



Funded by
the European Union



TRANSITION FINANCE IN THE REGULATORY CONTEXT

November 2024

Guidance notes for financial regulators: Assessment, guidance, and transparency: Incorporating climate and nature-related financial risks in regulatory practice.

This activity is part of the European Union Climate Dialogues (EUCDs) project and funded by the European Union through the Service for Foreign Policy Instruments (FPI). It intends to support stakeholders from non-EU countries by providing recommendations based on good practices and international standards and guidelines on transition finance and support how to first adopt and subsequently manage climate and nature related (C&N) risks. In this regard, it aims to support EU actors and partners to strengthen ongoing discussions on transition finance measures and specifically on the holistic integration of C&N risks in policy and supervisory frameworks.

The practical cases in this guide provide an overview from key institutions, including the European Central Bank (ECB), and central banks from the **Netherlands, Germany, and Portugal**. The selection of country-specific examples targets national central banks and regulators that have **systematically** integrated transition finance **across the different dimensions** assessed in this guidance note (e.g., adoption of climate and partly nature-related risks, prudential regulation, monetary and non-monetary policy operations, other financial regulation tools). However, while the applied practice cases presented in this guidance note serve an informative purpose, the list of country examples is **non-exclusive**, and may be subject to further modifications or enlargements due to the highly **evolving regulatory landscape** that characterizes policy action related to transition finance. Therefore, reader discretion is advised.

Most thematic areas include short, medium and long-term measures about the holistic integration of C&N risks policy and supervisory frameworks that correspond to the time component of transition finance. Key literature available during the time of developing the guide provides further reading, but the topic and associated publications are evolving. Overall, each country will need to examine different options for adjusting and using the introduced tools dependent on the national context and developments. That said, the applied practices (see tables on practical cases) in this report can provide guidance and/or lessons for most jurisdictions.

Thematically, this guidance note covers the following four chapters with respective sub-chapters:

- 1. Adoption of climate and nature related risks: Leading by example,
- 2. Prudential regulations, including disclosure and reporting standards and climate stress testing,
- 3. Monetary and non-monetary policy operations, and
- 4. Further financial regulation tools, incl. green credit policies and finance taxonomy development.

Each (sub-)chapter follows the same structure: An introduction to the chapter is complemented with applied practical cases illustrating the adoption of C&N risks from EU and non-EU authorities. Next, each chapter contains a concise description (“country stance”) of the state of play of transition finance among selected EUCD partner countries. This covers the **Commonwealth of Australia** (Australia), the **Federative Republic of Brazil** (Brazil), the **Republic of Colombia** (Colombia), the **Republic of South Africa** (South Africa), the **Arab Republic of Egypt** (Egypt), the **Kingdom of Morocco** (Morocco), the **Republic of Türkiye** (Türkiye), and the **Republic of Korea** (South Korea). The used terms in brackets respect each nation’s official designation while providing a more straightforward name for ease of communication. In addition, there are as well as an information box with potential bilateral learning opportunities between EU authorities and those of the selected EUCD countries. The aim of this complementary evidence is to inform readers about the actual progress made by the corresponding authorities in the policy areas examined in the report, highlight existing role models, and identify potential policy gaps and learning opportunities across the mentioned states. This is followed by illustrative guiding notes, and potential next steps with a time dimension if applicable. Finally, key literature for further reading is provided.

Authors Michael König-Sykorova, Mathias Grimm Bertello, Carola Menzel-Hausherr

Thanks for comments The author team would like to thank the European Commission's Directorate-Generals for Climate Action (DG CLIMA), Financial Stability, Financial Services and Capital Markets Union (DG FISMA), as well as the European External Action Service (EEAS) country delegates, and the EUCDs project team for their support throughout the process that led to the publication of this report.

Thanks to relevant EUCDs country correspondents Mariana Rojas-Laserna (**Colombia**), Francisco Maciel (**Brazil**), Mounir Temmam (**Morocco**), Tawik Elkheshen (**Egypt**), Gamze Celikyilmaz (**Türkiye**), and Diana Mawoko (**South Africa**).

In addition, we thank Emanuel Mönch, Sebastian Rink, Christine Grüning, and Callum Lee (Frankfurt School of Finance and Management), Hugues Chenet (IESEG School of Management), Charlotte Gardes-Landolfini (International Monetary Fund), Vincent Darcy (International Finance Cooperation), Takis Antonopoulos (Financial Stability Board), Julie Evain (Institute for Climate Economics), Mike Raddatz (Institute for Policy Evaluation), Sarah Mc Phail (South African Reserve Bank), Jeayoon Kim and Daekeon Lee (Bank of Korea), Gabriele Wagner, Gaelle Meulenberg, and Salma Elsahhar (Gesellschaft für Internationale Zusammenarbeit), as well as Thea Khitarishvili (Sustainable Development and Green Solutions) for valuable insights and contributions to this report. We would also like to thank representatives from financial supervisory agencies, central banks, and academia who actively participated in the EUCD MC02 workshop held on October 29th 2024.

Disclaimer The content reflects the views of the authors alone and does not represent the official views of the European Union, EUCD’s partner countries, relevant authorities, or the Frankfurt School of Finance & Management.

Target group This document targets staff from central banks, financial supervisors, and policymakers, providing them with information and guiding principles to adapt to and manage climate and nature risks. In addition, financial institutions and researchers may use this document to integrate sustainability into their operations and research.

Design: Felina Liguori (Frankfurt School of Finance and Management) and Marine de Castelnaud

TABLE OF CONTENTS

6	8		
Executive Summary	Definitions and basics on climate and nature related risks		
1. Adoption of climate and nature related risks: Leading by example			
15	20	24	28
1.1 Mandate on transition finance and C&N risks	1.2 Governance structure and internal capacities	1.3 Own disclosure practices and transparency – Leading by example	1.4 Research
2. Prudential regulation			
32	36	40	
2.1 C&N-related risk disclosure standards	2.2 C&N-related risk management standards	2.3 Formulating expectations and guidance on establishing transition plans	
44	46		
2.4 Incorporation of C&N risks in macroeconomic models / stress testing	2.5 Countercyclical capital buffers, large exposure restrictions, and the identification of systemically or other important financial institutions		
3. Monetary and non-monetary policy operations		4. Financial regulation tools	
49	52	56	59
3.1 Monetary policy operations	3.2 Non-monetary policy operations	4.1 Taxonomy development	4.2 Green credit policy

List of tables

Table 1: Description of climate and nature risk transmission channels and propagation to the financial system	11
Table 2: Overview of key initiatives regarding C&N risk adoption by selected EUCD partner countries	14
Table 3: Integration of C&N risks and opportunities in central banks' mandates	18
Table 4: Plan for adoption of C&N risks and opportunities in governance structure and capacities	22
Table 5: Illustrative plan for the holistic integration of C&N risks in central banks' disclosure practices	26
Table 6: Illustrative plan for the creation and implementation of a climate change-focused research agenda	29
Table 7: Overview of C&N-related disclosure standards in selected EUCD partner countries	30
Table 8: Overview of climate stress tests conducted in selected EUCD partner countries	31
Table 9: Pillars of ESG disclosure obligations that support the European Green Deal	32
Table 10: Summary of EBA's Pillar 3 ESG disclosure framework	34
Table 11: Plan for the incorporation of C&N risks in supervisors' risk management frameworks	38
Table 12: Illustrative transition plan developed by supervised entities	42
Table 13: Description of typical stages in climate stress testing	45
Table 14: Plan for the incorporation of C&N risks into macroprudential policy instruments	47
Table 15: Overview of key initiatives regarding C&N risk integration in (non-)monetary policy in selected EUCD partner countries	48
Table 16: Illustrative guiding steps for the adoption of C&N risks in monetary policy	50
Table 17: Illustrative guiding steps for the adoption of C&N risks in non-monetary policy	53
Table 18: Overview of national taxonomy developments in selected EUCD partner countries	55
Table 19: Overview of key initiatives in selected EUCD partner countries to issue or promote green credit lines	56
Table 20: Description of the taxonomy development process	57
Table 21: Plan for the incorporation of green credit policies, credit/lending operations, reporting frameworks	61

List of abbreviations

BaFin	German Federal Financial Supervisory Authority	IPCC	Intergovernmental Panel on Climate Change
BCBS	Basel Committee on Banking Supervision	IT	Information Technology
BIS	Bank of International Settlement	ITS	Implementing Technical Standards
CB	Capacity Building	LSI	Less Significant Institutions
C&E	Climate and Environmental	LERs	Large Exposure Restrictions
C&N	Climate and Nature	MaRisk	Minimum Requirements for Risk Management
CBE	Central Bank of Egypt	MIS	Management Information Systems
CBRC	China Banking Regulatory Commission	NDC	Nationally Determined Contributions
CCyB	Countercyclical Capital Buffers	NGFS	Network for Greening the Financial System
CET	Common Equity Tier	NMPP	Non-Monetary Policy Portfolios
CFF	Climate Finance Facility	O-SII	Other Systemically Important Institutions
CBRD	China Banking Regulatory Commission	PACTT	South Africa's Prudential Authority Climate Task Team
COP26	Conference of the Parties 26	PRI	Principles For Responsible Investment
CRR	Capital Requirements Regulation	SADC	Southern African Development Community
CSO	Civil Society Organisations	SARB	South Africa Reserve Bank
CSR	Corporate Social Responsibility	SCS	Sub-Committee for Sustainability and Sustainable Finance
CSRD	Corporate Sustainability Reporting Directive	SFDR	Sustainable Finance Disclosure Regulation
DNSH	Do No Significant Harm	SISCLIMA	Colombia's National Climate Change System
EBA	European Banking Authority	SLBs	Sustainability-Linked Bonds
ECB	European Central Bank	SME	Medium-Sized Enterprise
EUCD	European Climate Dialogues	SREP	Supervisory Review and Evaluation Process
FCA	Financial Conduct Authority	SSM	Single Supervisory Mechanism
FMP	Financial Market Participants	TCFD	Task Force for Climate Related Disclosures
FSB	Financial Stability Board	TNFD	Task Force for Nature Related Disclosures
G-FSC	German Financial Stability Committee	TPT	Transition Plan Taskforce
G-SII	Global Systemically Important Institutions	WACI	Weighted Average Carbon Intensity
IFRS	International Financial Reporting Standards		

EXECUTIVE SUMMARY

Climate and nature (C&N) risks and financial stability.

Due to the rising severity of climate change and natural degradation, (non-) financial corporates are becoming increasingly exposed to material losses arising from C&N risks. Climate related risks are broken down into physical risks, such as economic losses resulting from extreme weather events (e.g., heat waves), and transition risks, such as economic losses (e.g., stranded assets) due to the introduction of stricter regulatory requirements. Nature-related risks follow the same structure, they include physical (e.g., biodiversity loss) and transition risks (e.g., limiting economic activities through the expansion of natural protected areas). If not addressed adequately, the increase in C&N-related risks poses a threat to financial institutions in different forms, including credit losses, which may turn into systemic disruptions to the economy and undermine the stability of the financial system. There is certain confidence, that C&N risks to financial stability are consistently underestimated. Specifically, the limitations of current climate scenarios might lead regulatory agencies to underestimate climate-related risks.

Climate change mandate and governance structure.

To ensure that financial regulators (e.g., financial conduct authorities, banking supervisors, central banks) can assess, monitor, manage, and mitigate C&N risks in an effective manner, it is vital for them to establish appropriate governance structures. For instance, **Colombia's** 2016 National Climate Change System (SISCLIMA) aims to improve coordination in regulatory responses to C&N-related financial risks across government agencies. Sound governance structures may play a crucial role in ensuring financial stability and could support the required economic transformation by becoming role models for other financial market participants. The extent to which regulators can address C&N risks and support the economic transition as part of their mandates differs by jurisdiction and depends on the legal statutes of the institution. While central banks with a “broad” mandate have already started to explicitly incorporate sustainability goals into their operational frameworks, those with a “narrow” mandate are more constrained. These institutions resort to a risk-based approach (e.g., elicit a reduction in the price of green assets relative to high-emission assets) to deal with C&N risks in their own balance sheet and that of the institutions they supervise. However, the increasing awareness and recognition of the endogenous character (e.g., feedback loops) of climate change (see finance chapter 15 in IPCC, 2022) can be addressed within broad and narrow mandates of central banks and financial regulators.

Data challenges to assess impact.

Due to existing data limitations and difficulties in methodologies for the identification of C&N risks and economic transmission channels, the financial materiality, and specifically the impact materiality dimensions of climate change have not been fully understood. Impact materiality describes the impact from economic

activities on the environment (e.g., soil degradation). While some data exists on the financial materiality, such as increased inflation rates due to agricultural food shortages, further negative effects from economic activities are hardly quantified. This includes but is not limited to adverse effects of nature-related risks related on public health (e.g., worsening air quality due to local pollutants), migration flows (e.g., displaced communities due to depletion of local water resources), or long-term unemployment (e.g., productivity loss due to stranded infrastructure). Due to its global and local relevance, the identification and measurement of C&N risks beyond their immediate financial consequences on market participants is increasingly drawing attention from regulators in sustainability reporting. Despite this progress, data challenges and knowledge gaps may divert political priorities and impede the implementation of regulation necessary to address impacts and drivers of climate change at the (sub-)national level.

Addressing climate change using a mix of instruments, including disclosure requirements, climate stress testing, and asset purchases.

Focusing on the implementation of a risk-based approach in supervisory and central banks' policy frameworks can help address the underpricing of C&N risks, and thereby fill existing financing gaps. In addition, a risk-based approach encourages technological innovation, which may enable a systemic transformation of the economy. Unlike the risk-based approach that can be put in practice under narrow policy mandate, central banks and regulators with a broad mandate may set in motion a wide array of unconventional (non-) instruments to support the green transformation and the development of the financial sector. These include adjustments in the eligibility requirements for collateral in the corresponding credit assessment frameworks, climate-tilting strategies under asset purchase programmes (e.g., favouring corporate bond issuers with better climate performance over firms with greater exposure to climate and nature related risks,) as well as the integration of climate scenarios in macroeconomic modelling and stress testing. Key examples in climate stress testing across emerging and developing economies that exemplify such progress include the sector-level physical risk stress test performed by the South African Reserve Bank in June 2021 using historical data on drought frequency and intensity, as well as the stress test implemented by the Central Bank of **Egypt** on the country's financial sector in 2020 in alignment with the climate models developed by the Network for Greening the Financial System (NGFS). In addition, numerous regulators around the world already have or aim at introducing sound climate-related disclosure requirements (e.g., Regulation 031 issued by the Superintendencia Financiera de **Colombia** in December 2022) in line with internationally recognised guidelines, incl. the Task Force on Climate-related Financial Disclosures (TCFD) to explicitly mitigate C&N-related financial risks and safeguard financial stability.

Apply a precautionary approach due to complexities.

Given the lack of granular data needed to calibrate prudential and monetary policy tools on the basis of C&N vulnerability and risk assessments, regulators and central banks may follow a precautionary risk-based approach to transition finance. Namely, regulators may support the transformation of the economy in an orderly manner while ensuring a just and socially inclusive transition in all sectors of the economy. Regulators may specifically identify and manage high-emission and “hard-to-abate” sectors under special supervisory regimes. This can require targeted companies and financial institutions to design and implement credible and science-based transition paths and plans on a mandatory or voluntary basis. Thus, combining macroeconomic and climate stress testing for transition risk, with more qualitative risk analysis related to physical risk may be used to compensate the lack of knowledge to capture the full breadth and scale of C&N-related financial risks. The lack of forward-looking data on C&N risks should not be used as an excuse for inaction.

Overall recommendations.

Identifying, assessing, mitigating, and avoiding C&N risks is a sector-wide task that may benefit from deeper knowledge exchange and closer cooperation between relevant national and international authorities and financial market participants. Regulators may promote knowledge exchange programmes to improve climate modelling expertise and natural capital accounting and exchange on governance structures, both of which are essential to address C&N risks, but also to allow supervised entities to harness related opportunities effectively. Particularly, regulators may support supervised entities in the implementation of C&N related disclosures in alignment with internationally recognised standards, and guide these through the assessment and mitigation of existing risk exposures. In turn, relevant authorities may also benefit from such knowledge exchange, but also from human resource development, and capacity building programmes. Supplementary operational and strategic frameworks are being increasingly implemented by financial institutions, including thematic investing and active ownership.

Given the clear need for exchange on practical experiences on how to translate theoretical frameworks into work plans on the ground, it would be ill-advised to avoid close cooperation and knowledge exchange with supervised entities by embracing a blunt top-down approach. Sufficient prioritisation is needed in innovation and research, particularly on the impact dimension of the double-materiality approach, and the potential development of unconventional monetary policy instruments to support the urgent transformation of the economy. In this vein, acknowledging the contribution of regulators and central banks to the accumulation of C&N-related financial risks data under existing incentive mechanisms and policy frameworks (e.g., transition plans, decarbonisation strategies on the entity level) represents a strong

foundation for regulators to act on the topic and limit the build-up of financial risks in the medium- to long term that may endanger the stability of the financial system.

Structure of the report.

Section 1 covers regulators' practices to address C&N risks through their mandate, internal capacities, governance structures, and concludes with regulators and central banks' own disclosure practices and a proposed research agenda. Section 2 presents a set of potential regulatory tools for enhancing supervisory practices in alignment with C&N risks. These include regulatory requirements to integrate C&N in disclosure and reporting standards for financial market actors and macroprudential activities, such as stress testing and large exposure restrictions. Section 3 addresses the crucial role played by (non-) monetary policy in financing the transition and its effect on private sector institutions' financial decisions. Finally, Section 4 assesses green credit policies and transition finance taxonomies as a tool to support the holistic integration of C&N risks in the financial sector.

DEFINITIONS AND BASICS ON CLIMATE AND NATURE RELATED RISKS

A brief description of key concepts that are largely applied in transition finance literature is provided below. These concepts include:

- I. the definition of transition finance itself;
- II. that of climate and nature risks;
- III. the financial risk transmission channels; and
- IV. the time component that characterises transition finance.

In addition, this chapter provides an overview of the pressing data challenges that difficult assessment of climate and nature-related financial risks; and an explanation about the limitations of the analysis presented in this report. Overall, it is essential to have a well-informed understanding of existing climate and nature (C&N) risks, their transmission channels, as well as pressing challenges in their assessment, in order to design effective policy measures and advance the transition to a sustainable and low-carbon economy.

I. Definition of transition finance in this report

Despite its emerging importance across the globe in recent years, there is still no consensus on the definition of transition finance¹. In this guidance note, it relates to financing and funding of all sectors, including high-emitting and hard-to-abate industries, to enable them to gradually shift their activities towards the temperature goals of the Paris Agreement, while incorporating social and environmental safeguards. More specifically, transition finance can be recognised as financing developments towards a sustainable and energy efficient economy, at a compatible pace aligned national and international objectives. Transition finance is a means to mitigate risks arising from the transition towards the goal of achieving a climate-neutral economy. In this report, a risk perspective is majorly applied offering opportunities to be integrated in prudential regulation² and, if possible, in (non-) monetary policy instruments. In this regard, the dimensions as follows are crucial in the debate around transition finance:



Impact

Alignment with the temperature goal set in the Paris Agreement, with a strong focus on accounting for social aspects in the transformation. In addition to the temperature goal, the impacts on the environment and society of investment and lending decisions are essential for transition finance.



Sector(s)

Decarbonising hard-to-abate and high-emission sectors such as coal, steel, cement, and chemicals is crucial to achieve the Paris Agreement's temperature goals. These sectors are significant contributors to global greenhouse gas (GHG) emissions, and their decarbonisation is vital for limiting global warming.



Time

The process of gradually decarbonising all sectors is complex and requires careful planning and execution to avoid long-term lock-in effects to GHG-intensive or environmentally harmful activities with respect to the lifetime of assets.



Development

Relevant risks can be identified via materiality assessments. This acknowledges that sectors, localities, and actors may have different starting points in the transition. The scope can include just transition aspects, social inclusion, environmental protection and other sustainability elements as outlined in the Sustainable Development Goals (SDG).



Systematic

Avoid isolated approaches by considering all relevant C&N-related areas into account, including climate adaptation and resilience, water systems, circular economy, pollution, and biodiversity (see the targets of the Kunming-Montreal Global Biodiversity Framework).

