Climate-consistency of finance flows: iGST case study series

Consistency case study: actions supporting Article 2.1c of the Paris Agreement in Germany

Christoph Hoffmann, Meret Karenfort, Mariana Micozzi and David Ryfisch

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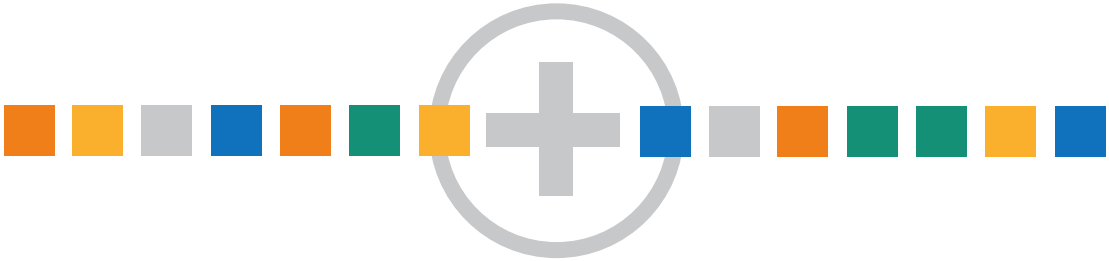

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About the independent Global Stocktake (iGST) and the Finance Working Group (FWG)

The Independent Global Stocktake (iGST) is a consortium of civil society actors working together to support the Global Stocktake (GST), the formal process established under the Paris Agreement to periodically take stock of collective progress toward its long-term goals.

The iGST aligns the independent community — from modelers and analysts to campaigners and advocates — so we can push together for a robust GST that empowers countries to take greater climate action.

The Finance Working Group (FWG) is an open partnership bringing together expert perspectives from the global North and South on the progress made towards financing climate action. Considering the provision of support to developing countries to mitigate and adapt to climate change and the consistency of finance flows with climate objectives, the FWG aims to support the UNFCCC GST process and to independently benchmark the official GST. The group is co-chaired by Charlene Watson of ODI and Raju Chhetri of the Prakriti Resources Center.

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Contents

Abbreviations

AFS	Ausschuss für Finanzstabilität [Financial Stability Board]
APA	Ad hoc Working Group on the Paris Agreement
BA	Biennial Assessment and Overview of Climate Finance Flows
BaFin	Bundesanstalt für Finanzdienstleistungsaufsicht [Federal Financial Supervisory Authority]
BDB	Bundesverband Deutscher Banken [Association of German Banks]
BMEL	Bundesministerium für Ernährung und Landwirtschaft [Federal Ministry of Food and Agriculture]
BMF	Bundesministerium für Finanzen [Federal Ministry of Finance]
BMUV	Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit [Federal Ministry for the Environment, Nature Conservation, Nuclear Safety]
BMWK	Bundesministerium für Wirtschaft und Klimaschutz [Federal Ministry of Economics and Climate Protection]
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit [Federal Ministry for Economic Cooperation and Development]
BNatSchG	Bundesnaturschutzgesetz [Federal Nature Conservation Act]
CAP	Common Agricultural Policy
CAT	Climate Action Tracker
CBDR	common but differentiated responsibilities
CBI	Climate Bonds Initiative
CO_2	carbon dioxide
CSRD	Corporate Sustainability Reporting Directive
DBB	Deutsche Bundesbank
DE	Deutschland (Germany)
DEG	Deutsche Investitions- und Entwicklungsgesellschaft [German Investment and Development Company]
DWD	Deutscher Wetterdienst
EBA	European Banking Authority
EBF	European Banking Federation
EC	European Commission

ECA	European Court of Auditors
ECB	European Central Bank
EFRAG	European Financial Reporting Advisory Group
EIB	European Investment Bank
EIOPA	European Insurance and Occupational Pensions Authority
ESAP	European Single Access Point
ESG	environmental social governance
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
ETF	Enhanced Transparency Framework
ETS	Emissions Trading System
EU	European Union
FC4S	Financial Centres for Sustainability
FNG	Forum für nachhaltige Geldanlagen
FÖS	Forum Ökologisch-Soziale Marktwirtschaft e.V.
FRL	forest reference level
FWG	Finance Working Group
GCF	Green Climate Fund
GDP	gross domestic product
GDV	Gesamtverband der Deutschen Versicherungswirtschaft [German Insurance Association]
GEF	Global Environment Facility
GGKP	Green Growth Knowledge Platform
GHG	greenhouse gas
GRI	Global Reporting Initiative
GST	Global Stocktake
HLEG	High-Level Expert Group on Sustainable Finance
ICT	information and communications technology
IEA SDS	International Energy Agency Sustainable Development Scenario
iGST	Independent Global Stocktake
IIRC	International Integrated Reporting Council
IMF	International Monetary Fund
IORP	institution for occupational retirement provision

KfW	Kreditanstalt für Wiederaufbau
KSG	Klimaschutzgesetz [Climate Protection Law]
LNG	liquefied natural gas
LULUCF	land-use, land-use change and forestry
MDBs	multilateral development banks
MDR	Mitteldeutscher Rundfunk
NDC	nationally determined contribution
NGFS	Network for Greening the Financial System
NGO	non-governmental organisation
NRW	North Rhine-Westphalia
PAIs	principle adverse impacts
PRB	Principles for Responsible Banking
RRF	Recovery and Resilience Facility
RRP	recovery and resilience plan
SBSTA	Subsidiary Body for Scientific and Technological Advice
SDGs	Sustainable Development Goals
SFDR	Sustainability Finance Disclosure Regulation
SMEs	small and medium-sized enterprises
TCFD	Task Force on Climate-Related Financial Disclosures
TEG	Technical Expert Group
TLTROs	targeted longer-term refinancing operations
UNDP	United Nations Development Programme
UNEP FI	United Nations Environment Programme Finance Initiative
UNEP PRI	United Nations Environment Programme Principles for Responsible Investment
UNFCCC	United Nations Framework Convention on Climate Change

+ Executive Summary

One of the three main goals of the Paris Agreement is to 'make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development', as stated in Article 2.1c (UNFCCC, 2015). This long-term goal recognises that – if the two other long-term goals of the Paris Agreement (on adaptation and mitigation) are to be met – an increase in finance that supports climate action must be partnered with a redirection of the finance, both public and private, that is locking countries into high-emission, low-resilience futures.

Article 2.1c applies to developing and developed countries alike. However, Article 2.2 states that the Agreement is to be implemented equitably, based on the principle of common but differentiated responsibilities (CBDR), which means taking into account the different national capacities and circumstances of the Parties. This statement applies to finance flows, and hence developed countries should lead actions aiming to tackle climate change and its adverse effects (United Nations, 1992: Article 3.1), and shall provide and mobilise climate finance for mitigation and adaptation to developing countries (UNFCCC, 2015: Article 9).

Given that Article 2.1c of the Paris Agreement is yet to be fully operationalised, this case study on Germany's progress towards implementing it is a first attempt to provide a comprehensive framework for analysing that progress. It is important to note that this case study primarily depicts the status quo at time of writing; it does not provide an in-depth and comprehensive evaluation of progress in all areas. This is simply not possible in a report that depicts a very dynamic and rapidly changing policy field.

The case study pursues two main goals:

1) to identify a set of relevant themes and categories with which to assess the status of those measures that have been implemented, the level of climate ambition that those measures represent, and the availability of the data required to enable state and non-state actors to track progress against their own targets and against the Paris Agreement goals; and
2) to identify the available sources of relevant information and data that we can use to conduct the assessment.

This case study on developed country Germany, which held the G7 presidency in 2022, is published alongside a case study of developing country Indonesia, which held the G20 presidency in 2022. It thereby adds to previously published analyses of Colombia (López Carbajal et al., 2021), Rwanda (Samo et al., 2022) and Switzerland (Bingler et al., 2021). We strongly encourage other countries to apply the emerging framework in analysing their own status quo, and we hope that this study will inform the

UNFCCC's Global Stocktake (GST) of progress towards achieving the goals of the Paris Agreement.

This case study focuses primarily on Germany. However, as a member of the European Union (EU), Germany cannot be viewed in isolation from Europe, and it is closely linked to other EU member states through European institutions such as the European Central Bank (ECB). The bulk of political sovereignty for these countries lies in Brussels; especially in the area of sustainable finance, many important regulatory projects are planned and implemented at the EU level. Therefore, in this case study, Germany's implementation of the Paris climate targets, as well as its political measures and regulations, are always examined in combination with the corresponding EU instruments.

Germany aims to become a leading location for sustainable finance. With its geographical location at the centre of Europe, its traditionally strong industry (especially in the automotive sector), and many highly specialised small and medium-sized enterprises (SMEs), Germany is one of the most important economies in Europe. While Frankfurt is its financial hub, Germany's financial system is not centralised like that in France or the United Kingdom but rather decentralised. The German banking system comprises three pillars – cooperative banks, public banks and private commercial banks – with which it aims to meet the different needs of regional economic clusters. Whether this structure promotes or is a barrier to the sustainable and Paris-compatible alignment of Germany's financial flows is not yet clear.

After a period during which the issue was ignored, an increasingly broad consensus has emerged, both politically and in large sectors of the financial industry, a successful, climate-compatible economy will require a sustainable and thus futureproof financial system – not least to mobilise the necessary financial resources for the required investments. To this end, the German government has set its sights on making Germany 'a leading location in the field of sustainable finance'.

Emission reduction goals are also guiding legislating efforts in the field of sustainable finance. Germany has implemented emission reduction measures at both European and national levels. In July 2021, the European Union agreed the 'Fit for 55' package within the framework of the Green Deal, whereby Europe is to become the first climate-neutral continent in 2050 and to achieve a 55% reduction in emissions by 2030 (compared with 1990 levels). In addition, the climate law in Germany, which has been updated following a decision by the Federal Constitutional Court, sets somewhat higher targets: Germany aims to be climate-neutral by 2045 – five years earlier than anticipated under the EU measure.

Regarding legislating efforts in the financial sphere, the German government adopted the first German Sustainable Finance Strategy in May 2021, based on the recommendations of a multistakeholder advisory council. It consists of five goals for both public and private finance; it comprises 26 measures. At the EU level, a new Strategy for Financing the Transition to a Sustainable Economy was published in June 2021 (EC,

2022c). This strategy builds on previous strategies on the subject, such as the Action Plan for Financing Sustainable Growth published in 2018 (EC, 2018). Central elements in the strategy remain the EU Taxonomy for Sustainable Activities (a work in progress), the Sustainable Finance Disclosure Regulation (SFDR) and the green bond standard.

But its goals and a sustainable finance strategy do not necessarily set Germany up for success in its pursuit of the Paris goals. For example, the German government remains vague in many areas of its sustainable finance strategy. In addition, no target specific to the financial sector is included in its new Climate Protection Programme 2030. At the EU level, the most important regulatory instruments are not yet in force and are still being fine-tuned. More generally, adaptation-related activities are not well documented and are not assessed against specific goals.

Both at the political level and in the financial services marketplace, issues relating to the sustainability of the financial system have been dismissed as peripheral for too long. This delay in the development and expansion of innovative and future-focused financial market structures is already having a negative impact on sustainability goals and thus on Germany's appeal as a business location. While such developments have now picked up speed, the coming years will show whether Germany's efforts will be enough.

If Germany is to become an industry leader, it must demonstrate the necessary broad understanding that **sustainable finance is a transformational tool that does not stand in the way of financial market stability but rather is a precondition to it in times of climate change**.

In sum, the following findings emerge from the case study of Germany's progress against Article 2.1c.

- **Overall, strategies and financial targets are strongly integrated into ongoing efforts at the EU level.** Both Germany and the European Union have defined strategies, targets and measures that are partly general and partly concrete. As one of the largest and most important EU member states, Germany exerts extensive influence on the European Climate Strategy and its implementation through various EU institutions. **The targets and measures in place must be more ambitious and implemented in more concrete ways if they are to be compatible with the goals of the Paris Agreement. We are in the decade of implementation, which means making the goals and tools work in practice.**
- **Financial policies and regulation are increasingly being put into place to achieve the binding climate targets – especially at the EU level.** It will be the concrete implementation of, for example, the Corporate Sustainability Reporting Directive (CSRD) and the EU Taxonomy that determines whether Paris alignment will be achieved. **But Germany's efforts to include fossil gas in the EU Taxonomy have, however, damaged the instrument and hence been a counterproductive contribution.**
- **For the German economy, lifting its large number of SMEs to a Paris-compatible path is a major challenge.** These commonly have only limited experience and little funding with which to produce comprehensive reports and sustainability data; solutions and support measures tailored to SMEs must now be developed and implemented quickly. For example, under the CSRD bundles of sector-specific and organisation-specific standards are to be

produced over the next three years. Support for SMEs in implementing taxonomy-based reporting requirements is also important. In these policy areas, Germany must come up with concrete progressive ideas if it is to live up to its own aspirations. It must analyse the problems, evaluate possible solutions and tailor support measures to suit the relevant stakeholders. **It must now be ambitious in pursuing Paris-compatible levels of outcome after its initial reluctance and despite voices criticising overregulation.**

- **The central banks and financial authorities of both Germany and the European Union will have to consider more climate-related financial risks** in their frameworks for microprudential supervision (by adjusting the accepted collateral framework for climate risks) and macroprudential supervision (by adjusting capital buffers for climate risks). In addition, further monetary policy activities and a clearer focus within the country's own portfolios will be needed if Germany is to achieve Paris compatibility. One option would be to implement targeted longer-term refinancing operations (TLTROs) for climate alignment in adaptation and mitigation.
- **Fiscal policy and carbon pricing are key features of the German climate mitigation policy, but their sectoral scope needs to be broader and climate-misaligned fiscal incentives should be clearly assessed.**
- **The public budget is not Paris-aligned.** There is, as yet, no systematic assessment of the climate compatibility of public budget planning and spending. Studies for 2021 show that environmentally damaging financial flows were almost twice those into environmental protection. This illustrates inconsistency between climate goals and public finances within Germany. However, in its coalition agreement, the new German government promises a spending review of harmful and climate-incompatible investments and expenditures. Germany has also provided its fair share of the $100 billion commitment under the UNFCCC.
- **Public financial institutions** such as the Kreditanstalt für Wiederaufbau (KfW) may have or be developing a dedicated climate strategy, but they do not act accordingly – most importantly, in the field of fossil gas investments. As recently as summer 2022, Chancellor Scholz announced that he would support Senegal in developing new gas fields. Germany should refrain from further promoting gas investments abroad if it is to remain on a Paris-compatible path – following the lead at the European level, in many areas, of the European Investment Bank (EIB)**.**
- **Germany must offer information instruments on climate-aligned investment planning to its industrial sectors.** For almost all of these, Germany has formulated sector targets up to 2030 that are not sufficiently ambitious to be Paris-aligned. The building and transport sectors are particularly lagging. It remains to be seen how far the federal government newly formed at time of writing will go to redefine and reformulate these targets in the coming years. Similarly, in the European Union, the decisive 'Fit for 55' package is still being negotiated. Further information instruments such as a comprehensive taxonomy for sustainable economic activities, as well as a central data archive for sustainability, have been implemented. The planned European Single Access Point (ESAP) for sustainability data would provide additional transparency in future.

The private sector identifies sustainable finance as increasingly important, while investments are still largely misaligned. Data accessibility is a problem. Many large companies and financial institutions try to align their financial flows accordingly. However, they are also the first to be affected by corresponding EU regulations. Smaller companies,

which play a particularly important role in the German economy, face complex financial, knowledge and capacity constraints. The current EU regulations, as well as increasing pressure from the financial sector and the importance of sustainability data for access to finance, are also becoming an increasingly urgent issue for all private players. These regulations and guidelines will, however, result in comprehensive opportunities and prospects for a futureproof business model – a fact often underplayed by stakeholders.

Overall, for the purposes of this review, that financial institutions only exceed data requirements, the Paris alignment of private financial flows is very difficult to assess.

In sum, we find the following.

- **Most market segments:** Private equity and listed equity segments are commonly misaligned. Information gaps make it impossible to assess their alignment in any specific scenarios.
- **Cross-cutting private sector activities**: Information gaps on segments other than the activities of stock exchanges and financial centres make it extremely difficult to assess the effectiveness of additional initiatives aiming to support the alignment of financial flows with the Paris Agreement goals.

Implications for Germany, the European Union and the GST: financial sector climate targets and data availability

Based on our analysis, we identify the following key next steps for Germany and the European Union.

- **Climate change adaptation must become an important focus of sustainable finance in Germany.** Last year's devastating floods in western Germany and extensive forest fires in its eastern regions have shone a spotlight on adaptation to climate change not only for Germany but also for the whole of Europe. This should have a greater impact on the orientation of financial flows, policies and regulation.
- **Germany should consistently adopt a holistic approach to sustainable finance by equally valuing (i) the financial risks and opportunities related to climate change, and (ii) the climate impacts.** Such a broad understanding of sustainable finance is still not internalised among many policy-makers. In many cases, sustainable finance is still seen as an obstacle to financial market stability and not as a precondition – an understanding that needs to be secured not only in politics but also at Deutsche Bundesbank (DBB) and ECB levels. A holistic approach would be to clearly define adaptation and mitigation finance targets that are in line with the adaptation goals, the German and European net-zero targets, and the global 1.5°/<2°C target.
- **In the present decade of implementation, Germany must be an important motor for implementing regulations and making them truly effective in practice.** Overall, the European Union is using its potential as a large single market and monetary union to create uniform rules, and thereby harmonising the climate rules applicable to the financial sector. The EU Taxonomy, the CSRD and the SFDR create a sustainable basic framework for the financial sector; the crucial phase for these instruments – their implementation – remains ahead. The challenge will be to ensure that the transformative compass continues to be properly aligned for all these policies. Germany's insistence that nuclear energy and fossil gas be included in the EU Taxonomy illustrates how difficult this is in practice. If Germany wants to live up to its own ambition, it must set an example at the European level with flagship programmes and initiatives.
- **The catchphrase 'making regulation work in practice' – reflecting a holistic understanding of sustainable finance – must be Germany's motto.** Many policies have been adopted, but the importance of sustainable finance should be further amplified. In its final report, the first Sustainable Finance Advisory Council made detailed and comprehensive proposals, mapping out the path to a sustainable financial system. The German government's Sustainable Finance Strategy is a good starting point, but it is too vague in too many places. The second Council under the new government must develop the recommendations of the first, and the German government's strategy must be developed to reflect a holistic understanding of sustainable finance that must more rigorously address issues of social and biodiversity.

Based on the present analysis, we also identify the following recommendations for the GST in general.

- The GST should look not only at the public measures and activities undertaken to implement or support the implementation of Article 2.1c but also those of the private sector. This will include a critical assessment of how ambitious the measures taken or

planned are, and of whether and how much of the data required to track progress against the targets is available.

- Assessing the degree of alignment or otherwise of private financial flows with a comparable, scenario-based and forward-focused methodology should be a key priority.
- Collecting data on both climate-aligned and climate-misaligned public financial flows and budget plans, net climate finance and net carbon pricing should be another priority for the GST– and a key duty of all countries.
- The availability and quality of qualitative and quantitative data on public domestic and private climate adaptation and climate resilience finance must be significantly improved.

Overall, the analysis framework laid out in this study can be used as a foundation on which Parties can track and comprehensively report on the alignment of public and private sector activities with Article 2.1c of the Paris Agreement in the lead-up to the GST.

Summary tables

The following tables (**Tables 1 and 2**) present the first summary of Germany's progress towards Article 2.1c of the Paris Agreement. The tables reflect the key findings that are set out in more detail in tables throughout the main body of this study (**Tables 4–13**).

