

# Scope for improvement

## Solving the Scope 3 conundrum

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# Overview

Scope 3 greenhouse gas (GHG) emissions – which link to a company’s activities but occur outside of the company’s operational control across the value chain – vary across companies and sectors, but on average account for over 80% of corporate carbon footprints. Accounting for these emissions is critical for investors to analyse transition risks associated with their investments and comply with net zero commitments and evolving regulatory standards.

However, poor quality and gaps in the data often make it challenging for investors to systematically assess Scope 3 exposures in their portfolios and to factor Scope 3 emissions in investment processes and reporting.

In this paper, we focus on a set of 10 key questions on Scope 3 that are frequently asked within the institutional investment community. Our primary audience is investors and other finance sector professionals who are looking to better understand and use Scope 3 data, but we hope that the report is also informative to a broader set of stakeholders, including disclosing companies, academics, standard setters, and policy makers.

The core of our research focuses on proposing a new method to determine the most material Scope 3 categories in each sector (excluding financed and facilitated emissions). We use this framework to systematically assess the quality of existing disclosures and discuss how missing Scope 3 data can be estimated. We also review the latest regulatory developments in key jurisdictions and how investors can use Scope 3 in conjunction with Scope 1 and 2 data. We conclude with recommendations for corporates disclosers, investors, standard setters and regulators.

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# Executive summary

Scope 3 emissions present one of the most vexing problems in climate finance. There is broad agreement that considering Scope 3 emissions is indispensable to a clear-eyed assessment of climate risks for companies. However, practical integration in portfolio analysis and investment decisions is often hobbled by the complexity of Scope 3 accounting, low disclosure rates, variable data quality, high volatility, and poor comparability.

We argue that lack of consensus on which categories should be regarded as material is key to the Scope 3 Conundrum. As a way forward we propose a new, parsimonious, and empirically driven approach to determine the most material Scope 3 categories in each sector, which can help lower reporting burdens for companies and increase the quality and comparability of both, reported and estimated Scope 3 data.

## 1. What are Scope 3 emissions and why do they matter?

These emissions are linked to a company's activities but occur outside of its operational control, with different types of upstream and downstream emissions classified in 15 different categories. **On average, Scope 3 emissions account for over 80% of overall carbon footprint of companies in our coverage** – though related transition risks vary depending on business model specifics and the ease of abatement.

## 2. How do companies measure Scope 3 emissions?

Companies can't directly measure their Scope 3 emissions, like they can for Scope 1, and estimating them does not follow a standardised procedure, like for Scope 2. Instead, companies need to analyse the main potential sources and then determine which to focus on in their reporting. **Existing standards provide broad discretion on which emissions to include, how to categorise them, and what data and methods to use to measure them** – creating a much higher reporting burden for Scope 3 emissions for companies, but also contributing to poor data quality and comparability for investors.

## 3. What do standard-setters and regulators have to say on Scope 3?

Following integration into key global standards like TCFD and ISSB, **mandatory Scope 3 reporting is being introduced in key jurisdictions, including the EU (2025), Japan (2025), the State of California (2026) and the UK (yet to be determined)**. Regulators are guiding firms to disclose their most 'material' or 'significant' emissions, but largely sidestep the question of which Scope 3 categories to cover or how to determine materiality.

## 4. What Scope 3 emissions should investors consider material?

Lack of consensus on which sources should be regarded as material often makes disclosures immaterial or difficult to assess. However, our research identifies **the two most material Scope 3 categories in each sector and shows that these on average cover 81% of total Scope 3 emissions, providing a useful rule of thumb to determine the most material categories** for investors and companies.

## 5. What is the current state of disclosure?

A total of **45% of large and medium-sized listed companies disclose Scope 3 data, but less than half of them cover the most material categories for their sector. Data also remains volatile, with over a third of disclosed values varying at least 50% YoY** and half varying at least 20%. Changes to reported Scope 3 categories is major source of variation, with almost half of reporting companies in the FTSE All-World Index either adjusting categories (37%) or disclosing for the first time (12%).

## 6. How can missing Scope 3 data be estimated?

Scope 3 emissions can be imputed through a variety of methods. **We use several strategies to improve the accuracy and robustness of our estimates** – including (1) systematically quality controlling input data; (2) separately estimating upstream and downstream emissions; (3) employing a multi-model approach; and (4) using a data quality hierarchy approach to curating the final data sets.

## 7. What is the quality of estimated data?

Ultimately, the quality of estimated data is inherently constrained by the quantity and quality of the available reported data. Compared to Scope 1 and 2 estimates, **Scope 3 estimation models must work with a third less input data – which, on average, is also almost twice as variable and more than twice as volatile.**

## 8. How should investors use Scope 3 data alongside Scope 1 and 2 emissions?

Due to the different relationship to management control, the overall lack of maturity of available Scope 3 data and inherently higher margins of uncertainty **investors should consider Scope 3 analysis as complementary to Scope 1 and 2 analysis and resist the temptation to aggregate emissions across all scopes into a single metric.** Investors also need to be mindful of the complex effects that Scope 3 integration can have on other widely-used climate metrics, including WACI and ITR.

## 9. Where does this leave companies, investors and standard setters?

We provide recommendations on Scope 3 for each. Cutting across them, **we emphasise the need to systematically focus on the most material Scope 3 categories in each sector to reduce reporting burdens and improve quality and comparability of Scope 3 data.**

## 10. What else to read on Scope 3?

We provide a **short, non-exhaustive guide to key research on Scope 3** emissions from academics and practitioners.

# 1. What are Scope 3 emissions and why do they matter?

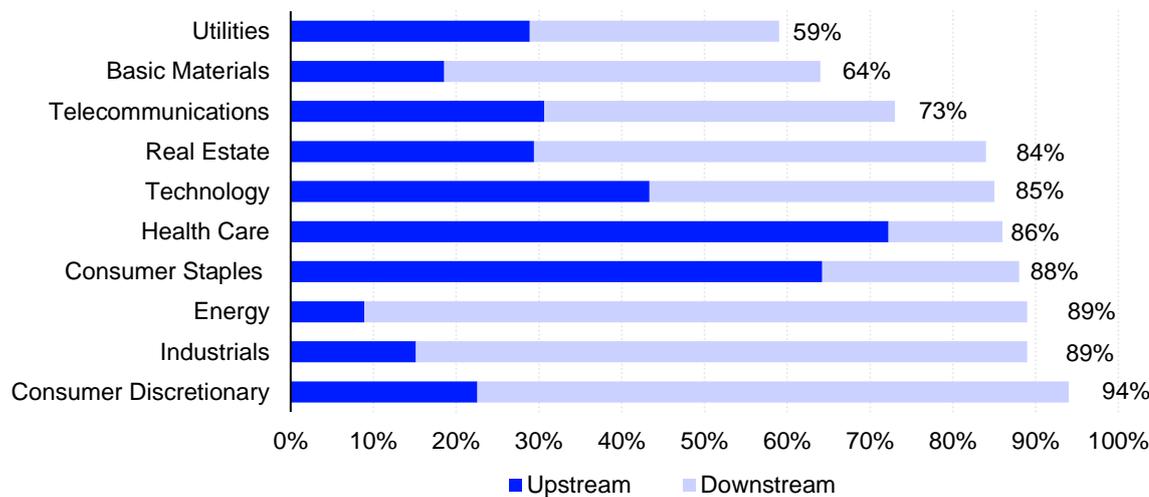
As per the accounting guidance by the GHG Protocol<sup>1</sup>, Scope 3 emissions encompass all emissions that occur outside of the company's immediate control but are associated with their value chain, from raw material extraction to waste treatment of the product after its use phase.

