



Integrating climate-related and environmental risks into risk management frameworks

Practices and challenges for the Luxembourg banking industry

July 2024



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Introduction

In 2021, the Commission de Surveillance du Secteur Financier (CSSF) released *Circular CSSF 21/773 on the Management of Climate-related and Environmental Risks* (the “CSSF Circular”).¹ It details how Less Significant Institutions (LSI) and branches of non-EU credit institutions should consider and integrate climate-related and environmental (CRE) risks as drivers of existing risk categories into their operations, including their business strategy, governance and risk management frameworks. These expectations align with the European Central Bank’s (ECB) *Guide on climate-related and environmental risks* (the “ECB Guide”) of November 2020 that applies to Significant Institutions (SI).²

In January 2022, the Association des Banques et Banquiers, Luxembourg (ABBL), with the support of Deloitte, released a whitepaper called *Integrating climate-related and environmental risks into risk management frameworks*. The aim was to share a comprehensive overview of the regulatory expectations as well as the Luxembourg banking industry’s initial practices, trends and challenges regarding CRE risk management.³

Given the fast-approaching deadline for full compliance with the CSSF Circular and the ECB Guide,⁴ we have updated that 2022 stock take to help banks finalize their efforts to embed CRE risk into their management framework. Therefore, this whitepaper:

- i. Provides an update of how the regulations have evolved since the first whitepaper’s release; and
- ii. Outlines good practices observed in the Luxembourg market regarding the various areas of CRE risk management that supervisory authorities consider relevant.

1. CSSF, [Circular CSSF 21/773 on the Management of Climate-related and Environmental Risks](#), 21 June 2021.

2. ECB, [Guide on climate-related and environmental risks: Supervisory expectations relating to risk management and disclosure](#), November 2020.

3. ABBL and Deloitte, [Integrating climate-related and environmental risks into risk management frameworks](#), January 2022.

4. Banks are expected to comply with these texts by 31 December 2024.



Regulatory evolution: environmental, social and governance (ESG) beyond climate considerations

Since our initial whitepaper's release,⁵ supervisory expectations regarding CRE risks have mainly focused on the proper implementation of the numerous regulatory texts issued since 2020. Qualitative measures from the 2023 ECB Supervisory Review and Evaluation Process (SREP) highlighted the need for banks to address weaknesses in their strategic planning and understanding of CRE risks.⁶

To address this, the ECB has set deadlines for SI to align with the ECB Guide's supervisory expectations by the end of 2024. The CSSF has also set and updated its supervisory priorities in sustainable finance to align with the ECB's requirements and expects LSI and all branches of non-EU credit institutions to fully comply with the CSSF Circular, also by the end of 2024.⁷

Table 1 summarizes the critical publications of the last two years, which this section explores in more detail, while Appendix 1 gives a more comprehensive overview of essential publications.









5. ABBL and Deloitte, [Integrating climate-related and environmental risks into risk management frameworks](#), January 2022.

6. ECB, [Aggregated results of SREP 2023](#), 19 December 2023.

7. CSSF, [The CSSF's supervisory priorities in the area of sustainable finance](#), 22 March 2024.



Table 1: Main regulatory publications on CRE risk management (January 2022 – January 2024)

Authority	Publication	Publication date	Scope	Focus
Basel Committee on Banking Supervision	 Principles for the effective management and supervision of climate-related financial risks	June 2022	Large internationally active banks	CRE
ECB	 Good practices for climate related and environmental risk management: Observations from the 2022 thematic review	November 2022	SI within the Single Supervision Mechanism (SSM)	CRE
European Commission (EC)	 Commission Implementing Regulation (EU) 2022/2453 of 30 November 2022 amending the implementing technical standards laid down in Implementing Regulation (EU) 2021/637 as regards the disclosure of environmental, social and governance risks	November 2022	Large institutions that have issued securities admitted to trading on a regulated market	CRE
ECB	 ECB report on good practices for climate stress testing	December 2022	SI within the SSM	CRE
CSSF	 Circular CSSF 21/773 on the Management of Climate-related and Environmental Risks - Outcomes of the self-assessment exercise 2022	June 2023	LSI and branches of non-EU banks in Luxembourg	CRE
European Banking Authority (EBA)	 EBA consultation on draft Guidelines on the management of ESG risks (EBA/CP/2024/02)	January 2024	All institutions in the EU	ESG
EC, European Council (EURO) and European Parliament (EP)	 Regulation (EU) 2024/1623 of the European Parliament and of the Council of 31 May 2024 amending Regulation (EU) No 575/2013 as regards requirements for credit risk, credit valuation adjustment risk, operational risk, market risk and the output floor (the “CRR3”)	June 2024	All institutions in the EU	ESG
EC, EURO and EP	 Directive (EU) 2024/1619 of the European Parliament and of the Council of 31 May 2024 amending Directive 2013/36/EU as regards supervisory powers, sanctions, third-country branches, and environmental, social and governance risks (the “CRD 6”)	June 2024	All institutions in the EU	ESG

As banks make headway in implementing the ECB guide and the CSSF Circular, supervisory authorities have initiated discussions with institutions and conducted self-assessment exercises to monitor their progress.

In November 2022, the ECB published the report *Good practices for climate-related and environmental risk management: Observations from the 2022 thematic review* ("ECB Good Practices for CRE"), and shortly afterwards, a second report entitled *ECB good practices for climate stress testing*. Both reports provided banks with examples and suggestions on how to improve their CRE risk management and measurement abilities based on identified good practices.

These reports were based on banks' responses to self-assessment questionnaires on their alignment with the ECB Guide's recommendations. This exercise has supported the ECB's continued discussions and supervisory activities with banks in the last two years.⁸

The CSSF also conducted two similar self-assessment exercises between 2022 and 2024 for a sample of LSI and third-country branches, representing different business models in Luxembourg. In June 2023, the CSSF presented the first exercise's main outcomes during a joint webinar with the ABBL. ESG risks remain one of the regulator's banking sector priorities, and it is expected that dedicated questions on climate-related risk integration and governance will be included in banks' long-form reports from 2024 onwards.

To that end, the CSSF also intends to develop and carry out on-site inspections specifically focused on CRE risks from 2024.⁹ A dedicated sample-based review is also planned to gather how sustainability aspects are being integrated into remuneration policies.

In parallel to these monitoring activities, supervisory authorities have continued to expand their focus from climate-related and environmental risks (E) to the other categories of ESG risks, i.e., social (S) and governance (G) aspects.

In particular, a tripartite agreement on the long-awaited **banking package**, the third Capital Requirements Regulation and the sixth Capital Requirements Directive (CRR3/CRD6), was reached in December 2023 and voted in the EP on 9 May 2024. The banking package is set to further deepen the requirements of the full scope of ESG risks. It not only aims to implement the final post-crisis reforms of the Basel III rules but also introduce EU-specific elements, particularly regarding the green transition, and new requirements for banks to systematically identify, disclose and manage ESG risks as part of their risk management.

8. ECB, [Climate risk stress test 2022](#), July 2022

9. CSSF, [The CSSF's supervisory priorities in the area of sustainable finance](#), 22 March 2024.

The banking package will impact each of the three pillars of the EU banking sector's prudential framework:

Pillar I – Minimum capital requirements

- **Risk weights in the Standardized Approach (SA):** the EBA and the European Securities and Markets Authority (ESMA) should jointly assess whether ESG risks are appropriately reflected in External Credit Assessment Institutions' (ECAI) credit risk rating methodologies.
- **Stress testing under the Internal Rating-Based (IRB) approach:** formal requirements are introduced to include ESG risk factors in stress scenarios, especially physical and transition risks stemming from climate change.
- **Financial, real estate and physical collateral:** ESG-related considerations should prompt banks to reassess the possible significant decrease in a collateral's market value.

Pillar II – Supervisory review

- **Internal Capital Adequacy Assessment Process (ICAAP):** institutions should explicitly consider the ESG risk coverage in the short, medium and long term when assessing internal capital needs under ICAAP.
- **Business planning and indicators:** institutions must develop and monitor specific plans, quantifiable targets and processes to address the financial risks arising from ESG in the short, medium and long term.

