Green and Sustainable Finance Cluster Germany

WORKING PAPER VERSION

Net Zero Banking in Practice:

Climate Change in Banks' Core Business

Net Zero Banking Alliance Germany

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Content

1. Executive Summary

The movement toward Net Zero Banking, aligning bank portfolios with the Paris Agreement, has become a pivotal focus for financial institutions globally. Despite substantial commitments to climate action, the actual impact of these initiatives has been increasingly scrutinized, revealing a need for more transparent, evidence-based strategies capable of enduring external evaluations.
This paper explores the integration of net zero strategies into fundamental banking operations, such as balance sheet management, pricing strategies, information dissemination, and enabling activities. The goal is to show how banks can influence climate action in their portfolios and in the real economy using specific action and tools in these strategic areas.

The four areas can contribute in the following manner:

- Balance sheet management in the context of climate change entails enhancing and expanding business planning, hedging, provision of risk capital and strategic investment, and divestment to capture complexities of asset and liability operations within this new context.

- Pricing strategies, more explicitly, the cost of capital & internal pricing, will need to adapt to capture aspects such as the pricing of climate risk, the role of concessional finance in supporting green or transitional initiatives, and the integration of green covenants and other non-financial terms in loan agreements.

- The dissemination of information is a central pillar of climate integration in banks, but also in the financial system at large. It includes the circulation of climate-related information internally and among stakeholders, ranging from clients and investors to the broader public and regulatory bodies.

- Although not directly influencing capital flow, enabling activities are essential for creating an organizational and cultural framework that supports the operationalization of the aforementioned transmission channels. These activities are fundamental to achieving effective climate change mitigation strategies within banks. Key actions include setting the right governance structures and establishing a climate-related client dialogue.

Not all action areas appear to have the same effect on the decarbonization of the real economy and the decarbonization of the banking portfolio. The report discusses this aspect and provides an assessment of the direction of effects (positive, neutral, negative). For some actions, bank and real economy decarbonization align while for others they are not linked or even move in opposite directions. Decision-makers should keep this in mind when designing net-zero banking strategies and policies.

From the discussion of the effectiveness of these action areas and their respective tools, the report concludes with ten action points for net zero banking to policy makers, regulators, and the banking sector.

Policy makers

1. Establish adequate real economy regulation and adequate emission pricing
2. Develop technologies for timely bankability
3. Enhance the data infrastructure
4. Strengthen the ecosystem for net zero banking and real economy implementation
5. Enable more research on effectiveness of action in net zero banking and transfer of applied research to the banking sector

Regulators

6. Establish a level playing field in sustainable finance
7. Improve transparency on net zero banking

Banking sector

8. Further develop climate risk models
9. Build more and better capacities on net zero banking
10. Leverage regulation for business development

More work is needed at the bank, the banking sector, and the policy level to unfold the full potential of net zero banking. In this context, this report is meant to be a stocktake that guides further action. Future work of the NZBAG will build on it.

2. Introduction

The concept of Net Zero Banking, that is, banks that aim to align financial portfolios with the goals of the Paris Agreement, has gained momentum in recent years (GFANZ, 2021). Banks have progressively committed to climate action, embarking on the implementation of strategies to align their portfolios accordingly (Net Zero Banking Alliance Germany, 2021). Despite these efforts, the efficacy of Net Zero Banking initiatives has been questioned, with emerging research and negative media coverage suggesting that the impact may be less significant than expected (Kacperczyk and Peydro, 2022; Rink, 2024; De Haas, 2023; Sastry et al., 2024).

This scrutiny underscores the need for a transparent and evidence-based approach to Net Zero Banking that can withstand external evaluation. This paper seeks to advance this discourse by delving into the practicalities of incorporating net zero pathways and transition strategies into the fundamental operations of banking, such as balance sheet management, pricing strategies, and information dissemination. Our objective is to elucidate the mechanisms through which Net Zero Banking and associated bank lending could influence climate action both at the macro- and microeconomic levels. This review is crucial against the back-drop of inadequate global measures to combat climate change, which escalates transition risks linked to potential abrupt shifts in policy and exacerbates physical risks associated with climate phenomena (Intergovernmental Panel on Climate Change (IPCC), 2021).

Learnings from last years' efforts of implementing Net Zero Banking highlight the need for a more rigorous debate on what Net Zero Banking actually is and how it can change the course of action on climate change. The journey to achieve net zero in banking must be understood in the context of (deep) uncertainties (Haas et al., 2023), including regulatory gaps, fiduciary responsibilities, and the tangible impact of banks on the broader economy. This debate involves intertwining the perspectives of financial stability with the objectives of sustainable development.

Currently, there is a variety of interpretations of Net Zero Banking and its role within the broader economic transformation. Methodologies predominantly focus on portfolio alignment, neglecting the broader macroeconomic context, banks' internal decision-making processes, and the intricacies of the real economy transition; for internal decision-making see the following example.

Internal decision making exemplified

This case study explores the internal decision-making process within a bank contemplating three potential projects, each with distinct financial and environmental implications. The bank evaluates the following three projects on various metrics including Volume, Profit and Loss (P&L), Capital Charge, and CO_2 footprint, see Table 1.

METRIC	A	B	C
Volume (mEUR)	100	100	100
P&L (%)	3	5	2.5
Capital Charge (%)	8	20	10
CO_2 footprint (units)	5	10	2

Table 1: Comparison of Projects

The decision-making criteria in Business traditionally prioritize P&L, with Project B being the most favorable in terms of profitability. However, when considering Capital Charge as Risk Management and Finance would, Project A becomes the optimal choice due to its lower cost. From an environmental perspective, Project C, with the lowest CO_2 footprint, aligns best with sustainability goals, which would be the preferred project of the Chief Sustainability Officer (CSO).

This scenario highlights the internal conflict between financial performance and environmental impact, raising the questions:

- How can climate considerations be quantitatively integrated into internal processes?
- What strategies can ensure that environmental impact metrics, such as the CO_2 footprint, hold equal weight to "traditional" financial metrics in decision-making?

Using this example, we will show how different tools can contribute to the implementation of net zero banking throughout the report.

Therefore, this document explores the multifaceted challenges banks face, from adhering to fiduciary duties and regulatory requirements while pursuing sustainable goals to leveraging indirect impacts on the economy. In addition, it addresses the critical issue of additionality in bank financing, namely, distinguishing between actively driving systemic change and redirecting capital flows.
The document was developed in the NZBAG working group "Impact and Transparency" and is based on an analysis of the literature and a discussion within the group.

This article synthesizes recent developments in understanding Net Zero Banking, encompassing policy implications, academic insights, and practical approaches to implementation. By providing a comprehensive overview of the current landscape, this paper lays the foundations for further discussion and the development of actionable strategies. Through a robust framework, it seeks to articulate a path forward for the banking sector to fulfill its commitments to Net Zero while navigating the complexities of the financial and regulatory environments.

3. Transmission Channels

Banks can contribute to mitigating climate change through different channels. Figure 1 illustrates a conceptual framework for banks' activities that support climate change mitigation. From the point of view of a bank, three transmission channels stand out: balance sheet management, cost of capital & internal pricing, and information dissemination. These are supported by enabling activities.