Tables 1 and 2 are a first attempt to collect information on those measures most prominently discussed. Other activities could be added to these in time.

How to read the tables

For the public levers table (**Table 1**), if a cell in the *Implementation status* column is grey, it means that no action on this measure is being taken. If a cell in this column is green, it means that the measure has been implemented or will be implemented in due course.

For both the public levers table (**Table 1**) and the private sector activities table (**Table 2**), if a cell in the *Paris alignment* column is yellow or red, it means that the measure does not sufficiently support progress towards the Paris goals because it lacks ambition or clearly defined targets.

If a cell in a *Data availability…* column is green, it means that the government provides the data necessary to assess whether and to what degree the measure contributes to aligning financial flows with the Paris Agreement.

The public levers table (**Table 1**) might also show a measure as under discussion (yellow) or rejected (red). In these cases, the *Paris alignment* column is either grey (no ambition) or yellow (ambition falls short of what would be required for Paris alignment). Data to assess the degree of alignment of a measure could still be available even if the measure is not implemented. In such cases, data could also be government-provided (green) or partially available at high search costs (yellow) – e.g., to assess the climate alignment of COVID-19 recovery measures or to assess the degree to which financial institutions voluntarily disclose their climate risks and impacts.

Table 1 Public levers for pursuing consistency of finance flows with climate objectives: implementation status, climate action focus, geographic focus, level of ambition and data availability for individual measures

Legend

	Implementation status	Paris alignment	Data availability to assess consistency status and progress[i]
2	Implemented or to be implemented	In line with scientific 1.5°/<2°C scenario or Climate Action Tracker (CAT)[ii] fair share target	Government-provided data
1	Under discussion by government	Progress in right direction, but not sufficient	Data partially available, search costs high[iii]
0	Rejected or disregarded by government	Misaligned without considerable progress towards alignment	Data not publicly available or search costs prohibitively high
-	Measure not yet on governmental agenda	Measure not yet on governmental agenda	Data probably available once measure is implemented

[i] *Data availability* is very important for tracking the progress and effectiveness of implemented measures. Given that the GST relies largely on accessible data for effectively evaluating progress against Article 2.1c, data availability is assessed in the summary tables using the same colour-coding as used for *Implementation status* and *Paris alignment*.

[ii] ClimateAnalytics and NewClimate Institute (2021).

[iii] For some measures, data on the level of voluntary action or inaction could be available, despite the fact that the measure is not mandatory. If this is the case, details on the present status are displayed in the detailed tables in the main body of the document.

Measure	Implementation status			Climate action focus		Geographic focus		Paris alignment			Data availability		
	0	1	2	Mitigation	Adaptation	Global	Domestic	0	1	2	0	1	2
National net-zero target defined			2	✓			✓		1				2
National net-zero target legally binding			2	✓			✓		1				2
Nationally determined contribution (NDC) explicitly includes Article 2.1c measures		-							-			-	
Government tracks climate alignment of financial flows		1		✓		✓	✓		-				
Government tracks climate alignment of COVID-19 recovery package			2	✓			✓		EU 2 DE 1			EU 2 DE 2	
National sustainable finance strategy			2	✓	✓	✓	✓		1				2
International cooperation			2	✓	✓	✓	✓		1				2

Financial policy and regulation							
Disclosure requirements on climate risks	2	✓	✓			1	
Climate risk analysis principles defined and disclosure templates standardised	2	✓				1	
Disclosure requirements on climate impacts	2	✓	✓			1	
Climate impact analysis principles defined and disclosure templates standardised	2	✓	✓			1	
Accounting standards include climate risk-adjusted financial metrics	2	✓	✓			1	
Financial market levies reflect climate components	1					1	
Central bank and financial supervision							
Macroprudential supervision considers climate risks	2	✓				1	
Microprudential supervision considers climate risks	2	✓				1	
Central bank rates reflect climate impact (green supporting factor / TLTROs)	0	✓				0	
Central bank interest rates reflect climate risks (brown penalising factor)	0	✓				0	
Central bank monetary policy portfolios are climate-aligned	1	✓				1	
Non-monetary policy portfolios are climate-aligned	1	✓				-	-
Fiscal policy and carbon pricing							
Carbon pricing	2	✓				1	2
Climate-misaligned tax incentives and subsidies phase-out plan	1	✓				0–1	1
Public budget							
Provision of international support	2	✓		✓		1	
Public budget and spending climate alignment plan	1	✓	.		✓	EU 0 DE 0–1	EU 1 DE 1
Sovereign green bond issuance	2	✓			✓	1	
Subnational entitles' green bond issuance	2	✓			✓	- 1	

Public financial institutions							
Climate bank or public development bank with dedicated climate finance strategy	1	✓		✓	✓	EU 1–2 DE 0–1	
Public export credit agency exclusively supports climate-aligned activities	1	✓		✓	✓	- 0–1	
State development finance institution has climate-aligned investment portfolio and focuses on climate-aligned development strategies	1	✓		✓	✓	0–1	
Public pension funds follow climate-aligned investment approach	1	✓			✓	EU 0–1 DE 0–1	
Information instruments for climate-aligned investment planning							
Energy sector-specific climate strategy	2	✓			✓	0–1	1
Transport sector-specific climate strategy	2	✓			✓	EU 0–1 DE 0	1 1
Buildings sector-specific climate strategy	2	✓			✓	EU 0–1 DE 0	1 1
Industry sector-specific climate strategy	2	✓			✓	0–1	1
ICT sector-specific climate strategy	-					-	-
Services sector-specific climate strategy	-					-	-
Agriculture and forestry sector-specific climate strategy	2	✓			✓	EU 0–1 DE 0–1	1 1
Further information instruments							
Mandatory government labelling and/or taxonomy to be applied to classify climate-aligned investments	2				✓	1	2
Climate-aligned projects–investor matchmaking hub	-					-	-
Public company-level climate and financial data repository	1				✓	1–2	1

Table 2 Private sector activities for pursuing consistency of finance flows with climate objectives: overall Paris alignment, availability of alignment information, availability of misalignment information, focus of activities on which information is available and overall degree of data availability

Legend

	Paris alignment	Data availability to assess consistency status and progress[i]
2	Aligned with science-based or CAT fair share approved target	Government-provided data
1	Aligned with NDC International Energy Agency-based pathways or other target	Data partially available, search costs high
0	Not aligned	Data not publicly available or search costs prohibitively high
.	No information available	–

[i] *Data availability* is very important for tracking the progress and effectiveness of implemented measures. Given that the GST relies largely on accessible data for effectively evaluating progress against Article 2.1c, data availability is assessed in the summary tables using the same colour-coding as used for *Implementation status* and *Paris alignment*.

Activities	Paris alignment			Alignment information[ii]		Misalignment information[iii]		Activities information[iv]		Data availability		
	0	1	2	Qual.	Quant.	Qual.	Quant.	Mitigation	Adaptation	0	1	2
Market segments												
Bank lending and mortgages	1			✓	x	✓	✓	n/a			1	
Real estate	1			✓	✓	x	x	n/a			1	
Bond markets	2			✓	✓	x	x	✓				2
Listed equity	1			✓	✓	x	x	n/a			1	
Private equity	.									0		
Insurance provision	1			✓	n/a	x	x	n/a			1	
Investment decision-making	1			✓	✓	x	x	n/a			1	
Cross-cutting aspects												
Retail client consultation on climate-aligned investments	.									0		
Real emission reduction impact	.									0		
Financial sector lobbying activities	.									0		
Stock exchange activities	1			✓	n/a	n/a	n/a	✓			1	
Financial centre activities	1			✓	n/a	n/a	n/a	✓			1	

[ii] Alignment information = information on the degree of alignment of financial activities with the Paris Agreement

[iii] Misalignment information = information on the degree of explicit misalignment of financial activities with the Paris Agreement

[iv] Activities information = information on whether alignment and misalignment information are available for mitigation and/or adaptation activities

+ 1. Why collate country actions supporting Article 2.1c of the Paris Agreement?

The third objective of the Paris Agreement, if operationalised, stands to have tremendous impact. Article 2.1c commits to 'making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development' (UNFCCC, 2015). This long-term goal recognises that not only do we need an increase in finance that supports climate action, but also we must redirect the finance – both public and private – that is locking countries into high-emission, low-resilience futures. It is only by meeting this third long-term goal that we can deliver on the two other long-term goals of the Paris Agreement, on adaptation and mitigation. While this third goal is universal, applying to developing and developed countries alike, this should not detract from the obligation of developed countries to provide and mobilise climate finance for mitigation and adaptation to countries that have not historically contributed to climate change (Article 9, UNFCCC, 2015).

The long-term goal targeting consistency of finance flows with a pathway towards low greenhouse gas (GHG) emissions and climate-resilient development is neither defined nor fully articulated under the UNFCCC process. Nor is there a place in the negotiations to discuss and develop the concept of consistency of finance flows (Bodle and Noens, 2018). Despite this, commitments to 'align' with the Paris Agreement are increasingly being made by both public and private institutions.

Unpacking how to fully operationalise these commitments to Paris alignment remains a work in progress. There are many sources of capital involved, employed through a range of intermediaries. The result is a large number of investment modalities and financial instruments, making this task complex (Carter, 2020). Emerging initiatives aiming at the alignment of finance flows with the Paris Agreement are, to date, largely based on guiding statements (MDBs, 2018).

Accountability under the Paris Agreement will fall to governments. As such, there is a rationale for focusing on the incentives and disincentives that public actors create for finance flows, both public and private, to be climate-aligned. These public levers include financial policy and regulation, fiscal policy, public investment and information instruments (Whitley et al., 2018; Watson and Schindler, 2017; GGKP, 2014) (see **Table 3**). However, public financial flows alone are not sufficient to transition to low-emission, climate-resilient development pathways.

Article 14 of the Paris Agreement obliges signatory countries to assess progress towards the purpose and long-term goals of the Paris Agreement, including Article 2.1c. The first

such GST is to be completed in 2023. There are, however, no further requirements for Parties to the Paris Agreement to report on consistency under the UNFCCC. Furthermore, the GST is not founded on detailed provisions, and hence those foundations allow ample leeway for interpretation by Parties, including on how to take stock of collective progress towards Article 2.1c (Watson and Roberts, 2019). A discussion of how to operationalise Article 2.1c might therefore yield useful lessons and encourage further action, and it may also support meaningful discussion at the first of these GSTs (UNFCCC, 2015).

Table 3 Government-led tools to encourage the consistency of finance flows with climate ambitions (Whitley et al., 2018)

Financial policies and regulations[i]	Fiscal policy levers[ii]	Public finance[iii]	Information instruments[iv]
▪ Lending requirements ▪ Accounting systems ▪ Mandates of supervisory authorities ▪ Standards ▪ Plans and strategies ▪ Disclosure requirements *(where mandatory and enforced)*	▪ Taxes ▪ Levies ▪ Royalties ▪ Price support or controls ▪ Public procurement ▪ Budget support *(including for establishing public funds, public finance institutions and state-owned enterprises)*	▪ Grants ▪ Debt ▪ Equity ▪ Guarantees ▪ Insurance *(from public pension funds, sovereign wealth funds and public finance institutions)*	▪ Certification and labelling ▪ Transparency initiatives ▪ Corporate strategies ▪ Awareness campaigns ▪ Statistical services ▪ Scenario analysis and stress testing ▪ Standards ▪ Plans and strategies ▪ Disclosure requirements *(where voluntary)*

[i] Primarily influence behaviour by force of law
[ii] Primarily influence behaviour through price
[iii] Primarily influence behaviour by shifting financial risk
[iv] Primarily influence behaviour by raising awareness

The Independent Global Stocktake (iGST) (see **Box 1**) can work with diverse actors across political and technical challenges. In this case, the challenge is how to progress the consistency of finance flows with low-emission, climate-resilient development pathways.

Box 1 What are the iGST and the Finance Working Group?

The **Independent Global Stocktake (iGST)** is a data and advocacy initiative – led by ClimateWorks Foundation – that brings together climate modellers, analysts, campaigners and advocates to support the Paris Agreement. The iGST comprises four working groups (adaptation, mitigation, finance and equity), and an umbrella group of iGST partners undertakes additional activities. The iGST's objective is to positively influence the official Global Stocktake (GST), by supporting information collection, technical assessment and political consideration, as well as bolstering national, regional and subnational relevance.

The **Finance Working Group (FWG)** of the iGST is an open partnership that brings together a wide range of expert perspectives from its members in the global North and South. Focusing on the finance-related aspects of the Paris Agreement, the working group considers two core, interrelated topics:

- the provision of support to developing countries to mitigate and adapt to climate change (Article 9); and
- the consistency of all finance flows with climate objectives (Article 2.1c).

The FWG's ultimate goal is that countries will make more ambitious pledges and domestic actions by 2025, which will support substantial progress towards meeting all three of the long-term goals under the Paris Agreement. To this end, the FWG aims to have direct influence on the UNFCCC GST process, by producing information, outreach and support for appropriate data inputs, and by benchmarking the official GST findings against its own assessment of progress on financing commitments under the Paris Agreement.

It will also support an active, independent civil society on issues surrounding the financing of climate action.

This case study of the action towards consistency of finance flows that has been taken in Germany includes a concise and high-level early mapping of government-led policy levers and, where feasible, private initiatives. Building on a framework aiming to operationalise consistency (Whitley et al., 2018), this case study identifies the financial policy and regulation, fiscal policy, public finance and information levers relevant to climate action that are already present in Germany. It also highlights the country's future challenges in itis pursuit of consistency.

The case study is intended to provoke thought and start conversations. It is the fourth in a series of case studies assessing the climate consistency of finance flows in specific countries, the first three being studies of Colombia, Switzerland and Rwanda. It will be partnered with a fifth, of Indonesia.

+ 2. Country and market context

The Paris Agreement has shifted multilateral negotiations away from a top-down target-setting approach towards a bottom-up approach, whereby all Parties define their own pathways to becoming low-emission, climate-resilient economies. For the operationalisation and pursuit of consistency of finance flows, that interpretations of Paris obligations will be nationally driven in turn necessitates transparency, whereby each Party must allow its interpretation of 'consistency' to be scrutinised if the process is to be legitimate. This further allows each Party's progress to be acknowledged in the context of the CBDR principle – that is, of 'common but differentiated responsibilities and respective capabilities, in the light of different national circumstances' (UNFCCC, 2015).

This section outlines the relevant country and market contexts within which Germany will need to make finance flows consistent with low-emission, climate-resilient development pathways (see **Box 2**).

Box 2 Germany at a glance

UNFCCC country grouping: developed country Party

World Bank classification: high-income country

Gross domestic product (GDP): $3.806 trillion (2020)

GDP per capita: $46,298.429 (2020)

Inflation: 3.1% (2021)

Foreign direct investments: €97 billion (2020)

UN Human Development Index: 0.947 (=very high), ranked 6th worldwide

World Bank Ease of Doing Business score: 22

Public budget: financing deficit, –4.2% of GDP *(*2020); revenue, €1,563 billion; expenditure, €1,702.6 billion

Public debt: 65.1% of GDP (2020)

Taxes and other revenues: 46.9% of GDP *(*2020)

Sovereign credit rating: AAA; outlook – stable (across all major credit rating agencies)

Share of financial sector activities in GDP: ~3.9%

Per capita GHG emissions: 8.67 tonnes CO_2 (2019)

Global ranking per capita GHG emissions: 53 (2022)

Sources: UNDP (2020); Destatis (2021); Climate Watch (2022); DBB Eurosystem (2022); Statista (2022a, 2022b, 2022c); TradingEconomics (2022); UNFCCC (2022); World Bank (2022a, 2022b, 2022c).

2.1 Private sector and Germany's market structure

Germany's economy is the fifth largest in the world and the largest in the European Union. It is strongly manufacturing-oriented (22.9% of gross value added) and export-focused (see **Figure 1**). Its main exports are classic export goods such as automotive, machinery, chemicals and household equipment. The German industrial landscape is most strongly characterised by the automotive industry (see **Figure 2**). It accounted for 4.7% of gross value added in 2016 (BMWK, 2017). The comparative importance of the export industry is a reflection of traditional German specialisation based on specific regional advantages. These include regional clusters in the automotive, chemicals and heavy industries, which are nourished by many highly efficient SMEs and research institutes, as well as the availability of a highly qualified workforce and engineers. Despite the importance of industry and difficulties in precisely defining the service sector, Germany remains a service economy, with services' share of GDP ranging from 55% to 70% (World Bank, 2022d).

Figure 1 Share of gross value added by sector of the German economy, 2016 (BMWK, 2017)

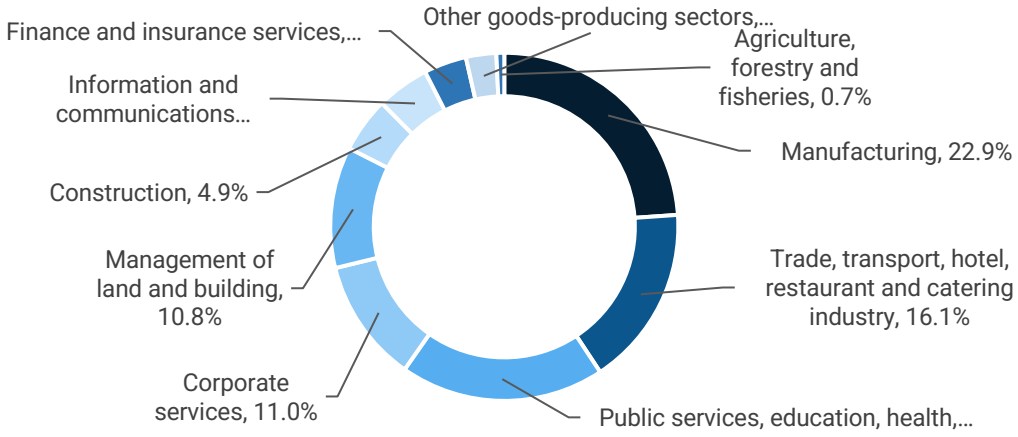
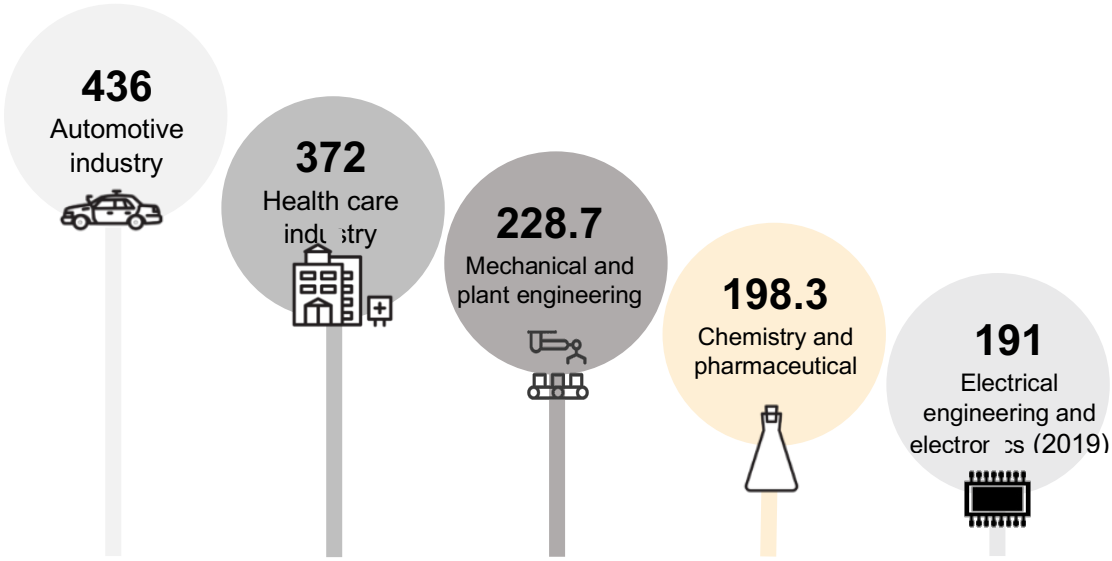


Figure 2 Germany's largest industries (annual turnover, in € billion) (Bundesregierung, 2020)



This general structure of the German economy makes it very vulnerable to transition risks. The shift towards electrified engines in the automotive sector will have a strong impact on many sectors of the economy. German SMEs are vulnerable to extensive and rapid transformation processes because of their high degree of specialisation and their size. It remains to be seen how the German business landscape will cope with the coming extensive changes associated with an ecological transformation. It is therefore all the more important that German businesses openly embrace and tackle the changes that go hand in hand with that transformation, rather than stick to outmoded approaches.

