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Briefing Note

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Kurzzusammenfassung: Auf dem Weg zu einer nachhaltigen Finanzwirtschaft

Die Nachhaltigkeitstransformation des Finanzsektors ist eine zentrale Voraussetzung für die Transformation der Realwirtschaft. Die systematische Integration von Nachhaltigkeitsaspekten in Investitionsentscheidungen ist für den Ausbau erneuerbarer Energien, die Renaturierung von Ökosystemen und die Gewährleistung von Energiesicherheit ebenso grundlegend wie für die Bereitstellung von bezahlbarem, energieeffizienten Wohnraum und nachhaltige Mobilität. Die systematische Integration muss sowohl eine Risiko- als auch einer Wirkungsbetrachtung beinhalten.

Eine Blockade oder Verzögerung des notwendigen Strukturwandels birgt die Gefahr von Fehlinvestitionen. Insgesamt lässt sich festhalten, dass dies keine Lösung darstellt, sondern bestehende Probleme verschärft und zusätzliche Kosten sowie Risiken generiert.

Eine Vorreiterrolle Deutschlands würde nicht nur den Finanzplatz Deutschland wettbewerbsfähiger machen, sondern hätte auch positive Auswirkungen auf den Finanzplatz Europa und darüber hinaus.

Der Weg zu einer nachhaltigen Finanzwirtschaft in Deutschland erfordert das Zusammenspiel verschiedener Meilensteine und Maßnahmen; er erfordert eine Reihe an Verbesserungen entlang verschiedener Dimensionen, welche wiederum in Wechselwirkung miteinanderstehen.

In diesem Zusammenhang diskutiert dieser Bericht vier Dimensionen auf dem Weg hin zu einer nachhaltigen Finanzwirtschaft in Deutschland: Transformationsrelevanz, Transparenz über die Nachhaltigkeit von Finanzprodukten, Risikomanagement mit Blick auf Nachhaltigkeitsrisiken, sowie die Wirkungsmessung nachhaltiger Investitionen. Hinzu kommen Grundbedingungen, bestehend aus einer breiten und hochwertigen Datenbasis, politischen Signalen und der Stärkung der für Sustainable Finance relevanten Institutionen. Insgesamt werden 15 Empfehlungen zur systematischen Integration von Nachhaltigkeitsaspekten in der Finanzwirtschaft entwickelt und erläutert.

Short description: Pathways to a sustainable financial economy

The sustainability transformation of the financial sector is a focal prerequisite for the transformation of the real economy. The systematic integration of sustainability aspects in investment decisions is important for topics such as renewable energy development, energy security, the restoration of ecosystems as well as for the provision of affordable, energy-efficient housing and sustainable mobility. This systematic integration must include both a risk assessment and an impact assessment.

Blocking or delaying the necessary structural change harbours risk of malinvestments and stranding of assets. Overall, it would exacerbate existing problems and generates additional costs and risks.

German leadership in this transformation would not only make Germany more competitive as a financial centre but would also have positive spill over effects on European financial markets and beyond.

The path towards a sustainable financial sector in Germany requires the interaction of various milestones and measures; it requires a series of improvements along different dimensions, which in turn are interrelated.

This report covers four of such dimensions: the relevance for transformation, transparency on the sustainability of financial products, sustainability risk management, and measuring the

impact of sustainable investments. Additionally, the report covers underlying basic conditions for the path towards a sustainable financial sector in Germany, consisting of a broad database, political signalling, and the strengthening of the institutions responsible for sustainable finance. A total of 15 recommendations for the systematic integration of sustainability aspects in the financial sector are introduced and explained.

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Executive Summary

This report develops 15 complimentary recommendations, which are designed to support Germany's progress towards positioning itself as a leader in sustainable finance. Besides foundational requirements, the recommendations are centred around transformational relevance, transparency, risk management and impact measurement of sustainable investment.

Recommendation 1: Real economy projects with transformative potential are prerequisites for a sustainable financial economy

Transformational projects in the real economy are elementary for a sustainable financial economy. Therefore, the regulatory framework must incentivize effectively and provide targeted support for transformation decisions with sustainable investible characteristics in the real economy.

Recommendation 2: Financial instruments with links to sustainable development goals

Green bonds represent an important step towards sustainable finance. However, they are not applicable in every context and are not available for all types of issuers. Financial products with binding Sustainable Development Goal (SDG) links can be complementary in this regard.

Recommendation 3: Monitoring the classification of financial products under the Sustainable Finance Disclosures Regulation (SFDR)

Despite progress in the transparency of sustainable financial products, the possibility of greenwashing still exists. SFDR classified financial products should therefore be reviewed regularly.

Recommendation 4: Greenwashing prevention – Annual decarbonization rankings to protect investors and consumers

Greenwashing is a problem that should not be underestimated. It can be countered in particular through transparency. An annual decarbonization ranking can protect consumers and investors from greenwashing.

Recommendation 5: The principle of double materiality must be applied consistently to enable sustainable financial decisions

Sustainable risk management should be guided by the concept of double materiality and take into account both inside-out and outside-in perspectives of entrepreneurial activities. On the one hand, climate change, biodiversity loss, and the destruction of important ecosystems negatively affect the stability of the financial sector and thus individual financial institutions. On the other hand, financial institutions and investors have an impact on climate and environment through their investment decisions.

Recommendation 6: Ensuring alignment of financial flows with sustainability targets

Recently, there has been a shift of focus towards climate-friendly practices among German financial institutions. Such endeavours, mostly voluntary, aim to assist the German government in achieving its climate action objectives.

Recommendation 7: Uncovering impact channels of (dis)investments and identifying the value of sustainable investment strategies

A well-founded impact measurement is indispensable to uncover the marginal contribution of sustainable finance to real economic transformation and to create robust forecasts. Here, the transformative impact of real economic projects per se must be distinguished from a possible incentive effect of sustainable investment approaches.

Recommendation 8: Continuous monitoring of sustainable investments

Continuous monitoring of sustainable investments by German financial institutions protects consumers from greenwashing and prevents misallocations. It also reduces information asymmetries between financial institutions and public institutions.

Recommendation 9: Focus on actual (re)financing instead of secondary market movements

Secondary market transactions have only limited direct impact on corporate sustainability decisions. However, little attention has so far been paid to direct financing of companies. Their effect on sustainability and transformation decisions must be researched more intensively.

Recommendation 10: Promoting data quality, enabling interlinkage of data strategy

The availability and interlinkage of high-quality data is an essential precondition for digital and sustainable financial sector. Currently emerging data tools should be linked more closely.

Recommendation 11: Improving data accessibility and comparability through standardized environmental indicators

Easily accessible and comparable data from the real economy is a basic prerequisite for sustainable finance. Small and medium-sized enterprises in particular should be supported in providing this, for example through public databases.

Recommendation 12: Making climate data available in a timely manner, promoting corresponding projects

Climate related data is sometimes only made available with considerable delay, with negative consequences for climate change mitigation decisions. Projects for continuous and timely updating should therefore be supported.

Recommendation 13: Strong institutions for an effective sustainable finance sector

Pathways to a sustainable financial economy require institutions that set a good and binding framework. In Germany, various public institutions are involved in shaping the framework for sustainable finance. They and their interaction should be strengthened.

Recommendation 14: Transforming public facilities into sustainable and climate-conscious entities

To date, German assets are not (always) consistently invested along the lines of the federal government's sustainability goals. This is sending mixed signals with regards to political declarations of intent and political action. As a result, the beacon function of the federal and state governments is not tapped and there is a risk that sustainability risks are not adequately managed.

Recommendation 15: Applying Pairs-aligned Benchmarks to public investments

With the Paris-aligned Benchmarks, the EU has created an instrument that can effectively contribute to compliance with the Paris Climate Agreement. Federal and state governments can take a pioneering position and align their investments with Paris-aligned benchmarks.

1 Introduction

The sustainable transition of the financial sector is a central prerequisite for the transition of the real economy. The systematic integration of environmental and sustainability aspects into investment decisions is as foundational for the development of renewable energy, renaturation of ecosystems, and energy as for providing affordable and energy efficient accommodation, sustainable mobility and reaching the land use target.

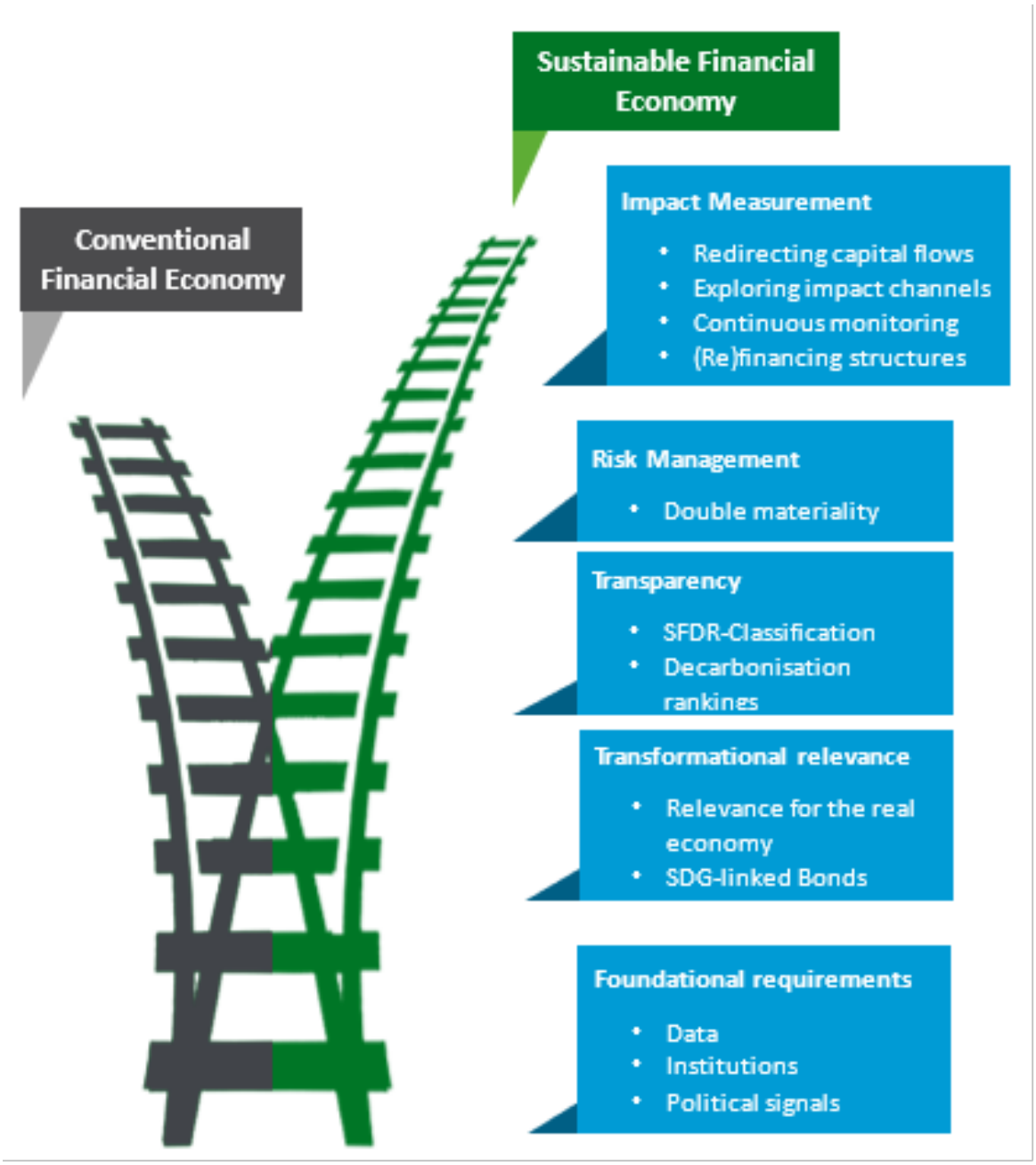
German leadership in this integration would not only increase the competitiveness of Germany as a financial centre but would also have a positive impact on European markets and beyond. Pathways towards a sustainable financial economy can offer solutions for other political matters, as evident in current discussions around risk sharing in for example the context of a Green Supporting Factor and a Brown Penalizing Factor. This is also true for seemingly competing goals such as environmental and social targets.