This guidance note follows primarily a time-sensitive perspective, with guidance for the short, medium, and long-term.

II. Climate and nature risks

Climate and nature related risks are interconnected concepts. While climate has been a topic in financial market participants' (FMP) discussions for some time (e.g., the Task Force for Climate Related Disclosures, short TCFD, has been published six years before the Task Force for Nature Related Disclosures (TNFD) recommendations in 2023), nature-related risks have traditionally been debated more intensively in the insurance sector, specifically with respect to disaster risk management. While a lack of capacity has led authorities to hesitate in adopting both concepts in their operational and supervisory frameworks, there is increasing evidence that integrative and "systemic" approaches may be necessary to support the Paris Agreement and the Montreal-Kunmin Protocol³.

Climate risks are divided into physical (e.g., material losses caused by extreme weather events, such as droughts, heat waves, hurricanes, and floods) and transition (e.g., business model disruptions stemming from policies and regulations, technological advancements, and societal actions like shifting consumer preferences) risks. To ensure that the financial system remains resilient in the presence of more frequent and severe climate risks, authorities and FMPs integrate them in their policies and operational frameworks. As a landmark guidance framework, the Financial Stability Board (FSB) established the TCFD, which has set out guidance for climate-related disclosure practices and outlines recommendations on supervisory and regulatory approaches to adopt climate-related risks. Currently, most central banks in the euro area, including the European Central Bank (ECB), as well as in EUCD partner countries (incl. the central banks of **Colombia, Brazil, and South Africa**) have adopted annual climate disclosure publication practices to enhance transparency regarding their climate actions in alignment with the TCFD recommendations, covering categories such as governance, strategy, risk management, metrics and targets.

Nature risks follow the same division as climate risks, and can be either physical, such as soil degradation, or transitional, which refer to the misalignment of business models due to the introduction of laws aiming to restore nature. Neglecting these risks can mislead investors and regulators when performing systemic financial risk projections. In fact, biodiversity loss constitutes a threat to the global economy at a systemic scale and can potentially propagate to the financial sphere⁴. Complementary to the TCFD, in 2023 the TNFD published guidelines for financial and non-financial

institutions to act on evolving nature-related risks. Overall, since nature related events are currently addressed in a largely siloed manner⁵, this may lead to the misestimation of systemic financial risks (see table 2), and thus, likely undermine progress on nature-related financial risks.

Climate and nature risks can turn from specific into systemic risks with severe macroeconomic impact as described below.

III. Financial risk transmission channels

As shown in figure 2 below, financial risk transmission channels describe the amplification process of physical and transitional C&N risks from asset-level threats (specific risks) to institution-wide (systematic risks) and ultimately systemic risks that undermine the stability of the financial system as a whole. However, physical and transition C&N risks differ in terms of how they transmit into financial risks. Physical risks posed by extreme weather events can erode the profitability of firms exposed to such risks, thereby worsening their liquidity and potentially their solvency.

3 IPCC, 2023, AR6 Synthesis report: Climate change 2023, <https://dx.doi.org/10.59327/IPCC/AR6-9789291691647>

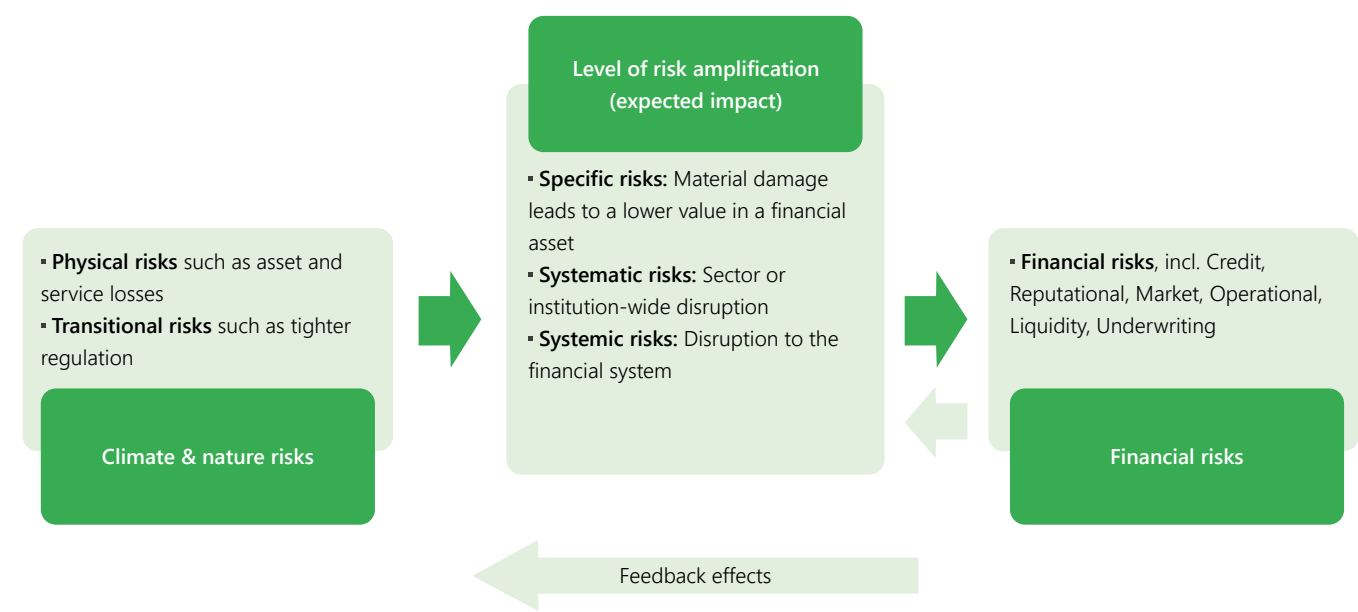
4 Chenet et al., 2021, Quantifying financial impacts of biodiversity loss? Conceptual and theoretical frameworks, limits, and implications, <http://dx.doi.org/10.2139/ssrn.4037473>

5 Kedward et al., Biodiversity loss and climate change interactions: financial stability implications for central banks and financial supervisors, <https://www.tandfonline.com/doi/full/10.1080/14693062.2022.2107475>

1 Caldecott, B., 2022, Defining transition finance and embedding it in the post-Covid-19 recovery, <https://doi.org/10.1080/20430795.2020.1813478>

2 EBA, 2024, The EBA consults on guidelines on the management of ESG risks, <https://www.eba.europa.eu/publications-and-media/press-releases/eba-consults-guidelines-management-esg-risks>

Figure 1: Climate and nature risk transmission channels and amplification levels



Note: Non-exhaustive, only illustrative. Based on NGFS (2024).

Depending on the magnitude of the financial losses suffered, the systemic relevance of the affected companies, and the effectiveness of the prudential response, physical risks may cause a higher rate of default and affect the stability of both the financial and the non-financial corporate sectors. Regarding transition risks, the “transition” to low-carbon economic activities may cause severe losses for unprepared companies with business models that heavily rely on fossil fuels and natural resources that are supposed to be protected, conserved, and restored. These “stranded assets” present a substantial risk to financial institutions that have provided loans to such companies, as well as to investors

that have purchased stocks and bonds issued by such entities. At the same time, feedback effects from financial risks caused by either physical or transitional C&N risks can reinforce the impact of climate change on the economy ⁶, going from specific risks at the asset level to potentially systematic and systemic economic threats. Despite differences in financial risk transmission channels, both physical and transitional C&N risks may derive into systemic risks that undermine the stability of the financial system. As a result, climate change will have ever increasing implications for the conduct of financial supervision and monetary policy.

Table 1 below provides a more detailed description of the financial transmission channels of C&N risks illustrated in figure 2, as well as a brief examination of the expected impacts of each risk type, and an overview of the policy instruments targeting each type of amplification level (specific, systematic, and systemic).

Table 1: Description of climate and nature risk transmission channels and propagation to the financial system

Level of risk amplification	Specific risk	Systematic risk	Systemic risk
Transmission channel (excl. feedback effects)	Financial asset	Financial institution and or economic sector	Financial system
Expected impact	Impact on non-financial corporates caused by physical (e.g., damaged infrastructure due to extreme weather events) and/or transition (e.g., stranded infrastructure) risks that lead to a reduction in value of an FI's financial asset(s).	High exposure to specific risks (e.g., market risk), followed by materialising asset losses generates an adverse institution or sector-wide financial impact.	Amplification of systematic risks across financial institutions and/or economic sectors due to high levels of interconnection, which undermines the stability of the financial system. Wider macroeconomic impact expected in the absence of effective policy responses.
Instruments/ Mitigation mechanism(s)	<ul style="list-style-type: none">▪ Disclosure standards (see section 2.1)▪ Taxonomy development (see section 4.1)	<ul style="list-style-type: none">▪ C&N risk management standards (see section 2.2)▪ Transition planning by supervised entities (see section 2.3)▪ Green credit policy (see section 4.2)	<ul style="list-style-type: none">▪ Integration of C&N risks in macro-economic modelling and stress testing (see section 2.4)▪ Climate-focused macroprudential tools (see section 2.5)▪ Integration of C&N risks in (non-) monetary policy operations (see section 3)

Note: Only illustrative, non-exhaustive. Building on De Menno (2022).

As illustrated in table 1, systemic risk differs from specific risks, which manifests at the asset level and can be managed via portfolio diversification. Systemic risk can be also distinguished from systematic risk (e.g., market risk), which manifests at the (sub-)sector level but does not have the potential to impede the functioning of the entire financial system or create spillovers into the real economy. However, evolving financial system dynamics, such as increasing interconnectedness (e.g., de-coupling of banking, insurance, and investment services), complexity (e.g., multi-sector and multi-jurisdiction scope), brittleness (e.g., mispricing due to uncertainty), and pro-cyclicality (e.g., excessive leverage) can make an economy more vulnerable to C&N-induced financial instability and exacerbate systemic risk amplification. In fact, according to the NGFS (2024), climate change will likely

cause greater uncertainty about the economic environment in which monetary policymakers operate in pursuit of fulfilling their monetary policy and financial stability mandates ⁷. Therefore, it is crucial for financial supervisors and monetary policy authorities to understand these risks and take appropriate measures to mitigate them.

6 NGFS, 2024, Acute physical impacts from climate change and monetary policy.

7 NGFS, 2024, Acute physical impacts from climate change and monetary policy, https://www.ngfs.net/sites/default/files/medias/documents/ngfs_acute_physical_impacts_from_climate_change_and_monetary_policy.pdf

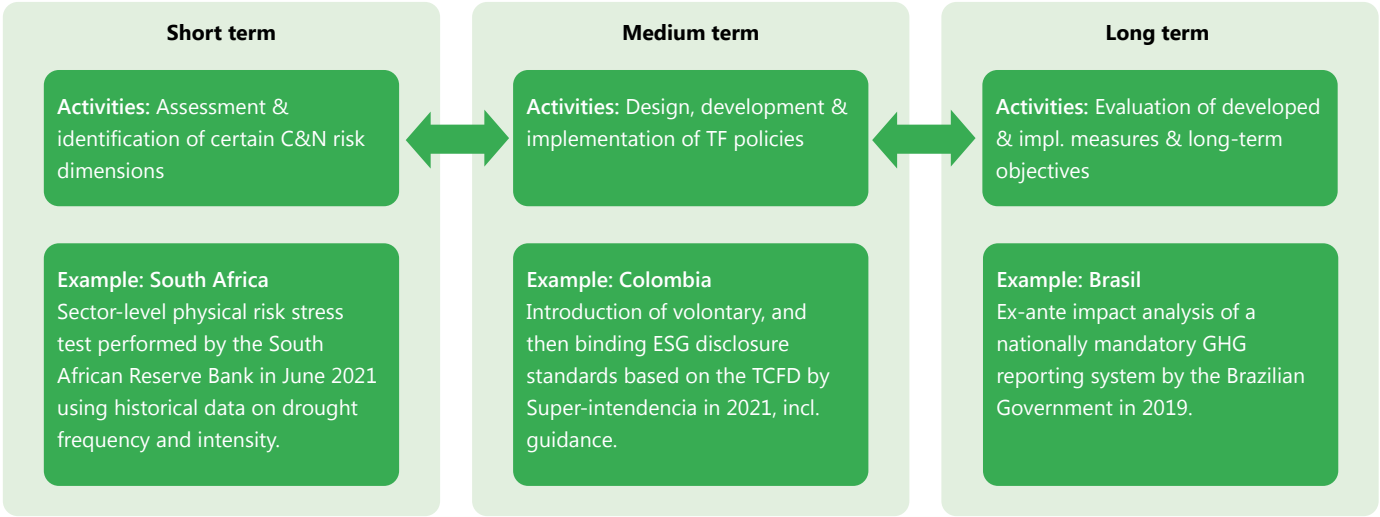
IV. Data challenges facing the identification and assessment of C&N risks

There is a need for enhanced disclosures, better data, and strengthened risk assessment methodologies (see section 2.1) as highlighted in various reports, incl. the Financial Stability Review of the European Central Bank (ECB). However, several barriers, including but not limited to the ones described in this paragraph, hinder an appropriate identification and assessment of C&N risks, particularly among FMPs. A significant obstacle is the lack of data on nature dependencies across existing supply chains, and the exposure of FMPs to C&N risks at the asset level (e.g., syndicated loans). Inconsistent methodologies may impair the proper assessment of transmission channels for different types of C&N risks. Metrics and frameworks used in climate-related macroeconomic impact models tend to focus on credit risk as a key transmission channel, while neglecting the impact of

climate change on other financial risk categories (e.g., market, reputational, etc.). As a result, conventional macroeconomic models are not fully equipped to capture the breadth and scale of climate and nature-related financial risks, which creates barriers for financial regulators to integrate C&N risks effectively. Finally, what seemed feasible for financial climate risk modelling from a data perspective is not applicable to the same extent as nature-related financial risks, which are inherently more complex, chaotic, and less understood.

The 'risk measurement-based' approach still dominates the private climate finance landscape, but it does not fully capture the long-term amplification pattern of climate risks due to its reliance on short-term horizons. In this regard, while data challenges are often cited, it is important to acknowledge that there is already sufficient data and knowledge available to make informed decisions. It is also acknowledged that there will never be perfect data and models to provide the complete insights that FMPs might desire for entirely rational and mechanical decision-making.

Figure 2: Illustration of the proposed time horizon for regulatory and central banking policies



Note: Only illustrative, non-exhaustive. Examples are recovered from publicly available sources, incl. official government websites.

V. Respecting the time component of an orderly, but rapid transformation

To mitigate potential social implications of materialising transition risks, and thereby pave the way for an orderly, but rapid (e.g., a gradual process where climate policy becomes more stringent⁸) and just transition, it is crucial for financial regulators to consider the time component inherent to the transition process. This may imply the introduction of clear guidelines on C&N risk management followed by sufficiently long notice periods prior to the introduction of mandatory regulations (e.g., disclosure requirements, green differentiated capital requirements, etc.) or supervisory expectations to enable firms to adjust their business models accordingly and overcome undue transition risks. The adoption of such a “time component” may ensure that the transition takes place in alignment with ambitious climate goals, while mitigating side effects on labour market opportunities for different stakeholders within the jurisdictions of relevant national authorities. This corresponds to the large ongoing political debate on transition finance that allows for a phased-approach in decarbonising (especially hard-to-abate) sectors over time.

VI. Limitations in this report

While the time-based recommendations expressed in this report draw on the latest findings from academic, non-academic literature, as well as state-of-the-art applied practice cases, the research field of transition finance is characterised by its constantly evolving character and complexity. Therefore, the applied practical cases and recommendations in this report may present certain limitations that undermine their applicability, specifically as financial regulation is a highly context-dependent domain. This includes limited evidence, prudential supervision framework issues, and various constraints such as financial, human, governance, institutional and policy-related. As the interplay of various constraints lead to difficult limits that are challenging to overcome, the authors exhort readers to take a cautious approach towards their interpretation and implementation. Particularly, the availability of more granular data on C&N risks may improve the measurement of exposure levels of financial market participants to such risks and provide new insights about the effect of green monetary instruments, ultimately leading to substantial adjustments to the way in which relevant authorities should incorporate C&N risks to enable the transition to a sustainable and low-carbon economy.

Key references (if not cited as footnote)

- Dafermos et al., 2018, Climate change, financial stability, and monetary policy.
- De Menno, 2022, Environmental sustainability and financial stability: Can macroprudential stress testing measure and mitigate climate-related systemic financial risk?
- Elderson, 2021, Overcoming the tragedy of the horizon: Requiring banks to translate 2050 targets into milestones.
- European Commission, 2023, Commission recommendation (EU) 2023/1425 on facilitating finance for a transition to a sustainable economy.
- IPCC, 2022, Mitigation of climate change, WG3 AR6, Chapter 15, Executive summary.
- Hartmann et al., 2022, Central banks, climate change, and economic efficiency.
- SASB, 2016, Climate risk technical bulletin.
- SUERF, 2021, Patchy data is a good start: from Kuznets and Clark to supervisors and climate.
- TCFD, 2017, The use of scenario analysis in disclosure of climate-related risks and opportunities.
- TNFD, 2023, The TNFD nature-related risk and opportunity management and disclosure framework.
- NGFS, 2023, Nature-related financial risks: a conceptual framework to guide action by central banks and supervisors.
- NGFS, 2024, Acute physical impacts from climate change and monetary policy.

8 NGFS, 2024, Scenarios Portal, <https://www.ngfs.net/ngfs-scenarios-portal/>

1. ADOPTION OF CLIMATE AND NATURE RELATED RISKS: LEADING BY EXAMPLE

Central banks and financial regulators are increasingly aware of the implications of climate and nature (C&N) risks for their own operational frameworks⁹. This heightened awareness and the resulting holistic integration of C&N risks in central banks’ mandates, governance frameworks, disclosure practices, and research activities can set a positive example for other financial market participants and bolster the development and execution of climate policies in alignment with the Paris Agreement and the Global Biodiversity Framework.

Some widely-recognised challenges that may prevent the holistic adoption of C&N risks in emerging and developing economies include shortages of trained personnel who can understand and integrate climate risks into financial regulation, as well as a lack of internal technical expertise in climate risk stress testing, scenario analysis, and supervision. In addition, many developing countries rely heavily on donor programmes (World Bank, UNDP, AfDD, etc.) and international institutions to build capacity, which can limit the

pace of domestic adaptation. Lastly, limited budgets for training, research, and acquiring the necessary tools to monitor and manage C&N risks may also pose barriers to their holistic adoption by regulators and central banks in developing economies.

EUCD MC02¹⁰ country stance: To ensure that relevant national authorities can assess, manage, and mitigate C&N risks effectively and align their efforts on a path consistent with nationally determined contributions (NDC), it is vital to coordinate action and monitor their progress via appropriate governance structures. The following EUCD partner countries in MC02 have established specialised internal and sector-wide units to design and coordinate climate change responses across the regulatory and monetary policy fields: **Australia** (Council of Financial Regulators’ Working Group on Financial Implications of Climate Change, created in 2017), **Colombia** (Sistema Nacional de Cambio Climático, created in 2016), and **South Africa** (Prudential Authority Climate Task Team). Countries that have organisational rather than sector-wide

coordination units include **Morocco** (Bank Al-Magrib’s Task Force on Green Finance, created in 2019), **Türkiye** (Central Bank of the Republic of Türkiye’s Climate Change Response Task Force), **South Korea** (Bank of Korea’s Climate Change Response Task Force, created in 2021, and the Financial Supervisory Services’ Sustainable Finance Team, established in 2020). In turn, relevant authorities in **Egypt** and **Brazil** have yet to create internal and sector-wide units to coordinate climate change action. The figure below provides an (non-exhaustive, only illustrative) overview of key initiatives undertaken by EUCD partner countries regarding the holistic adoption of C&N risks at the national level.

Bilateral learning opportunity Although some EUCD partner countries are still in the process of developing system-wide coordination units to tackle climate change, member countries of the euro area could follow the role of certain EUCD MC02 partner countries, such as **South Africa**, to create a high-level climate change committee that coordinates climate action and oversees the implementation of regulatory approaches to mitigate C&N risks. Such governance structure may increase the effectiveness of policy coordination, enhance decision making processes through the participation of different public and private stakeholders, while ensuring that the economy remains on a Paris-aligned path.