These emissions can arise from a diverse set of sources and extend along complex global value chains, making them more difficult to evaluate than Scope 1 (that are generated directly by the company) or Scope 2 emissions (indirect emissions linked to the company's operational energy consumption). On average, they account for over 80% of overall carbon footprint of companies<sup>2</sup> with at least 60% of emissions for the Utilities sector, and over 90% of emissions for the Consumer Discretionary sector (See Figure 1).

The GHG Protocol divides Scope 3 emissions into 15 categories as shown in Table 1. These categories are classified into two main groups: upstream emissions related to purchased or acquired goods and services; and downstream emissions related to sold goods and services, also including leased assets and investments. Upstream emissions are more typically dominant for sectors producing finished products or using carbon-intensive inputs, whereas downstream emissions make up a larger share in sectors producing raw materials or intermediary products (See Figure 1).

**Figure 1. Scope 3 typically comprises the majority of a company's overall emissions**

Average share of Scope 3 in total emissions



Source: FTSE Russell, January 2024. Note: The total share of Scope 3 in total emissions calculation is based on FTSE All-World Index constituents reporting Scope 3 emissions; upstream and downstream shares calculation is based on FTSE All-World Index constituents' reported and estimated Scope 3 emissions.

Any assessment of a firm's climate impact and carbon risk is incomplete without considering Scope 3 emissions. Companies with large downstream emissions footprints – future emissions that are generated when customers use the companies' products, such as an aircraft manufacturer – may come under pressure from regulators or face obsolescence risk from the introduction of low carbon alternatives. Where companies rely on carbon-intensive inputs, such as consumer electronics or food and beverage

<sup>1</sup> See: [The Greenhouse Gas Protocol, 'Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard, Supplement to the GHG Protocol Corporate Accounting and Reporting Standard' \(2011\)](#), (Accessed: 01/12/2023).

<sup>2</sup> Calculation based on FTSE All-World Index constituents reporting Scope 3 emissions

companies, they may face significant future cost inflation or pressure from customers to decarbonise their supply chains.

However, the relationship between Scope 3 emissions and transition risks for a company's specific business model can be complex, requiring careful consideration of the nature of a company's Scope 3 emissions and the associated ease of abatement. A company dependent on a product with significant downstream Scope 3 emissions may face material transition risk as lower carbon alternatives become available. The same volume of Scope 3 emissions may be less of a challenge to its business model where it relates to upstream emissions linked to the power consumption of suppliers – as those emissions are likely to decrease over time as the grid decarbonises.

Similarly, make-or-buy decisions can also shift large volumes of emissions between a company's Scope 1 and 2 emissions and its upstream Scope 3 emissions, without necessarily impacting the actual carbon intensity of the overall production process, or the transition risk it faces.

Note that this report does not address financed and facilitated emissions, which are covered under 'Category 15: Investments' and are critical to understanding exposure to climate risks for companies in the finance sector. The GHG Protocol currently provides only limited guidance for estimating these emissions and data availability for this category currently remains limited. Measurement practices are, however, evolving rapidly, with a new reporting framework for financed and facilitated emissions proposed by the Partnership for Carbon Accounting Financials (PCAF) in 2022.

**Table 1. Breakdown of Scope 3 categories**

#	Category	Description
Upstream	1 Purchased goods and services	Extraction, production and transportation of goods and services purchased or acquired by the company
	2 Capital goods	Extraction, production and transportation of capital goods purchased or acquired by the company
	3 Fuel- and energy-related activities (not included in Scopes 1 or 2)	Extraction, production and transportation of fuels and energy purchased or acquired by the company, not already accounted for in Scope 1 or Scope 2
	4 Upstream transportation and distribution	Transportation and distribution of products/services, whether purchased from tier 1 suppliers or facilitated through third-party services, covering inbound and outbound logistics, and inter-facility transportation
	5 Waste generated in operations	Disposal and treatment of waste generated in the company's operations (in facilities not owned or controlled by the reporting company)
	6 Business travel	Transportation of employees for business-related activities (in vehicles not owned or operated by the reporting company)
	7 Employee commuting	Transportation of employees between their homes and their worksites (in vehicles not owned or operated by the reporting company)
	8 Upstream leased assets	Operation of assets leased by the company (lessee) and not included in Scope 1 and Scope 2 – reported by lessee
Downstream	9 Downstream transportation and distribution	Transportation and distribution of products sold by the company between the company's operations and the end consumer (if not paid for by the company), including retail and storage (in vehicles and facilities not owned or controlled by the company)
	10 Processing of sold products	Processing of intermediate products sold by downstream companies (e.g., manufacturers)
	11 Use of sold products	End use of goods and services sold by the company
	12 End-of-life treatment of sold products	Waste disposal and treatment of products sold by the company at the end of their life
	13 Downstream leased assets	Operation of assets owned by the company (lessor) and leased to other entities, not included in Scope 1 and Scope 2 – reported by lessor
	14 Franchises	Operation of franchises, not included in Scope 1 and Scope 2 – reported by franchisor
	15 Investments	Operation of investments (including equity and debt investments and project finance) in the reporting year, not included in Scope 1 or Scope 2

Source: FTSE Russell, January 2024. Note: Adapted from The GHG Protocol, 'The Corporate Value Chain (Scope 3) Accounting and Reporting Standard' (2011).

## 2. How do companies measure Scope 3 emissions?

Reporting Scope 3 emissions poses unique challenges for companies. As they occur outside of the operational control of the organisation, companies can't directly measure their Scope 3 emissions in the same way they can measure Scope 1 emissions. Given their complex and heterogenous nature, estimating them does not follow a straightforward, highly standardised procedure as is seen for Scope 2 emissions.

Instead, current standards still give Scope 3 reporters leeway over key aspects of the data estimation and curation process. This allows for significant discretion in determining what emissions should be reported, how they are classified across the different Scope 3 categories, and what methods and data sources are being used to estimate the emissions.

### What emissions? Defining boundary conditions and identifying emission sources

Due to the complexity of products and global value chains, complete reporting of Scope 3 is generally only a theoretical aspiration. An automaker trying to determine its 'Category 1: Purchased good and services', must, for example consider the embedded emissions of tens of thousands of individual parts sourced from hundreds of different Tier 1 suppliers, who in turn, source inputs from thousands of Tier 2 suppliers that source raw materials from Tier 3 suppliers across global value chains.

In practice, companies are responsible for identifying the main potential sources of Scope 3 emissions and then determining which sources to focus on and with what degree of granularity to evaluate them. The GHG Protocol encourages companies to maintain a representative inventory of the "most significant GHG emissions, [that] offer the most significant GHG reduction opportunities and are most relevant to the company's business goals".<sup>3</sup> To guide companies in determining which of these emissions should be included, the protocol has defined a list of criteria, summarised in Table 2.

