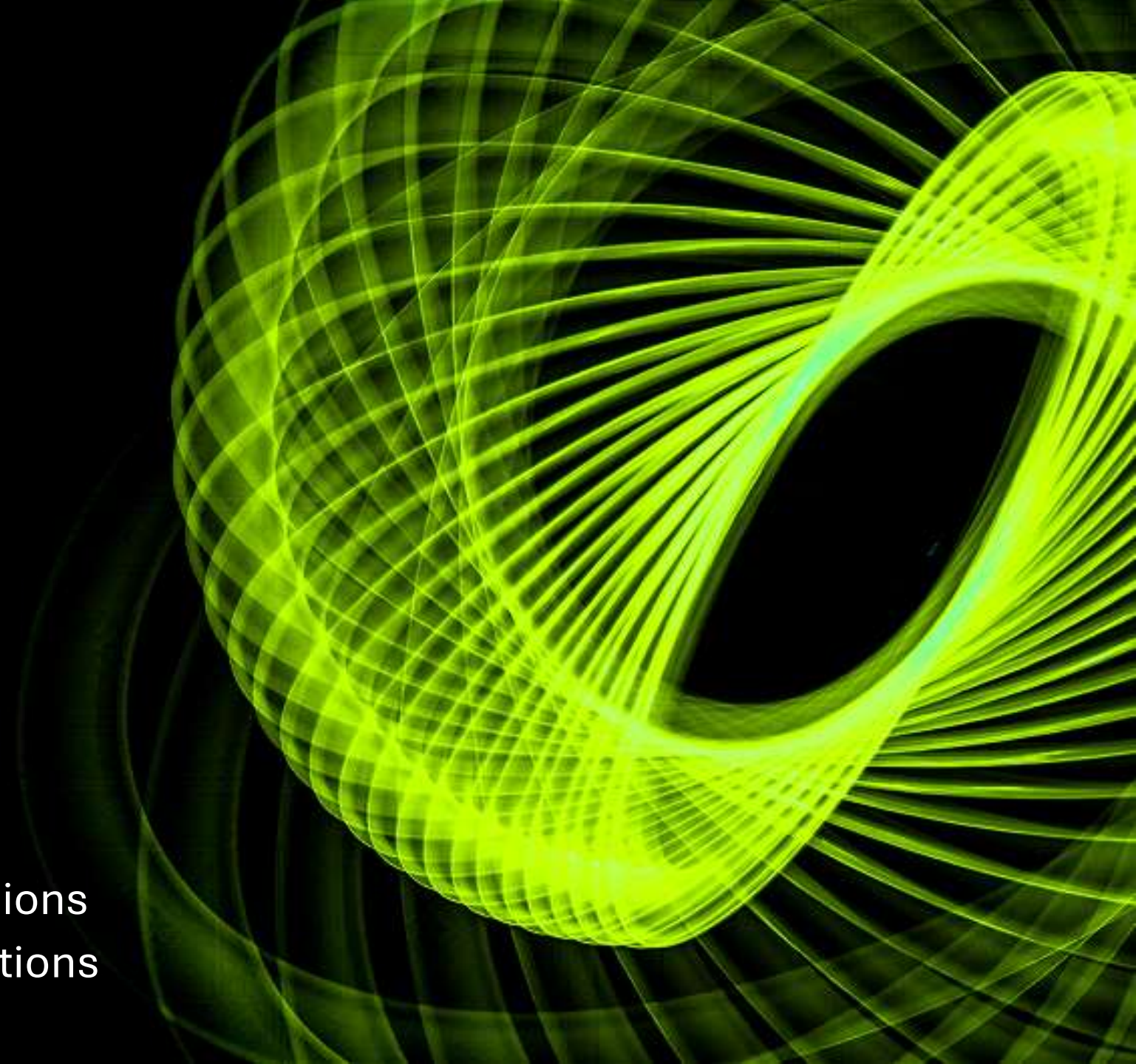




Decoding financed emissions

Unpacking greenhouse gas emissions
measurement for financial institutions

October 2025



Foreword and executive summary

Navigating financed emissions: a strategic imperative beyond compliance

Foreword

Global capital markets are evolving under complex pressures. Geopolitical fragmentation, diverging regulatory pathways, and growing demands for climate accountability are shaping how financial institutions assess risk and allocate capital.

Amidst these shifts, emissions associated with capital allocation – so-called “financed emissions” – have emerged as a critical yet under-addressed area of focus for banks, asset managers, and pension funds.

This paper explores how financial institutions can navigate regulatory expectations, address data gaps, optimise emissions modelling, and interpret financed emissions dynamics to inform risk management and guide capital toward the low-carbon transition.

Executive summary

Financed emissions provide financial institutions with a lens into the climate impact of their portfolios, revealing exposure to transition risks and opportunities for strategic intervention.

Yet measuring these emissions is challenging: only about 10,000 organisations report emissions worldwide, leaving substantial gaps in value chain and scope 3 data. Emissions modelling offers a solution, providing full portfolio coverage and a means to validate client disclosures, but requires careful handling of methodological complexity, outdated proxies, macroeconomic distortions, and potential double counting. Market fluctuations can drive volatility in financed emissions, highlighting the need to interpret trends alongside financial market dynamics.

Despite these challenges, financed emissions remain central for identifying portfolio hotspots, supporting sectoral target-setting, and guiding capital allocation toward the climate transition.

By combining insights from financed emissions with robust data governance, process integration, and advanced digital and AI capabilities, financial institutions can translate emissions intelligence into actionable strategies that enable a credible contribution to global decarbonisation objectives.

Inside this paper

Why financed emissions matter – understanding portfolio climate impact and transition risks.

Regulatory landscape – key standards and reporting expectations.

Data and modelling challenges – gaps in reporting, scope 3, and methodological complexity.

Interpreting dynamics – separating genuine decarbonisation from market fluctuations.

Driving the transition – using financed emissions to identify hotspots and inform sectoral target-setting.

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Chapter 1

Navigating the regulatory landscape and applicable standards

Financed emissions are a critical metric for financial institutions, revealing their climate impact, exposure to transition risk, and policy effectiveness. They are shaped by lending and investment choices and increasingly subject to regulatory scrutiny.

Navigating the regulatory landscape and applicable standards

Why do the greenhouse gas emissions of borrowers and investees matter to financial institutions?

Financed emissions are a critical metric for financial institutions, revealing their climate impact, exposure to transition risk, and policy effectiveness. They are shaped by lending and investment choices and increasingly subject to regulatory scrutiny.

In the evolving landscape of sustainable finance, financed emissions have emerged as one of the most material and strategically significant metrics for banks, asset managers, and institutional investors. These emissions represent the greenhouse gases (GHGs) associated with lending and investment portfolios, extending the accountability of financial institutions well beyond their direct operations.

More than a compliance metric, financed emissions offer a panoramic lens into how capital allocation decisions ripple through sectors, financial products, geographies, and even the supply chains of borrowers and investees. Understanding them is no longer optional – it is an essential part of a sound strategy.

Three strategic lenses for financed emissions

The concept of financed emissions can be viewed from three interrelated, strategic perspectives: impact, risk, and performance measurement.

First, financed emissions illustrate the extent to which a financial

institution exerts influence on real-world climate outcomes through its financial activities. Capital flows, whether channelled into low-carbon innovation or carbon-intensive incumbents, can accelerate or hinder progress toward climate targets that are set across jurisdictions (such as the Paris Agreement) as well as those applied at a company-level. From a wider society perspective, financial institutions can play a key role in supporting the transition to a low-carbon economy by directing capital to sustainable projects. This ensures shared value-creation for both the financial sector and the real economy.

Second, financed emissions also act as a proxy for climate transition risk. Portfolios heavily exposed to high-

emitting counterparties may face long-term credit, market, and reputational risks – especially as regulatory scrutiny and carbon pricing increase globally. Continued dependency on fossil fuels and carbon-intensive technologies signals a potential vulnerability to value erosion.

Finally, changes in portfolio emissions and intensity provide a measure of the effectiveness of climate strategies. Understanding the level of effectiveness is essential to help financial institutions assess and protect the long-term value of their portfolios. While not perfectly linear, a long-term decline in financed emissions generally reflects stronger sustainability integration within financial organisations.

Regulatory mandates and global convergence

The importance of financed emissions has not gone unnoticed by regulators. Increasingly, they are mandating disclosure and integration into portfolio steering. In the European Union, financial institutions face a layered regulatory architecture that comprises *CSRD*, *Pillar III*, and *SFDR*.

- *CSRD* requires disclosure of financed emissions as part of broader sustainability reporting obligations for financial institutions.^{5,6,11}
- *EBA's ESG Pillar III* mandates transparency around climate-related exposures and financed emissions for credit institutions. More recent EBA guidelines require banks to develop climate transition plans.^{7,12}

- *SFDR* requires asset managers to disclose the carbon footprint of their investment decisions, emphasising double materiality.^{8,10}

Together with the *EU Taxonomy* – which requires financial institutions to disclose the extent to which their finance activities meeting environmental sustainability criteria – financed emissions reporting offers a rather complete view of a portfolio's contribution to, and impact on, the transition to a low-carbon economy.

In parallel, the EU's climate benchmarks – the *Paris-Aligned Benchmark* and the *Climate Transition Benchmark* – anchor emission metrics such as weighted average carbon intensity (WACI) and emissions per unit of invested capital, signalling a pathway for alignment with real-world decarbonisation trajectories.^{9,13}

Globally, the *IFRS S2* climate disclosure standard – developed by the *International Sustainability Standards Board (ISSB)* – reinforces the disclosure of financed emissions. It is being adopted or considered in jurisdictions including the UK, Japan, Hong Kong SAR, Taiwan, Australia, Canada, and Switzerland, with local regulators shaping implementation in line with domestic policy priorities.³

PCAF: The leading methodology for financed emissions

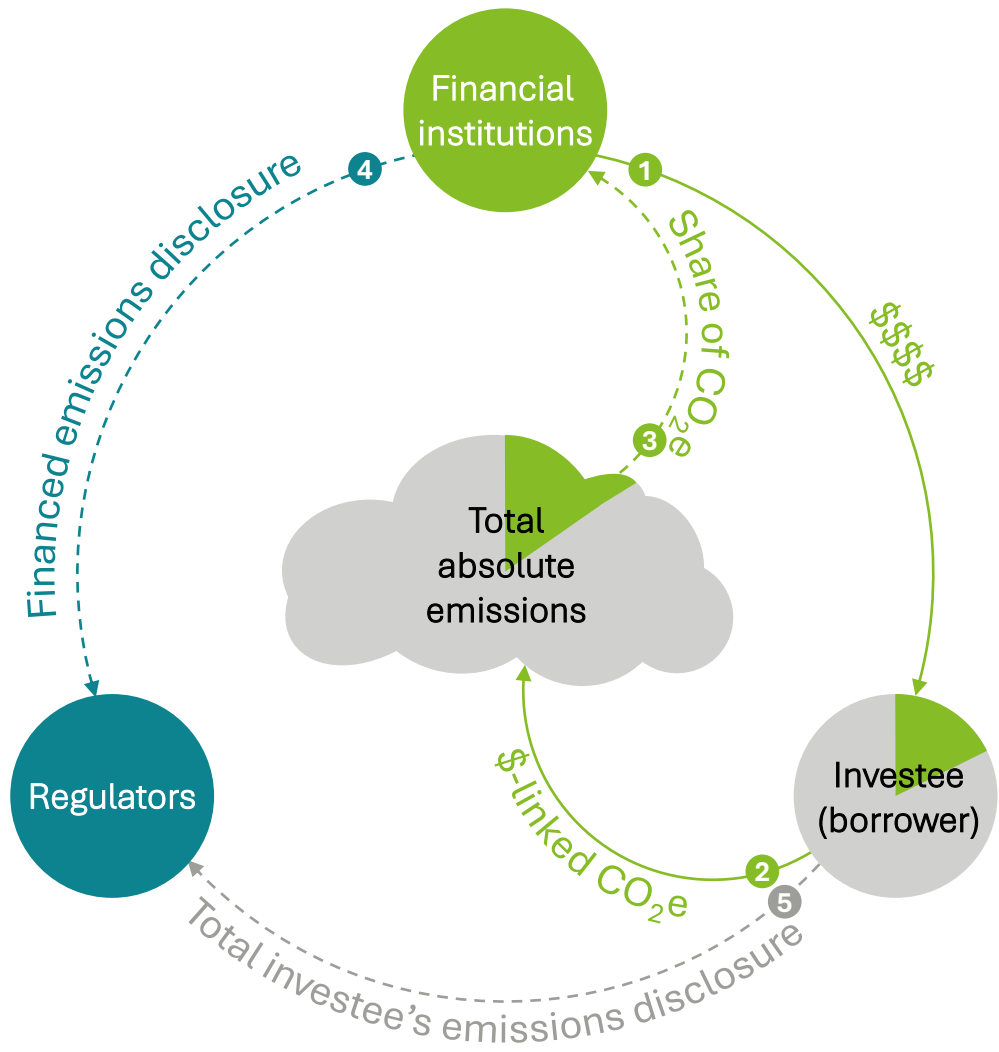
To bring consistency and comparability to financed emissions disclosures across the world, the *Partnership for Carbon Accounting Financials (PCAF)* developed a now widely adopted methodology for financed emissions accounting, aligned with the *GHG Protocol*. What began as voluntary guidance has become the de facto global standard, integrated into regulatory frameworks

and industry initiatives alike.