The financial sector plays a fundamental role in the functioning of the economy and is an important key infrastructure. In 2020, the contribution of the financial sector to German gross value added was around 3.9% (see **Figure 1**). Central above all is the allocation of the necessary financial resources to the real economy (Germanyworks, 2022). Frankfurt,

as most important German financial centre, links the German, European and international institutions. Characteristic of the German banking sector is the three-pillar structure, comprising cooperative banks (e.g., DZ Bank, WGZ Bank), public institutions (e.g., KfW Bank and Landesbanken, savings banks) and private commercial banks (e.g., Deutsche Bank, Commerzbank, Unicredit Bank) (Finance Watch, 2014; DBB, 2021). As a result, the German banking market is very different from the centralised banking structure of many other countries, characterised by large commercial banks. While it is not clear how the structure of the banking sector in Germany will affect the green transformation, it is likely that it will not be as easy to more sustainably manage and align financial flows as it is in more centralised systems.

In Germany, the market for 'sustainable' investments and funds has been growing steadily for years. In 2021, for example, the market for sustainable funds and mandates grew by 3% – more than twice as quickly as the conventional fund market. Nevertheless, the share of sustainable funds and mandates in the overall German fund market is only 6.4% (FNG, 2021).

2.2 German GHG emissions and the German Energiewende

In Germany, GHG emissions have decreased since 1990. Emissions dropped by 41% between 1990 and 2020. Total emissions converted into carbon dioxide (CO_2) equivalents (excluding those from land use, land use change and forestry) fell 38.7% by 2021. Total emissions of 762 million metric tons were reported for 2021. This represents a significant increase in emissions compared to 2020, which was impacted by the special effects of the COVID-19 pandemic, but it is well below 2019 emissions levels (Umweltbundesamt, 2022a). It must be noted, however, that Germany made these strides towards its emission reduction targets because of external factors – in particular, the COVID-19 pandemic in 2020 and, earlier, because of deindustrialisation processes in eastern Germany after 1990.

In terms of domestic GHG emissions, the energy (31%), industry (23%) and transport (21%) sectors are those responsible for the most emissions in Germany in 2019. This is followed by households (11%) and the agriculture sector (7%) (Umweltbundesamt, 2022a); see **Figure 3**).

The German Energiewende ('energy turnaround') in the electricity sector has been one driver of emission reductions in recent years. Emissions of CO_2 from German power generation have been slowly declining in line with the long-term trend since 1990 (see **Figure 4**). This is mainly because of the closure of emission-intensive lignite-fired power plants in the 1990s, as well as the decline in electricity generation from lignite and hard coal in recent years. The share of electricity generated from renewable energy sources has increased significantly in recent decades. However, the strong expansion of renewable energies was reflected to only a very limited extent in the trend of CO_2 emissions, because the generation of electricity from fossil energy sources did not decrease similarly. This is mainly a result of Germany's decision, following the Fukushima

reactor incident in 2011, to completely phase out its nuclear energy by the end of 2022. While nuclear energy has low emissions on paper Germany's population has long been sceptical about nuclear energy. Although no suitable disposal site has yet been found for the nuclear waste in Germany, nuclear energy has played an increasingly minor role in recent years.

Figure 3 Germany's GHG emissions in 2019 (based on Umweltbundesamt, 2022a)

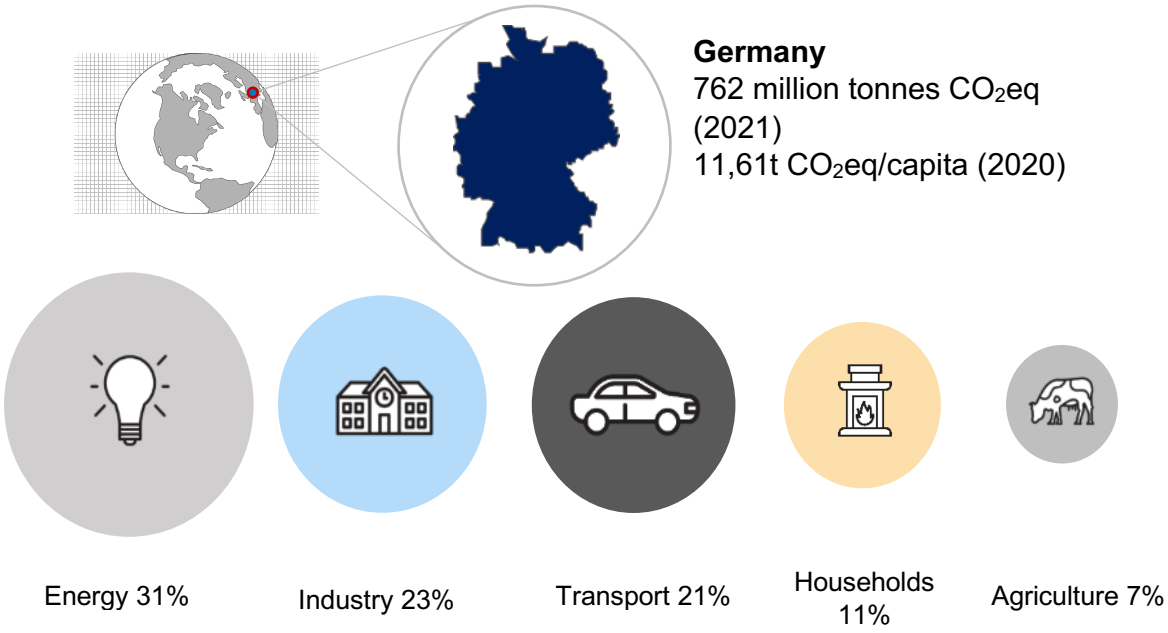
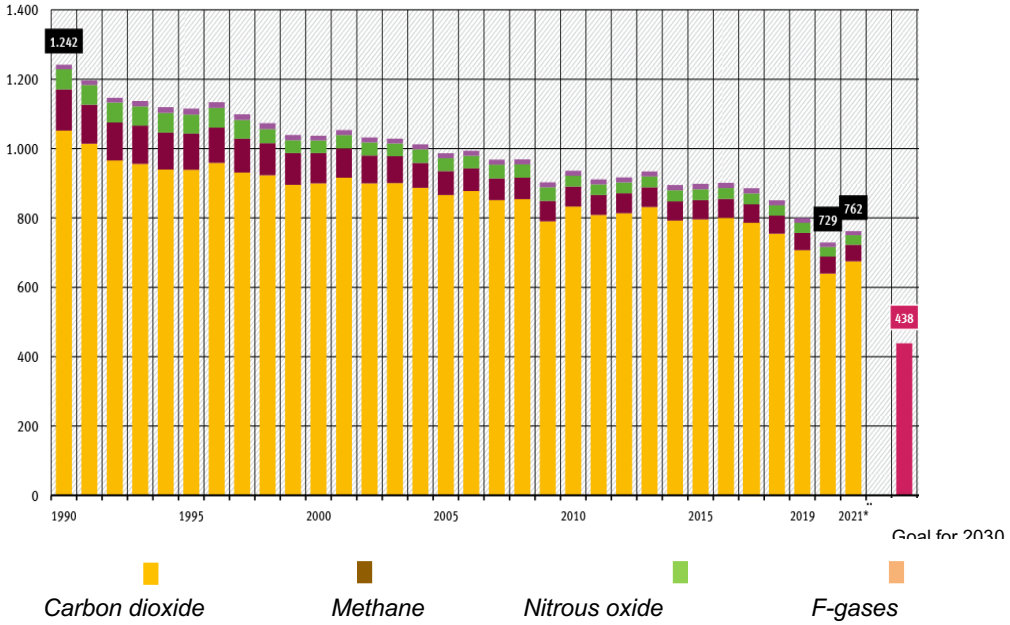


Figure 4 Germany's GHG emissions by gas since 1990 (based on Umweltbundesamt, 2022a)

In million metric tons of CO_2 equivalents



The energy transition was facilitated most effectively by Germany's Renewable Energies Act of 2000. The Act promoted the long-term transformation of the electricity system into a strongly decentralised grid powered by renewables. At that time, the decentralised nature of renewable electricity production was reflected in ownership structures, with most electricity producers small cooperatives, associations and individuals. However, this trend was increasingly weakened by reforms to the law from 2016 onwards (IASS, 2019).

Outside the energy sector – which is also covered by the EU Emissions Trading System (ETS) – Germany is failing to meet its own climate protection targets in several sectors. The German government's Council of Experts, which is responsible for an independent review of Germany's climate protection measures, has calculated that the reductions targeted in the transport sector for 2022–2030 are far from sufficient and that the German government's 2022 emergency programme focused on the building sector meets the targets only if those targets are interpreted generously (Expertenrat Klima, 2022).

2.3 Key economic climate-related risks in Germany

Germany as a whole is affected by climate change and the consequences of global warming. From 1881 to 2019, the annual mean air temperature for Germany increased by 1.6°C. A further increase in temperature in Germany between 2021 and 2050 of around 1.1–1.5°C is expected (DWD, 2020). In a business-as-usual scenario, the warming amounts to about 3.8°C. Under all possible climate change scenarios, more days with very high temperatures and hot spells, but also heavy rainfall events, are expected. Climate change also has different consequences for the various regions of Germany. Particularly in the northeast of Germany, climate change will lead to intensified droughts, while a stronger warming in temperatures is expected in the Alps and Alpine foreland. In coastal areas, a likely sea level rise of 0.6–1.1 metres is expected by 2100 (DWD, 2020). The consequences of climate change are therefore linked to significant impacts on the health and prosperity of the people in Germany.

In the German economy, industry is responsible for a high share of gross value added and manufacturing's share of gross value added is comparatively high compared with that of the rest of the European Union as a bloc. In addition, as an export nation, Germany is strongly integrated into international value chains. This means that the economy is affected by the consequences of climate change in a variety of ways, both at home and abroad. The risks that partner climate change impacts relate to various areas of the industrial and commercial value chain, such as inbound logistics (e.g., the availability of raw materials and intermediate products, the conditions of goods transport), production (e.g., employee benefits, the availability of production-related resources such as energy and water) or the sales market (Umweltbundesamt, 2021a).

The future supply of German companies with raw materials and intermediate products can be affected in particular by climatic influences in climate-vulnerable sourcing and producing countries. If several supplier countries are affected by climatic influences at the same time, this can intensify the overall negative impact on the supply of raw materials

and intermediate products. Trade with climate-vulnerable countries also reveals risks for German companies, such as changes in demand and shifts in future sales markets (Umweltbundesamt, 2021a).

In July 2021, the effects of climate change were particularly evident in Germany: a great flood killed more than 180 people and caused billions of dollars in damage. The floods hit Rhineland-Palatinate and North Rhine-Westphalia (NRW) in particular, and especially the Ahrweiler Valley in the Eifel region of Germany. An international study has proven the connection between these floods and climate change (World Weather Attribution, 2021).

On 14 and 15 July, parts of the two states received 100–150 litres of rain per square metre within 24 hours – most of it within 10–18 hours. Such extreme rainfall has not been seen in Germany since weather records began. As a result of the heavy rain, flash and widespread flooding occurred in the affected regions (Tagesschau, 2021).

The flood had major consequences for the insurance industry. With insured losses to homes, contents, businesses and motor vehicles of around €12.5 billion, 2021 was the most expensive natural hazard year since statistics began in the early 1970s (GDV, 2021). Of these, the floods on the Ahr and Erft rivers caused the highest insurance losses in 2021, at €8.2 billion – and actual level of destruction is far higher. Reinsurer Munich Re, for example, reports in its annual financial statements that the flood catastrophe in Germany caused losses of €33 billion and confirms that it was the most expensive natural disaster to date (Munich Re, 2021).

These, of course, are the cost of only the damage for which insurance has to pay; many of the losses were not covered, and hence flood victims leaned on the federal and state governments for substantial financial support. The federal and state governments are each contributing half of the reconstruction costs, which amount to €28 billion. In addition, the federal government alone is contributing €2 billion to rebuild its infrastructure – that is, rail bridges, railroads and highways (SWR, 2021).

The financial consequences of climate change have already been immense, and these costs have raised political awareness – as well as broader social awareness – of the financial risks to Germany. Moreover, there are concerns about Germany's capacity to adapt to climate change: the country regularly updates an adaptation strategy first developed in 2008 (German Government, 2008) and, to date, it has no adaptation law. Only in one federal state has a climate adaptation law: NRW passed its law in 2021 (NRW Ministry of Interior, 2021).

2.4 Nationally relevant targets for the consistency of finance flows

The most important basis for emissions reduction measures in Germany are the European Green Deal and the new German Climate Act (EC, 2022a). In July 2021, the European Union agreed – through the 'Fit for 55' package within the framework of the Green Deal – to become the first climate-neutral continent in 2050 and to reduce emissions by 55% by 2030, compared to 1990 levels. In addition, the climate law in Germany has been updated

following a decision by the Federal Constitutional Court, to aim at somewhat higher targets. Germany wants to be climate-neutral by 2045 – five years earlier than planned through the European union. The emissions reduction target has also been raised from 55% to 65%. For the year 2040, a reduction target of 88% applies. There are also specific reduction targets for agriculture, transport, buildings, industry and energy, which are addressed briefly in this study.

2.5 Potential impact of crises on Germany's climate objectives: COVID-19, the Ukraine war and inflation driven by energy prices

To mitigate the social impact and stabilise the economy, governments around the world adopted economic stimulus and rescue packages during the COVID-19 pandemic. In Europe, national governments and the European Union put together extensive stimulus packages to get the economy back on track. Each country planned for its pandemic recovery in the context of the broader EU COVID-19 Recovery Plan whereby the European Union aims to emerge stronger from the pandemic. This includes an enormous €750 billion stimulus package for the entire European Union (designated 'Next Generation EU'), the central element of which is the €672.5 billion Recovery and Resilience Facility (RRF). The RRF will enable all EU member states to implement recovery measures based on their own national recovery and resilience plans (RRPs) (EC, 2022a). European leaders agreed in July 2020 that EU recovery efforts must include be aligned with the green and digital transformation, and the regulation establishing the RRF requires at least 37% of spending in national RRPs to support the green transformation and prescribes that the rest of the funding not harm the transition.

The German government alone has adopted measures with a budgetary impact of more than €350 billion (BMF, 2021). Meanwhile, 2020 was the warmest year in Europe since weather records began (Copernicus Klimawandeldienst, 2021). It is therefore interesting to explore to what extent the funds provided by the German government so far appear to be in line with the what is required under the Paris Agreement.

At the German level, the three programmes that have received the most funding from the federal government are climate-relevant:

- the Economic Recovery and Future Program – about €130 billion;
- the Economic Stabilization Fund (WSF) – about €600 billion; and
- the KfW special programmes – unlimited).

Without assessing the success of the rescue packages in terms of economic policy, some studies show that the possible climate effects cannot be identified in many cases because there are no eligibility criteria, procedures are not transparent or wording is vague (DIW ECON, 2021). In other cases, it is apparent that the climate-relevant potential has been left untapped or completely disregarded in the design of the packages and that some measures may even have negative consequences for the climate.

One example is the general reduction in value added tax, where the opportunity to create purchasing incentives for low-emission products and technologies has remained unexploited. The Green Recovery Tracker – a joint project by Wuppertal Institute and E3G (Third Generation Environmentalism) – assesses the contribution of EU member states' national RRPs to the green transition. Germany's RRP has a green spending share of 38%, meeting the EU benchmark of at least 37%. However, when all recovery measures are evaluated, including those in the national recovery package only from June 2020, Germany achieves a green spending share of just 21%. While 20% (€28.5 billion) of the measures have positive or negative green transition impacts depending on their implementation, 17% (€24.1 billion) of all measures actually have a negative impact. All of this highlights the importance of impact assessment during further planning, review and implementation of the stimulus measures (Green Recovery Tracker, 2022).

Since February 2022, the focus has been on another crisis: the war in Ukraine. Europe and its partners responded by imposing sanctions on Russia. The effects of the war are being felt around the world.

Russia is the largest exporter of fossil gas and the second largest exporter of crude oil in the world. Fears of an embargo pushed the price of gas up to previously unseen heights. The European Union relied on Russia for almost 45% of its gas imports; Germany, for 55%. Past German governments not only accepted but also encouraged this dependence on Russian energy imports. The Nord Stream 2 Baltic Sea pipeline – which some observers and NATO partners such as the United States had long cautioned against – is one example of German decision-making in this regard.

In this context, the debate on expanding liquefied natural gas (LNG) capacity has intensified. Economics and Climate Minister Habeck, however, is focusing primarily on diversifying energy sources, fossil gas and LNG sources, with particular priority given to energy efficiency and then to the expansion of renewable energies. Concerns about the energy supply have sparked a new debate about conventional energy sources. While nuclear power operators refuse to extend contracts, politicians are questioning the early phase-out of coal (the new federal government has provided in its coalition agreement for a deadline of 2030) (MDR, 2022). Because of high energy prices, the German government announced several relief packages available from April 2022 that were to include a reduction in the energy tax on fuel for three months, a one-time energy allowance of €300 and highly discounted public transport tickets for three months (Merkur, 2022). Further relief packages were agreed over the summer and autumn of 2022.

Triggered by rising energy prices, Germany and other EU member states are also experiencing very high inflation rates of over 10%, which are putting people and companies in Germany under severe financial pressure. Steps are being taken to avoid creeping tax increases in connection with inflation: one additional shield is to cushion rising energy costs and the most severe consequences for consumers and businesses (BMF, 2022). However, it is unclear whether the measures will be enough to prevent a severe recession in Europe and Germany. Many of the measures have been criticised as being too general and too poorly targeted, supporting all income groups and not those

communities and sectors that are particularly hard hit by the energy and inflation crises (Tagesschau, 2022).

+ 3. Public levers

In the last two years, Germany has laid the foundations for a sustainable German financial sector. Its main pillars are stable climate legislation, its first Sustainable Finance Strategy and the political goal of climate neutrality by 2045. But goals alone and a sustainable finance strategy do not necessarily lead to success in achieving Paris alignment. For example, the German government remains vague in many areas of its Sustainable Finance Strategy. In addition, its new Climate Protection Program 2030 includes no specific target for the financial sector. It thus remains to be seen whether and how the German financial sector will achieve the goals of the Paris Agreement.

3.1 Overall strategies and targets

Since 2015, Germany has set ambitious targets for achieving the Paris climate goals. Central to these are the German Climate Protection Law (Klimaschutzgesetz, or KSG) and, at the EU level, the Green Deal. Germany plans to be climate-neutral by 2045 following amendments to the KSG required by its highest court. The European Union aims to achieve climate neutrality in 2050, as part of its Green Deal. But ambitious targets alone are not enough to meet the Paris targets; rather, CO_2 budgets must be met and appropriate transition scenarios pursued. Germany still has some way to go in this respect – especially in areas such as transport and building sector emissions, where urgent steps need to be taken (Expertenrat Klima, 2022).