#### Box 1. Examples of Scope 3 emissions

**Smartphone:** Most of the emissions occur outside the manufacturing process or the distribution and sales process in the value chain. Upstream emissions are generated when extracting and processing materials used to build the components of the device, and downstream emissions occur during the use phase linked to both the electricity consumption of the device and energy intensive data usage.

**Automobile:** Although upstream emissions can be significant, most Scope 3 emissions for automotive producers occur during the use phase of the vehicle, consisting of tailpipe emissions for conventional cars or the emissions linked to power generation to power electric vehicles. They can vary drastically, depending, for example, on typical usage patterns or the weight and the size of the car.

**Food products:** While food producers often generate substantial emissions during manufacturing (transformation, heating, cooling) and distribution (packaging, transport), the bulk of emissions typically occur at the beginning of the value chain. These relate to emissions-intensive agricultural processes linked to livestock and crop production (including those generated through land-use change such as deforestation).

Source: FTSE Russell, January 2024.

This results in heterogenous reporting practices, with companies rarely reporting against all 15 Scope 3 categories. Significant discrepancies also exist in how companies choose to classify emissions, leading to large inter-company variation (see Box 2). This makes it difficult to compare data across reporters –

<sup>3</sup> From: [The Greenhouse Gas Protocol, 'The Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard' \(2011\)](#), p.65

despite efforts to gradually standardise accounting methodologies through increasingly granular sector guidance<sup>4</sup>.

This also means that Scope 3 emissions face significantly higher greenwashing risk than Scope 1 or 2 emissions. Reporters still frequently omit the most material sources of Scope 3 emissions; and focus on reporting easier to measure, but less material, sources (see Section 4). A good example is ‘Category 6: Business Travel’ – 87% of companies that disclose Scope 3 data disclose data for this category, though it represents less than 1% of total emission disclosed by all companies.

**Table 2. GHG Protocol criteria to determine which Scope 3 emissions should be covered**

Criteria	Description
<b>Size</b>	Is the activity expected to materially contribute to the company’s total Scope 3 emissions?
<b>Influence</b>	Can the company reasonably contribute to or encourage potential emissions reductions?
<b>Risk</b>	Are these emissions meaningfully linked to the companies’ risk profile (e.g., financial, regulatory, litigation or reputational risks)?
<b>Stakeholders</b>	Is the type of emissions deemed critical by key stakeholders (e.g., customers, suppliers, investors, regulators or standard-setters)?
<b>Outsourcing</b>	Do the emissions relate to outsourced activities that either were previously performed in-house or are typically performed in-house by sector peers?
<b>Sector guidance</b>	Have the emissions been identified as significant by sector-specific guidance?
<b>Other</b>	Do the emissions meet any additional criteria for determining relevance developed by the company or industry sector?

Source: FTSE Russell, January 2024. Note: Based on The Greenhouse Gas Protocol, ‘The Corporate Value Chain (Scope 3) Accounting and Reporting Standard’ (2011)

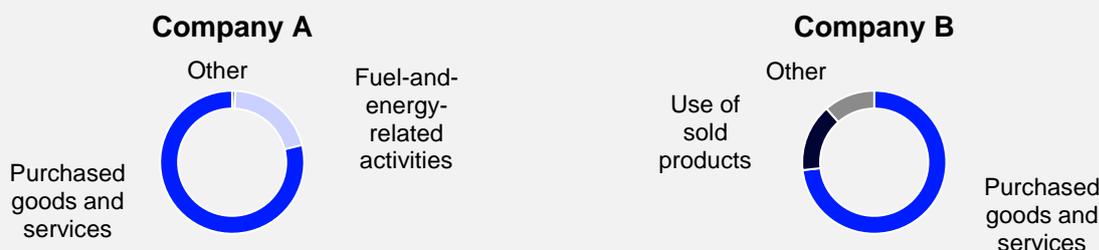
**Box 2. Similar companies can show large disparities in Scope 3 reporting**

Given the variety of emissions sources and different ways companies choose to categorise them, two companies with similar business models and Scope 3 intensities can end up with a different breakdown of those emissions.

Figure 2 captures real-world Scope 3 emissions disclosures for two large European retailers with relatively high-quality reporting. For both retailers, ‘Category 1: Purchased goods and services’ represents the bulk of Scope 3 emissions. Both also operate petrol stations, which make up a relatively small part of their business but are material in terms of Scope 3 emissions. Company B accounts for these as downstream Scope 3 emissions under ‘Category 11: Use of sold products’. In contrast, Company A chooses to reports them as ‘Category 3: Fuel- and energy-related activities’ – an upstream category – and reports no downstream emissions.

Ultimately, both report similar total Scope 3 intensities (992 vs. 1107 tCO2-eq/MUSD) from similar sources. But this example illustrates how different methods of accounting for the same emissions can result in significant discrepancies in reporting, with Company A reporting almost no downstream emissions and over 99% upstream emissions, compared to around 20% downstream emissions for Company B and less than 80% upstream emissions.

**Figure 2. Disclosed categories can vary widely between companies**



Source: FTSE Russell, January 2024.

<sup>4</sup> On this topic, see [“Asset owners grapple with the limits of Scope 3”, Responsible Investor](#). (Accessed: 11/01/2024).

## Which calculation method? The choice of data sources and estimation methods

After defining emissions sources in its Scope 3 inventory, a company needs to compute the associated emissions. There are two principal methods to compute Scope 3 emissions:

- Using reported GHG emissions data from suppliers or clients
- Estimating emissions through a combination of activity data (e.g., volumes of inputs or sold products or in some cases spend data) and emissions factors (e.g., industry averages, public databases of emissions factors).

However, for each Scope 3 category, there are multiple different types of input data (mostly sourced from external stakeholders) with different levels of granularity and accuracy, that can be used to estimate data. For example, to estimate 'Category 1: Purchased good and services', reporters can either use the 'supplier-specific method' (based on surveying suppliers to obtain product lifecycle GHG emissions data) or the 'spend-based method' (based on estimating emissions with similar techniques to those used by investors to estimate the Scope 1 and 2 emissions of companies that don't report their emissions),<sup>5</sup> or a combination of both.

The highest-quality Scope 3 reporting would typically involve a full lifecycle analysis (LCA)<sup>6</sup> of key products and inputs (often conducted by specialised third parties), supported by extensive data collection from both suppliers and customers. Due to time and cost constraints, however, companies often resort to several simplifying assumptions, which tend to decrease the quality of the reported data and comparability with data reported by other firms.

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<sup>5</sup> Simmons, J. & al. (2022). "Mind the gaps: Clarifying corporate carbon". FTSE Russell.

<sup>6</sup> A lifecycle analysis is a suite of analytical methods and constraints meant to assess the environmental impact of a product, process, or service over their entire supply chain – from the sourcing of raw materials to its use by customers and disposal. Although it is considered to be the most accurate method for calculating upstream Scope 3 emissions, it is not entirely free of uncertainty (see Perkins, J. & al. (2019). *Uncertainty Implications of Hybrid Approach in LCA: Precision versus Accuracy*. Environmental Science & Technology 2019 53 (7), 3681-3688 DOI: 10.1021/acs.est.9b00084.).