At the heart of PCAF's approach lies the "follow the money" principle. Emissions are attributed to financial institutions proportionally to their exposure – typically expressed as the share of a borrower's or investee's enterprise value (Figure 1).

The attribution method suggested by PCAF is grounded in financial logic. If an investor shares in the financial upside (or downside) of an enterprise, it follows that they should bear proportional responsibility for associated environmental externalities. The approach aligns sustainability disclosure with the financial data already flowing through accounting and risk management systems – making it both pragmatic and scalable.^{15,16,17}

Figure 1: Applying the PCAF’s “follow the money” principle, often a first step in financed emissions accounting while attributing emissions to financial institutions



When financial institutions provide funding **1**, they help enable economic activity, which often comes with the externality of greenhouse gas emissions **2**.

Under the principle of “follow the money,” financial institutions are seen as partially responsible for their investee’s (borrower’s) emissions, in proportion to the scale of their financial involvement **3**.

A financial institution’s total financed emissions **4** are calculated as the sum of its proportional share of emissions from the companies or projects it finances.

Companies or projects remain ultimately accountable for their full, or so-called total absolute, emissions **5**.

CO₂e stands for carbon dioxide equivalent, the unit used to express the emissions of different greenhouse gases in a single measure

From regulatory signals to action

Even as the volume of climate-related regulations grows, signals in the 2025 regulatory landscape may seem fragmented and contradictory. This should not prevent financial institutions from understanding financed emissions, which remain a core component of risk management and strategy. Robust emissions intelligence reveals exposure to transition risks, highlights portfolio vulnerabilities, and informs strategic decision-making.

Financial institutions do not directly control the emissions of the companies they finance, yet they can shape outcomes across their portfolios. Achieving this influence takes time: it requires establishing engagement processes and procedures that nudge sustainability performance without compromising financial stability or business

objectives. Whether through “soft” levers, such as dialogue and participation in decarbonisation initiatives, or “hard” levers, including enforceable covenants and selective divestment, financial institutions can prioritise interventions where they have the greatest impact. In this context, measuring what you manage becomes both the integral pillar and the logical starting point.

Over the next chapters, we move from the fundamentals of measurement towards a more nuanced discussion of underlying data and modelling approaches, and the ways financial institutions can translate emissions insight into influence. By linking transparency to strategic action – through portfolio steering, engagement, smart targets, and capital allocation – financial institutions can drive impact while maintaining their mandate to remain financially stable and profitable.



Chapter 2

Addressing the emissions data gaps challenge

Emissions data are limited, with only about 10,000 organisations reporting worldwide. Significant gaps remain in value chain and scope 3 emissions, underscoring the need to rigorously verify vendor and counterparty data.

Addressing the emissions data gaps challenge

Limited access to borrower and investee GHG emissions data is still the weakest link in portfolio assessments.

Availability of emissions data poses a challenge, with only about 10,000 organisations globally self-reporting their emissions, often overlooking value chain emissions.

When it comes to accounting for any non-financial parameters of lending or investment portfolios, the first practical challenge financial institutions face is sourcing the data. Until recently, financial organisations had little reason to monitor the GHG emissions of their clients. This has changed over time, due to the increasingly stringent regulatory landscape as detailed in Chapter 1. As a result, emissions data gathering has emerged as a distinct and demanding step in the financed emissions accounting process.

When the need arises, the most

immediate reaction is often to ask clients directly – either through private disclosures to the front office or via third-party sustainability and business data providers. This approach is echoed in the PCAF standard, which establishes a data quality hierarchy to rank emissions data sources by their expected accuracy and reliability.

The most preferred source is a counterparty's own GHG disclosure that has undergone independent assurance – considered both credible and accurate. The next best is unverified self-reported data. If neither is available, financial institutions are advised to use emissions modelling techniques based on available physical or financial data, such as sectoral proxies linked to consumption of

resources or assets. At first glance, this tiered approach appears straightforward. In practice, however, it runs into the widespread scarcity of self-reported emissions data. The obligation to report GHG emissions remains the exception rather than the norm, even in well-regulated markets and among corporates.

Today, the most comprehensive pools of self-reported emissions data for corporates cover just over 10,000 entities globally – and this number is unlikely to grow significantly in the near term. Until recently, global sustainability regulations were expected to result in emissions disclosures from around 60,000 companies. However, recent regulatory rollbacks – including the EU's omnibus proposals⁴ and the postponed implementation of the

SEC's climate rule in the US – have sharply lowered those expectations. The projected supply of self-reported emissions data now stands at fewer than 15,000 companies in the EU and the US.

In other jurisdictions, sustainability disclosure requirements remain in early development or are subject to long transition periods. While voluntary frameworks such as *CDP (formerly the Carbon Disclosure Project)* have made progress, the overall growth in voluntary disclosures still falls short of the demand from financial institutions seeking high-quality, standardised emissions data cross all relevant groups of investees and borrowers (Figure 2).

Figure 2: Data availability varies widely across counterparty groups – some are highly mature, while others provide none – making financed emissions accounting more complex

Counterparty groups (segments of investees and borrowers)	Public sector			Corporate sector			Retail		
	Supranationals	Sovereign central governments	Sub- sovereigns and public agencies	Publicly listed corporates (large- and mid-cap)	Publicly listed corporates (small-cap)	Large privately held corporates	Small and medium enterprises	Consumer mortgages	Consumer loans for motor vehicles
	Self-reported data availability								
Scope 1	High	Very high	Very low	Very high	Very high	High	Very low	Very low	Very low
Scope 2	High	Very low	Very low	Very high	Very high	High	Very low	Very low	Very low
Scope 3 upstream	Low	Very low	Very low	Medium	Medium	Low	Very low	Very low	Very low
Scope 3 downstream	Low	Very low	Very low	Low	Low	Very low	Very low	Very low	Very low
Economic valuation	Medium	Very high	Medium	Very high	Very high	High	Medium	Very high	Very high
Proxies and estimations availability									
Scope 1	Medium	Medium	Medium	Very high	Very high	Very high	Medium	Medium	Very high
Scope 2	Medium	High	Low	Very high	Very high	Very high	Medium	Medium	Very high
Scope 3 upstream	Low	High	Low	Very high	Very high	Very high	Low	Very low	Very low
Scope 3 downstream	Low	Very low	Very low	Low	Low	Low	Low	Very low	Very low
Economic valuation	High	Very high	High	Very high	High	High	Low	High	High
Typical emissions data availability (percentage of entities covered)	Very high (90%-100%)		High (70%-90%)		Medium (30%-70%)		Low (10%-30%)		Very low (0-10%)

Source: Deloitte analysis. See the [Methodology section](#) in the appendix for details.
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Data availability is especially constrained in certain groups of borrowers and investees

The largest blind spot on the emissions data landscape within the corporate sector is small and medium-sized enterprises (SMEs), which often have no obligation to disclose GHG emissions, or indeed any information, publicly. These entities also frequently lack the internal capacity or resources to conduct emissions analysis. Yet in many high-emitting sectors such as agriculture, road transportation, and construction, SMEs represent the dominant form of economic activity.

Public sector entities, including municipalities, special administrative regions and multilateral agencies, are also rarely subject to mandatory GHG disclosure. These actors often fall outside national inventories, making them largely invisible to portfolio-

level emissions analysis.

In the retail segment – a significant exposure for commercial banks – emissions data and proxies remain scarce. Private individuals with mortgages or car loans are not required to report emissions or provide related data, with rare exceptions such as the Dutch real estate market, where around 60% of mortgaged properties carry energy labels. Attempts to account for emissions from private assets face not only organisational challenges but also legal and societal resistance, often driven by privacy and data protection concerns.

Scope 3 emissions remain the weakest link

In terms of data categories, available emissions data remains fragmented. Disclosures tend to concentrate on emissions within the reporting

organisation's direct operational boundary (scope 1) and those linked to purchased energy (scope 2) – categories that are generally easier to quantify. In contrast, the largest share of a company's carbon footprint often lies in its supply chain (scope 3 upstream) and value chain (scope 3 downstream). Empirically, well-scrutinised and fully accounted scope 3 emissions are, on average, an order of magnitude greater than scope 1 and 2 combined. This reflects the deep interconnectivity of modern economies and their dependence on global flows of energy, materials and goods.

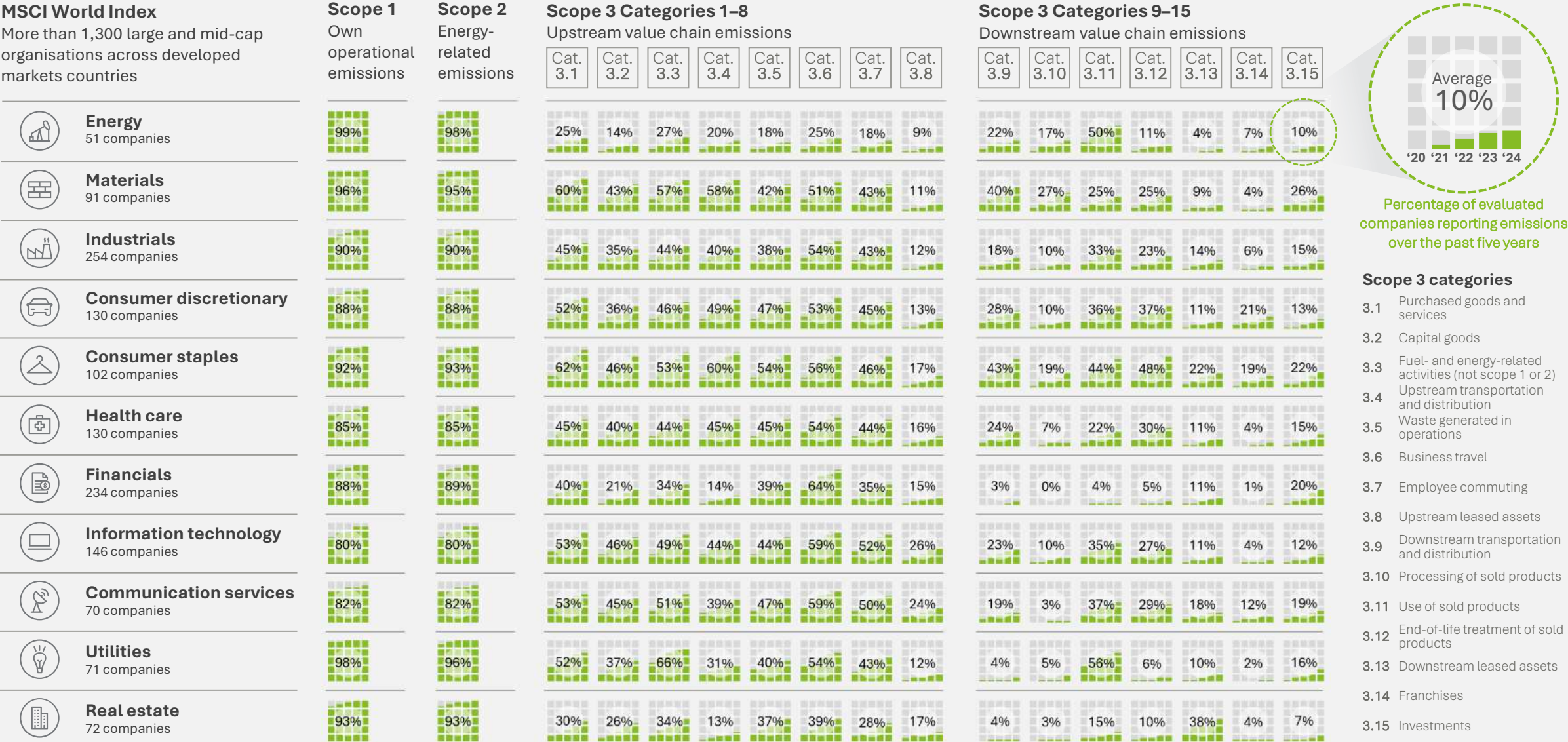
However, scope 3 accounting is complex, and the current state of emissions data provision in these categories is still limited and uneven. This is particularly true for downstream value chains, where emissions are systematically under-monitored and often excluded from

reporting altogether.

