mitigate their risk exposure, with exclusion being one potential final outcome if the client is found to be incompatible. When entering into a new client relationship or when funding new debtors, these institutions conduct a preliminary assessment of the counterparty's environmental profile, based on both quantitative and qualitative data. As a result, funding and credit conditions, and entity-level monitoring, may be affected. The institutions regularly review the environmental policies of clients and debtors to ensure that they comply with the institutions' environmental policies and that remediation measures are taken as and when needed.

Corporate-related policies

The ECB observes that most nature-related criteria apply to corporate clients and debtors. The due diligence policy is often conditioned on counterparty's turnover exceeding a certain threshold, or on the counterparty being subject to environmental disclosure regulation. The nature-related assessments conducted by institutions relate to clients' nature-related practices, their transparency, target-setting, third-party opinions, and/or transition policies (see Table 60). Tolerance thresholds are defined and may differ between existing clients and new clients, for instance by defining no appetite for new clients and setting a maximum share of revenue that can be obtained from environmentally harmful activities in the case of existing clients.

Table 60

Non-exhaustive list of observed client relationship and funding criteria applicable to corporates and/or their projects

Nature-related risk category	Criteria	Sector-specific examples
All (broad criteria)	Some institutions assess whether their clients acknowledge their exposure to C&N risks and disclose environmental information. Some institutions require their clients operating in sensitive sectors to have strategies in place to reduce their dependencies and impacts on the environment. They also require environmental impact studies when undertaking projects.	In the mining sector, one institution does not lend to clients who fail to evaluate the impact of their projects on biodiversity and fail to define action plans to avoid, minimise and compensate their impact.
Land and sea use: impact on habitats and species	Some institutions monitor the location of their clients' production channels and require that they are not located in nor near protected areas, or that the share of such sites is below a given threshold. Common lists of protected areas include the UNESCO World Heritage sites, the Ramsar List of Wetlands, Alliance for Zero Extinction sites, International Union for Conservation of Nature (IUCN) sites, high conservation value forests as defined by the Forestry Stewardship Council (FSC), and Natura 2000 sites. Some institutions also define assessment criteria to avoid negative impacts on endangered species. Common lists of endangered species include Appendix I of the Convention of on International Trade in Endangered Species (CITES) and the IUCN Red List of Threatened Species.	In the fisheries sector, one institution defines criteria on the catching methods of its clients to minimise the impact on marine species and habitats. It excludes business related to the hunting of marine mammals, shark finning, the use of dynamite and poison in fisheries, and drift-net fishing with nets longer than 2.5 kilometres. It also encourages its clients to follow the Marine Stewardship Council (MSC) standard for sustainable fishing. Another institution requires its clients to provide evidence that they are not involved in illegal fishing through their own production activities or through their supply chain. In the agriculture sector, one institution requires its clients to comply with the environmental eligibility criteria of the EU Common Agricultural Policy (CAP). It notably monitors the land use practices among its clients to limit erosion, maintain organic soil matter, and ensure the preservation of local birds and their habitats.
Land use: sealing of ground surface	Some institutions monitor the sealing of ground surfaces related to their funding activities. They do not finance construction projects close to protected areas, and they require such projects to have biodiversity and land use strategies in place to minimise negative impacts.	In the commercial real estate sector, one institution monitors the building permits of its clients to ensure that land use change and biodiversity loss are either excluded or compensated.
Pollution	Some institutions monitor the waste production of their clients and require that a minimum share of waste be recycled. The production and trade of certain wastes and pollutants are excluded, such as Highly Hazardous Pesticides as defined by the Joint Meeting on Pesticide Management, products containing Persistent Organic Pollutants listed under the Stockholm Convention, or Ozone-Depleting Substances listed under the Montreal Protocol. Some institutions require their clients to adhere to sectoral standards and/or to be certified by independent labels, such as the World Bank Environmental, Health and Safety Guidelines, and the IFC Performance Standards on pollution.	In industrial sectors, some institutions require production plants to have a certified environmental management system such as ISO 14000. In the mining industry, some clients must adhere to the Global Industry Standard on Tailings Management, to the principles of the International Council on Mining and Metals (ICMM), or, in the case of gold and silver mining companies, to the International Cyanide Management Code. Another institution excludes business related to mountaintop removal, riverine tailings disposal and submarine tailings disposal. In the agriculture sector, one institution conditions its funding on clients embracing practices such as the preservation of buffer strips along watercourses, and the protection of the water from dangerous pollutants and nitrates, in line with the CAP funding criteria. Another institution requires its clients to have a waste management system in place for animal manure and sludge to reduce leakage. In the agrochemical sector, one institution requires adherence to the International Code of Conduct on the Distribution and Use of Pesticides of the Food and Agriculture Organisation (FAO) concerning the manufacture, sale, distribution and advertising of pesticides. One institution also verifies compliance with the EU Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and their safe use. In the ship-breaking and recycling sector, one institution requires its clients to adhere to the Responsible Ship Recycling Standards (RSRS) and excludes the financing of ship recycling where the vessel is beached. Instead, vessels must be disposed of at approved recycling facilities.
Water stress	Some institutions define requirements on water use for their clients and monitor water consumption per tonne of production or per euro of revenue. The thresholds vary according to the sector covered by	In water-related sectors, one institution monitors the share of water losses in the supply network, the age of the supply network, and the share of reused water.