- **Risk management:** includes formal requirements for stress testing scenarios covering ESG.
- **SREP:** formally includes ESG factors in the SREP methodology to be used by competent authorities.
- **Supervisory powers:** competent authorities can require institutions to reduce their ESG risk exposure by adjusting their business strategies, governance and risk management.

Pillar III – Market discipline (disclosures)

- **Additional reporting to competent authorities:** additional templates should be completed for:
 - Existing and new exposures to fossil fuel sector entities; and
 - Exposure to physical and transition risks.
- **Additional public disclosures:** all institutions, including small and non-complex ones, should disclose:
 - The total amount of exposures to fossil fuel sector entities; and
 - How they integrate the identified ESG risks in their business strategy and processes, as well as governance and risk management.

The banking package also mandates the EBA to examine if further requirements or adjustments are necessary based on the banking industry's evolving ESG considerations. The EBA will address these various mandates in three waves:

- **Wave 1** – general guidelines on possible targeted enhancements to the current prudential framework and related risk management practices (public consultation initiated in January 2024).¹⁰
- **Wave 2** – possible introduction of a standardized methodology to identify and qualify the exposures based on a common set of principles for ESG risk classification (by the end of 2024).
- **Wave 3** – possible additional and more comprehensive revisions to the framework (Pillar I) and how such a dedicated prudential treatment of exposures based on ESG factors would affect the EU's financial stability and bank lending (by the end of 2025).

10. EBA, [Consultation on draft Guidelines on the management of ESG risks](#), 18 January 2024.

Consequently, in January 2024, the EBA initiated a consultative process on its draft **Guidelines on the management of ESG risks**. The publication specifies new minimum standards and reference methodologies for ESG risk management and requires institutions to implement early management actions depending on the institution's size and complexity. The following key areas of the draft guidelines are particularly notable:

01. Reference methodology for ESG risk identification and measurement

- **Risk-based assessment** across the short, medium and long-term time horizon (for a minimum 10 years), including quantification for environmental risks;
- **Identification of ESG risk drivers** (transition and physical), transmission channels, concentrations, and counterparties' diversion from transition objectives;
- **Implementation of sound data processes** to gather required client and counterparty ESG data (including biodiversity impact and social standards);
- **Assessment of data gaps and documentation of remediation actions** (proxy usage and quality assurance of third-party providers); and
- **Usage of a combination of methodologies**, including exposure-, portfolio-(alignment) and scenario-based, depending on the different time horizons assessed, among others.

02. Minimum standards and reference methodology for ESG risk management and monitoring

- **Full integration of ESG risks in regular risk management systems and processes**, e.g., business and risk strategy, risk appetite, ICAAP, the internal liquidity adequacy assessment process (ILAAP), credit policies and internal controls;
- Development of an **engagement strategy** that includes at least some **interaction with counterparties** with the objective of improving their ESG risk profile, adjustment of financial terms and pricing, limits, and portfolio diversification in **risk management and mitigation tools**;
- Definition and monitoring of **early warning indicators, metrics and backward- and forward-looking key performance indicators (KPIs) and key risk indicators (KRIs)**, including thresholds that are cascaded down the institution; and
- **Integration of ESG risks across the three lines of defense** and assurance of their **adequate awareness and understanding**.

03. CRD-based transition plans

Based on Article 76 of the forthcoming CRD6, institutions will be responsible for **developing transition plans** and reviewing them annually, or biennially for LSI, to address and mitigate (prudential) risks in the short, medium and long term. In addition, an **intermediate 2030 milestone** to reduce greenhouse gas (GHG) emissions will be introduced.

These transition plans aim to proactively reflect changes arising from the sustainable economy transition and prepare or adapt the institution's entire value chain from a strategic, risk and operational perspective. Similar expectations are embedded in other EU legislations, including the Corporate Sustainability Reporting Directive (CSRD) and the Corporate Sustainability Due Diligence Directive (CSDDD). However, the EBA has stated that its CRD-based transition plans are different because they focus on prudential risk. Table 2 summarizes the differences between the CSRD and CRD6 transition plans.

Table 2: Main differences between CSRD and CRD6 transition plans

Transition plans	CSRD	CRD6
Scope and objectives	<p>The transition plan focuses on climate change mitigation and aims to provide information on how an entity's strategy and business model align with the Paris Agreement goals (limiting global warming to 1.5°C) and achieving climate neutrality by 2050.</p> <p>CSRD introduces sustainability disclosure requirements for certain listed and large EU and third-country companies.</p>	<p>The transition plan aims to ensure that institutions' management bodies monitor and address the financial risks arising from the sustainable finance transition across different time horizons, and at least over 10 years.</p> <p>Furthermore, institutions should determine which counterparties should submit transition plans as part of their business relationships.</p> <p>CRD6 and CRR3 scope is limited to credit institutions and certain investment firms.</p>
Approach	<p>CSRD requires an assessment of a company's transition plan, which uses qualitative indicators to assess the integration of low-carbon activities in current and future business models for each sector.</p>	<p>CRD-based transition plans take a risk-based view and contribute to the institution's overall resilience to ESG risks.</p> <p>In particular, they include risk identification and assessment, risk mitigation strategies and scenario analysis.</p>
Requirements	<p>The European Sustainability Reporting Standard (ESRS) E1-1 underpins CSRD and sets out further requirements on transition plan disclosure.</p> <p>The CSRD transition plan requirements focus on climate change mitigation, whereas the CSRD's broader sustainability disclosures address sustainability impacts, opportunities and risks.</p>	<p>The EBA's proposed guidelines on the management of ESG risks include prudential transition plans. In general, the proposed EBA guidelines are only addressed to institutions and include expectations regarding risk appetite, consistency with ICAAP, and portfolio alignment assessments. They also include specific responsibilities across the three lines of defense.</p>



When designing their CRD-based transition plans, banks must keep in mind that the transition plan assessments will become part of the SREP, supported by supervisors' new mandate to assess business model sustainability over a minimum of 10 years. This significantly differs from the typical three-year time horizon currently applied by supervisors. In practice, institutions should clearly demonstrate the approaches they plan to adopt when shifting towards a more sustainable economy.

The CRD-based transition plan encompasses a comprehensive strategic process, including specified timelines and intermediate quantifiable targets and milestones, to monitor and address the financial risks stemming from ESG factors. This will include engaging with internal and external stakeholders, integrating ESG factors into loan policies, adjusting strategic financing decisions, addressing physical risks, developing new products or services, setting specific investment criteria, and initiating new policies on carbon-intense sectors.

Institutions are expected to use robust data processes to collect, verify, and merge necessary information to support these transition efforts, with additional public and non-public disclosures. They will also need to include a wide array of metrics, such as financed GHG emissions, portfolio alignment metrics, biodiversity-related risks, and ESG-related concentration and reputational risks. This data should inform the design of institutions' strategic plans and help with monitoring their implementation progress.

As counterparty transition plans also shape the institution's own transition blueprint, it should proactively engage with counterparties to ensure alignment. Institutions should regularly discuss risks and mitigation options and consider adapting product offerings and other specific partner-focused approaches

appropriately. In some cases, it may be necessary to end partnerships that do not align with the bank's risk appetite and transition plans.

Institutions should also assess how their transition process will affect their business and risk profile, measuring the estimated impacts on revenue and profitability. Risk management policies should be adapted to cover new sectors like green and transition technologies, while considerations of climate risks and opportunities should inform internal policies, procedures, processes and products.

Overall, while prudential regulations were initially focused on CRE risk management, we have observed a gradual shift to the broader concept of ESG risk management, reflecting the global movement toward an ESG mindset. In other words, not just the "E" but also the "S" and the "G", as summarized in Figure 2.

Although climate risks will likely remain regulators' near-term priority, the shift from CRE to ESG is clearly reflected in the forthcoming banking package (CRR3/CRD6) and the related EBA mandates, with requirements gradually entering into force as from 2025. Therefore, while banks are still struggling to implement CRE risk management practices, as discussed in the next section, institutions should start taking steps to deepen their understanding of ESG risks beyond climate and map out their data needs.