Table 2: Overview of key initiatives regarding C&N risk adoption by selected EUCD partner countries

EUCD partner country	Key policy measures/initiatives (non-exclusive)
Australia	Creation in 2017 of the Working Group on Financial Implications of Climate Change within the Council of Financial Regulators.
Brazil	Incorporation in 2021 of a ‘Sustainability Dimension’ as the fifth dimension into the BCB’s strategic roadmap, the “Agenda BC#”.
Colombia	Launch of the National Climate Change System in 2016 (decree no. 298) to improve coordination in climate policy response across public and private entities.
Egypt	Restructure of the National Climate Change Council in 2019 to be headed by the Prime Minister.
Morocco	The “Roadmap for Aligning the Moroccan Financial Sector with Sustainable Development” was launched in 2016 as the result of an institution-wide coordination effort.
South Africa	Establishment of the Presidential Climate Commission (PCC), charged with leading and coordinating a just transition.
South Korea	Creation of the “Commission on Sustainable Development” announced in 2022 to ensure an efficient implementation of national sustainable development policies.
Türkiye	In 2021, the BRSA released the “Sustainable Banking Strategic Plan 2022-2025” to improve the integration climate risks into its operational framework.

Note: Only illustrative, non-exhaustive

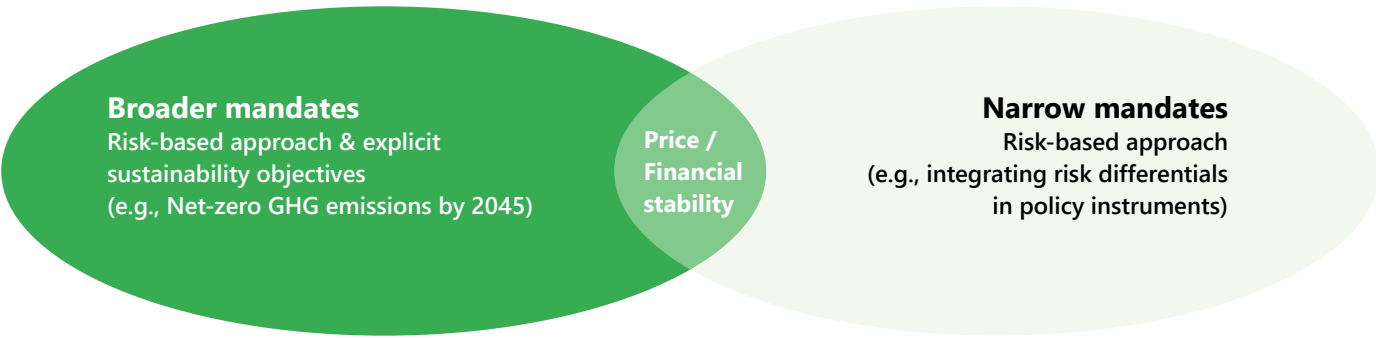
Section 1.1. discusses the link between C&N risks and the mandate of central banks. Section 1.2. highlights the role of internal governance and capacities to address C&N risks. Section 1.3. shows how central banks already “lead by example” when it comes to C&N risk integration. Section 1.4. concludes with research gaps and activities.

1.1. Mandate on transition finance and C&N risks

As show in the figure 2 below, the holistic adoption of sustainability objectives and policy measures that can be implemented by central banks and regulators to deal with C&N risks is largely determined by their mandates. Under a broad mandate, central banks and regulators may follow a risk-based approach and explicitly embrace sustainability-related objectives, such as achieving net-zero GHG emissions by 2045. From a central banking perspective, this could be achieved, for instance, via climate-tilting strategies

in asset purchases (see section 3), or, in the case of regulators, the introduction of green differentiated capital requirements. In contrast, central banks and regulators with narrow mandates are constrained from supporting climate and nature-related targets explicitly. Therefore, authorities with this type of mandate often refrain from taking a promotional role in greening the financial system, and instead resort to a risk-based approach alone to mitigate C&N risks, consisting of reducing the relative price of green assets. This approach can be conducted under a narrow mandate without taking a promotional role and directly financing green projects. Such risk-based approach under a narrow mandate may entail, as explained in this report, the adjustment of governance structures and internal risk assessment capacities (see section 1.2), climate and nature stress testing (see section 2.4), or the introduction of transition planning requirements (see section 2.3) and transition taxonomies (see section 4.1).

Figure 3: Mandate types and approaches for adopting C&N risks



Note: Simplified illustration. Non-exhaustive, only illustrative. Theoretical underpinnings. Authors’ illustration.

9 IPCC, 2022 chapter 15 AR6, WG3, <https://doi.org/10.1017/9781009157926.001>

10 MC02 stands for “Multicountry Activity 2”

However, an academic survey documents that only 10% (out of a total sample of 135 central banks) have mandates referring to sustainability concerns. Thus, explicit mandates to incorporate C&N-related financial risks are rarely present in core policy frameworks. Around 40% of the surveyed 135 central banks are mandated to assist government's policy priorities, which in many cases includes general sustainability goals¹¹. Notably, most of the mandates were written before climate change and sustainability became a major issue, as highlighted in the Brundtland Report in 1987 or the first IPCC Assessment Report in 1990. **Since most central banks and regulators do not have broad mandates to address climate change, they often resort to a risk-based approach for dealing with C&N risks on their own balance sheet and that of the institutions they supervise, without providing direct financing to green projects.**

Another important aspect to consider is the coverage of the mandate with respect to supervision. While some central banks have a responsibility for financial stability and supervision, others are responsible only for monetary policy. For the former, C&N risks undoubtedly need to be integrated in microprudential supervisory frameworks and policies, given the materiality of C&N-related financial risks. However, even for central banks without a mandate for microprudential supervision, consensus is emerging that they need to address climate and other sustainability risks in their macroprudential frameworks and policies¹².

Overall, central banks and regulators focus on their mandates and primary objectives such as price and financial sector stability, respectively, where it is essential to understand and potentially mitigate the impact of C&N risks on the financial sector. In terms of implications for the stability of the financial system, losses from materialising physical risks¹³ or stranded assets due to climate change and transition policies (such as new laws ruling out the exploitation of oil reserves or high-emitting production facilities that will not be used as the world moves away from conventional fuels and manufacturing processes) can negatively affect financial institutions' balance sheets and increase reputational risks. This can also lead to sharp increases in credit risk premiums, which would in turn restrain the flow of credit to the economy. Therefore, even without an explicit mandate for facilitating sustainable finance, central banks need to have the inhouse capacities and ensure that supervised entities understand and appropriately manage all material risks, including any related to climate change and nature degradation.

11 Dikau et al., 2018, Central banking, climate change, and green finance, <https://www.adb.org/sites/default/files/publication/452676/adb-wp867.pdf>

12 NGFS, 2020, Guide for Supervisors- Integrating climate-related and environmental risks into prudential supervision, https://www.ngfs.net/sites/default/files/medias/documents/ngfs_guide_for_supervisors.pdf

13 According to the ECB (2023), physical risks arising from climate change, such as heat waves, windstorms, floods, and droughts have "crucial implications" for price stability.

In addition, they should aim to detect weaknesses in how financial institutions identify, measure, monitor, and control C&N-related financial risks that could adversely affect their safety and soundness. By guiding or contributing to green credit policies, central banks can also steer the transition of the financial sector within the limits (see "Guiding notes and potential next steps" under this sub-section) of their respective mandates and align with existing government policies to mitigate climate change.



Practical cases

ECB Due to the potentially profound implications of climate change on the central banks' primary objective of maintaining price stability, the ECB has formulated a comprehensive climate action plan for 2021-2024, thereby underscoring its commitment to integrating C&N risk considerations within its legal mandate. This commitment is aligned with article 3 of the Treaty on the EU, by which "without prejudice to the objective of price stability, the ECB shall support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union", including the achievement of net-zero GHG emissions by 2050.

Deutsche Bundesbank On the macroprudential mandate, the Bundesbank Act (1957) and the Financial Stability Act (2013) provides the legal framework for the operations of the Bundesbank in **Germany**. This includes the German Financial Stability Committee (G-FSC), **Germany's** national macroprudential body. The Federal Ministry of Finance, Federal Financial Supervisory Authority (BaFin) and the Bundesbank each have three voting representatives on the G-FSC, while the Financial Market Stabilization Agency has one non-voting advisory member. Beyond the primary objective of price stability, the Bundesbank has an explicit mandate to contribute to financial stability. While climate change is not mentioned in the Bundesbank Act explicitly, one of the declared objectives is to play a role in fostering market transparency on the implications and risks posed by climate change, and to act as a catalyst for sustainability in the financial system. Thus, the integration of climate change into its mandate is more an interpretation of its broader objectives within the context of evolving economic and financial risks.

Banco de Portugal During the Conference of the Parties 26 (COP26) in 2021, the central bank outlined its commitments¹⁴ and proposed actions¹⁵ to achieve the climate targets established by the European Union and the Portuguese government. Until 2025, the central bank will pursue three focus areas to enhance environmental, social, and governance (ESG) concerns within its mandate, incl. integrating climate risks into the missions, reinforcing ESG sustainability in internal management, and promoting ESG awareness among employees and external stakeholders.

De Nederlandsche Bank In 2014, the central banks' mandate has been updated to include "sustainable prosperity" and "financial stability," equipping the central bank with new macroprudential instruments and tools to fulfil its mandate. In 2016, the central bank published an exploratory study on the transition to a carbon-neutral economy and established the Sustainable Finance Platform 2017. The central bank also became a TCFD supporter, founding member of the NGFS and published an Assessment of Climate-Related Risks for the Dutch Financial Sector. In 2018, the central bank organised the International Climate Risk Conference for Supervisors and became the first central bank to sign up to the United Nations' Principles for Responsible Investment (UN PRI). In 2020, the central bank published a report on biodiversity loss and associated risks, as well as a report on good practices in managing climate risks.



Guiding notes and potential next steps

Despite the potential transmission of material losses arising from C&N risks into systemic financial and economic disruptions, most relevant national authorities around the world have not adopted a holistic approach towards the incorporation of C&N risks into their mandates. **Since the limits of central banks' mandates must be respected, they can play a "promotional" role in enhancing green climate policy. Undoubtedly, central banks should not become a full "substitute" for governments in climate policy.**^{16,17} The table below describes potential steps for adopting C&N risks and opportunities in line with central banks' existing mandates, by dividing them into a first assessment phase and a subsequent development stage.

14 Banco de Portugal, 2021, The Banco de Portugal pledge on climate action, https://www.bportugal.pt/sites/default/files/anexos/documentos-relacionados/bdp_pledge_cop26_en.pdf

15 Banco de Portugal, 2022, Acting for sustainability: The Banco de Portugal's approach to ESG sustainability 2022-2025, ISBN (online) 978-989-678-816-2

16 Crow and Bingham, 2018, Carney plans to test UK banks' resilience to climate change, <https://www.ft.com/content/0ba2390a-ffd4-11e8-ac00-57a2a826423e>

17 NGFS, 2021, Adapting central bank operations to a hotter world: Reviewing some options, https://www.ngfs.net/sites/default/files/media/2021/06/17/ngfs_monetary_policy_operations_final.pdf

Table 3: Integration of C&N risks and opportunities in central banks' mandates

Timeframe and exemplary objectives	Short term	Medium term	Long term
	Focus on assessment and identification	Focus on planning and development	Focus on developing / monitoring
Narrow mandate (price stability) Enable the transition of the financial system by enhancing its resilience to C&N risks.	<ul style="list-style-type: none">▪ Assess direct link, such as corporate bond holdings and collateral debt (see section 3), between the central bank's mandate and C&N-related risks.▪ Identify potential barriers to C&N risk adoption.▪ Communicate why creating resilience against C&N risks among financial institutions aligns with the mandate and traditional core responsibilities (e.g., price stability).	<ul style="list-style-type: none">▪ Collaborate across agencies for collecting data and coordinating policy response.▪ Plan feasible options for incorporating C&N risks and opportunities into the existing mandate, e.g., through improved ESG reporting in line with TCFD/ TNFD recommendations.▪ Once risk differentials between sustainable and high-emission financial assets become evident, consider introducing green differentiated capital requirements, and climate-tilted bond purchases.	<ul style="list-style-type: none">▪ Monitor impact for introduced measures.▪ Fully incorporating C&N risks in existing mandate, for example, through the design of a comprehensive C&N-related framework.
Broad mandate (price stability and financial support for government objectives, incl. the transition to a sustainable economy) Actively engage in greening the financial system through the adoption of an explicit commitment.	<ul style="list-style-type: none">▪ Identify potential barriers to C&N risk adoption and build on TCFD/TNFD recommendations.	<ul style="list-style-type: none">▪ Collaborate across agencies for collecting data and coordinating policy response.▪ Evaluate different science-based standards and instruments (e.g., green differentiated capital requirements, climate-tilted bond purchases) for greening the financial system.	<ul style="list-style-type: none">▪ Integrate identified policy instruments in current operational frameworks.▪ Verify adopted policy instruments in close coordination with key stakeholders.▪ Monitor the policy impact on their operations to ensure a just transition.

Note: Time horizons are only illustrative. The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities, and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions.

Firstly, in order to integrate C&N risks and opportunities in central banks’ functions, it is essential to assess, acknowledge and communicate the direct link between their mandate and functions, incl. price stability and C&N-related financial risks. While central banks with a clear sustainable finance mandate (broad mandate) may shape green credit policies more actively (e.g., via beneficial interest rates for reaching clearly defined transition objectives), central banks without such a mandate may instead focus on disclosure, prudential and non-monetary policies.

Secondly, central banks may play a catalytic role by collaborating across agencies to collect data and evidence under an inclusive approach. An important first step towards the adoption of an inclusive approach is to identify all sub-national institutions with a specific sustainability mandate and available C&N risk data, as well as existing and missing coordination streams.

After assessing the scope of central banking support and potential barriers, the central bank may consider integrating sustainability needs and goals within “traditional” and existing core responsibilities, such as safeguarding macroeconomic and financial stability while considering climate change and natural degradation (e.g., biodiversity loss). Under a narrow mandate, the institution should develop and verify options to facilitate the transition of the financial system by strengthening its resilience to C&N risks. Conversely, if the central bank has a broad mandate, it should develop and verify options in close coordination with key stakeholders about the effect on their financial investments in green projects to minimise distributional impacts. Once the central bank has specified its needs and how these can be integrated in/justified by the existing mandate (e.g., core responsibilities), it should develop possible approaches to address C&N risks and opportunities. These approaches differ between a “learning by doing” approach (step-by-step) or by the design of a comprehensive C&N-adjusted framework.



Further literature

- Campiglio et al., 2018, Climate change and finance: What role for central banks and financial regulators?
- Deutsche Bundesbank, 2021, Climate change and financial stability: Contributions to the debate.
- Fischer, 2018, Global warming: Does the ECB mandate legally authorise a “green monetary policy”?
- Financial Times, 2019, Central banks’ mandates allow them to tackle climate change.
- NGFS, 2021, Adapting central bank operations to a hotter world.
- NGFS, 2021, Guide on climate-related disclosure for central bank.
- Svartzman et al., 2020, Central banks, financial stability, and policy coordination in the age of climate uncertainty: A three-layered analytical and operational framework.
- Boneva et al., 2021, Climate change and central banks: what role for monetary policy?
- Overseas Development Institute, 2021, The role of central banks in tackling climate change.
- IMF, 2024, Central banks and climate change: key legal issues.

1.2. Governance structure and internal capacities

In terms of governance structure and internal capacities of regulators and central banks, there is a need to expand technical expertise through organisation-wide strategic approaches. Additional resources, including Information technology (IT) monitoring systems, management information systems (MIS), and granular data are necessary for identifying, assessing, and quantifying C&N risks consistently. Currently, despite efforts to improve internal C&N risk identification and assessment procedures (e.g., by recruiting climate change experts, purchasing, and collecting relevant data), data gaps that prevent the proper assessment of C&N risks prevail in many regulatory agencies and central banks across emerging and developed economies¹⁸. A robust internal governance process and support from senior stakeholders can lay the groundwork for incorporating disclosure practices in line with the TCFD and TNFD guidelines. In addition, improving regulators and central banks' internal governance and capacities for C&N risk management can also set a positive example for other financial institutions to follow.



Practical cases

ECB The ECB has taken an integrated approach to address climate-related risks and opportunities within its existing governance structure. This includes the establishment of a dedicated climate change centre to consolidate efforts across different areas. Multiple committees oversee climate-related risks and opportunities for monetary policy-related corporate sector holdings and investment portfolio. In fact, in July 2022, the ECB published several concrete measures to incorporate C&N risks into monetary policy instruments (corporate asset purchases, collateral framework). Collaboration among staff and working groups at the ECB and national central banks is instrumental in, e.g., integrating climate considerations into the Eurosystem's tilting strategy for asset purchases. This collaborative approach contributes to shaping views and consensus within the Eurosystem.

Deutsche Bundesbank The central bank and BaFin share the supervisory responsibility in **Germany** and work together to ensure that the national financial system is resilient when it comes to C&N risks. To enhance the coordination and direction of climate change and climate policy-related work within the Deutsche Bundesbank, the executive board established the Green Finance Steering Committee in early 2021. This committee oversees and guides the work programme on climate change and related risks, providing strategic direction for the entire organisation. Working groups within the committee, comprising staff members from different units, handle specific climate-related projects and report to executive board members during committee meetings. The central bank has integrated sustainability criteria into the management of its euro portfolio by creating a sustainable investment plan that emphasises climate change and the shift to a low carbon economy.

Banco de Portugal The central bank has established a sub-committee for sustainability and sustainable finance (SCS), which is managed by an inter-departmental forum responsible for overseeing and ensuring the coherence of the bank's climate and sustainability efforts. While individual departments hold responsibility for specific initiatives and their implementation, the SCS adds a top-down layer to the governance structure. It regularly reports to the board of directors on the bank's sustainability initiatives and progress made. This mixed approach combines bottom-up implementation with overarching guidance from the SCS, strengthening the central bank's commitment to sustainability.

De Nederlandsche Bank The governing board of the central bank has established corporate social responsibility (CSR) goals according to the "Visie 2019-2025" on a yearly basis, including C&N risks. These risks are subsequently reflected in the plans of the individual divisions and updated as part of its CSR strategy. The board also follows a CSR decision rule, which states that every action's potential influence on the CSR priorities must be considered during the deliberation process. For better assessment and management of climate risks, the central bank collaborates with numerous stakeholders in the financial sector. For instance, in 2016 it launched the Platform for Sustainable Finance, to promote information sharing on sustainability-related topics like climate risks, carbon accounting, and carbon pricing. This consultative council includes representatives from the financial industry, supervisors, and government ministries.



Guiding notes and potential next steps

Defining supervisors' and central banks' objectives, their tolerance for risk, setting internal controls, as well as allocating roles and responsibilities and establishing adequate reporting lines, are crucial aspects of internal governance. Siloed approaches without horizontal (e.g., across departments and institutions) and vertical (e.g., from strategic to operational) integration may constrain the implementation of "low hanging fruits", such as communication flow, ease of coordination, and early actions. The establishment of a respective centre or unit in the form of an inter-departmental forum which is responsible for overseeing, connecting, and ensuring the coherence of the central bank's C&N risk efforts may be copied as blueprint from existing structures. The Climate Change Centre (CCC) at the ECB is a well-known example. Internal governance structures are crucial in the identification, and management of C&N related risks. This includes governance of monetary policy, asset management, and internal operations.

To improve capacities for an adequate assessment of C&N risks within supervisory agencies and central banks, adjustments to the governance structure may be a valid approach. Supervisors and central banks may start disclosing their governance structures regarding specific areas and functions encompassing C&N risks and opportunities to demonstrate efforts and act as role models for other financial institutions (see section 1.3) . The table below provides an overview for ensuring that C&N risks and opportunities are integrated across the central bank's core policy and operational frameworks.