Nature-related risk category	Criteria	Sector-specific examples
	the requirement. Requirements may apply to water intensity and/or to the evolution of water consumption over time. Complementarily, institutions define criteria to limit water withdrawals in water-stressed areas. They define the maximum share of their clients' facilities located in these areas, and/or the maximum share of revenues generated from water extracted in water-stressed sites. One institution also monitors the fines imposed on its clients for non-compliance with water quality parameters of discharges. Some institutions also require transparency from their clients operating in sensitive sectors and/or areas. One institution encourages its clients to disclose water-related metrics using the Global Reporting Initiative (GRI) Water and Effluents Standards or industry-specific SASB standards.	For dam construction, one institution requires its clients to comply with the recommendations of the World Commission on Dams (WCD), and with the International Hydropower Association Sustainability Assessment Protocol. In the real estate sector, one institution monitors the water conservation and water-saving facilities of the collateral. In the agriculture sector, one institution conditions its loan granting on the installation of drip irrigation systems. One institution expects its clients operating in water-stressed areas to recognise and address water risks in their policies, to monitor their exposure and to take part in initiatives addressing water challenges, commensurate with the size and impact of their operations.
Overexploitation of resources	Some institutions require their clients active in sectors dependent on natural resources to be certified in accordance with industry sustainability standards. This applies to the clients' production processes, and to the products used in their value chains.	In aquaculture, institutions may require certificates from the Aquaculture Stewardship Council (ASC) or the Best Aquaculture Practices (BAP). Entities should also be supplied by responsible suppliers certified under the Global Standard for Responsible Supply (IFFO RS).
Deforestation	Some institutions define criteria to avoid the financing of deforestation. They are linked to: Harmful practices, such as the prohibition of land clearing by burning. Commodities and production certifications such as the Roundtable on Sustainable Palm Oil (RSPO), the Roundtable on Sustainable Soy (RSS), the international Sustainability and Carbon Certification (ISCC) and the Rainforest Alliance. Sensitive areas such as swamps and peatlands, IUCN protected areas, the Arctic and the Brazilian Amazon and Cerrado.	One institution does not finance projects related to deforestation in Brazil, even if such deforestation is legal. Deforested land in the Amazon biome is not accepted as collateral either, even if such deforestation was carried out legally. It also ends the relationship with clients that have been involved in illegal deforestation after January 2005. For some institutions, wood products must be labelled by the Forest Stewardship Council (FSC), the Programme for the Endorsement of Forest Certification (PEFC), or a national scheme endorsed by the PEFC.
Invasive species	Some institutions also require their clients to prove that they do not intentionally introduce alien species into their environment.	In the shipping sector, one institution requires its clients to fully comply with International Maritime Organization (IMO) standards, and to install ballast water treatment systems on their vessels. In the aquaculture sector, one institution requires its clients to have "zero escape" strategies and associated management systems in place.

Sovereign bond policies

The ECB observes that some institutions have integrated nature-related criteria into their risk assessment and risk policies for sovereign bond portfolios. Depending on the institution, these criteria cover asset management and/or the institution's own balance sheet. Institutions typically define exclusion criteria to avoid tail risk, and sustainability criteria to identify the best performers that would help the institution meet its nature-related targets, ultimately tilting portfolio investments.