Nonetheless, there is meaningful progress at the top end of the corporate market. Among the more than 1,300 constituents of the MSCI World Index – representing some of the largest listed companies globally – over 97% now report scope 1 and scope 2 emissions. In some sectors, this figure is approaching full coverage.

However, scope 3 emissions remain a blind spot. Despite recent improvements in certain industries and upstream segments, less than half of upstream value chain emissions are currently disclosed by major large and mid-cap corporates (Figure 3). Downstream coverage is even thinner, with only about 25% of companies including those categories in their public reporting.

Figure 3: Emissions reporting has improved over five years, yet scope 3 emissions remain consistently underreported across all categories



Source: Deloitte analysis based on London Stock Exchange Group (LSEG) data. See the [Methodology section](#) in the appendix for details.
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Quantifying supply chain emissions remains a complex task. Many companies continue to make overly narrow judgements about materiality, often claiming that certain categories of scope 3 emissions are irrelevant to their business. While such assessments may reflect legitimate limitations, they risk obscuring significant ‘shadow emissions’ that remain unmeasured and unmanaged.

There is evidence, however, that the anticipation of regulatory tightening has begun to drive change. Over the past five years, the number of companies reporting ‘relevant’ scope 3 categories has risen steadily, suggesting a broadening understanding of value chain materiality and the growing completeness of full emissions inventories.

Nevertheless, it is important to note that this gradual change has been

slower than anticipated, as previously discussed. While global sustainability regulations are expected to increase the available emissions disclosures over time, implementation postponement has impacted the estimates regarding available emissions data.

When self-reported data fall short, estimation methods take over

The current levels of emissions data availability leave financial organisations with no choice but to step in to perform what their investees and borrowers have not fulfilled – modelling GHG emissions.

By modelling emissions rather than collecting emissions data, financial institutions aim to address the existing gap in financed emissions accounting. A comparative analysis between self-reported emissions and modelled results – derived using a wide range of physical and economic

activity-based modelling methods and statistical techniques – suggests that certain sectors may significantly underreport emissions.

Our analysis of disclosures from constituents of the MSCI World Index over the past five years (Figure 4) highlights the energy sector, utilities, and consumer discretionary as the most affected. These three industries exhibit the largest “shadow” emissions, both in absolute terms and relative to self-reported figures.

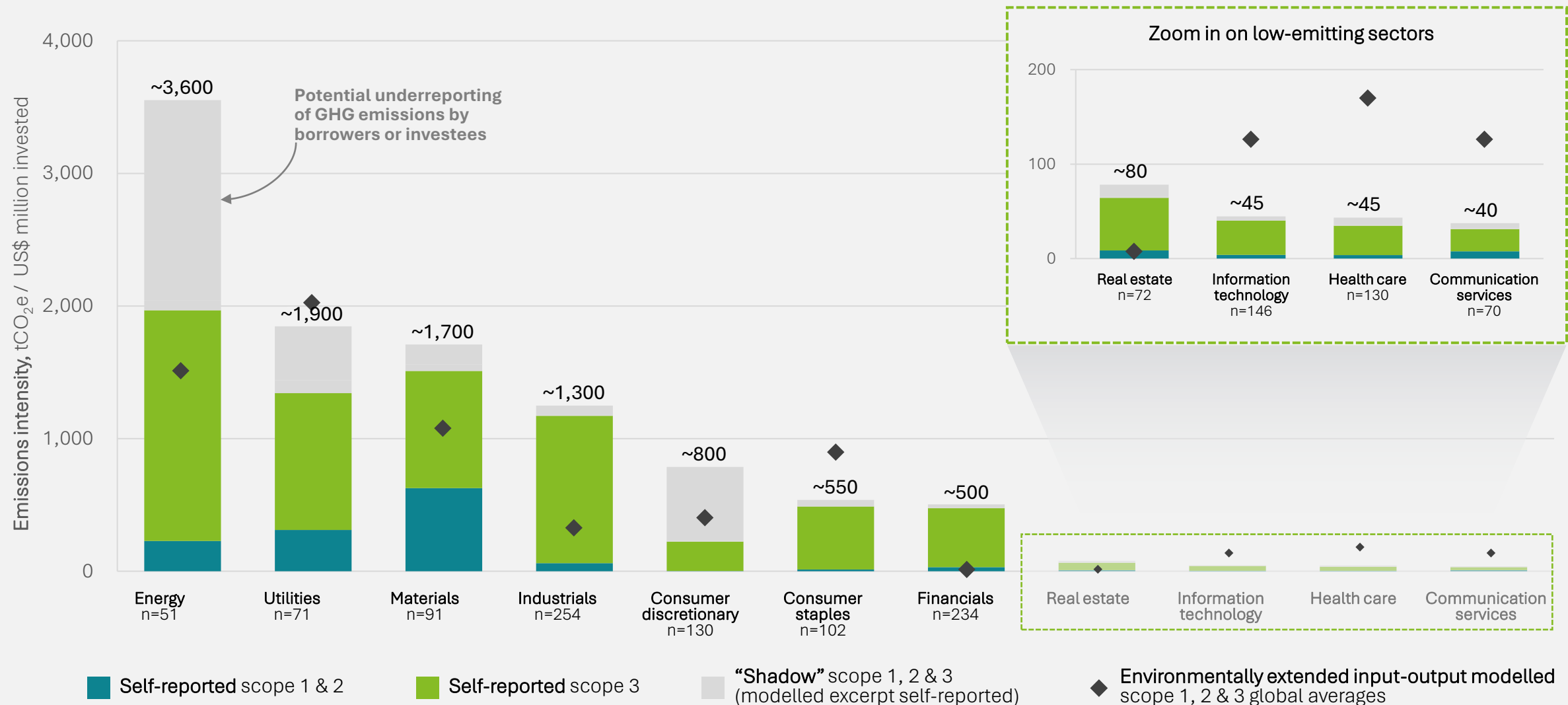
Discrepancies between self-reported company-level data and top-down estimates, such as those based on environmentally extended input–output (EEIO) analysis, often reach multiple-digit percentage differences, largely driven by incomplete accounting of material supply chain emissions and the variability in methods.

Emissions modelling is not a

stopgap. It is a critical capability for enabling compliant disclosure and meaningful risk management – not solely based on clients’ declarations, but by leveraging the strategic position of financial institutions to observe patterns across disclosures and connect the dots to build intelligence.

From a data quality management perspective, modelling expertise shall support the creation of a more robust control environment around data generation, governance and use. This also enables a data-driven approach to steering portfolios away from excessive exposure to high-emitting clients. When made reliable and accessible across the organisation, this modelled emissions data can do more than just fill in the gaps – it can ignite and shape climate strategy.

Figure 4: Emissions modelling highlights gaps in self-reported data, emphasising the need to rigorously verify and cross-check vendor and counterparty submissions



Source: Deloitte analysis based on LSEG data (self-reported and modelled emissions) and Exiobase data (EEIO). See the [Methodology section](#) in the appendix for details.
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Chapter 3

Optimising emissions modelling for accurate portfolio insights

Emissions modelling gives financial institutions portfolio-wide visibility on financed emissions and a check on client data, but requires careful handling of methodological complexity and data quality to ensure reliable insights.

Optimising emissions modelling for accurate portfolio insights

With limited self-reported data, especially for scope 3, financial institutions rely on emissions modelling – but the approach remains complex and nuanced.

Emissions modelling ensures full portfolio coverage and enables financial institutions to challenge client disclosures with alternative estimates. Yet this approach faces hurdles – from boundary mismatches and outdated emission factors to macroeconomic distortions and inconsistency across methods.

As financial institutions seek to measure and manage the carbon footprint of their portfolios, emissions modelling has become an indispensable tool. Given the limited availability of self-reported data – particularly for scope 3 emissions – financial institutions increasingly rely on estimation techniques to bridge the gaps. These techniques typically use known operational indicators (e.g., energy use or production

volumes) or financial metrics (e.g., revenue or total assets), matched to sectoral and regional emissions intensities.

Though inherently uncertain, emissions modelling offers a consistent proxy that supports portfolio-wide coverage. It allows financial institutions to quantify financed emissions where disclosures are incomplete or absent, thereby supporting decision-making across investment, lending, and climate planning activities, informing risk and strategy discussions.

Challenges impacting emissions modelling

Emissions modelling is far from straightforward. Paradoxically, it is

even more data-intensive than relying on reported emissions, as the modelling process depends on detailed annual activity data for each counterparty. More sophisticated methods require granular physical indicators – such as volumes of goods produced or levels of energy consumption – which are often just as scarce as emissions data itself. A more scalable modelling option involves using financial indicators such as total assets or revenue. These metrics are typically available across much broader datasets.

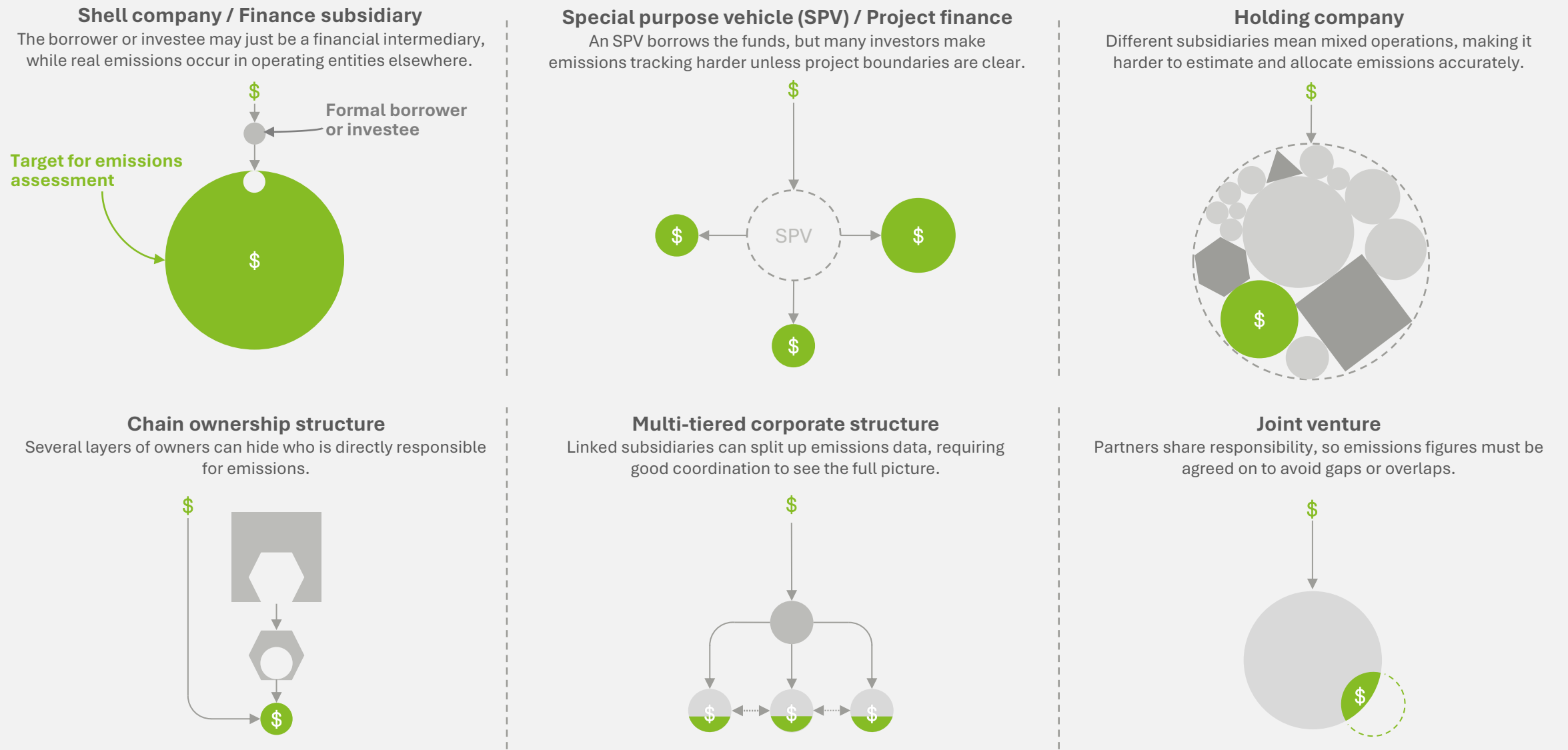
Challenge 1: Aligning economic activity with the legal entities that sit on financial institutions' books

In many cases, the borrower or investee is not the operational entity generating emissions. Instead,

emissions may originate from subsidiaries, associates, or assets buried behind layers of holding companies and legal structures (Figure 5). The modelling process must therefore account for these indirect relationships.