Based on the EBA's proposed guidelines on the management of ESG risks, institutions could take the following steps to design a CRD-based transition plan:

01. Define their climate strategy and vision by considering their materiality assessment results;
02. Outline policies and procedures aligned with their climate strategy and risk appetite;
03. Design products aligned with their ESG strategy, where applicable;
04. Build a stakeholder engagement strategy based on their ESG strategy; and
05. Calibrate relevant KPIs and KRIs to closely monitor their ESG strategy.

Figure 1: Transition planning

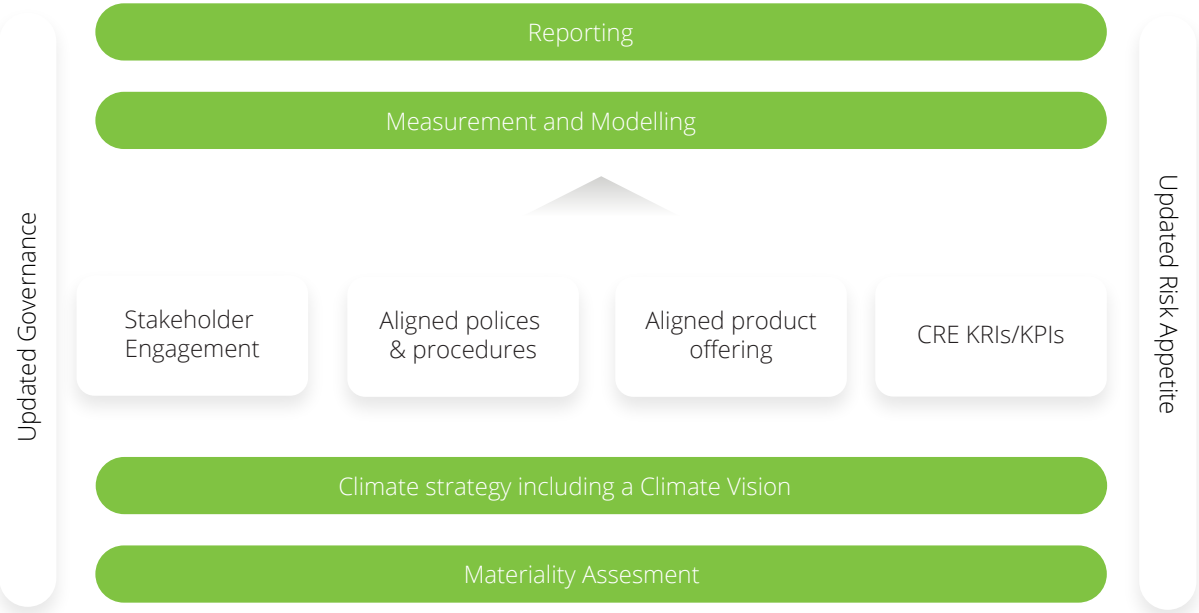
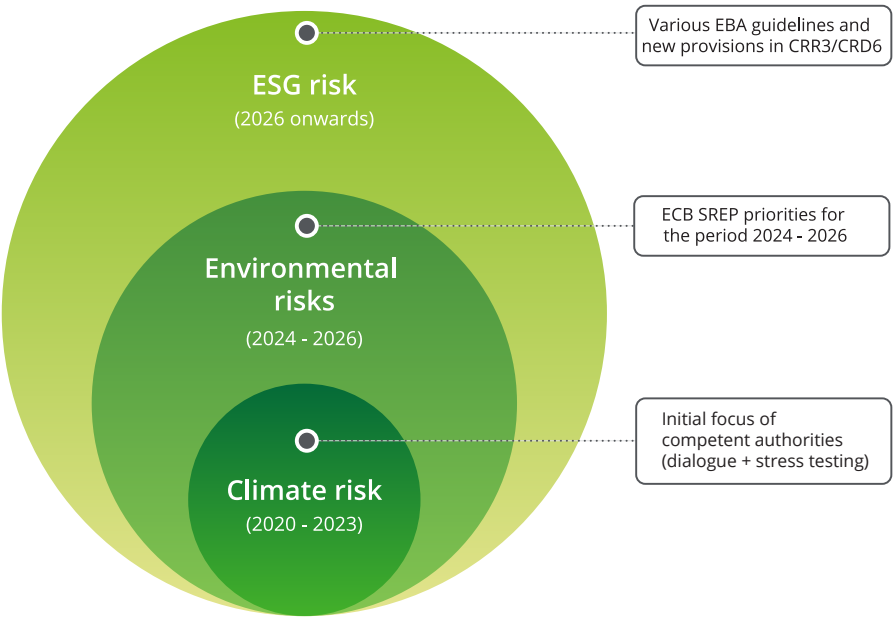


Figure 2: Regulatory transition from CRE to ESG



State-of-play of the Luxembourg banking industry in CRE risk management practices



Despite the plethora of recent CRE risk publications by regulatory bodies, professional associations and academics, the industry has yet to tackle many of the challenges to concretely and properly implement supervisory requirements in their risk management frameworks.

This is due to the topic's intrinsic complexity, the multiple interdependencies between CRE drivers and economic sectors, and financial variables.

In late 2022, to support the banking industry to effectively manage CRE risks, the ECB Good Practices for CRE was published to address the requirements of the ECB Guide. The good practices fall into four main groups:

01. Assessment of materiality:

The ECB highlights the materiality assessment's crucial role in managing CRE risks. Institutions should systematically recognize risk drivers and determine the materiality of these risks. As climate risks continuously change and evolve, a dynamic detection and evaluation process that adapts to the changing environment is necessary. This comprehensive understanding of risk exposure is vital, forming the foundation layer of climate risk management.

02. Business strategy:

The ECB recommends that business strategies consider and include comprehensive risk management practices for CRE risks. Institutions should establish strategic plans that proactively address potential environmentally driven changes. Strategic steering tools will help banks navigate the complex landscape of environmental risks and drive informed business decisions. In addition, financial institutions' progress toward environmentally friendly and sustainable banking practices should be a strategic priority.

03. Governance and risk appetite:

The ECB emphasizes the need for sound governance structures and a well-defined risk appetite in climate-related risk management. Risk management should be embedded across all levels of an institution's organizational structure, with clear roles and responsibilities defined to address these risks effectively and efficiently. Robust data governance for effective risk reporting is essential, further aiding in managing CRE risks.

04. Risk management:

Regarding CRE risks, institutions are guided to conduct exhaustive due diligence, maintain up-to-date risk classification systems, and ensure comprehensive collateral valuations. The dynamic nature of these risks requires a forward-looking approach, including the regular review and update of risk management methodologies and practices.



The ECB proposes 26 observed good practices, split across 15 topics, as illustrated in Figure 3. Practices highlighted in italics are particularly relevant to LSI and Luxembourg business models and are analyzed in this section.

Figure 3: Topics covered in the ECB Good Practices for CRE
(Source: ECB)

Business strategy

- *Transition planning*
- Target setting and key performance indicators
- *Strategic review of products*
- *Client engagement*
- Client transition plans

Materiality

- *Identification of risk drivers - transmission channels*
- *Materiality assessments*
- Materiality thresholds

Governance and risk appetite

- *Governance framework*
- Remuneration policies
- *Second line of defense*
- Third line of defense
- *Risk appetite - key risk indicators*
- *Data governance, processes and collection*
- Internal risk reporting

Risk management

- *Due diligence - data collection*
- Due diligence - controversies
- *Credit risk*
- Market risk
- *Operational risk*
- *Collateral valuations and pricing*
- *Loan pricing*
- *Internal capital adequacy assessment*
- Exclusion approach
- Environmental risks - due diligence
- Environmental risks - risk measurement

For each highlighted good practice, this section provides an overview of the major regulatory expectations, typical implementation challenges, concrete examples of good practices observed by the ECB in the European banking industry, and a specific focus on how the Luxembourg banking sector addresses these challenges locally.¹¹

11. These practices were collected through interviews with several ABBL members over the first half of 2024.

Materiality

Materiality risk assessments are a key element of banks' risk management frameworks, as referred to in Article 76(2) subparagraph 2 of Directive 2013/36/EU. More specifically, the determination of materiality is anchored in the ICAAP. In this context, it is important to recognize that CRE risks are risk drivers that impact existing prudential risk categories.