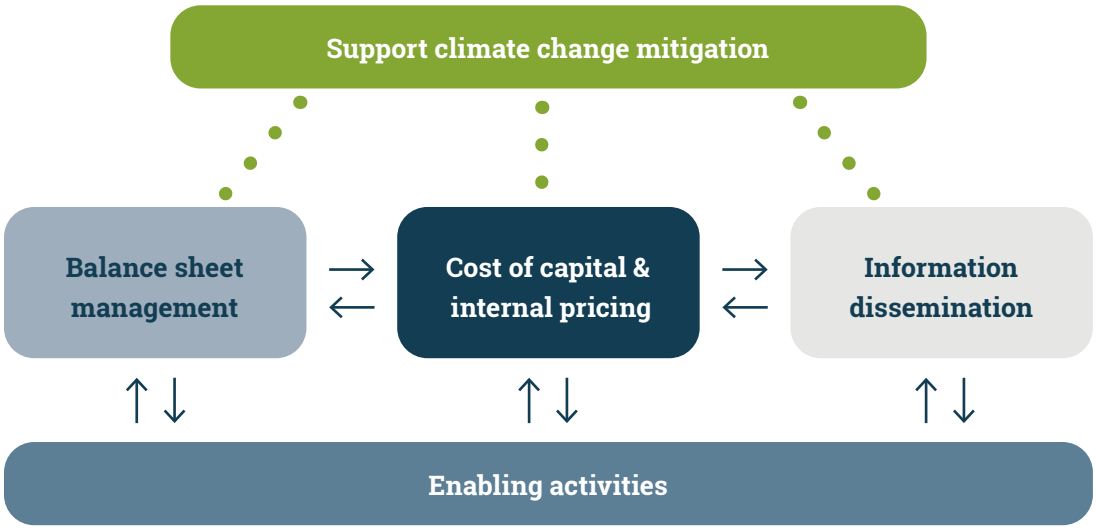

Figure 1: Transmission channels (own assessment)

Through the first channel, "Balance sheet management", banks can manage their balance sheets in a way that promotes climate-friendly projects and assets while also decarbonizing the bank's lending portfolio. Thereby banks can influence the lending market through strategic investment and divestment decisions, which could ultimately affect liquidity in the real economy.

The second channel, "Cost of capital & internal pricing", embodies all activities through which banks can support climate change mitigation by adjusting the cost of capital to favor environmentally sustainable investments and by incorporating environmental considerations into their internal pricing mechanisms.

The third channel, "Information dissemination", denotes the role of financial institutions in spreading relevant information regarding climate change and motivating borrowers to provide information. This involves discussing technology pathways with stakeholders and collecting and passing on data.

"Enabling activities", such as client dialogue and governance, represent the necessary underlying actions that support the main activities without usually having a direct link to financing conditions.

In the following, we discuss the transmission mechanisms of each channel by reflecting on possible actions, including their potential effectiveness to support the decarbonization of bank portfolios and the real economy. In addition, we discuss the tools that banks can employ to activate the transmission channel and categorize their potential relevance for the decarbonization of the bank portfolio, climate-

related risks in lending portfolios, and decarbonization of the real economy. The following **Table 2** summarizes the actions in the different areas.

The discussion of tools for one action is followed by a table that briefly assesses their effectiveness. We use the following categories:

- **Portfolio:** the likely effect of the tool on the decarbonization of the lending portfolio
- **Risk:** the likely effect of the tool on the climate-related risk in the banks' portfolio
- **Economy:** the likely effect of the tool on the decarbonization of the real economy

We use the following symbols in the assessment:

+ = mostly positive effects
0 = neutral or opposing effects
- = mostly negative effects
If a tool lies between two symbols, we show both separated by /.

AREA	ACTION
Balance Sheet Management	• Business Planning • Hedging • Provision of Risk Capital and Strategic Investment • Divestment
Cost of Capital & Internal Pricing	• Pricing Climate Risk • Concessional Finance for Green and Transitional Activities • Covenants and Non-Financial Loan Terms
Information Dissemination	• Dialogue with Rating Agencies • Market Signalling • Policy Signalling • Internal Audit and Compliance
Enabling Activities	• Governance and Strategic Decision-Making • Client Dialogue

Table 2: Net-Zero Banking Actions in Different Areas of the Bank

3.1 Balance Sheet Management

Balance sheet management is the first channel through which banks can implement net-zero strategies. Balance sheet management is essential for navigating the complexities of asset and liability operations within a bank's balance sheet. In the context of climate change implementation, four potential strategies actions appear relevant: business planning, hedging, provision of risk capital and strategic investment, and divestment.

Business Planning: The cornerstone of strategic balance sheet management lies in business planning. This entails a comprehensive analysis of the bank's risk appetite, that is, the level of risk a bank is willing to take to achieve its goals. For example, a bank with a high risk appetite might invest in early-stage renewable energy projects, which have higher risks but also higher potential rewards. In contrast, a bank with a low risk appetite might prefer investing in established technologies such as onshore wind with lower risks. In addition, sectoral and geographical focuses affect the climate exposure of a bank's portfolios as different sectors and regions will likely develop differently in terms of their climate impact. While it is expensive to decarbonize the steel sector, it is much cheaper to decarbonize electricity (IEA, 2021). As a result, a bank with a large utility profile will find it easier to decarbonize its portfolio compared to a bank with strong steel exposure. Finally, temporal aspects are of particular interest in this context due to the short-term nature of most banking assets, which is starkly contrasted with very long tenures of some asset classes, such as mortgages; see Table 3 for an illustration.

BUSINESS ASPECT	TIME HORIZON
Loan Tenure	1 – 10 years
Risk Management	1 – 5 years
Mortgage	10 – 30 years
Climate Commitment	30 – 40 years

Table 3: Business Aspects and Their Time Horizons

At the macrolevel, questions remain as to whether the decarbonization of the bank balance sheet inherently leads to a decarbonized economy. The first evidence points to a disconnect between individual institutional actions and the broader economic impact (Kacperczyk and Peydro, 2022). However, this lack might be due to the early stage in which banks seem to be implementing strategic business planning with respect to climate goals. **Increasingly used tools include:**

- **Selection (industry, client, asset):** A straight-forward approach is to simply select industries, clients, and assets on their climate relevance. This includes crowding in green or transitioning financing and crowding out brown financing. Crowding in means increasing investments in green projects, while crowding out means reducing or eliminating investments in fossil fuel-based projects. For example, a bank might choose to fund solar panel installations (crowding in) while divesting from coal power plants (crowding out).

- **Strategic asset allocation** based on new vs existing business: This encompasses setting weights for sectors, geographies, or levels of "brownness" / "greeness" in lending and investment portfolios. Using this setting, banks regularly check the allocation in accordance with their strategy and with the latest climate science and technological developments.

Strategic asset allocation exemplified:
Systematically introducing weights on the CO_2 footprint in the bank steering would make Project B from Table 1 much less attractive for the overall portfolio performance in comparison to A and especially C. If a climate weight is integrated in the incentive mechanism for the Business department, it could render project C the most attractive for this department as well.