A textbook case involves shell entities or special purpose vehicles (SPVs) established purely for financial structuring. Emissions modelling for these entities must consider the activities of the underlying operational companies – which may differ substantially in sector and emissions profile. Tailored approaches are often needed, particularly for diversified groups or financial holdings with exposure to carbon-intensive industries.

Figure 5: Modelling challenges arise from borrowers’ legal structures and funding schemes, underscoring the importance of PCAF’s “follow the money” principle in achieving an accurate picture



Even when companies self-report emissions, organisational boundaries frequently diverge from those used in financial reporting. Emissions inventories may exclude subsidiaries, joint ventures, or non-consolidated associates – all of which may carry material emissions. This mismatch complicates the alignment of financial data and emissions and can lead to underestimation or misallocation of portfolio exposure.

Challenge 2: Looking beyond the high-level entity view

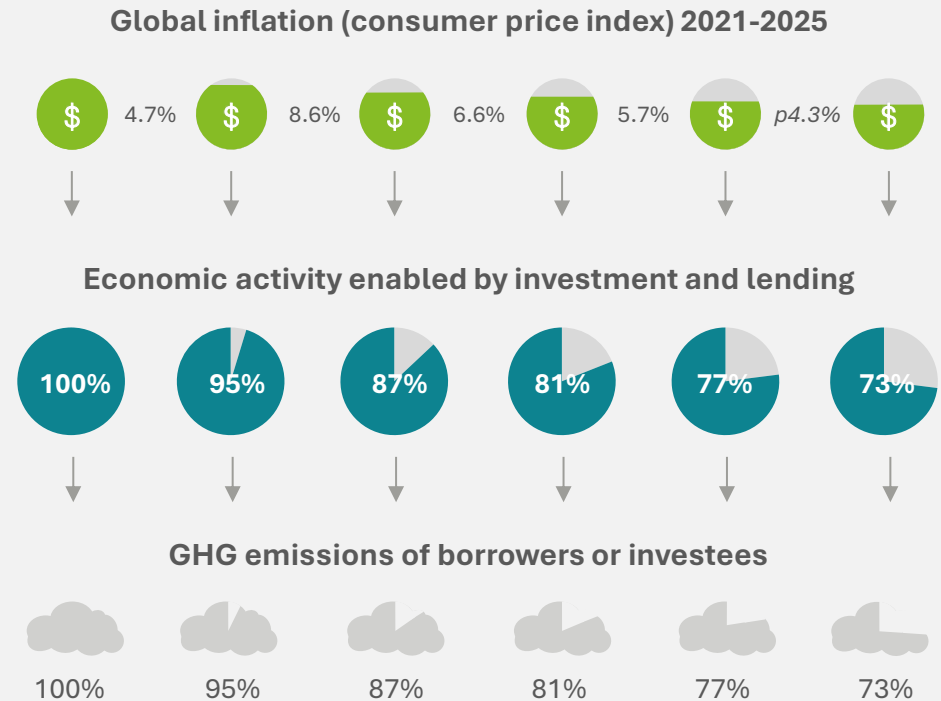
Sometimes the required level of detail goes beyond the organisational level. Certain financial products – such as green bonds or project finance facilities – inherently require a deeper, facility-level view. This involves attributing the financial exposure to a specific entity, asset or project. In many cases, this cannot be achieved without bespoke

disclosures from the borrower, typically arranged through privately negotiated agreements.

Challenge 3: Accounting for inflation and currency shifts

An additional, often overlooked, complication arises from macroeconomic distortions such as inflation and currency exchange movements. The International Monetary Fund (IMF) reports global inflation has exceeded 4% annually in recent years. This volatility impacts how much economic output – and therefore GHG emissions – a single international dollar can finance when it is spent. In effect, the GHG generation potential of financial flows is eroded over time, unless modelling efforts explicitly account for inflationary effects (Figure 6). Currency fluctuations similarly affect the purchasing power of capital across jurisdictions.

Figure 6: Inflation affects emissions estimates based on a counterparty’s assets or revenue, potentially leading to overestimations



Due to inflation, each dollar now buys less than before – and also triggers fewer greenhouse gas emissions than it once did. If the IMF’s inflation forecasts hold, by the end of 2025 the emissions linked to each dollar spent by a counterparty be around one-third lower than in 2020. This implies that modelled emissions may be overestimated if not adjusted for inflation.

If unadjusted, currency fluctuations can bias emissions modelling for foreign exposures. Foreign exchange markets are inherently volatile: over the past five years, the British pound, Japanese yen, Mexican peso, Turkish lira and Brazilian real have moved significantly against the US dollar due to economic shocks or political events, making currency adjustments essential in financed emissions modelling methods that approximate emissions based on a counterparty's total assets or revenue denominated in the US dollars.

Challenge 4: Managing differences in reporting cycles and dealing with outdated emission factors

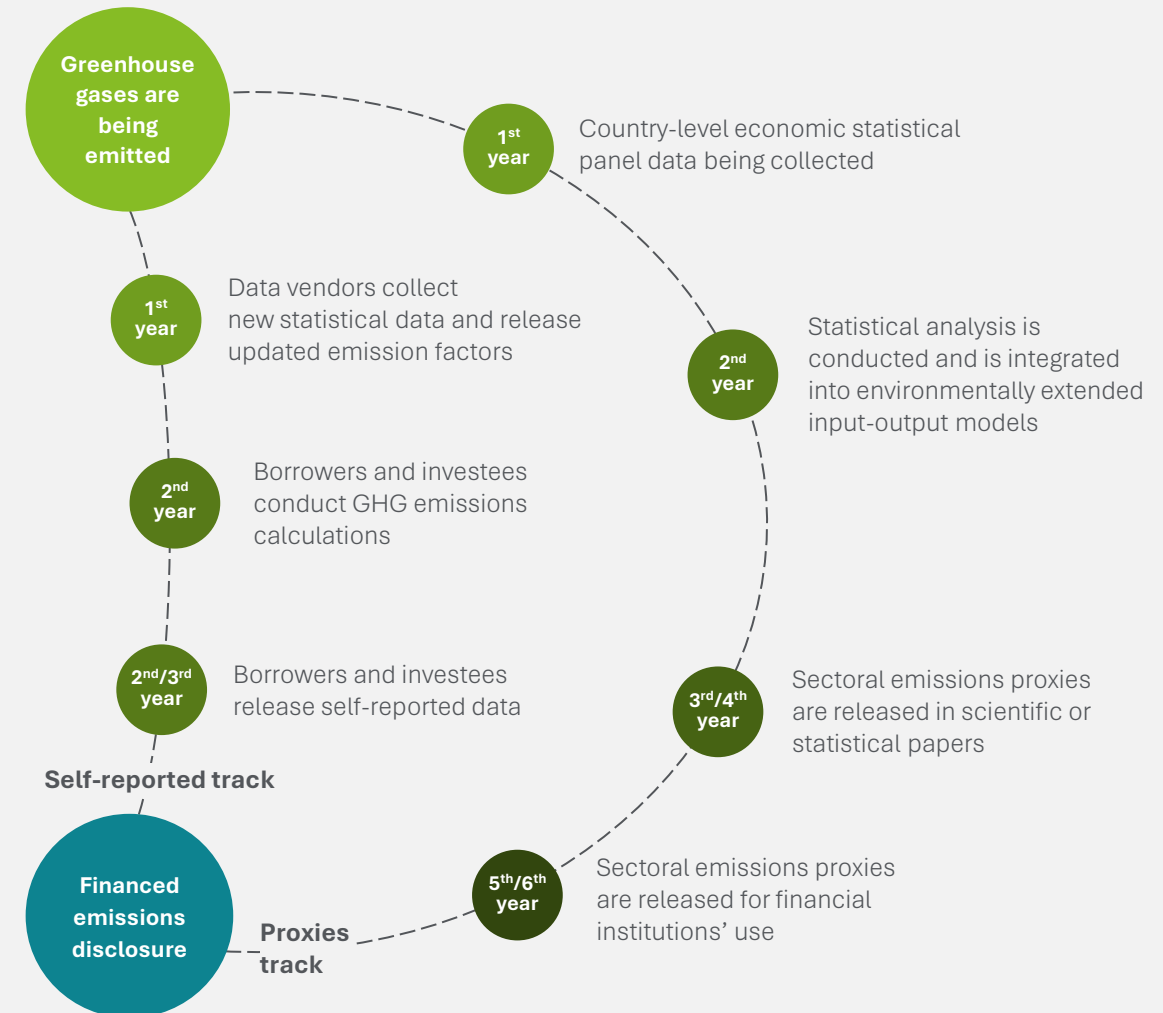
Further distortions arise from timing mismatches. Financial institutions must align multiple variables to construct clean, coherent time series that match exposures and valuations across their portfolios. However,

borrowers' emissions disclosures and underlying activity data often lag by one to three years, due to differences in reporting cycles.

Even when the latest available self-reported data are used, the complexity of the data collection process means that carbon intensity figures typically reflect conditions from one, two, or even three years prior (Figure 7).

For emission factors – particularly those derived from environmental-economic models – the situation is even more pronounced. These factors often rely on panel-based data collection across multiple sectors and regions, and may be based on statistics that are several years or even decades old. This latency materially affects both the accuracy and comparability of financed emissions estimates.

Figure 7: Before reaching financial institutions, self-reported emissions and proxies still have a long way to go in their full life cycle



Source: Deloitte analysis.

Challenge 5: Avoiding double counting

Double counting is another challenge, especially at sector level. While less significant for individual firms, overlaps can inflate aggregate emissions when exposures to the same asset are reflected across multiple financial institutions. This is particularly relevant in securitisation structures or when financial institutions hold stakes in each other. Under current standards, financed emissions include scope 1, 2, and 3 of the borrower – and financed emissions themselves fall under scope 3, category 15 of the GHG Protocol.¹⁴ Without safeguards, this can lead to inflated emissions figures for the financial sector as a whole.

Challenge 6: Reconciling modelled with self-reported data

Finally, deciding whether to rely on

self-reported or modelled emissions in each specific instance depends on the intended use.

From a risk management perspective, adopting the higher figures may be more prudent. It is important to recognise that modelled data can reveal “shadow emissions” not yet captured by borrowers or investees. These gaps can lead to sudden increases in reported emissions once disclosure improves, highlighting a potential risk that must be managed proactively.

Conversely, for disclosure compliance, prioritising self-reported data is often preferable. It is reasonable to believe that counterparties may be the best-informed party regarding their own operations and supply chains, potentially providing the most accurate representation of emissions if accounted for correctly.



Chapter 4

Decoupling financed emissions from purely financial portfolio fluctuations

Emissions intensity fluctuates significantly over time, often shaped more by financial market dynamics than actual emissions. Recognising these structural drivers is essential for interpreting financed emissions dynamics.

Decoupling financed emissions from purely financial portfolio fluctuations

Are changes in financed emissions reflecting genuine portfolio decarbonisation, or merely market swings?

Market valuation fluctuations drive significant volatility in financed emissions across major market-linked portfolios, causing a dilution effect in rising markets. Cross-regional and sectoral differences emerge, highlighting the need for cautious interpretation and use of complementary climate metrics for robust analysis.