¹⁸ FSB, 2022, Supervisory and Regulatory Approaches to Climate-related Risks - Final report, <https://www.fsb.org/wp-content/uploads/P131022-1.pdf>

Table 4: Plan for adoption of C&N risks and opportunities in governance structure and capacities

Objectives	Governance structure			Internal capacities		
Category	Strategic objectives	Board composition	Data provision	HR / Capacity building	Coordination	Monitoring
Assessment (short term)	<ul style="list-style-type: none">▪ Identify and delineate the board's role in the design, implementation, and oversight of high-level C&N-related objectives.	<ul style="list-style-type: none">▪ Evaluate board's governance structure and the division of responsibility for C&N-related issues.	<ul style="list-style-type: none">▪ Assess the level of agility in internal IT systems, MIS and/or national statistics departments to provide granular data on board's C&N risk appetite, limits, and profile.	<ul style="list-style-type: none">▪ Identify and appoint persons with adequate expertise for overseeing and updating policy frameworks.	<ul style="list-style-type: none">▪ Plan the creation of an integrative frontline desk for C&N-related issues to improve coordination across the institution.	<ul style="list-style-type: none">▪ Introduce low-hanging entry points in the policy framework to improve risk governance.
Development (medium term)	<ul style="list-style-type: none">▪ Adopt a high-level approach for integrating C&N risks and opportunities under existing mandates.	<ul style="list-style-type: none">▪ Increase the frequency of board and management-level discussions on C&N risks.	<ul style="list-style-type: none">▪ Formulate institution-wide action plans based on granular C&N-related data an in line with stated objectives.	<ul style="list-style-type: none">▪ Conduct capacity building programmes to train internal staff in the use of qualitative and quant. tools for C&N risk mgmt.▪ Adjust compensation schemes / introduce incentives to encourage internal staff to focus on C&N-related topics.	<ul style="list-style-type: none">▪ Launch an integrative center for analysis of C&N-related issues with a direct reporting line to central bank's governor.▪ Actively engage in cross-country networks (e.g., NGFS) and strengthen inter-agency cooperation.	<ul style="list-style-type: none">▪ Develop internal monitoring controls (e.g., in line with TCFD) / compliance procedures to ensure policy coherence across the central bank.

Note: Time horizons are only illustrative. The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities, and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions. MIS: Management information systems. CB: Capacity building.



Further literature

- Banco De Portugal, 2022, Acting for sustainability.
- Banco De Portugal, 2022, Climate-related financial disclosures of the Banco de Portugal's financial assets.
- De Nederlandsche Bank, 2020, Annex 1: Climate-related financial disclosure.
- Deutsche Bundesbank, 2022, Climate-related disclosures.
- ECB, 2021, ECB sets up climate change centre.
- Elderson, 2022, Supervising banks' governance: Structure, behaviour and culture.
- NGFS, 2021, Guide on climate-related disclosure for central banks.
- Policy Centre For the New South, 2022, Paving the way for greener central banks: Current trends and future developments around the globe.

1.3. Own disclosure practices and transparency – Leading by example

Disclosing information is a key aspect of central banks’ communication. As it can directly shape the expectations of market participants, communication is sometimes thought of as a policy tool of its own. This can apply to both monetary and non-monetary central bank policies. Thus, by explaining or in other words: “disclosing”, clearly and transparently to the public what actions central banks take to enhance sustainability outcomes (aligned with the mandate and primary objective), the market usually aligns expectations. However, it is unclear whether C&N risks are sufficiently captured in existing credit ratings, so that central banks may need to consider additional measures to assess their own exposure to such risks. With this in mind, disclosure practices by central banks regarding C&N related risks may cover risk tolerance statements, role and functions, its strategic positioning against climate change, targets, processes, products, and its own balance sheet. Own disclosure practices on C&N risks provide several advantages. Firstly, they may encourage other market participants to follow and promote widespread transparency – “leading by example”. Secondly, it meets increasing public demand for clear information regarding C&N-related risks, including central bank balance sheets. Thirdly, it points attention towards specific areas and determines expectations about future developments.

While central banks across the globe increase the pace and have already committed to disclosing climate risk exposures, only a few central banks publish independent reports in line with e.g., the TCFD/TNFD recommendations. In any case, technical expertise must be expanded to provide C&N-related disclosures, especially when it comes to disclosing information related to the impacts of the financial sector on eco-system services (inside-out perspective). There are useful guides, such as NGFS (2021) on climate-related disclosure for central banks, which builds on the recommendations of the TCFD. Regarding nature-related risks, the NGFS also provides a set of key steps that organisations should consider when getting started. Moreover, it advises on how to address some practicalities when preparing to assess and disclose C&N risks across the TNFD’s four disclosure pillars (governance, strategy, risk and impact management, and metrics and targets), to guide policies and actions by central banks and financial supervisors.



Practical cases

ECB As financial stability risks are associated with carbon footprint and financial institutions’ risk exposure and respective exposures in central banks’ balance sheets, the ECB publishes the review of the disclosure based on the assessment of institutions’ climate-related and environmental risks disclosures. The ECB has formulated a clear and detailed 3-year roadmap (2021-2024) corresponding to the climate objectives of the ECB ¹⁹.

Deutsche Bundesbank The central bank discloses its own operations with respect to climate change through its annual climate-related disclosures. It reports on how it incorporates the financial implications of climate change and climate policy into its work, including the calculation of different GHG metrics. The disclosures are based on the recommendations of the TCFD. In addition, the Bundesbank discloses its sustainable investment strategy and the corresponding climate-related metrics for the foreign currency portion of foreign reserve assets.

Bank of England In July 2023, the central bank released a comprehensive report outlining its strategy for managing risks arising from climate change. More specifically, the document addresses the Bank’s approach and describes concrete measures taken to integrate C&N risks in its governance framework, overall strategic objectives, as well as in its risk management procedures. Particularly, metrics and targets for risk management were developed in line with TCFD guidelines.

Banco de Portugal In 2023, the central bank published for the first time an annual report on the “Banking sectors exposure to climate risk”. In this report, the central bank presents an exploratory analysis of the potential impact of the physical and transition risks of climate change on the Portuguese banking system.

De Nederlandsche Bank The central bank publishes an annual report on how climate priorities are integrated in policy decisions, including the role of governing board in assigning weights to these priorities. In addition, the “Sustainable Finance Strategy” that the central bank published in July 2021 is a living document. The ambition is that sustainability is an integral part of all central bank tasks by 2025. The strategy will facilitate and drive the strategy’s implementation in the years ahead.



Guiding notes and potential next steps

Central banks may consider adopting a progressive approach for C&N-related disclosure practices. To do so, it is necessary to strengthen and harmonise the collection and assessment of C&N-related financial data in cooperation with stakeholders by, e.g., facilitating information repository hubs to enable organisations to gather granular and comparable firm-level data. This can be realised via developing and disclosing transition paths and by recognising, for instance, that data and methodologies are currently not completely available or in use and must improve gradually over time. Given that disclosing information about C&N risk may act as a (non-)monetary policy tool by itself, as it influences supervised entities’ expectations about future developments, existing reporting gaps should not be left unaddressed. To better integrate C&N risks in a holistic manner in existing disclosure practices, central banks should consider following the disclosure recommendations highlighted in the table below. For further guides on disclosure practices by central banks, see references.

¹⁹ The roadmap includes measures, including but not limited to integrate climate risks into the ECB’s multi-country models and assessing their impact on potential growth, conducting scenario analyses regarding transition policies, modelling implications of climate change for the transmission of monetary policy, developing indicators on green financial instruments, and constructing indicators on exposures of financial institutions to climate-related physical risks through their portfolios.

Table 5: Illustrative plan for the integration of C&N risks in central banks’ disclosure practices

Time frame		Short term	Medium term	Long term
Area	Description	Focus on assessment	Focus on development	Focus on monitoring
Governance structure and procedures	Board’s risk tolerance, oversight, management role, and functions. Governance structures for monetary policy, asset management, financial stability, and internal operations encompassing C&N risks and opportunities.	<ul style="list-style-type: none">▪ Assess current status on C&N risk disclosure and identify challenges and opportunities for further improvement in C&N-related disclosure practices.	<ul style="list-style-type: none">▪ Develop technical expertise and expand institutional capacities to address institution-wide C&N-disclosure gaps.▪ Particularly, enhance disclosure on the impacts of the financial sector on ecosystem services (inside-out perspective).	<ul style="list-style-type: none">▪ Fully integrate C&N risks in disclosure practices in operational and governance frameworks.
	Strategies for identifying and assessing the inward and outward impacts of C&N risks, including the description of material risks. In addition, any adaptation of functions and operational frameworks shall be disclosed.	<ul style="list-style-type: none">▪ Enhance transparency by embedding a holistic approach to measuring and reporting on C&N risks into the overall disclosure strategy.▪ Ensure strategy alignment with short and medium-term objectives.	<ul style="list-style-type: none">▪ Identify information data points and metrics to be aligned with disclosure guidelines and standards, such as ISSB S1, S2 to increase interoperability and consistency.	<ul style="list-style-type: none">▪ Monitor progress towards the achievement of pre-specified targets, overall strategy effectiveness, and report accordingly.
Risk management	Products, processes, and portfolio allocations relevant for the identification, assessment, and management of C&N risks.	<ul style="list-style-type: none">▪ Adopt science-based metrics, such as those provided by the TCFD/TNFD frameworks to measure financed emissions and exposure levels to C&N risks.	<ul style="list-style-type: none">▪ Assess backward and forward-looking information regarding C&N-related exposures associated with credit facilities and investment portfolios.▪ Report on the identified exposure levels in alignment with TCFD/TNFD disclosure standards.	<ul style="list-style-type: none">▪ Actively engage with stakeholders by, e.g., facilitating information repository hubs to enable organizations to gather granular and comparable firm-level data.

Note: Time horizons are only illustrative. The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities, and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions. Largely depends on national circumstances. Building on NGFS and TCFD/TNFD reports. For detailed guidelines see e.g., NGFS (2021).



Further literature

- Bennani et al., 2020, Does central bank communication signal future monetary policy in a (post)-crisis era? The case of the ECB.
- ECB, 2023, The importance of being transparent: A review of climate-related and environmental risks disclosure practices and trends.
- FSB, 2023, Progress on climate-related disclosures.
- NGFS, 2021, Guide on climate-related disclosure for central banks.
- NGFS, 2023, Nature-related financial risks: A conceptual framework to guide action by central banks and supervisors.
- TCFD, 2017, Recommendations of the task force on climate-related financial disclosures.
- TNFD, 2023, The TNFD nature-related risk and opportunity management and disclosure framework.

1.4. Research

Although concrete actions in financial regulation and (non-) monetary policy to mitigate C&N risks are rare or still at an exploratory stage, central banks and supervisors increasingly recognise the need for research and advocacy on the use, development, and implications of regulatory and central banking policy instruments (e.g., micro- and macroprudential tools, modelling frameworks for climate stress testing, economic forecasting and scenario analysis, climate performance indicators for asset valuation, etc.) to reduce exposure to C&N risks. Key research fields are): Green bubbles, double materiality, interaction between policies, compound risks, banking governance, and small and medium-sized enterprise (SME) banking. A further point of interest is the widespread development of research workshops and conferences. Providing a platform for experts from various fields to share their research and insights on climate change helps in further spreading awareness and understanding of the issue among policymakers, researchers, and the public. In addition, findings and discussions from these workshops and conferences can inform and influence the formulation of monetary and fiscal policies.



Practical cases

ECB The central bank has been intensifying its quantitative work to better understand C&N-related risks to financial stability, such as aspirations to estimate Financial System Exposures to Climate-Related Risks, including concentrated bank exposures to physical and transition risk drivers, a prevalence of exposures among more vulnerable banks and in specific regions, the risk-mitigating potential for interactions across financial institutions, and strong intertemporal dependency of transition and physical risks. The ECB also organises research workshops and conferences on various topics, including climate change. These events foster dialogue with researchers worldwide and strengthen the foundation for future ECB decisions. For instance, the:

- ECB workshop on fiscal policy and climate change (2022): One-day workshop discusses how fiscal policy can effectively mitigate climate change, examines how climate change is impacting public finances, and investigates the role of interactions between monetary and fiscal policies in this context,
- Emerging Markets Group ECB workshop on the open economy and climate change (2023): This workshop, discusses the major risks that climate change poses to natural, human, and economic systems; and

■ International Energy Agency – ECB – European Investment Bank (IEA-ECB-EIB) Conference on Ensuring an Orderly Energy Transition: This conference focused on ensuring an orderly energy transition.

Banque de France Researchers at the central bank have further developed the concept of double materiality by identifying three different applications of this accounting practice in the financial system²⁰. This research distinguished between an idiosyncratic risk perspective, which considers the environmental impact of financial institutions’ balance sheets, and a systemic risk perspective, which proposes that C&N risks that FIs contribute to may not necessarily be borne by themselves but build up systemic physical and transition related risk.



Guiding notes and potential next steps

Central banks may address the identified research gaps to increase the body of knowledge on climate and nature-related prudential regulation tools. A non-exhaustive list of key research areas, as described below, covers double materiality, the interplay between transition finance and green monetary policy, and the importance of peer-learning and exchange programmes between central banks and financial institutions. The impact dimension of the double materiality approach is crucial to the design of appropriate and effective climate policies, as well as to increase the political and societal support needed for the transition. For example, acknowledging the endogeneity of biodiversity loss and climate risks helps to account for C&N risks in a holistic approach via systemic thinking. As Le Quang et al. (2022) pointed out, if “finance is not redirecting financial flows to an ecological reconversion, they are participating in global warming and in so doing amplify the associated risks.”²¹ Hence, the importance of analysing this dynamic interaction is fundamental with more research needed. Regarding the interplay between transition finance and green monetary policy, research efforts may focus on evaluating the extent to which monetary policy tools that target greater financing for green activities affect hard-to-abate sectors and the achievement of a just transition. After having identified research gaps, authorities should focus on establishing a clear research agenda to tackle pre-defined policy challenges. Future research shall not be solely conducted financial regulators research departments. Cooperation with academia at large can build on research groups findings and maximising impact of limited R&D resources. The table below illustrates the steps required to ensure the implementation of a successful research agenda and policy response.

Table 6: Illustrative plan for the creation and implementation of a climate change-focused research agenda

Time frame	Short term	Medium term	Long term
Objectives	Focus on assessment	Focus on research	Focus on implementation
Gap analysis, identification of challenges, and implementation of actionable policy recommendations.	▪ Conduct a country-wide gap analysis on sustainable finance research and commit to creating a top-level research agenda.	▪ Define the challenges to be addressed, the target public, and the associated objectives. ▪ Formulate research questions in line with stated objectives and gap analysis results.	▪ Provide R&D funding for academia for policy evaluation. ▪ Develop actionable policy recommendations based on the research output. ▪ Promote dialogue by presenting the research output and associated policy recs. in different platforms (e.g., working groups, intl. forums) to raise awareness and drive efficient climate policies at the supervisory level.
Reinforced stakeholder involvement	▪ Assess potential stakeholders, including further government agencies, academia, and international organizations for their participation in the research process.	▪ Clearly delineate roles and responsibilities and among stakeholders involved in research activities, with a special focus on academia and established research groups. ▪ Ensure strategic objectives, research questions, and interests are agreed upon by the different stakeholders.	▪ At this stage, stakeholder feedback will ensure the alignment of policy recommendations with domestic needs and the formulation of efficient policy recommendations to tackle pre-defined challenges.

Note: Time horizons are only illustrative. The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities, and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions.



Further literature

- Battiston et al., 2021, Climate risks and financial stability.
- Bei et al., 2022, Financial support for biodiversity conservation research report.
- Chenet et al., 2021, Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy.
- Chenet et al., 2021, Quantifying financial impacts of biodiversity loss? Conceptual and theoretical frameworks, limits, and implications.
- Chenet et al., 2022, Developing a precautionary approach to financial policy – from climate to biodiversity.
- D’Orazio, 2021, Towards a post-pandemic policy framework to manage climate-related financial risks and resilience.
- Hidalgo-Oñate et al., 2023, Climate-related prudential regulation tools in the context of sustainable and responsible investment: A systematic review.
- ECB, 2021, Financial stability review.
- ECB, 2021, Occasional paper series: Climate change and monetary policy in the euro area.
- Gourdel et al., 2021, Assessing the double materiality of climate risks in the EU economy and banking sector.
- IPCC, 2022, Climate Change 2022: Mitigation of Climate Change, WG3 AR6, Chapter 15.
- Kedward et al., 2022, Biodiversity loss and climate change interactions: Financial stability implications for central banks and financial supervisors.
- Le Quang et al., 2022, Better safe than sorry: Macroprudential policy, Covid 19 and climate change.
- Svartzmanet et al., 2021, A “silent spring” for the financial system? Exploring biodiversity-related financial risks in france.

20 Boissinot et al., 2022, Aligning financial and monetary policies with the concept of double materiality: Rationales, proposals and challenges, <https://www.inspiregreenfinance.org/wp-content/uploads/2022/06/Boissinot-et-al-2022-Aligning-financial-and-monetary-policies-with-the-concept-of-double-materiality-rationales-proposals-and-challenges.pdf>

21 Le Quang et al., 2022, Better safe than sorry: Macroprudential policy, Covid 19 and climate change, <https://doi.org/10.1016/j.inteco.2021.07.002>

2. PRUDENTIAL REGULATION

There are regulatory challenges in estimating and capturing C&N risks in existing capital regimes, and in identifying research gaps. As a result, existing micro- and macroprudential rules do not adequately address the complexities of C&N risks, leaving gaps in capturing and managing them. This is further aggravated by reliability issues in self-reported environmental impact data, and the absence of forward-looking information about firms' plans to transition to a Paris-aligned economy, which constrains the provision of consistent, comparable, granular, and reliable data for assessing C&N risks.

To address these shortcomings, financial regulators may use the available options to modify micro- and macroprudential instruments (Section 2.1, Section 2.2, Section 2.3) under e.g., the Basel III Pillars, including adjusting risk weights, concentration limits, supervisory review processes, disclosure obligations, and introducing mandatory transition planning requirements. In turn, central banks should take action to categorise and assess C&N risks, integrate these into macroeconomic modelling and climate stress testing (Section 2.4), and system-wide capital requirements for large exposure restrictions, and systemically important institutions processes (Section 2.5).

EUCD MC02 country stance Regarding microprudential regulation, it is crucial for supervisory authorities to assess C&N risks in a systemic way and mitigate these by introducing C&N risk management such as green differentiated capital requirements, and disclosure standards in line with e.g., internationally recognised frameworks (e.g., TCFD, TNFD). Although no green differentiated capital requirements have been implemented as of yet in any EUCD partner country, efforts on the introduction of sustainability disclosure requirements vary by jurisdiction. For instance, relevant authorities in **Australia**, **Brazil**, **Türkiye**, and **South Korea** have launched public consultations on the adoption of climate risk reporting frameworks (“starters”). Unlike this first group of “starter” countries, capital market agencies and supervisory authorities in **South Africa** (King IV, Johannesburg Stock Exchange Listings Requirements), **Colombia** (Regulation 031/2021), **Morocco** (Article 2.9 of public offerings and disclosure rulebook of the AMMC), and **Egypt** (FRA decision number 18 for year 2021) already require publicly listed companies to disclose climate information in line with TCFD standards, hence pertaining to the “leading” group of countries. Figure 2 below provides an overview of key initiatives in EUCD partner countries regarding the introduction of C&N-related disclosure standards.

Table 7: Overview of C&N-related disclosure standards in selected EUCD partner countries

EUCD partner country	Key policy measures/initiatives (non-exclusive)
Australia	Submission to public consultation of the “Australian Sustainability Reporting Standards – Disclosure of Climate-related Financial Information” (ED SR1) in 2023 by AASB.
Brazil	The BCB issued binding disclosure requirements for social, environmental, and climate-related risks through Resolutions 139 and 151 in 2021.
Colombia	Introduction by the SFC of binding disclosure standards on ESG practices based on TCFD guidelines in December 2021 (Regulation 031/21).
Egypt	In 2021, the FRA issued decrees N° 107 and 108 in 2021, requiring listed non-banking companies to submit quarterly sustainability reports in accordance with TCFD guidelines.
Morocco	In 2019, the AMMC introduced mandatory non-financial ESG reporting requirements for listed companies under Circular No. 03/19.
South Africa	King IV and Regulation 28 of the Pension Funds Act incorporate principles on climate-related risks and opportunities disclosure.
South Korea	In 2021, the FSS published the “Guidance on ESG Information Disclosure” to harmonize voluntary sustainability disclosure among non-listed companies.
Türkiye	In 2020, the CMB released the “Sustainability Principles Compliance Framework”, which sets out guiding principles for listed companies regarding ESG disclosure.