Once identified, these risks need to be assessed, as those considered as "material" should be duly managed, monitored, mitigated and potentially covered by internal capital. This implies the definition of appropriate materiality thresholds against which exposures to given risk types are evaluated.

CRE risks are unique in that supervisory bodies expect them to be assessed on a short-, medium- and long-term basis. The materiality assessment helps institutions make more informed decisions on their business risk strategy and risk appetite.

Relevant good practices observed in Europe

01. Identification of risk drivers

Applying the concept of transmission channels to identify relevant CRE risks (both physical and transition) has become a market standard, we also found that most interviewed banks in Luxembourg apply this method. This typically results in a matrix, where a comprehensive list of all relevant CRE risk drivers is mapped against traditional risk categories in the bank's risk taxonomy. The identification phase is usually driven by the second line

of defense (risk and compliance functions), with a robust contribution and validation expected from the relevant business functions and management.

However, banks can find it challenging to list all the CRE risk drivers that can trigger transmission to other risk types. To address this issue, the ECB's suggested good practice is to complement internal expertise with external sources like

scientific literature, publications from internationally renowned bodies, and climate scenarios, such as those developed by the Intergovernmental Panel on Climate Change (IPCC) or the Network for Greening the Financial System (NGFS). This can help ensure the materiality assessment is not limited to climate-related aspects but also covers environmental risks. Table 3 lists some of the ECB's examples of primary risk drivers based on observed practices.

Table 3: Examples of primary risk drivers (Source: ECB)

Physical risk drivers	Transition risk drivers
Riverine and sea floods	Environmental taxation and subsidies
Hail, storms and hurricanes	Behavioral changes of consumers, suppliers and employees
Reduced soil productivity	Technological developments
Soil pollution by hazardous materials, excessive fertilization, and soil erosion (over-exploitation)	Energy and transport policies (e.g., reduction of CO ₂ emissions)
Water stress and pollution	Ban of certain environmentally damaging materials/chemicals
Deforestation and unconventional site clearance	Regulatory requirements (e.g., sustainability certificates and disclosures)

02. Materiality assessment

To evaluate the materiality of risks for CRE risk drivers, institutions should use both qualitative and quantitative techniques, determined by the type of exposure and the risk factor in question. Relevant examples of risk assessment methods to inform the materiality assessment are provided in Table 4.

One common feature across all observed good practices is the need for data. This data could include specific information about the counterparty, such as mapping with NACE¹² sector classification, building energy consumption, and building materials. This information serves as key input for measuring materiality of the CRE risks.

Table 4: Selected examples of methods used in the materiality assessment
(Source: ECB)

Portfolios	Risk type	Method used
Commercial and residential real estate	Physical risks	<p>Location-specific risk analysis quantifies physical risks using geospatial mapping and local geographical characteristics, such as building type, surrounding terrain type, construction features, and (public) transport routes.</p> <p>Using natural hazard maps (e.g., for floods, droughts and wildfires), the model constructs vulnerability curves for building type clusters at the postal code level.</p> <p>Risk estimates are derived and translated into expected damages and losses to the collateral portfolio.</p>
	Transition risks	<p>Exposures are mapped to buckets of energy performance certificates (EPC). Based on the buildings' EPC, clients are segmented into low, medium, high and very high risk using the institution's internal classification system.</p> <p>This provides an overview of exposures to high-risk clients that may be particularly affected by rising energy costs, have limited means to invest in renovation measures, or both.</p>
Bank-wide	Transition risks	<p>Scenario analysis is conducted to assess reputation risks, including potential greenwashing and the financing of polluting industries.</p> <p>First, a set of scenarios is defined, and the possible affected stakeholders (e.g., investors, customers, authorities and interest groups) are mapped, together with the profit and loss (P&L) area that would be most affected.</p> <p>Second, possible losses are estimated based on expert judgment and historical losses, similar to approaches adopted for other non-financial risk scenario analyses. Results are discussed and adjusted in dedicated workshops before being aggregated to produce a quantitative approximation.</p>
	Physical and transition risks	<p>Stress climate scenarios are conducted on the credit portfolio to assess their impact on either the probability of default (PD) (e.g., through changes in client revenues/costs) or loss given default (LGD) (e.g., through changes in the collateral).</p> <p>The difference between the expected losses in the "normal" scenario and the "stress" scenario is then compared against a predefined threshold (loss amount).</p>

12. Assessment of the amount of the amount of interest, fee and commission income and underlying volumes from 22 NACE sectors that the EC has identified as the most carbon-intensive ones.

How is it applied in Luxembourg?

While all the banks interviewed by the ABBL identified risk using transmission channels for both physical and transition risks, there were differences in the maturity of the assessment techniques used to identify relevant risks and set materiality thresholds.

Most banks in Luxembourg use qualitative and non-complex approaches based on a risk differentiation scale, such as “low-medium-high” or “green-amber-red”, against which the severity of each CRE risk driver is assessed. This is similar to the risk control and self-assessment (RCSA) exercise and may involve potential financial losses, business disruptions, or legal and reputational damage considerations.

The result is a heatmap, where for each prudential risk category a qualitative expert judgment is made on the impact and likelihood of the identified physical and transition risk drivers, both in the short and longer term. The materiality threshold is often associated with the most severe category (i.e., “high” or “red” risks), which may fall short of regulatory expectations. This is sometimes supplemented by proxy-based quantitative information, such as exposure analysis, sensitivity or scenario analysis, or concentration analysis. Table 5 lists some examples of the practices observed in Luxembourg.

Table 5: Examples of Luxembourg materiality assessment techniques (Source: ABBL and Deloitte)

Example #1	Example #2	Example #3
Physical risk impact on operational risk	Physical risk impact on credit risk (mortgage)	Enhanced counterparty screening that also captures social and governance-related criteria
<p>An institution identifies relevant physical risk events that could affect the operations of activities outsourced to other group entities, which are located in other jurisdictions.</p> <p>Based on scenarios formulated at group level, as well as forward-looking flood, drought and wildfire maps obtained from an external data provider, the institution derives a physical risk score to form its conclusion on the materiality of this risk.</p>	<p>A subsidiary of an international banking group assesses the materiality of its credit exposures collateralized by mortgages through analyzing geographical concentration risk.</p> <p>Using publicly available data, the institution allocates a physical risk level (high, medium and low) to geographical regions and measures concentration per risk bucket against a predefined materiality threshold.</p>	<p>A bank gathers data from multiple external providers and integrates it into an in-house tool to identify controversial counterparts. Internally set criteria, which are quite high-level, guide the identification of these controversial entities. This tool can identify social and governance-related criteria as well as CRE-related criteria.</p> <p>Strategically, this approach has led the bank to decide to minimize controversial exposures in its lending and investing activities or, where possible, eliminate them completely.</p>

Business strategy

The results of the materiality assessment help banks formulate and define ESG objectives and initiatives and create a transition plan for their business strategy, risk appetite and product offering.

Relevant good practices observed in Europe

The ECB Good Practices for CRE observes that some institutions use transition planning to manage transition risks by connecting their CRE risk strategy (material transition risk drivers, risk appetite and KRIs) with their strategic objectives (strategic targets, KPIs and product design).

Institutions have many options to choose from when building their ESG strategy, which should align with the bank's ESG vision and existing business model. These include setting limits and targets, defining exclusion and inclusion criteria, or reflecting ESG in pricing, product design and sales decisions.