- **Stratifying the balance sheet along time horizon buckets:** allows banks to align their financial assets and liabilities with their long-term climate goals, by identifying how different assets will contribute to or mitigate against climate change over various time frames. It helps prioritize areas for action according to the banks' flexibility to adjust their portfolio (e.g., all 30-year mortgages had to be aligned with net zero since 2015 to ensure the net zero target for 2045 of this particular product from this period would be met).

Table 4 summarizes the effectiveness of the tools for portfolio decarbonization, climate-related risk in the portfolio, and impact on the economy. All strategies exhibit positive effects on portfolio decarbonization, as they are directly linked to ensuring greener loans on the banking book. They are likely to reduce the exposure of banks to transition risks[1]. However, a shift of lending to greener activities is unlikely to decarbonize activities in the real economy (Sastry et al., 2024).

TOOL	PORTFOLIO	RISK	ECONOMY
Selection	**+**	**+ / 0**	**0**
Strategic asset allocation	**+**	**+ / 0**	**0**
Balance sheet	**+**	**+ / 0**	**0**

Table 4: Effectiveness of Tools, Business Planning

Hedging: Hedging strategies are designed to prepare banks for potential market corrections triggered by climate-related risks (e.g, Cepni et al. (2022), Engle et al. (2020), or Andersson et al. (2016)), such as sudden changes in carbon pricing or consumer preferences. Although some hedging strategies, such as investing in green assets, could potentially foster real economic shifts toward sustainability by lowering the costs of green projects and enhancing capital flow, most are primarily focused on financial stability on the balance sheet rather than direct decarbonization efforts. However, these strategies can indirectly contribute to the mitigation of climate change by promoting a more resilient and adaptable financial system.

1 However, banks might build up cluster risks.

Banks have several tools at their disposal to develop a hedging strategy for climate risks.

- **Stress testing & scenario analysis:** The prerequisite to employing hedging strategies is understanding where potential effects of climate change could appear in the portfolio and how severe they could be. For this purpose, stress testing (i. e., the analysis of the impact of extreme events on the banks' balance sheet) and scenario analysis (i. e., analysis of potential future developments under different climate outcomes) are available for this purpose.

Stress testing exemplified:
Banks might currently underestimate the climate risks inherent with different counterparties. A climate stress test might reveal that the capital charge of 20% for project B in Table 1 is too low. This might be due to an underestimation of risk associated with a CO_2 price or with a change in consumer preferences for more sustainable products. If the banks increases the capital charge on project B then project C becomes the most attractive in terms of risk-return profile, potentially convincing the Business department to reconsider its preferred project.

- **Green instruments:** Green instruments have the potential to work as hedging tools against climate risks, both transitional and physical. They tend to perform better when the market is hit by a climate-induced shock (Cepni et al., 2022; Engle et al., 2020). This mechanism can help banks hold non-green or not-yet-adapted assets for transitioning purposes.

- **Carbon credits and offsets:** Carbon credits have emerged as an additional asset class, which currently receives substantial attention. Those assets can benefit net zero banks' hedging strategies in two ways: (i) they can be used to hedge against the risk that portfolio constituents do not decarbonize as intended, and (ii) they can help diversify the (investment) portfolio (Demiralay et al., 2022). However, carbon offsets oftentimes show low levels of additionality and sometimes counterproductive effects[2]. This means that the quality of their design does not always yield the intended outcome and that resources invested in them could have been spent better elsewhere. In addition, banks might divert resources away from their primary lending activities when pursuing offset strategies.

The tools have varying effects; see **Table 5**. While stress testing and scenario analysis are unlikely to support decarbonization efforts in the bank and economy, green instruments could help banks align with their targets. The effect of carbon credits depends mainly on their quality. As most carbon credits are of low quality, they are unlikely to affect the bank and could even harm decarbonization efforts in the real economy.

TOOL	PORTFOLIO	RISK	ECONOMY
Stress testing & scenario analysis	**0**	**+**	**0**
Green instruments	**+**	**+**	**0**
Carbon credits	**0 / +**	**0 / +**	**–**

Table 5: Effectiveness of Tools, Hedging

2 See The Oxford Principles for Net Zero Aligned Carbon Offsetting for a discussion of credible offsetting strategies.

Provision of Risk Capital and Strategic Investment

A critical barrier to the advancement of emerging green technologies is the scarcity of financing (Yu et al., 2021), particularly compared to established green technologies such as wind and solar power. By providing high-risk venture capital, financial institutions can play a crucial role in fostering the innovation necessary for climate transformation. However, the inherently conservative nature of the banking environment may limit direct involvement in the early stages of technological development, relegating banks to a more supportive role in later phases of scaling and mass deployment.

Standard innovation financing tools can be applied to overcome the challenge and extend the volume of financing from banks to innovative industries, clients, and assets.

- **Early stage instruments:** The frameworks around green and sustainability-linked instruments can be extended to use these instruments for the earlier stage financing of innovative technologies such as green steel or carbon capture and storage (CCS). This can signal the existence of a funding pipeline for the real economy. However, in itself, this tool will not overcome the perceived risks of such projects and will not substantially alter their economic viability.

- **Public private partnerships:** Cooperation between public and private actors can help reduce these perceived risks. State actors can provide financing subsidies, guarantees, or take over higher-risk positions to increase the bankability of innovative industries, clients, and assets. This increases the attractiveness for banks to finance respective projects. For example, a government might offer guarantees or subsidies for projects like green hydrogen production, encouraging banks to invest in these emerging technologies through senior tranches despite their higher risks.

These tools help decarbonize the bank portfolio (Table 6) by including new projects and technologies into the financing pipeline. They do not change the risk in the portfolio substantially, as they might be exposed to less policy risk but to higher technology risk. The tools support the transformation in the real economy if they enable technological development, which is more likely to occur with public support than through bank financing alone.

TOOL	PORTFOLIO	RISK	ECONOMY
Early stage instruments	**+**	**0**	**0 / +**
Public private partnerships	**+**	**0**	**+ / 0**

Table 6: Effectiveness of Tools, Provision of Risk Capital and Strategic Investment

Divestment

Divestment strategies involve withdrawing investments from certain sectors or companies in the hope of influencing corporate behavior toward more sustainable practices. In some sectors and brown technologies such as electricity generation from coal, divestments by banks can change firm behaviour (Green and Vallee, 2022). Divestment can further serve as a signal to deter new environmentally harmful projects (Becht et al., 2023) and be applied as a measure of last resort. Its effectiveness as a general tool for transformation is however limited. Divestment risks redirecting control over brown firms to less sustainable financial institutions. Furthermore, by pulling investments from companies in dire need of transition finance, divestment can inadvertently exacerbate environmental damage rather than mitigate it in a potentially counterproductive manner (Hartzmark and Shue, 2023).

Divestment strategies are nowadays well-tested, and thus banks have several tools at their disposal.

- **ESG integration & portfolio tilting:** ESG integration involves systematically including environmental, social, and governance (ESG) criteria in the lending process. Climate aspects generally represent a relevant part of the ESG ratings (Dumrose et al., 2022) and capital can be allocated away from borrowers not aligned with the Paris climate objectives.[3] Portfolio tilting refers to the deliberate adjustment of investment and lending allocations towards assets with favorable ESG ratings. These strategies may not always apply to the existing lending stock, but regular rollover in many portfolios can be used to divest from specific clients.