Note: Only illustrative, non-exhaustive.

Alongside microprudential regulation, a comprehensive and holistic adoption of C&N risks in macroprudential policy can safeguard the stability of the financial system by reducing the amplification effect triggered by the materialisation of losses arising from climate change. This comprises the promotion of knowledge exchange with key audiences, the development of climate stress tests and the incorporation of C&N risks into macroeconomic modelling, countercyclical capital buffers, large exposure restrictions, as well as the identification of other systemically important financial institutions and capital surcharges based on exposure levels to C&N risks. In this regard, despite having implemented climate stress tests and promoted dialogue with key audiences, EUCD partner countries have yet to adopt C&N risks across their available set of macroprudential tools and are hence classified as “starters” in this report. Figure 4 below provides an overview of climate stress tests conducted in EUCD partner countries to identify exposure levels to C&N risks.

Bilateral learning opportunity Regarding microprudential regulation, this report encourages regulatory institutions in the Euro area to consider the approach put forward by EUCD partner countries like the Commonwealth of **Australia** in future feedback rounds, whose consultation process for the development of sustainability reporting standards in 2023 gathered a wide range of public and private stakeholders. Such approach is crucial to ensure the alignment of reporting standards with national jurisdictions’ economic characteristics, while mitigating any potential transition risks that could arise in the transition to a low-emission and sustainable economy. In addition, although EUCD partner countries are classified as “starters” when it comes to the integration of C&N risks in macroprudential policy, it is important to highlight the increasing use of science-based scenarios (e.g., climate scenarios developed by the NGFS) among authorities in **Egypt** and **Morocco** in climate stress tests. The use of science-based climate scenarios is key to providing granular estimates of FMPs’ exposure to C&N-related financial risks, thereby contributing to an improvement in national policy responses and the design of effective macroprudential policy tools (such as the calibration of capital buffers, or green differentiated capital requirements) to counter climate change.

Table 8: Overview of climate stress tests conducted in selected EUCD partner countries

EUCD partner country	Key policy measures/initiatives (non-exclusive)
Australia	Climate Vulnerability Assessment (CVA) conducted in 2022 by the APRA.
Brazil	Two climate stress tests conducted by BCB in 2022 and 2023, respectively, using different sources of physical risk.
Colombia	Climate stress test on the banking sector conducted in 2021 by SFC and the World Bank to raise awareness and identify potential risk transmission channels.
Egypt	Climate stress test conducted by the CBE in 2020 based on NGFS’ reference scenarios.
Morocco	Release of Regulatory Directive n° 5/W/2021 in 2021 by Bank al-Maghrib on C&N risk management for FIs based on NGFS and TCFD guidelines.
South Africa	In 2021, the SARB piloted a sector-level physical risk scenario using historical data on drought frequency and severity.
South Korea	Development of the climate risk management model “Frontier-1.5D” to estimate losses from climate change among (non-) financial corporates.
Türkiye	Publication of a case study by the BRSA about the sector-level impact of physical risks from climate change on non-performing loans in Antalya province.

Note: Only illustrative, non-exhaustive.

2.1. C&N-related risk disclosure standards

Ultimately, to support a Paris-aligned (and eventually GBF-aligned) economy, supervised entities must provide investors, lenders, insurers, and other stakeholders with clearer insights into their C&N-related financial risks and opportunities. This can drive more informed decision making and promote a more stable and sustainable financial system. Considering the role of the financial sector in the required transformation, institutions are expected to incorporate transition and physical C&N risk management into their management frameworks – comparable to other financial risks. This, however, has an impact on their strategy, balance sheets and income statements, as emphasised by the NGFS and the Basel Committee on Banking Supervision (BCBS). To facilitate this information, regulators take different routes as outlined in the practical cases below.



Practical cases

European Union The EU action plan on sustainable finance (2018) has three main objectives (1. Reorienting capital flows towards sustainable investment, 2. Managing financial risks. and 3. Promoting transparency and long-termism) serving the European Green Deal. The latter has triggered various legislative schemes on ESG disclosures in the EU as outlined in the table below.

Table 9: Pillars of ESG disclosure obligations that support the European Green Deal

	Regulation	What?	Who?
Pillar 1	Taxonomy disclosures (Taxonomy regulation)	Defines env. sustain. activities (Paris aligned).	NFRD Corporates (>500 employees) ²²
Pillar 2	Non-financial statement (NFRD-CSRD)	Corporates ESG and diversity information.	Public interest firms (>500 employees, scope extended w/ CSRD to all large companies plus all firms listed on regulated markets (except listed MSMEs).
Pillar 3	EBA Prudential Disclosures (CRR/IFR)	ESG risks and risk mitigation actions.	Large, listed banks (CRR) and investment firms (IFR).
Pillar 4	Disclosure regulations (SFDR)	Investment products and financial advice.	Financial firms selling investment products and financial advisers.

To measure the sustainability impact of business activities financed by banks, the European Banking Authority (EBA) provides ESG disclosure guidance – the Implementing Technical Standards (ITS) on prudential disclosures on ESG risks in accordance with Article 449a of Regulation (EU) No 575/2013 (Capital Requirements Regulation – CRR).

22 Article 8 of the Taxonomy regulation requires any undertaking subject to the NFRD to disclose information on how and to what extent the undertaking’s activities are associated with economic activities that qualify as environmentally sustainable under the Taxonomy Regulation.

Deutsche Bundesbank Published the Climate-related Disclosures 2022 on non-monetary policy portfolios ²³ (NMPPs) in alignment with the TCFD guidelines on four pillars: Governance, strategy, risk management, and metrics and targets. This initiative was carried out as part of the Eurosystem-wide climate-related disclosures on NMPPs, which require all Eurosystem central banks to disclose climate-related metrics and targets for their euro-denominated NMPPs and staff pension funds.

Banco de Portugal Published first report, climate-related financial disclosures on its own financial assets and is focused on integrating climate-related risks into its mission and internal risk framework. Main metrics used are aligned with the TCFD and Partnership for Carbon Accounting Financials (PCAF), and include Weighted Average Carbon Intensity (WACI), Total Carbon Emissions, and Carbon footprint.

De Nederlandsche Bank Central bank published the Guide on Managing Climate and Environmental Risks, which provides the financial sector with focal points and good practices towards embedding C&N risks into reporting frameworks. Furthermore, it highlights key areas within a financial institution’s comprehensive control process, covering aspects from the business model and strategy to governance, risk management, and disclosure.

23 Euro-denominated non-monetary policy portfolios contain the assets held by Eurosystem central banks that are not related to monetary policy operations (ECB, 2021).



Guiding notes and potential next steps

The FSB established the TCFD, which sets out guidance for climate-related disclosures and recommendations for supervisory and regulatory approaches to climate-related risks and calls for continued progress on disclosure. It also established the TNFD in 2023 to enhance the understanding and management of nature-related financial risks among different economic actors. Most of the central banks in the euro area including the ECB have adopted annual climate disclosure publication practices in line with EBA’s Pillar 3 to enhance transparency regarding their climate actions. These disclosures align with the TCFD recommendations, incl. sections on governance, strategy, risk management, metrics, and targets.

Regarding the EBA’s Pillar III disclosure framework specifically, it serves as a key document for banks in the euro area to properly define targets, gaps and policies to manage ESG risks, understand the transitional and physical climate risks faced by their counterparties and gain a deep understanding of the EU Taxonomy eligibility of investment opportunities. The tools presented in the EBA’s Pillar 3 disclosure framework (e.g., the Green Asset Ratio and the Banking Book Taxonomy Alignment Ratio) may also prove useful for FMPs across EUCD partner countries and other jurisdictions that currently lack the appropriate measurement tools to quantify the alignment of their portfolios with internationally recognised C&N-related standards. This step may lead to a deeper understanding of FMPs’ actual exposure to C&N risks and thereby play a crucial role in preventing emission lock-ins and the potential materialisation of looming transition risks in the form of “stranded assets”. Table 8 below provides a clear description of the disclosure standards on ESG risks set out by the EBA’s Pillar 3 with concrete examples to better reflect how C&N risks can be incorporated in existing reporting frameworks.

Table 10: Summary of EBA's Pillar 3 ESG disclosure framework

Item	Disclosure elements	Examples
Climate risks (in line with the FSB's TCFD re-commendations).	<ul style="list-style-type: none">Whether the institution faces transition risks of e.g., stranded assets due to the exposures to carbon-intensive activities²⁴.Physical acute or chronic climate risks due to the exposure to sectors and geographies with extreme weather events.	<ul style="list-style-type: none">Exposure to fossil fuel companies excluded from sustainable climate benchmarks, and to carbon-related sectors.Assets subject to impact from chronic or acute climate change events by sector and geography (such as loans to property within a flood plain).
Mitigation actions	<ul style="list-style-type: none">Financed activities that address transition risks by reduce GHG emissions (incl. information on the energy efficiency of the real estate portfolio).Actions that support counterparties in the adaptation to climate change but do not meet taxonomy criteria.	<ul style="list-style-type: none">Building renovation loans that improve the energy efficiency of the building but do not meet taxonomy screening criteria.Loans to build barriers against flooding, or water management mechanisms against droughts that do not meet taxonomy screening criteria.
Green Asset Ratio (GAR)	<ul style="list-style-type: none">Information on exposure to corporates subject to the Corporate Sustainability Disclosure Directive (CSRD) and taxonomy-aligned activities within retail financing consistent with Paris Agreement goals that contribute significantly to climate change mitigation and adaptation.	<ul style="list-style-type: none">Activities contributing to climate change mitigation (e.g., generation of RE), or enabling mitigation (e.g., manufacturing of RE technologies) and adaptation (e.g., reforestation of forests and woodlands).
Banking Book Taxonomy Alignment Ratio (BTAR)	<ul style="list-style-type: none">Information on exposure to non-CSRD corporates (not assessed under CRD IV regulation) supporting activities consistent with the Paris Agreement goals.	<ul style="list-style-type: none">Activities enabling climate change mitigation and adaptation (e.g., afforestation, engineering activities for climate adaptation, etc.)
Qualitative disclosure	<ul style="list-style-type: none">Quantitative information about their ESG strategy, governance, and risk management arrangements.	<ul style="list-style-type: none">Governance arrangements, business model and strategy, risk management frameworks.

Note: Time horizons are only illustrative, non-exhaustive



Further literature

- DNB, 2023, DNB publishes supervisory approach for climate and environmental risk management.
- EBA, 2022, Implementing Technical Standards (ITS) on prudential disclosures on ESG risks in accordance with Article 449a CRR.
- ECB, 2020, Guide on climate-related and environmental risks: Supervisory expectations relating to risk management and disclosure.
- NGFS, 2021, Guide on climate-related disclosure for central banks.
- NGFS, 2023, Nature-related financial risks: A conceptual framework to guide action by central banks and supervisors.
- OECD, 2023, A supervisory framework for assessing nature-related financial risks: Identifying and navigating biodiversity risks.
- Ramos-García et al., 2022, Climate transition risk in determining credit risk: evidence from firms listed on the STOXX Europe 600 index.

24 Banks need to present a.) information about fossil fuel companies excluded from sustainable climate benchmarks and about other carbon-related sectors (identified in the same sustainable climate benchmark Regulation, b.) information on Scope 3 emissions, e.g. GHG emissions financed by the institution (incl. Scope 1, 2 and 3 of the counterparty) and on alignment of metrics with 2050 Net Zero goals. / In academia and industry, different methods are used to measure the transition risk - incl. factors such as companies' carbon efficiencies compared to their sectoral peers, the ability to pass on carbon costs to end consumers and awareness of carbon-related risks in general terms (Ramos-García et al., 2022).

2.2. C&N-related risk management standards

Significant progress has been made in the domain of financial disclosure building on extensive research and the influential recommendations of the TCFD. As a result, supervisors are increasingly setting expectations for financial institutions to disclose information on climate risks and the measures taken to address them (see sections 2.1, 2.3). In particular, the “Guide for Supervisors integrating climate-related and environmental risks into prudential supervision” published by the NGFS in May 2020 provides authorities with a roadmap on how to integrate C&N risks in supervisory frameworks. The guide sets out five recommendations based on good practice examples from member banking and insurance supervisory agencies’ expectations, with the objective to strengthen the identification, assessment, and management of C&N risks in the financial system to ensure its resiliency to climate change. The recommendations build primarily on the TCFD framework²⁵ and aim to strengthen capacity building and knowledge exchange, as well as the identification of exposure levels and material losses from climate change using granular data. In addition, these adjustments to regulatory frameworks should be complemented with and inform the design of supervisory expectations about the incorporation of C&N risk management standards by (non-) financial corporates, with the aim to increase the financial system’s resilience to climate change and natural hazards.



Practical cases

European Banking Authority Released a comprehensive report on the management and supervision of ESG risks for credit institutions and investment firms in 2021. The report combines methods on portfolio alignment, risk management (including scenario analysis) and C&N exposure assessment. More specifically, it provides uniform definitions of ESG risks, as well as appropriate qualitative and quantitative criteria to assess the impact of ESG risks on the financial stability of institutions in the short, medium, and long term. Notably, the report sets a foundation for the development of EBA Guidelines on the management of ESG risks by institutions and an update of the Supervisory Review and Evaluation Process (SREP) Guidelines to include ESG risks in the supervision of credit institutions.

German Federal Financial Supervisory Authority (BaFin) Provided non-binding guidance in 2019 in the form of its “Guidance notice on dealing with sustainability risks” applicable to German banks that are supervised at the national level (less significant institutions – LSIs). The guidance notice lists examples of ESG risks threatening the financial sector and presents good practice approaches, particularly regarding risk management and business organisation. The seventh amendment to the Minimum Requirements for Risk Management (MaRisk), published in June 2023 (Circular 05/2023 (Banking Act)) turned the non-binding guidelines from the BaFin guidance notice into mandatory rules.

Banco de Portugal Carta Circular 10 (2021) established supervisory expectations on the management of financial risks related to climate and environmental change under its direct supervision. The central bank emphasises the importance of the identification, measurement, and mitigation of C&N-related risks for institutions under its direct supervision.

De Nederlandsche Bank DNB published a supervisors’ Guide on Climate and Environmental (C&E) Risk Management subject to periodic revision. The guide incorporates feedback from both FIs and NGOs and provides the financial Sector (incl. insurers, pension funds, and investment firms) with focal points and good practice insights for managing climate and environmental risks. A survey has been conducted in 2023 to assess how well pension funds and insurers manage ESG risks based on the guide’s focal points, with the aim to inform supervisory methodologies and help identify new good practices.

25 While the TCFD recommendations allow for flexibility, financial sector regulators/supervisors (and financial sector players) should ensure that they are eventually on a transition path – e.g., on a path to compliance with international commitments (Paris Agreement, or the Global Biodiversity Framework), which in turn requires banks to work with their clients on realising transition paths, which also reduces transition risks. It relies for instance on science-based metrics that reflect the exposure to certain sectors (and associated C&N-related risks that relate e.g., to specific greenhouse-gas emission (GHG) metrics. Various organisations already set climate targets through the Science-Based Targets initiative (SBTi), e.g., Paris compliant emission reduction targets that can be compared with the actual performance of organisations (Rekker, 2022).



Guiding notes and potential next steps

Due to lack of data, in the short to medium-term, the focus may be for supervised entities on a more qualitative data level of C&N risk exposure levels to inform management practices. As risk management frameworks and data infrastructure are continuously evolving, authorities may gradually increase the use of more quantitative methods and require financial institutions to provide. To facilitate the appropriate use of C&N-related data and enable informed decision-making processes among (non-) financial corporates, improving C&N risk management practices based on internationally recognised standards is crucial.

Improving C&N risk management practices based on internationally recognised principles (e.g., Bank of International Settlement (BIS))²⁶ is crucial to facilitate the appropriate use of granular data on C&N risks, enable an informed decision-making process among (non-) financial corporates, and strengthen the resilience of the financial system to climate change. However, due to the scarcity of granular data on C&N risks, regulators may require financial institutions in the short to medium term to adapt their management frameworks based on a qualitative interpretation of C&N risk exposure levels. In the long run, with risk management frameworks and data infrastructure continuously evolving, authorities may gradually increase the use of more quantitative methods for identifying and managing C&N risks (e.g., by requiring (non-) financial corporates to integrate climate metrics in supply chain monitoring systems, internal compensation schemes, strategic outlook, and in the case of financial market participants, portfolio investments).

To improve C&N risk management practices, and thereby increase the financial system’s resilience to climate change, it is imperative to close existing information gaps on C&N risks. To achieve this, supervisors should adjust their disclosure standards to capture C&N risks along the entire value chain of (non-) financial corporate businesses. This additional data would help private sector companies better assess C&N dependencies, identify potential transmission channels, and ensure that exposure levels to C&N risks are effectively quantified. However, besides the introduction of C&N-related disclosure standards, reducing information gaps also requires (non-) financial corporates to strengthen board-level oversight, reduce tolerance to sustainability risks, and delineate new sustainability-related management functions and responsibilities across their organisations. Nevertheless, such a comprehensive approach to C&N risk management is largely missing, which paves the way for further adjustments to regulatory frameworks. To address these shortcomings and gaps, the table below provides a detailed plan for the incorporation of C&N risks into risk management frameworks at the supervisory level.

26 These principles refer to the BIS’ “Principles for the effective management and supervision of climate-related financial risks” published in June 2022.

Table 11: Plan for the incorporation of C&N risks in supervisors’ risk management frameworks

Objectives	Short term	Medium term	Long term
Risk management framework	<ul style="list-style-type: none">▪ Conduct a gap analysis on sustainable finance practices of the regulated entities. Commit at the board level to developing a binding framework for risk management.▪ Align risk management frameworks with internationally recognised standards/guidelines, incl. TCFD/TNFD and BIS.	<ul style="list-style-type: none">▪ Allocate roles, responsibilities and accountabilities at management and board levels for assessing compliance with binding rules on climate, and, if possible, on nature risk management.	<ul style="list-style-type: none">▪ Ensure the framework remains adaptable to integrate newly developed and internationally recognised science-based standards for C&N risk management. This evaluation process should be conducted periodically.
Metrics & standards	<ul style="list-style-type: none">▪ Assess the effects of adopting C&N related criteria in risk management frameworks through a preliminary testing phase.▪ Issue voluntary risk management guidelines in line with the TCFD/TNFD and BIS recommendations to facilitate their adoption in the financial sector.	<ul style="list-style-type: none">▪ Establish binding principles for C&N risk management in line with the TCFD/TNFD and BIS recommendations.▪ Set supervisory expectations in alignment with ambitious climate and nature targets and NDCs.	<ul style="list-style-type: none">▪ Develop monitoring procedures to track compliance with risk management frameworks, incl. entire supply chains.▪ Introduce strong incentive mechanisms to ensure compliance with supervisory expectations.

Note: Time horizons are only illustrative. The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities, and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions.



Further literature

- Banco De Portugal, 2021, Banco De Portugal establishes supervisory expectations on the management of climate and environmental-related risks for the less significant institutions under its direct supervision.
- EBA 2021, EBA report on management and supervision of ESG risks for credit institutions and investment firms.
- IMF, 2023, Global financial stability report.
- NGFS, 2020, Guide for supervisors: Integrating climate-related and environmental risks into prudential supervision.
- BIS, 2022, Principles for the effective management and supervision of climate-related financial risks.
- UNEP FI, 2019, Principles for responsible banking.

2.3. Formulating expectations and guidance on establishing transition plans

According to the NGFS, transition plans can provide useful information for microprudential authorities, for example as a forward-looking tool to assess whether C&N risks are being adequately addressed within the risk management frameworks of (non-) financial corporates. To better understand the level of integration of transition planning in supervisory frameworks, the NGFS recently published a stocktake of regulatory expectations with respect to transition planning rules targeting FIs. Remarkably, as highlighted by the NGFS, even though the potential of transition plans is widely recognised by policy makers, there is no single unifying definition for transition plans, which reflects the existence of different purposes and country-specific needs.