Figure 4: ESG risk transition planning

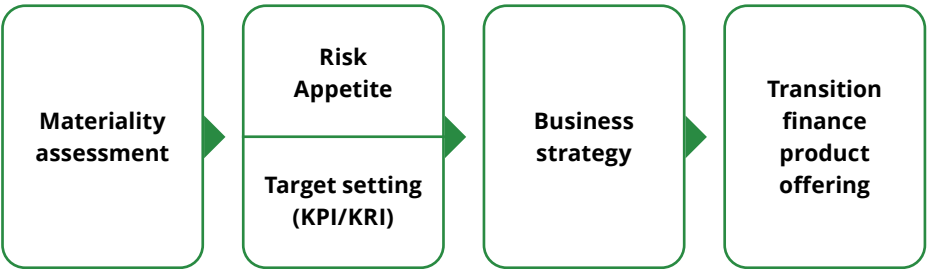


Table 6: Examples of relevant advisory services and transition products (Source: ECB)

Client engagement	Transition product
<ul style="list-style-type: none">• Residential real estate: provide online platforms that inform clients of concrete options to increase the energy efficiency of their property, such as by retrofitting it.• Green mobility: provide clients with information on the potential energy savings of renewing their car fleet (for corporate and small-to-medium-sized clients) or switching to a more efficient personal vehicle (for retail clients).	<ul style="list-style-type: none">• Green and sustainability-linked bonds and loans: offer products that apply the International Capital Market Association Green Bond and Sustainability-Linked Bond Principles (funding) and the Loan Market Association's Green Loan and Sustainability-Linked Loan Principles (lending).• House renovation loans: offer special-purpose loans for energy-efficient house renovations, which are sometimes supported by a government scheme.

Another example of good practice is using a transition risk scorecard methodology when performing due diligence during credit origination for customers active in sectors with elevated transition risks. The assessment's results are used to offer these customers specific products to support them in the sustainable economy transition.

Depending on an institution's objectives and vision, external engagement with clients and internal engagement with stakeholders across all departments are necessary. As business strategies shift to embrace ESG as a central part of their business model, all of the bank's activities will be impacted. The closer these ESG strategies are to the bank's core business model, the greater the need for the activities to be aligned.

As ESG strategies mature, client engagement becomes increasingly key, with client-facing roles and profit centers needing to showcase ESG products to customers. The bank's current product offering should also be evaluated and examined with the existing duration of contracts and maturities in mind, as the impact of ESG risks may materialize in the medium-to-long-term horizon. Finally, business relationships and products should be evaluated to ensure they align with the bank's strategic ESG goals.



How is it applied in Luxembourg?

While banks have begun integrating CRE into their risk management practices, business strategies with explicit CRE targets and indicators are not yet widespread in Luxembourg and sometimes rely on group targets. However, leading practices are beginning to emerge, some of which are illustrated in Table 7, indicating that things are moving in the right direction.

Table 7: Examples of CRE transition planning activities in Luxembourg (Source: ABL and Deloitte)

Example #1 Client engagement in private banking	Example #2 Green products incentivization	Example #3 Alignment with group target
<p>A private bank has created key monitoring indicators (KMIs) to collect and analyze clients' preferences and investment approaches regarding ESG.</p> <p>The bank intends to transform these KMIs into KRIs in the future, with clear targets and limits when sufficient data history is available.</p> <p>These KMIs include how often ESG-related products are presented to clients and their level of interest in these products.</p>	<p>A retail bank has created attractive pricing for green or sustainability-linked loans to incentivize clients to move to greener solutions.</p>	<p>A subsidiary of an international banking group has rolled out its parent company's strategy locally, aiming to achieve long-term CO₂ neutrality in its operations. For example, the bank plans to relocate to a new building next year in order to improve its carbon footprint.</p> <p>The subsidiary has precisely outlined its ESG investment approach for private banking clients, defining classifications for all investment instruments and including exclusion criteria. While their clients can still opt for these financial products and instruments, warnings on potential ESG risks are included in client reports.</p>

Governance and risk appetite

Management bodies are expected to consider CRE risks when developing the institution's overall business strategy, business objectives and risk management framework, as well as exercise effective oversight of CRE risks. The management body will also need to explicitly allocate roles and responsibilities regarding CRE risks to its members, subcommittees, or both.

Relevant good practices observed in Europe

01. Internal governance arrangements

A sound governance structure is vital for effective ESG risk management. Institutions must adequately incorporate ESG-related risk management strategies into all of a bank's divisions and departments and across the three-lines-of-defence model. A good practice is to properly and formally evaluate the bank's human and financial resources in line with these strategies and allocate budget and increase staffing when necessary.

Embedding CRE risk management in an institution's governance framework requires appropriate and specific training sessions. Climate-related KPIs should also be included in remuneration policies, sometimes spanning several years, with deferred payouts. Examples of KPIs used as part of senior executives' performance reviews include "emissions intensity reduction targets at portfolio level", "amount of 'sustainable' or 'green' finance products issued by the bank", or "achieved milestones as per the CRE risk management strategy roadmap". The ECB notes that this practice is generally limited to members of the management body and senior managers only.

When assigning roles and responsibilities for ESG risk management, it can be beneficial to establish a central coordination unit. However, the ECB expects banks to enhance their ESG competencies across all their existing

departments. Banks should consider CRE risk management expertise in the management body's suitability assessment and when setting up committees or relevant expertise within existing functions.

According to the ECB, CRE risk practices are now commonly integrated across organizations' entire three lines of defense, with responsibilities typically split as follows (not an exhaustive list):

First line:

commonly responsible for ESG risk assessments, such as credit processes and due diligence.

Second line:

- The risk management function can be responsible for:
 - Providing expert opinion on client transactions;
 - Recommending risk mitigation techniques;
 - Preparing and maintaining climate-related risk management policies (e.g., exclusion policies);
 - Developing methodologies to assess portfolio alignment using the Paris Agreement Capital Transition Assessment (PACTA) or financed emissions using the Partnership for Carbon Accounting Financials (PCAF) approach; or
 - Conducting due diligence with specific questionnaire(s) for clients.

- The compliance function can be responsible for:
 - Monitoring regulatory developments;
 - Conducting related compliance risk assessments (CRAs); or
 - Providing advice and checks on products offered to clients (i.e., whether "green" products actually qualify as such, based on regulatory criteria).

Third line:

the internal audit function is expected to incorporate CRE internal audit reviews in its multi-year audit planning. This can include reviews of:

- The controls for initiatives to achieve the institution's climate-related targets;
- The governance and internal control frameworks for categorizing loans as "green"; and
- The bank's climate risk assessment and stress testing framework.

02. Risk appetite and KRIs

In recent years, institutions in Europe and Luxembourg have gradually begun to include granular and forward-looking climate-related KRIs into their risk appetite frameworks, while disclosing the limitations of existing indicators in their internal reports.

The ECB and CSSF have both published examples of relevant CRE risk indicators, some of which are included in Figure 5.

Figure 5: Examples of CRE KRIs observed in Europe and Luxembourg (Source: ECB and CSSF)

- “We cannot exceed xx% of misalignments along transition trajectory to net-zero emission target by 2030.”
- “Financed emissions in the lending and investment portfolios should not exceed xx million EUR.”
- “Credit risk exposures to sectors or geographies subject to elevated climate-related risks should not exceed xx% of total credit risk exposures.”
- “The percentage of loans to corporates with a low emissions profile should be above xx% by 2025”
- “The percentage of assets under management (AuM) considered sustainable (internal definition) should reach at least xx% by 2025.”
- “The size-weighted ESG score of our investment portfolio valued at fair value through other comprehensive income (FVOCI) should be above xx.”
- “Lombard collateral from vulnerable countries or sectors (internal definition) should remain below xx% for each client.”
- “We should progressively phase out sectors that do not match our climate and environment-related risk objectives by 2035.”

How is it applied in Luxembourg?

01. Internal governance arrangements

Similar to the ECB's observations at the European level, Luxembourg institutions have made significant progress in embedding CRE risk into their internal governance and training programs, while adopting different organizational set-ups depending on their institution, as illustrated in Figures 6 and 7.