Sovereign exposure to nature-related risks is often estimated based on country-level nature-related vulnerability assessments, complemented by sovereign credit ratings to estimate resilience to shocks. Physical risk exposure is estimated on the basis of nature dependencies and hazards, in a similar way as for corporates. Transition risk exposure differs and is typically assessed by comparing the commitments and contributions made by the countries concerned to international objectives. Institutions verify whether countries have signed and ratified international treaties and conventions on nature, and whether they positively contribute to the

implementation of these decisions (see Table 61). To ensure that these country-level commitments translate into action, they further evaluate and sometimes score countries' nature-related policies. When sovereign actors issue sustainable bonds, these bonds are assessed based on quantitative indicators related to the affected sector, in a similar way as for sustainable corporate bonds.

Table 61

Non-exhaustive list of observed international treaties and conventions on nature used by institutions to monitor nature-related commitments among sovereign entities

Convention	Overview of sovereign commitments
Convention on Biological Diversity (CBD)	The CBD targets the preservation of biological diversity, the sustainable use of biodiversity components, and the fair and equitable sharing of benefits arising from the use of genetic resources. Under the Convention, signatories are required to develop national biodiversity strategies and action plans. The Conference of the Parties (COP), composed of governments that have ratified the treaty and observer organisations, reviews progress, identifies priorities and makes amendments to the Convention. The CBD is complemented by the Cartagena Protocol on Biosafety, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, and by COP decisions such as Kunming-Montreal Global Biodiversity Framework (GBF).
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	The CITES aims to ensure that the survival of species is not threated by the international trade of wild animals and plants. It defines control requirements and a licensing system for imports, exports, and introduction from the sea of endangered species. The convention appendices list the species covered by this international agreement and are regularly updated at Conferences of the Parties (COP). Appendix I lists species threatened with extinction whose trade in specimens is permitted under exceptional circumstances. The species listed in Appendix II are not necessarily threatened with extinction, although their trade is controlled to avoid uses incompatible with their survival. Finally, Appendix III includes species protected by at least one country that has asked other parties to control the trade in specimens.
Convention on the Conservation of Migratory Species of Wild Animals (CMS)	The CMS aims to protect migratory animals, their habitats and migratory routes. It provides a list of threatened species in Appendix I, and of species that would benefit from international cooperation in Appendix II. Signatories commit to protecting them, conserving and restoring their habitats and to mitigating obstacles to their migration.
Convention on Wetlands, or "Ramsar Convention"	The Ramsar Convention promotes the conservation and wise use of wetlands and their resources. Signatories commit to work towards the "wise use of all their wetlands", as defined in the Convention, by defining national policies and action plans. The list of Wetlands of International Importance is defined in the "Ramsar List".
International Treaty on Plant Genetic Resources for Food and Agriculture, or "International Seed Treaty"	The International Seed Treaty promotes the conservation and sustainable use of plant genetic resources for food and agriculture, as well as the fair and equitable sharing of the benefits arising from their use, in line with the Convention on Biological Diversity. It establishes a system to protect and share 64 crops, defined in its Annex 1, accounting for around 80% of the world's food supply. Farmers and scientists from ratifying countries have the right to request related seeds or plant material.
New York Declaration on Forests	The New York Declaration on Forests was adopted in 2014 by governments, companies, NGOs and financial institutions. It calls for forest protection through ten goals, such as halting forest loss by 2030 and restoring 350 million hectares of degraded landscapes and forestland.
UNESCO World Heritage Convention (WHC)	The Convention defines criteria for the inscription of natural sites on the World Heritage List. Signatories are responsible for the identification, conservation, presentation and transmission to future generations of natural and cultural heritage.
United Nations Convention on the Law of the Sea	The Law of the Sea Convention includes the duty for state signatories to take steps for the conservation of living resources in the high seas. They must define allowable catches and conservation measures for the populations of harvested species in these areas.

5.3 Due diligence and risk classification

Expectation 7.2
Institutions are expected to comprehensively include climate-related and environmental risks in their assessment of materiality for all of their business areas in the short, medium and long term under various scenarios.

Expectation 7.5
Institutions are expected to conduct a proper C&N due diligence, both at the inception of a client relationship and on an ongoing basis.