At the EU level, as one of the largest and most important member states, Germany exerts extensive influence on the European Climate Strategy and its implementation through various EU institutions. Both in Germany and at the EU level, the task that lies immediately ahead is to implement the goals ambitiously. We are in the decade of implementation, which means making the goals and tools work in practice.

Regarding finance, an increasingly broad consensus has developed in German politics in recent years that a successful, climate-compatible economy will require a sustainable and thus futureproof financial system – not least to mobilise the necessary financial resources for the required investments. To this end, the German government has set its sights on making Germany ‘a leading location in the field of sustainable finance’.

With this ambitious goal in mind, the Committee of State Secretaries for Sustainable Development decided in February 2019 to develop a German sustainable finance strategy. An advisory body was consequently established in June 2019: the Sustainable Finance Advisory Council of the Federal Government. This multistakeholder body both pooled its existing expertise and promoted dialogue on the topic of sustainable finance. Based on the Advisory Council’s recommendations, the German Federal Cabinet adopted the first German Sustainable Finance Strategy in May 2021. It consists of five goals for both public and private finance; it comprises 26 measures. The overarching goal of the Strategy is to develop Germany into a leading location for sustainable finance – but

assessment of the strategy varies. Various stakeholders describe many of the measures adopted as ‘too vague’.

The assessment table (**Table 4**) shows that:

- **Overall, strategies and financial targets are strongly integrated into ongoing efforts at the EU level.** Both Germany and the European Union have defined strategies, targets and measures that are partly general and partly concrete. As one of the largest and most important EU member states, Germany exerts extensive influence on the European Climate Strategy and its implementation through various EU institutions. **The targets and measures in place must be more ambitious and implemented in more concrete ways if they are to be compatible with the goals of the Paris Agreement. We are in the decade of implementation, which means making the goals and tools work in practice.**

Table 4 Overall strategies and targets assessment: status of measure implementation, and qualitative and quantitative information on the status of mitigation- and adaptation-related Paris alignment

Legend

Implementation status	Paris-alignment status
Implemented or to be implemented	In line with scientific 1.5°/<2°C scenario or CAT fair share target (ClimateAnalytics and NewClimate Institute, 2021)
Under discussion by government	Progress in right direction, but not sufficient
Rejected or disregarded by government	Misaligned without considerable progress towards alignment
Not yet on government agenda	No information available

Measure implementation	European Union (EU) or Germany	Context	Paris alignment: Mitigation		Paris alignment: Adaptation	
			Qualitative information	Quantitative information	Qualitative information	Quantitative information
Net-zero target defined	**European Union** 	The European Green Deal is the basis for European climate policy. All 27 EU member states have committed to making Europe the first climate-neutral continent by 2050. As an interim target, they have agreed to reduce emissions by at least 55% by 2030 compared to 1990 levels (EC, 2022b).	The Climate Action Tracker (CAT) classifies Europe's net-zero target as 'acceptable' (CAT, 2022).	*Nationally determined contribution (NDC)*: climate neutrality in 2050 *Updated NDC*: 55% reduction in GHG emissions by 2030, compared with1990, including instruments *Green Deal*: Europe's overall 2030 target of at least 55% reduction below 1990 level (EC, 2021a)	None in the European NDC, but the initiative of a new strategy is mentioned, which has been released in 2021.	Not applicable
	Germany 	Following a decision by the Federal Constitutional Court, the German government tightened Germany's climate targets in 2021. The amendment came into force in August 2021; it includes the new target of carbon neutrality by 2045 and an emissions reduction of 65% by 2030. It also includes new sector targets (German Government, 2021a).	The CAT still classifies the German target as 'insufficient' (i.e., leading to a 2–3°C temperature increase): > To be in line with the 1.5°C limit of the Paris Agreement, Germany's new 2030 domestic reduction target should aim for national emission reductions of at least 69% below 1990 levels. To fully contribute its fair share Germany would have to significantly increase its international climate finance. The program to implement this target would need to include a coal phase-out by 2030, a renewable energy target for the electricity sector increased to around 90% or more by 2030, a fast uptake of electric vehicle sales to at least 95% of the market by 2030, and a reduced emissions intensity of Germany's heavy industry. The proposed target of 65% by 2030 falls short of 1.5˚C compatibility.	*NDC*: see above	See above	See above

			(ClimateAnalytics and NewClimate Institute, 2021: 1, CAT 2021)			
Net-zero target legally binding	**European Union**	European Climate Law includes the net-zero target and is therefore legally binding.	See above	See above	See above	See above
	Germany	The German Klimaschutzgesetz (KSG) includes the net-zero target and is therefore legally binding.	See above	See above	See above	See above
NDC explicitly includes Article 2.1c measures	**European Union**	The European NDC focuses on the 2030 emission reduction target.	The EU did not include any mitigation-related Article 2.1c measures in its NDC.	Not available because measures not included in NDC.	The European Union did not include specific adaptation-related Article 2.1c measures in its NDC. (Adaptation is generally mentioned and a new adaptation strategy	See above

					has been released in 2021).	
	Germany	The European NDC applies to all EU member states.	See above	See above	See above	See above
Government tracks climate alignment of financial flows	**European Union**	EU Taxonomy will allow for the quantitative tracking of public and private climate aligned financial flows.	Consistent and systematic tracking does not take place.	Consistent and systematic tracking does not take place.	Consistent and systematic tracking does not take place.	Consistent and systematic tracking does not take place.
	Germany	The German Sustainable Finance Strategy targets the climate-compatible alignment of financial flows and its aim is that public sector financial flows will serve as a role model.	So far, the German government has complied with demands for a sustainable orientation of public funds only in the case of the fund for financing nuclear waste management; consistent and systematic tracking does not otherwise take place.	Consistent and systematic quantitative tracking does not take place. The EU Taxonomy will deliver a credible tool for tracking climate financial flows in future – but it has been compromised by its inclusion of fossil gas and nuclear energy.	See above	See above
Climate alignment of COVID-19 recovery package	**European Union**	EU stimulus packages labelled 'Next Generation EU' are partnered with the central Recovery and Resilience Facility (RRF).	Efforts must be aligned with the green and digital transformation.	The RRF Regulation requires at least 37% of spending in national RRPs to support the green transformation and the rest to do it no harm.	Not considered	Not considered
	Germany	Three programmes have received the most funding from the federal government: ▪ The Economic Recovery and Future Program (about €130 billion) ▪ The Economic Stabilization Fund (about €600 billion) ▪ The KfW special programmes (unlimited) There are also further related recovery programmes with smaller budgets.	The climate effects of COVID-19 measures cannot be identified in many cases because eligibility criteria are missing, procedures are not transparent or wording is vague (DIW ECON, 2021; see also the European requirements in the context of the RRF).	Germany's RRP has a green spending share of 38%, meeting the EU benchmark of at least 37%. But when all recovery measures are evaluated, including those in the national recovery package only from June 2020, Germany achieves a green spending share of just 21%. While 20% (€28.5 billion) of the measures have positive or negative green transition impacts depending on their implementation, 17% (€24.1 billion) of all measures actually have a negative impact. All of this highlights the importance of impact assessment during further planning, review and implementation of the stimulus measures (Green Recovery Tracker, 2022).	See above	See above

Sustainable finance strategy	**European Union**	On 6 July 2021, the Commission published the new European Sustainable Finance Strategy, Strategy for Financing the Transition to a Sustainable Economy (EC, 2022c). This builds on previous sustainable finance strategies on the subject, such as the 2018 Action Plan for Financing Sustainable Growth.	The new sustainable finance strategy aims to support the financing of the transition to a sustainable economy by proposing action in four number of areas: transition finance, inclusiveness, resilience and contribution of the financial system and global ambition. (EC, 2022c)	Six measures describe concrete objectives on legal acts, reviews and proposals. Central to these are the: 1. EU Taxonomy 2. Sustainable Finance Disclosure Regulation (SFDR) 3. Green Bond Standard	The primary aim of the EU Strategy is to finance its climate targets; hence a clear focus on climate mitigation can be observed. The physical effects of climate change and adaptation measures play a role in only a few parts of the action plan.	Not considered
	Germany	In May 2021, the German government published its first Sustainable Finance Strategy (German Government, 2021b). With its Strategy, the German government aims to establish Germany as a leading international location for sustainable finance. This was already an objective under the old federal government; the new government has amplified this ambition in its coalition agreement (German Government, 2021c).	The Strategy's five main goals are: 1. Advancing sustainable finance worldwide and in Europe 2. Taking opportunities to finance transformation and anchor sustainability impacts 3. Targeted improvements to risk management in the financial industry and ensuring financial market stability 4. Strengthening Germany as a financial centre and expanding its expertise **5.** Establishing the federal government as a role model for sustainable finance in the financial system	In addition to the main goals, 26 concrete measures are also included, which are subdivided into different time horizons. Many organisations and analysts see the Strategy as a good first step but criticise that it is far too vague in many areas, saying that it needs to be revised and further concretised (Germanwatch, 2021; WWF, 2021).	*Measure 13*: Further develop environmental social governance (ESG) impact and further develop assessment methods This measure is supposed to capture adaptation to climate change through scenario analyses. This includes, e.g., clearly assessing the impact of water risks clearly measurable for investment decisions.	See above
International cooperation	**European Union**	The EU is involved in extensive international cooperation on the subject – particularly in the area of international standards and reporting.	The EU is a member of the International Platform on Sustainable Finance (founding member).	No action quantifications available	See column *Paris alignment: Mitigation*	No action quantifications available

	Germany	International cooperation is part of the German Sustainable Finance Strategy. Sustainable finance is supposed to be a topic of the G7 in 2022 (Germany holds the presidency in 2022); the global dialogue is to be promoted in general (German Government, 2021b).	Germany's additional memberships include of the: ▪ Network for Greening the Financial System (NGFS) (of which the DBB is a founding member) ▪ Coalition of Finance Ministers for Climate Action The country also participates comprehensively in EU sustainable finance processes.	No action quantifications available	See column *Paris alignment: Mitigation*	No action quantifications available

Note: The measures assessed here were selected by the authors of this study and are structured similarly to those used in the Swiss iGST study, Whitley et al. (2018) and Bingler et al. (2018).

3.2 Financial policy and regulation

Recent European policy on and regulation of sustainable finance are rooted in earlier efforts. The revised EU Sustainable Finance Strategy (EC, 2021) builds strongly on previous measures such as the 2018 Action Plan for Financing Sustainable Growth (EC, 2018). Central to EU strategy is its Taxonomy, which will create a clear classification for sustainable economic activities. The decision to include nuclear energy and natural gas in the EU Taxonomy as a green activity has, however, raised questions of whether it has been distorted by individual political interests – especially those of France and Germany.

A variety of scientific publications suggest that, given its significant impact on the climate, gas should not be considered a bridge or transition fuel nor should it be included in the EU Taxonomy (NewClimate Institute, 2021; CBI, 2022). Lifecycle assessments of gas generally undermine the case for its use as a climate-friendly alternative. Rapid technological advances and the declining costs of renewable alternatives, energy storage and end-use electrification mean that gas investments are not only increasingly inconsistent with overall climate goals, but also they carry serious risks in terms of high emissions, switching and physical climate risks. There are serious doubts too as to whether nuclear energy meets the requirements of the EU Taxonomy and the corresponding environmental goals (Base, 2021; Böll, 2021).

The expert panel of the EU Commission, the EU Platform for Sustainable Finance, has therefore called for both technologies to be excluded from the EU Taxonomy (WWF, 2022; Platform on Sustainable Finance, 2021). Such exclusion would have a significant impact on the significance and credibility of the instrument; it remains to be seen how influential the instrument can be in the future while including these two technologies.

The Taxonomy should clearly and scientifically define what is sustainable and what is not. The final decision in the EU Parliament to include fossil gas and nuclear energy in the Taxonomy raises doubts about its international relevance, fundamentally damages its credibility and will fuel the debates surrounding it for a long time to come.

In addition, the European Union is working on comprehensive uniform disclosure regulations. While the SFDR is already in force and regulates disclosure in the financial sector with regard to sustainability, the comprehensive renewal of reporting regulations for the corporate sector, the CSRD, is still in progress. In practice – and especially in the field of climate reporting – there has been continuous improvement. At the same time, however, it is also evident that few companies have yet succeeded in implementing climate reporting effectively across the entire spectrum of their activities. It is obvious that many companies still regard climate-related reporting as a ‘compliance exercise’ rather than an opportunity to review the resilience of their business model as the climate crisis bites (Rödl&Partner, 2020). Germany must amplify the many advantages that accrue to those companies which engage in sustainability reporting at an early stage (Germanwatch, 2022c).

In addition, the limited scope of the CSRD is problematic, with only very few companies in Europe affected by it. For Germany, in particular, this problem is exacerbated by an economy characterised by many SMEs. How to lift SMEs – with their, in some cases, limited experience and little funding with which to produce comprehensive reports and sustainability data – onto a Paris-compatible path is one of the country's major challenges; solutions and support measures tailored to SMEs must now be developed and implemented quickly. For example, under the CSRD bundles of sector-specific and organisation-specific standards are to be produced over the next three years. Support for SMEs in implementing taxonomy-based reporting requirements is also important. In these policy areas, Germany must come up with concrete progressive ideas if it is to live up to its own aspirations. All of this shows that climate-related reporting – one part of financial policy and regulation – poses ongoing challenges and that there is still a long way to go before the goal of Paris alignment is achieved.

Overall, the European Union is using its potential as a large single market and monetary union to create uniform rules, and thereby harmonising the climate rules applicable to the financial sector. The EU Taxonomy, the CSRD and the SFDR create a sustainable basic framework for the financial sector – but there remain many areas with room for improvement. In the remaining term of office of the European Commission and beyond, one thing is paramount: ensuring that the tools and regulations created must be applicable in practice – 'making them work' – even in the face of obstacles and resistance. This sounds simple, but it is critical to major projects such as the Taxonomy and CSRD. The Commission must analyse the problems, evaluate possible solutions and tailor support measures to suit the relevant stakeholders. **It must be ambitious in pursuing Paris-compatible outcomes after its initial reluctance and despite voices criticising overregulation.** It therefore remains to be seen whether the European Union will be able to agree on binding and Paris-compatible regulations.

The assessment table (**Table 5**) shows that:

- **Financial policies and regulation are increasingly being put into place to achieve the binding climate targets – especially at the EU level.** It will be the concrete implementation of, for example, the Corporate Sustainability Reporting Directive (CSRD) and the EU Taxonomy that determines whether Paris alignment will be achieved. **But Germany's efforts to include fossil gas in the EU Taxonomy have, however, damaged the instrument and hence been a counterproductive contribution.**
- **For the German economy, lifting its large number of SMEs to a Paris-compatible path is a major challenge.** These commonly have only limited experience and little funding with which to produce comprehensive reports and sustainability data; solutions and support measures tailored to SMEs must now be developed and implemented quickly. For example, under the CSRD bundles of sector-specific and organisation-specific standards are to be produced over the next three years. Support for SMEs in implementing taxonomy-based reporting requirements is also important. In these policy areas, Germany must come up with concrete progressive ideas if it is to live up to its own aspirations. It must analyse the problems, evaluate possible solutions and tailor support measures to suit the relevant stakeholders. **It must now be ambitious in pursuing Paris-compatible levels of outcome after its initial reluctance and despite voices criticising overregulation.**

Table 5 Financial policy and regulation assessment: status of measure implementation, and qualitative and quantitative information on the status of mitigation- and adaptation-related Paris alignment

Legend

Implementation status	Paris-alignment status
Implemented or to be implemented	In line with scientific 1.5°/<2°C scenario or CAT fair share target (ClimateAnalytics and NewClimate Institute, 2021)
Under discussion by government	Progress in right direction, but not sufficient
Rejected or disregarded by government	Misaligned without considerable progress towards alignment
Not yet on government agenda	No information available

Measure implementation	European Union (EU) or Germany	Context	Paris alignment: Mitigation		Paris alignment: Adaptation	
			Qualitative information	Quantitative information	Qualitative information	Quantitative information
Disclosure requirements on climate risks	**European Union** 	The disclosure of climate risks and climate impacts is not clearly distinguished in the EU or in Germany. Disclosure of impacts necessarily means making risks more visible. The following two instruments are decisive, however. ▪ the Corporate Sustainability Reporting Directive (CSRD), which updated the Non-Financial Reporting Directive (NFRD) ▪ the Recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD). The TCFD was created in 2015 by the Financial Stability Board (FSB) to develop consistent climate-related financial risk disclosures for use by companies, banks and investors in providing information to stakeholders. The TCFD presented its recommendations to G20 finance ministers in 2017. It recommended requiring companies to report on their climate-related risks, their strategic significance and their management of these risks (TCFD, 2022).	In 2018, a panel of experts, the EC High-Level Group on Sustainable Finance (HLEG) recommended implementing the TCFD Recommendations across the bloc (HLEG, 2018). As part of the Action Plan on Financing Sustainable Growth, a 2019 addendum to climate-related reporting was published, which translates the TCFD Recommendations into the logic of the EU Corporate Sustainability Reporting Directive (CSRD) (EC, 2019). In April 2021, the Commission presented its draft of the new CSRD. It should also adopt the TCFD Recommendations (EC, 2022d). In Germany, as well as in European disclosure regulation, the implementation of binding future-oriented reporting obligations, e.g., according to the framework of the TCFD, is planned but still missing so far (Sustainable Finance Beirat, 2021).	The exact details of the CSRD criteria are still being worked out. The TCFD Recommendations focus on four areas: 1. *Governance*: Responsibilities sitting with the board and senior management for climate-related issues 2. *Strategy*: Importance of climate protection and climate change for competitiveness and corporate strategy 3. *Risk management*: Procedure for identifying, assessing and managing climate-related risks 4. *Figures and targets*: Publication of key figures on GHG emissions; designation of targets and information on target achievement (TCFD, 2022)	In general, there is a lot of overlap between mitigation and adaptation. On the one hand, the disclosure of climate risks has a mitigation effect, since investments can be shifted away from activities that are harmful to the climate; on the other, it also has an adaptation effect when the consequences of climate change become visible in the risk assessment. The TCFD Recommendations distinguish between transition risks and physical climate risks. The relevance of the physical impacts on the performance of companies is emphasised and thus the issue of adaptation plays a role.	No action quantifications available
	Germany 	See above	The German government views the recommendations of the TCFD as an important element of uniform global standards for sustainability reporting and will continue to advocate this at G7 and G20 levels (German Government, 2021b).	See above	See above	See above