Understanding financed emissions across diversified market portfolios is essential for financial institutions seeking to integrate climate considerations into their investment and lending decisions. This chapter presents a strategic analysis of hypothetical portfolios aligned with major market indices, offering insights into emissions exposure patterns and the dynamics.

Portfolio benchmarking approach

To establish illustrative benchmarks, we estimated financed emissions for portfolios replicating the sector and company compositions of leading global and regional equity indices. These include the MSCI World Index as a proxy for the global market (Figure 8a), alongside regional benchmarks such as the S&P 500 (US), STOXX Europe 600 (Europe), FTSE 100 (UK), Hang Seng (Hong Kong SAR) and Nikkei 225 (Japan). See figures 8b, 8c, 8d, 8e, and 8f in the Appendix.

Our methodology incorporates all three scopes of GHG emissions (scope 1, 2 and 3), leveraging modelled data to ensure comprehensive coverage (see

Appendix for methodology details). This inclusive approach provides a more complete view of emissions exposure than frameworks limited to scope 1 and 2 alone.

The analysis covers a six-year period, tracking absolute emissions alongside financed emissions to capture the share attributable to financial institutions' exposure.

Emissions trends and disclosure dynamics

The data reveal a steady increase in absolute emissions across these portfolios, predominantly driven by improved transparency and expanded reporting of scope 3 emissions. This trend aligns with evolving sustainability regulations

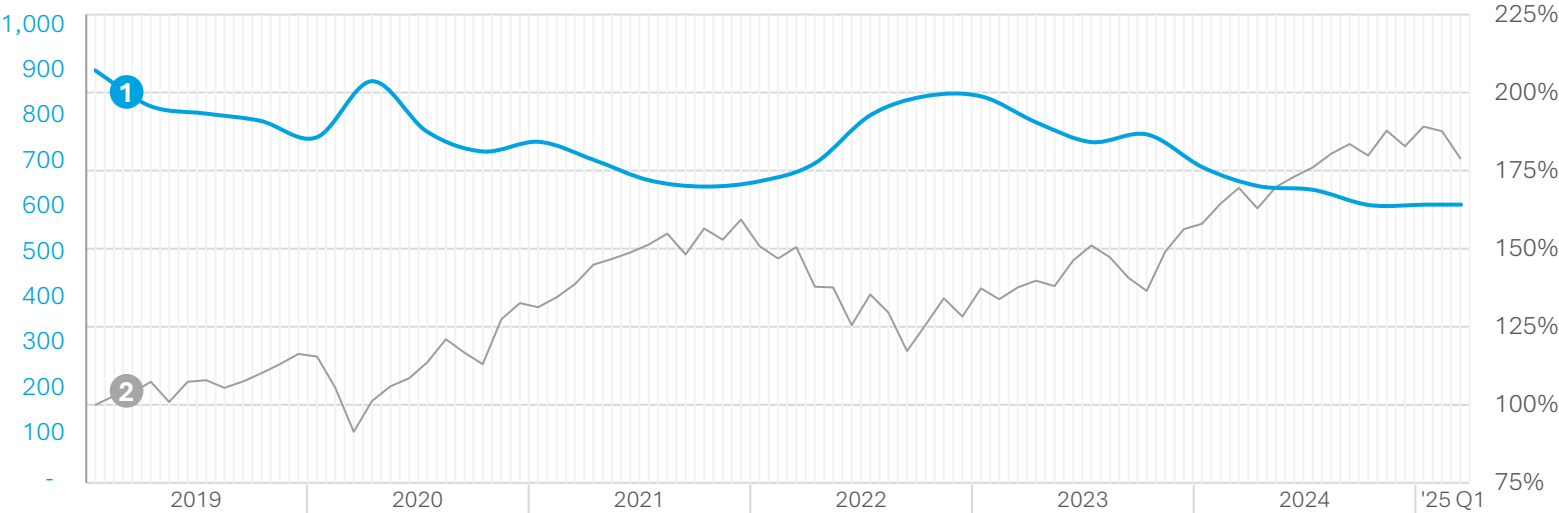
and proactive corporate disclosure efforts between 2021 and 2023. Meanwhile, scope 1 and 2 emissions, in absolute terms, have remained relatively stable.

Market influence on financed emissions volatility

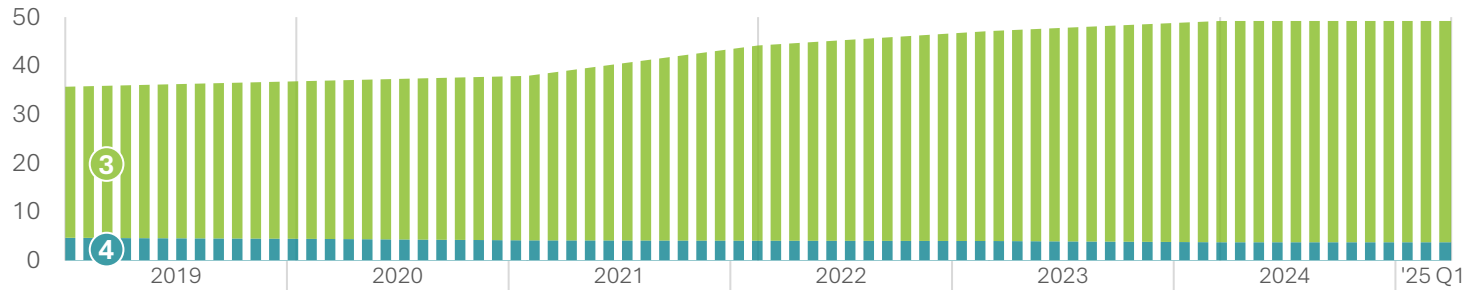
Contrary to expectations, financed emissions do not move in lockstep with absolute emissions. Instead, they are significantly influenced by market valuation fluctuations, showing a pronounced inverse correlation: as markets appreciate, financed emissions tend to decline, and vice versa¹⁸. About 80% of the volatility in financed emissions among large and mid-cap companies is driven by these market dynamics.

Figure 8a: Market volatility drives changes in financed emissions, underscoring the need to view them in context rather than in isolation

Financed emissions of a portfolio tracking MSCI World Index
Financed emissions **scope 1, 2 & 3**, tCO₂e/US\$m invested (left axis) and index performance, % (right axis)



Carbon footprint of MSCI World Index constituencies
Absolute total **scope 1 & 2**, and **scope 3** emissions of the index constituencies, billion tCO₂e



MSCI World Index

The MSCI World Index is a primary global benchmark tracking large- and mid-cap equities across 23 developed markets, including the US, Canada, Western Europe, Japan, and Australia. It comprises over 1,300 constituents, covering roughly 85% of each market’s capitalisation, and reflects sector distribution across developed economies.

Over the past years, financed emissions **1** from a hypothetical portfolio mirroring the index have trended downward, though with pronounced year-to-year swings. These emissions are strongly and negatively linked with market performance **2**, meaning that when markets rise, financed emissions typically fall.

In absolute terms, companies in the index are responsible for nearly 50 billion tonnes of CO₂e. About 92% of these are value-chain scope 3 emissions **3**, while the remaining 8% stem from scope 1 and 2 emissions **4**.

This arises from the attribution method, where emissions responsibility is proportional to the financial institution's economic interest in the company, calculated via EVIC – a composite metric combining market capitalisation, preferred shares, debt and non-controlling interests (Figure 9).

Given that market capitalisation often dominates EVIC – ranging from 50% to nearly 100% depending on sector and company – movements in equity markets materially affect the emissions share attributed to financial institutions.

Implications of market-driven attribution

Inflated company valuations driven by market growth, inflationary pressures or organic economic expansion can reduce the apparent emissions share of financial

institutions without corresponding improvements in real-world emissions performance. This “dilution effect” poses a challenge for using financed emissions as a short-term performance metric.

While market volatility introduces noise into year-on-year financed emissions, longer-term analysis over three to ten years smooths these effects, providing a more meaningful basis for assessing climate impact and transition progress.

Cross-market insights

Despite these limitations, financed emissions, as a metric, offer valuable comparative insights across geographies. For example, portfolios aligned with the US market (Figure 8b; see Appendix) tend to show lower financed emissions intensity ratios, reflecting high market capitalisations. Conversely, Chinese

and Japanese portfolios – characterised by relatively small market capitalisations – exhibit higher financed emissions ratios (Figures 8e, 8f; see Appendix). European and UK portfolios occupy an intermediate position (Figures 8c, 8d; see Appendix).

At the sectoral level, financed emissions highlight emission-intensive industries within portfolios, enabling targeted identification of climate risk hotspots. This prioritisation supports strategic allocation of engagement resources and informs sector-specific transition approaches.

Financed emissions: one important metric, but not the only one

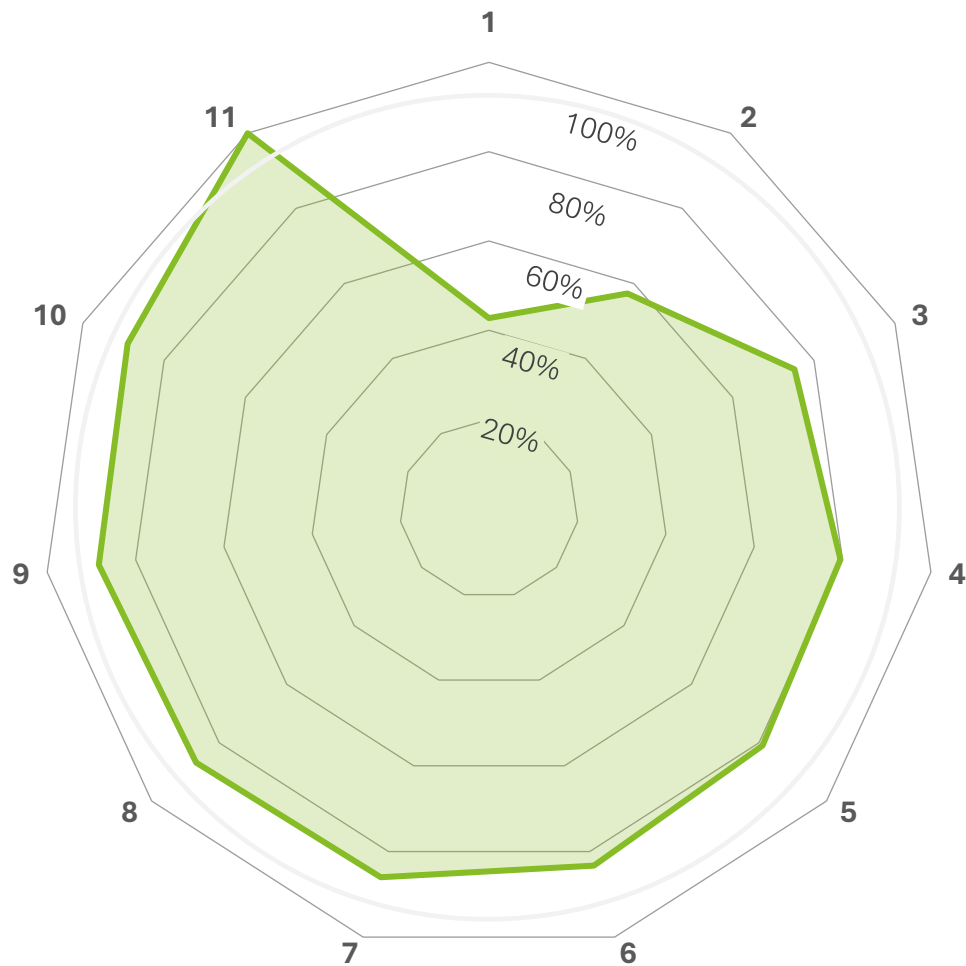
Financed emissions is a vital starting point for emissions intelligence, offering a portfolio-wide perspective on climate exposure. However, the

market sensitivity of financed emissions demands cautious interpretation, particularly for short-term performance assessment.

Financial institutions should leverage these insights as part of a broader toolkit, complementing financed emissions with sectoral intensity metrics and transition pathway analyses to underpin robust climate strategies.

The next chapter will explore metrics and frameworks better suited to tracking year-on-year emissions performance and supporting actionable transition planning.

Figure 9: Financed emissions from listed companies in less capital-intensive sectors are most exposed to purely financial volatility due to their capital structure



Analysis of large- and mid-cap listed companies shows that EVIC is largely determined by market capitalisation, particularly outside capital-intensive sectors such as information technology or healthcare.