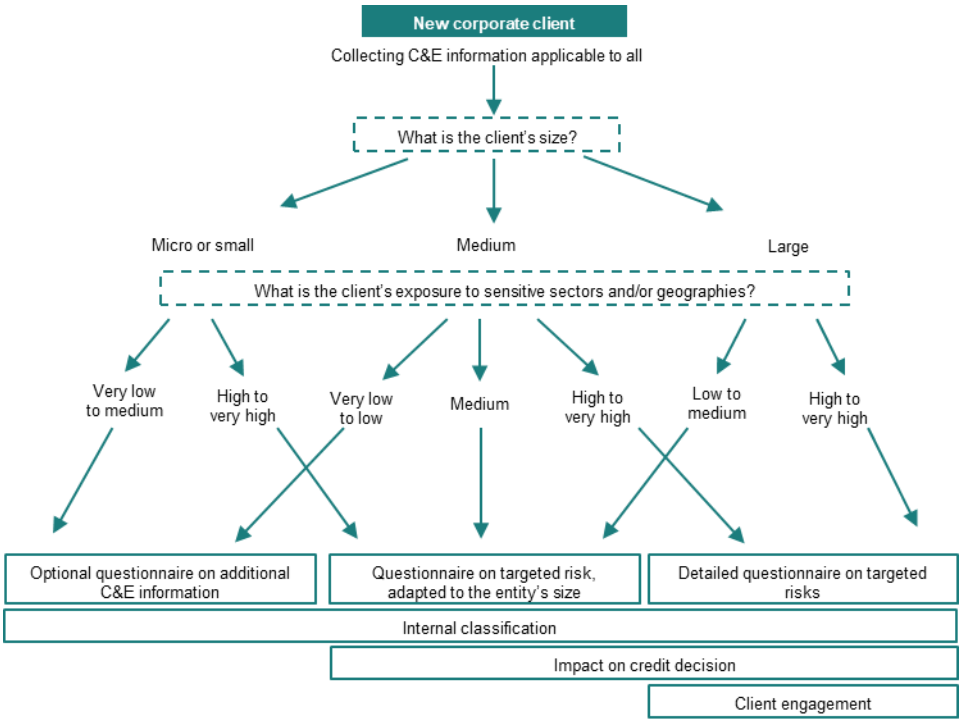
Expectation 8.2
Institutions are expected to adjust risk classification procedures in order to identify and evaluate, at least qualitatively, climate-related and environmental risks.

In line with their sectoral and client policies, institutions implement classification systems to identify and monitor those clients and debtors most exposed to environmental risk drivers (see Section 5.3.1). This information is typically summarised in the form of scorecards for monitoring purposes (see Section 5.3.2). For specific cases involving allocated use-of-proceeds and project funding, some institutions have also defined due diligence policies to assess the risk exposure of both the project and the project holder (see Section 5.3.3).

The approach is integrated into the institution's credit policy and loan origination framework, as well as into the asset management framework. The first and second lines of defence are trained specifically on how to integrate the approach into investment and credit decision-making. Due diligence may be targeted or prioritised for those clients or sectors most exposed to nature-related risks.

The approach taken consists of the steps stylised in the following figure.

Figure 25
Stylised process for client classification



5.3.1 Good practice for assessing corporate clients

Separating the wheat from the chaff – assessing clients and debtors

Newly added good practice

When entering a new corporate client relationship, institutions collect data on the client's nature-related profile. This due diligence is a mandatory step that must be documented in the credit file and loan origination documentation. The ECB observes that in most cases, data collection is conditional on the client's balance sheet size and/or on the sectors in which it is active. The assessment is performed at the level of the client's group and, if necessary, at the level of a specific subsidiary.

Some institutions define several levels of nature-related assessment based on the nature of the client, the institution's exposure to that client, and the client's sectoral and geographical exposure. A lighter screening process for the least exposed clients may include an assessment of restricted activities and companies, of the clients' environmental self-declarations, and of their profile and management practices when exposed to material risk drivers. The full screening additionally includes an assessment based on sector policies and an assessment of the supply chain.

For each applicable nature-related risk dimension, credit officers collect quantitative nature-related data from their clients. Furthermore, qualitative due diligence questions are defined so that the credit officer can form a view of the possible impact of risk drivers on the client's revenue-generating capacity and cost structures. Some indicators are common to all clients, while entities operating in sensitive sectors are subject to additional information requests (see Figure 25). Some institutions also adjust their questionnaires based on country or regional specificities.

A number of institutions apply a similar approach and assessment criteria for their asset management activities.