Climate risk analysis principles defined and disclosure templates standardised	**European Union**	In general, EU efforts in the area of reporting are to be understood in the sense that the rules and principles will be standardised and thus also become simpler. Until now, there have been an incredible number of voluntary, proprietary or competing methods and standards and reporting obligations.	In September 2021, the European Financial Reporting Advisory Group (EFRAG), which developed the disclosure criteria for the new CSRD, published a working paper, which outlined so-called prototype climate standards that would build on existing standards and be circumscribed by the CSRD (EFRAG, 2022).	An EFRAG Working Group published the first part of new standards in January 2022, as seven papers. Four of the papers focused on cross-cutting standards: ▪ strategy and business model ▪ governance and organisation of sustainability ▪ key sustainability impacts, risks and opportunities ▪ definitions for concepts, goals, measures and resources. Two centred standards for conceptual guidance: ▪ dual materiality ▪ characteristics of information quality. One offered a thematic climate standard. The working paper is a revised version of the prototype climate standard previously published in September 2021 (EFRAG – PTF-ESRS, 2022). A comprehensive consultation on all the individual standards ended in summer 2022.	In general, there is a lot of overlap between mitigation and adaptation. On the one hand, the disclosure of climate risks has a mitigation effect, since investments can be shifted away from activities that are harmful to the climate; on the other, it also has an adaptation effect when the consequences of climate change become visible in the risk assessment.	No action quantifications available
	Germany	See above + In 2020, BaFin (Germany's Federal Financial Supervisory Authority) published a widely followed fact sheet (BaFin, 2020a). It provides guidance to financial	See above + In its fact sheet, BaFin addresses the implications for strategies, corporate governance and business organisation. Management at financial companies	See above	See above	See above

		companies on how to deal with sustainability risks. BaFin recommends that companies strategically address sustainability risks, and hence this guidance has implications for strategies, corporate management and business organisation (BaFin, 2020b).	should 'develop an understanding of sustainability risks, including physical and transitory risks, their characteristics, and possible impacts on their own business' (BaFin, 2020a: 22). The focus of the fact sheet is on risk management. The fact sheet also deals with issues relating to stress tests, including scenario analyses, and it deals with transition and impact scenarios. It is apparent that the fact sheet is largely based on the TCFD Recommendations, even if these are explicitly addressed only twice.			
Disclosure requirements on climate impacts	**European Union**	The disclosure of climate risks and climate impacts is not clearly distinguished in the EU or in Germany. Disclosure of impacts necessarily means making risks more visible. See also row *Disclosure requirements on climate risks*, above. The following two instruments are decisive: ▪ the CSRD – focused on disclosure requirements in the corporate sector ▪ the Sustainable Finance Disclosure Regulation (SFDR), in force since March 2021 – focusing on disclosure requirements in the financial services sector. (EU-Lex, 2022)	According to the current timetable, the CSRD would come into force from 1 January 2024 for the 2023/24 financial year. As presented, they will require all companies with 250 or more employees to report in the future. The Taxonomy-conformity of economic activities would also have to be reported under the CSRD (EC, 2022d). The SFDR focuses on the financial sector. In accordance with its requirements, the financial sector must be more transparent about environmental social governance (ESG) issues and report in detail on sustainability issues – in	In addition to companies with 250 or more employees, the new draft CSRD imposes reporting obligations on only listed companies. As a result, only 49,000 of the 22.2 million companies in Europe would fall under its scope (Germanwatch, 2022c). From 2023 at the latest, companies falling within its scope are required to disclose in their precontractual materials and in their annual report information the most significant adverse impacts on sustainability factors – known as their principle adverse impacts (PAIs). The PAIs are mandatory performance indicators, partnering	See column *Paris alignment: Mitigation*	See column *Paris alignment: Mitigation*

			relation to the respective company and its products. See also row *Disclosure requirements on climate risks*, above.	13 environmental measures and 5 social with 46 additional voluntary, predefined ESG indicators that are intended to reflect the adverse environmental and social impacts of the investment product. See also row *Disclosure requirements on climate risks*, above.		
	Germany	See above	In its coalition agreement, the new federal government supports the CSRD as an important milestone in the field of sustainable finance (German Government (2021c).	The limited scope of the new CSRD is problematic. In Germany, 99.4% of all companies are SMEs, and hence the instrument will not cover most of its corporate sector. SMEs are particularly relevant to Germany's transformation. A major challenge will therefore be to ensure that the corresponding reporting requirements for SMEs are not complicated and burdensome, while at the same time amplifying the corresponding steering effects and disclosure of risks as a management tool (Germanwatch, 2022c).	See column *Paris alignment: Mitigation*	See column *Paris alignment: Mitigation*
Climate impact analysis principles defined and disclosure templates standardised	**European Union**	The main instrument for standardisation and simplification in disclosure regulation is the EU Taxonomy. The EU Taxonomy describes those activities that contribute significantly to the environmental objectives defined in it, and it can be seen as a link between the SFDR and the CSRD. The EU Taxonomy presented in 2020 is a classification system for sustainable economic activities. The Taxonomy is intended to	The EU Taxonomy also contains a disclosure requirement. Banks and companies that meet certain criteria (number of employees, etc.) must disclose their green asset ratio – how many of their assets are Taxonomy-compatible (i.e., 'green'). Intended as a tool for leveraging private financial flows, the Taxonomy will	See also rows *Disclosure requirements on climate risks* and *Disclosure requirements on climate impacts*, above	The 2020 technical annex submitted by the TEG includes some 200 pages of taxonomy criteria for adaptation to climate change and 390 pages of taxonomy criteria on climate change mitigation.	See column *Paris alignment: Mitigation*

		enable investors, companies and other stakeholders to take into account the transition towards a low-carbon, more resilient and resource-efficient economy when making decisions (TEG, 2020a). To this end, the Taxonomy aims to define, for six environmental targets, which economic activities contribute substantially to their achievement.	most likely also apply to public investments and funds in the long term. This underlines its relevance in Europe – but the inclusion of nuclear energy and natural gas in the Taxonomy jeopardises its Paris compatibility. See also rows *Disclosure requirements on climate risks* and *Disclosure requirements on climate impacts*, above.			
	Germany	See above	See above	See above	See column *Paris alignment: Mitigation*	See column *Paris alignment: Mitigation*
Accounting standards include climate risk-adjusted financial metrics	**European Union**	See also rows *Disclosure requirements on climate risks* and *Disclosure requirements on climate impacts*, above	See also rows *Disclosure requirements on climate risks* and *Disclosure requirements on climate impacts*, above	See also rows *Disclosure requirements on climate risks* and *Disclosure requirements on climate impacts*, above	See also rows *Disclosure requirements on climate risks* and *Disclosure requirements on climate impacts*, above	See also rows *Disclosure requirements on climate risks* and *Disclosure requirements on climate impacts*, above
	Germany	See above	See above	See above	See above	See above
Financial market levies reflect climate components	**European Union**	After the 2008 global financial crisis, many EU member states introduced a levy on liabilities *less* customer deposits (known as the L-D design). As a rule, however, these do not take into account any climate components. The EU Taxonomy might be a first step towards putting climate related market levies in place.	Not considered	Not considered	Not considered	Not considered
	Germany	See above	See above	See above	See above	See above

Note: The measures assessed here were selected by the authors of this study and are structured similarly to those used in the Swiss iGST study, Whitley et al. (2018) and Bingler et al. (2018).

3.3 Central bank and financial supervision

With regard to central bank policies, Germany has delegated a portion of its sovereignty to the ECB. The ECB has in the past actively amplified climate-related risks on its agenda and conducts regular climate stress tests together with its partner organisations.

The central banks and financial authorities of both Germany and the European Union will have to consider more climate-related financial risks in their frameworks for microprudential supervision (by adjusting the accepted collateral framework for climate risks) and macroprudential supervision (by adjusting capital buffers for climate risks). In addition, further monetary policy activities and a clearer focus within the country's own portfolios will be needed if Germany is to achieve Paris alignment.

A detailed look at the DBB's sustainability management reveals numerous flaws. For example, its own environmental social governance (ESG) strategy still includes fossil gas and a link to the Paris compatibility of its own strategy remains absent. The DBB commits to climate-related reporting on its non-monetary portfolios by mid-2022, which will erase ambiguities and facilitate the management of its ESG portfolios. This commitment needs to be expanded to include its monetary policy portfolios.

Overall, the DBB needs to take a more supportive role at the ECB level. Concerning monetary policy, it should push for climate transition TLTROs and the faster adoption of the climate scoring method for the existing corporate bond purchases. Concerning financial supervision, it should work towards taking climate risk into account in capital buffers at the macroprudential level and climate risk adjustments for the collateral framework at the microprudential level.

The assessment table (**Table 6**) shows that:

- **The central banks and financial authorities of both Germany and the European Union will have to consider more climate-related financial risks** in their frameworks for microprudential supervision (by adjusting the accepted collateral framework for climate risks) and macroprudential supervision (by adjusting capital buffers for climate risks). In addition, further monetary policy activities and a clearer focus within the country's own portfolios will be needed if Germany is to achieve Paris compatibility. One option would be to implement targeted longer-term refinancing operations (TLTROs) for climate alignment in adaptation and mitigation.

Table 6 Central bank and financial supervision assessment: status of measure implementation, and qualitative and quantitative information on the status of mitigation- and adaptation-related Paris alignment

Legend

Implementation status	Paris-alignment status
Implemented or to be implemented	In line with scientific 1.5°/<2°C scenario or CAT fair share target (ClimateAnalytics and NewClimate Institute, 2021)
Under discussion by government	Progress in right direction, but not sufficient
Rejected or disregarded by government	Misaligned without considerable progress towards alignment
Not yet on government agenda	No information available

Measure implementation	European Union (EU) or Germany	Context	Paris alignment: Mitigation		Paris alignment: Adaptation	
			Qualitative information	Quantitative information	Qualitative information	Quantitative information
Macroprudential supervision considers climate risks **+** **Microprudential supervision considers climate risks**	**European Union** 	The European Systemic Risk Board (ESRB) is the central body for macroprudential supervision in the EU. The European Central Bank (ECB) also publishes sector guidance and risk management expectations on the topic of climate-related risk and financial stability.	Since the end of 2019, forward-looking scenario analyses have been carried out using Network for Greening the Financial System (NGFS) scenarios (ESRB, 2021). In January 2022, ECB Banking Supervision launched its climate risk stress test. The European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA), and the European Securities and Markets Authority (ESMA), in cooperation with the ESRB, are all required in law to use stress tests to assess the resilience of financial institutions or market participants when subject to adverse market developments.	There are no clear and quantifiable conclusions yet. The topic is on the agenda and individual things such as climate-related stress tests are carried out.	The systemic risks of climate change are also always about adaptation alignment.	Not considered
	Germany 	The Financial Stability Board (AFS) is the central body for macroprudential supervision in Germany, but links with the ECB are substantial.	In Germany, BaFin is the authority that orders the specific use of macroprudential instruments. It acts partly at the recommendation of the Financial Stability Committee and partly on its own initiative. The Financial Stability Committee reviews on an ongoing basis whether existing instruments are sufficient or must be amended.	Stress tests are planned for 2022/23 to assess the impact of different CO_2 price paths on financial stability in Germany (DBB, 2021).	See above	See above

			Germany's Sustainable Finance Strategy prescribes that: > … financial market players must recognise, assess and manage the risks. To do this, they must develop suitable methods, e.g., in the lending process, underwriting or stress testing (risk management). The Federal Government expressly supports this development on the part of the central banks and supervisory authorities.			
Central banks' interest rates reflect climate impact (green supporting factor / green TLTROs) **+** **Central banks' interest rates reflect climate risks (brown penalising factor)**	**European Union**	The regulatory framework in this respect is still very unclear. It is not yet specified that a green or brown supporting factor will be introduced. Before any regulation in this regard, however, green and brown activities must be defined. The EU Taxonomy for Sustainable Finance offers a definition for green activity. The Platform of Sustainable Finance has also recently called for guidelines to be extended to brown and yellow/transitional economic activities.	Apart from the green supporting factor, one additional option in this area would be to implement targeted longer-term refinancing operations (TLTROs) for climate alignment in adaptation and mitigation.	There are no clear qualitative or quantifiable conclusions yet.	See column *Paris alignment: mitigation*	See column *Paris alignment: mitigation*
Central bank monetary policy portfolios are climate-aligned	**European Union**	The Action Plan + Roadmap 2021 includes climate change considerations in EU monetary policy strategy (ECB, 2021) The ECB provides details on how it aims to decarbonise its corporate bond holdings (ECB, 2022).	The key types of ECB monetary policy operation that can become climate-aligned are: ▪ credit operation ▪ the Eurosystem collateral framework ▪ the asset purchase programmes. In this last area, the ECB published further details on how it aims to gradually decarbonise the corporate	There are no clear qualitative quantifiable conclusions yet.	See column *Paris alignment: mitigation*	See column *Paris alignment: mitigation*

			bond holdings in its monetary policy portfolios. One goal is to reduce the Eurosystem's exposure to climate-related financial risk, following the Governing Council's July 2022 decision to tilt its corporate bond purchases towards issuers with a better climate performance. The overall climate score that will be used to tilt bond holdings combines the following three subscores: 1. Backward-looking emissions 2. Forward-looking target 3. Climate disclosure (ECB, 2022) Promised changes through the ECB Action Plan include: ▪ disclosure requirements as an eligibility criterion ▪ the expansion of valuation and risk analysis of financial assets to include climate-related financial risks ▪ the positioning of financial assets as collateral if they promote the transition. (ECB 2021)			
	Germany	The DBB proclaims market neutrality in its investment decision and insists on political independence (DBB, 2020). BaFin and DBB are members of NFGS.	The DBB is yet to adopt an environmental social governance (ESG) or climate approach to its own portfolios. While it already manages several third-	The DBB excludes: ▪ companies that generate 5% or more of their revenues from the production of nuclear power or related	No data or information	No data or information

			party portfolios with some ESG criteria, it does not provide the detail of the criteria used for all these portfolios. In fact, the details available on the bank's ESG strategy for four of its clients reveal a deeply flawed approach, as follows. ▪ The criterion excluding fossil fuels concerns only fossil fuel extraction and does not apply to fossil gas. ▪ Both criteria regarding fossil fuels and carbon intensity might not be applied to fossil fuel companies. ▪ No reference is made to the Paris Agreement. ▪ The 'best-in-class' approach is largely insufficient. The fact that the DBB mentions green bonds is not reassuring: like several other central banks, including the ECB, the DBB seems to think that investing in this asset class is enough to align its portfolios with climate goals. (ReclaimFinance, 2021)	components, or the extraction of fossil fuels, except natural gas ▪ the 10% most carbon-intensive companies in the investment universe.		
Non-monetary policy portfolios (e.g., own pension portfolios) are climate-aligned	**European Union**	The Eurosystem published a common position on climate-related sustainable investments in non-monetary policy portfolios in 2021, following NGFS recommendations. The aim is to start providing annual climate-related disclosures for non-monetary portfolios in the next two years – aligning with the Recommendations of the Task Force on Climate-Related	No data available	No data available	No data or information	No data or information

		Financial Disclosures (TCFD) (ECB, 2021).				
	Germany	See above The DBB will start climate-related disclosure for its non-monetary policy euro portfolios in mid-2022 (DBB, 2021).	The introduction of a stock-based funded pension in the future is very likely, whereby the Deutsche Rentenversicherung will become a big investor. In addition, consumers in Germany privately save for their retirement – and all of these pension provisions are not tied to any binding environmental conditions.	No data available	No data or information	No data or information

Note: The measures assessed here were selected by the authors of this study and are structured similarly to those used in the Swiss iGST study, Whitley et al. (2018) and Bingler et al. (2018).

3.4 Fiscal policy and carbon pricing

The European Union has long relied on emissions trading as a means of reducing its CO_2 emissions. This is reflected in one of the highest CO_2 levies in the world – at times over €100 per tonne of CO_2 for fossil fuels. But design flaws led to an oversupply of CO_2-certificates and price erosion. Moreover, the ETS has not yet been adjusted to reflect the current target. The EU authorities are struggling to reach agreement on the issue, such that the revised edition of the ETS is still pending.

Meanwhile, the emission reductions achieved in the industry and real estate sectors have been partially offset by the stagnation of emissions in the transport sector. German CO_2 pricing complements the ETS in the head and transport sector. In addition, both the European Union and Germany are still investing heavily in fossil fuels. The fuel rebate introduced in June 2022 in reaction to high fuel prices caused by the war in Ukraine also represents another major climate-damaging subsidy.

The assessment table (**Table 7**) shows that:

- **Fiscal policy and carbon pricing are key features of the German climate mitigation policy, but their sectoral scope needs to be broader and climate-misaligned fiscal incentives should be clearly assessed.**

Table 7 Fiscal policy and carbon pricing assessment: status of measure implementation, and qualitative and quantitative information on the status of mitigation- and adaptation-related Paris alignment

Legend

Implementation status	Paris-alignment status
Implemented or to be implemented	In line with scientific 1.5°/<2°C scenario or CAT fair share target (ClimateAnalytics and NewClimate Institute, 2021)
Under discussion by government	Progress in right direction, but not sufficient
Rejected or disregarded by government	Misaligned without considerable progress towards alignment
Not yet on government agenda	No information available

Measure implementation	European Union (EU) or Germany	Context	Paris alignment: Mitigation		Paris alignment: Adaptation	
			Qualitative information	Quantitative information	Qualitative information	Quantitative information
Carbon pricing	**European Union** 	The Emissions Trading System (ETS) was introduced in 2005 and is the central European climate protection instrument. Norway, Iceland and Liechtenstein have joined the ETS (EU 30) (Umweltbundesamt, 2021b).	The ETS covers electricity and heat generation and energy-intensive industries. Since 2012, intra-European air traffic has also been included in the EU ETS. Design flaws led to oversupply and price erosion. The new EU climate target will also necessitate a more significant reduction in emissions and hence the ETS will have to be adjusted in the context of the 'Fit for 55' package.	This includes 11,000 plants in the energy sector and energy-intensive industry. Together, these account for around 40% of greenhouse gas emissions in Europe (Umweltbundesamt, 2021b). In February 2022, the CO_2 price reached almost €100 per tonne (Handelsblatt, 2022).	Not targeted by carbon pricing	Not targeted by carbon pricing
	Germany 	To achieve the climate protection targets, the Fuel Emissions Trading Act (Brennstoffemissions-handelsgesetz, or BEHG) was announced on 19 December 2019 as part of the climate response package.	German emissions trading has included heat and transport sectors since 2021. The revenues from the CO_2 price should be reinvested in climate protection measures or provided as financial relief for citizens.	The CO_2 price has been €25 since January 2021. It is gradually rising, to reach €55 in 2025. For 2026, a price corridor of €55–€65 will apply (German Government, 2022a). Because of the war in Ukraine and resulting high energy costs, a freeze of the CO_2 price was discussed in Germany in autumn 2022. This would send a strong negative signal (see also Germanwatch, 2022a). The sale of CO_2 emission rights brought Germany €12.5 billion in 2021 (ZDF, 2022).	Not targeted by carbon pricing	Not targeted by carbon pricing
Climate-misaligned tax incentives and	**European Union**		The EU Parliament proposes to phase out all climate-damaging subsidies by 2025 and all other	*Environmentally and climate harmful subsidies annually*: €137 billion		

subsidies phase-out plan			environmentally harmful subsidies by 2027, and to create a toolbox for member states to reduce environmentally harmful subsidies (Umweltbundesamt, 2021c).	(Tagesspiegel Background, 2020)		
	Germany		Germany has committed to ending international public finance for fossil fuels by the end of 2022 – but it insisted on still financing 1.5°C-compatible gas investments, going forward. In its coalition agreement, the new federal government agreed to 'reduce unnecessary, ineffective and environmentally and climate damaging subsidies and expenditures', but it has not yet taken any steps to do so. In the context of the relief package in March 2022, however, the federal government announced that it would reduce the energy tax for three months to mitigate the impact of increased fuel prices in response to the Ukraine war. The fuel rebate introduced in June in reaction to high fuel prices causes by the war in Ukraine is another seriously climate-damaging subsidy. The G7 agreed as long ago as May 2016 to end inefficient subsidies for oil, gas and coal by 2025, but there has been little progress made (Umweltbundesamt, 2021c).	*Environmentally and climate harmful subsidies 2018*: €65.4 billion (Umweltbundesamt, 2021c)		

Consistency case study: Germany

Note: The measures assessed here were selected by the authors of this study and are structured similarly to those used in the Swiss iGST study, Whitley et al. (2018) and Bingler et al. (2018).