In line with the definition of transition finance provided in this report (see introductory section on Definitions and basics on climate and nature related risks), it is important to distinguish between risk-based transition plans and those geared towards the achievement of specific climate targets, such as the net-zero GHG emissions goal. In other words, a risk-based transition plan aims to serve as a guiding framework for (non-) financial corporates to manage and gradually mitigate C&N risks in an effective manner, but it does not necessarily target the achievement of specific climate goals. Specifically, a ‘risk-based’ approach relies on changing the relative price of green to high-emission assets, which may not turn out to be efficient in achieving climate targets. For example, Kedward et al. (2022) argue that a risk-based approach, as it is not linked to specific climate targets, may fail to prevent carbon lock-in dynamics²⁷. In contrast, adopting target-based transition planning, as envisioned in the CSRD directive of the EU, require (non-) financial corporates to explain in a credible manner how their transition plans will enable them to reach specific climate targets (e.g., the net-zero target of the EU, or, more broadly, the temperature goal of the Paris Agreement).



Practical cases

European Commission In the EU, companies that are subject to Article 9 of the Sustainable Finance Disclosure Regulation (SFDR), such as investment funds, can make use of transition planning to disclose detailed information about how their portfolio allocation impacts sustainability factors, and how they are integrating sustainability risks into financial decision-making processes over time. In addition to the requirements outline in the SFDR, companies based in the EU that fall within the scope of Corporate Sustainability Reporting Directive (CSRD) will need to disclose transition plans from 2025 (for the fiscal year 2024) onwards, as required by the Corporate Sustainability Due Diligence Directive (CSDDD) and the EU Banking Package released in March 2024. However, the European Commission could consider going even further by integrating it into Pillar 2 of the prudential regulation and the Supervisory Review and Evaluation Process (SREP)²⁸ to implement a “transition support” approach, which would allow supervisors to use stronger policy levers that are better tailored to transition risks.

Bank of England The BoE launched its Climate Transition Plan in July 2023, applying the format and content of the Transition Plan Taskforce (TPT) of the HM Treasury, and elaborating the approach of developing the plan. The **UK’s** microprudential authority (Prudential Regulation Authority) supports the work of the TPT but is yet considering the role of transition plans in its supervisory practices. In turn, the **UK’s** Financial Conduct Authority (FCA) already requires listed companies to disclose transition plans, by applying currently a “comply-or-explain” rule (though also currently considering mandatory publications for all large companies).



Guiding notes and potential next steps

Financial sector regulators may ensure that transition plans do not just target new green investments and divestments from brown sectors, but instead supports the transition efforts of supervised entities and their clients in gradual steps with an ideally science-based approach. In addition, it is important to consider the adoption of a multi-year approach when engaging FIs in their transition efforts. This includes acknowledging that there may be short-term increases in their financed emissions from supporting the transition of higher emissions clients towards guided climate-positive outcomes.

In turn, central banks, in collaboration with e.g., national banking associations, could provide guidance on or facilitate the process of transition planning (of banks and their clients) – and even formulate supervisory expectations on the establishment of transition plans and monitor their progress, with the objective to align supervised entities’ financial flows with transition pathways that support climate and nature-positive²⁹ goals. In this context, the IMF argues that regulators are increasingly focusing on standardising transition planning through the release of corresponding frameworks (e.g., the framework released by the **UK’s** Transition Plan Taskforce) to facilitate cross-company comparisons and enhance their credibility³⁰.

The concept of using transition plans for the purposes of financial supervision has recently gained momentum following a speech by European Central Bank (ECB) board member Frank Elderson, who pointed to transition planning as a way to overcome what Mark Carney called the ‘tragedy of the horizon’. Dikau et al. (2022) differentiate between voluntary, market-led transition plans, mandatory corporate disclosure of transition plans, and mandatory prudential transition plans.

For instance, in the absence of legislation from financial regulators (e.g. the FCA in the **UK**), requiring firms to engage in appropriate transition planning, central banks can act as role models by developing their “own” transition plans (reflecting national circumstances, essential sectors and hard-to-abate sectors, exposure to C&N-related physical risks, etc.) and thus, encourage other market players to initiate their transition planning process. For this, FMPs should outline concrete steps that they are planning to take to mitigate C&N risks and to align their business models and strategies with the objectives of international climate and biodiversity-related commitments and national targets. The table below describes an illustrative transition plan based on the internationally recognised, science-based standards developed by the TCFD.

27 Kedward et al., 2022, Aligning finance with the green transition: From a risk-based to an allocative green credit policy regime <https://www.ucl.ac.uk/bartlett/publicpurpose/wp2022-11>

28 SREP is a set of procedures carried out annually by supervisory authorities to ensure that each credit institution has appropriate strategies, processes, capital, and liquidity in place for the risks to which it is or might be exposed. The SREP includes the evaluation of the following four central elements: Business model viability; Governance and risk management; Capital adequacy; Liquidity.

29 There are three basic measurements for a nature-positive goal: Zero net loss of nature from 2020, net-positive improvement (recovery) in nature by 2030, and full recovery of nature by 2050 (WWF, 2024).

30 IMF, 2023, Activating alignment - applying the G-20 principles for sustainable finance alignment with a focus on climate change mitigation, <https://www.imf.org/external/np/g20/pdf/2023/091323-synthesis.pdf>

Table 12: Illustrative transition plan developed by supervised entities

Time frame		Short term	Medium term	Long term
Governance structure & procedures	Integration in the board's risk tolerance oversight, MGMT role, functions.	<ul style="list-style-type: none">▪ Commit at senior management and board levels to net-zero transition and nature-positive³¹ developments.▪ Commit to integrating an adequate C&N risk perspective into risk tolerance and oversight.	<ul style="list-style-type: none">▪ If not done, allocate roles, responsibilities and accountabilities at management and board levels and refine the design of policies and procedures.	<ul style="list-style-type: none">▪ Embed and monitor climate and nature KPIs into performance management systems.▪ Evaluate effectiveness of the transition plan against KPIs (applicable to the categories below as well)
Strategy & targets	Integration in the strategy, policies, businesses, and financial planning.	<ul style="list-style-type: none">▪ Choose and commit to strategic targets (i.e., scope of emissions reduction).▪ Develop data strategy for e.g., carbon accounting requirements and other impact measurement and monitoring needs.▪ Inform strategy design with peer learning and a review of best practices.	<ul style="list-style-type: none">▪ Set and validate "science-based" targets (e.g., or emissions reduction, incl. for financed emissions).▪ Integrate data needs into lending and portfolio monitoring processes.▪ Complete (limited) baseline emissions assessment.	<ul style="list-style-type: none">▪ Deploy new products.▪ Fully integrate C&N-related targets into corporate strategy, including lending and portfolio management processes.▪ Broaden measurement scope to including all asset classes.
Products, processes, and portfolio, incl. risk management	Integration in the assessment / management of financial products / processes and portfolio.	<ul style="list-style-type: none">▪ Adjust risk management to identify material climate and nature-related risks (exposure of portfolio to physical and transition risks).▪ Introduce green product and adjust processes.	<ul style="list-style-type: none">▪ Design new "green" products.▪ Begin to integrate climate risk into risk management frameworks, risk tolerance and limits etc.	<ul style="list-style-type: none">▪ Fully integration of climate risk into risk management frameworks, expected loss, pricing, capital provisioning etc.
Metrics and disclosures	Integration in line with the first three pillars above.	<ul style="list-style-type: none">▪ Identify and select relevant mandatory and voluntary disclosure standards for reporting to external stakeholders.	<ul style="list-style-type: none">▪ Report in line with TCFD framework, prepare reporting against TNFD.	<ul style="list-style-type: none">▪ Fully align with emerging reporting and disclosure standards.

Note: Time horizons are only illustrative. The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions. Structure is based on TCFD/TNFD top-level classification: Governance, Strategy, Risk Management, and Metrics and Targets. This table replaces "Risk Management" with "Products, processes, and portfolio, incl. risk management" reflecting on the need to first adjust processes and products.



Further literature

- ADB, 2018, Introduction to disaster risk financing.
- APRA, 2021, Prudential practice guide: CPG 229 climate change financial risks.
- BOE, 2023, The Bank of England's climate transition plan.
- Bundesbank, 2023, Transition plans – The next step on the path to net zero? Annual general meeting.
- Dikau et al., 2022, Net zero transition plans: A supervisory playbook for prudential authorities.
- EBA 2021, EBA report on management and supervision of ESG risks for credit institutions and investment firms.
- Equator Principles, 2023, Financial industry benchmark for determining, assessing and managing environmental and social risk in projects
- Elderson, 2021, Overcoming the tragedy of the horizon: requiring banks to translate 2050 targets into milestones.
- NGFS, 2023, Stock take on financial institutions' transition plans and their relevance to micro-prudential authorities.
- PRA, 2019, Supervisory statement SS3/19 - Enhancing banks' and insurers' approaches to managing the financial risks from climate change.
- WWF, 2024, Nature-positive by 2030: a mission statement for nature.

31 A nature-positive development is a contribution towards halting and reversing the loss of nature or ensuring the recovery of the health, abundance, diversity and resilience of species, populations and ecosystems (WWF, 2024).

2.4. Incorporation of C&N risks in macroeconomic models / stress testing

FIs hold assets that are often more exposed to climate risks than they realise. As explained in the introductory section under “Financial risk transmission channels”, C&N risks may potentially amplify to the extent of posing severe systemic threats to the stability of the entire financial system. At the same time, financial regulators and supervisors must be aware that policies which mitigate climate change may impact the fossil fuel sector and can cause stranded assets. In this regard, climate and nature-related sensitivity tests (short: stress tests) provide a policy tool for analysing C&N risks that threaten the economy and the financial system. Regarding available methodologies for C&N risk stress testing, it is important to distinguish between micro founded and macroeconomic approaches. While both stress testing methodologies, macroeconomic climate stress tests focus on providing system-wide vulnerability assessments to C&N risks, microprudential stress tests rely on entity-specific rather than system-wide data to quantify exposure levels to such risks. However, as the increasing interconnection between FMPs is hardly captured in entity-specific performance variables, some studies argue that relying solely on microprudential stress tests to calibrate buffer requirements may lead to an overestimation of banks’ resilience to C&N risks³². Therefore, this report encourages regulators and central banks to conduct C&N risk stress tests by following a dual approach, whereby both micro and macroeconomic data complement each other to ensure a granular assessment of C&N risk exposure levels.



Practical cases

ECB The ECB conducted a climate risk stress test in 2022 as part of its Supervisory Review and Evaluation Process (SREP) and Climate Action Plan. The stress test was carried out amongst systemically relevant institutions and aimed at assessing their level of exposure to climate risks and preparedness for adequate managing these specific risk sources. It analysed the resilience of firms, households, and banks to three transition scenarios developed by the NGFS, which differed in terms of timing and ambition. Subsequently, based on the findings from the stress test, the ECB published a report in December 2022 outlining good practices for conducting climate stress tests. Overall, the report highlights the fact that there is a high level of inconsistency across banks’ practices, and that several areas of climate stress testing require improvement.

Deutsche Bundesbank Performed climate stress tests on the German financial system in 2021. The central bank has been bolstering its capabilities for climate-related activities (e.g., stress testing) through the adoption of new strategies and units like a dedicated new central sustainability unit, the Green Finance Steering Committee, which will report directly to the executive board³³. Additionally, the Bundesbank, among other central banks, is applying the NGFS scenarios as part of its economic models and analyses.

Banco de Portugal The central bank has started to conduct climate stress testing to assess the resilience of financial institutions to climate-related risks. A measure called CRISK, systemic climate risk, was introduced, which is the expected capital shortfall of a financial institution in a climate stress scenario. This measure was used to study the climate-related risk exposure of large global banks during the collapse of fossil-fuel prices in 2020.

De Nederlandsche Bank The central bank carried out an energy transition risk³⁴ stress test for the **Netherlands’** financial system, utilising various climate scenarios to gauge the potential impacts of climate change. The stress test was conducted internally by a team of experts from the central bank, who were responsible for both its execution and the development of its methodology. However, in order to test the scenario assumptions, the central bank sought support from external experts. The central bank’s climate risk analysis is mainly led by two departments: The Financial Stability Department, which assesses risks that includes climate risks to the Dutch financial system, and The Sustainable Finance Department, which focuses on the central bank’s efforts in sustainable finance. Both departments house a dedicated team of climate risk experts responsible for formulating and implementing the central bank’s approach to climate risk analysis.



Guiding notes and potential next steps

The assessment typically comprises an integrative analysis of physical and transition risks across a range of climate-related scenarios. In terms of physical risks, the institution may evaluate how extreme weather events can affect the productivity and default probability of assets within banks’ portfolios. Regarding transition risks, FIs may assess the impact of carbon taxes on customers’ cash flows and creditworthiness. To evaluate the impact of physical risks, the NGFS Guidance recommends following the steps shown in the table below:

Table 13: Description of typical stages in climate stress testing

Objectives	Assessment	Implementation	Interpretation
Ensure a granular and holistic approach to climate stress testing.	<ul style="list-style-type: none">Define needs and objectives,Identify available data sources (e.g., historical data or forecasts)Establish the scope and approach of the climate stress test.	<ul style="list-style-type: none">Incorporate short and long-term environmental scenarios into the analysis, alongside identified risks in a qualitative and quantitative way.Deliver impact estimations based on the developed scenarios.	<ul style="list-style-type: none">Present and interpret the magnitude and trends shown in the impact estimates.Consider reflecting the results of scenario analysis and stress testing when revising nature risk management policies and practices.

Note: The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions. Mathias can you add reference. Described stages are drawn from NGFS, September 2022: NGFS Scenarios for central banks and supervisors

Specifically, concerning nature-related risks more granular data is needed to better understand the impacts and dependencies and assess the vulnerabilities of supervised institutions. Data gaps can be addressed through various policy measures, including the use of forward-looking scenario analysis tailored to domestic contexts, sectoral approaches, the introduction of corporate disclosure requirements on nature-related risks based on the TNFD recommendations, as well as the development of common definitions by referring to the NGFS’ conceptual framework. Once nature-related granular data become available, scenario analysis and stress testing should allow the assessment of the impact of material nature risks on institutions’ risk profile and business strategies and explore their resilience to financial losses under a range of outcomes.



Further literature

- Banco De Portugal, 2023, Annual report on the banking sector’s exposure to climate risk.
- De Nederlandsche Bank, 2018, An energy transition risk stress test for the financial system of the Netherlands.
- Deutsche Bundesbank, 2023, Climate-related disclosures.
- Federal Reserve Bank of New York, 2023, Climate stress testing.
- Fiedler et al., 2021, Business risk and the emergence of climate analytics.
- NGFS, 2020, Guide to climate scenario analysis for central banks and supervisors.
- OECD, 2023, A supervisory framework for assessing nature-related financial risks: Identifying and navigating biodiversity risks.

32 Bank of England, 2023, Macroprudential stress test models: a survey, Staff working paper No. 1,037, ISSN 1749-9135

33 Deutsche Bundesbank, 2023, Climate-related disclosures by the Deutsche Bundesbank 2023, <https://www.bundesbank.de/resource/blob/906622/96d5120f93da926fb175fe937b9f775b/mL/2023-klimabericht-data.pdf>

34 Energy transition risks refer to business model disruptions posed by policy measures such as sudden and high increases in carbon taxes, or through the introduction of more stringent as GHG emission caps to align the economy with a net-zero GHG emissions target (DNB, 2018).

2.5. Countercyclical capital buffers, large exposure restrictions, and the identification of systemically or other important financial institutions

Macroprudential policy tools, such as system-wide capital requirements, large exposure restrictions (LERs), and key indicators for identifying systemically important institutions, all of which aim at preventing the amplification of systemic risks and protecting financial stability have been widely adopted since the Great Financial Crisis (GFC). Nevertheless, even though C&N risks can derive into systemic disruptions and destabilise the financial system, central banks thus far have taken a cautious approach towards the incorporation of C&N related financial risks into their macroprudential frameworks. For example, despite the substantial transmission potential of material losses arising from C&N-related financial risks, to which global systemically important institutions (G-SIIs) and other systemically important institutions (O-SIIs) may be disproportionately exposed, existing assessment frameworks for the identification of (other) systemically important FIs and related capital surcharges across the world have not considered this accordingly.



Practical cases

ECB and CCyBs Countercyclical Capital Buffers (CCyBs) are capital requirements used for countering procyclicality in the financial system. They were first introduced after the Basel III agreement to enhance the financial system’s resilience and mitigate potential systemic risks during periods of credit expansion. Currently, CCyB rates are set by the national banks in the euro area based on their national regulatory frameworks. Such frameworks are primarily based on the Basel III regulatory standards (Basel guide), which emphasise the deviation of the credit-to-GDP ratio from its estimated long-term trend, known as the credit-to-GDP gap or Basel gap as a basis for setting the CCyB rates. Under the Single Supervisory Mechanism (SSM) regulation, the ECB’s role in this context is to assess the appropriateness of the CCyB rate decisions notified by the national authorities and setting higher CCyB rates if required, thereby contributing to an efficient banking union with a consistent approach to cyclical systemic risk. However, despite the capability of CCyBs to stem the amplification of systemic risks, considerations to incorporate C&N risks into the calculation of CCyB rates are still being discussed.

LERs in Germany The Bundesbank monitors compliance with large exposure limits as well as the risk spread of an institution’s large exposures. Large exposures are loans to one borrower or a group of connected clients, which achieve or exceed 10% of Tier 1 capital. These provide banking supervisors with valuable information on the concentration of risk within an institution. European banks are subject to the EBAs’ regulations on large exposures.

ECB and Systemically Important Financial Institutions (SIFIs) In the EU, G-SIIs and O-SIIs face additional requirements concerning the amount of Common Equity Tier 1 (CET 1) capital they must hold as a buffer. Specifically, supplementary capital buffers for O-SIIs are also determined by the corresponding relevant authorities in each of the EU member states on a yearly basis, being the maximum amount of CET 1 capital held as a 3% buffer of the institution’s total risk exposure.



Guiding notes and potential next steps

To counter the amplification of systemic risks and material losses caused by climate change, central banks may consider the implementation of differentiated green capital requirements in their prudential frameworks. This includes, for instance, adding a capital surcharge on the CCyB rate of FIs exposed to jurisdictions with unambitious climate targets and strategies, as well as expanding the set of indicators used for the identification of O-SIIs in national frameworks to capture exposure levels to C&N risks. The table below provides a detailed description of the required steps and timeline for integrating C&N criteria in macroprudential frameworks.

Table 14: Plan for the incorporation of C&N risks into macroprudential policy instruments

Objectives	Short term	Medium term	Long term
Countercyclical capital buffer (CCyB) rates	▪ Adopt C&N criteria as a strategic objective at the board level.	▪ Develop instrument-specific metrics and indicators in line with TCFD/TNFD guidelines to reflect climate risk exposure levels in CCyBs and large exposure restrictions.	▪ Apply C&N criteria and related metrics to macro prudential policy instruments (CCyBs, LER).
Large exposure restrictions (LER)	▪ Explicitly adjust macroprudential objectives to include C&N criteria in the assessment of FIs’ risk exposure.	▪ Conduct targeted capacity building programmes to ensure FIs can adjust their business operations and continue accessing credit according to the new regulation without creating substantial transition risks.	
Identification of Other Systemically Important Institutions (O-SIIs)	▪ Commit at the board level to including C&N related metrics in the framework used for identifying O-SIIs.	▪ Establish science-based metrics and indicators for the identification of O-SIIs in line with TCFD/TNFD guidelines to capture exposure levels to C&N risks. ▪ Apply capital surcharges based on FIs’ country-specific exposure levels and related sovereign climate commitments and transition pathways.	▪ Fully integrate C&N risks in the eligibility criteria for O-SIIs in national macro-prudential frameworks.

Note: Time horizons are only illustrative. The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions.



Further literature

- BaFin, 2023, Countercyclical capital buffer.
- Banco De Portugal, 2023, Countercyclical capital buffer.
- Bank of England, 2023, The financial policy committee's approach to setting the countercyclical capital buffer.
- BIS, 2021, Global systemically important banks.
- DNB, 2023, DNB adjusts O-SII buffers.
- ECB, 2023, Shelter from the storm: Recent countercyclical capital buffer (CCyB) decisions.
- Miller et al., 2022, Preventing a climate minsky moment: Environmental risks and prudential exposure thresholds, designing a transition-aligned large exposure threshold framework.
- Moody’s Analytics, 2022, PRA updates address depositor protection and systemic risk buffers.