Another observed good practice is a retail bank that nominated a designated project manager to manage all projects linked with sustainability (and ESG) aspects. Given the multitude of regulations that apply—including the CSSF Circular 21/773, the Sustainable Finance Disclosure Regulation (SFDR), the Markets in Financial Instruments Directive (MiFID) and the CSRD—leveraging one centralized project manager to manage and implement all different sustainability initiatives across the bank can be more efficient; thus, providing a comprehensive view of the necessary data points needed. Concluding that these regulations impact all departments, the bank decided to centralize requests into a single ESG projects portfolio in order to address these data needs consistently and effectively.

Figure 6: Overview of observed CRE risk training practices in Luxembourg (Source: ABL and Deloitte)

- One bank has developed tailored training programs to cater to diverse audiences. The board of directors receives higher-level training, while more customized training courses target staff members who are directly involved in CRE risk management daily, such as second-line functions or credit analysts. A more general training program has also been launched to raise awareness among all employees.
- One asset servicing bank has a mandatory e-learning course for all employees. Its weekly staff meetings sometimes include updates regarding sustainability and CRE risks. These updates are given by the group's representatives or external guests and experts to address a specific topic. The bank's onboarding training also includes a section related to climate and sustainability matters.
- One private bank has previously organized training and awareness sessions on climate and sustainability on an ad-hoc basis, with specific discussions in various committees like the risk committee, executive committee, and the board of directors. Now that the bank has established internal CRE risk management processes, it is currently formalizing a structured, recurring training program that will be included in all employees' overall training curriculum.
- Other good practices observed in the Luxembourg market to strengthen the ESG skillset includes encouraging employees to certify in ESG risk management, enroll in relevant external courses, or become involved in industry working groups. Additionally, when recruiting, preference can be given to candidates with prior experience in ESG and sustainability.

Figure 7: Overview of observed CRE risk governance practices in Luxembourg (Source: ABBL and Deloitte)

- Commonly, the risk management department oversees the implementation of governance, risk appetite, materiality assessment, and ESG into the risk management framework. Meanwhile, the compliance function usually scrutinizes legal texts, manages reputation risk, handles greenwashing risks and oversees the client product offering, its classification and the related documentation—including MiFID requirements.
- While some banks have appointed a Chief Sustainability Officer, others view CRE risk management as a transversal topic spanning various functions (such as the three lines of defense, HR and finance). In the latter case, CRE risk topics must be discussed in a management committee, whether the risk committee or a dedicated ESG committee. For example, one bank has identified synergies between ESG regulatory requirements to adopt a global, consolidated approach that goes beyond CRE risks. This bank has established a dedicated ESG committee for this purpose, comprising three members of the executive committee (including the CEO), a risk management function representative, and representatives from other functions as well. This governance structure aims to ensure that ESG requirement information is properly distributed across all functions.
- In one bank, the business strategy department is responsible for introducing sustainability into strategic initiatives. However, in many international groups, CRE factors in strategic initiatives often depend on the overarching group strategy. For example, in a subsidiary of a global banking group, the parent company initiates and guides the ESG risk management process, while at the local level, expert teams primarily handle this process. This means the CEO holds overall accountability, and the risk management department oversees the integration of ESG risks into the risk management framework. Meanwhile, the legal department oversees the evaluation of regulatory risks associated with ESG. Status meetings with the group are held every week.

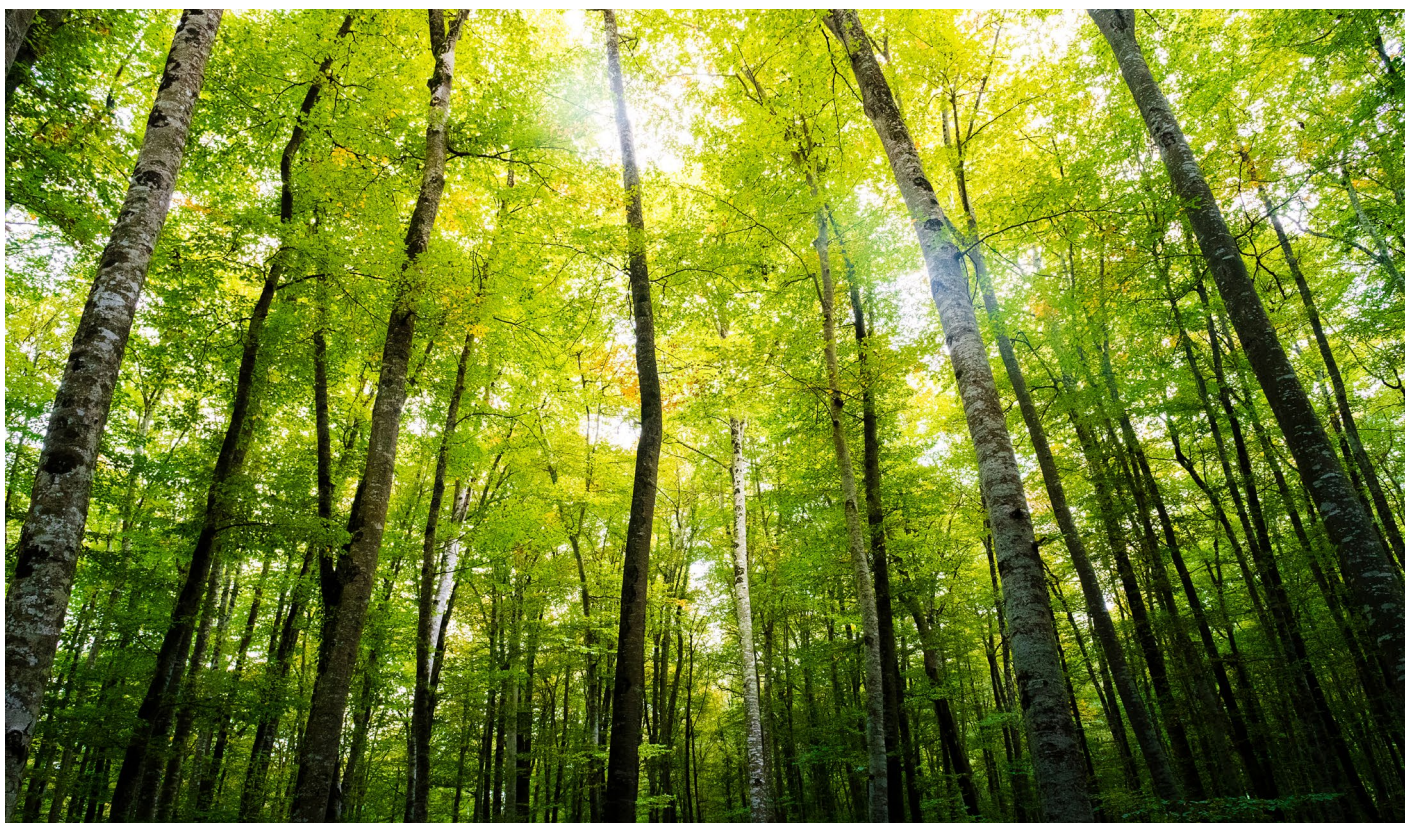
02. Risk appetite and KRIs

Setting CRE risk indicators for activities like investment portfolio management or granting credit is progressing well in Luxembourg, in line with European trends. However, certain indirect activities pose challenges for local banks. These include assets under management for private banking clients with advisory or execution-only mandates, or assets held by investment funds for custody banks.

While measuring exposures to CRE risk in underlying assets is common, setting targets and hard limits is more challenging, as clients ultimately make the investment decisions. However, banks can still encourage and incentivize clients as much as possible, which requires specific expertise to identify and define the relevant indicators over which banks have

complete control. For example, a private bank can set the percentage of investment solutions labeled “green” in the client offering, while depository banks can set the coverage of sub-custodians and other suppliers that have signed (or provided an equivalent of) a code of conduct with climate and ESG engagements.

While some banks have yet to include CRE-specific elements in their remuneration, leading practices have recently emerged. One private bank has added sustainability performance goals and KPIs in their employee performance scorecard, which significantly impacts performance assessment and remuneration. The KPIs used depend on where the function lies on the three lines of defense.