3.5 Public budget

The public budget is not Paris-aligned. There is, as yet, no systematic assessment of the climate compatibility of public budget planning and spending. Studies for 2021 show that environmentally damaging financial flows were almost twice those into environmental protection. This illustrates inconsistency between climate goals and public finances within Germany. However, in its coalition agreement, the new German government promises a spending review of harmful and climate-incompatible investments and expenditures. This is a first step towards a green budgeting strategy.

In line with its commitments under the UNFCCC, Germany has provided large-scale public financial, technological and capacity-building support, by means of both bilateral and multilateral contributions, including official development assistance. Germany provided its fair share of the $100 billion commitment (ODI, 2021) – yet it falls short of being 1.5°C-compatible (CAT, 2022).

Germany has issued green government bonds with great success at both federal and state levels. The European Commission also issued some for the first time in 2021, but they are still a significantly smaller market than that for conventional bonds.

The assessment table (**Table 8**) shows that:

- **The public budget is not Paris-aligned.** There is, as yet, no systematic assessment of the climate compatibility of public budget planning and spending. Studies for 2021 show that environmentally damaging financial flows were almost twice those into environmental protection. This illustrates inconsistency between climate goals and public finances within Germany. However, in its coalition agreement, the new German government promises a spending review of harmful and climate-incompatible investments and expenditures. Germany has also provided its fair share of the $100 billion commitment under the UNFCCC.

Table 8 Public budget assessment: status of measure implementation, and qualitative and quantitative information on the status of mitigation- and adaptation-related Paris alignment

Legend

Implementation status	Paris-alignment status
Implemented or to be implemented	In line with scientific 1.5°/<2°C scenario or CAT fair share target (ClimateAnalytics and NewClimate Institute, 2021)
Under discussion by government	Progress in right direction, but not sufficient
Rejected or disregarded by government	Misaligned without considerable progress towards alignment
Not yet on government agenda	No information available

Measure implementation	European Union (EU) or Germany	Context	Paris alignment: Mitigation		Paris alignment: Adaptation	
			Qualitative information	Quantitative information	Qualitative information	Quantitative information
Provision of international support[i]	**European Union** 	Developed countries committed to provide and mobilise $100 billion annually from 2020 through to 2025 from a wide variety of sources, balanced between adaptation and mitigation activities.	The EU's fair share of the $100 billion should be between $33 billion and $36 billion (Deutsche Klimafinanzierung, 2021).	€23.2 billion in 2019 *EU institutions (excluding the European Investment Bank, or EIB) bilateral public climate financing total (2017–2018 annual average)*: $3,157 million (100% grants) to the (Oxfam International, 2020). *Private finance mobilised*: €734 million (2017); €144 million (2018)	See column *Paris alignment: mitigation*	See column *Paris alignment: mitigation*
	Germany 	As above In Germany, the most important vehicles for this are: the Green Climate Fund, the Adaptation Fund, the Global Environment Facility (GEF), public loans through KfW and DEG, and the multilateral development banks. The largest share comes from public sources – mainly, the Federal Ministry for Economic Cooperation and Development (BMZ) and the German Society for International Cooperation. The focus of German climate financing is on bilateral cooperation.	More than 80% of German climate finance is provided by BMZ, with the rest provided nearly entirely by the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety (BMUV). Germany provided its fair share of the $100 billion commitment (ODI, 2021) yet it falls short of being 1.5°C compatible (CAT, 2022).	€7.83 billion in 2020 (increased tenfold since 2005), of which €7.64 billion came from from public sources (BMZ, 2022) *German bilateral public climate finance total as reported (2017–2018 annual average)*: $7,026 million (36.4% grants) (Oxfam International, 2020) Net climate finance *GCF contribution*: initial capitalisation, €750 million; 2020–2023, €1.5 billion *Private finance mobilised*: $548 million (2017); $552 million (2018)	Non-governmental organisations critique the reported public adaptation finance share as hiding a significantly lower actual amount of overall adaptation finance, alleging that the climate finance associated with the Rio Marker system has been overstated (i.e., because 50% of the project value is accounted for as climate finance if it contributes to adaptation in any way).	Of German climate finance, 20% ($1.5 billion) was allocated to adaptation projects, rising to 30% ($2.2 billion) if half of cross-cutting finance is also included (Oxfam International, 2020).
Public budget and spending climate alignment plan	**European Union**		The EU committed to spending at least 20% of its 2014–2020 budget on climate action.	The Commission announced that the EU had met this target, spending €216 billion on climate action for this period. However, the European	No strategy defined	No data available

				Court of Auditors (ECA) found that the reported spending was not always relevant to climate action and that the overall climate reporting was overstated by €72 billion (ECA, 2022).		
	Germany	A spending review linking sustainability goals to the federal budget is expected to be published at the end of 2022. The data for 2021 shows that the value of financial flows that are environmentally damaging is almost twice that spent on environmental protection. Germany's public finances are therefore inconsistent with its environmental and climate goals.	In its coalition agreement, the new federal government offers several points of reference that are relevant in the context of a green budgeting approach. For example, the coalition partners state that they want to 'gradually convert the federal budget to target- and impact-oriented budget management'. Coalition members have also stipulated that, in 'the entire legislative period, all expenditures will be put under the microscope' and that there should be a 'strict reprioritization against the benchmark of the climate objectives in the coalition agreement'. This represents a clear link to the forthcoming spending review, which should apply a budget tracking approach to determine the annual budget share for climate-aligned and climate-harmful investments. The data for 2021 shows that the financial flows associated with environmentally damaging activities are almost twice those spent on environmental protection (FÖS, 2022).	No data available	No strategy defined	No data available
	European Union	Within the 'Next Generation EU' framework, green bonds with a total volume of up to €250 billion	The EC issued green bonds worth €12 billion for	No data available on whether investments are	No data available on whether investments are	No data available on whether investments are

Sovereign green bonds issuance		are to be emitted by the end of 2026 (EC, 2021d).	the first time in October 2021 (EC, 2021d).	made in mitigation or adaptation	made in mitigation or adaptation	made in mitigation or adaptation
	Germany	Germany issued a first green 'bund' in 2020. These green federal securities are twins of the standard bund, with identical maturities (of 2, 5, 10 and 30 years) and coupon.	Significantly lower in size than conventional bunds, green bunds are informed by the United Nations' Sustainable Development Goals (SDGs) and Green Bond principles, and they are financing expenditure on climate and environmental protection.	€11.5 billion in green 'bunds' were issued in 2020 and €12.5 billion in 2021.	See column *Paris alignment: mitigation*	See column *Paris alignment: mitigation*
Subnational entities' green bond issuance	**European Union**					
	Germany	Germany's states are also able to issue bonds.	The first state-level green bond was issued in 2021.	*Baden-Württemberg*: €300 million for climate projects *Hessen*: €600 million for sustainable and ecological projects	See column *Paris alignment: mitigation*	See column *Paris alignment: mitigation*

[i] Collective commitment to mobilising $100 billion per year from public and private sources to support climate action in developing countries, under Article 9 of the Paris Agreement.

Note: The measures assessed here were selected by the authors of this study and are structured similarly to those used in the Swiss iGST study, Whitley et al. (2018) and Bingler et al. (2018).

3.6 Public financial institutions

The EIB has a dedicated climate strategy and is following a Paris-compatible path in many areas. But, despite its commitment to phase out fossil fuels, the EIB remains financed by and finances several gas projects – albeit under very restrictive conditions.

Compared to its European counterpart, the German KfW's climate strategy and project orientation are much less ambitious and distinct. KfW – in part an export credit agency – is developing a dedicated climate strategy, but it will continue to finance gas projects (which are not Paris-compatible). As recently as summer 2022, Chancellor Scholz announced that he would support Senegal in developing new gas fields. Germany should refrain from further promoting gas investments abroad if it is to remain on a Paris-compatible path.

Furthermore, most (public and private) pension funds in Germany are not yet Paris-compliant. A fixed component of German climate policy is the Energy and Climate Fund, which is intended to support the energy transition.

The assessment table (**Table 9**) shows that:

- **Public financial institutions** such as KfW may have or be developing a dedicated climate strategy, but they do not act accordingly – most importantly, in the field of fossil gas investments. As recently as summer 2022, Chancellor Scholz announced that he would support Senegal in developing new gas fields. Germany should refrain from further promoting gas investments abroad if it is to remain on a Paris-compatible path – following the lead at the European level, in many areas, of the EIB.

Table 9 Public financial institutions assessment: status of measure implementation, and qualitative and quantitative information on the status of mitigation- and adaptation-related Paris alignment

Legend

Implementation status	Paris-alignment status
Implemented or to be implemented	In line with scientific 1.5°/<2°C scenario or CAT fair share target (ClimateAnalytics and NewClimate Institute, 2021)
Under discussion by government	Progress in right direction, but not sufficient
Rejected or disregarded by government	Misaligned without considerable progress towards alignment
Not yet on government agenda	No information available

Measure implementation	European Union (EU) or Germany	Context	Paris alignment: Mitigation		Paris alignment: Adaptation	
			Qualitative information	Quantitative information	Qualitative information	Quantitative information
Climate bank or public development bank with dedicated climate finance strategy	**European Union** 	The European Investment Bank (EIB) is one of the multilateral development banks (MDBs). The MDBs have committed to become Paris aligned based on a framework comprising six building blocks. The MDBs are in the process of developing methodologies for their main finance instruments – direct investment, through financial intermediaries and policy-based lending – but the EIB does not engage in policy-based lending.	The EIB committed to Paris alignment for all new projects as of the beginning of 2021 (EIB, 2021), applying the MDBs' Paris alignment framework and own guidelines. The EIB pledged to phase out all fossil fuel finance by end of 2021. The EIB has a dedicated climate strategy and it targets delivery of 50% of EIB finance for climate and environmental action by 2025 (85% of which will likely be climate finance).	*EIB climate finance in 2020*: €28.9 billion, of which €3.2 billion flowed to low- and middle-income countries Mitigation finance accounted for €2.49 billion of the finance for low- and middle-income countries. Despite its 2019 commitment to phase out fossil fuels, the EIB has since funded six gas projects, at a value of €890 million (Counter Balance).	Before the COP 2021, the EIB announced its intention to invest more in adaptation and cohesion with detailed new plans to better equip key infrastructure assets for climate change and help large emitters reduce their overall emissions. Both are important objectives of the EIB Group's Climate Bank Roadmap.	The Board of Directors approved €6.1 billion for 28 projects to strengthen economic resilience in the Corona pandemic, promote climate action and improve public health and education. A total of €2.2 billion to be invested in climate action, clean transport and renewable energy **Exemplary projects:** Increasing renewable electricity generation in Austria, France, Spain, Portugal and North Africa; supplying water to 300 towns in southern Germany; expanding the use of electric vehicles in businesses in Italy, modernising the port of Klaipeda in Lithuania and purchasing more than 700 new freight wagons for use across Europe that will provide an alternative to road transport (EIB, 2021).
	Germany 	KfW Bankengruppe is the state-owned national development bank. It comprises various divisions, including for national activities, international development finance and, through its subsidiaries, export financing (KFW-IPEX) and private sector development finance (DEG). The Ministry of Finance and the Ministry of	KfW Bankengruppe has an exclusion list that includes coal (with very few exceptions) and exploration of non-conventional oil. KfW does not have a climate strategy, however; it applies a sustainable development goal SDG mapping to its projects. It	Between 2018 and 2020, Germany, continued to back fossil fuel financing through its different channels (KFW, DEG and Allianz Trade), to an annual value of $2.8 billion (Oil Change International, 2021).	No information available	No information available

		Economic Affairs and Climate take turns to chair the board of directors.	has a sustainable finance strategy that includes the Paris Agreement compatibility work as Paris-compatible sector guidelines – but these guidelines are based on the International Energy Agency Sustainable Development Scenario (IEA SDS), which is not 1.5°C compatible.			
Public export credit agency exclusively supports climate-aligned activities	**European Union**	Member states each have their own public export credit agency.	-	-	-	-
	Germany	KFW-IPEX and Allianz Trade (formerly Euler Hermes) jointly provide Germany's export finance. KFW-IPEX provides the export financing, while Allianz Trade provides the export finance insurance. Allianz Trade is officially mandated by the German government. The KfW is still financing gas projects (which are clearly not Paris-compatible). In summer 2022, Chancellor Scholz announced that he would support Senegal in developing new gas fields.	Independent analysis has found that Germany's export credit agency is misaligned (Perspectives, 2021). A dedicated climate strategy is under development, which is said to be informed by a target of mid-century climate-neutrality and in line with a 1.5°C pathway. Germany has committed to ending international public finance for fossil fuels by the end of 2022, yet it insisted on still financing 1.5°C-compatible gas investments, going forward. German direct investments or indirect support for the following activities related to fossil gas abroad are, in principle, not compatible with the Paris Climate Agreement: ▪ expansion of natural gas production (e.g., exploration or development of new gas fields) ▪ new infrastructure for processing or transporting natural gas (e.g., new gas	See above	No information available	No information available

			pipelines, LNG export terminals) ▪ activities that increase demand for natural gas (noting that renewable electricity generation has largely reached cost parity), such as new gas-fired power plants that are not primarily used to absorb peak load and stabilise grid frequency, or gas for cooking and heating if renewables, in combination with electrification, are possible instead. (Germanwatch, 2022b)			
State development finance institution has climate-aligned investment portfolio and focuses on climate-aligned development strategies	**European Union**	See row *Climate bank or public development bank with dedicated climate finance strategy* above	See above	See above	See above	See above
	Germany	KfW Development Bank and subsidiary DEG	See above	See above	See above	See above
Public pension funds follow climate-aligned investment approach	**European Union**		In 2019, the European Insurance and Occupational Pensions Authority (EIOPA) carried out a stress test that also takes into account environmental social governance (ESG) criteria. The test results show that the equity investments of the sample have a high carbon footprint compared to the EU economy as a whole (EIOPA, 2019).	The majority of institutions for occupational retirement provision (IORPs) report taking ESG factors into account, but less than 20% of the IORPs in the sample were assessing the impact of ESG factors on risks and returns. While the majority reported having taken appropriate steps to identify sustainability factors and ESG risks to inform their	No information available	No information available

				investment decisions, only 30% of IORPs have procedures in place to manage ESG risks. Furthermore, only 19% of the sampled IORPs assess the impact of ESG factors on the risk and return of their investments. All scenarios resulted in significant overall deficits (EIOPA, 2019).		
	Germany		German pension schemes do not take sustainability aspects into account in their investment strategy (Bundesregierung, 2022a). It is only in its coalition agreement that the new federal government mentions its plans to launch an equity-backed pension fund – and there will be debates about whether this must also meet sustainable criteria.	No information available	No information available	No information available

Note: The measures assessed here were selected by the authors of this study and are structured similarly to those used in the Swiss iGST study, Whitley et al. (2018) and Bingler et al. (2018).

3.7 Information instruments for climate-aligned investment planning

Germany has formulated sector targets with a deadline of 2030 for all sectors other than the information and communication technology (ICT) and service sectors. However, the CAT classifies Germany's climate targets as not Paris-aligned (CAT, 2022) because these targets are not ambitious enough. Moreover, the inaugural climate protection report published by Robert Habeck (Minister for Economic Affairs and Climate) in September 2022 shows that Germany is not on track to meet even these targets (Bundesregierung, 2022b). It remains to be seen how far the federal government newly formed at time of writing will go to redefine and reformulate these targets in the coming years. In some areas, such as the energy sector, it can be said that the new German government is making considerable efforts to get on a Paris-compatible path – or at least to achieve its own climate targets. The policies already published and planned almost all aim at creating good conditions, incentives and support schemes for private investment.

However, Germany does not prepare specific long-term capital provision plans to show how it intends to achieve the targets set out in the sectoral strategies. Such capital-raising plans could ease the crowding in of private capital for the investment required. The adaptation strategy is, to a large extent, not supported by quantifiable targets, and it is neither detailed nor prescriptive. Investors are well advised to prepare their own physical risk resilience strategies for their investments in Germany.

The European Union does not formulate sectoral targets, but it does formulate key targets, such as an emissions reduction of 55% by 2030, an energy share of at least 32% for renewables and an improvement in energy efficiency of at least 32.5% (EC, 2022g). With its 2021 'Fit for 55' legislative package, the European Commission took up this mandate, and it proposes a revision of all relevant policy instruments and the introduction of new regulations to achieve the additional emissions reductions. Now, the phase of positioning these targets more solidly begins between member states and the European Parliament, and it will be followed by negotiations between the three legislative institutions (i.e., the Parliament, Council and Commission). In all likelihood, negotiations will continue until the end of 2022 and into 2023.[1] But more ambitious targets are urgently needed and it remains to be seen whether the Commission's proposals will be implemented.

The assessment table (**Table 10**) shows that:

- **Germany must offer information instruments on climate-aligned investment planning to its industrial sectors.** For almost all of these, Germany has formulated sector targets up to 2030 that are not sufficiently ambitious to be Paris-aligned. The building and transport sectors are particularly lagging. It remains to be seen how far the federal government newly formed at time of writing will go to redefine and reformulate these targets in the coming years. Similarly, in the European Union, the decisive 'Fit for 55' package is still being negotiated.

[1] Detailed analysis: www.germanwatch.org/sites/default/files/germanwatch_analyse_ff55_07–10–2021.pdf

Table 10 Information instruments for climate-aligned investment planning assessment: status of measure implementation, and qualitative and quantitative information on the status of mitigation- and adaptation-related Paris alignment

Legend

Implementation status	Paris-alignment status
Implemented or to be implemented	In line with scientific 1.5°/<2°C scenario or CAT fair share target (ClimateAnalytics and NewClimate Institute, 2021)
Under discussion by government	Progress in right direction, but not sufficient
Rejected or disregarded by government	Misaligned without considerable progress towards alignment
Not yet on government agenda	No information available

Measure implementation	European Union (EU) or Germany	Context	Paris alignment: Mitigation		Paris alignment: Adaptation	
			Qualitative information	Quantitative information	Qualitative information	Quantitative information
Energy sector specific climate strategy	**European Union** 	Renewable Energy Directive (Directive 2009/28/EC)	To rapidly reduce dependence on fossil fuels from Russia, the European Commission proposes to increase the overall renewable energy target for 2030 from 40% to 45% as part of the 'Fit for 55' package and to raise the binding energy efficiency target from 9% to 13% (EC, 2022h).	A share of 23.1% of total energy use for heating and cooling came from renewable sources in 2020, increasing from 11.7% in 2004. Overall, the share is 22.1%, which is 2% above the 2020 target (Eurostat, 2022).	No strategy defined Climate impacts observed include the following. ▪ The energy-efficient refurbishment and insulation of houses, to adapt to energy demands and rising temperatures, is supported by a KfW funding programme (KfW, 2022b). ▪ Interruptions in the supply of electricity via distribution and transmission networks have resulted from extreme weather events, poorer transmission capacity of high-voltage power lines because of high temperatures and problems with the cable straining of underground cables during drought. ▪ Fluctuations of the distribution and transmission grids affect the reliability of the energy supply and are a consequence of changes in the yields of wind and photovoltaic plants. (Umweltbundesamt, 2022c)	No data available
	Germany	Climate Protection Law (Klimaschutzgesetz, or KSG)	A sector target is of 108 million tonnes of CO_2 equivalents in the energy	At around 30%, the energy industry is the sector with the highest emissions. In	See above	See above

		The policies already published and planned are almost all aimed at creating good conditions, incentives and support for private investment. In Germany, however, there are a large number of small, local energy companies. Some of them, such as the municipal utilities, are often) publicly owned in part and also financed via the regular financial market or state banks. There are no plans for large-scale direct federal investments in the energy system.	sector for 2030 (BMWK, 2022a). Under its coalition agreement, the new federal government commits to the following: ▪ coal phase-out 2030 ('ideally') ▪ 80% of gross electricity demand to come from renewable energies in 2030 ▪ photovoltaics at approx. 200 GW by 2030 ▪ onshore wind energy to be designated as 2% of the state's land area ▪ nuclear phase-out by 2022. (German Government 2021c) Overall, it can be said that the new German government is making considerable efforts to get on a Paris-compatible path – or at least to achieve its own climate targets first. ▪ The Wind Energy on Land Act, together with amendment of the federal Nature Conservation Act (Bundesnaturschutzgesetz, or BNatSchG), should ensure the designation of sufficient areas for the urgently needed wind energy and at the same time for nature conservation. ▪ The 'Easter package' will ensure that greenhouse gas neutrality is more strongly integrated into power grid planning.	2020, its greenhouse gas (GHG) emissions amounted to 220 million tonnes of CO_2 equivalents; in 2021, the figure will be even higher. This means that there will be a gap of 85 million tonnes of CO_2 equivalents between now and the 2030 climate target, which means that cumulatively, from 2022 to 2030, there will be 509 million tonnes more climate-damaging emissions than planned (BMWK, 2022a).		