## 3. What do standard-setters and regulators have to say on Scope 3?

Since Scope 3 emissions were first defined in 2001<sup>7</sup> by the GHG Protocol and its early integration in the CDP questionnaire in 2003<sup>8</sup>, standard setters – including GRI, TCFD, and ISSB – have increasingly encouraged companies to report on them. In 2011, the Corporate Value Chain (Scope 3) Standard of the GHG Protocol established a new framework for companies to report on their Scope 3 GHG emissions. Its subsequent incorporation into the TCFD recommendations in 2017 marked a further significant milestone, followed by the 2023 inclusion of Scope 3 emissions disclosure requirements in the IFRS S2 standard by the ISSB.

Their guidance of these standards generally focused on four key requirements:

- To report Scope 3 GHG emissions if ‘appropriate’ (TCFD), ‘material’ (ISSB), or ‘significant’ (GRI).
- To follow the GHG Protocol’s Corporate Value Chain Standard in their Scope 3 emissions disclosures (ISSB, TCFD, GRI).
- To follow the guidelines of the Partnership for Carbon Accounting Financials (PCAF) to disclose Scope 3 ‘Category 15: Investments’ emissions (TCFD, ISSB).
- To provide a description of the methodologies, assumptions and data quality controls used to calculate or estimate Scope 3 emissions (ISSB, TCFD, GRI).

Mandatory Scope 3 disclosure requirements are also increasingly being discussed by regulators in several key jurisdictions (see Table 3). The EU, as well as the State of California, have announced that they will make Scope 3 emissions disclosures mandatory for companies over the course of the next two years. In the UK and Japan, the planned ISSB integration into national corporate disclosure rules would also require listed companies to begin reporting on their Scope 3 emissions after adoption. Similar rules have been proposed in the US at the federal level, however, following the consultation on the rule, its implementation remains uncertain.

Meanwhile, both standard-setters and regulators have so far largely sidestepped the question of which Scope 3 categories corporates should cover in their disclosures, instead guiding companies to disclose their most “material” or “significant” emissions (see Box 3: What Scope 3 emissions should be considered “material?”). However, beyond general guidelines (see Table 2 in the previous section) there is currently limited consensus on how companies should determine significance or materiality.

<sup>7</sup> See: [The Greenhouse Gas Protocol, 'Scope 3 Frequently Asked Questions', \(2022\)](#), (Accessed: 01/12/2023).

<sup>8</sup> See: [Carbon Disclosure Project, 'Carbon Disclosure Project 2010, Global 500 Report' \(2010\)](#), (Accessed: 01/12/2023).

**Table 3: Scope 3 regulatory landscape**

Country	Key requirements
EU	Since 2018, the EU Commission has recommended (but not required) that companies report their Scope 3 emissions as part of its guidelines on reporting climate-related information under the non-financial reporting directive (NFRD). Under the new European Sustainability Reporting Standards (ESRS) as part of the Corporate Sustainability Reporting Directive (CSRD), all listed companies will be required to report Scope 3 emissions if deemed material (from a double materiality perspective) and "significant" from 2025 onwards.
Japan	Under current regulations, Scope 3 disclosures are voluntary in Japan. In 2023, the Japanese Financial Services Agency (FSA) required all listed companies to disclose sustainability-related information using the TCFD pillars, but with no mandatory requirements on Scope 3 emissions. The Sustainability Standards Board of Japan (SSBJ) is currently preparing ISSB implementation, with draft standards – including requirements on Scope 3 disclosures – expected for March 2024, with the final standards expected by March 2025.
UK	The UK's Financial Conduct Authority (FCA) has encouraged (but not required) premium and standard listed companies to report Scope 3 emissions where "appropriate" since 2020, in line with the 2017 TCFD recommendations. In the first half of 2024, the FCA is expected to consult on proposals to implement new disclosure rules for listed companies that reference the UK-endorsed IFRS S1 and IFRS S2, including Scope 3 disclosure requirements. In parallel, the UK Government is running an assessment process to review the standards for adoption in the UK, which is intended to conclude by July 2024.
USA	Under current regulations, Scope 3 disclosures are voluntary in the US. In 2022, the Securities and Exchange Commission (SEC) proposed – as part of its draft climate disclosure rules – to make Scope 3 disclosures mandatory for all listed companies "if material or if the entity has set a GHG emissions target or goal that includes Scope 3 emissions". Following a consultation period, the rules are yet to be finalised. As of October 2023, California's adopted climate disclosure laws require businesses active in the state "with more than \$1 billion in annual revenue to report their scope 1, 2 and 3 emissions" <sup>9</sup> from 2027 onwards, though implementation could be delayed. <sup>10</sup>

Source: FTSE Russell, January 2024.

### Box 3. What Scope 3 emissions should be considered 'material'?

**TCFD:** "When considering whether to disclose Scope 3 GHG emissions, organisations should consider whether such emissions are a significant portion of their total GHG emissions."<sup>11</sup>

**SBTi:** "If a company's relevant Scope 3 emissions are 40% or more of total Scope 1, 2 and 3 emissions, they must be included in near-term science-based targets."<sup>12</sup>

**GRI:** "The reporting organisation can identify other indirect (Scope 3) GHG emissions by assessing which of its activities' emissions contribute significantly to the organisation's total anticipated other indirect (Scope 3) GHG emissions."<sup>13</sup>

**SEC (proposed draft):** "Consistent with the Commission's definition of 'material' and Supreme Court precedent, a registrant would be required to disclose its Scope 3 emissions if there is a substantial likelihood that a reasonable investor would consider them important when making an investment or voting decision."<sup>14</sup>

**ISSB - IFRS S1:** "In the context of sustainability-related financial disclosures, information is material if omitting, misstating or obscuring that information could reasonably be expected to influence decisions that primary users of general-purpose financial reports make on the basis of those reports, which include financial statements and sustainability-related financial disclosures and which provide information about a specific reporting entity."<sup>15</sup>

**ESRS E1:** "Identify and disclose its significant Scope 3 categories based on the magnitude of their estimated GHG emissions and other criteria provided by GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (Version 2011, p. 61 and 65-68) or EN ISO 14064-1:2018 Annex H.3.2, such as financial spend, influence, related transition risks and opportunities or stakeholder views."<sup>16</sup>

Source: FTSE Russell, January 2024.

<sup>9</sup> See: [California Legislative Information, 'SB-253 Climate Corporate Data Accountability Act', \(2023\)](#). (Accessed: 01/12/2023)

<sup>10</sup> See: [Newsom's budget cuts threaten to delay California's new environmental disclosure laws | GreenBiz](#) (Accessed: 22/01/2024)

<sup>11</sup> See: [Task Force on Climate-related Financial Disclosures, 'Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures', \(2021\)](#). (Accessed: 01/12/2023)

<sup>12</sup> See: [Science Based Targets, 'SBTi Criteria and recommendations for near-term targets', \(2023\)](#). (Accessed: 01/12/2023)

<sup>13</sup> See: [GRI Standards, 'GRI 305: Emissions', \(2016\)](#). (Accessed: 01/12/2023)

<sup>14</sup> See: [Securities and exchange commission, 'The Enhancement and Standardization of Climate-Related Disclosures for Investors', \(2022\)](#). (Accessed: 01/12/2023)

<sup>15</sup> See: [IFRS Sustainability, 'General Requirements for Disclosure of Sustainability-related Financial Information', \(2023\)](#). (Accessed: 01/12/2023)