This report includes four dimensions on the path towards a sustainable financial economy in Germany: transformational relevance, transparency on the sustainability of financial products, risk management with regards to sustainability risks, and impact measurement of sustainable investments. Additionally, there are three foundational requirements, namely a broad data basis, political signals, and strengthening of relevant institutions. Overall, 15 recommendations for the systematic integration of environmental and sustainability aspects for the financial economy are developed and explained.

Figure 11 in the annex visualises the structure as well as interconnectedness of these recommendations.

The paths towards a sustainable financial economy in Germany requires the interaction of different milestones and measures, visualised in Figure 1. The different dimensions, which mark the pathway from the conventional towards a sustainable financial economy will be explained in detail in the following. Individual recommendations are not (always) to be understood as subsequent steps but as complimentary measures which need to be addressed in tandem.

Figure 1: The path towards a sustainable financial economy in Germany



Source: own compilation, Umweltbundesamt.

This briefing note is part of a larger research project and to be understood as its synthesis. For a detailed analysis please see the concluding report of the respective research project.

2 Dimensions on the path towards a sustainable financial economy

This report includes four overarching dimensions for the systematic integration of sustainability and environmental aspects into the financial economy. First, transformational relevance of financial decisions will be evaluated. To this end, availability of projects with transformational potential in the real economy as well as financing instruments with links to sustainable development goals will be discussed. These are the prerequisite for a sustainable financial economy. Subsequently, transparency of financial products is discussed, especially in the context of classification of financial products according to the Sustainable Finance Disclosure Regulation (SFDR). Moreover, the role of a decarbonisation ranking in order to protect investors and consumers from greenwashing is evaluated. Furthermore, this chapter discusses questions revolving around risk management with regards to climate and nature risk. Here the principle of double materiality is elaborated on. Lastly, impact measurement of sustainable investment is assessed. This investigates how to ensure that capital flows are directed towards sustainability and outlines the importance of researching impact mechanisms to allow for robust prognoses. Moreover, an approach for continuous monitoring of sustainable investment is suggested and an explanation provided as to why a focus on actual (re)financing instead of shifts occurring on secondary markets is of utmost importance.

2.1 Transformational relevance

Financial decisions which systematically integrate sustainability criteria can result in substantial transformational relevance and thereby can support sustainability goals. Transformational relevance is a prerequisite-laden undertaking, which must be approached from two sides. On the one hand, projects with transformational potential in the real economy are necessary so that private capital can act transformational. The volume of sustainable investment is limited by the financing demand of the real economy in the of context of sustainable or transformative economic activities. An economic and sustainable growth of the market volume for sustainable investment requires growth of sustainable economic activities. This can either stem from growth of already sustainable activities or from a transition of activities which are not yet considered sustainable. An economic framework which effectively incentivises transition decisions is of key importance. On the other hand, transformational financing can be rooted in investment models such as financial instruments which are linked to sustainability goals.

The analysis of the status quo of the market volume of sustainable investments in Germany and Europe as well as to further growth potential, does not allow for many insights into the volume of transformative funds. Considering the dynamic demand for sustainable investments on the one hand, as well as investment barriers and limited availability of transformative projects, it must be assumed that an overproportionate growth of the volume of sustainable investments without simultaneous growth of financing of sustainable projects in the real economy will not result in the desired transition impact. As a result, a green bubble may form.

Therefore, removing institutional barriers to financing transformative investments is a key regulatory lever.. Additionally, the development of transformative innovation projects should be stimulated using targeted measures such as research partnerships or technology transfer projects. This would foster the development of a financial as well as ecologically sustainable project pipeline to invest in. These measures help prevent a green bubble by increasing the availability of investable sustainable projects. Moreover, they allow to accelerate the speed of the transformation.

The existing conflict of interest within enterprises is an obstacle in the field of transformational relevance. In the short term, costs associated with a transition may outweigh in the assessment for or against a transformational process and thereby hamper the long-term transition of the company towards environmental and climate benefits. This does not necessarily imply that companies act in bad faith, yet neither allows to assume they are acting in good faith. Misleading information and shifting responsibility to the consumers often come in place of real transition efforts.

For a successful transition it therefore is key to not only consider companies that are well on their way to sustainability but also the ones only getting started.

2.1.1 Recommendation 1: A sustainable financial sector needs suitable target investments in the real economy

Transformative investment targets are essential for a sustainable financial sector. The regulatory framework must incentivize and support the development and realization of transformative projects in the real economy to accommodate the capital flows from sustainable finance.

The effective transformation of the financial sector requires real economic projects, which

(i) contribute to a green transformation, and

(ii) are investable for sustainability-conscious investors, i.e., they qualify as sustainable under applicable regulation, and generate positive expected returns.

The demand for as well as supply of sustainable investment products have increased. To have real impact, the dynamic growth in sustainable investment volumes must be matched by a pipeline of transformative projects in the real economy.

Table 1: Financing volumes by financing instrument, own estimate

Financial instrument (Claims on domestic non-financial corporations)	Market volume (in EUR bn)	Of which included in EU taxonomy	Of which sustainable in the sense of the EU taxonomy
Loans	1549,0	627,6 (40,4%)	86,4 (5,57%)
Bonds and debentures	209,0	91,1 (43,6%)	12,4 (5,95%)
Listed shares	1692,6	675,1 (39,9%)	93,4 (5,52%)
Unlisted shares	512,0	204,3 (39,9%)	28,2 (5,51%)
Other share rights	903,3	342,8 (38,0%)	47,4 (5,25%)

Source: Own compilation based on a study by the University of Hamburg using data from the BACH database, Eurostat and the Carbon Disclosure Project (CDP), as of April 2021 (see Busch et al., 2024).

Supporting the project pipeline in the real economy

Research shows that the investment gap is not primarily based on the scarcity of invested funds, but on the lack of investable projects (Bhattarcharya et al., 2019). To have real impact on the achievement of sustainability targets, finance is inextricably linked to the real economy. Consequently, the path towards a sustainable financial sector must be accompanied by regulatory support for the development and cultivation of corresponding project pipelines in the real economy. A similar view has been expressed by the OECD with respect to the infrastructure sector (OECD, 2018). Regulators must create a suitable regulatory environment to enable the sourcing and realization of transformative projects in the real economy, such as accelerated approval processes of transformative projects as well as a consistent and reliable regulatory trajectory. To facilitate the transformation, sustainable finance regulation must be accompanied by industrial policy that enables and fosters green innovation.

Promoting the investment character of sustainable or transformative projects

At the same time, transformative projects must be structured in a way that makes them investable for sustainability-conscious investors, i.e., they must generate positive expected returns and satisfy the criteria to be classified as sustainable. First, this requires that the economic characteristics in terms of risk and return must be adequate. Where this does not apply, economic viability could be supported by the provision of venture capital or the use of instruments such as blended finance. This is the case, for example, in the development of new, greener technologies, such as the hydrogen market, where high initial investment is matched by high investment risk. On the other hand, it must be possible to classify the projects in such a way that they become attractive for sustainable investors, even if they represent short- and medium-term transitional solutions and first steps in the transformation process, but the corporate activities do not yet become fully "green". New classifications and certifications for transition investment products could be introduced.

2.1.2 Recommendation 2: Financial instruments with links to sustainable development goals

Green bonds represent an important step towards sustainable finance. However, they are not applicable in every context and are not available for all types of issuers. Financial products with binding Sustainable Development Goal (SDG) links can be complementary in this regard.

The sustainable fixed income market is seen as having a lot of potential in the future. However, some points of criticisms can be identified with green bonds as an instrument:

- Intended use: By their nature, bonds tend to be instruments for refinancing companies and are therefore less suitable for investments, which are generally the motivation for green bonds (e.g. investments in "green" projects). The intended use of a green bond should not be able to be defined as seen fit. Examples of green bonds show that a superficially green or sustainable intended use often does not stand up to closer analysis because collateral damage or unintended consequences have not been taken into account.
- Cost: Often, green targets could already be achieved with conventional bonds – without having to use the cost-driving instruments required for green bonds.

- Greenwashing: Green bonds do not prevent issuers from also investing in harmful projects. They offer issuers the opportunity to symbolically participate in a market that makes them look sustainable even though they are not - they are greenwashing.
- Use of proceeds: In commercial terms, green bonds should be administered via segregated accounts so that it can be verified and documented at any time that funds raised by means of green bonds are not mixed with funds from conventional forms of financing. In this way, it can be ensured that these funds are used precisely for the purposes stated in the prospectus. Green bond monitoring is currently not sufficiently regulated and standardized.
- Transparency: The most important feature of an issuing strategy and of issuers' financial communication during the year is transparency. Investors expect comprehensible information about the bond and the issue (Shao et al., 2020). Greater transparency also seems to lead to a price advantage over conventional bonds (Guttenberg/Mack, 2020).

There are investment areas within which bonds with specific sustainability and development goals can be useful. SDG-linked types of financial instruments can be a key element here, as they can incorporate social goals in addition to environmental goals. Due to all these aspects, SDG-linked financing with ambitious targets and substantial and enforceable penalties should be preferred to green bonds. Germany should therefore promote the concept of SDG-linked financing models, in addition to green bonds with ambitious targets.

Table 2 summarizes advantages of SDG-linked bonds over green bonds.

Table 2: Advantages of SDG-linked bonds over green bonds

No.	Characteristic	SDG-linked Bond	Green Bond
1	Reference	Goal	Activity
2	Financing Volume	Unlimited	Only already green activities
3	Sustainability Objective	Unconstrained	Environmental
2	Suitability for Refinancing	Yes	No, only for existing green activities
3	Suitability as a credible instrument for firms from emission intensive sectors to communicate transition plans	Yes	No
4	Time perspective	Forward-looking	Sustainable activities already in effect
5	Link to cost of capital	Directly linked to achieving goal	Market determined Greenium
6	Legal enforceability	Yes, covenants are an established concept	Ex Post Reporting so far lacking transparency, no incentive on either side

Source: own compilation, Sociovestix Labs.

Sustainability goals as enforceable contractual clauses

SDG-aligned bonds are feasible for all issuers in any context, as they are not tied to specific economic activities. Instead, binding SDG links are designed to be achieved by means of enforceable contractual terms. Missed SDG targets can entail substantial contractual penalties, resulting in a direct incentive to comply. Whether the contract structure entails a reward if the targets are met or a penalty if they are not met is irrelevant. SDG-linked bonds thus have the potential to address the tragedy of the horizon, as they make long-term development goals the basis of current contracts.

Applicability in the market

The integration of SDG-linked type of financial instruments into the German banking and bond market does not pose any major challenges. From the perspective for implementability and adoption in the market, it is important to use data for target setting that is already available in the financial market. This leaves SDG-linked bonds simpler to implement than their green counterparts and thus more attractive to both issuers and investors.

2.2 Transparency

There are still high commercial interests in designating conventional investment products and corporate strategies as sustainable. On the one hand, this problem can be countered by further transparency in the area of SFDR classification. On the other hand, annual rankings offer the possibility to present the ambition level of companies in a comparable way and thus protect investors and customers from greenwashing.

A comparison of the most important statistics on various sustainable investments in Germany and Europe shows that there are very different indications of how large the sustainable investment volume already is. The best-known source of information in Germany is the Forum Nachhaltige Geldanlagen e.V. (FNG), while for Europe it is the Eurosif SRI study, which used to be published every two years. The latest available Eurosif SRI Study is from 2018. In addition, the German Federal Association of Investment and Asset Management e.V. (BVI) also provides information on investment opportunities in funds and represents the interests of fund companies and asset managers. For information on bonds, the Climate Bonds Initiative is one of the most important sources of information on the sustainable bond market worldwide. The non-profit initiative is also actively working to make the bond market more supportive of sustainable causes. The overview of the reported volumes of sustainable investments in the various instruments clearly shows that the figures can differ greatly depending on the method and definition of sustainability. Depending on the definition, this can lead to overestimates of the capital that is actually invested sustainably.