- **Bottleneck principle:** Similarly to portfolio tilting, some banks use exposure metrics for carbon-intensive or climate-relevant sectors as a minimum factor in the credit process. Through this approach, they set an upper limit (based on credit guidelines and risk appetite) on their activity in specific sectors, technologies, or carbon-intensive assets. Excluding existing clients using this approach is a form of divestment.

The divestment tools in **Table 7** will decarbonize the bank portfolio by removing brown projects from the books. They might improve the risk position with respect to climate risks in case of materialization. Research shows only a limited impact on real economy decarbonization.

TOOL	PORTFOLIO	RISK	ECONOMY
ESG integration	**+**	**+ / 0**	**0**
Bottleneck principle	**+**	**+ / 0**	**0**

Table 7: Effectiveness of Tools, Divestment

3 Please note that not all ESG ratings focus on impact. Hence, it is important to consider the strategic focus of the rating when using these for impact purposes.

Net Zero Portfolio Steering at Deutsche Bank

Deutsche Bank aims to be Net Zero by 2050. To achieve this, DB has established a respective sustainable finance governance, and implemented supporting tool sets.

The Sustainable Finance Governance Forum is tasked with the interpretation and method of applying the sustainable finance framework's definition and product classifications. The Members may be consulted for specific sustainable finance transactions as well as general, client or productspecific sustainable finance criteria for selected activities or industries. The Net Zero forum reviews client decarbonization targets, strategies and governance to assess alignment with the bank's sectoral decarbonization target DB has published decarbonization targets for carbon intensive sectors as part of DB's net zero strategy, transition plan and risk appetite. In order to reach these goals DB applies client and asset selection for carbon intensive sectors towards a strategic asset allocation along industry-specific pathways. To foster decision making certain metrics supports to optimize between generating revenue versus declining carbon budget. At current state, the metrics are focusing on exposure, limit, revenue and portfolio-specific intensity metrics which differs for carbon-intensive industries per sector. In case of bottlenecks on current targets and/or pathways the reviews result in prioritization of new transactions or adjustment proposals for certain transactions.

As DB, we are reflecting on how to continuously improve our decision-making capacities with respect to our net-zero targets. Currently, we are considering different additional concepts like Return on Carbon as a future decision criterion, where one calculates revenue over financed emissions as efficiency metric. Hence, the Return on Carbon allows to rank transactions which shows high profitable clients or transactions with low CO_2-consumptions on the upper range, while low profitable clients or transactions with high CO_2-consumptions are on the lower range. This allows to cut off transactions which are above the targeted CO_2-budget for the respective sector. In case of CO_2-budget constrains the underlying portfolio is optimized with regard to profitability. This is another example how a bottleneck principle could be applied in the future.

3.2 Cost of Capital & Internal Pricing

In the banking sector, the valuation of loans is a fundamental aspect of financial management. Over the past decade, the increasingly evident influence of climate change on the economy has moved the discussion towards its impacts on capital costs and the potential impact that capital costs can have on climate action. Depending on the role perspective, the valuation of climate aspects varies or follows a different objective function. For the P&L, adding green projects to the portfolio is the main target. From the regulatory capital perspective, adding a climate component to Risk Weighted Assets (RWA) is currently challenging. From a Pillar II perspective of Basel III, climate is very likely to play an increasingly important role. For a bank, these considerations matter in defining a climate strategy that supports the decarbonization pathway.

We structure the discourse around three principal themes: the pricing of climate risk, the role of concessional finance in supporting green or transitional initiatives, and the integration of covenants and other non-financial terms in loan agreements.

Pricing Climate Risk: The challenge of accurately pricing climate risk is significant, given the complex nature of climate change's impact on the financial system and specific lending relationships. Climate risks include both physical risks (e.g., extreme weather events) and transition risks (e.g., changes in regulations, market preferences). Pricing these risks accurately helps ensure that banks are not overexposed to potential financial losses due to climate-related events, ensuring long-term financial stability.

The increasing regulatory demands require financial institutions to improve their ability to identify, assess, and manage climate-related risks (EBA, 2024). Such risks could increase the cost of capital for environmentally harmful projects (Delis et al., 2023), making them economically unfeasible. In contrast, green activities might enjoy relatively cheaper financing conditions. For example, if a bank finances a coastal real estate project, it must consider the increased risk of flooding due to rising sea levels. Incorporating this risk into the loan price could result in higher interest rates or require additional collateral from the borrower.

Currently, banks tend to price climate risks at a lower level than capital markets (Beyene et al., 2021), that is, bonds tend to price climate risks more than loans. For carbon-intensive companies, e.g., fossil fuel firms, the difference in resulting capital cost might make banks more attractive as a source for lending than capital markets. This could result in a shift of brown assets from capital markets to lending portfolios. The effect is likely to be weaker for real estate finance.

However, an unintended consequence of such pricing might be the inadvertent increase in capital costs for green projects as well, as banks recalibrate the capital cost frameworks of their existing portfolios, which may be predominantly non-green. This calibration could decrease the availability of funds for sustainable projects (Oehmke and Opp, 2022)[4]. This underscores the need for further advances in the field.

4 The authors show this effect for the introduction of regulatory djustments to capital adequacy measures. The effect should remain independent of whether the regulator or the bank takes this action.

Banks have begun to deploy various tools to understand the effects of climate change on their risk pricing. Many tools are still in development and are being implemented (Rink, 2024), and heuristics are often used. As a result, the loan price is likely to not fully reflect climate risks (Ehlers et al., 2022). Relevant tools include:

- **Adjustments to the loan risk model:** Integration of climate factors (emission data, delta to transition indicators, physical hazard data, etc.) into loan models to estimate potential changes in probability of default (PD) and loss given default (LGD). This approach is very close to the core banking activity. However, the lack of historical data on climate effects makes the (regulatory) use of this tool nearly inadequate, as it does not reflect evolving future events. For example, a bank might use historical data on flood incidents to predict future risks for properties in flood-prone areas. This prediction can then be factored into the risk assessment of loans for such properties. However, since flood risks are expected to increase substantially with increasing global temperatures (Intergovernmental Panel on Climate Change (IPCC), 2021), using historical data alone is inadequate.

- **Economic capital adequacy:** In the absence of regulatoryly accepted loan-specific modeling of climate risks, capital charges could be levied through economic capital adequacy. In this case, the resilience of a bank against a series of climate scenarios and/or climate shocks is tested using sensitivity analysis and stress tests. Capital charges could be adjusted under Pillar II of the Basel regime to ensure that the bank is sufficiently capitalized in the future. Similar tools might be deployed for liquidity risk purposes. For example, during a stress test, a bank might simulate a scenario where carbon prices triple, assessing the impact on its loan portfolio. If significant vulnerabilities are identified, the bank might increase capital reserves to mitigate these risks.

- **Exclusions[5]:** Some banks have begun to shift portfolios away from dark brown assets, often by excluding specific sectors (e.g., coal mining). Although some of the motivation for such exclusions could be environmental concerns, excluding new business with potentially higher risk of stranding and higher transition risks could well form part of a climate risk strategy, that is, the risk exceeds the climate risk appetite of the bank. If the vast majority of market players follow similar strategies, loan prices can change (Berk and van Binsbergen, 2021)[6]. On the contrary, banks may include specific activities, which is discussed in the next subchapter.