<sup>16</sup> See: [EFRAG, 'ESRS 1: Climate Change', \(2022\)](#). (Accessed: 01/12/2023)

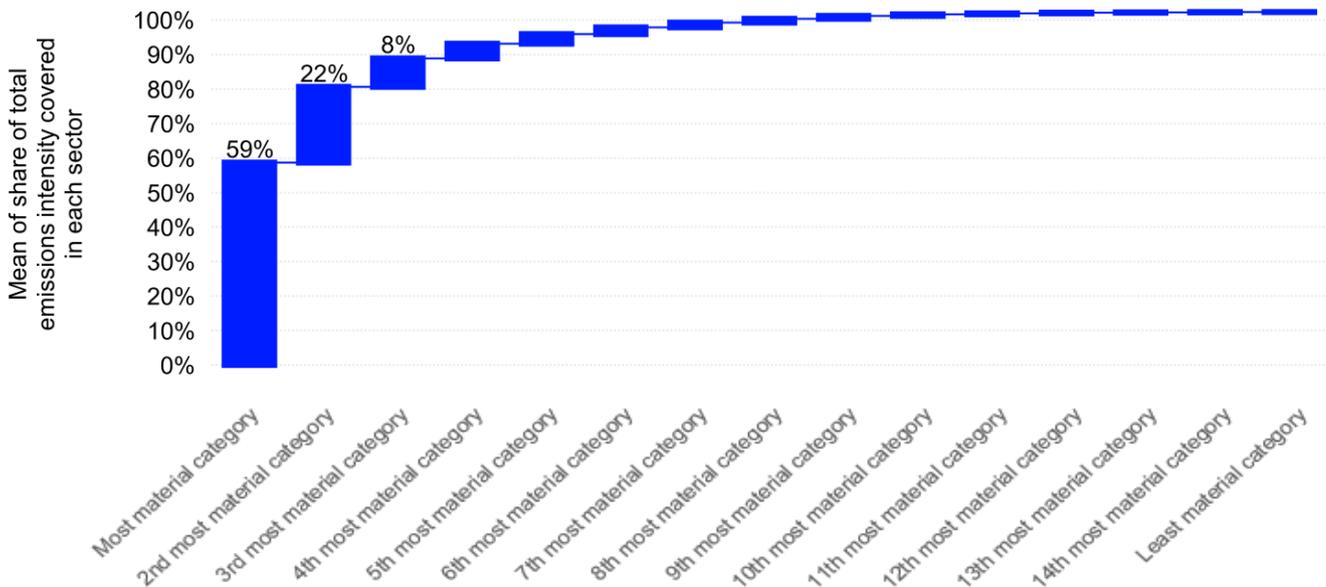
## 4. What Scope 3 emissions should investors consider material?

In the absence of specific regulatory guidance or standards, investors need a clear perspective on what corporate Scope 3 emissions to regard as material to inform their investment process and corporate engagement. This poses significant challenges given the variability of Scope 3 emissions categories that companies cover in their disclosures, with an average of six categories disclosed for companies that report their Scope 3 emissions.<sup>17</sup>

To address this challenge, we propose an empirically-driven, parsimonious approach that focuses on the most material Scope 3 categories and accounts for the most important sectoral differences.

- Using a sample of over 4,000 large and medium-sized listed companies, we first calculate the median Scope 3 intensity per dollar of revenue for each Scope 3 category in each sector. This is based on all available reporting from companies in each specific category, mitigating the risk of underestimating material categories with low reporting rates.<sup>18</sup>
- We then rank the Scope 3 categories in each sector by their contribution to the overall Scope 3 carbon intensity in the sector; and designate the two most important categories as the material Scope 3 categories for this sector.
- We focus on broad industry classifications (ICB level 1), with limited exceptions in cases where Scope 3 emissions profiles of subsectors are materially different – requiring a focus on different Scope 3 categories to achieve good coverage of total Scope 3 emissions in the sector.

**Figure 3. The two most material categories in each sector account, on average, for over 81% of total Scope 3 emissions intensity**



Source: FTSE Russell, January 2024.

<sup>17</sup> Based on FTSE All-World companies disclosing at least one Scope 3 category in 2021.

<sup>18</sup> To maintain robustness, we perform this calculation using 2019, 2020 and 2021 data. The results shown in the next sections are averaged over these years.

Based on this approach, we suggest that investors should consider a company’s Scope 3 disclosures as covering their material emissions if, based on its sector classification, its Scope 3 disclosures cover at least their top two categories. The materiality assessment of reported emissions provides a key tool to systematically differentiate higher-quality reporting practices from lower quality disclosures across broad investment universes, providing a steppingstone toward greater comparability and enhanced data integrity.

Similarly, we suggest that companies should cover at least the two most material categories for their sector in their Scope 3 reporting to align with the GHG Protocol. In some cases, individual business models may diverge so much from sector peers that reporting in additional categories is required to achieve good coverage of total Scope 3 emissions. In these cases, reporting in the most material sector categories should nonetheless be maintained by companies to ensure data comparability and provide confidence that material Scope 3 emissions are not omitted.

As shown in table 4, this approach provides consistent results, with the two most material categories covering at least 72% – and on average 81% – of the overall Scope 3 emissions intensity in each sector. Figure 3 shows that just one material category would provide significantly lower coverage (on average 59% of total Scope 3 emissions in each sector), while the gains from adding an additional, third category are relatively marginal (increasing coverage by an average of just 8%).

Figure 4 visualises the same results for the overall Scope 3 emissions intensity of our coverage. It demonstrates the concentration of Scope 3 emissions in a few key sectors; and reiterates that the material categories we identify account for the bulk of the Scope 3 intensity in our coverage – working particularly well in the most carbon intensive sectors, energy and utilities.

**Table 4. Classification of material GHG categories by sector**

ICB code	Industry or sector	Most material Scope 3 GHG emissions categories	Share of overall Scope 3 intensity covered (%)
ICB 10	Technology	Purchased goods and services; use of sold products	88%
ICB 15	Telecommunications	Purchased goods and services; use of sold products	76%
<i>In addition, 'Category 2: Capital goods' is material for ICB 1510 (Telecommunications Service Providers)</i>			
ICB 20	Health Care	Purchased goods and services; use of sold products	78%
ICB 35	Real Estate	Capital goods; downstream leased assets	82%
<i>In addition, 'Category 11: Use of sold product' is material for ICB 351010 (Real Estate Investment &amp; Services Development)</i>			
ICB 40	Consumer Discretionary	Purchased goods and services; use of sold products	87%
ICB 4050	Travel and Leisure	Purchased goods and services; franchises	75%
ICB 45	Consumer Staples	Purchased goods and services; use of sold products	78%
ICB 50	Industrials	Purchased goods and services; use of sold products	89%
ICB 5510	Basic Resources	Purchased goods and services; Processing of sold products	78%
<i>In addition, 'Category 11: Use of sold product' is material for any companies involved in coal mining.</i>			
ICB 5520	Chemicals	Purchased goods and services; use of sold products	72%
<i>In addition, 'Category 10: Processing of sold products' is material for companies involved in primary chemicals production.</i>			
ICB 60	Energy	Purchased goods and services; use of sold products	88%
ICB 65	Utilities	Fuel- and energy-related activities; use of sold products	89%
ICB 6510	Waste and Disposal Services	Purchased goods and services; upstream transport & distribution	74%

Source: FTSE Russell, January 2024. Note: Combined share of the most material categories in the overall sectoral Scope 3 intensity is calculated using the same approach described at the beginning of Section 4.