Greenwashing is a central problem in sustainable financing issues, which is to be countered in particular by increased transparency and classification requirements. There has been considerable progress in this area in recent years. Under EU law, large companies must publish certain information on how they deal with social and environmental challenges. On December 11th 2019, the European Commission committed to reviewing the Non-Financial Reporting Directive (NFRD) as part of the European Green Deal. The NFRD has been replaced by the Corporate Sustainability Reporting Directive (CSRD). This extends the sustainability-related reporting requirements and applies to significantly more companies in the EU.

As part of the European Commission's Action Plan on Financing Sustainable Growth, EU Regulation 2019/2088 on Sustainable Financial Disclosure (SFDR) aims to create more transparency on the level of sustainability of financial products. The aim is to steer private

investment towards sustainable investments and prevent greenwashing. Phased implementation began on March 10th 2021.

2.2.1 Recommendation 3: Monitoring the classification of financial products under the Sustainable Finance Disclosures Regulation (SFDR)

Despite progress in the transparency of sustainable financial products, the possibility of greenwashing still exists. SFDR classified financial products should therefore be reviewed regularly.

The SFDR is a central component of the EU Sustainable Finance Agenda and was presented by the European Commission in 2018 as part of the Sustainable Finance Action Plan. The directive contains far-reaching disclosure requirements in the area of sustainability of financial products, which have been gradually coming into force since March 10th 2021.

Table 3 explains for which environmental objective and sustainability risk the regulation applies.

Table 3: Environmental objectives and sustainability risks in the SFDR context

Brief description	Currently in use for the following environmental objective	Type of Sustainability risk
The EU Sustainable Financial Disclosure Regulation 2019/2088 (SFDR) aims to create more transparency on the level of sustainability of financial products in order to steer private investment towards sustainable investments and prevent greenwashing.	▶ Climate change mitigation ▶ Climate change adaptation ▶ Sustainability and protection of water and marine resources ▶ Transition to a circular economy ▶ Pollution prevention ▶ Protection and restoration of biodiversity and ecosystems	▶ Physical risks ▶ Transitory risks ▶ Legal risks ▶ Resources risks ▶ Social risks

Source: Own compilation, Sociovestix Labs.

A large part of the SFDR applies to financial market participants such as financial advisors and asset managers, regardless of whether they officially pursue sustainability ambitions or not. Disclosure must take place at both product and organizational levels. Specifically, the disclosure requirements relate to websites, financial product prospectuses and periodic reporting. Of particular note is the disclosure of Principal Adverse Impact (PAI) indicators. Article 4 of the SFDR requires financial market participants to disclose on their websites how they take PAI into account in their investment decisions and explain due diligence processes. If PAIs are not taken into account, financial market participants must explain why this is not done.

The three types of SFDR funds

SFDR distinguishes between three types of funds, with fund issuers self-declaring which category they fall into.

- Article 6 funds do not have any sustainability reference.
- Article 8 funds (light green) consider sustainability goals but do not have them as a primary focus.
- Article 9 Funds (dark green) invest in activities that contribute to a sustainability goal.

Disclosure requirements become progressively more demanding along the above articles. For example, Article 9 funds with a climate reference must track a dedicated benchmark such as one of the EU Climate Benchmarks (see also Recommendation 15). A Q&A document published by the European Supervisory Authorities (ESAs) in November 2022 explicitly states that Article 9 funds cannot use a general market index as benchmark (ESMA, 2022).

Preliminary non-representative empirical information (Follow the Money, 2022; Klasa, 2022), as well as existing Morningstar reclassifications (Bioy et al., 2023), suggest that there may be room for improvement in both the consistency and accuracy of SFDR classifications. Providers may seek to be classified as Article 9 due to commercial incentive but while doing so trying to maintain their unsustainable investment benchmarks. This would not be in line with Articles 9(1) and 9(3) of the SFDR Regulation. In this context, a regular review of the sustainability of investments is useful (see also Recommendation 8).

2.2.2 Recommendation 4: Greenwashing prevention - annual decarbonization rankings to protect investors and consumers

Greenwashing is a problem that should not be underestimated and can be countered in particular through transparency. An annual decarbonization ranking can protect consumers and investors from greenwashing.

For some years now, sustainability has been a central advertising promise for many companies, which they emphasize to consumers, investors, and regulatory authorities. However, appearances are often deceptive. In the area of climate action, for example, only a few of these companies are on a transition path to net zero with the required speed of at least 7% absolute CO2 reduction per year.

Table 4 lists key weaknesses of existing decarbonization methodologies and thus identifies essential characteristics for an effective decarbonization ranking.

Table 4: Key weaknesses of existing decarbonization methods

No.	Weakness
1	Emission intensity vs. emission reduction: relative but not absolute sustainability
2	Emission Scope: ignoring Scope 3 GHG emissions
3	Ignoring the Precautionary Principle

Source: Own compilation, Sociovestix Labs.

Objective of the decarbonization ranking

The proposed company ranking aims to transparently disclose the decarbonization of companies. This offers an important added value in terms of information for the public, ministries, and science. Such a ranking increases the pressure on companies to strengthen and deepen their decarbonization processes. Following the analyses above, such a ranking should take into account absolute emission reductions, Scope 3 emissions, and the precautionary principle.

It is conceivable to extend the decarbonization ranking to other environmental objectives as well. An extension along the social component of sustainable finance is also possible: A company ranking that quantifies, for example, the proportion of female managers or gender pay gap within the company would be technically feasible.

Institutional implementation

To create greater transparency and provide incentives to increase ambition, one of the relevant public institutions (e.g., the German Federal Financial Supervisory Authority (BaFin), the Bundesbank, the Federal Environment Agency (UBA), or consumer protection authorities and agencies) could publish an annual ranking of companies' decarbonization speed. If necessary, ranking results could also be shared with consumer and investor protection agencies. Locating the decarbonization ranking at the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) is recommended. The BMUV could commission the UBA with implementation. Alternatively, the Deutsche Bundesstiftung Umwelt (DBU) is also conceivable.

2.3 Risk management

Risk management is a central pillar of sustainable finance. It is true that sustainability is playing an increasingly important role in investment decisions. However, the financial sector's heterogeneous approach to sustainability and sustainability risks (e.g. PRI, 2021) underscores the current lack of a generally accepted definition of sustainability in the context of financial investments. This means that there is considerable room for interpretation and thus little transparency or comparability for investors. This also applies to risk issues. In order to assess the current state of the market and the potential for an impact on the transformation of the economy and society for more sustainable courses of action, sustainability must first be defined. This should take into account both the inside-out and outside-in perspectives of investment and investment decisions: On the one hand, climate change, biodiversity loss, and the destruction of important ecosystems have a negative impact on the stability of the financial sector and thus on individual financial institutions. These need to integrate sustainability risks centrally into their risk management. On the other hand, financial institutions and investors have an impact on climate and environment through their investment decisions.

Sustainability risks are of particular importance in the context of the lending and investment decisions of financial service providers, often motivated by reasons of avoiding reputational risks.

Many financial institutions are developing a sustainable product portfolio. In-house and external (cross-sector) frameworks and assessment grids are being developed for this purpose. These products can help make portfolios more resilient to sustainability risks. However, financial institutions mostly did not ask for sustainability information from customers.

The German Federal Financial Supervisory Authority (BaFin) has published a fact sheet on dealing with sustainability risks. BaFin sees its fact sheet as a "compendium of non-binding procedures (good practice approaches)" that can be applied by supervised companies in the area of sustainability risks to implement the legal requirements for proper business organization and an appropriate risk management system, taking into account the principle of proportionality (BaFin, 2020, p. 9). The fact sheet can be seen as an impetus for a meaningful supplement to the minimum requirements for risk management and does not pursue the goal of formulating specific audit requirements (BaFin, 2020).

Compensation systems are conducive to appropriate management of risks and consistent with sustainability strategy. Possible guiding questions:

- Are the existing compensation systems conducive to appropriate management of sustainability risks?
- In the case of a specific sustainability strategy, are they consistent with it?

Embedding accountability at different management levels (starting at C-level), ensures strong buy-in and systematic consideration of sustainability risks. Accountability and compensation systems can be coupled through target agreements (Cook et al., 2023). The performance-based component of managers, for example, can be tied to sustainability data such as emissions reductions, in addition to financial metrics.

There are systems for measuring, reporting, and verifying (MRV) transparent and ambitious climate reporting. They enable a systematic inclusion of sustainability risks in existing controlling and management structures.

2.3.1 Recommendation 5: The principle of double materiality must be applied consistently to enable sustainable financial decisions.

Sustainable risk management should be guided by the concept of double materiality and take into account both inside-out and outside-in perspectives of entrepreneurial activities. On the one hand, climate change, biodiversity loss and the destruction of important ecosystems have a negative impact on the stability of the financial sector and thus on individual financial institutions. On the other hand, financial institutions and investors have an impact on the climate and the environment through their investment decisions.

The notion of materiality is a central concept in accounting that has also been adopted with respect to corporate sustainability. At its core is the goal of distinguishing important from unimportant information to streamline corporate reporting and thus ensure the most efficient flow of information between companies and stakeholders, in particular shareholders. Which information is considered material depends, among other things, on the industry, the specific business model, but also the target group of the communication. Traditionally, the analysis of materiality is about assessing to what extent the business activities or key figures in question contribute or can contribute to the economic success or failure of the company.

As already illustrated in the well-established metaphor of the triple bottom line, corporate decisions have an impact not only on financial, but also on environmental or social targets. To capture these non-financial dimensions of corporate activity, the concept of double materiality is increasingly used in sustainability reporting, which is intended to take into account both the financial (outside-in) and environmental and social target variables (inside-out) in connection with sustainability developments. As a basic accounting principle, the dual materiality approach is not limited to sustainable companies or investors, but to all those subject to non-financial

reporting obligations. In the context of internal accounting, it is also interesting for all companies that are interested in managing their economic and socio-ecological sustainability.

To comprehend the sustainability of economic activities holistically, the principle of dual materiality is essential. To enable sustainable financial decisions, it must therefore be applied consistently.

2.4 Impact measurement

Despite the growing popularity of sustainable investments among investors, there is no scientific consensus on whether, to what extent, or under which conditions the approaches actually contribute to the transformation of the real economy (Hoepner/Schneider, 2023; Kölbel et al., 2020). Sustainability of corporate activities can be measured in different ways:

1. Negative impact of activities, especially on the environment or social issues. Examples are CO2 emissions, water pollution or the number of employees in the low-wage sector.
2. Positive impacts that contribute to achieving environmental goals - for example, meeting a temperature target via CO2e PPM reduction[1].

On the way to a sustainable financial economy, increasing efforts are already being made to redirect financial flows in a sustainable manner. Here, too, the question of the ecological effectiveness of investment decisions regularly arises. This is a key issue for investors, customers, and regulators. In order to more clearly demonstrate the sustainability impact of voluntary commitments and (re-)financing decisions, various measures are necessary and conceivable that will significantly strengthen Germany's ambition to become a leading sustainable finance location.

When integrating ESG criteria into equity decisions, the impact development in the "real" world through these financial products has been neglected so far (Hoepner/ Schneider, 2023). This is also due to the lack of conceptually well-defined measurement tools for so-called impact investing, i.e. investment with environmental and social impact. In addition, there is a lack of data on the use of funds to enable comparable analyses that are not influenced by interest groups.

Clear structures can help here to record and clearly demonstrate the effectiveness of sustainable financial products. Precisely defined competencies and responsibilities would prevent misunderstandings - also on the part of the media. It is important to distinguish between actual change in the orientation of financial flows and mere relabelling. In this context, it is useful to create transparency platforms. Reporting frameworks have already been created, but their widespread use is lacking. While voluntary self-commitment is currently the norm, pressure from the public sector could also further encourage this.