- **Internal emission pricing:** A specific form of assessing climate risk is the introduction of an internal emission price by a bank. The price can be fed into models, e.g. cash flow models.[7] For example, bank sets an internal carbon price of 100 EUR per ton of CO_2. This price is used to evaluate the profitability of projects, making high-emission projects less attractive compared to low-emission alternatives (recall Projects B and C). In addition, internal carbon markets and pricing can be used to potentially reduce overall exposure to transition risks while allocating this artificially scarce resource using a market-based approach and reflecting current market practices (e.g., the EU emission trading scheme).

- **Bottleneck principle:** Some banks use exposure metrics for carbon-intensive or climate-relevant sectors as a minimum factor in the credit process. Through this approach, they set an upper limit (based on credit guidelines and risk appetite) on their activity in specific sectors, technologies, or carbon-intensive assets.

5 Divestment can be considered a form of exclusions where existing business relationships are phased out.

6 However, it would still not be clear whether such repricing would be preferences- or risk-driven.

7 The implementation comes with some modelling assumptions such as the level of emission prices (in 2023, the EU emission price fluctuated between 70–100 EUR) and the rate of emission price pass through to or from other economic actors.

Climate risk pricing tools can generally have a positive effect on portfolio decarbonization **(Table 8)**, at least as a one-off effect at the margin. They are very likely to improve the risk position of the portfolio as they help banks better reflect or avoid these risks. However, it is unlikely that the impact on the real economy will be large due to limited pricing effects and potentially counterproductive effects (Hartzmark and Shue, 2023).

TOOL	PORTFOLIO	RISK	ECONOMY
Risk model adjustments	**+ / 0**	**+**	**0**
Economic capital	**+ / 0**	**+**	**0**
Exclusions	**+**	**+**	**0**
Exclusions Emission pricing	**+ / 0**	**+**	**0**
Bottleneck principle principle	**+**	**0 / +**	**0**

Table 8: Effectiveness of Tools, Cost of Capital & Internal Pricing

Case study on cost of capital & internal Pricing with regards to ESG risk by LBBW

In recent decades, credit risk modeling has become a standard practice in financial institutions' risk management. Most models focus on the probability of default and the recovery rate. In recent years, climate risk has become a major factor in determining overall risk in a given credit portfolio. However, most models focus on the likelihood of extreme weather events and the resulting damage to bank collateral, also known as physical risk. Transitory risk, on the other hand, defined as the risk that results from societal and economic changes toward a low carbon and more climate-friendly future, is yet to be integrated into banks' risk models. This case study discusses possibilities for integrating ESG risk in the pricing of banks for commercial real estate.

Measuring ESG factors

ESG is a broad topic. Although the use of fossil fuels and the emission of CO_2 are one of the most common considerations in terms of environmental factors, other factors such as water usage, building pollutants, and hazardous waste from the past also need to be considered. In addition, social and governance factors should also be considered. Although most environmental factors can be measured reliably, social and governance factors cannot be measured as reliably. The most common way to measure ESG risk is through ESG questionnaires. The answers are then rated on a scale from 1 to 3, with 1 being the best score possible. Single scores are then added to a client or transaction score.

Theoretical background on ESG risk

In theory, better real estate performance in terms of ESG should result in a lower risk to the financing bank. This is

1. due to higher demand for real estate with a good ESG score, since tenants prefer this type of real estate. Higher demand should result in a lower probability of default, reducing the cost associated with risk for banks.

2. due to the higher demand from investors for good quality ESG properties, resulting in higher recovery rates, further lowering the risk cost to banks.

However, for much of the past 14 years, low interest rates have been supporting real estate markets around the world, resulting in very low to no defaults on real estate lending. In addition, banks' risk models are based on the past default and recovery rates. Since there were very few defaults in this long period of time, banks face the challenge to quantify the theory of lower risk for good scoring ESG real estate.

Bridging the gap

Faced with this challenge, we at LBBW/Berlin Hyp developed a pricing scheme based on the ESG score of a property without changing the risk cost determined by our internal risk models. To do so, we break down the ESG score by category. As expected, environmental questions had the greatest impact on the ESG score. Breaking this further down by looking at commercial real estate, the ESG score in large part depends on the heat and power consumption of a property and the CO_2 emissions related to power and heat. Second, a benchmark for CO_2 emission was needed. Within commercial real estate, the most common benchmark is the "Carbon Risk Real Estate Monitor" (CRREM). CRREM developed a pathway for almost every type of property in every country to reach net zero emission by 2050. Due to the indepth data that CRREM provides, we decided to use it as the benchmark for commercial real estate. After defining the benchmark, a scheme was developed that covers the actual CO_2 emissions of a building with its CRREM benchmark emissions. However, CRREM pathways are declining significantly until 2050. Our pricing scheme takes this into account by not only comparing CO_2 emission at the point a loan is handed out to a costumer but over the entire term a loan is granted.

Back testing and further steps

The back testing results showed that most deals in the past would have had a discount or a penalty in the low basis point range. Looking at the pricing of commercial real estate loan, this can be considered low impact. However, the impact is much higher for prime properties that already reached net zero or nearly net zero and the worst performing properties. For these two types of property, ESG pricing can drastically change the price of a loan. At the moment, the pilot phase for ESG pricing is underway. It remains to be seen whether the results of the backtest hold in the future. Looking at the importance that ESG has gained in recent years, it is safe to say that banks' ESG-based pricing will be the subject of much change in the coming years. From the perspective of today, it seems most likely that ESG factors will change the cost of risk in the future.

Concessional Finance for Green and Transitional Activities

The dynamics of the competitive market and the regulatory framework of the banking sector pose challenges in significantly altering the cost of capital when lending to the real economy through conventional financial products such as loans (Berk and van Binsbergen, 2021). However, varying the cost of capital is essential for the viability and acceleration of innovative and sustainable projects.

Concessional finance, particularly with government and state backing, is posited as a solution to derisk projects and spur economic viability for green technologies and sectors. However, the potential drawbacks of such an approach include the risk of substantial deadweight effects where public funds might subsidize projects that would have proceeded without such support and a somewhat prevailing insufficiency of such instruments to make net zero projects work at scale due to high transaction costs and undersized concessionality.

Concessional tools have existed for a while in the financial industry. They include the following:

- **Dedicated instruments:** Banks increasingly offer financial products that incorporate financial benefits and costs associated with the sustainability performance of the underlying asset or activity. Some products finance a predefined set of assets or activities (green loans or bonds), whereas others target changes in underlying activities (sustainability-linked loans or bonds). The idea is that a greenium or a bonus reduces capital costs for the lender, which is potentially facilitated by changes in capital requirements (RWA)[8]. For example, a green loan might offer a lower interest rate if the borrower meets specific environmental performance targets, such as reducing energy consumption by 20%. However, this has not materialized to a degree that would actively support the transformation of assets and activities so far.

- **Public funding:** Banks can work with capital provided from public sources to reduce perceived risks. State actors can provide financing subsidies, guarantees, or take over higher risk positions to increase the bankability of innovative industries, clients, and assets.