**Figure 4. The most material Scope 3 categories (in blue) in each sector account for most of the Scope 3 intensity of our coverage**



Source: FTSE Russell, January 2024. Note: Based on 2021 reported data. UoSP = use of sold products, PoSP = processing of sold products and P G&S = purchased goods and services. The calculation methodology follows the same approach as described at the beginning of Section 4. The size of the rectangle for each sector (combining material and other Scope 3 emissions) is proportionate to sector's contribution to the overall Scope 3 intensity of our coverage. The blue part of the rectangle shows the share of the emissions intensity covered by the two most material categories in each sector as defined in Table 4. The grey part of the rectangle covers the contribution of all other categories.

## 5. What is the current state of disclosure?

Although continuing to lag Scope 1 and 2 reporting, Figure 6 shows that the proportion of companies globally that report some form of Scope 3 emissions has steadily increased from 37% of FTSE All-World constituents in 2016 to 45% in 2021, the last year for which complete data is available at the time of writing. The FTSE All-World Index represents over 4,000 large and medium-sized listed companies across developed and emerging economies.

Indeed, for the same sample our analysis shows that:

- Over half of reporting companies omit the most material Scope 3 categories from their disclosures – that is 45% of companies report on Scope 3 emissions, but only 20% provide data for the most material Scope 3 categories in their sector (see Figure 5)
- Emerging markets reporting is still far behind developed markets, with only 21% of companies providing some form of Scope 3 disclosures and only 5% reporting on material Scope 3 emissions in their sector (Figure 6)
- The quantity and quality of Scope 3 reporting varies widely by sector. Telecoms and Utilities lead whilst Real Estate and Health Care are the laggards (Figure 7)
- Figure 8 shows that disclosure rates differ widely by categories, and that disclosure rates don't necessarily correlate with the materiality of individual Scope 3 categories
- As Scope 3 measurement practices evolve rapidly, disclosed data by companies exhibits significant volatility (with the volume of disclosed emissions typically increasing). Over half of disclosed values vary at least 20% year-on-year and over a third vary at least 50% year-on-year (see Figure 9)
- Inconsistencies in the Scope 3 categories that companies report on are a major source of this variation, with approximately half of the reporting companies either adjusting their reporting categories (37%) or disclosing for the first time (12%) (Figure 10)
- More consistent reporting on the most material categories provides a straightforward avenue to more stable and comparable Scope 3 data. Indeed, Scope 3 disclosures of companies that consistently report on the most material categories in their sector exhibit a median year-on-year volatility of just 12.7%, or a half of the median volatility in our coverage (25.5%)

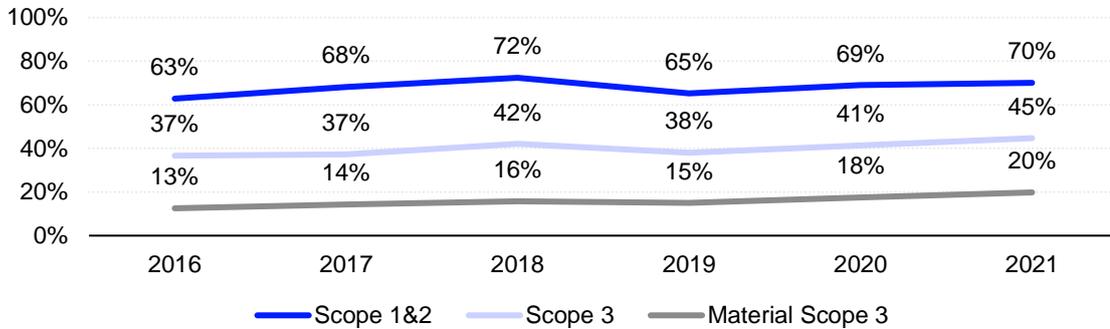
Volatility in corporate Scope 3 disclosures should generally be interpreted as both a symptom of the lack of maturity in scope 3 emissions reporting today and of evolving reporting practices, which will ultimately make value-chain emissions data more comparable and more meaningful to investors and other stakeholders.

Currently, however, the significant gaps and variability of Scope 3 disclosures still pose a major challenge to the users of this data, whether for assessing transition risk exposure or corporate engagement purposes. It is therefore imperative for investors and other stakeholders to systematically quality control disclosed data. These challenges are particularly pertinent in the creation of portfolio-level metrics for reporting or systematic investment purposes, such as, for example, those currently required for Paris Aligned and Climate Transition Benchmarks (PAB/CTB) in the EU.<sup>19</sup>

<sup>19</sup> See: [Official Journal of the European Union, 'Commission delegated regulation \(EU\) 2020/1818 of 17 July 2020', \(2020\)](#). (Accessed: 09/01/2024).

**Figure 5. Quantity and quality of Scope 3 disclosures lag Scopes 1 and 2**

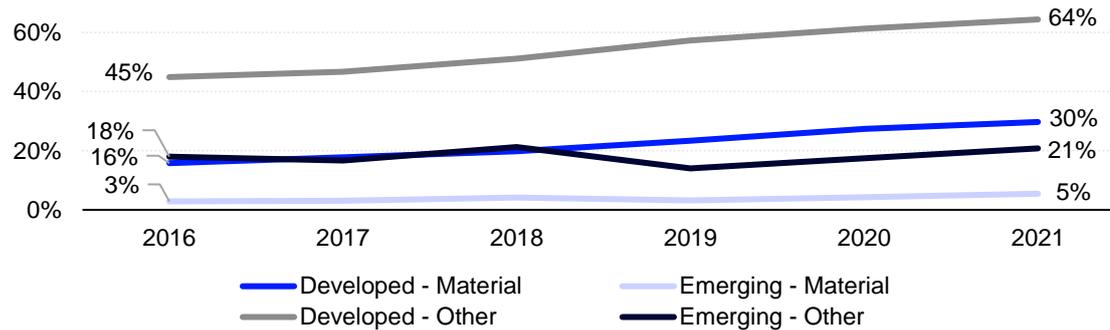
Proportion of FTSE All-World constituents disclosing Scope 1 and 2 and 3 emissions



Source: FTSE Russell, January 2024.