2.4.1 Recommendation 6: Ensuring alignment of financial flows with sustainability targets

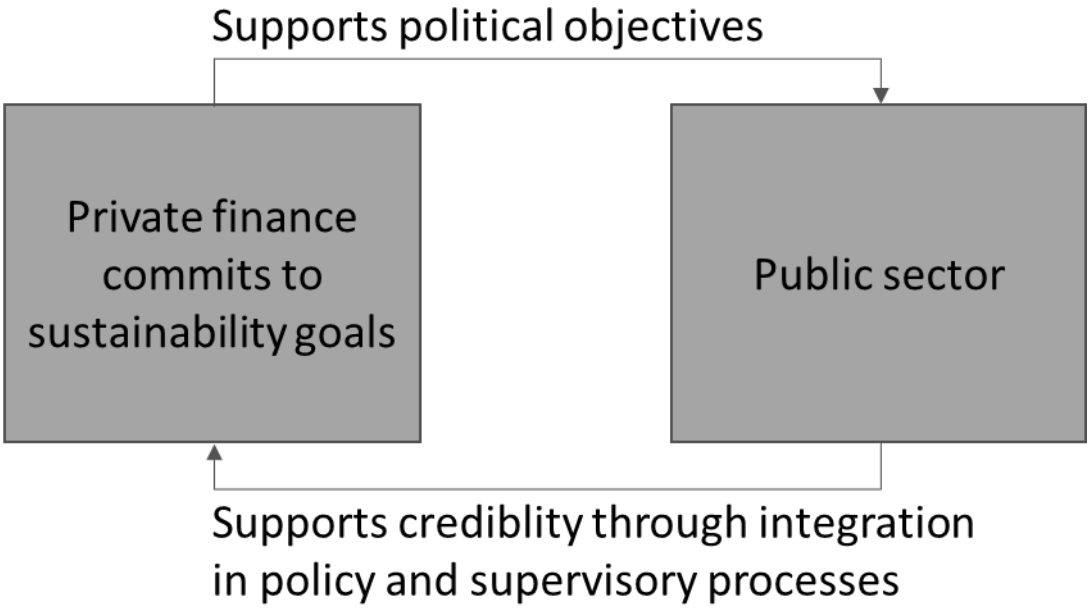
Recently, there has been a shift of focus towards climate-friendly practices among German financial institutions. Such endeavours, mostly voluntary, aim to assist the German government in achieving its climate action objectives.

These efforts have begun to encapsulate other sustainability objectives, including biodiversity, resource conservation, and social elements like housing accessibility. Figure 2 illustrates the

[1] It would be extremely useful to develop a likewise scalable equivalence KPI for biodiversity.

reciprocal relationship between the commitment to sustainability from both the private financial sector and the public sector.

Figure 2: The Reciprocal Relationship with Sustainability



Source: own compilation, Frankfurt School of Finance & Management.

Recognizing the significant role of financial institutions in funding the transformation towards a more sustainable future, it is essential for the German government to place a greater emphasis on financing in its climate action measures and sustainability strategies. This focus would help to guide financial streams towards sustainable activities, as outlined in major international agreements such as the 2015 Paris Agreement. This approach will help to position Germany as a global leader for sustainable finance. Suggested measures include:

- Empowering financial institutions to play a more influential role in the German climate and sustainability strategy, particularly in the redirection of capital flows (aligned with Article 2.1c of the Paris Agreement);
- Extending national and European climate protection contributions (NDCs) to encompass climate protection obligations of the financial sector;
- Tasking Bundesbank and BaFin with the responsibility of measuring Paris-aligned, sustainable, and transformative financial flows;
- Developing a centralized transparency platform for tracking and monitoring climate and sustainability targets of German financial institutions;
- Mandating benchmarking of financial institutions' climate change goals and their realization;
- Regularly reviewing the enactment of voluntary commitments by the supervisory authority.

These measures are designed to foster a more comprehensive understanding of how well financial institutions are aligning their portfolios with sustainability goals. This alignment requires harmonizing and standardizing existing methods and reporting frameworks, along with

developing additional or complementary user-friendly, scientifically sound, and credible methods and tools (refer to Wietschel/Rink, 2021 for example).

In implementing these recommendations, the German government can draw on strategies from European partner countries. In the Netherlands, financial institutions report yearly to parliament on their contributions to the Climate Accord implementation. Austrian financial institutions have the opportunity to join the Green Finance Alliance, coordinated by the government.

2.4.2 Recommendation 7: Uncovering impact channels of (dis)investments and identifying the value of sustainable investment strategies

A well-founded impact measurement is indispensable to uncover the marginal contribution of sustainable finance to real economic transformation and to create robust forecasts. Here, the transformative impact of real economic projects per se must be distinguished from a possible incentive effect of sustainable investment approaches.

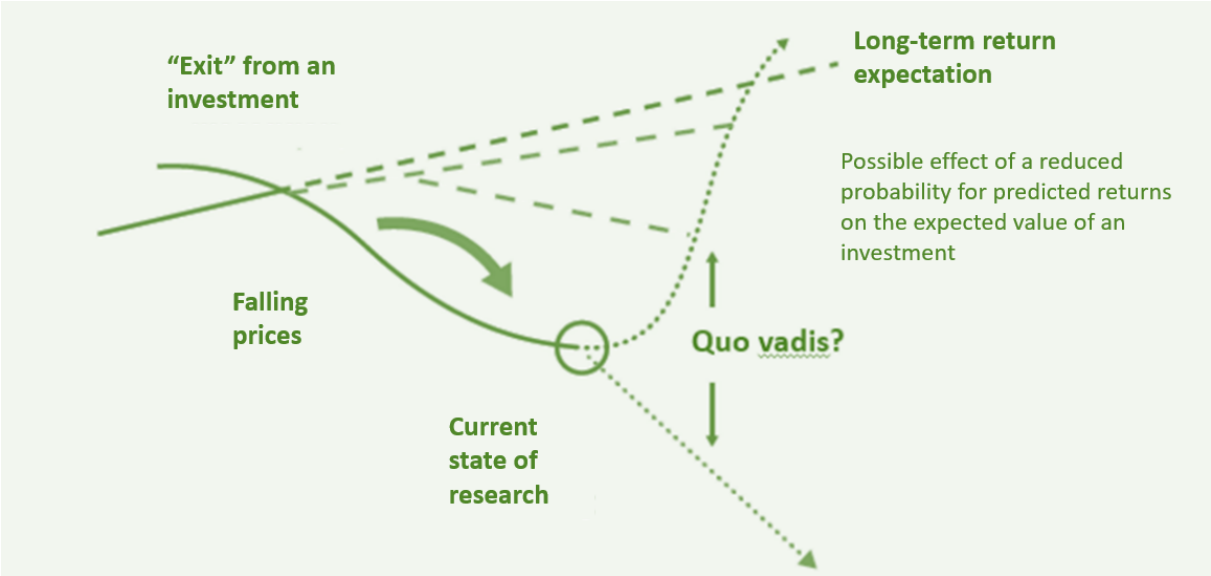
A fundamental principle of financial economics states that a risky euro is worth less than a risk-free euro. In a sustainable financial economy, this principle must apply analogously to environmental and social sustainability: a sustainable euro must be worth more than an environmentally and socially unsustainable euro. The question of whether this principle holds in practice has not been settled yet (e.g. Larcker/Watts, 2020). Traditionally, research in economics and finance has assumed that sustainability causes net costs and thus reduces profits. This view is now considered outdated. Instead, most studies conclude that there is a positive empirical relationship between sustainability and economic success (Friede et al., 2015). Causes are, for example, higher resource efficiency, higher productivity of employees, or the lower probability of reputation-damaging scandals. Hence, investing in sustainable financial products may pay off financially. However, to what extent sustainable finance causally contributes to the transformation of the real economy is a separate issue. Vice versa, the sustainability of portfolio firms does not imply a positive contribution of the respective financial product.

Conceptually, it can be assumed that financial decisions can have both direct and indirect effects on the sustainability of companies. For instance, if investors are willing to finance sustainable projects at more favourable conditions, this implies a relative advantage that leads to a higher valuation in the usual financial valuation procedures. In this way, sustainable finance can causally increase the financial attractiveness of various business strategies and create incentives in favour of sustainability. In this respect, more favourable financing conditions can causally contribute to the so-called business case for sustainability. Furthermore, the academic literature on the influence of investors on corporate strategies generally distinguishes so-called exit and voice strategies (Kölbel et al., 2020). Exit strategies are investment strategies that reflect sustainability preferences in buying and selling decisions. Common examples include negative screening or dynamic positive criteria, such as best-in-class approaches, but also ESG integration. In addition to the potential financial incentive effect, exit strategies can have a stigmatising effect, especially if they are accompanied by negative publicity (Ansar et al., 2013).

In contrast, the voice approach relies on the active use of control rights acquired in the context of financial investments, such as share voting rights, as well as active dialogue with management. Various scholars argue for a combination of both approaches (e.g. Kölbel et al., 2020). It is important to note that the effectiveness of all approaches is based on the assumption that investors pursue environmental or social goals beyond the pure profit motive, and that the effect is not neutralised by other influences. The latter can be the case, for example, if

opportunistic investors use a price decline as a buying opportunity and use the acquired voting rights to block or even reverse sustainability improvements (Hart/Zingales, 2017).

Figure 2: Possible effect of exit strategies on the price of brown investments



Source: Adapted from Ansar et al. (2013).

As a basis for evidence-based policy, it is necessary to identify stable correlations to enable robust forecasts about the effect of different approaches and instruments and their sustainability. Only then can regulation also apply the principle of double materiality in a targeted manner. Research funds must be made available in a targeted manner with respect to this.

2.4.3 Recommendation 8: Continuous monitoring of sustainable investments

Continuous monitoring of sustainable investments by German financial institutions protects consumers from greenwashing and prevents misallocations. It also reduces information asymmetries between financial institutions and public institutions.

Figure 4 shows how the proposed Continuous Accountability Monitoring (CAM) system is structured. After an initial introduction to the system by an analyst (internal), so-called ground truth mapping, the system can continuously monitor changes via public data sources (external). This follows the principle of so-called "crawling". This method is very similar to what search engines like Google do: Data collection is done from different websites; different links are visited and data is extracted there. In the second step, a comparison is made between previous data and current data to detect changes. The system includes a verification process (human in the loop): The changes detected by the system are manually examined and confirmed by a human analyst.

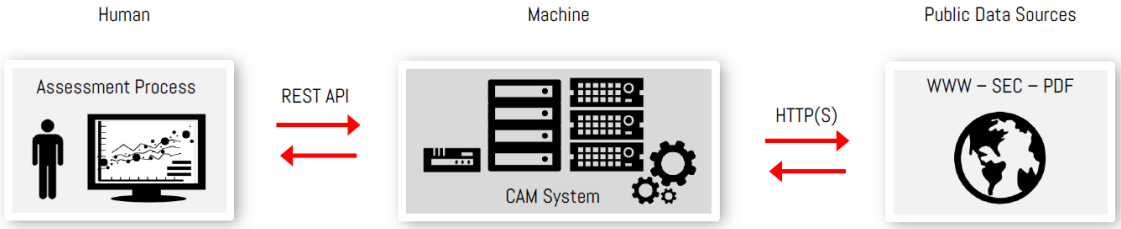
The software system developed by SDG-Labs is currently used to check the sustainability reporting of 2900 companies from Germany on a weekly basis. The companies are banks, insurance companies, holding companies and companies with the business areas of banking and investment services. They include, for example, large investment banks such as Deutsche Bank AG, insurance companies such as R+V Versicherung AG, but also smaller credit institutions such as savings banks and cooperative banks.

The monitoring system is used to search the websites of all companies, including sub-websites, annual and sustainability reports, and other documents, for specific keywords. The keywords were defined on the basis of the green taxonomy, so that documents with financial regulatory content in particular are to be found.

As of today (11/08/2023), 498 of the 2900 companies, or about 17%, have at least one document with relevant content.

CAM enables to uncover a certain form of greenwashing, so-called greenrinsing. When greenrinsing, companies quietly reduce the ambition of their publicly announced sustainability targets over time, hidden away from public attention.