Risk management

To recap, institutions are expected to incorporate CRE risks as drivers of existing risk categories into their risk management framework, with a view to managing, monitoring and mitigating these risks over a sufficiently long-term horizon. In particular, they should identify and quantify these risks within their overall process of ensuring capital adequacy (ICAAP).

Over the last few years, banks have developed various approaches to properly capture and assess how CRE risk drivers could impact their institutions' risk profile in various ways, including credit, market, operational, liquidity, and reputation risks. While still posing a significant challenge to LSI, these quantification methodologies are evolving fast.

Relevant good practices observed in Europe

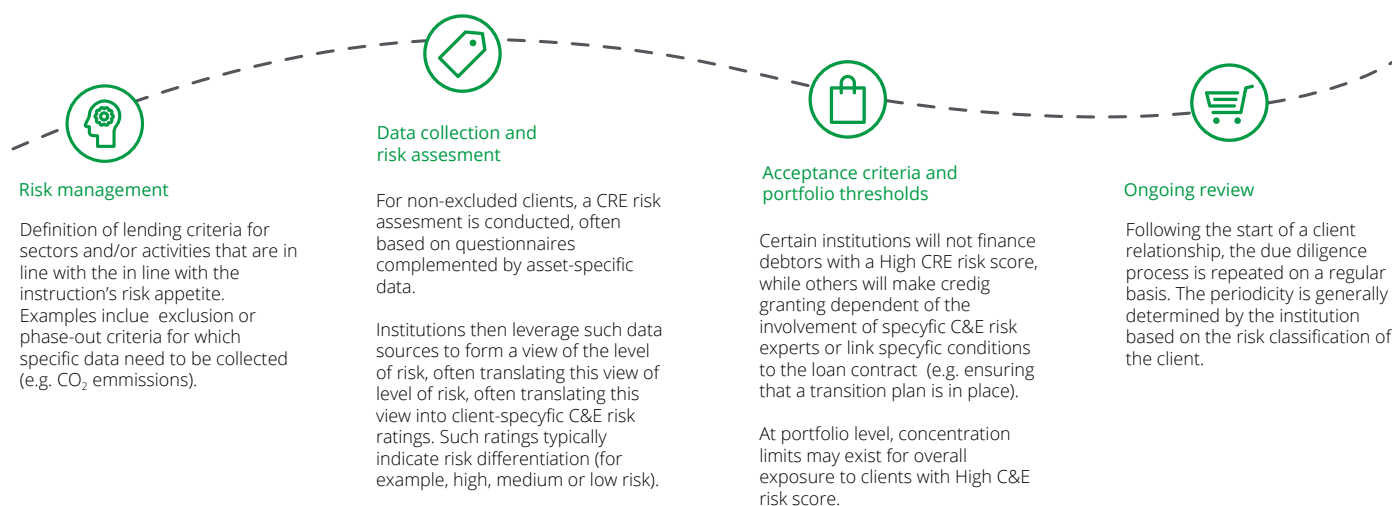
The ECB Good Practices for CRE lists several approaches in this area that are particularly relevant for Luxembourg banks:

1. Data collection in client due diligence;
2. Assessing CRE risk impact on credit and operational risks; and
3. Capturing CRE risks in loan pricing and collateral valuation.

01. Data collection in client due diligence

Several institutions have developed advanced approaches to embed CRE risks into their client due diligence and lending policies. Figure 8 summarizes these good practices.

Figure 8: Data collection as part of the client due diligence process (Source: ECB)



02. CRE risk impact on individual risk types

Incorporating the impact of physical and transition risks into credit risk models is still a work in progress for many organizations. Most banks have adopted an indirect approach through a stand-alone CRE risk scorecard for clients, which could feature an adapted traffic light system of green for low, amber for medium and red for high risk. This assessment's results are then discussed in credit committees and can lead to the counterpart's internal credit rating being adjusted, such as a downward override if the scorecard is low. While directly including CRE drivers in PD or LGD models is less frequently seen, it is gaining in popularity.

From an operational risk standpoint, banks are enriching existing scenario analyses with forward-looking projections to integrate climate change's aggravating effects stemming from physical risk drivers. As a result, climate change scenarios are being used to adjust the probability of some operational risk events occurring.

03. Loan pricing and collateral valuation

The EBA guidelines on loan origination¹³ entered into force in June 2021 and were transposed into Luxembourg law through the CSSF Circular 22/824¹⁴, applicable since 31 March 2023. Since then, banks must assess a borrower's exposure to ESG factors, especially from a CRE perspective, and the appropriateness of the mitigating strategies set out by the borrower. Consequently, banks have already begun to systematically integrate CRE risks in their loan pricing frameworks, either through the cost price or the margin adjustment.

Table 8: CRE risk integration into loan pricing (Source: ECB)

Integration via cost price	Integration via margin
<ul style="list-style-type: none">• Credit costs: the institution has a CRE risk rating system that can indirectly impact the credit cost component of the loan price, as risk managers can force a downward override of the client rating if the CRE risk rating is poor.• Funding costs: the institution offers green deposits (with fiscal benefits) at lower rates than ordinary deposit products. This involves lower funding costs being passed on to green lending products.	<ul style="list-style-type: none">• Reduction: the institution offers green lending products with lower margin requirements, or sustainability-linked loans where interest rate discounts (in basis points) depend on the client meeting CRE risk targets.• Increase: the institution offers sustainability-linked loans where interest rate discounts depend on meeting CRE risk targets. If these targets are not met, the margin requirement increases (in basis points).

In addition, institutions are required to consider ESG factors affecting the collateral's value, such as a building's energy efficiency. Mortgage lending's typical long-term nature and close links with physical risk drivers makes it an obvious candidate for integrating CRE risk drivers into loan pricing. For example, the ECB Good Practices for CRE highlights a group of leading institutions that use the EPCs of financed buildings to reflect CRE risks in both collateral valuations (e.g., with additional haircuts) and pricing (e.g., adjusted PD or LGD).

13. EBA, [Guidelines on loan origination and monitoring \(EBA/GL/2020/06\)](#), last updated 25 August 2022.
14. CSSF, [Circular CSSF 22/824, Application of the Guidelines of the European Banking Authority on Loan Origination and Monitoring \(EBA/GL/2020/06\)](#), 22 December 2022.

How is it applied in Luxembourg?

01. Data collection in client due diligence

Similar to the rest of Europe, banks in Luxembourg have started collecting data and information from clients to assess CRE risk exposures. The ECB Good Practices for CRE lists some of the information commonly collected during the client due diligence process; Table 9 summarizes examples of data that the ECB suggests could be collected and our observations based on discussions with local banks.

Illustration #1 (postal code) – one private bank collects the postal code of real estate used as collateral to assess flooding and wildfire risks, relying on a group tool to map the data to the risks. This assessment's time horizon is currently short-term. While the process is quite manual, it will become more automated by adjusting the core banking system database. For Luxembourg-based real estate, the Geoportail website is used to assess exposure to possible physical hazards.

Illustration #2 (EPC) – while EPCs are commonly collected for mortgage lending, they are only sometimes used in the loan pricing and risk measurement processes. Some banks only collect EPCs on new loans, while others have already started using EPCs in their credit risk models to explain the regression used to derive PD.

Illustration #3 (CRE scorecard) – a questionnaire is completed for all credit files related to corporate lending, with the questions split into three groups:

- Economic sector
- Counterparty
- Transaction

Table 9: Data collected during client due diligence
(Source: ECB, ABBL and Deloitte)

Degree of practice in Luxembourg	ECB collected data examples
Commonly observed	Geographical location data, such as postal code
	Energy performance certificate (EPC)
Sometimes observed	Sustainable building certificate
	Adverse media check
	Current and projected total GHG emissions broken down by Scope 1, 2 and 3 emissions (only in SI)
	Energy consumption intensity (GWh) (only in SI)
	Assessment of the impact of CRE regulations
	Implementation of CRE risk policies
Not observed in our sample of interviewed banks	Adherence to sustainability reporting, expected to increase as new reporting standards become mandatory (e.g., CSRD)
	Client due diligence questionnaire (CRE scorecard)
	Water consumption intensity
	Fossil fuel dependency (e.g., percentage of revenue and production volumes)
	Production, use or disposal of chemicals
	Time-bound emission reduction plans

The questionnaire's data is analyzed to obtain a CRE score and is classified as:

- Positive, which may suggest the internal credit rating should be upgraded; or
- Neutral or negative, which may suggest the internal credit rating should be downgraded.