**Figure 6. Material Scope 3 disclosures are still rare in emerging markets (EMs)**

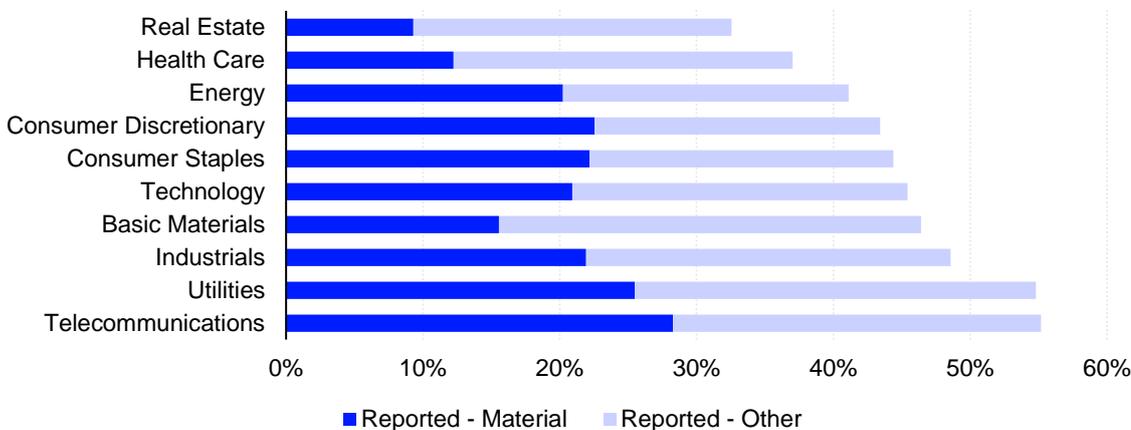
Proportion of FTSE All-World constituents with material Scope 3 disclosures, by region



Source: FTSE Russell, January 2024.

**Figure 7. There is significant sectoral variability in disclosure rates**

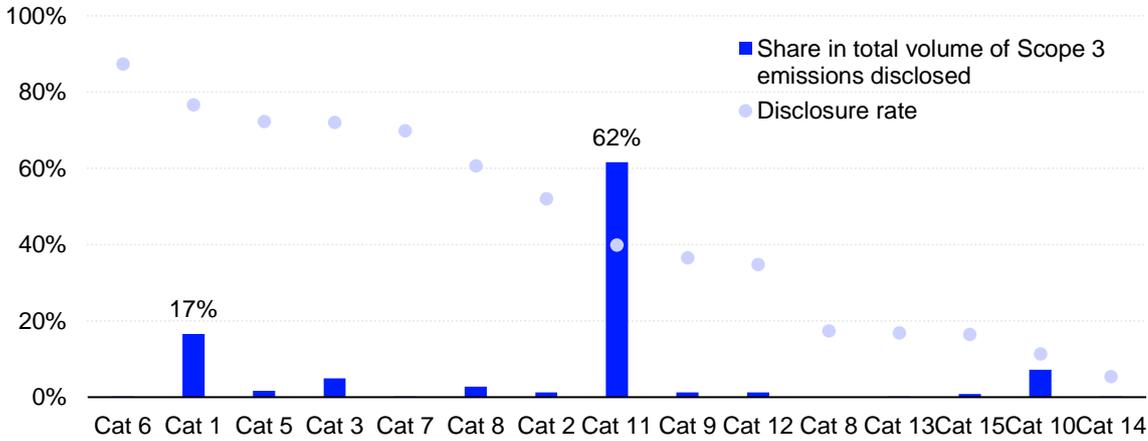
Breakdown of companies with material disclosure of Scope 3 in FTSE All-World Index, by industry



Source: FTSE Russell, January 2024.

**Figure 8. Disclosed Scope 3 categories 1 and 11 account for the bulk of total reported emissions**

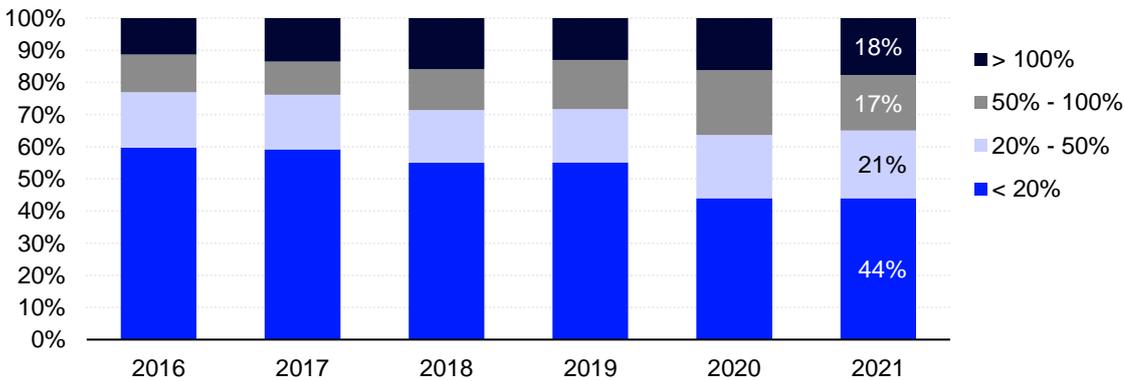
Breakdown of total reported FTSE All-World Index emissions



Source: FTSE Russell, January 2024.

**Figure 9. Scope 3 disclosures remain volatile...**

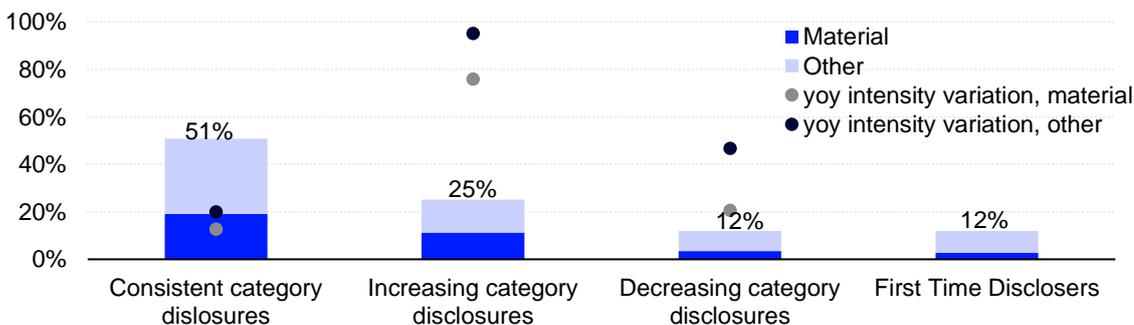
Share of reported Scope 3 data within YoY variation thresholds



Source: FTSE Russell, January 2024.

**Figure 10. ...as only half of firms maintain consistent reporting**

Variation of number of categories and related intensity change between 2020 and 2021



Source: FTSE Russell, January 2024.

## 6. How can missing Scope 3 data be estimated?

With over half of the Scope 3 data in the global index universe unavailable, investors must rely heavily on estimated Scope 3 emissions data. Various strategies have been developed to estimate Scope 3 emissions of non-reporting companies, the most popular of which include input-output models, machine learning approaches and classical modelling approaches such as linear regression, median or production-based models. Even though machine learning gained increasing popularity in this space, research indicates that the current input data quality often remains inadequate to fully leverage the potential of advanced models for improved predictive accuracy.<sup>20</sup>

The FTSE Russell approach for Scope 3 emissions estimation builds closely on the techniques developed for estimating Scope 1 and Scope 2 emissions (see our previous report: [Mind the gaps – Clarifying corporate carbon](#)). It is based on the following principles:

### Reported data is systematically quality controlled prior to its use in estimation models

To detect potential underreporting, the materiality and quality of the disclosed data is systematically evaluated<sup>21</sup>. The data points, which meet quality control requirements, are then aggregated to upstream and downstream emissions. To control for extreme values, outliers are replaced with the quantiles of the carbon intensities distribution within their respective peer group ('winsorization'). This is performed asymmetrically, that is, with a focus on adjusting particularly low reported values for stronger protection against under-reporting. This approach aligns with the 'precautionary principle' calling for checks against potential under-reporting.<sup>22</sup>

### Upstream and downstream emissions are estimated separately

To improve the quality of estimates, upstream and downstream emissions are modelled separately. This allows detection of potential under-reporting more effectively and flexibility during the data aggregation process, for example, using a reported value for upstream emissions and a production-based estimate for downstream emissions for an oil and gas company that omitted the use of sold product category (ideally, each of the 15 Scope 3 categories would be modelled separately to improve the accuracy of estimates, but this will be only possible once the quality and quantity of disclosures improves significantly).