- **Forgo return:** One concessionality element could result from investors changing their sustainability preferences so that they are willing to forgo some return for more (impact-oriented) climate lending by banks. For example, a pension fund invests in green bonds with slightly lower returns but with significant environmental benefits, causing banks to issue more green bonds. The pension fund could have an incentive to do so because its beneficiaries may want to enjoy retirement in a more sustainable world. A trend toward calling for more climate action is observable for institutional investors (Rink et al., 2024) and for retail investors (Bauer et al., 2021). If this results in a willingness to forgo return at a scale and scope necessary for banks to change their risk appetites, or their own cost of capital remains questionable.

8 However, the effect such RWA reductions as a tool to increase lending to a specific sector remained limited in the case of the SME Supporting Factor.

Concessional finance tools are very likely to help decarbonize the bank portfolio due to their enabling effect for green financing opportunities; **Table 9**. It is therefore also likely in many cases to support the decarbonization of the real economy. The risk in portfolios likely increases when the return is reduced. It is likely to reduce the inherent risk of lending to residuals through public funding. For this reason, public funding and dedicated instruments can help reduce risks in the portfolio.

TOOL	PORTFOLIO	RISK	ECONOMY
Dedicated instruments	**+**	**+ / 0**	**0**
Public funding	**+**	**+ / 0**	**+**
Forgo return	**+**	**–**	**+**

Table 9: Effectiveness of Tools, Concessional Finance for Green and Transitional Activities

Covenants and Non-financial Loan Terms

Beyond direct financial metrics, banks possess the capacity to influence environmental sustainability through loan stipulations. This includes the implementation of covenants that require borrowers to adopt greener practices or integrate transitional strategies within their business models. This approach offers a potentially simpler alternative to pricing adjustments, although it faces regulatory and practical feasibility challenges. Borrowers may seek financing from institutions with less stringent requirements if such covenants are not universally adopted or adequately incentivized.
In broad interpretation, banks regularly use green covenants.

- **Dedicated instruments:** Banks use green loans and sustainability-linked loans to finance sustainable activities in the economy (Auzepy et al., 2023). A sustainability-linked loan might require a company to reduce its carbon footprint by 10% annually. Failure to meet this target could result in higher interest rates. By setting specific targets or using dedicated taxonomies, those approaches could be understood as non-financial terms to a loan. Although the market for such instruments is growing, their effectiveness in achieving transformational change remains questioned (Auzepy et al., 2023); see **Table 10**.

TOOL	PORTFOLIO	RISK	ECONOMY
Dedicated instruments	**+**	**+ / 0**	**0**

Table 10: Effectiveness of Tools, Covenants and Non-financial Loan Terms

Dedicated instruments exemplified:
Banks might use secondary markets to refinance their portfolios. If markets have a stronger preference for low carbon products, they may be willing to pay more (forgo some basis points) for portfolios dedicated to finance projects like C (recall Table 1) and might ask for a discount on projects like B. This might change the P&L outcome of both projects due to cheaper / more expensive refinancing and in turn make project C more attractive.

3.3 Information Dissemination

The dissemination of information is a central pillar of climate integration in banks, but also in the financial system at large. It includes the circulation of climate-related information among stakeholders, ranging from clients and investors to the broader public and regulatory bodies. The purpose is to create transparency, foster accountability, and facilitate informed decision-making that aligns with climate goals. In addition, it allows better modeling and climate-related risk management. Here, we discuss the Dialogue with Rating Agencies, Market and Technology Signalling, and Policy Signalling.

Dialogue with Rating Agencies

Engaging in a dialogue with rating agencies helps banks to ensure that their climate-related risks and initiatives are accurately reflected in their credit ratings. This interaction can lead to better market perceptions about the banks' climate risk level and its ambitions to manage climate risks and transition in line with the Paris climate goals. Ultimately, this could potentially lower the cost of capital for banks when accessing capital markets for financing and refinancing purposes. However, rating agencies are unlikely to be able to fully model and thus capture the "true" risks associated with climate change. This is due to the forward-looking nature of climate change. Misinterpretations or oversights could lead to misleading signals in the financial markets, affecting the pricing of risk and the allocation of resources.

Two levels of dialogue between the bank and the rating agency appear to be helpful.

- **Provide information on assets:** The availability of climate-related loan portfolios and asset pool data can allow rating agencies to issue more nuanced ratings that consider exposure to climate risks when using sustainable refinancing instruments.

- **Provide information on the bank:** A dialogue between the rating agency and the bank about the bank's overall strategy, governance, and risk management practices related to climate change can help secure a company rating that accurately reflects the institution's commitment to sustainability and its ability to manage associated risks.

Information on bank exemplified:
As rating agencies become more concerned about climate risks (Kempa and Moslener, 2024), banks can expect to get better ratings and thus better refinancing conditions when becoming more climate friendly. As these aspects become more important, their effect on P&L considerations might rise.

The tools are unlikely to result in major direct changes in the portfolio decarbonization trajectory, the risk profile of the portfolio, or the decarbonization of the economy; see **Table 11**. Only future second-round effects, see the exemplification, might lead to changes in this assessment.

TOOL	PORTFOLIO	RISK	ECONOMY
Asset information	**0**	**0 / +**	**0**
Bank information	**0**	**0 / +**	**0**

Table 11: Effectiveness of Tools Dialogue with Rating Agencies

Market Signalling

Through their intermediary function, banks have inter- and cross-industry exposure to the real economy. By publicly reporting on their portfolio decarbonization efforts and strategies, banks can influence the direction of investments and encourage a shift toward greener technologies in practices. Through such signals, banks can support policy makers and innovative industry players in their efforts to create a "race to the top" in stimulating green innovation and developing long-term decarbonization planning in climate-relevant sectors. However, the effectiveness of this approach may be hampered by the lack of standardized methodologies to measure and report decarbonization and raise concerns about greenwashing. To mitigate these risks and maximize impact, banks can use the following tools:

- **Reporting standards:** Banks disclosing their decarbonization efforts and progress can ensure transparency and comparability. This requires cooperation at the industry level to establish standards. In addition, the reporting should be informative to different stakeholder groups (regulatory, policy makers, real economy, etc.). This can act as a counterpoint to the accusations of greenwashing as information becomes more available and its origins more transparent.

- **Voluntary commitments:** Many banks made commitments to climate goals, such as the Paris Agreement targets (Net Zero Banking Alliance Germany, 2021). This can signal policy support.

- **Industry exchanges:** Banks can become part of exchanges with the industry to define transition pathways, elaborate on financing for the transition, and communicate their own ambitions.

Market signalling tools tend to have a positive effect on decarbonization of bank portfolios, as they exhibit public pressure on the bank to act; Table 12. The effects on risk in the portfolio and on the decarbonization of the real economy should be limited. Industry exchange might foster innovation.

TOOL	PORTFOLIO	RISK	ECONOMY
Reporting standards	**+**	**0**	**0**
Commitments	**+ / 0**	**0**	**0**
Industry exchange	**+**	**0 / +**	**0 / +**

Table 12: Effectiveness of Tools, Market Signalling

Policy Signalling

By engaging with policymakers, banks can influence the development and implementation of policies that support climate change mitigation. This involvement can leverage the banks' expertise and resources to advocate for effective regulatory frame-works and incentives that facilitate the transition to a low-carbon economy. However, the influence of financially powerful institutions could lead to policies that disproportionately reflect their interests, potentially deviating from economically optimal solutions.