Figure 3: Continuous Accountability Monitoring (CAM)



Source: Own compilation, Sociovestix Labs.

Stronger reporting by the regulator is needed, but also by a wider range of stakeholders, for example through the ESAs. Large, primarily European, asset owners have joined forces in initiatives such as the Net-Zero Asset Owner Alliance (NZ AOA) to collectively advance climate change ambitions in the financial sector and work pre-competitively to implement them. In these efforts, climate action and sustainability are considered material aspects in investment decisions and part of fiduciary duty. This is consistent with the traditional mandate of financial service providers, which is to optimize portfolios under given risk-return profiles. Institutional investors with long investment horizons, in particular, are increasingly seeking to comprehensively integrate climate and sustainability considerations, and the risks that may accompany them, in order to ensure that future obligations are met.

The role of public institutions

Much has been achieved in recent years with regard to the transparency of sustainable investments. But without continuous monitoring, greenwashing remains a key problem that harms consumers and can lead to capital misallocation. Therefore, Germany should implement a radar system with a corresponding set of rules that allows BaFin or the Bundesbank to continuously monitor the implementation of reporting requirements of more than 3,000 financial institutions. Monitoring sustainable finance on the basis of SFDR, EU Taxonomy, CRSD and Paris-aligned Benchmarks would allow public institutions to enter into evidence-based discussions with relevant stakeholders and thus avoid information asymmetries to the detriment of federal representatives. Disclosure requirements for companies and financial market actors are still not well coordinated, for example with regard to the EU Taxonomy. Timelines, scope, and data flows should be revised to improve their applicability. The German government should develop an action plan to achieve this goal and actively introduce this plan at the EU level. This approach will help position Germany as an important marketplace for sustainable finance in Europe. Furthermore, compliance cost would be reduced and investor confidence in the frameworks would be strengthened.

Data requirements

For the sake of comparability, it is important to choose the right reference variables for very granular data sets, for example to take seasonal effects into account. It is also important to put data in the appropriate context. Baseline data should become a public good so that it is available to any individual, NGO, and researcher in good quality. This includes specific CO2e for Scope 1, 2, and 3, and should be extended to other standardized metrics. In the area of climate data, a number of such standardized metrics already exist; in other areas, such as biodiversity, they need to be further established.

2.4.4 Recommendation 9: Focus on actual (re)financing instead of capital market movements

Secondary market transactions have only limited direct impact on corporate sustainability decisions. However, little attention has so far been paid to direct financing of companies. Their effect on sustainability and transformation decisions must be researched more intensively.

Most financial products that are currently marketed as sustainable are based on investment strategies in secondary capital markets, especially the stock or bond market. In contrast to the primary market, secondary market transactions usually take place between investors and without the participation of the companies whose securities are traded on the capital market. Hence, there is no flow of money to the respective companies and consequently no financing or refinancing in the conventional sense. Rising or falling securities prices affect companies only through indirect channels, e.g. if they are used as a reference for financing or refinancing conditions in the primary market or if the remuneration of management is linked to capital market prices.

A potential impact channel that is yet to be fully exploited lies in the consideration of sustainability aspects in the actual financing and refinancing of companies, in which targeted demands can be made on companies (see also Recommendation 2). Particularly in recent years, a dynamic body of research has developed in this area that examines the relationship between sustainability strategies and primary market conditions, i.e. actually realised (re)financing costs. For example, companies with higher sustainability ratios achieve relatively higher prices in IPOs (e.g., Reber et al., 2022). A similar pattern emerges for the primary market of tradable debt securities (e.g., Apergis et al., 2022). Overall, current empirical research overwhelmingly concludes that more sustainable firms achieve relatively better financing terms. However, as this is a relatively recent state of research, it would be too early to establish a consensus here.

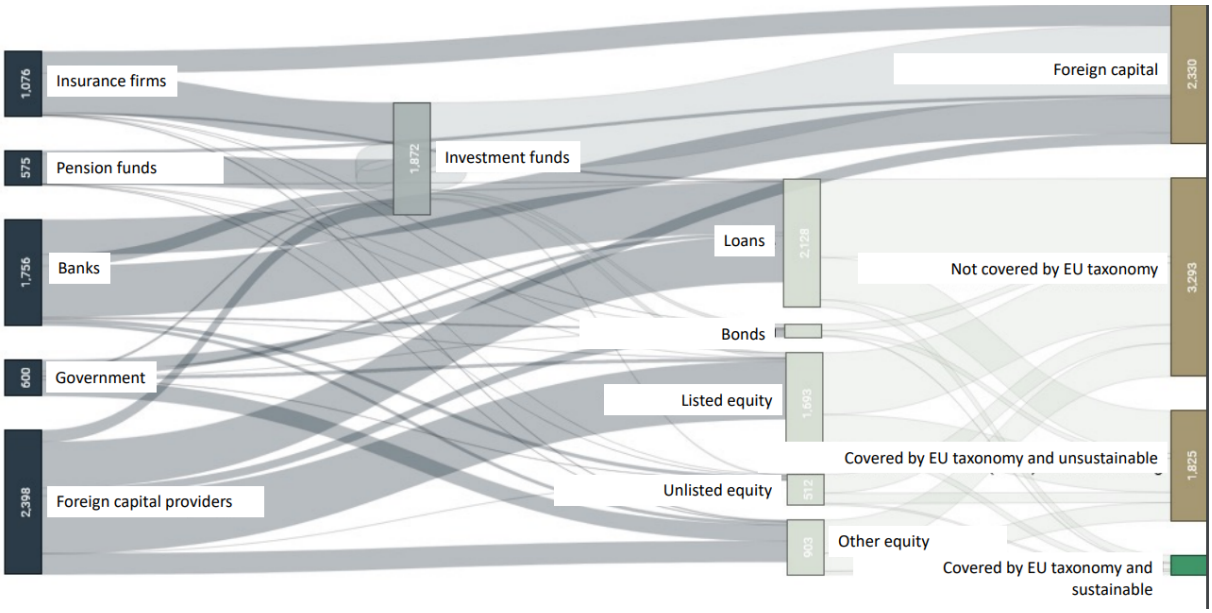
Moreover, in contrast to the Anglo-American market, the German real economy relies much less on capital market finance. Only 438 of all German companies were listed on the stock exchange in 2020 - with a downward trend since the financial crisis of 2007/2008. Traditionally, the German real economy finances itself predominantly through commercial banks. This also corresponds to the preferred savings behaviour of German households, which still rely on conservative savings products despite the growing popularity of securities investments among the younger generation. Research on sustainability and capital markets has limited relevance for the German case. Figure 5 shows the financing structure of the German real economy. On the one hand, this shows the great importance of foreign investors for the German real economy. On the other hand, the chart also shows that a large part of the financing invested in Germany flows to foreign capital borrowers. It should be noted that domestic insurance companies and banks are also partly owned by international investors. To disentangle ambiguity in the territorial scope, we focused our analysis on the question of how the financial sector can act as an engine of

sustainable transformation in the German real economy, instead of examining the effect of the assets invested in Germany.

To tap the potential of sustainable finance for the transformation of the real economy in Germany, it is essential to consider the specific ownership and financing structures of German companies. Here, the importance of banks and institutional investors, which play a central role in both equity and debt financing, are of particular relevance. Overall, a key lever for the transformation lies in winning commercial banks as partners for the transformation and exploring ways in which commercial banks can support the sustainable transformation in financing and refinancing.

There is an urgent need for research to be able to fully exploit the potential of sustainable finance as a driver of sustainable transformation in Germany.

Figure 4: Liabilities of non-financial corporations in Germany



Source: Own compilation based on a study by the University of Hamburg using data from the BACH database, Eurostat and the Carbon Disclosure Project (CDP), as of April 2021 (see Busch et al., 2024).

3 Foundational requirements

This report identifies three basic conditions for the systematic integration of environmental and sustainability aspects in finance. These are: a broad data base, political signalling and the strengthening of institutions relevant for sustainable finance. These foundational requirements support and influence the dimensions presented so far.

3.1 Data basis

For years, academic research and also financial firms have criticized the fact that data on sustainable corporate activities are not available in sufficient quality and/or granularity (Busch et al., 2020; Kishan, 2022) to reliably compare companies, make reliable statements about developments, or serve as an incentive for competing companies to report better.

Sustainable finance requires a broad, comparable, and high-quality data base. Data has a key transformative potential and therefore plays an essential role in redirecting financial flows. The quality and availability of data should receive considerable attention, as only with it can transparency, risk management and impact measurement be effectively implemented and managed.

Data providers prepare published information for financial institutions or analyse further information. The data can be used in decision-making processes. Compared to ratings, commercial data providers offer raw sustainability data. These can then be used individually in the financial institutions. Financial institutions are currently in the process of adapting their data infrastructure to the requirements of sustainability information. To do this, systems must be expanded and modernized. Data integration must take place from the front end to the back end. Financial institutions and sustainability rating agencies are currently establishing enhanced reporting services for the real economy (e.g. EU Taxonomy reporting). This enables improved access to data. A robust data foundation for sustainable finance can be supported by regulation at key points, such as by providing a simple toolset that enables easily accessible and comparable data. Raw databases offer the possibility to prepare sustainability-relevant and publicly accessible data and to make them available to users. In contrast to data providers, raw databases are organized by public authorities and offer a high degree of transparency.

At the EU level, the European Single Access Point (ESAP) should be mentioned in this context. Here, there would be the possibility of combining all relevant environmental data in Europe, such as existing Eurostat data sets. The Copernicus project will lead to higher data granularity. However, it should be noted that the ESAP does not perform quality checks, which has implications for the comparability of data points. The European Commission published non-binding guidance to help companies disclose relevant climate-related information in a more consistent and comparable manner. The Task Force on Climate-Related Financial Disclosures (TCFD) can be understood as the basis for the guidelines. The guidelines could become mandatory via the update of the NFRD to the CSRD. The European Financial Reporting Advisory Group (EFRAG) has established a working group that is currently developing more detailed guidance within this process. For investments in listed companies or funds, there is a relatively good information situation compared to other investment products. However, due to different standards, lack of audits, as well as differences in the evaluation of company data by third-party providers, a possibility for systematic comparison is missing here as well. Even if various seals and labels are a way of signalling to investors that financial products are committed to principles and goals, the issuance of a seal can only be based on existing data and is therefore dependent on high data quality. Only by measuring the sustainability of corporate activities or sustainability

risks can allocation methods be developed and implemented when designing financial products or making investment decisions. The most common sustainable investment strategies are, in descending order, ESG integration, negative screening (exclusion process), shareholder engagement, norm-based screening, thematic investing, positive screening or best-in-class approach, and impact investing (GSIA, 2020). These methods also relate heavily to tradable securities and fund products.

3.1.1 Recommendation 10: Promoting data quality, enabling interlinkage of data strategies

The availability and interlinkage of high-quality data is an essential precondition for a digital and sustainable financial economy. Currently emerging data tools should be linked more closely.

The availability of data is currently a key limiting factor in the assessment and management of sustainability risks. Data plays an essential role for a digital and sustainable financial economy. The availability and quality of data plays an important role in unlocking transformational potential. Its transformative potential should receive greater critical appreciation and consideration on the path to a sustainable financial economy.

As part of a successful development into a leading sustainable finance market place, Germany could take a pioneering role in the area of data quality and availability and thus effectively redirect investments into climate and environmental protection. Information asymmetry hinders an efficient allocation of capital, as for example investors do not have sufficient information about investment opportunities, central aspects relevant to steering cannot be considered and competitive distortions can arise due to information advantages. Better data availability builds trust in investment products, both from internal and external stakeholders. It allows differentiated product strategies and effective communication on targets and their achievement.