On average, market capitalisation makes up roughly 80% of a large- and mid-cap listed companies’ total economic value.

This means that financed emissions are influenced by market price swings as well as actual changes in emissions performance, making consistent and comparable assessments challenging.

Average share of market capitalization in the EVIC

Chapter 5

Using financed emissions insights to accelerate the low-carbon transition

Financed emissions provide data-driven insights into portfolio hotspots, enabling sector-level analysis that informs credible target setting and tracks progress. The key priority is robust data management and seamless digital integration.

Using financed emissions insights to accelerate the low-carbon transition

Despite the challenges, financed emissions remain central for financial institutions in driving the low-carbon transition.

Financed emissions provide a starting point for understanding portfolio carbon footprints and risk hotspots, but sector-specific portfolio targets offer more reliable guidance. Combining emissions intelligence, robust data governance, and AI-driven processes enables financial institutions to implement credible, actionable transition strategies.

Financed emissions: a starting point with limitations

Managing GHG emissions financed through lending and investment is central to financial institutions' climate strategies. Financed emissions provide an initial view of a portfolio's carbon footprint, highlighting high-emitting sectors

and regions and signalling transition risk. They form a bridge between finance and the real economy, supporting hotspot analysis and informing risk management¹.

Yet, they are not perfect: attribution choices, valuation effects, and evolving data coverage can create volatility and distort comparisons. Consequently, they should be treated as directional indicators rather than definitive measures for target-setting.

From hotspot analysis to sectoral strategies

Short-term and intermediate targets are most meaningful when they allow financial institutions to track the annual decarbonisation progress of investees and borrowers. This

requires extending targets beyond total financed emissions, to avoid year-on-year changes driven by market dynamics or significant portfolio growth. Framing targets in line with sector-specific decarbonisation pathways is therefore particularly helpful.

Sector-specific targets

Portfolio segmentation by counterparty sector forms the foundation of leading science-based frameworks, including *SBTi*¹⁹. At the sectoral level, targets can be expressed in absolute or intensity terms. Absolute targets commit financial institutions to reduce total emissions – either by reducing the portfolio size or by nudging counterparties to decarbonise their

businesses. Intensity targets, by contrast, lower emissions per unit of output (for example, tonnes of CO₂e per megawatt hour of electricity generated, per tonne of cement produced, or per passenger kilometre). Unlike absolute figures, which fluctuate with portfolio size, intensity metrics allow meaningful comparisons over time and align more closely with real-economy decarbonisation pathway.

Both approaches are valuable²: absolute targets support net-zero alignment, while intensity targets enhance comparability and limit portfolio-growth distortions. In all cases, setting a target represents a long-term commitment to encourage counterparties to reduce their emissions.

Financial institutions exercise influence without control

Financial institutions do not directly control the emissions of the companies they finance, yet they can shape outcomes across the portfolio through a spectrum of levers. Influence begins before deal origination, by screening counterparties and setting expectations for climate performance, continues during the investment through engagement and monitoring, and extends post-investment via stewardship, collaboration with sector initiatives, or contractual mechanisms.

These levers range from “soft” measures, such as relationship management, dialogue on transition plans, and participation in industry decarbonisation efforts, to “hard” measures, including enforceable covenants, reporting requirements, and, where necessary, selective

divestment. The effectiveness of these actions depends on governance frameworks, risk appetite, portfolio composition, and the willingness of counterparties to respond.

Viewed through the lens of sectoral targets, this approach allows financial institutions to manage emissions influence even without direct control, prioritising interventions where they can have the greatest impact and aligning capital allocation with climate objectives.

Key priorities in the years to come

Whether financial institutions are only beginning to measure financed emissions or are already advancing towards sectoral target setting, three priorities can rapidly move their efforts to the next level. Extending data governance ensures consistency and reliability across

varied data sources. Controls and standardisation reduce operational risk and ensure reliable, comparable data. Finally, leveraging digital solutions and AI provides scalability, analytical depth, and reduced manual effort, enabling financial institutions to meet growing disclosure demands and transform data into actionable strategy.

Priority 1: Extend data governance

For financial institutions, data governance is the backbone of any credible climate strategy. Financed emissions draw on a mix of self-reported company data, third-party estimates, and modelled outputs, which makes consistency, comparability, and traceability vital. Without clear governance, emissions insights risk becoming fragmented and unreliable, undermining both disclosure quality and internal decision-making.

Strong governance requires transparent methodologies, alignment with recognised standards, and robust controls across the data lifecycle – from collection and verification to reporting and assurance. A solid data foundation underpins this, including standardised data definitions, quality checks, and a single source of truth.

Complementing this, a well-designed data architecture ensures emissions data flows correctly between systems, integrates with financial and risk platforms, and is accessible to all relevant teams.

Extending data governance to emissions data ensures that metrics move beyond box-ticking exercises and become actionable intelligence, capable of guiding strategic decision-making across portfolios.

Priority 2: Establish controls and standardisation

Embedding financed emissions into day-to-day operations begins with a robust risk and control framework. Responsibilities must be clearly defined across functions: credit teams, portfolio managers, risk officers, and relationship managers need to understand their roles in collecting, validating, and applying emissions data. Formalised processes should specify how emissions information feeds into credit approvals, portfolio monitoring, and risk assessments, with controls to ensure data accuracy, consistency, and auditability.

The next step is standardisation, ensuring that data definitions, reporting formats, and methodologies are consistent across teams and systems. By applying

common standards, the financial institution can reduce discrepancies, support reliable cross-functional decision-making, and create a clear audit trail for internal and regulatory purposes.

Controls and standardisation paves the way for digitalisation. Once responsibilities and controls are in place, workflow tools, system integrations, and analytics platforms can streamline data capture, validation, and reporting. Over time, these capabilities embed financed emissions management into the institution's operating DNA, aligning core business activity with long-term transition objectives while reducing manual effort and operational risk.

Priority 3: Leverage digital solutions and AI capabilities

As financial institutions enter the next phase of transition planning,

digital solutions will play a pivotal role. Data volumes are expanding, disclosure requirements are becoming more complex, and the need for timely, decision-ready climate insights is more pressing than ever. Financial institutions must leverage advanced data architectures and analytics to transform raw information into actionable emissions intelligence.

Digital solutions and AI-driven tools are unlocking new capabilities across the value chain: automation can streamline repetitive data collection, machine learning can improve data quality, address gaps, and enhance the accuracy of portfolio-level target monitoring. The most effective solutions are those that integrate seamlessly into existing workflows - enabling data to flow across functions without friction and ensuring consistency and accuracy from source to decision.

Importantly, technology should not be viewed as a standalone fix. Its real value lies in supporting stronger governance, faster data collection, better integration across teams, and more credible, forward-looking transition strategies. Financial institutions that embed digital capabilities into their core strategy - linking emissions data with investment decisions, risk models, and client engagement - will not only meet compliance demands but also turn financed emissions into a lever for climate impact, capital allocation, and long-term value creation.

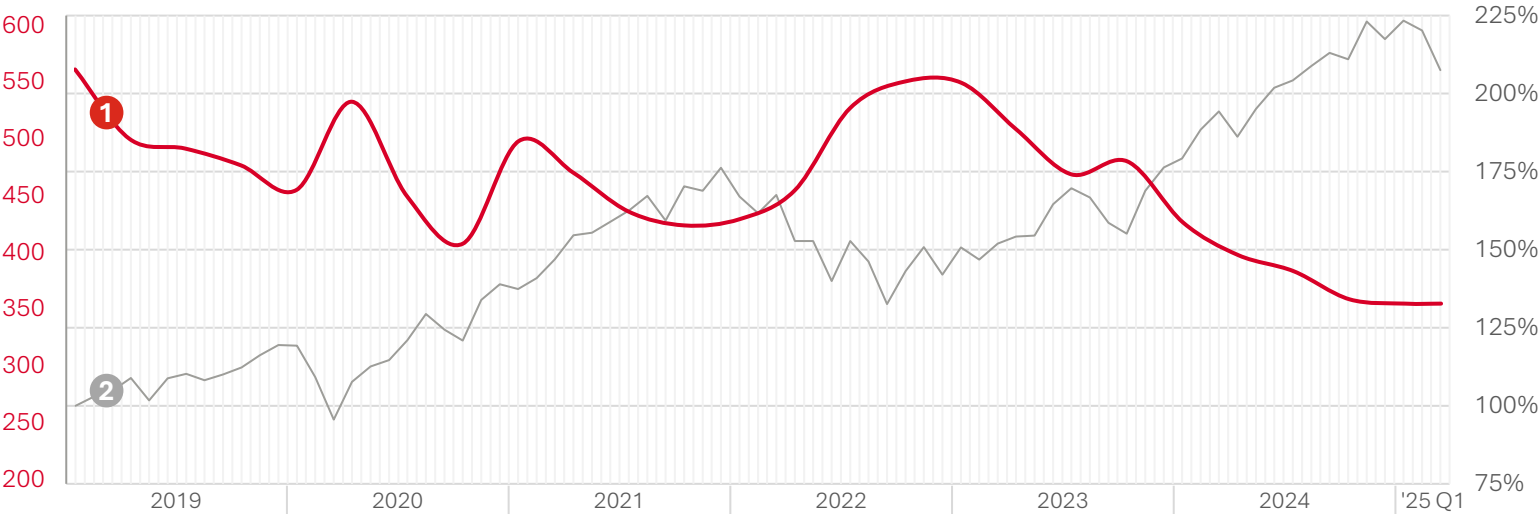
Appendix

Overview of selected regional portfolios

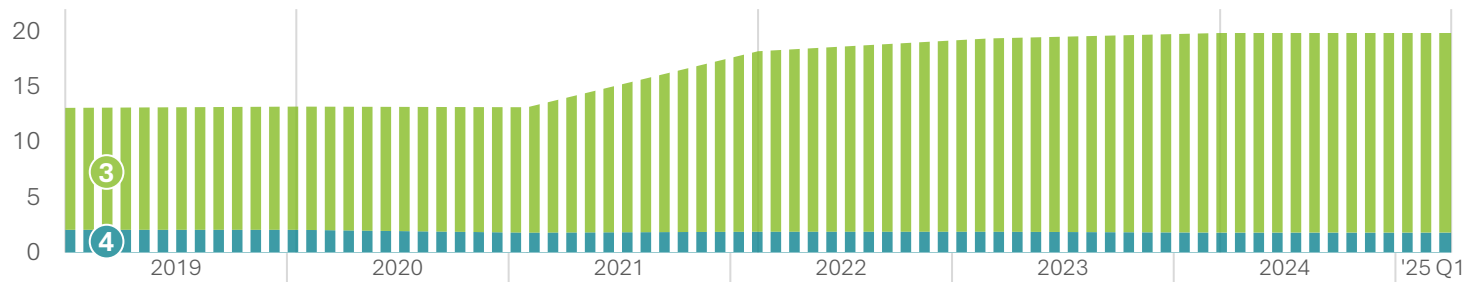
The following appendices illustrate how financed emissions vary across hypothetical regional portfolios, highlighting significant regional differences in the metric.