Table 62

Non-exhaustive list of assessment criteria for nature-related due diligence of medium- and high-risk clients

Nature-related risk driver	Relevant risk factors	Due diligence topics	
Biodiversity loss	Operations in areas vulnerable to biodiversity change Operations affecting endangered species Implementation of deforestation policies	Revenues	Is the client dependent on natural capital assets, ecosystems and biodiversity? What is the impact of depletion of natural capital assets, ecosystems and biodiversity on client's revenue-generating capacity (e.g. reduction in crop yields)? Public sentiment around biodiversity and how this may affect product demand.
		Expenses	Is the client's supply value chain dependent on natural capital assets, ecosystems and biodiversity (e.g. in procurement and other contracts)? Are supply chain disruptions likely? What is the impact of biodiversity issues on the client's "local licence to operate" or its access to market capitals?
Pollution	Emission of air/water/land pollutants (weight in tonnes) Production, use or disposal of chemicals	Revenues	Are consumer preferences shifting towards less polluting alternatives (e.g. trends related to reusable/bio-based materials in view of plastic pollution)?
		Expenses	Is the client compliant with legal obligations on pollution prevention? Have any instances of legal non-compliance been reported? Pollution-related regulatory restrictions, tax changes or even bans (e.g. ban on single-use plastics, introduction of more stringent emission standards). What are the client's future needs to invest in pollution control equipment that would have a significant impact on CapEx?
Water stress	Exposure to areas of high water stress Water consumption intensity	Revenues	Are consumer preferences shifting towards less water-intensive options? How sensitive are consumers to prices in this market (assuming that rising water resource costs are priced into products)?
		Expenses	Exposure to the risk of water scarcity either directly as a source of input, or indirectly (e.g. through water used for cooling, heating, transport, cleaning, etc.) or through water-dependent supply chains? Are there any national or regional water discharge standards that must be met? If not, does the client have a standard policy governing its discharges?

The second line of defence ensures the harmonised application of the assessment methodology, provides a second opinion for sensitive cases and oversees engagement with clients. If a client is not entirely aligned with the institution's nature-related policy, the second line of defence conducts an additional in-depth analysis of the client's profile, including its commitment and ability to comply with the policy. The analysis concludes with an opinion on the client relationship, which can only be overruled at the senior management level. Based on this, the institution decides whether to unconditionally approve, approve under specific conditions, disapprove, or delay new client relationships or funding. An escalation process is triggered if the first line of defence requests an exemption from this framework or does not agree with the second line of defence's opinion.

5.3.2 Good practice for creating an internal scoring
Keeping a hawk's eye on the client – scoring and monitoring clients

Newly added good practice

In addition to the above, some institutions have developed their own nature risk assessment scoring tools at the entity level or asset level. With their scoring methodology, they obtain a nature risk indicator that captures exposure to several

environmental risks. The nature score is often merged with climate classification scores, where climate becomes one of the risk drivers forming the score. Weights are attributed to the most relevant risk drivers, as well as to risk features that are the most important for the institution, such as materiality, targets or transparency. Ultimately, internal scores are used to classify clients, thus affecting the client relationship and steering funding decisions.

Nature scores tend to be based on data collected through due diligence action (see Sections 5.2.2 and 5.3.1). They typically comprise the following:

- **General criteria,** which apply to entities from all economic sectors, such as transparency and the definition of an environmental strategy.
- **Additional nature criteria** defined at the sectoral level to account for specificities and for the most sensitive risk exposures. While one risk driver may be relevant across several sectors, the metrics used vary according to the sector and its specificities. As an illustration, one institution assesses the management of environmental pollution for both the shipping and the real estate sector. However, the metrics for shipping relate to the usage of scrubbers and the emission of sulphur oxides (SOx), while those for real estate relate to air, soil, ground water, noise and light pollution.
- **Entity-level considerations,** notably to account for entity-level policies that reduce risk exposure. Some institutions allow for marginal adjustments to the client's nature score based on predefined criteria. Such criteria may relate to recognised certifications on environmental management, such as ISO certifications, or to certified investments aimed at reducing nature-related impacts and dependencies.

The ECB observes that some institutions make use of external ESG and sustainability ratings from providers they consider to be aligned with their own policies. They use these scores to diversify their data sources and expand the range of available risk assessments. It is important for institutions to critically evaluate these ratings and to understand the underlying data when using these tools and managing the potential limitations of the ratings.