			New targets include to convert the German power system to 80% renewables by 2030 and to almost 100% renewables by 2035.			
Transport sector specific climate strategy	**European Union**	In general, the transport sector remains a major problem in terms of its Paris compatibility. ▪ Regulation (EU) 2019/631 sets the CO_2 fleet limits (in gCO_2/km) for passenger cars and light commercial vehicles. ▪ The 'Fit for 55' climate package adopted in June includes an end to the internal combustion engine across the EU by 2035.	Regulation on CO_2 emissions from new passenger vehicles is another strategic measure. ▪ Since 2015, not all newly registered passenger cars must exceed a weight-based average of 130 gCO_2/km. Since 2020, a stricter target value of 95 gCO_2/km applies, which must initially be met by 95% of the new car fleet and then applies to the entire fleet from 2021. ▪ Since 2017 and then 2020, a weight-based CO_2 target values for light commercial vehicles of 175 gCO_2/km and 147 gCO_2/km, respectively, have also applied. ▪ The CO_2 regulation for the target years 2020 and 2021 includes various other elements, such as the multiple counting of zero- and low-emission vehicles, and eco-innovations for CO_2-saving technologies whose effect cannot be proven in the official test procedure, but also penalties in the event of	The share of energy from renewable sources used in transport activities reached 10.2% in 2020.	No strategy defined The navigability of inland waterways is affected by extreme weather events; they can also cause damage to roads, railways, traffic control systems, overhead lines and power poles. The impairment of traffic can cause accidents and economic losses (Umweltbundesamt, 2022d).	No data available

			non-compliance with the target values. ▪ The target for 2025 is –15%, and –37.5% and – 31% for light commercial vehicles for 2030 compared to the Worldwide Harmonised Light Vehicles Test Procedure (WLTP) target in 2021 (Umweltbundesamt, 2020). ▪ The 'Fit for 55' climate package adopted in June 2022 includes an end to the internal combustion engine across the EU by 2035. Aviation measures are included in the ETS Exemplary objectives under the Green Deal include ▪ to reduce emissions from passenger cars by 55% by 2030 ▪ to reduce emissions from trucks by 50% by 2030 ▪ to ensure all new cars are emissions-free by 2035 (EC, 2022a).			
	Germany	Again, the policies already published and planned are almost all aimed at creating good conditions, incentives and support for private investment.	Electric mobility is being promoted through the environmental bonus and the innovation bonus. A CO_2 levy is imposed on fossil fuels. The new German government has set itself the target of at least 15 million fully electric passenger cars by 2030. In addition, CO_2 differentiation and a CO_2 surcharge in the	Between 2010 and 2019, emissions from transport increased by 7% to 164 million tonnes. To reach the 2030 sector target, an ambitious reduction to 85 million tonnes (i.e., about 50% compared to 2019 levels) is required. The gap between current levels and the 2030 climate target is 41 million tonnes of CO_2 equivalents; cumulatively, from 2022 to 2030, the climate gap is	See above	See above

			truck toll from 2023 are planned (BMWK, 2022a).	271 million tonnes of CO_2 equivalents. As regards electric mobility, the share of all-electric passenger cars in new car registrations in 2021 was 13.6%, while the share of plug-in hybrids was 12.4%. In December 2021, the share of fully electric passenger cars was as high as 21.3%; that of plug-in hybrids, 14.4%.		
Building sector specific climate strategy	**European Union**	▪ Energy Performance of Buildings Directive (Directive (EU) 2018/844) ▪ Energy Efficiency Directive (Directive 2012/27/EU)	The Renovation Wave Strategy + Action Plan targets the improved energy performance of buildings. It aims to double annual energy renovation rates in the next 10 years (EC, 2020b). The Commission proposed in 2021 that all new buildings must be emission-free from 2030 and all new public buildings, from 2027 (EC, 2021c).	Europe's housing stock is worth €17 trillion (representing half of the EU's wealth). Modernising it will require an investment of €2.75 trillion over the next 10 years. Banks hold €7 trillion worth of European mortgages and almost a third of their non-financial loans are secured by real estate assets. However, only 8% of leading banks' balance sheets currently meet the green thresholds defined in the EU Taxonomy. In addition, mortgage lenders are largely uncovered by the two Directives. The same is the case for buildings under the EU financial regulations. Overall, the private sector has an important role to play in retrofitting existing buildings, because public grants are not sufficient and quickly run dry (climatestrategy, 2021).	No strategy defined Heavy rain and river floods can cause considerable damage to buildings. Green spaces have an important cooling effect on the urban climate but are themselves affected by increasing heat and drought. Urbanisation leads to urban heat islands and thus to heat stress for people (Umweltbundesamt, 2022e).	No data available

	Germany	The Buildings Energy Act (Gebäudeenergiegesetz, or GEG) is the legal basis for the buildings programme. The construction of efficient buildings is promoted by the federal government by means of the Federal Promotion for Efficient Buildings (BEG) (BMWK, 2022b).	Germany is targeting a 67 million tonnes reduction by 2030, compared with 1990 levels. The aim is to reduce emissions by improving the energy-efficiency of buildings by increasing investment in efficiency and renewable energies, and increasing the use of renewable energies for heat generation. In the Immediate Action Programme 2022, an additional nearly €5 billion is provided for the energy-efficient refurbishment of buildings and for energy-efficient new buildings, including in social housing (German Government, 2022b). The new federal government has set itself the goal of making 50% of heating climate-neutral by 2030 (BMWK, 2022a).	From 1990 to 2019, emissions have fallen from 210 million tonnes of CO_2 to 119 million tonnes. Between 2010 and 2019, a reduction of 18% was achieved. The climate targets for 2020 and 2021 in the building sector were consequently missed. In fact, a counter-trend can be observed: energy consumption has increased. The gap between current levels and the 2030 climate target is 24 million tonnes of CO_2 equivalents; cumulatively, from 2022 to 2030, the climate gap is 152 million tonnes of CO_2 equivalents (BMWK 2022a).	See above	See above
Industry sector specific climate strategy risks	**European Union**	The focus here is on the Emissions Trading System (ETS).	The sector leans on the ETS and is subject to a CO_2 levy. The Commission has published an Industrial Strategy for Europe, aiming to accelerate the green and digital transition (EC, 2020a).	The sector leans on the ETS and is subject to a CO_2 levy. There has been a 42.8% reduction in emissions within the ETS from power generation and energy-intensive industries over the last 16 years (EC, 2021b).	No strategy defined The supply of raw materials and intermediate products can be impaired, as well as the transport of goods. Sales markets can change or shift (Umweltbundesamt, 2022h).	No data available
	Germany	The central measures are emissions trading, the Fuel Emissions Trading Act (Brennstoffemissions-handelsgesetz, or BEHG) and support programmes, such as the Federal Promotion of Energy-Efficient Buildings, the Steel Industry Investment Programme	The sector leans on the ETS and is subject to a CO_2 levy. The German government is targeting a reduction of GHG emissions in the industrial sector to 118 million tonnes by 2030	The industrial sector was responsible for around 24% of total emissions in 2020, or 172 million tonnes of CO_2 equivalents. Between 2010 and 2019, GHG emissions decreased by less than 3%. This reduction rate must be	See above	No data available

		and the Decarbonisation Programme (BMWK 2022a).	(German Government, 2022c). A hydrogen strategy underpins its ambition is to become the world's leading supplier for modern hydrogen technologies (German Government, 2022d). The country's Steel Industry Action Plan supports climate-neutral production and safeguards jobs (German Government, 2022e).	increased significantly to meet the Climate Change Act target for industry, to around 35% reduction between 2019 and 2030. The gap between current levels and the 2030 climate target is 37 million tonnes of CO_2 equivalents; cumulatively, from 2022 to 2030, the climate gap is 178 million tonnes of CO_2 equivalents (BMWK, 2022a).		
ICT sector specific climate strategy risks	**European Union**	No climate alignment and resilience strategy	No strategy defined	No data available	No strategy defined	No data available
	Germany	See above	See above	See above	See above	See above
Services sector specific climate strategy risks	**European Union**	No climate alignment and resilience strategy	No strategy defined	No data available	No strategy defined	No data available
	Germany	See above	See above	See above	See above	See above
Agriculture and forestry sector specific climate strategy risks	**European Union**	▪ Common Agricultural Policy (CAP) ▪ Farm to Fork Strategy ▪ Land Use, Land Use Change and Forestry Regulation (LULUCF Regulation) (Regulation (EU) 2018/841) (and Delegated Act (EU) 2021/268 amending forest reference levels, or FRLs)	*CAP*: The CAP aims to support farmers and the rural regions, and to make agriculture more ecologically sustainable, while ensuring a reliable and stable framework (EC, 2022d). *Farm to Fork Strategy*: This strategy targets a fair, healthy and environmentally friendly food system (EC, 2022f). *LULUCF Regulation*: Each country must set FRLs to be applied between 2021 and 2025. The FRL is a forward-looking benchmark for accounting for net	Although the CAP 2014–2020 has made €100 billion available for climate protection (representing half of all European climate protection expenditure), there has been no significant change in emissions since 2010 (ECA, 2021).	No strategy defined *Agriculture*: Extreme events such as heat waves, heavy rainfall or water shortages have a direct impact on agricultural production (Umweltbundesamt, 2022f). *Forestry*: The vitality and productivity of forests is severely impaired and their natural adaptive capacity is often already exceeded today. This increasingly endangers the climate and forestry yields (Umweltbundesamt, 2022g).	No data available

			emissions from existing forests (EC, 2022e).			
	Germany	▪ Agenda 2019, 'Adaptation of agriculture, forestry, fisheries and aquaculture to climate change' ▪ 2020 programme of measures to implement the Agenda ▪ Forest Strategy 2020	Germany is targeting 56 million tonnes of CO_2 equivalents in 2030 (compared to 1990 levels) (BMEL, 2021a) Its Forest Strategy 2020 sets out 10 fields of action and 59 milestones, with intermediate targets up to 2030 (BMEL, 2021b). In agriculture, 10 climate protection measures are set out within the framework of the Climate Protection Programme 2030 (BMEL, 2021c).	In 2020, the agricultural sector had a share of 9% of total German emissions, with 62.4 million tonnes of CO_2 equivalents. Between 2010 and 2019, GHG emissions declined slightly (–1.6 %). The reduction rate must be increased to just under 8% in the period from 2019 to 2030. The gap between current levels and the 2030 climate target is 7 million tonnes of CO_2 equivalents; cumulatively, from 2022 to 2030, the climate gap is 36 million tonnes of CO_2 equivalents. The sector subject to LULUCF had an emissions balance of –11.3 million tonnes of CO_2 equivalents in 2020. As the only sector with capacity, it acts overall as a sink for CO_2 in Germany.	Agenda 2019 on the adaptation of agriculture, forestry, fisheries and aquaculture to climate change identifies expected climate impacts. The 2020 programme of measures to implement the Agenda develops targeted countermeasures.	No data available

Note: The measures assessed here were selected by the authors of this study and are structured similarly to those used in the Swiss iGST study, Whitley et al. (2018) and Bingler et al. (2018).

3.8 Further information instruments

The European Commission has introduced the Taxonomy as the official EU tool for labelling sustainable financial products. It comprises two climate and four environmental criteria, and it is being developed in an elaborate process. At time of writing, only the two climate criteria have been published. Whether the Taxonomy is also Paris-aligned remains in question – especially since it classifies some investments in fossil gas and nuclear energy as 'green'.

The planned ESAP for sustainability data promises some additional transparency in future and hence its development ought to be a higher political priority in future.

The assessment table (**Table 11**) shows that:

- **Further information instruments such as a comprehensive taxonomy for sustainable economic activities, as well as a central data archive for sustainability, have been implemented.** The European Commission has introduced the Taxonomy as the only generally accepted tool for labelling sustainable financial products. It comprises two climate and four environmental criteria, and it is being developed in an elaborate process. The planned ESAP for sustainability data would provide additional transparency in future.

Table 11 Information instruments for climate-aligned investment planning assessment: status of measure implementation, and qualitative and quantitative information on the status of mitigation- and adaptation-related Paris alignment

Legend

Implementation status	Paris-alignment status
Implemented or to be implemented	In line with scientific 1.5°/<2°C scenario or CAT fair share target (ClimateAnalytics and NewClimate Institute, 2021)
Under discussion by government	Progress in right direction, but not sufficient
Rejected or disregarded by government	Misaligned without considerable progress towards alignment
Not yet on government agenda	No information available

Measure implementation	European Union (EU) or Germany	Context	Paris alignment: Mitigation		Paris alignment: Adaptation	
			Qualitative information	Quantitative information	Qualitative information	Quantitative information
Mandatory government labelling and/or taxonomy to be applied to classify climate-aligned investments	**European Union** 	See **Table 5** column *Climate impact analysis principles defined and disclosure templates standardised*	See **Table 5** column *Climate impact analysis principles defined and disclosure templates standardised*	See **Table 5** column *Climate impact analysis principles defined and disclosure templates standardised*	See **Table 5** column *Climate impact analysis principles defined and disclosure templates standardised*	See **Table 5** column *Climate impact analysis principles defined and disclosure templates standardised*
	Germany 	See above	See above	See above	See above	See above
Climate-aligned projects – investor matchmaking hub	**European Union**		No action taken other than a support programme for municipalities	Not available	No action taken	No action taken
	Germany		A Digital Hub initiative, funded by the Federal Ministry of Economics and Climate Protection (BMWK), connects SMEs and corporates with new innovation partners from science and the start-up scene. The focus is on digitalisation, but there are also a few climate-related projects (dehub, 2022).	No data available	See column *Paris alignment: Mitigation*	No data available
Public company-level climate and financial data repository	**European Union**	A European Single Access Point (ESAP) is planned and an EU data repository is already in place.	The ESAP is designed to: ▪ provide access to up-to-date, standardised financial and sustainability data relating to all reporting companies in the EU ▪ provide investors with reliable and comparable data to inform their investment decisions across		Some data on the link between resilience and finance	

			national and linguistic borders. The EU data repository will group data into various categories, including finance and environment.			
	Germany	See above	See above	See above	See above	See above

+ 4. Private sector activities

Legally, the Paris Agreement applies to states and not to private or other actors with a role in shifting finance flows (Bodle and Noens, 2018). However, growing appreciation that climate change presents material risks to economic activity and the financial system – for example in the context of the CSRD, TCFD or the NGFS – is driving private-led commitments to align investments and portfolios with climate targets, as well as to increase disclosure of climate risks (Bolton et al., 2020; NGFS, 2019; IMF, 2019; Batten et al., 2016).

A multitude of considerations and investment framework conditions influence capital flows. It is therefore difficult to say which private sector activities are government-driven, government-enabled or government-supported and which have taken place relatively independently of any governmental activities. Eventually, this differentiation would be artificial in any case, since all government activities in the context of Article 2.1c should eventually aim to align investments across the entire financial industry with the goals set out in the Paris Agreement.

Private financial instruments and institutions present different alignment levels in Germany and the European Union, with different scenarios. Market segments/asset classes evidence the challenges related to information access – specifically, on quantitative climate-misaligned activities. However, qualitative data related to some aligned asset classes, such as bond markets, insurance and bank-lending instruments, shows some alignment to either NDC-based pathways, pathways based on the International Energy Agency Sustainable Development Scenario (IEA SDS) or scientific 1.5°C/<2°C scenarios. Information gaps have been a notable challenge to this study and our aim to gather exhaustive information. Notable gaps were found for private and listed equity in both the European Union and Germany, as well as for climate-misaligned activities. The qualitative information related to cross-cutting private sector activities shows some reporting initiatives at the level of financial centres.

4.1 Market segments

Quantitative information related to climate-aligned activities for real estate in Germany evidences that investments in certified green buildings reached a record high during 2021. Concerning bond markets, they comprised 16% of total corporate bonds issuance in Germany; 50% of the global 2021 green bond volumes were issued in Europe, with a year-on-year growth of 136% in financial corporates.

Information related to insurance provision in the European Union shows that many member states are signatories to the Principles for Responsible Insurance.

Information gaps are notably present in various segments, such as for mortgages for both Germany and EU member states, private equity in both the European Union and Germany, and listed equity in the European Union, as well as for insurance provision.

With regards to climate-misaligned activities in the European Union and Germany, private banks contributed to the fossil fuels industry by financing projects to a total of $253,928 billion (EU) and $11.7 million (Germany) during 2020. No further data was found for climate-misaligned activities in the remaining EU and German market segments, such as mortgages, real estate, bond markets, equity, insurance and investment decision-making. In fact, information gaps were found in almost all categories other than bank lending.

The assessment table (Table 12) shows that:

- Private equity and listed equity segments are commonly misaligned. Information gaps make it impossible to assess their alignment in any specific scenarios.

Table 12 Climate alignment of market segments assessment: information on climate-aligned and climate-misaligned activities

Legend

Paris alignment assessment	Data availability to assess status and progress
In line with scientific 1.5°/<2°C scenario	Government-provided or easily accessible data
Aligned with NDC- or IEA-based pathways or other/own targets	Data partially available, high search costs
Not aligned	Data not publicly available or search costs prohibitively high

Note: In contrast to the public levers tables, the private sector activities tables only evaluate the degree of alignment and data availability and not the political implementation status of measures. The color-coding for assessing data availability is different to that used in the tables in the executive summary in order to avoid confusion with the degree of alignment color-coding from the public levers section.