Dovetailing of national and international levels

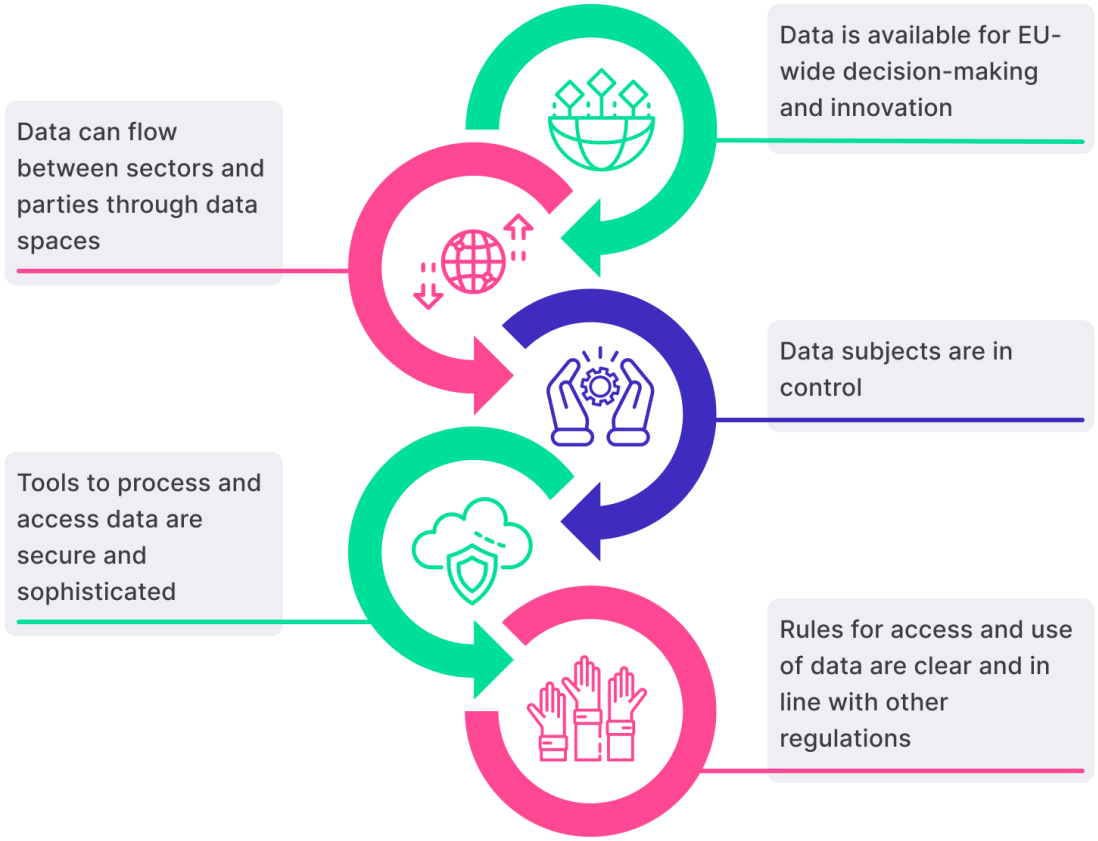
The German government should connect strategies for digital technologies and data management (Digital Finance Strategy, Data Strategy) with the Sustainable Finance Strategy at national and EU level and promote their interlinkage. Financial markets are highly globalized and investments are made in projects and companies far beyond the German border. It is more efficient to build on the existing regulatory framework and to use existing data infrastructures.

In the context of this linkage, not only technical elements should be considered. Availability as well as format are important, but these primarily improve data availability. Data quality checks should also play an important role in improving data quality. Transparency about the origin of data is of eminent importance:

- Have they been (voluntarily) disclosed by companies themselves or have they been generated by third-party providers?
- When were the data published and were they subsequently changed?
- Are they independently verified?

Figure 6 shows the European data strategy.

Figure 5: European data strategy



Source: Circularise (2022).

Open Finance Framework

As part of the EU Digital Finance Strategy, the Open Finance Framework has been proposed. It is based on the principle that customers of financial service providers should own and control the data they generate and provide. Subject to privacy and consumer protection guidelines, access to and use of customer data should be openly shared, with consent, between financial service providers and the financial sector. Data sharing and access rights for third parties should be enabled.

The advantages of the Open Finance Framework are better comparison options and easy switching between different providers, personalized advice, and personally tailored products. The latter includes personal financial management in the sense of default notifications and notification of the availability of lower interest rates as well as asset management in the sense of investment analyses (including sustainability aspects) and the monitoring of savings and expenses. In the area of pension entitlements, the Open Finance Framework could also increase transparency for individual investors. Ultimately, it would also offer new opportunities in the area of alternative calculation of credit scores. This, in turn, is also useful for financial institutions. Overall, it would lead to increased transparency and inclusion in the market.

3.1.2 Recommendation 11: Improving data access and comparability through standardised environmental indicators

Easily accessible and comparable data on real economic activities are a basic prerequisite for sustainable finance. Especially for small and medium-sized enterprises, their provision should be supported, for example through public databases.

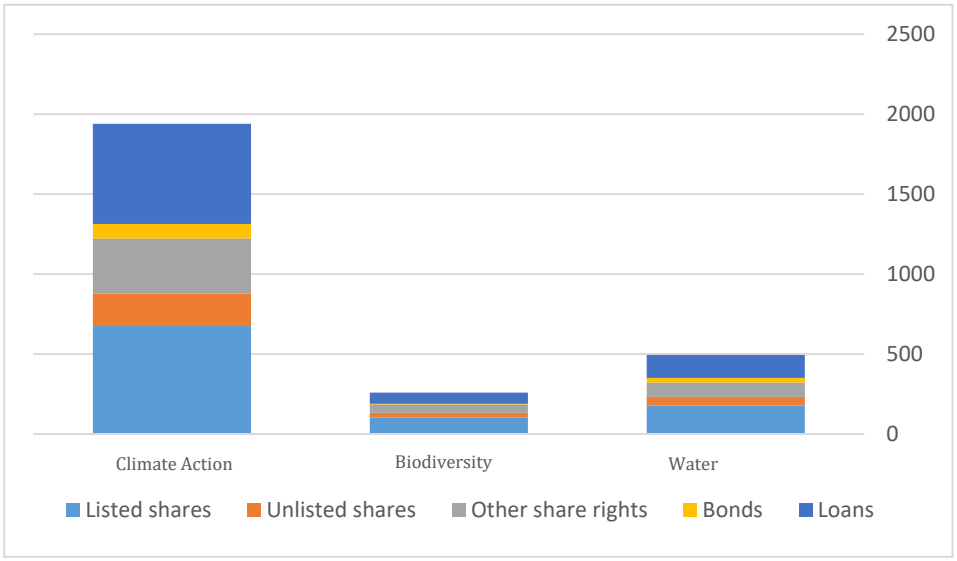
A crucial prerequisite for sustainable finance is the availability and adequate quality of relevant data (see also Recommendation 10). Due to corresponding disclosure obligations, sustainability-related data is often available only for large capital market-oriented companies and, even where it is available, objective comparison may be difficult.

Figure 7 shows the share of real economic investment in the German economy in line with the environmental objectives of climate change mitigation, protection and restoration of biodiversity and ecosystems, and sustainable use and protection of water and marine resources. The EU Taxonomy defines three further environmental objectives: Climate change adaptation, transition to a circular economy, and pollution prevention and control.

Environmental indicators for biodiversity

To effectively increase transparency and comparability, binding environmental indicators are needed. While informative indicators have been developed for corporate greenhouse gas emissions (especially CO2e), similar indicators for biodiversity are lacking. While only 1% of investments in environmental protection are currently used for biodiversity (Strassburg et al., 2020), nature-based solutions are the most effective means of achieving climate-friendly effects - and the achievement of climate goals. According to the OECD, USD 125-140 trillion, equivalent to 150% of global economic output, depend on ecosystem services alone (OECD, 2019). It is therefore essential to develop and establish environmental indicators.

Figure 6: Share of sustainable investments by environmental objective



Source: Own compilation based on a study by the University of Hamburg using data from the BACH database, Eurostat and the Carbon Disclosure Project (CDP), as of April 2021 (see Busch et al., 2024).

Make reporting obligations easy to implement for small and medium-sized enterprises

In recent years, the EU has launched several regulatory initiatives as part of the European Green Deal, such as the ESAP (see Recommendation 10). Regulators and investors hope that the ESAP will provide reliable and high-quality data that can be automatically transferred and analysed,

thus helping them to make investment decisions and assess sustainability risks. When designing this database, it must be ensured that the data is not only readily available but also reliable. In this context, the question arises how disclosure requirements can be extended to small and medium-sized enterprises while reducing the burden of compliance.

3.1.3 Recommendation 12: Making climate data available in a timely manner, promoting corresponding projects

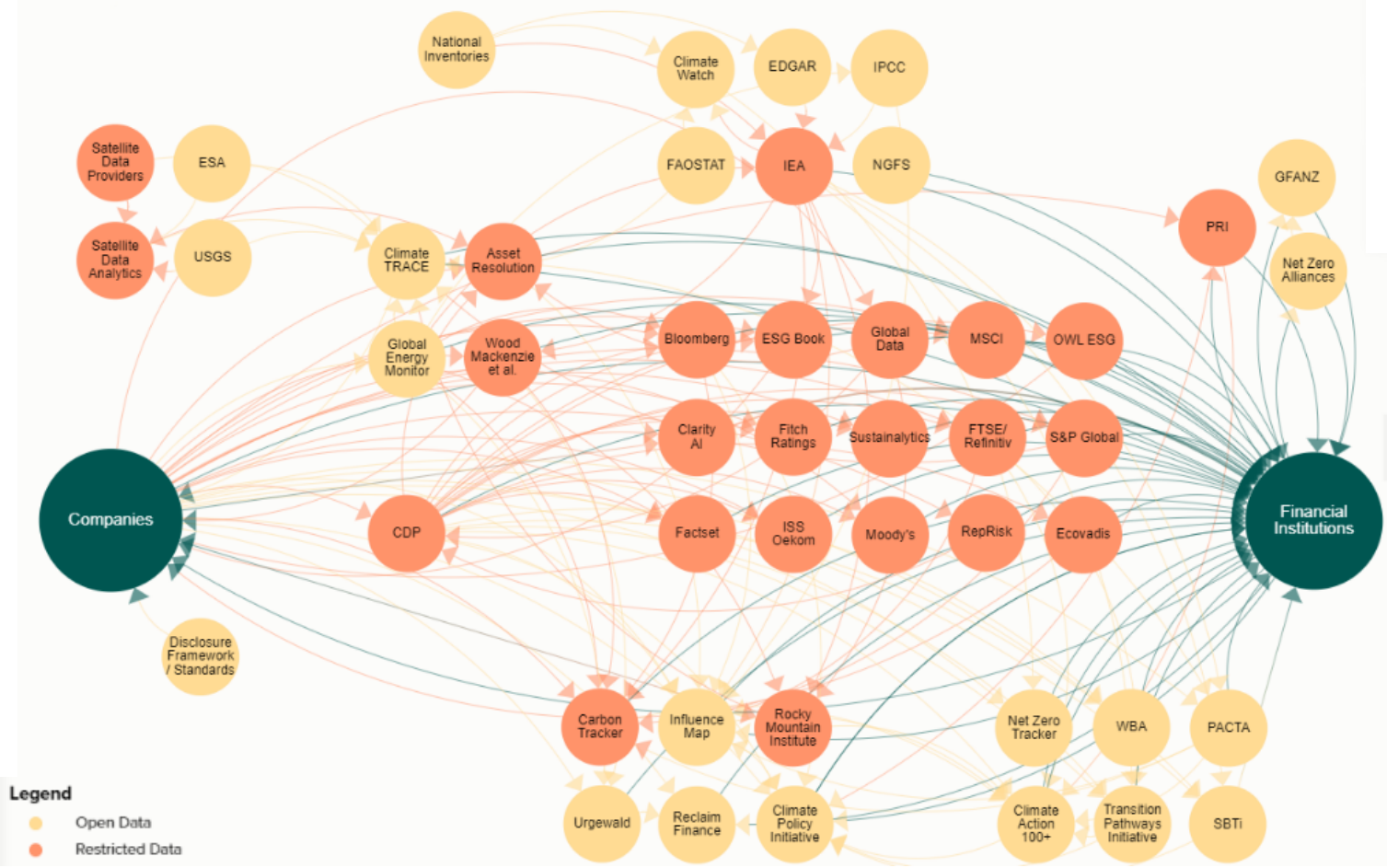
Climate data is sometimes only made available with considerable delay, with negative consequences for climate action decisions. Projects for continuous and timely updating should therefore be supported.