Figure 8b: How US capital market volatility drives changes in financed emissions

 Financed emissions of a portfolio tracking S&P 500 Index
Financed emissions scope 1, 2 & 3, tCO₂e/US\$m invested (left axis) and index performance, % (right axis)



 Carbon footprint of S&P 500 Index constituencies
Absolute total **scope 1 & 2**, and **scope 3** emissions of the index constituencies, billion tCO₂e



S&P 500 Index

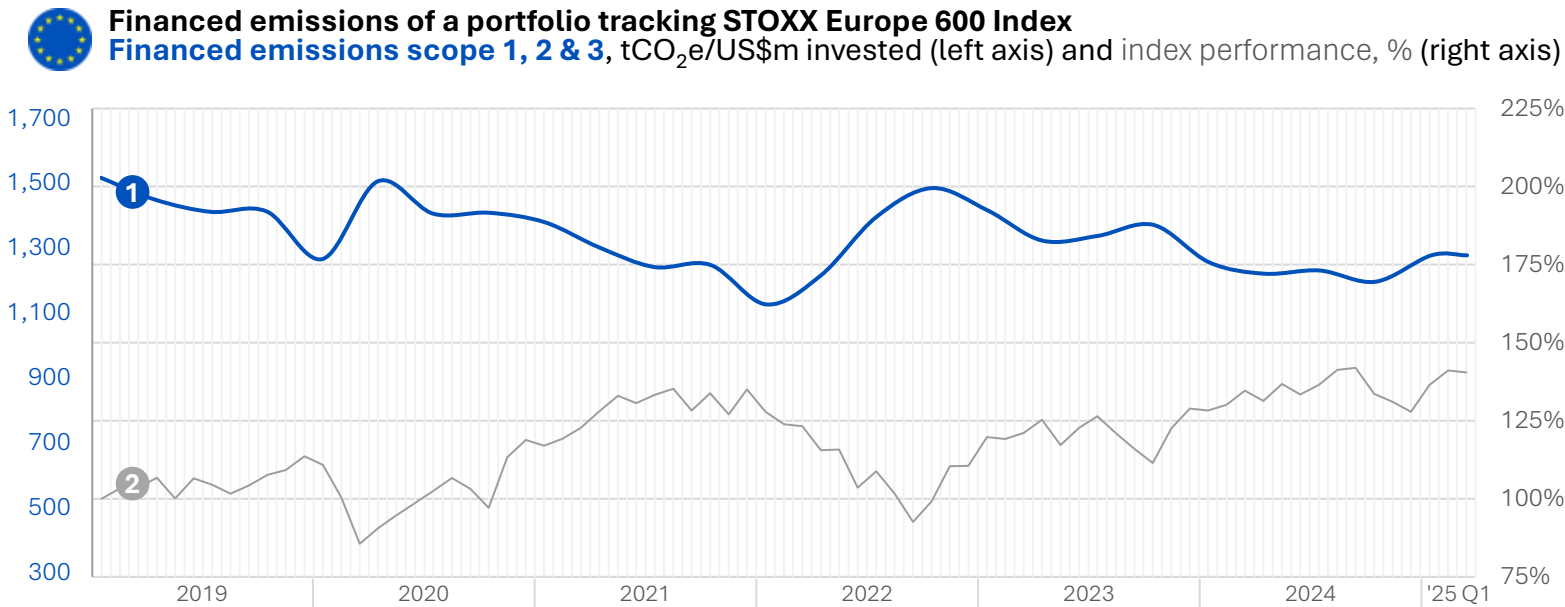
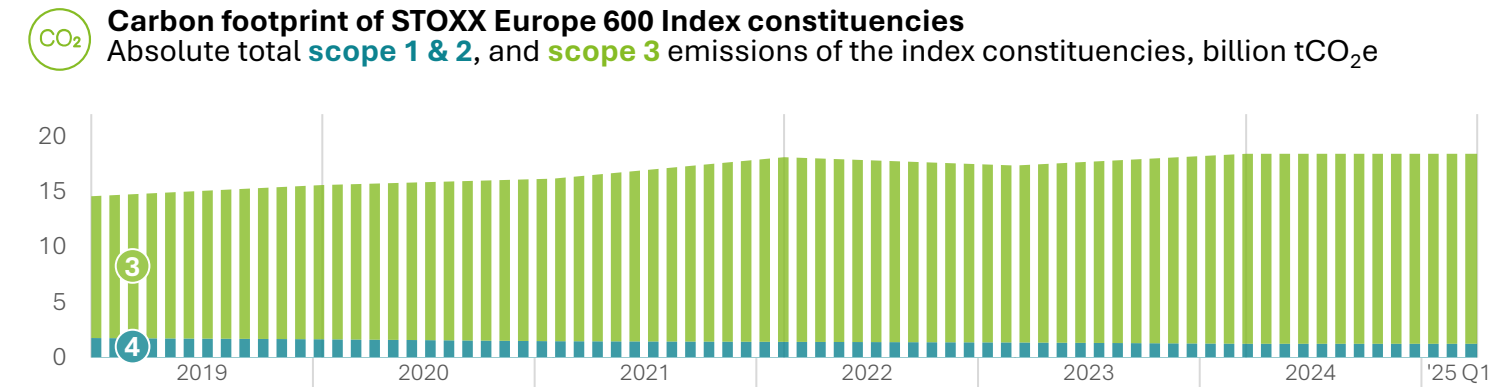
The S&P 500 Index is the main benchmark for US equities, tracking the performance of approximately 500 large US companies. It covers about 80% of the US market capitalisation, with constituents selected to broadly reflect the structure and sector balance of the US economy.

Over the past years, financed emissions **1** from a hypothetical portfolio mirroring the index have trended downward, though with significant year-to-year swings. These emissions are strongly and negatively linked with market performance **2**, meaning that when markets rise, financed emissions typically fall.

In absolute terms, companies in the index are responsible for nearly 20 billion tonnes of CO₂e. About 91% of these are value-chain scope 3 emissions **3**, while the remaining 9% stem from scope 1 and 2 emissions **4**.

Source: Deloitte analysis based on LSEG (emissions data) and S&P (index performance data). See the [Methodology section](#) in the appendix for details.
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Figure 8c: How European capital market volatility drives changes in financed emissions



STOXX Europe 600 Index

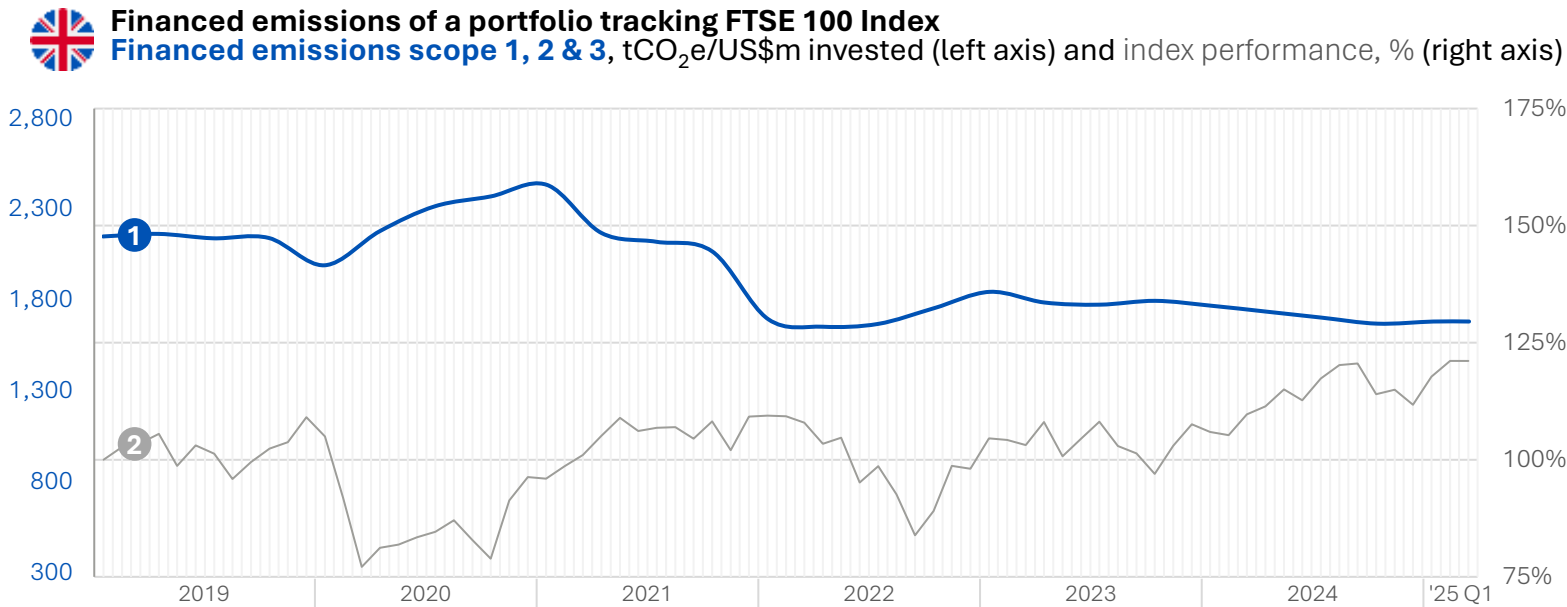
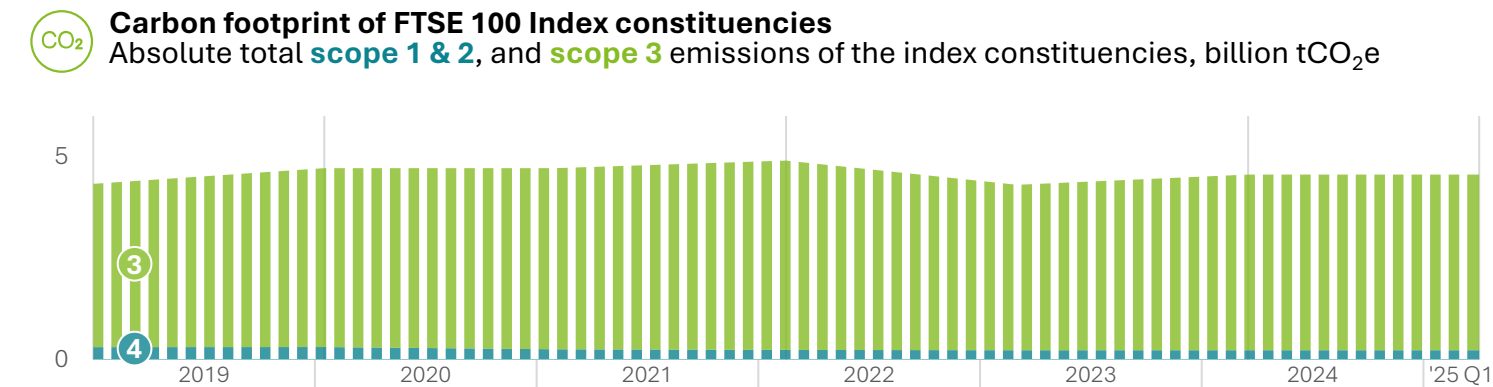
The STOXX Europe 600 Index benchmarks European equities, including large-, mid-, and small-cap companies across 17 countries. It consists of 600 constituents, capturing around 90% of Europe’s free float-adjusted market capitalisation across all major sectors.

Over the past years, financed emissions **1** from a hypothetical portfolio mirroring the index have trended slightly downward, with pronounced year-to-year swings. These emissions are strongly and negatively linked with market performance **2**, meaning that when markets rise, financed emissions typically fall.

In absolute terms, companies in the index are responsible for nearly 18 billion tonnes of CO₂e. About 93% of these are value-chain scope 3 emissions **3**, while the remaining 7% stem from scope 1 and 2 emissions **4**.

Source: Deloitte analysis based on LSEG (emissions data) and S&P (index performance data). See the [Methodology section](#) in the appendix for details.
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Figure 8d: How UK capital market volatility drives changes in financed emissions



FTSE 100 Index

The FTSE 100 Index is the UK’s leading equity benchmark, comprising the 100 largest companies on the London Stock Exchange by market capitalisation. It accounts for about 80% of the UK’s free float-adjusted market cap, with sector weights skewed toward financials, energy, consumer staples, and basic materials.