Paris alignment		Climate-aligned activities		Climate-misaligned activities	
		Qualitative information	**Quantitative information**	**Qualitative information**	**Quantitative information**
Bank lending and mortgages	**European Union** 	*Bank lending*: The European Banking Federation (EBF) has endorsed the Principles for Responsible Banking (PRB). It also has its own renewed sustainable finance strategy (EBF, 2020). Among other things, the EBF provides corporates and financial institutions with analysis methods and tools to help them assess the impact of environmental social governance (ESG) risks on lending. *Mortgages*: No data available	No data available	Many EU private banks finance projects related to the fossil fuels industry.	During 2020, EU banks contributed nearly $253,928 billion to the financing of projects related to the fossil fuels industry (Banking on Climate Chaos, 2021).
	Germany 	*Bank lending only*: The Association of German Banks (Bundesverband Deutscher Banken, or BDB) is a signatory of the Principles for Responsible Banking[i] (BDB, 2021). > Private banks segment their loan and investment portfolios to identify the customers with the highest CO_2 emissions. They consider sustainability criteria that go beyond climate protection. Methods for managing the portfolios are developed and integrated into business processes. This enables banks to gear their business to achieving the [2°C] target in 2050 and support customers in the transformation process. > The first step is to break down loan and trading portfolios by industry. This enables banks to focus on the sectors that emit the most CO_2 (e.g., energy producers, manufacturing industries, transport and mobility, the construction industry). Some private banks are already able to use models to determine the carbon footprint of	No data available	German private banks currently financing projects related to fossil fuels include Commerzbank, Deutsche Bank and DZ Bank.	During 2020, Deutsche Bank contributed some $9.1 billion to financing fossil fuels projects. Commerzbank has done the same to the tune of $2.3 billion. DZ Bank has also contributed to that industry by financing $355 million of fossil fuel investments (Banking on Climate Chaos, 2021).

		their customers. Others are still in the process of selecting suitable models. Our aim is to ensure that it is standard practice for all our member banks to measure the CO_2 emissions associated with an activity financed by a loan. The fundamental principles of materiality and proportionality should figure prominently in the process. On the basis of these results, banks can then define criteria for new business which will help them gear their portfolios to meeting the 2°C target of the Paris Climate Agreement. These criteria should be an integral part of a bank's business and risk strategy. (Jäger, 2020)			
Real estate	**European Union**	The EBF has positioned sustainable finance as a priority working issue (EBF, 2022).	No data available	No data available	No data available
	Germany	Germany´s KfW has developed energy efficiency standards for the construction sector (KfW, 2022a).	In 2021, the investment volume in certified green buildings in Germany reached a record high of approximately €12.4 billion. The relative share of the total volume of single asset deals also broke all records in 2021, at 25.7%. Every fourth euro invested in commercial real estate in Germany last year thus flowed into sustainably certified buildings. Three groups of buyers invested more than half of their investment volume in certified green buildings: insurance companies (59%), open-end funds (55%) and closed-end funds (53%). In 2021, Berlin (€3.2 billion), Frankfurt (€3.1 billion) and Munich (€2.5 billion) were a particular focus for green buildings investment.	No data available	No data available

			The risk of certified buildings as an investment opportunity is particularly evident in office properties: in 2021, almost 38% of the office investment volume was spent on green buildings. (In 2020, it had been 34%). The second-largest share of green buildings is accounted for by the logistics asset class (16.5%), with logistics project developers and users attaching particular importance to green building certificates. (BNP Paribas Real Estate, 2022)		
Bond markets	**European Union**	No data available	Half of the green bond volumes issued globally in 2021 were issues in in Europe, contributing $265 billion to the global total. The most important year-on-year growth in the region came from financial corporate (136%) (CBI, 2021). Private sector green bonds issuance reached a total of $138.4 billion in the EU during 2021. Financial corporate green bonds issuance in Europe reached a total of $82.4 billion in the same year (representing +143% year-on-year growth), while non-financial corporate green bonds issuance reached $56 billion (a +111% year-on-year growth). These two issuer types together accounted for 44% of cumulative green bond volumes by the end of 2021 (CBI, 2021).	Issued green bonds are labelled by means of CBI methodology.	Corporate (private sector) green bonds issuance by sector in the EU during 2021 by sector: ▪ *Energy*: 33% ($87.1 billion) ▪ *Buildings*: 30% ($79.9 billion) ▪ *Transport*: 16.5% ($43.8 billion) ▪ *Land use*: 7% ($18.5 billion) (CBI, 2021)
	Germany	No data available	German financial corporates (its private sector) accounted for 16% of global green bonds issuance among financial corporates during 2021 (almost $135 billion) (CBI, 2021)	No data available	No data available
Listed equity	**European Union**	No data available	No data available	No data available	No data available

	Germany	The German Stock Exchange (Deutsche Börse) has a specific ESG Product Hub.	During 2020, 1.26 million contracts were traded in ESG derivatives. The volume of ESG trading reached a total of €12.2 billion. Some 1.32 billion tonnes of CO_2 equivalents were traded during 2020 (Deutsche Börse Group, 2022).	No data available	No data available
Private equity	**European Union**	No data available	No data available	No data available	No data available
	Germany	No data available	No data available	No data available	No data available
Insurance provision	**European Union**	The EU signatories to the Principles for Responsible Insurance are: ▪ *Austria*: UNIQA Insurance Group AG ▪ *Belgium*: Ageas, AG Insurance, Belfius Bank & Insurance, KBC Group ▪ *Cyprus*: American Hellenic Hull Insurance Company ▪ *Finland*: Alandia, Pohjola Insurance ▪ *France*: AXA, CNP Assurances, Crédit Agricole Assurances, Matmut, SCOR ▪ *Greece*: Interamerican Hellenic Insurance Group ▪ *Ireland*: IPB Insurance, Willis Towers Watson ▪ *Italy*: Generali Group, Intesa Sanpaolo Vita Insurance Group, Poste Vita, Unipol Group ▪ *Luxemburg*: FWU Life Insurance Lux ▪ *Netherlands*: Achmea, Aragon, ASR Nederland, NN Group ▪ *Poland*: PZU ▪ *Slovenia*: Zavarovalnica Triglav ▪ *Spain*: Caja Ingenieros Vida y Pensiones, Grupo Catalana	No data available	No data available	No data available

		Occidente, MAPFRE, Solunion Seguros, Vida Caixa ▪ *Sweden*: Handelsbanken Liv, Länsförsäkringar Sak, Löf (UNEP FI, 2022)			
	Germany	The German Signatories to the Principles for Responsible Insurance are: Allianz, Goather, Hannover Re, Munich Re, LVM Versicherung, R+V Versicherung AG, Signal Iduna, Talanx AG, VHV Group and W&W Group (UNEP FI, 2022).	No data available	No data available	No data available
Investment decision-making	**European Union**	There are many European network supporters of the Principles for Responsible Investment (UNEP PRI, 2022).	No data available	No data available	No data available
	Germany	Many German financial market actors and institutions are signatories to the United Nations' Principles for Responsible Investments (PRI) (UNEP PRI, 2022).	Germany's total sustainable investments as of 31 December 2020 amount to €335.3 billion. The sum includes sustainable funds and mandates, as well as sustainably managed customers and own investments. The continued high growth rate reached 25% that year (FNG, 2021).		

[i] Which means, among other principles, that banks will align their business strategy 'to be consistent with and contribute to individuals' needs and society's goals, as expressed in the Sustainable Development Goals, the Paris Climate Agreement and relevant national and regional frameworks' (UNEP FI, 2022).

4.2 Cross-cutting activities

Notable data gaps were found for cross-cutting activities for both the European Union and Germany, as were climate-aligned and climate-misaligned activities. Qualitative information shows that the German Stock Exchange (Deutsche Börse) subscribes to the Global Reporting Initiative (GRI) and participated in the International Integrated Reporting Council (IIRC).

Financial centre activities in both the European Union and Germany also show the financial centres of both to be active members of the Financial Centres for Sustainability (FC4S).

The assessment table (Table 13) shows that:

- Information gaps on segments other than the activities of stock exchanges and financial centres make it extremely difficult to assess the effectiveness of additional initiatives aiming to support the alignment of financial flows with the Paris Agreement goals

Table 13 Cross-cutting private sector assessment: information on climate-aligned and climate-misaligned activities

Legend

Paris alignment assessment	Data availability to assess status and progress
In line with scientific 1.5°/<2°C scenario	Government-provided or easily accessible data
Aligned with NDC- or IEA-based pathways or other/own targets	Data partially available, high search costs
Not aligned	Data not publicly available or search costs prohibitively high

Paris alignment		Climate-aligned activities		Climate-misaligned activities	
		Qualitative information	Quantitative information	Qualitative information	Quantitative information
Retail client consultation on climate-aligned investments	**European Union**	No data available	No data available	No data available	No data available
	Germany	No data available	No data available	No data available	No data available
Real emissions reduction impact	**European Union**	No data available	No data available	No data available	No data available
	Germany	No data available	No data available	No data available	No data available
Financial sector lobbying activities	**European Union**	No data available	No data available	No data available	No data available
	Germany	No data available	No data available	No data available	No data available
Stock exchange activities	**European Union**	No data available	No data available	No data available	No data available
	Germany	Deustche Börse Group supports initiatives on sustainable reporting such as the Global Reporting Initiative (GRI) and the International Integrated Reporting Council (IIRC). It seeks external validation in the form of the different sustainability ratings by independent institutions that assess companies according to their approach to ecological, economic and social challenges and risks. (Deutsche Börse Group, 2022)	No data available	No data available	No data available
Financial centre activities	**European Union**	*Financial Centres for Sustainability (FC4S) European members*: Frankfurt, Stuttgart, Stockholm, Paris, Madrid, Milan, Lisbon, Luxembourg, Barcelona and Dublin (FC4S, 2022)	No data available	No data available	No data available
	Germany	*Financial Centres for Sustainability (FC4S) German members*: Frankfurt and Stuttgart (FC4S, 2022)	No data available	No data available	No data available

+ 5. Conclusions

This paper is the first substantial assessment of how well Germany's public levers and private sector activities currently comply with Article 2.1c of the Paris Agreement. While it may not yet be fully comprehensive or conclusive, the study clearly reveals areas in which Germany is relatively advanced, while also highlighting areas in which more work is needed to align financial flows with the third long-term goal of the Paris Agreement.

The approach has been twofold:

1) to identify a set of relevant themes and categories with which to assess the status of those measures that have been implemented, the level of climate ambition that those measures represent, and the availability of the data required to enable state and non-state actors to track progress against their own targets and against the Paris Agreement goals; and
2) to identify the available sources of relevant information and data that we can use to conduct the assessment.

In most cases, Germany and the European Union have been analysed together.

Based on this analysis, we can draw some implications and conclusions for Germany's progress towards implementing Article 2.1c and for the GST more generally.

5.1 Implications for Germany

Driven by the opportunities that sustainable finance offers in the German financial sphere, the German government has set itself the goal of making Germany a leading international location in sustainable finance. This goal is presuppositional and must be complemented by targeting the Paris compatibility of all financial flows.

Based on our analysis, we identify the following key next steps for Germany (and the European Union).

- **Climate change adaptation must become an important focus of sustainable finance in Germany.** Last year's devastating floods in western Germany and extensive forest fires in its eastern regions have shone a spotlight on adaptation to climate change not only for Germany but also for the whole of Europe. This should have a greater impact on the orientation of financial flows, policies and regulation.
- **Germany should consistently adopt a holistic approach to sustainable finance by equally valuing (i) the financial risks and opportunities related to climate change, and (ii) the climate impacts.** Such a broad understanding of sustainable finance is still not internalised among many policy-makers. In many cases, sustainable finance is still seen as an obstacle to financial market stability and not as a precondition – an understanding that needs to be secured not only in politics but also at DBB and ECB levels. A holistic approach would be to clearly define adaptation and mitigation finance targets that are in

line with the adaptation goals, the German and European net-zero targets, and the global 1.5°/<2°C target.

- **In the present decade of implementation, Germany must be an important motor for implementing regulations and making them truly effective in practice.** Overall, the European Union is using its potential as a large single market and monetary union to create uniform rules, and thereby harmonising the climate rules applicable to the financial sector. The EU Taxonomy, the CSRD and the SFDR create a sustainable basic framework for the financial sector; the crucial phase for these instruments – their implementation – remains ahead. The challenge will be to ensure that the transformative compass continues to be properly aligned for all these policies. Germany's insistence that nuclear energy and fossil gas be included in the EU Taxonomy illustrates how difficult this is in practice. If Germany wants to live up to its own ambition, it must set an example at the European level with flagship programmes and initiatives.
- **The catchphrase 'making regulation work in practice' – reflecting a holistic understanding of sustainable finance – must be Germany's motto.** Many policies have been adopted, but the importance of sustainable finance should be further amplified. In its final report, the first Sustainable Finance Advisory Council made detailed and comprehensive proposals, mapping out the path to a sustainable financial system. The German government's sustainable finance strategy is a good starting point, but it is too vague in too many places. The second Council under the new government must develop the recommendations of the first, and the German government's strategy must be developed to reflect a holistic understanding of sustainable finance that must more rigorously address issues of social and biodiversity.

5.2 Implications for the GST

For the German context, both quantitative data and qualitative data were readily available and qualitatively sound; the interplay between German and European institutions, laws and information was sometimes challenging. Most of the quantitative data on climate finance that we identified was related to mitigation measures, while we could often not find or collect reliable data on adaptation finance. This highlights a problematic gap, because assessing the compliance of finance flows with the Paris Agreement requires quantitative data on adaptation and maladaptation finance flows across the spectrum (mitigation, adaptation and resilience). Such data should therefore be provided by all countries in a standardised form.

Based on the present analysis, we also identify the following recommendations for the GST in general.

- The GST should look not only at the public measures and activities undertaken to implement or support the implementation of Article 2.1c but also those of the private sector. This will include a critical assessment of how ambitious the measures taken or planned are, and of whether and how much of the data required to track progress against the targets is available.
- Assessing the degree of alignment or otherwise of private financial flows with a comparable, scenario-based and forward-focused methodology should be a key priority.

- Collecting data on both climate-aligned and climate-misaligned public financial flows and budget plans, net climate finance and net carbon pricing should be another priority for the GST– and a key duty of all countries.
- The availability and quality of qualitative and quantitative data on public domestic and private climate adaptation and climate resilience finance must be significantly improved.

Overall, the analysis framework laid out in this study can be used as a foundation for the comprehensive reporting and tracking of the alignment of public and private sector activities towards implementing Article2.1c in the lead-up to the first GST and for future GST cycles.

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+ Annexes

Annex 1. List of stakeholders actively engaging through interview, survey and group discussion

- Laetitia DeMaraez, Climate Analytics
- Jane Ellis, OECD
- Janine Felson, AOSIS
- Mattias Frumerie, Ministry of Foreign Affairs, Sweden
- Marenglen Gjonaj, UNFCCC
- Lorena Gonzalez, UNSG
- Raphaël Jachnik, OECD
- Joo Jin Kim, Solutions for Our Climate, Korea
- Eva Louise Lithman, Adaptation Fund
- Padraig Oliver, UNFCCC
- Anoop Poonia, CAN International/CVF
- Michai Robertson, Department of Environment, Antigua and Barbuda
- Andrea Rodriguez Osuna, Avina Foundation, Mexico
- Nancy Saich, EIB
- Liane Schalatek, HBS
- Joe Thwaites, World Resources Institute

Only those who actively participated in the survey, calls and interviews are mentioned here by name. Our thanks are also offered to additional participants in the group discussion and webinar.

Annex 2. Guiding survey and interview questions

Number	Question
Section 1	**What do we want to see in the Global Stocktake (GST) with regards to finance?**
1	The Paris Agreement considers 'Means of Implementation and Support': what is your interpretation of what we need to take stock of for this long-term objective?
2	Article 8 on Loss and Damage also calls for Parties to enhance 'support' (alongside understanding and action): should this form part of the finance stream of the GST?
3	The GST is a collective exercise: how do know who is doing enough when considering:
3a	▪ the $100 billion committed by developed countries to be programmed in developing countries?
3b	▪ the desire for all financial flows to be consistent with the Paris Agreement?
4	What would a successful GST for finance show?
Section 2	**Inputs into the GST Part One: the Biennial Assessment and Overview of Climate Finance Flows (BA)**
	Within the Katowice Climate Package (and despite much discussion in the UNFCCC around potential finance-related inputs to the GST), only the BA of the Standing Committee on Finance is identified as a formal input.
5	What is your perception of this decision?
6	What do you see as the data, content or process shortcomings or limitations of the BA in terms of underpinning the finance elements of the GST?

7	Has the BA process, since the first BA in 2014, contributed to accountability, knowledge and learning around finance (and wider means of support)? How?
8	Has the BA encouraged ambition in climate finance and consistency of finance with the Paris Agreement, or could it? How?
9	Has the BA played a role as an agenda-setter or pacemaker, or could it? How?
10	What is needed to compliment the BA process (there will be a 2020 and a 2022 BA) and who would lead it, to contribute to successful GST in terms of:
10a	▪ accountability, knowledge and learning for finance?
10b	▪ ambition in climate finance and the consistency of finance flows with climate objectives?
Section 3 Inputs into the GST Part Two: other potential finance-related inputs	
	There is a relationship between the GST and the Enhanced Transparency Framework (ETF), the latter of which will necessarily include a methodology through which countries gather and provide finance-related data and information under the UNFCCC into the future (although this will not impact the BA 2022 that will inform the GST).
11	What remains to be decided for the ETF when it comes to finance to implement the Paris Agreement and how important will this be?
12	Other potential inputs for the finance part of the GST have been highlighted within the UNFCCC process, including, for example, information on needs of support and gaps, and finance-related action undertaken by non-Party stakeholders.
12a	▪ Are there other sources of input that you think should be considered under the finance elements of the GST?
12b	▪ To what extent do you think these should be considered separately (perhaps complementary to) or within the BA?
13	What further inputs to the GST might be best placed to respond to the need to track progress towards achieving Article 2.1c ('making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development')?
14	Further thoughts and comments

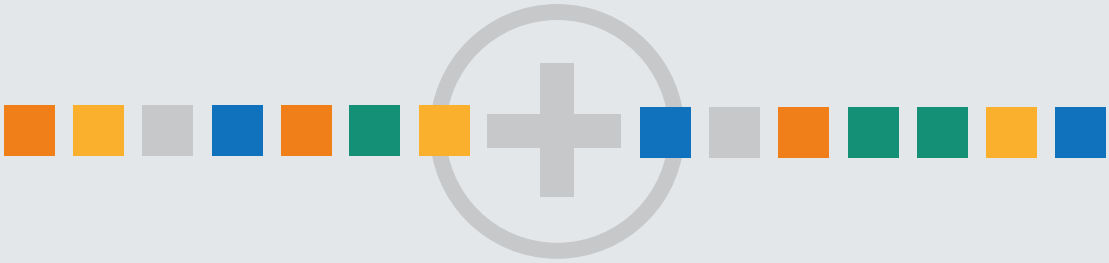
Note: Questions were adapted to each interviewee and were not necessarily replicated exactly nor the full set completed through survey.

Annex 3. Suggested inputs to the GST

The following list is taken from an informal discussion note that was put forward at a meeting of the Ad hoc Working Group on the Paris Agreement (APA) in 2017, and joint reflections on the GST from the APA and the Subsidiary Body for Scientific and Technological Advice (SBSTA) in 2018, and it reflects a number of further suggested inputs to finance discussions of the GST:

- Information on mobilisation and provision of support
- Relevant sections of the synthesis report on information from the enhanced transparency framework (summaries of GHG emissions and trends of all Parties elaborated by the secretariat biennially from [NIR] and biennial communications)
- Information on needs of support and gaps
- Reports of operating entities of the [FM, SCF, AF, AC, WIM ExCom, TEC/CTCN, PCCB, GCF, CBIT], as well as biennial communications by developed countries on indicative quantitative and qualitative financial information, and communications, reports and NDCs by developing countries on financial, technology and capacity-building needs

- Information on the collective pace of transformation in technology, investment in low carbon development, consumption behaviour, institution and policy
- Information on best practices, experiences and lessons learned
- Information on potential barriers to implementation and how to overcome them
- Information on opportunities for international cooperation – in particular, climate finance and technology innovation
- Report of the GCF on financial provisions
- Available information on efforts related to financial support provided by developed to developing countries
- Information from international financial institutions on climate-proofing and climate-resilience measures
- Sources of input that capture linkages and gaps between action and support
- Assessment of support provided for the implementation of the conditional component of the NDCs
- Adequately effective action and support provided for adaptation (information on costs of priorities identified and needs identified in the adaptation communications, NDCs, [NAPs, Nat Coms])
- Information provided by developed countries on climate finance efforts
- Efforts related to support on technology development and transfer for developing countries
- Information form multilateral financial institutions and multilateral development banks (e.g., total global investment in clean technology).



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