Figure 26

Stylised example of a scoring methodology combining climate-related and nature-related factors

Step 1: calculating the indicator

$$\frac{\text{Recycled hazardous waste}}{\text{Hazardous waste generated}}$$

E.g. 46%

Step 2: converting into a score format

Indicator	Score conversion
70% to 100%	0
60% to 70%	1
50% to 60%	2
40% to 50%	3
30% to 40%	4
0 to 30%	5

E.g. 3

Nudge associated with a qualitative analysis: Is the company compliant with the End-of-Life Vehicles (ELV) Directive (2000/53/EC)?

- Yes : 0
- Partially: -0.5 to -1.5
- No: -2

E.g. "yes" (0)

Step 3: Computing the final scores from to 0 to 5

Client score	Scoring category	Weight of the criteria	Computation *Score * weight*
Criteria applicable to all clients	Acknowledgement of C&N exposures, disclosure and targets?	10%	1 * 0.1 = 0.1
	GHG emission intensity (scopes 1 and 2)	30%	3 * 0.3 = 0.9
	Water consumption intensity	20%	4 * 0.2 = 0.8
Criteria applying to the covered sector *E.g. automotive*	Average emissions per km per vehicle of all vehicles produced for sales	20%	2 * 0.2 = 0.4
	Waste management	10%	3 * 0.1 = 0.3
	Natural resource dependency (e.g. rare earth elements)	10%	4 * 0.1 = 0.4
	Final score: sum of the above		**2.9**

5.3.3 Good practice for assessing project funding

Measuring with a yardstick – assessing use of proceeds

Newly added good practice

For project funding, some institutions apply exclusion and assessment criteria to both the project to which the funds are allocated and the project holder. Institutions ensure that, even when funds are not directly allocated to high-risk projects, excluded or restricted activities are not indirectly financed through entities. Figure 27 below provides a stylised example of a decision matrix used to determine the funding eligibility of clients and projects. The ECB observes that many institutions also refer to the Equator principles, which are industry standards for assessing the social and environmental risks of project funding. These standards imply different degrees of due diligence depending on how the projects and project holders are classified in terms of environmental risk exposure.

Figure 27
Stylised decision matrix to account for the environmental profile of clients and projects in lending and investment decisions

Debtor profile / Project profile	Positive environmental profile	Neutral environmental profile	Negative environmental impact but below exclusion thresholds	Excluded profile due to parts or all its activities
Funds allocated to a project with a positive impact on the environment	Financing with a regular approval process	Financing with a regular approval process	Financing possibility subjected to client engagement	No financing
Neutral use of proceeds or no direct allocation of the funds	Financing with a regular approval process	Financing with a regular approval process	Financing possibility subjected to client engagement	No financing
Use of proceeds with negative impact on the environment but below exclusion thresholds	Financing possibility subjected to senior management and/or dedicated committee approval	Financing possibility subjected to senior management and/or dedicated committee approval	Financing possibility subjected to additional client engagement and to senior management and/or dedicated committee approval	No financing
Funds allocated to an excluded economic activity	No financing	No financing	No financing	No financing

5.4 Risk mitigation

Expectation 7.4
Institutions are expected to adopt a strategic approach to managing and/or mitigating climate-related and environmental risks in line with their business strategy and risk appetite, and to adapt policies, procedures, risk limits and risk controls accordingly.

Expectation 8.3
Institutions are expected to consider climate-related and environmental risks in their collateral valuations

Expectation 8.5
Institutions' loan pricing frameworks are expected to reflect their credit risk appetite and business strategy with regard to C&N risks.

Expectation 7.6
Institutions are expected to assess the impact of C&N risks on their capital adequacy from an economic and a normative perspective.

On completion of the environmental risk assessment, the outcome is integrated into the general credit assessment and decision-making process. The approach is the same as for the climate and nature-related good practices described in Section 4. This section further elaborates on how nature-related risks are specifically integrated into the processes described above.

As a first step, and sometimes to account for the specificities of each client that are not necessarily reflected in the risk monitoring processes, institutions tend to use engagement tools (see Section 5.4.1). For high-risk clients with poor due diligence results, the credit officer may decide to adjust the credit or investment decision (see Section 5.4.2). For instance, they may issue a negative credit decision, or a positive credit decision subject to specific conditions.