Regulators and investors usually only get access to relevant climate data with a significant delay. In some cases, delays of more than one year are to be expected. This has negative consequences for the consideration of climate mitigation and climate change adaptation in investment decisions. Projects for the timely, continuous updating of climate data therefore play an important role. Their implementation is an important building block on the road to sustainable finance.

Figure 8 shows the current information flows in the area of climate data. The graph illustrates how long information paths are from companies to institutions and how commercial licenses restrict the flow of information.

The basic process described by the graphic is as follows: Companies disclose climate data, with reference to disclosure standards and frameworks that are openly available. This data is usually not only found on the company's own websites but is also published through disclosure platforms. They represent a central collection point for this data. Commercial data providers then aggregate and evaluate the original company data. The resulting data is often the primary input for financial institutions. Financial institutions use the data to gather information for their capital allocation decisions.

Figure 7: Information flows in the area of climate data



Source: Adapted from Climate Arc (2023).

3.2 Strengthening institutions

Sustainable finance needs strong institutions to accompany its development. Various institutions are involved in Germany as a marketplace for sustainable finance. In order to bring together their heterogeneous competencies and thus be able to set the framework for sustainable finance more effectively, their competencies must be strengthened, and cooperation must be consolidated.

One example is the mandate for investing assets, which is governed by various laws. The Federal Ministry of the Interior and Home Affairs (BMI) plays a central role in shaping investment policy by issuing investment guidelines. The issuance is in agreement with the Federal Ministry of Finance (BMF). The ministries are responsible for the strategies of the Federal Government's pension reserves, the Federal Government's pension fund, the Federal Employment Agency's pension fund and the social long-term care insurance pension fund. These assets are managed by the Bundesbank, which in this case is the executive fiscal agent for the Federal Government. The Federal and State Government Employees' Retirement Fund (VBL) and the Nuclear Waste Management Financing Fund (KENFO) have capitalized mandates to invest their respective special-purpose assets. Ideally, the federal and state governments coordinate a joint strategy for all German public assets. The BMUV can provide support in this regard with a view to taking environmental aspects into account.

Another example is the Kreditanstalt für Wiederaufbau (KfW) - it could become Germany's transformation bank. Here, KfW has a central role to play in questions of bankability and viability of (innovative) business models. The current management of many KfW products via financing volume as a strategic KPI poses a challenge to KfW's successful positioning as a transformation bank. The German government should adapt KfW's mandate to increasingly manage KfW through effective transformation financing as a key KPI. This should lead to increased use of instruments for crowding-in private capital.

Indeed, the coalition agreement (Bundesregierung, 2021a) includes the ambition to support companies in their investments on the path to climate neutrality with targeted instruments, and a transformation fund at KfW is explicitly listed as one. The German government has set up a fund financed from the sale of carbon dioxide certificates as a special asset to promote the implementation of the energy transition.

3.2.1 Recommendation 13: Strong institutions for an effective sustainable finance sector

Pathways to a sustainable financial economy require institutions that set a good and binding framework. In Germany, various public institutions are involved in shaping the framework for sustainable finance. They and their interaction should be strengthened.

Sustainable finance does not develop on its own. It needs strong institutions that shape its framework and incorporate different competencies in the process. The Federal Republic of Germany has various institutions that are active in the field of sustainable finance: The Federal Ministry for the Environment and Consumer Protection, the Federal Ministry of Finance as well as the Federal Ministry of Economics and Climate Protection, the Bundesbank, BaFin, the Federal Environment Agency, the Federal Agency for Nature Conservation, but also institutions such as the Sustainable Finance Advisory Council work on the framework and success structures of sustainable finance. Strengthening their functions and cooperation, for example in the necessary measures outlined above, is an important contribution to strengthening Germany as a location for sustainable finance.

One aspect to be considered in this context is the diversity of the players. Important factors here are the costs of competence building, but also the price structure of data providers. It is often cheaper to bundle demand, as price advantages can be achieved when trading as a closed unit. These price advantages are then enjoyed by all institutions; individual budgets for data acquisition could add up to a better data base. Taking these factors into account, institutional bundling should be weighed. Asset owners that are not in competition with each other are suitable for pooling.

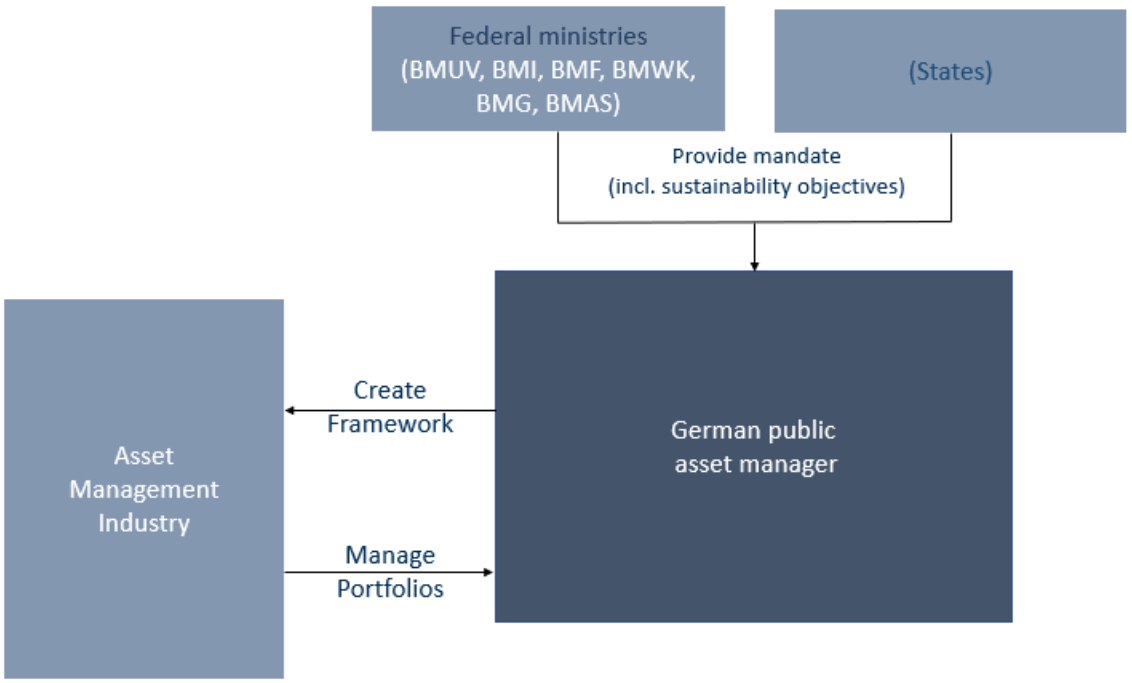
A central German asset manager

A central German asset manager for public assets could be discussed as a holistic option for sustainability integration. The asset manager could manage federal and, if desired, state assets. The central public asset manager would receive a principle-based but otherwise relatively free mandate for action from the federal and state governments, see Figure 10. Advantages of this approach are that it promotes transformation, strengthens green and sustainable products, and has a signaling effect.

A positive example can be found in Baden-Württemberg: Since 2023, investments must be aligned with the UN Sustainable Development Goals and the 1.5 degree climate target. Nuclear energy and coal are explicitly excluded. The resolutions affect around 17 billion euros, of which around 10 billion euros come from pension reserves for civil servants' pensions (SWR, 2023). In total, four German pension funds already use Paris-aligned benchmarks: Baden-Württemberg, Brandenburg, Hesse and North Rhine-Westphalia (Qontigo, 2023).

As a key element within the Sustainable Finance 2022 framework plan, the state of Berlin issued its first sustainable bond of 750 million euros in January 2023 for projects with particular environmental and social added value (Senate Department for Finance Berlin, 2023).

Figure 8: German public asset manager on sustainability integration



Source: Own compilation, Sociovestix Labs.

3.3 Political Signals

Though the development of sustainable finance is primarily aimed at the systematic consideration of sustainability criteria by private players, the federal and state governments have an important role model function. Policy signals to private actors are therefore of considerable relevance, both for investment criteria for public investments and for the issue of Paris-aligned benchmarks for public investments.

To date, the federal government's investment strategy reflects climate and sustainability aspects only to a limited extent. The pioneer at the federal level is KENFO. Climate and sustainability aspects have already been taken into account in the development of its mandate. In the investment of other special and special-purpose funds of the federal government, sustainability and especially climate aspects are included to a much lesser extent. However, initial efforts to integrate climate and sustainability aspects are evident. For example, against the backdrop of the German Sustainability Strategy developed by the German government to implement the 17 UN Sustainable Development Goals, the Investment Committee has adopted a sustainability concept for equity investments in the special funds.

In its final report, the first Sustainable Finance Advisory Council of the German federal government recommends a systematic integration of sustainability aspects into the federal government's investment strategy (Sustainable Finance Advisory Council of the German federal government, 2021 a). A sustainable investment strategy by the federal government is considered sensible and necessary here, among other things, because of the federal government's role model function and lighthouse effect.

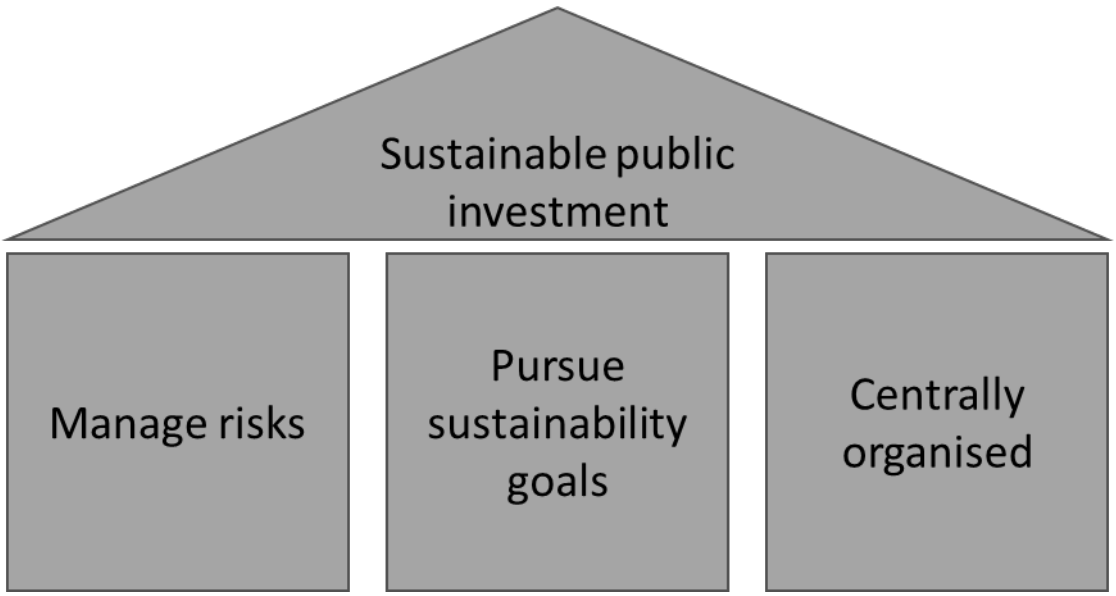
3.3.1 Recommendation 14: Transforming public facilities into sustainable and climate-conscious entities

Currently, the investment of German public financial assets often does not align consistently with the federal government's sustainability goals. This inconsistency creates a disjunction between political declarations of intent and actual policy action, undermining the potential lighthouse effect of federal and state governments investment behaviour. Consequently, there is a risk of inadequately managing sustainability, which could negatively impact the performance of public investment funds and overlook sustainable return opportunities.