In addition, policy makers can use this channel to send signals to the banking system. By understanding the policy ambition, banks can more easily adjust their strategies to the policy circumstances. Strong policy signalling also reduces the uncertainty inherent in climate policies for banks (Haas et al., 2023), which could increase financial flows to the low-carbon economy (Kempa and Moslener, 2024).

To responsibly harness this influence, banks use the following tools:

- **Engage with policy makers:** Participate in public consultations and expert groups, providing evidence-based recommendations that align with scientific consensus on climate action. This can be in the field of banking (EBA, ECB, BaFin, Bundesbank, etc.) but also beyond to show how bank finance can contribute to climate action and where barriers to financing a more rapid transition lie. Additionally, banks gain deeper insight into the policy makers' ambitions, which improves their planning capability due to reduced uncertainty.

- **Uphold voluntary commitments:** Currently, some relevant global polluters roll back their climate commitments. This signals declining support for the Paris Agreement and (costly) regulatory action. Banks can demonstrate leadership and commitment by upholding their commitment and following through with credible actions. The long-term economic argument for climate action (Intergovernmental Panel on Climate Change (IPCC), 2021) supports this point. However, policy engagement can also be used to show where policy making is insufficient to reach the Paris climate targets and demand better regulatory guidance.

The tools for policy signalling show varying levels of effectiveness; see **Table 13**. Policy engagement is unlikely to be related to portfolio decarbonization or portfolio risks through direct channels. It might help set better real economy policies and, by this support real economy decarbonization. However, upholding commitments helps the bank remain strategically focused on decarbonizing its portfolio, while also supporting risk functions in pursuing net zero efforts.

TOOL	PORTFOLIO	RISK	ECONOMY
Policy engagement	**0**	**0**	**0 / +**
Uphold commitments	**+**	**+ / 0**	**0**

Table 13: Effectiveness of Tools, Policy Signalling

Internal audit and compliance

The internal audits and compliance are crucial in enhancing climate integration within banks. These functions ensure that the bank's climate-related objectives and practices are not only aligned with regulatory requirements, but also effectively mitigate the risks associated with climate change. Tools for banks internal audits include:

- **Climate strategy audit:** Internal auditors assess the robustness of the bank's climate strategy, ensuring that it is integrated into the broader business strategy and is supported by realistic and scientifically informed targets. Audits verify that climate-related commitments (such as those to the Paris Agreement) are reflected in operational practices and business decisions. In addition, they assess the scientific basis and feasibility of the bank's climate goals.

Climate strategy audit exemplified:
If banks start to audit their business decisions with respect to their climate strategy, they will change the power between Business, Risk and the CSO. The climate component will become more relevant for decision making, potentially making them a central factor in the credit process.

- **Regulatory compliance:** Compliance officers monitor compliance with a growing body of climate-related regulations. They ensure that the bank's disclosures on climate risks and efforts are transparent and in accordance with international standards, such as those set by the Task Force on Climate-related Financial Disclosures (TCFD). This should ensure the accuracy and comprehensiveness of the information disclosed to stakeholders.

- **Risk management oversight:** Internal audit plays a key role in examining the effectiveness of the risk management framework in identifying, measuring, and mitigating climate-related risks. This includes evaluating the physical risks of climate change and the transition risks associated with the transition to a low-carbon economy. In the end, internal audits evaluate the effectiveness of measures implemented to mitigate identified risks.

Audits can help strengthen the institutional setting for the implementation of decarbonization strategies. Thus, they help the portfolio decarbonization; see **Table 14**. They also increase the ability for decision making in risk departments to implement climate measures. The decarbonization of the real economy is likely not significantly affected by the aspects mentioned above.

TOOL	PORTFOLIO	RISK	ECONOMY
Climate strategy audit	**+**	**+**	**0**
Regulatory compliance	**+ / 0**	**+**	**0**
Risk oversight	**+ / 0**	**+**	**0**

Table 14: Effectiveness of Tools, Internal audit and compliance

3.4 Enabling Activities

While not directly influencing the flow of capital, enabling activities are essential for creating an organizational and cultural framework that supports the operationalization of the aforementioned transmission channels. These activities are fundamental to achieving effective climate change mitigation strategies within banks.

Governance and Strategic Decision-Making

Establishing clear governance structures and strategic decision-making processes is vital for integrating climate considerations into the core operations of banks. This involves the formation of committees, the definition of roles and responsibilities, and the setting of clear objectives and targets related to climate action. By embedding sustainability into the decision-making framework, banks can ensure a cohesive and strategic approach to climate change mitigation. This process is supported by:

- **Committee formation:** These committees can oversee climate-related initiatives and ensure alignment with the bank's overall strategy.
- **Education programs:** Upskilling of staff at all levels on climate and sustainability issues can foster a culture of sustainability and equip employees with the knowledge to implement climate aspects in their area of expertise (market, risk, etc.).
- **Establishing dedicated positions:** Positions such as Chief Sustainability Officer (CSO) can promote sustainability in the organization and ensure the integration of climate considerations into business operations. It can ensure that the dimension "sustainability" is integrated alongside traditional dimensions such as risk and business.

The effectiveness of the tools depends on the cultural change that must accompany the governance structure. If the banks culture shifts towards stronger climate focus, the tools can be effective in supporting portfolio decarbonization. Otherwise, the effects are likely to remain limited. Their effectiveness for portfolio risk and real economy decarbonization is limited; see Table 15. Only education could improve bank risk assessments and affect the behavior of employees in the economy.

TOOL	PORTFOLIO	RISK	ECONOMY
Committee	**+ / 0**	**0**	**0**
Education	**+ / 0**	**+ / 0**	**0 / +**
Dedicated position	**+ / 0**	**0**	**0**

Table 15: Effectiveness of Tools, Governance and Strategic Decision-Making

For a discussion of governance aspects in the context of climate commitments, refer to the NZBAG publication HERE.

However, there is a risk that banks with too climate-focused governance structures divert management attention away from other non-climate topics (Edmans, 2023). For example, overly focusing on climate change mitigation efforts might divert resources and attention away from other (financial) product innovation, which could result in lower overall capital flows or less investment in innovation in the real economy.

Client Dialogue

Engaging in constructive dialogue with clients about sustainability practices can influence their decision-making and operations toward stronger transitional outcomes. Through the sharing of information, the provision of advisory services, and the collection of sustainability data, banks can guide their clients to adopt sustainable practices and make strategic investments that support climate goals. Effective engagement requires:

- **Sustainability data collection:** This allows banks to assess the environmental impact of client operations and identify opportunities for improvement.
- **Knowledge exchange and sharing of tools:** Awareness raising and capacity building can provide clients with the resources and insight needed to implement sustainable practices.
- **Provision of advisory services:** Banks can use their central position in the economy to become a platform for sustainability advisory services through internal or external sources.
- **Escalation strategy:** Processes and a structured approach to the escalation of sustainability issues within client organizations and the bank are likely to increase the effectiveness of the client dialogue. This involves different forms of dialogue, support, and divestment / termination of the client relationship as a measure of last resort.