5.4.1 Good practice for client and debtor engagement
Emerging from the woods – engaging with high-risk clients to reduce exposure

Newly added good practice

As a first step, high-risk clients are subject to dedicated due diligence (also see Section 2.2.1 on C&N engagement policies). By engaging with their clients and accompanying their transition, institutions aim to ensure that their clients align with their risk and strategic policies. Some institutions also decide to engage with clients and debtors that are not yet aligned with their environmental policies when they have robust plans and commitments in place to comply to these expectations within a given timeframe or are able and willing to draw up such plans.

Some institutions have designed engagement tools to monitor and support their clients' environmental transition beyond climate change. These tools help to ensure that clients become aligned with the institutions' own policies, limit the exposure of institutions to environmental risks, and provide data on the clients' resilience (see Table 63).

The ECB observes that engagement policies on nature-related risks tend to focus on corporate clients. Most engagement tools focus on clients' positive impacts, or on limiting their negative impacts, and may not always directly mitigate nature-related risk exposures. However, they are used as a first step to integrate nature-related risks into client policies and to initiate dialogue with clients.

Table 63

Non-exhaustive list of observed client engagement tools

Engagement tool	Description	Example
Connecting stakeholders	Institutions create programmes to bring together clients in sensitive sectors around shared themes of interest, encouraging dialogue, fostering research, promoting the use of innovative tools, and facilitating access to funding.	One institution provides its clients in the agriculture sector with new transition tools, connects them to research projects, and to revenue sources to finance their transition. It conducts workshops between the clients and their account managers, along with universities and their research centres, corporates and consultants. During these workshops, the participants focus on tools to measure environmental impact and on methods to limit negative impacts. Complementarily, the institution provides clients with new funding and revenue streams by connecting them to economic actors that have environmental targets and are willing to finance transition projects.
Offering nature-related expertise	Institutions offer nature-related advice to their clients to make them more resilient to nature-related risks and ensure their alignment with the institution's policies.	One institution exposed to deforestation-related risks hires technical assistants at each of its branches located in sensitive areas and offers their services to clients. One institution provides technical support to its clients in the agriculture sector on soil protection and water management. It offers them a soil sampling analysis service and supports them in defining nature-related monitoring indicators and objectives.
Subsidising certified sustainable practices	Institutions subsidise their clients when they implement sustainable practices and obtain an official certification.	One institution offers a lump-sum grant to its clients in the agriculture sector when they implement environmental practices and obtain the highest-level state certification for environmentally sustainable farming (covering biodiversity conservation, plant protection, fertiliser management, and water management).
Requiring nature-related compensation	Institutions monitor the practices of their clients to ensure that they avoid, minimise, and compensate their negative impacts.	One institution requires clients to compensate for unavoidable deforestation. It estimates the number of hectares and trees deforested by the client, and requires them to reforest areas, planting at least four times the number of trees that were cleared.

5.4.2 Good practice for credit and investment decisions
Steering clear of stormy seas – adjusting financing offers to account for nature-related risks

Newly added good practice

Entity-level and asset-level analyses affect client relationships, funding conditions and asset management decisions (also see Section 4.4 on loan pricing and collateral valuation). On a case-by-case basis, and in addition to the client engagement described above, nature-related assessments can lead to enhanced monitoring, or to funding and investment restrictions.

Defining funding conditions

Some institutions decide to engage with medium- to high-risk clients under specific conditions. They may adjust the characteristics of the transaction to account for nature-related risks, such as pricing (see below), the amount, the duration, or the use of proceeds.

One institution has defined a list of restricted companies and drawn up a list of partially restricted companies. It may engage with partially restricted entities provided that the restricted activities are not financed. In this case, the company is asked to sign a document stating that it is aware of the institution's position with respect to its activities, and the engagement with the client or debtor is ring-fenced if this document is not signed by the company's senior management (e.g. financing a specific asset only). Additionally, when non-wholesale clients are active in one of the sensitive nature-related sectors (as identified in the materiality assessment) and exceed a lending threshold (fixed and predefined for all entities), they must sign a self-declaration confirming that they have appropriate policies and controls in place to manage their material nature-related risks.

Adapting loan pricing

As detailed in Section 4.4.1, institutions have also integrated nature-related factors into their loan offers and pricing through either the cost component or the commercial margin component of the loan price. The pricing of the loan can also reflect the nature-related risk profile of the debtor through sustainability-linked loans (see the example provided in Table 48).