The CRE score is then submitted to the credit committee, which will decide whether to override the internal rating accordingly when assessing the credit file.

02. CRE risk impact on individual risk types

Based on the ABBL's interviews, it appears that banks in Luxembourg rarely set aside internal capital to cover CRE risks in their ICAAP. This is often due to a lack of data to calculate the economic capital figure in a sufficiently robust way. However, banks in Luxembourg perform multiple assessment types to measure the potential impact of CRE risks on individual risk categories.

In addition to the examples presented in previous sections, other good practices observed locally include:

- A bank has implemented a system to handle reputational risk associated with CRE concerns. The compliance department oversees the tool, which navigates and scans online media and publications for specific keywords. If the tool detects any publications or content associated with the bank containing these defined keywords, it automatically generates and sends a report by e-mail.
- A bank has designed a climate risk stress test that simulates a significant asset crash event linked to a severe physical risk event.
- A bank is developing approaches based on data from the NGFS. While still a work in progress, the bank plans to explore the various NGFS scenarios like "Hot House World" along with an extended timeline of up to 40 years. Then, it will attempt to combine NGFS methodologies and macro-economic projections to simulate the evolution of indicators, such as GDP and unemployment, and associate them with PD or LGD parameters, or both.

- In its stress testing framework, one bank considers climate risk as a driver of other strategic risks, introducing the CRE component in the narrative description of the existing framework. The bank then assesses the likelihood of the scenario's occurrence. Examples include the loss of an important client due to climate risk exposure, or a client facing sanctions due to non-compliance with changing climate-related regulations.

03. Loan pricing and collateral valuation

For banks that have integrated CRE considerations into their pricing process, the most common approach observed in Luxembourg is the margin-based adjustment. This involves collecting CRE information via a questionnaire that is assessed qualitatively, and a resulting upward or downward adjustment is made to the loan's rating, price, or both.

One observed leading practice is adjusting loan pricing for retail clients based on predefined CRE criteria. An alignment with the EU Taxonomy could reduce the loan rate by a few basis points, while penalizing factors that depend on the loan type could increase the rate by a few basis points.

Figure 9: Overview of mortgage lending in Luxembourg

While most banks that offer mortgages collect EPCs, how they are used and integrated in the credit process differ.

- In the most advanced cases, EPC (or similar documentation) is one of the explanatory variables of the PD/LGD regression models. Therefore, it has a direct impact on the pricing model through the PD/LGD values.
- Another bank potentially decreases the asset value based on the energy label (haircut) and sets a concentration limit for areas at increased risk of floodings and wildfires.
- One institution includes the energy class as an input variable when evaluating collateral. However, it currently has little to no influence on the collateral's value.
- One bank is working towards developing the parameters for a damage function. Based on climate science models and observed hazard data, the threshold for a given severity is translated into a hazard-specific metric, such as the depth of flooding at a threshold of 100mm of rain in one day. This metric is inserted into a damage curve to estimate the value damages that can be used to adjust collateral valuations. The adjusted collateral valuations are then mapped with the loan-to-value (LTV) ratio.

Conclusion

Since our first whitepaper on this important topic was published, the prudential regulatory scrutiny related to CRE risk management has heightened, through formal supervisory expectations like the banking package, strengthened targeted supervision, and on-site inspections. The regulatory landscape is also extending beyond CRE risks to tackle other ESG concerns, prompting the industry's early adopters to begin integrating the broader S and G factors into their risk management frameworks.

Most interviewed institutions have concretely assessed the business opportunities, impacts and risks of CRE risk drivers. While not yet hiring extensively, these banks are training existing staff and continuing to build capabilities.

Over the last two years, Luxembourg banks have made progress with implementing CRE risk management practices, particularly with materiality assessments, business strategy, governance and risk appetite and the overall risk management framework. It is particularly encouraging to see Luxembourg banks find pragmatic solutions to implement evolving regulatory requirements into their specific business models. For example, fit-for-purpose implementation initiatives related to metrics, targets and climate stress testing can be challenging due to the Luxembourg market's unique banking business models.

However, significant short-term hurdles remain to fully align with ECB and CSSF expectations. Two key concerns are the lack of reliable climate risk data and models, and properly embedding CRE savviness across the entire organization.

- While the industry has seen concrete and relevant initiatives to collect data, its overall quality, reliability and relatively limited history impair banks' ability to build solid quantitative models. However, institutions generally agree that while the task is far from complete, it is better to make steady progress instead of holding out for the perfect data and solution. In other words, banks advocate for continuous improvement, even if conditions are not yet perfect.
- As banks increasingly introduce CRE and ESG questionnaires in their credit origination process and other client-facing business activities, front-office units must have adequate knowledge and awareness of CRE considerations to implement defined CRE strategies and targets. Similarly, management bodies must be properly informed and involved in defining the bank's CRE risk appetite, as well as the associated indicators and limit system, to monitor how the CRE risk profile evolves over time.

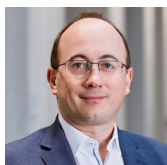
In general, institutions have made great strides in integrating ESG risks into their overall operations over recent years, with the trend here to stay. While some challenges remain, banks recognize that inaction is no longer an option; business and risk strategies defined over the short, medium and long term must properly include CRE aspects, building upon a solid and comprehensive risk management framework endorsed by management bodies and executed by all three lines of defense.



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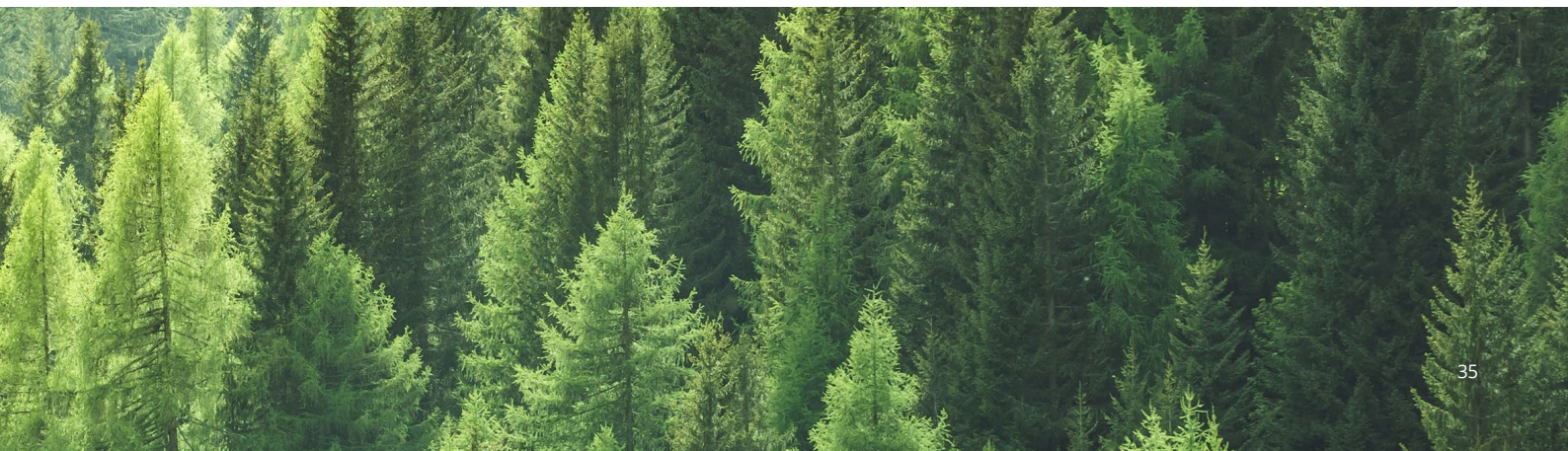
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