The federal government and the Länder possess significant financial assets, including reserves and special-purpose assets that fund pensions, unemployment insurance, and other future liabilities, such as the final disposal of nuclear waste (Bundesministerium des Innern, für Bau und Heimat, 2020). Entities like the VBL and the KENFO are mandated to actively invest these special-purpose assets.

Despite these resources, the federal government's climate and sustainability goals are not consistently reflected in the investment of those funds. This inconsistency sends mixed signals between political intention (e.g., ratification of the Paris Climate Agreement) and political action (i.e., the strategic orientation of the investment policy of public assets). This disconnect hampers the full utilization of the potential lighthouse function of the federal and state governments in the realm of sustainable finance.

Figure 10: Pillars of the Confederation's Sustainable Investment Assets



Source: own compilation, Frankfurt School of Finance & Management.

The federal government should proactively integrate climate and sustainability aspects into the investment policy of public fixed assets. With the dynamic evolution of methods, tools, and instruments over recent years, operational implementation has become increasingly manageable. To align public assets with its climate protection and sustainability goals, the federal government should consider the following:

- Systematic and transparent management of climate and sustainability risks across all public facilities;
- Embedding sustainability goals within active investment strategies utilizing conventional methods;
- Discussing the creation of a centralized German asset manager for all public assets to manage sustainability integration efficiently, thereby strengthening the lighthouse effect.

In formulating this strategy, the German government can leverage domestic experiences. For instance, KENFO has already integrated sustainability goals into its investment policy, including Paris climate targets and the phase-out of nuclear power and coal production (KENFO, n.d.). Moreover, some states, like Baden-Württemberg, have legislated the sustainable orientation of public investments, with sustainability as a core principle alongside traditional economic considerations of profitability, security, and liquidity (Baden-Württemberg, 2022).

The German government should implement such a strategy in close collaboration with, or supported by, the Sustainable Finance Advisory Council of the German government of the 20th legislative period.

3.3.2 Recommendation 15: Applying Paris-aligned benchmarks to public investments

With the Paris-aligned benchmarks, the EU has created an instrument that can effectively contribute to compliance with the Paris Climate Agreement. The federal and state

governments can take a pioneering role and align their investments with Paris-aligned benchmarks.

The European Union (EU) established the first benchmarks that effectively adhere to the Paris Climate Agreement. There are two EU Climate Benchmarks to choose from Hoepner et al., 2019):

- EU Climate Transition Benchmark (EU CTB)
- EU Paris-aligned Benchmark (EU PAB)

The two benchmarks differ in their level of ambition: EU PAB is best suited for investors with the greatest climate ambition. However, both have in common that greenhouse gas emissions of embedded investments have to be reduced by at least 7% each year, according to the science-based calculations of the Intergovernmental Panel on Climate Change (IPCC).

The German Sustainable Finance Strategy of the Federal Government describes in measure 19 "Improve sustainability and transparency in the capital investments of the Federal Government (Federal Government 2021b) " how special-purpose and special funds are to be invested more sustainably in the future: "For the special-purpose funds Versorgungsrücklage und Versorgungsfonds des Bundes, Versorgungsfonds der Bundesagentur für Arbeit as well as Vorsorgefonds der sozialen Pflegeversicherung, the adopted sustainability concept will be implemented promptly through equity investments in sustainability indices. The underlying investment strategy of the investment committee integrates ESG criteria and combines exclusions and a selection of companies that are leaders in their sector (best-in-class) in terms of their sustainability rating. In doing so, equity investments are gradually switched to two sustainability indices that apply the EU Climate benchmarks" (Federal Government 2021b).

International comparison

The federal and state governments could act as role models in complying with the Paris Climate Agreement. To this end, reduction paths in line with the EU Climate Benchmarks for public investment should be applied. This would ensure that public investments effectively serve climate protection and have a positive long-term impact. Other countries are already implementing similar strategies for their funds: Ireland, New Zealand, Sweden, Taiwan and the United Kingdom.

4 Conclusion

This report identifies milestones and measures for a path to sustainable finance in Germany. This must include the systematic integration of environmental and sustainability aspects under both a risk and an impact perspective.

The first milestone on the road to sustainable finance deals with fundamentals. Data is a cornerstone for a successful transformation to sustainable finance. They form the basis for informed decision-making and allow progress to be measured. To achieve this, it will be necessary to develop non-financial data to the same extent as financial reporting data. The standardization of key figures and the acceleration of data availability are particularly important in this context. Development in this direction can be encouraged by public funding and pressure.

In general, fundamentals also include a binding framework, which must be set by strong institutions. In this context, it is important that the various players pull together constructively. In addition to individual competencies, cooperation between the various institutions should also be strengthened.

The third aspect of fundamentals is political signals. The consideration of sustainability in the investment of public funds and especially the application of Paris-aligned benchmarks can act as a signal to other market participants and thus extend the reach beyond their own investment sums. Pooling of competencies can generate synergies and strengthen negotiating power. A unified approach and leadership from the federal government can be useful in this regard.

In general, sustainability aspects should be integrated into all federal government assets, but the states can also play a central role. Examples from Baden-Württemberg and Berlin show that both the will and the opportunity to do so exist. Baden-Württemberg invests about 17 billion euros of public money from now on based on sustainability aspects. Berlin issued its first sustainability bond this year. This report highlights the differences between use-of-proceeds based green bonds and target-linked sustainability-linked bonds and argues for a stronger focus on the latter.

Sustainability-linked bonds, such as those issued by the state of Berlin, are very much in line with the transformation relevance dimension - as they are more flexible and forward-looking than green bonds, their role in transformation finance is significant. Since transformative projects in the real economy are a prerequisite for sustainable finance, the regulatory framework must effectively incentivize and specifically support real economy transformation decisions. This can also help to counteract the Tragedy of the Horizon.

In the current system, companies and their current managers often have few incentives to implement costly short-term transformation plans to achieve long-term sustainable development that exceeds their own horizons. Aggregating the individual risks this creates for the economy and society as a whole, the lack of incentives has systemic consequences. This also applies in terms of financial stability. An adjustment of national regulation should be prepared.

A look at Europe and the international private sector shows that concrete options for action exist and good practice has already been established in some areas. It is worthwhile to learn from the experience of existing strategies and their implementation and to apply already developed instruments such as the EU Paris-aligned benchmarks. This is not only easier and faster to implement, but also helps to make Germany attractive as an international sustainable finance location.

Another dimension is transparency. On the way to a sustainable financial economy, the German government should advocate a high level of transparency regarding governance structures in financial and non-financial companies. This can help strengthen companies' long-term planning.

Besides promoting transparency in companies, financial products should also be critically examined with regard to greenwashing. Here, European regulation such as the SFDR can be taken up. To protect investors and consumers from greenwashing, an annual ranking of companies according to their decarbonization speed can be published. This creates transparency regarding the performance of individual companies, but can also be used as a data basis for financial products and investment strategies.

Putting a stop to greenwashing favors another dimension: risk management. In risk management, perspective is essential. Following European leadership, the consequences for the environment and society should be considered here in addition to the financial materiality (for companies and investors). In concrete terms, this means that not only the influence of risk factors such as climate change on companies and financial products must be taken into account, but also the influence of companies and investments on climate change. While this direction of dual materiality is being taken in the European regulatory space, other jurisdictions, particularly the U.S., have so far lagged behind in this regard.

Finally, the dimension of impact measurement is discussed. Both changes in financial flows and impact channels need to be explored, as there is currently no consensus on whether, to what extent or under what conditions approaches actually contribute to the transformation of the real economy. In terms of effectiveness, it is important to focus on actual refinancing rather than on the secondary market. In this context, debt capital markets should be emphasized, as refinancing is naturally required here on a regular basis. Equity transactions in the vast majority of cases take place on the secondary market between investors*. In the rapidly evolving regulatory framework, it is important that continuous monitoring takes place. In addition, actual change in the direction of financial flows must be differentiated from re-labelling.

These milestones and measures, formulated in the form of the 15 recommendations, show a way forward for sustainable finance in Germany. This offers the opportunity to consolidate Germany as a competitive financial center and both support national sustainability goals and affirm the EU in its pioneering role in the area of climate and the environment.

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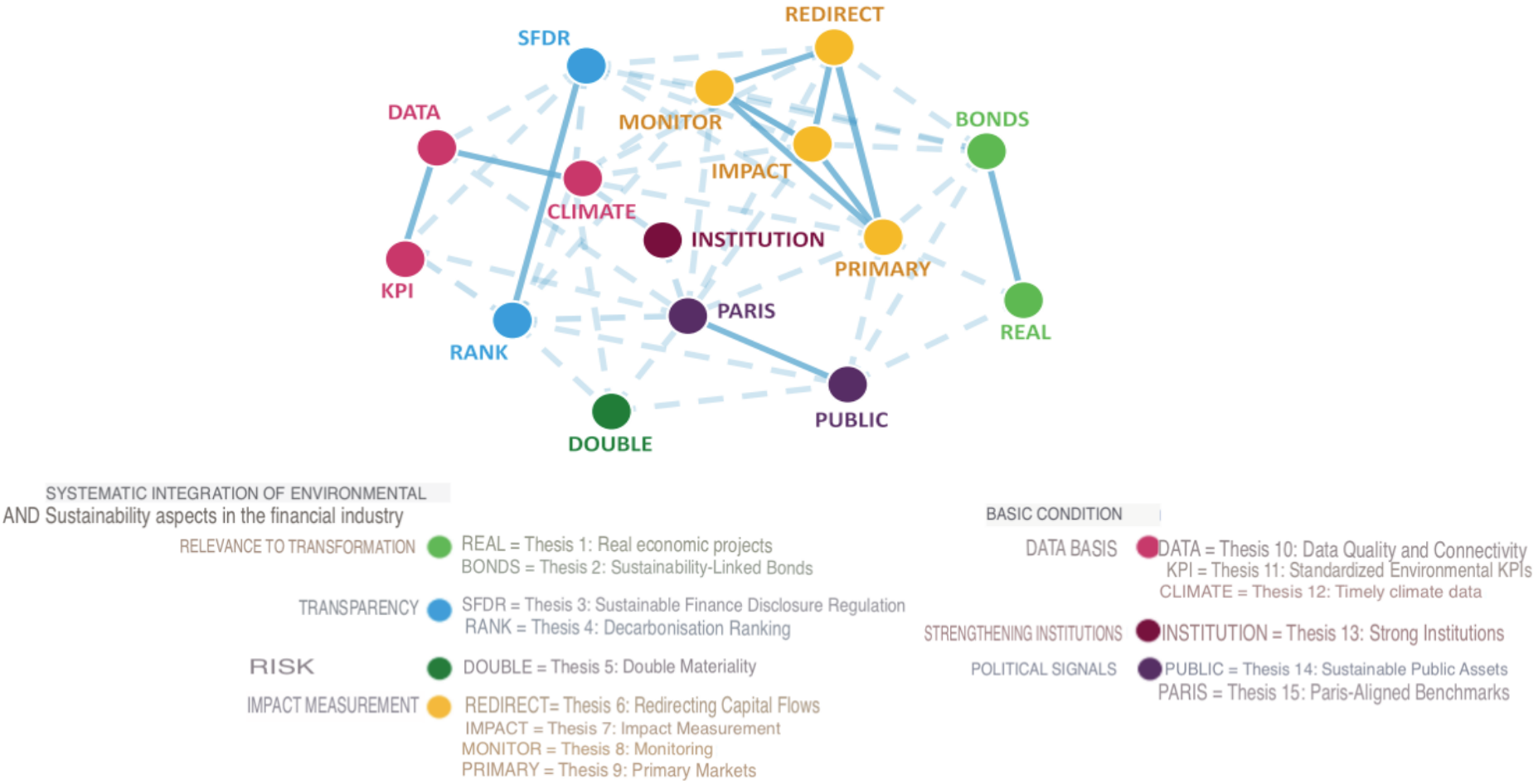
A Annex A

Figure 9: Network diagram of recommendations for pathways to a sustainable financial economy



Source: Own representation, Sociovestix Labs.