Collateral valuation and policy

Some institutions account for nature-related characteristics in their collateral valuation and collateral policy (also see Section 4.4.2).

One institution assesses the nature-related characteristics of the collateral securing the loan. The assessment of the property feeds into the financing decision and influences the potential green labelling of the loan, and thus also its pricing. To do so, the institution has developed its own climate- and nature-related scoring methodology, using criteria similar to those set out in the EU Taxonomy. Nature-related criteria cover the land use change (soil surface sealing), the use of recycled material for the construction, and biodiversity (location in or near a protected area, and the presence of green areas in or around the building). All the properties in the

portfolio have been assessed and are regularly reviewed. If assigned the best score, the borrower must continue to provide regular documentation on the property to preserve this score and the associated benefits. The institution also labels those loans with the worst-performing collateral as “brown” loans and monitors the distribution of collateral sustainability performance in its portfolio.

One institution includes covenants relating to the nature-related characteristics of collateral in its loans in the maritime sector. These covenants require EU-flagged ships to be recycled at an approved yard under the EU Shipping Recycling Regulation, and non-EU-flagged ships to be recycled at a yard certified under the Hong Kong Ship Recycling Convention, as certified by a member of the International Association of Classification Societies (IACS) accepted by the institution. Such covenants are systematically negotiated with clients in the sector for new asset-based financing. When the client rejects the covenant, only the dedicated climate and nature committee can waive this loan requirement following an assessment of the matter.

5.5 Capital adequacy

5.5.1 Good practice for capital adequacy

Weathering the storm – assessing capital adequacy for nature risks

Newly added good practice

Some institutions integrate nature-related risks into their Internal Capital Adequacy Assessment Process (ICAAP), ultimately allocating capital to material nature-related risks. The approach is the same as that applied to the climate and nature-related good practices described in Section 4.6. This section further elaborates on how nature-related risks are specifically integrated into the processes described above. The ECB observes that, while nature-related risk quantification approaches are less elaborate than those used for climate risks, institutions are now taking their first steps in integrating nature-related risks into their ICAAP.

Institutions typically begin integrating nature-related risks into their ICAAP documentation dedicated to risk inventory and risk management. The ECB observes that some institutions conduct qualitative analyses of nature-related risks in their ICAAP due to a lack of data or sufficiently mature risk quantification methodologies. One institution integrates a biodiversity risk analysis into its ICAAP, covering the impact of nature-related physical and transition risks on all financial risk categories. The institution identifies risk materiality for one risk category and acknowledges that it cannot precisely quantify nature-related risks due to the still emerging nature of the methodologies. Even though the risks are not considered material within the time frame of the ICAAP, the institution expects them to become increasingly relevant. Hence, it defines a capital buffer for nature-related risks in its ICAAP. This buffer is based on expert judgement and accounts for both the risk materiality identified and unquantifiable nature-related risks.

The ECB observes that some institutions have also conducted dedicated nature-related scenario analyses. Such scenarios are based on the transmission channels used for climate scenarios, e.g. from the NGFS and the Representative Concentration Pathway (RCP), which are recalibrated to integrate nature-related risk drivers. Examples of stressed metrics for transition risks often include taxes for nature-related damage, water prices and biomass prices. For physical risks, institutions apply stressed financial impacts to exposures highly dependent on ecosystem services. The ECB observes that, in the absence of more established scenarios for nature-related risks, scenarios tend to be built internally. While one institution has not yet adjusted its capital need assessment due to the emerging nature of these scenarios, it has included its nature stress test in its ICAAP documents to inform the risk assessment process. Another institution that has identified long-term nature-related risks through its dedicated stress test uses the results to define a capital add-on in the economic perspective.

Some institutions integrate nature-related risk variables into their internal stress tests, with the results ultimately affecting capital. Some institutions have included nature-related factors in their physical and transition scenarios, thus amplifying the effects of climate change or regulation, e.g. with the introduction of EU regulation on farming and bans on chemical products, in addition to the increase in carbon prices, or with raw material scarcity and declining soil productivity in addition to physical climate events. Another institution conducted a nature-related scenario analysis to quantify the impact of nature-related risks on its CET1 ratio. Due to the exploratory nature of the methodology and the correlation observed between the climate and nature risk quantification results, the institution used the nature-related scenario results to define an overlay in its internal stress test, ultimately affecting its normative capital assessment.

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For specific terminology please refer to the ECB glossary (available in English only).

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