3. MONETARY AND NON-MONETARY POLICY OPERATIONS

Central banks cannot only set a positive example for other FIs, but can also mitigate their own exposure to reputational risks while making an active contribution to the transition to a sustainable and low-GHG economy by incorporating C&N risks into their monetary and non-monetary policy frameworks. This section presents examples of good practice and guidance on the incorporation of C&N-related financial risks into monetary policy instruments (Section 3.1.), such as asset purchases, foreign exchange market interventions, and collateral frameworks, as well as on non-monetary policy operations (Section 3.2), which include own portfolio investments and the allocation of staff pension funds.

EUCD MC02 country stance Across EUCD partner countries, concrete policy measures to incorporate C&N risks in monetary and non-monetary policy operations are either missing or remain largely unaddressed. Only the Bank of Korea has officially announced the application of negative screening criteria (based on the MSCI ESG index) for foreign asset purchases under its non-monetary policy portfolio and is classified as “starter”, while further EUCD partner countries show no sign of action. The figure below provides an overview of key initiatives undertaken by EUCD partner countries regarding the integration of C&N risks in (non-) monetary policy.

Table 15: Overview of key initiatives regarding C&N risk integration in non-monetary policy in selected EUCD partner countries

EUCD partner country	Key policy measures/initiatives (non-exclusive)
Australia	Despite no concrete action, the RBA recognizes that climate change and policy responses will have “wide-ranging” implications for price stability.
Brazil	The BCB included sustainability criteria in the evaluation of counterparties for the management of international reserves.
Colombia	The central bank published in July 2022 a study on the impact of climate change on inflation rates based on NGFS’ modelling framework.
Egypt	No sign of action.
Morocco	No sign of action.
South Africa	No sign of action.
South Korea	Application from 2024 onwards of negative screening criteria based on the MSCI ESG screened indexes for BOK’s own funds portfolio.
Türkiye	Despite no sign of concrete action, TCMB has expressed its commitment to supporting green finance practices.

Note: Only illustrative, non-exhaustive.

Bilateral learning opportunity The precautionary risk-based approach taken by EUCD partner countries regarding the integration of C&N risks in (non-) monetary policy decisions can prove advantageous in certain jurisdictions. This is primarily because data may currently not be sufficiently granular to provide an appropriate calibration of policy instruments (e.g., climate tilting strategies for corporate bond purchases, collateral value reductions based on pre-established climate scoring methodologies) that ensures the proper identification of C&N-related financial risks. To increase the availability of granular data and start integrating C&N risks in (non-) monetary policy frameworks, it may be necessary for central banks with explicit sustainability mandates in the euro area to ensure (non-) financial corporates and authorities have the right internal governance and technical capacities to quantify C&N risks (see section 1.2) and to improve C&N-related disclosure practices (see section 2). Namely, without an effective provision of granular data, euro area countries should instead follow a risk-based approach as it is the case in certain EUCD partner countries.

3.1. Monetary policy operations

While central banks with explicit sustainability mandates may be able to implement the recommendations provided in this section, it is important to note that central banks with no explicit mandate on sustainability-related issues may consider other measures to enable a systemic change of the economy. Such measures could include improving their own C&N risk disclosure frameworks (see section 1.3), aligning non-monetary policy portfolios with ambitious climate targets (see section 3.2), or adopting credible transition plans (see section 2.3). First, in terms of quantitative easing, while it remains particularly difficult to incorporate C&N related risks into sovereign and public bond holdings due to legal restrictions and scarce availability of green instruments issued by federal and local authorities, central banks can actively decarbonise their corporate bond holdings and reduce reputational risks by adopting a flow-based tilting strategy. However, such an approach might prove insufficient in reaching established climate targets due to recent periods of inflationary pressure and the resulting contractionary monetary policy measures.

Secondly, regarding foreign reserve management, green bonds offer reasonable safety and return properties, but they frequently fail to meet liquidity requirements, which substantially restricts their incorporation into foreign reserve holdings held by central banks.

Thirdly, the integration of environmental criteria and nature-related risks remains largely unaddressed in ongoing restructurings of collateral frameworks. However, such adjustments, when conducted in alignment with science-based and robust climate indicators are crucial for preventing high-emitting firms from accessing credit provided by central banks unconditionally. Furthermore, as stated by the ECB, favoring the supply of credit to firms with better climate performance may also encourage firms across different sectors to improve their climate disclosure practices and reduce GHG emission levels.

Lastly, it is important to note that beyond their direct balance sheet implications, C&N risks may also affect central banks’ output projections and inflation targets. In fact, as highlighted by Chavleishvili and Moench (2024)³⁵, natural disasters have a persistent impact on the conditional mean, conditional volatility and skewness of macroeconomic aggregates such as inflation and economic growth. Given that both inflation and growth projections are crucial elements of monetary policy calibration, it is vital for central banks to integrate C&N related risks in a holistic manner in the macroeconomic models used for estimating macroeconomic phenomena. The practical cases listed below provide a non-exhaustive selection of efforts to incorporate C&N risks across monetary policy operations, including modelling frameworks used for calibration purposes.

35 Chavleishvili, et al., 2024, Natural disasters as macroeconomic tail risks, <http://dx.doi.org/10.2139/ssrn.4657195>

36 Approach to promote environmental sustainability by purchasing green bonds or other environmentally friendly financial assets. This approach aims to support the transition to a low-carbon economy and address climate change by directly financing projects and companies that have a positive environmental impact.



Practical cases

ECB As part of its comprehensive Climate Action Plan announced in July 2021, the ECB began implementing a flow-based tilting approach in October 2022 for all its reinvestments in corporate bonds. This policy aims at increasing the bank’s share of bonds issued by entities with high climate performance (e.g., low GHG emission intensity) relative to those with a lower performance in the corporate sector. According to the ECB, the climate score ranges from a minimum of 0 (lowest performance) to a maximum of 5 (highest performance) and it is assessed based on three criteria: the entity’s carbon intensity, the ambition it places on its carbon reduction targets, and the quality of its climate-related disclosures. In addition, the ECB will limit the share of assets issued by entities with a high carbon footprint that can be pledged as collateral by individual counterparties when borrowing from the Eurosystem. Secondly, members of the Eurosystem will be able to consider climate risks when applying reductions in the valuation of collateral assets pledged by corporates seeking credit. Lastly, issuers of the collateral assets will have to comply with the Corporate Sustainability Reporting Directive (CSRD), which requires companies to report according to the European Sustainability Reporting Standards (ESRS). The ECB considers these standards to be “essentially aligned” with the IFRS’ Sustainability Disclosure Standards.



Guiding notes and potential next steps

To mobilise sufficient resources to finance the transition and avoid skewing portfolio allocation towards high emitters by following a market-neutral approach to monetary policy, central banks may consider favouring low emitters over high-polluting sectors of the economy. In other words, neglecting C&N risks by upholding market-neutral asset purchases can generate an endogeneity problem, whereby a central bank inadvertently reinforces the market share of high emitters at the expense of issuers with lower GHG intensity. To revert this endogeneity problem, **central banks with broad mandates on climate change may adopt a flow-based tilting strategy to corporate asset purchases, as well as collateral framework adjustments to better reflect the true cost of emissions.** More specifically, central banks with broad mandates on climate change may consider the measures illustrated in the table below. Regarding **green quantitative easing**³⁶, central banks may expand the scope of climate indicators by adopting nature-related financial risks into the assessment frameworks of eligible assets,

including corporate, sovereign bonds, as well as asset-backed securities (ABS). In addition, it is critical to look beyond reinvestment operations and explore the incorporation of robust climate performance indicators into net asset purchases (e.g., via stock-based tilting strategies) to reduce GHG-intensity at a pace that enables the achievement of ambitious climate targets. In addition, expanding public sector purchase programmes to include Sustainability-Linked Bonds (SLBs) can offer central banks an opportunity to decarbonise their balance sheets and promote the transition to a sustainable economy without constraining public debt issued by governments and fiscal authorities with strict use-of-proceeds.

Lastly, to better reflect environmental criteria in the conduct of monetary policy, central banks could adopt nature-related risks into collateral framework adjustments, for instance based on the recently released TNFD recommendations. In addition, as climate data on specific instruments becomes available, climate-based scoring could be applied to all marketable and non-marketable assets that can be pledged as collateral, including asset-backed securities and covered bonds.

Table 16: Illustrative guiding steps for the adoption of C&N risks in monetary policy

Objectives		Short term	Medium term	Long term
Asset purchases	Corporate sector asset purchases	<ul style="list-style-type: none">▪ Acknowledge and assess the implications of C&N risks on the conduct of monetary policy and related instruments.▪ Commit at the board level to net-zero transition and integrate C&N risks in existing monetary policy mandates.	<ul style="list-style-type: none">▪ Apply stock-based tilting strategies supported by robust climate indicators (e.g., TCFD/TNFD metrics) and science-based targets.	<ul style="list-style-type: none">▪ Incorporate climate KPIs into the assessment criteria of all corporate marketable instruments.
	Public sector asset purchases	<ul style="list-style-type: none">▪ Develop capacity building programmes with government agencies to raise awareness and foster sovereign issuances of thematic/green assets in line with internationally recognised standards and targets.	<ul style="list-style-type: none">▪ Tilt public sector asset purchases toward sovereign green bonds/SLBs and provide advice on structuring and monitoring.	<ul style="list-style-type: none">▪ Fully integrate domestic and international sovereign thematic/ green bonds in existing asset purchase schemes.▪ Support the deployment of further tools to track alignment with science-based KPIs and enhance monitoring.
Collateral framework	Selection & valuation of assets pledged as collateral	<ul style="list-style-type: none">▪ Incorporate “climate scoring” and nature risk indicators into existing asset eligibility criteria. This should be done in line with the TCFD/TNFD guidelines.	<ul style="list-style-type: none">▪ Apply reductions to the face value of collateral assets issued by entities with poor climate performance, e.g., those below a certain threshold according to the “climate scoring” scheme.	<ul style="list-style-type: none">▪ Ensure the full applicability of climate scores to all assets eligible as collateral debt as more granular data on market instruments becomes available.

Note: Time horizons are only illustrative. The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions.



Further literature

- ADB, 2023, Global climate challenges, innovative finance, and green central banking.
- Cicarelli et al., 2023, The asymmetric effects of weather shocks on euro area inflation.
- Climate Policy, 2021, Greening monetary policy.
- ECB, 2023, Climate-related financial disclosures of the Eurosystem’s corporate sector holdings for monetary policy purposes.
- ECB, 2023, ECB staff opinion on the first set of European sustainability reporting standards.
- ECB, 2023, ECB takes further steps to incorporate climate change into its monetary policy operations.
- European Commission, 2023, Corporate sustainability reporting.
- Faccia et al., 2021, Feeling the heat: extreme temperature and price stability.
- Gautier et al., 2024, Decomposing the inflation response to weather-related disasters.
- Kotz et al., 2024, Global warming and heat extremes to enhance inflationary pressures.
- NGFS, 2023, Monetary policy and climate change: Key takeaways from the membership survey and areas for further analysis.
- NGFS, 2023, Nature-related financial risks: A conceptual framework to guide action by central banks and supervisors.
- Scouteris et al., 2022, Green bonds and the ECB: A tale of (measured) promise and (required) caution
- NGFS, 2024, The green transition and the macroeconomy: a monetary policy perspective.

3.2. Non-monetary policy operations

Next to monetary policy operations, a consistent risk-based approach to transition finance implies that central banks with broad or narrow mandates should assess how their own balance sheet of non-monetary policy (incl. staff pension funds, own investment portfolios) contributes to the build-up of systemic C&N risks. This assessment should be complemented with an analysis of sustainable investment strategies, such as active ownership and thematic investing, to mobilise financial resources to the green transition.

While central banks in the euro area have widely adopted sustainability criteria in **staff pension portfolios**, particularly by incorporating the UN PR), C&N related financial risks as described in this guide still play only a minor role in the allocation of staff pension funds. Regarding the management of **own funds’ portfolios**³⁷, central banks can make use of several investment strategies, including active ownership, ESG integration, screening, as well as impact and thematic investing to actively skew their balance sheets towards sustainable activities. In this context, it is crucial to clearly delineate the responsibilities of external fund managers and to set limits to the actual investment approach by incorporating science-based climate and nature indicators.



Practical cases

ECB In February 2021, a common stance was adopted at the Eurosystem level to incorporate and harmonise climate risk disclosure practices in Euro-denominated non-monetary policy portfolios by the end of 2022. For instance, in line with the NGFS’ recommendations, climate-related data for non-monetary policy portfolios will be released by banks in the Eurosystem on an annual basis using the TCFD guidelines in the category of metrics and targets. In addition, across its own investment portfolio and staff pension fund, the ECB has long applied exclusion criteria on equity securities (based on the UN Global Compact guidelines) and active ownership by using voting rights to engage with violators of standards and transform their practices.

Deutsche Bundesbank The central bank has been applying a best-in-class approach and the UN Global Compact screening criteria to exclude equity securities from the staff pension fund since 2017, and since 2023 from its foreign reserve assets portfolio.

37 Refers to the collection of financial assets and investments that the central bank holds as part of its own investment activities, separate from its monetary policy operations. This includes the Foreign Exchange Reserves (currency holdings), gold reserves, government and corporate bonds, other fixed income securities (e.g., ABS), equities, and short-term deposits (cash (equivalents)).

38 Deutsche Bundesbank, 2024, Climate-related disclosures by the Deutsche Bundesbank 2024, <https://www.bundesbank.de/resource/blob/844900/7d5fc06ce856b79af8f-c6176e4edf079/mL/2024-klimabericht-data.pdf>

39 These correspond to the metrics highlighted in the report “Recommendations of the Task Force on Nature-related Financial Disclosures” issued in September 2023 under Annex 1: TNFD’s global disclosure metrics.

In addition, for bonds issued by promotional and development banks, minimum requirements using a climate-focused sustainability score are defined. This sustainability scoring is based on three pillars: 1) green and/or brown shares of business activities; 2) ambition, e.g., regarding GHG reduction targets or the exclusion of fossil energy financing; 3) transparency and/or the quality of climate-related disclosures³⁸.

Banco de Portugal The central bank has participated in green bond investment funds managed by the BIS since 2021. Moreover, it has incorporated ESG principles into the guidelines for the management of the Bank’s own investment portfolio since 2021 and published the Responsible Investment Charter in May 2022. In addition, Banco de **Portugal’s** staff pension fund is managed by a separate body, namely Banco de **Portugal** Pension Fund Management Company, which has strictly adhered to the UN Global Compact principles of responsible investment (PRI) since 2017.

De Nederlandsche Bank The central bank has applied exclusion restrictions on equity securities and fixed income assets (based on the UN Global Compact), as well as active ownership. In addition, it has implemented an ESG integration strategy into valuation models (e.g., by providing detailed assessments of emission levels, corporate structure, policies, and past incidents). Regarding the allocation of its staff pension funds, the DNB has not yet applied sustainability criteria on equity and fixed income holdings.



Guiding notes and potential next steps

As a first step, central banks may wish to consider aligning their investment strategies for non-monetary policy operations, including staff pension funds and own portfolios with nature criteria³⁹ by drawing on the latest TNFD and TCFD recommendations. This involves setting limits to external investment managers to consider the materiality and impact of C&N related financial risks within the entire asset allocation process (selection and monitoring). Subsequently, as encouraged by the NGFS, central banks should disclose climate and nature-related information on own policy operations and financial activities to enhance transparency and accountability in the eyes of the public, thereby acting as role models for other financial institutions. A straightforward implementation guide with potential impacts is described in the table below.

Table 17: Illustrative guiding steps for the adoption of C&N risks in non-monetary policy

Objectives		Short term	Medium term	Long term
Selection / Monitoring	Own funds portfolio	▪ Commit at the board level to net-zero transition in financed emissions and integrate climate change in current portfolio management framework.	▪ Apply exclusion criteria in line with UNPRI ⁴⁰ combined with targeted divestitures to ensure that the portfolio is aligned with ambitious climate targets. ▪ Explore the integration of nature-related risks in the assessment of portfolio investments as data becomes available.	▪ Fully integrate investment strategies (e.g., active ownership, impact and thematic investing) to support the transition to a low-carbon and sustainable economy. ▪ Actively promote and develop capacity building programmes to encourage the integration of C&N risks across FIs.
	Non-monetary policy activities	▪ Commit to non-financial disclosure on portfolio investments at the board level.	▪ Integrate climate-related disclosure in reporting frameworks for non-monetary policy investments in line with TCFD/ TNFD to enhance market transparency.	▪ Fully align disclosure practices on non-monetary policy operations with science-based standards and frameworks (e.g., TCFD, TNFD, ISSB).

Note: Time horizons are only illustrative. The recommendations brought forward in this report constitute a non-exhaustive selection of key policy measures that may be further evaluated by relevant national authorities and adapted to local economic circumstances with the required discretion to avoid inconsistencies and unintended repercussions.



Further literature

- ADB, 2023, Global climate challenges, innovative finance, and green central banking.
- Banco Do Portugal, 2022, Acting for sustainability, the Banco De Portugal’s approach to ESG sustainability 2022-25.
- Banco Do Portugal. 2022, Banco De Portugal’s responsible investment charter.
- Bundesbank, 2021, Bundesbank to start climate-related disclosures for its non-monetary policy euro portfolio in mid-2022.
- ECB, 2021, Eurosystem agrees on common stance for climate change-related sustainable investments in non-monetary policy portfolios.
- NGFS, 2019, A sustainable and responsible investment guide for central banks’ portfolio management.
- NGFS, 2021, Adapting central bank operations to a hotter world; reviewing some options.
- Sociedade Gestora Dos Fundos De Pensoes Do Banco De Portugal S.A., 2022, Declaração relativa aos principais impactos negativos das decisões de investimento sobre os fatores de sustentabilidade.

40 The abbreviation UNPRI stands for “United Nations Principles for Responsible Investment”.

4. FINANCIAL REGULATION TOOLS

This section considers two key policy measures that aim at advancing the development of green financial markets: national and regional taxonomies (Section 4.1) designed in line with internationally recognised standards, and the implementation of green credit policies (Section 4.2). On the one hand, green, transition⁴¹, and sustainable finance taxonomies are classification systems that help to identify C&N risks⁴², as well as to promote green investments by outlining clear environmental standards (through defined criteria and thresholds that specific economic activities must meet to be considered sustainable), thereby enhancing financial market transparency. In addition to financial barriers, taxonomy-related tools also address technological market failures and behavioural gaps, as they entail measures to decrease the relative price of low-carbon activities with respect to high-emission investments. In this way, taxonomies can guide investors on how to align their activities with supervisory expectations, binding C&N-related disclosure requirements, and the goals of a more sustainable economy, while ensuring that businesses and industries are held accountable for their environmental impact. On the other hand, green credit policies, such as targeted refinancing lines, preferred interest rates, green credit quotas, as well as the incorporation of C&N risks into long-term lending criteria aim at helping corporates fund a wide range of sustainable and green projects (e.g., circular economy, renewable energy, waste management) as specified in the respective use of proceeds. Consequently, the introduction of financial sector regulations may act as an enabler of the transition to a sustainable and low-carbon economy by making financial flows consistent with ambitious climate targets and avoiding potential distortions, such as carbon lock-ins and greenwashing. At the same time, these regulations can pave the way for a systemic change by gradually increasing the relative price of high-emission activities with respect to taxonomy-aligned investments.

These policy instruments could be applied by central banks with both direct and indirect mandates to complement existing monetary policy operations in support of the low-emission transition and to reduce the economic and price stability impact of fossil fuel price fluctuations.

EUCD MC02 country stance South Africa, South Korea, and Colombia lead the way after having implemented both guidelines for fixed income securities issuance and national green taxonomies. In turn, **Australia** and **Türkiye** are currently in the process of issuing their own green taxonomies and are therefore considered as “starters”. On the other hand, although **Egypt** and **Morocco** have not yet explored the development of national taxonomies, these countries have already expressed their commitment to do so and have implemented guidelines for green fixed income securities issuance as well. Hence, the latter group of countries is classified as “starters” in this report too. Lastly, **Brazil** is also classified as a “starter” since it has finalised a public consultation to develop a national taxonomy and released a comprehensive action plan in December 2023. The figure shown below provides an overview of key initiatives in EUCD partner countries regarding the development of national taxonomies or, in their absence, the introduction of green or sustainable financing frameworks.