Client dialogue tools can support portfolio decarbonization by better understanding the fit of the client with the banks strategy. However, the effect is likely to be limited **(Table 16)**. Newly acquired data can support risk management and might motivate companies in the real economy to use reported data for strategic decision making. Advisory services might serve specific customer groups in their decarbonization efforts.

For a discussion of client dialogue, refer to NZBAG publications on sustainability-related client dialogue HERE.

TOOL	PORTFOLIO	RISK	ECONOMY
Data collection	**+**	**+**	**0 / +**
Knowledge exchange	**0**	**0**	**0**
Advisory services	**0 / +**	**0**	**0 / +**

Table 16: Effectiveness of Tools, Client Dialogue

Case Study Client Dialogue in Retail Banking at ING

While in ING's Wholesale Banking, the setup is centered on intense exchange and discussions with clients, this is very different for our ING's retail banking. Within retail, the most relevant sector for decarbonization is residential real estate, our mortgage business. Here, we have to integrate client engagement in a digital banking business model.

Target Setting & Decision making

ING steers the residential real estate portfolio in line with net zero based on the emission intensity. The current state of the ING portfolio in relation to the target is reported in the ING Group Climate Report, according to how ING discloses its performance in the most carbon intensive sectors of the Wholesale Banking business. Since only very limited real data on the CO_2 emissions of houses is available, ING has developed a proxy model that estimates the CO_2 emissions for most of the portfolio.

Based on this reporting, a decarbonization tool was developed to project the portfolio's emission intensity under different scenarios until 2030 and subsequently until 2050. Based on this analysis, ING identified the levers and agreed on business ambitions that would lead to alignment with the net zero pathway. The main levers are as follows:

- **Decarbonization of grid related energy sources for electricity and heating:** This lever cannot be influenced by the retail business of ING and is subject to developments in the energy sector.

- **Changing the inflow of new mortgages:** The category in which the greatest influence can be made is the steering of the new mortgage intake from ING Germany. By taking in more houses with lower energy demand, the portfolio can be influenced. However, overall demand is largely driven by the behavior and needs of the customers.

- **Modernizations in the existing portfolio:** Due to the slow turnover of the mortgage portfolio, the main decarbonization lever consists of supporting homeowners to modernize their homes to reach higher energy efficiency standards. A lot can be done to enable customers to modernize their homes, but ING cannot force mortgage customers to renovate. In addition, modernization rates in Germany remain low due to increased prices for modernizations, long lead times, and soaring prices for construction materials & craftsmen.

Depending on the actual development of the emission intensity of the portfolio and the respective decarbonization pathways, the ambitions are up-dated on a yearly basis to determine how the portfolio is developing along the pathways. This influences e.g. what type of product we build and where we spend our money on marketing.

Client engagement

To provide sustainable advice in the real estate sector, we have equipped our sales staff with a renovation calculator. This tool allows for an individualized assessment of renovation needs, costs, and funding opportunities. During every construction financing discussion, we evaluate the renovation status of private properties and collaboratively plan investments with the customer.

To further streamline and expedite the journey towards an energy-efficient home for private customers, we have partnered with companies in the modernization ecosystem. These collaborations grant customers access to skilled partners in energy consulting and modernization implementation. Through a dedicated landing page, customers can select a suitable renovation company and register for a complimentary initial consultation with the relevant contact. Typically, they will respond within 48 hours. Customers can then order the desired services, including applying for funding, coordinating handymen, and overseeing the construction site.

Education

All client-facing staff received an intensive sustainability training to raise awareness and educate staff on the requirements and possibilities of decarbonization in the residential real estate sector. This enables ING's sales managers and our distribution partner network to generate meaningful client discussions about the individual transition journey of each homeowner and their house. The focus is on providing client-facing staff with technical knowledge and tools on the modernization of houses.

4. Action Points for Net Zero Banking

Achieving net zero banking requires the activation of all transmission channels discussed in this report. So far, net zero banking is not fully integrated in the core of the bank, but is continually getting closer to it. To support the process, regulatory adjustments, technological advancements, financial innovations, and collaborative efforts across the financial ecosystem are necessary. Here, we outline ten action points that the NZBAG banks and the NZBAG aims to support. These are critical for transitioning the banking sector towards net zero while ensuring economic stability and fostering sustainable growth. The following recommendations are structured along the target audiences policy makers, regulators, and the banking sector.

Policy makers

1. **Real Economy Regulation and Adequate Emission Pricing:** Implement comprehensive regulations throughout the real economy to ensure that emissions are adequately priced, both within the EU and internationally. This requires concerted efforts to align cross-border policies (such as the Carbon Border Adjustment Mechanism), minimizing the risk of carbon leakage and ensuring a level playing field. In addition, sustainable finance regulation and real economy regulation as well as real economy regulation in itself should be coherent.

2. **Technological Development for Timely Bankability:** Accelerate investment in and development of sustainable technologies to ensure their bankability within the necessary timelines. This involves supporting research and innovation in green technologies to make them financially viable and scalable.

3. **Data Infrastructure Enhancement:** Build a robust data infrastructure that supports the banking industry's needs for precise and actionable climate-related information. This involves strategizing on data collection, ensuring harmonization, and improving access to highquality data for all stakeholders. Data accessibility is likely to become a competitive advantage for every financial centre. Projects such as the safe Financial Big Data Cluster (sFBDC) should be continuously pursed.

4. **Strengthening the Ecosystem:** Foster a supportive ecosystem that facilitates knowledge sharing and collaborative action among banks, clients, and other financial institutions. This could involve creating platforms for interbank cooperation and client engagement in sustainability initiatives.

5. **Research on Action Effectiveness and Applied Research Transfer:** Invest in research to evaluate the effectiveness of sustainability actions by the financial sector and facilitate the transfer of research insights into practical banking operations. This ensures that sustainability initiatives are grounded in evidence and contribute materially to achieving net zero goals.

Regulators

6. **Establishing a Level Playing Field in Sustainable Finance:** Address disparities in sustainable finance by harmonizing regulations and standards across capital markets, banking sectors, and shadow banking entities. This ensures that sustainable financing is consistently supported and not disadvantaged by regulatory disparities. In addition, regulators should use its powers to activate the market by setting stronger and more direct standards.

7. **Improving Transparency:** Standardize and enhance transparency in reporting climate-related risks and actions. This includes aligning reporting standards on portfolio decarbonization and portfolio greening (e.g., by making the Green Asset Ratio more comprehensive).

Banking sector

8. **Climate Risk Model Development:** Harmonize the development of climate risk models that bridge the gap between the perspectives of credit risk and portfolio management perspectives. Redefining "stress" in stress testing to incorporate climate risks accurately is crucial for assessing long-term financial stability as well as provide some guidance on the likelihood of climate out-comes for better risk management.

9. **Capacity Building:** Identify and address capacity-building needs within banks to ensure that they are equipped to manage and integrate climate risks and opportunities. Using data management as an example, banks should develop competencies in handling and analyzing sustainability-related data effectively.

10. **Leveraging Regulation for Business Development:** View regulatory frameworks not only as a compliance requirement, but use them as a lever for innovative business development. This approach encourages banks to develop new financial products and services that support the transition to a sustainable economy.

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