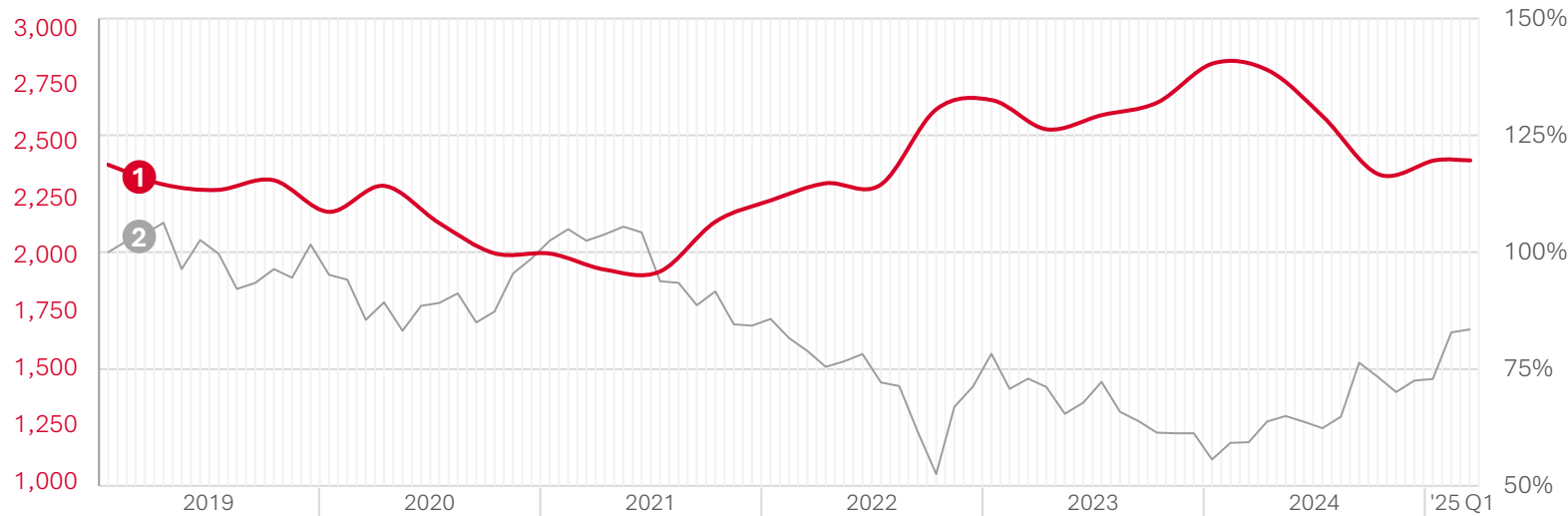
Over the past years, financed emissions **1** from a hypothetical portfolio mirroring the index have trended downward, with fluctuations gradually diminishing in scale. These emissions are strongly and negatively linked with market performance **2**, meaning that when markets rise, financed emissions typically fall.

In absolute terms, companies in the index are responsible for nearly 4.6 billion tonnes of CO₂e. About 95% of these are value-chain scope 3 emissions **3**, while the remaining 5% stem from scope 1 and 2 emissions **4**.

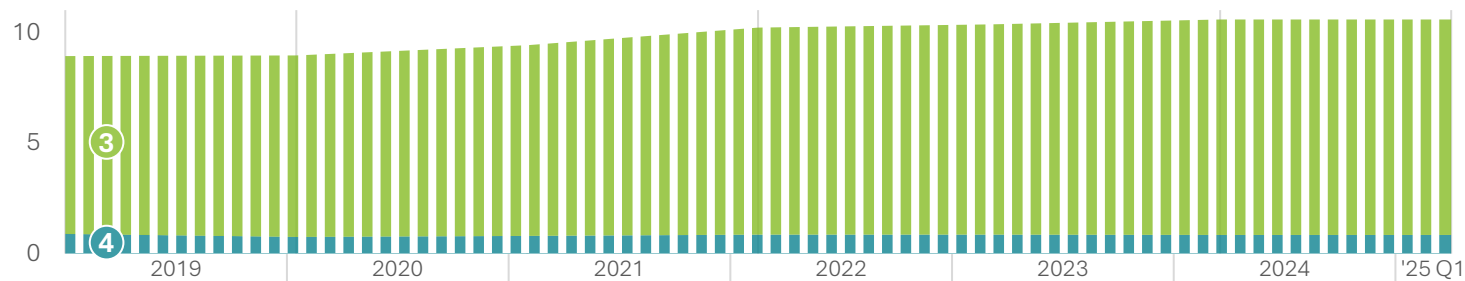
Source: Deloitte analysis based on LSEG (emissions data) and S&P (index performance data). See the [Methodology section](#) in the appendix for details.
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Figure 8e: How Chinese capital market volatility drives changes in financed emissions

Financed emissions of a portfolio tracking Hang Seng Index
Financed emissions scope 1, 2 & 3, tCO₂e/US\$m invested (left axis) and index performance, % (right axis)



Carbon footprint of Hang Seng Index constituencies
Absolute total **scope 1 & 2, and **scope 3** emissions of the index constituencies, billion tCO₂e**



Hang Seng Index

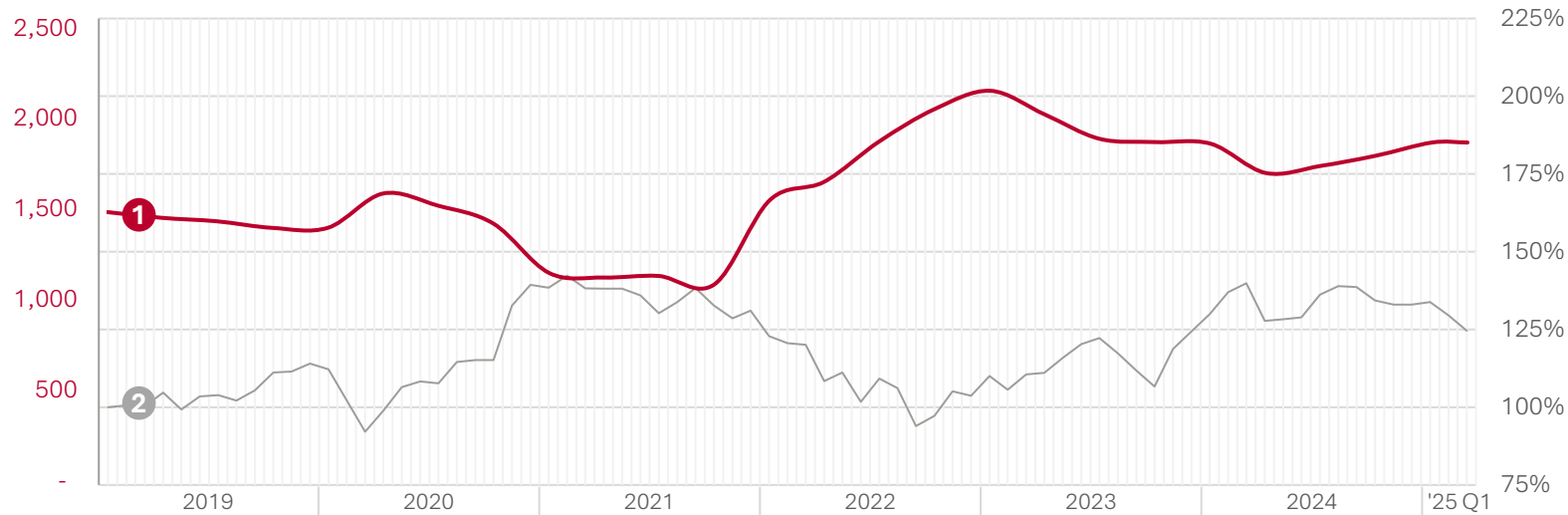
The Hang Seng Index is Hong Kong's key equity benchmark, covering around 80 of the largest and most liquid companies in financials, utilities, properties, and commerce. It represents approximately 60% of Hong Kong's market capitalisation and includes both local and Mainland China-linked firms.

Over the past years, financed emissions **1** from a hypothetical portfolio mirroring the index have shown year-to-year swings, while remaining broadly unchanged overall. These emissions are strongly and negatively linked with market performance **2**, meaning that when markets rise, financed emissions typically fall.

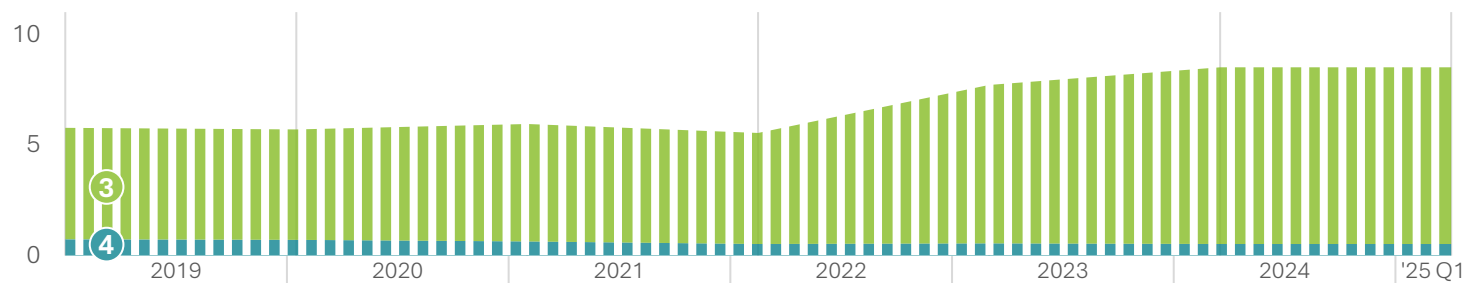
In absolute terms, companies in the index are responsible for nearly 10.6 billion tonnes of CO₂e. About 92% of these are value-chain scope 3 emissions **3**, while the remaining 8% stem from scope 1 and 2 emissions **4**.

Figure 8f: How Japanese capital market volatility drives changes in financed emissions

Financed emissions of a portfolio tracking Nikkei 225 Index
Financed emissions scope 1, 2 & 3, tCO₂e/US\$m invested (left axis) and index performance, % (right axis)



Carbon footprint of Nikkei 225 Index constituencies
Absolute total scope 1 & 2, and scope 3 emissions of the index constituencies, billion tCO₂e



Nikkei 225 Index

The Nikkei 225 Index tracks 225 large-cap companies listed on the Tokyo Stock Exchange, covering a broad range of sectors. It is price-weighted, has a historical focus on manufacturing and technology, and represents a significant share of Japan's market capitalisation.

Over the past years, financed emissions **1** from a hypothetical portfolio mirroring the index have trended slightly upward, though with significant year-to-year swings. These emissions are strongly and negatively linked with market performance **2**, meaning that when markets rise, financed emissions typically fall.

In absolute terms, companies in the index are responsible for nearly 8.5 billion tonnes of CO₂e. About 94% of these are value-chain scope 3 emissions **3**, while the remaining 6% stem from scope 1 and 2 emissions **4**.

Methodology

Approach to analysis

Figure 2: The GHG data availability barometer draws on a broad spectrum of proprietary and open-data platforms currently available to financial organisations for financed emissions accounting and modelling – such as Exiobase, IEA, UNFCCC, CDP, DEFRA, CRREM. We then applied the PCAF guidance for each asset class to assess the adequacy of each database in calculating financed emissions. Finally, we evaluated the completeness of data coverage that a financial organisation would achieve were it to acquire all these data sources for a hypothetical portfolio spanning every country, industry and asset class.

Figure 3: Self-reported GHG emissions data has been sourced through LSEG Workspace, a data platform of London Stock Exchange Group plc. Each square in the chart represents the completeness of GHG emissions disclosures by companies in the MSCI World Index over the period 2020–2024. Grey shading denotes a missing disclosure – either because the company did not report emissions data or because it declared such disclosure to be not material or not applicable.

Figure 4: Average emissions intensities per US\$ million invested represent sector averages for MSCI World Index constituents from 2019 to Q1 2025 (annualised). The figures show the tonnes of CO₂e emitted in one year per US\$ million of total assets of companies in each sector. Self-reported and modelled GHG emissions data has been sourced from LSEG Workspace, a data platform of London Stock Exchange Group plc. Environmentally extended input-output data represent global averages (World averages) for scope 1, 2 and 3 combined. This data is sourced from Exiobase 3.

Figures 8a, 8b, 8c, 8d, 8e, and 8f: The index performance charts display performance in US\$ to neutralise the impact of currency exchange fluctuations for comparison purposes. The index values are normalised to 100% as of 1 January 2019. GHG emissions data and certain financial data has been sourced through LSEG Workspace, a data platform of London Stock Exchange Group plc. Financial market data has been sourced through S&P Capital IQ Pro, a data platform of S&P Global Market Intelligence LLC. The “financed emissions” line on these figures represent total scope 1, 2 and 3 combined per one US\$ million invested.

Figure 9: The figure shows the average share of market capitalisation in the EVIC of the MSCI World Index constituencies from 2019 to Q1 2025 (annualised). Financial data has been sourced through LSEG Workspace, a data platform of London Stock Exchange Group plc.

Disclaimer

The figures on financed emissions for portfolios tracking selected indices presented in this publication are indicative and illustrative in nature. They do not constitute a position, endorsement or evaluation of any specific index. The figures presented in this publication may differ from official publications due to variations in calculation methodologies, alignment with specific frameworks, the definition of GHG emissions boundaries (e.g. inclusion of scope 3), and technical assumptions applied. For official data and methodologies, readers should refer to the disclosures provided by the relevant index administrators. This material has not been sponsored, endorsed, promoted, or reviewed by any index administrator, nor do such entities make any representation as to its accuracy or completeness.

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Colophon

Continue the conversation



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