Figure 18: Overview of national taxonomy developments in selected EUCD partner countries.

EUCD partner country	Key policy measures/initiatives (non-exclusive)
Australia	Ongoing development of the Australian National Taxonomy, supported by ASFI.
Brazil	Ongoing development of a national taxonomy, guided by the Sustainable Taxonomy Action Plan released in December 2023.
Colombia	Leading example with the release of a national taxonomy (EC 005/22) aligned with international best practices and frameworks in April 2022.
Egypt	Release a Sovereign Green Financing Framework in 2020.
Morocco	The AMMC published Guidelines for “Green Bonds” (2016), “Green Social and Sustainability Bonds” (2018) and “Gender Bonds” (2021) in collaboration with the IFC.
South Africa	Release of the national Green Finance Taxonomy by the institution-wide Taxonomy Working Group in April 2022.
South Korea	Release of the K-Taxonomy Guideline in 2021 by the Ministry of Environment.
Türkiye	Ongoing development of a national taxonomy.

Note: Only illustrative, non-exhaustive.

Regarding green credit policy, the Development Bank of Southern Africa established the Climate Finance Facility (CFF), a targeted lending facility created to increase private investment in climate-related infrastructure projects in the Southern African Development Community (SADC). In addition to **South Africa**, other country categorised as “leading” include **Egypt** and **Brazil**, due to the green credit lines established by the Central Bank of **Egypt** and the National Bank for Economic and Social Development (BNDES) of **Brazil**, respectively. Besides these three countries, the governments of **Türkiye**, **Colombia**, and **Morocco** have engaged with multilateral organisations to facilitate provisory green credit lines to private sector entities and are therefore classified as “starters”. In addition, the central bank of **South Korea** (BOK) is currently considering policy measures to incorporate climate-related factors in its lending programme over the long term. However, BOK has not yet activated any green lending programme, so that **South Korea** is classified as “starter”. In **Australia**, green lending activity is largely led by private market actors and relevant authorities are yet to announce any related measures, which is why **Australia** is classified as “no sign of action” in this assessment. Figure 6 below provides an overview of key initiatives undertaken in EUCD partner countries by the central bank to either issue or promote green credit lines in the private

Bilateral learning opportunity Although euro area member states and several EUCD partner countries have put in place sustainable finance taxonomies to breach financing gaps and reduce informational asymmetries that mislead investors towards greenwashing activities and carbon lock-ins, it is vital to strengthen knowledge exchange at the international level to foster the integration of transitional activities (e.g., as classified in the ASEAN Taxonomy) into existing frameworks. Furthermore, in terms of green credit policy, this report encourages euro area member countries to improve blended finance mechanisms and develop targeted green refinancing and credit lines in collaboration with private FMPs to promote energy infrastructure projects. This is key to advancing the transition to a sustainable economy, and the opportunity itself can be exemplified by the Climate Finance Facility (CFF), a targeted lending facility created to increase private investment in climate-related infrastructure projects in the Southern African Development Community (SADC).

41 Transition taxonomies aim to identify the types of activities, underlying technologies, and industrial processes that have the potential for substantial reduction in greenhouse gas emissions, allowing for a common understanding of investments conducive to a Paris-aligned transition. The emission reduction targets and criteria in transition taxonomies should be connected to a country’s nationally determined contributions, long-term strategies, and their supporting sectoral decarbonization targets (IMF 2023).

42 When inadequate climate-financial risk assessment creates information asymmetry about firms’ development prospects and restricts investment opportunities in low-carbon projects, robust climate risk identification and management can support the revision of the cost of capital for high carbon investments (Monasterolo and al 2022).

Figure 19: Overview of key initiatives in selected EUCD partner countries to issue or promote green credit lines.

EUCD partner country	Key policy measures/initiatives (non-exclusive)
Australia	Market-led dynamic.
Brazil	Introduction of sustainability criteria into rural lending schemes by BCB in 2021 via Regulation 140.
Colombia	Bancóldex has destined USD 90 million to finance green projects for MSMEs, including renewable energy, energy efficiency, and sustainable transport.
Egypt	The CBE has channeled credit facilities to SMEs via the banking sector to promote green lending at lower interest rates.
Morocco	Market-led dynamic.
South Africa	The DBSA created the Climate Finance Facility (CFF), a blended finance platform, to increase private investment in eligible green projects.
South Korea	The BOK announced the creation of a targeted green lending programme to promote green credit facilities for SMEs within the banking sector.
Türkiye	Market-led dynamic.

Note: Only illustrative, non-exhaustive.

4.1. Taxonomy development

Although various taxonomies reflect the topic of transition finance, the underlying approaches differ heavily. While some taxonomies only include a definition of transition activities, others add a “transition check” to allow specific activities to be classified as “transitional”. However, all taxonomies agree that transition activities need to support the transformation in a way that is consistent with a pathway towards net-zero. In this regard, there is a need for taxonomies to be adjusted to the needs of each country or region. At the same time, international investors need legal certainty and applicable and aligned taxonomies to channel financial flows towards a more sustainable low-carbon economy. Besides regulatory agencies, central banks can, as explained in section 1.3, act as a role model for private FMPs by aligning their disclosure practices, including transition plans, with internationally recognised C&N risk reporting standards, as well as sustainable and transition finance taxonomies.



Practical cases

The **EU taxonomy** specifies economic activities that are expected to contribute substantially to one of the six environmental objectives (these include climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control and protection and restoration of biodiversity and ecosystems), while doing ‘no significant harm’ (DNSH) to any of the outlined objectives and meeting ‘minimum safeguards’ to comply with the technical screening criteria.

The **ASEAN taxonomy** classifies activities according to their contribution to climate and environmental objectives using a traffic light system (green, yellow, and red), and sets out that each activity must demonstrate its contribution to at least one of the four established objectives (climate change mitigation, climate change adaptation, protection of healthy ecosystems and biodiversity, and resource resilience and the transition to a circular economy). Moreover, each activity must not adversely impact any other objective. The taxonomy further incorporates a flexible review mechanism to ensure that it remains relevant in its contribution toward sustainability and aligned with the global sustainability agenda and technological advancements.

According to the German Institute for Economic Research (DIW, 2024), a key difference between the EU and ASEAN taxonomies is the approach they follow to classify economic activities. On the one hand, the ASEAN taxonomy relies on a multi-tiered approach to categorise activities into green, amber and red depending on the contribution of each activity to climate change mitigation. On the other hand, the EU taxonomy uses a binary approach, whereby an activity is described as “green” if it substantially contributes to at least one out of six environmental objectives (see above) without causing any significant harm to the rest.

Despite existing differences in approach, the authors stress that coordination between the existing taxonomies worldwide is necessary to improve comparability across activities, and that the criteria and thresholds used to classify them should be aligned with the Paris Agreement.



Guiding notes and potential next steps

Key steps in the development and implementation of a transition finance taxonomy include setting appropriate and ambitious objectives in alignment with national climate targets, selecting a design, and facilitating adoption. In line with internationally recognised principles and standards (e.g., the Transition Finance Framework proposed by the G20 Sustainable Finance Working Group), this guide helps to mitigate the risk of greenwashing and to ensure comparability and interoperability of the classification framework by considering the needs and interests of both public and private stakeholders. The table below provides a description of the steps required for ensuring a successful development and implementation process of a national taxonomy.

Table 20: Description of the taxonomy development process

1. Governance structure	<ul style="list-style-type: none">▪ Define roles and responsibilities.▪ Establish groups at the strategic, managing, technical and operational levels.▪ Ensure representation of various stakeholders.▪ Establish common mindset within the governance structure.▪ Enable financial and human capacities for the development process.
2. Goal and Thematic Areas	<ul style="list-style-type: none">▪ Define strategic goals based on high-level commitments, such as Nationally Determined Contributions (NDCs) or National Adaption Plans (NAPs).▪ Define thematic areas to position taxonomy within the country’s economy and development priorities.
3. Definition	<ul style="list-style-type: none">▪ Select and define objectives of the taxonomy.▪ Follow principles such as the do not significant harm and social safeguard in selecting sectors and economic activities.▪ Select sectors and economic activities to be covered in the taxonomy.▪ Integrate approaches such as Technical Screening Criteria (TSC) or a principle-based whitelist approach to ensure alignment of eligible economic activities with the taxonomy.
4. Alignment	<ul style="list-style-type: none">▪ Ensure country contextualization and alignment across jurisdictions.▪ Harmonize approaches in taxonomy development by adopting international standards.▪ Find common ground between individual and common taxonomy concepts.
5. Consultation, testing and adoption	<ul style="list-style-type: none">▪ Prepare a guidance document for taxonomy users.▪ Allocate resources for taxonomy implementation.▪ Test the taxonomy through stakeholder consultations and integrate feedback.▪ Review and finalize the taxonomy.▪ Integrate a monitoring and evaluation plan.
6. Periodic revision of the taxonomy	<ul style="list-style-type: none">▪ Conduct a high-level internal review of the taxonomy framework periodically to reassess its alignment with newly released international standards and best practices.

The first step in the development process of a finance taxonomy is to appoint suitable stakeholders (e.g., government members, ministries, financial regulators, research institutions, or financial sector associations) responsible for overseeing the entire process to ensure accountability. In this initial selection, while the engagement of various stakeholders in defining the sustainable finance taxonomy can lead to a more well-rounded and effective strategy that incorporates various aspects and potential impacts on different stakeholders, it is vital to ensure a shared understanding of the strategic goal, and the alignment of institutional interests with the taxonomy's ambitions to guarantee its success and wide-scale adoption.

Secondly, it is essential to clearly define the strategic goals of the taxonomy, its thematic areas, and to guarantee its progressive development independently of political events and election outcomes. The strategic goal of a taxonomy forms the foundation of its development and is a vision of what the entire taxonomy aims to achieve. Concretely, it helps to bring together public and private market actors and to mobilise financial resources toward the achievement of country-specific targets. Above all, strategic goals should be aligned with high-level national priorities and international commitments, such as the temperature goal set out in the Paris Agreement to increase impact. In turn, thematic areas determine the broader positioning of the finance taxonomy within the country's economy and development priorities. For example, a green finance taxonomy aims to ensure sustainable development through activities such as renewable energy, or energy efficiency measures, whereas a sustainability taxonomy is a combination of social, green, and economic objectives.

Thirdly, once the governance structure is established and the strategic goals and thematic areas are identified and agreed upon by participating local stakeholders, the focus should be set on defining the objectives, sectors, and activities (incl. a description of private sector actors and public agencies that will be required to follow the established taxonomy-related principles) covered by the taxonomy. While setting the objectives (e.g., climate change mitigation), either directly or through a phased approach, it is critical to ensure that they are aligned with the core strategic goals of the taxonomy, local priorities, timelines, and resource constraints, and that they fulfil minimum environmental and/or sustainability criteria. In terms of the selection of economic activities, it is essential to clearly specify the qualitative and quantitative thresholds and make use of industry classification codes to facilitate comparability across different jurisdictions.

Fourthly, it is necessary to ensure that the taxonomy is adapted not only domestically (both at the regional and national levels), but that it is also aligned with internationally recognised standards to facilitate its comparability across the investor community worldwide.

Fifthly, the likelihood of a successful adoption and applicability of the finance taxonomy can be increased by conducting an initial

testing phase, providing information via implementation guides to target users, and by introducing an inclusive review process on a regular basis to gather feedback from different stakeholders.

Finally, as taxonomies are often used to classify sustainable financial products, there is a need for classified transformation activities (which are consistent with credible and science-based transition pathways). In this context, regional or even international frameworks laying the groundwork for further taxonomy development can help in aligning taxonomies globally, while at the same time ensuring homogeneous environmental objectives, ambitions, and consistency with science-based targets. At the same time, for financial investors, it is important to have a spectrum of investment opportunities beyond those considered merely "green". The reason is that even if there is no shortage of transition capital, in the absence of a transition-aware taxonomy, there is the risk that capital is funding corporate transitions that are not well aligned with national transition pathways.



Further literature

- BCG and GFMA, 2021, Global guiding principles for developing climate finance taxonomies – a key enabler for transition finance.
- BIS, 2021, BIS Papers No 118: A taxonomy of sustainable finance taxonomies.
- EC, 2023, EU Taxonomy navigator.
- OECD, 2020, Developing sustainable finance definitions and taxonomies.
- OECD, 2022, OECD Guidance on transition finance: Ensuring credibility of corporate climate transition plans add others guides.
- Sustainable Finance Working Group, 2021, A taxonomy of sustainable finance taxonomies
- UN PRI, 2020, Testing the taxonomy: Insights from the UN PRI taxonomy practitioners group
- IMF, World Bank, OECD, 2023, Activating Alignment: Applying the G-20 Principles for sustainable finance alignment with a focus on climate change mitigation.
- IMF, 2023, Global financial stability report.
- Monasterolo et al., 2022, The double materiality of climate physical and transition risks in the euro area.
- UNEP, 2023, Common framework of sustainable finance taxonomies for Latin America and the Caribbean.
- DIW, 2024, [Transitioning to net zero: Full potential of sustainable finance taxonomies not yet exhausted](#).

4.2. Green credit policy

Most central banks in developed countries are yet to adopt C&N risks when assessing their own lending activities directed at the financial institutions they supervise and align borrower-based measures with the objective of the transition to a low-emission economy. The effectiveness of green credit policy can be influenced by a variety of factors, including the scale of the programme, the criteria used to determine eligible projects, and the level of participation by financial institutions. In this regard, lending limits or outright exclusions on selected transition-incompatible activities, such as coal-fired power generation or the exploration and production of new oil and gas reserves would be the most direct means of redirecting credit flows away from legacy industries. Additionally, the provision of green targeted refinancing lines with concessional terms and conditions (and potentially, together with capacity building) can overcome financing barriers and encourage green finance initiatives. Finally, it is crucial to highlight that the democratic legitimacy of green credit policy requires a stronger coordination with executive bodies, governmental oversight, and central bank responsibility.



Practical cases

ECB Through the incorporation of science-based climate indicators, the ECB will limit the value of assets pledged as collateral that banks can use to qualify for credit⁴³. While the introduction of these measures is a significant improvement, their introduction applies only to a small range of marketable assets that are eligible for collateral and therefore affects only 5.87% of the ECB's balance sheet. As collateral framework adjustments are a key monetary policy instrument, more information on related measures taken by the ECB are described in Section 3.1 of this document.

De Nederlandsche Bank In addition to tax incentives, the Green Funds Scheme launched by the Dutch Government implements the accreditation of credit and investment institutions as 'green banks', which are to be supervised by the DNB and the Dutch Treasury. With specific criteria, the Scheme indicates which project categories are eligible for the green status. If the status is granted, a certificate valid for up to 10 years is issued on behalf of the State Secretary of VROM (Housing, Spatial Planning and the Environment), which enables project managers to access green financing from one of the "green" banks.

People's Bank of China The China Banking Regulatory Commission (CBRC) has developed green credit guidelines to address the risks of increasing environmental problems in 2012. These guidelines contain specific requirements by FIs to adjust their loan policies towards more environmentally friendly lending by managing the environmental and social risk of their clients while limiting lending to environmental high-risk clients⁴⁴.

⁴³ ECB, 2022, ECB takes further steps to incorporate climate change into its monetary policy operations, <https://www.ecb.europa.eu/press/pr/date/2022/html/ecb.pr220704-4f48a72462.en.html>

⁴⁴ These guidelines apply to all FIs including policy banks, state-owned banks, joint-stock commercial banks, financial asset management companies, the Postal Savings Bank of China (PSBC), provincial rural credit unions as well as trust firms, financial leasing companies and enterprise group finance companies.



Guiding notes and potential next steps

Central banks can implement borrower-based measures, including loan-to-value and loan-to-income caps, as well as credit guidelines to encourage green lending activities among FIs. These measures could also be complemented with ad-hoc capacity building programmes for targeted entities to strengthen efficiency in portfolio allocation in line with climate targets. Moreover, clearly defining green use of proceeds eligible for concessional finance, metrics, and indicators (e.g., by reflecting a national or regional taxonomy if available) in line with the TCFD/TNFD frameworks and providing an efficient monitoring system can help assess the effectiveness of credit instruments. For the next steps, it is necessary to continue expanding the scope of credit policy via adjustments in the concessional criteria to foster the adoption and development of net-zero technologies in hard-to-abate sectors. Put differently, beyond supporting activities that are inherently green, central banks should not hinder the transition of hard-to-abate sectors by excluding them from lending activities. Instead, central banks may consider introducing clear concessional criteria for credit access in hard-to-abate industries (e.g., credit is granted only upon the design and implementation of science-based transition plans that are aligned with ambitious climate goals) or reduce the cost of credit as carbon-intensive firms adopt ambitious climate targets and implement net-zero technologies gradually. Complementing credit quotas with the introduction of science-based disclosure standards is essential to increase transparency in financial markets and align credit activities with the goals of a sustainable economy, particularly in emerging economies, where financing and disclosure gaps are prevalent.

Third, in addition to climate risks, central banks should consider incorporating environmental concerns or nature-related financial risks in credit assessment frameworks, as these may also pose a threat to financial stability⁴⁵. Lastly, it is crucial to develop efficient incentive mechanisms to align the business activities of non-compliant debtors with a science-based net-zero transition pathway. These steps and the recommended timeline for their implementation are illustrated in the figure below:

45 Chenet et al., 2021, Quantifying financial impacts of biodiversity loss? Conceptual and theoretical frameworks, limits, and implications, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4037473

Table 21: Plan for the incorporation of green credit policies, credit/lending operations, reporting frameworks

Objectives	Short term	Medium term	Long term
Credit eligibility criteria (Credit assessment frameworks)	<ul style="list-style-type: none">▪ Commit at the board level to net-zero transition in financed emissions for credit operations.▪ Issue green credit guidelines in line with TCFD/TNFD frameworks to enable FIs to adapt their business models and operations accordingly and mitigate adverse liquidity constraints.▪ Develop capacity building programmes to facilitate a smooth less business model adaptation and encourage the integration of C&N risks across the financial sector.	<ul style="list-style-type: none">▪ Apply loan-to-value and loan-to-income caps based on the exposure of eligible entities to C&N risks. Climate indicators should be aligned with science-based metrics, such as those brought forward by the TCFD/TNFD.▪ Issue green credit lines with preferential interest rates for entities with clear transition pathways operating in hard-to-abate sectors.	<ul style="list-style-type: none">▪ Fully integrate C&N criteria via adjustments to the credit assessment framework and integrate C&N criteria across all lending activity.▪ Align lending criteria applicable to hard-to-abate sectors with new technological developments to meet fin. needs to transition to sustainable business model.
Transition pathways and monitoring (Reporting frameworks)	<ul style="list-style-type: none">▪ Commit to non-financial disclosure in line with internationally recognised standards on lending activities to enhance market transparency.▪ Introduce mandatory requirements for transition planning accompanied by capacity development programmes to effectiveness.	<ul style="list-style-type: none">▪ Develop monitoring tools to track debtors' progress toward pre-established climate targets and alignment with stated transition pathways to measure the effectiveness of credit operations.	<ul style="list-style-type: none">▪ Develop and apply incentive mechanisms to enable non-compliant debtors to fully align their activities with a path consistent with ambitious climate targets.

Note: Time horizons are only illustrative, non-exhaustive.



Further literature

- ADB Institute, 2023, Global climate challenges, innovative finance, and green central banking.
- New Economics Foundation, 2018, Green central banking in emerging markets and developing country economies.
- Xiao et al., 2022, Does green credit policy move the industrial firms toward a greener future? Evidence from a quasi-natural experiment in China.

Frankfurt School of Finance & Management gGmbH

Adickesallee 32–34
60322 Frankfurt am Main

E-Mail: m.koenig@fs.de

November 2024



[@frankfurtschool](#)



[@frankfurtschool](#)



facebook.com/FrankfurtSchool



youtube.com/FrankfurtSchoolLive



linkedin.com/company/frankfurtschool



xing.com/company/frankfurtschool



Frankfurt School