Different estimation approaches may be most appropriate for estimating different types of Scope 3 emissions. Input-output models are particularly useful for estimating upstream emissions, as they can account for all the disparate sources of emissions in a company's upstream inputs. In contrast, production-based models typically provide better results for estimating downstream emissions.

### A multi-model estimation strategy is used to produce more robust estimates

To attenuate the biases of any individual estimation technique we rely on multiple models to produce our final estimates, which use alternative estimation methods, sources of data, peer group classifications, and statistical assumptions. Broadly, these models can be clustered in two groups:

- 'Specialised' models that typically yield the most precise estimates, but which can only be applied where specific conditions are met. This includes simple extrapolation (where companies have previously reported data) and, in certain sectors, modelling of downstream emissions based on reported production volumes (such as the volume of fossil fuels produced by an oil and gas company)
- 'Generalised' models that only require data that is available for almost all companies (such as sector classification and revenue data), but typically produce less precise estimates. 'Generalised' models

<sup>20</sup> Nguyen, Q. & al. (2022) "Scope 3 Emissions: Data Quality and Machine Learning Prediction Accuracy". USAEE Working Paper.

<sup>21</sup> For an explanation of the different sources of uncertainty in reported Scope 3 emissions, please see: Klaaßen, L. & Stoll, C. (2021). *Harmonizing corporate carbon footprints*. Nat Commun 12, 6149 (2021). <https://doi.org/10.1038/s41467-021-26349-x>.

<sup>22</sup> See Olesiewicz, M. & Kooroshy, J. (2023). *Proceed with caution: challenges in embedding the precautionary principle in Paris-aligned benchmarks*. FTSE Russell. Available at: <https://www.lseg.com/en/insights/ftse-russell/proceed-caution-challenges-embedding-precautionary-principle-paris-aligned-benchmarks> (Accessed: 10/12/2023)

include those estimating carbon intensities based on either sector medians, input-output tables, or regressions

Where generalised models are used, our estimates are based on the 'ensemble method', which combines the estimates generated by different generalised methods into a final estimate, helping to stabilise predictions and reduce annual variation, which is crucial for quantitative investment strategies<sup>23</sup>. All estimation approaches are described in Table A in the Annex.

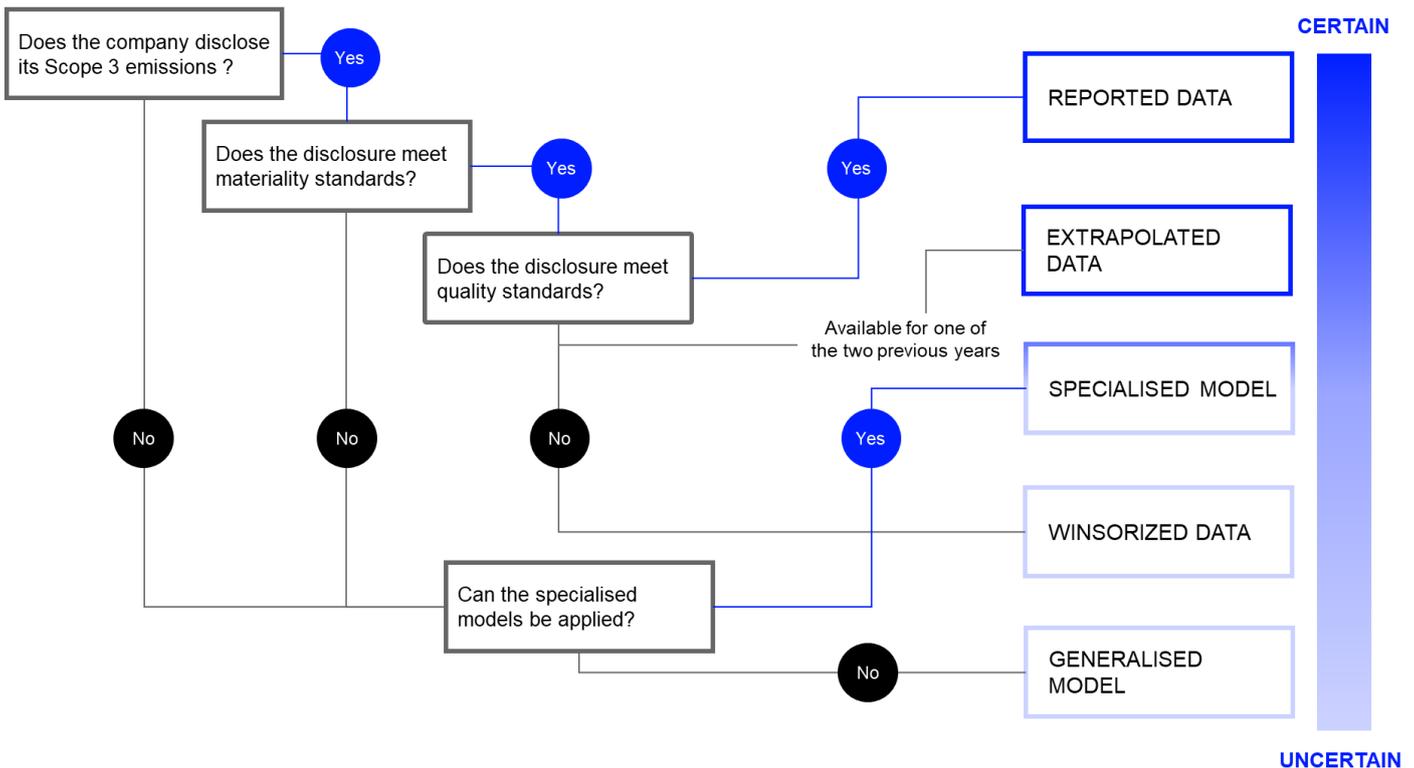
### Final estimates are selected according to their quality

Ultimately, we select the highest quality data point available for each company to construct our final Scope 3 emissions data set, according to the data hierarchy represented in Figure 11.

The diagram shows that we prefer reported data, unless (a) disclosed data fails the minimum data quality requirements;<sup>24</sup> or (b) the disclosed Scope emissions are materially lower than those estimated by the specialised model. Where reported data is not available, we resort to specialised models and, where these are not available either, we will rely on the estimate generated by the ensemble of the generalised models.

Based on this methodology, Figure 12 shows the resulting breakdown of sources for our final Scope 3 emissions data set for the FTSE All-World Index in 2021. Estimated data plays a smaller role for upstream emissions, given higher disclosure rates. For downstream emissions, estimates play a bigger role, due to lower reporting rates, including for sectors with large downstream emissions, such as companies in the Energy industry.

Figure 11: Data and estimates selection hierarchy

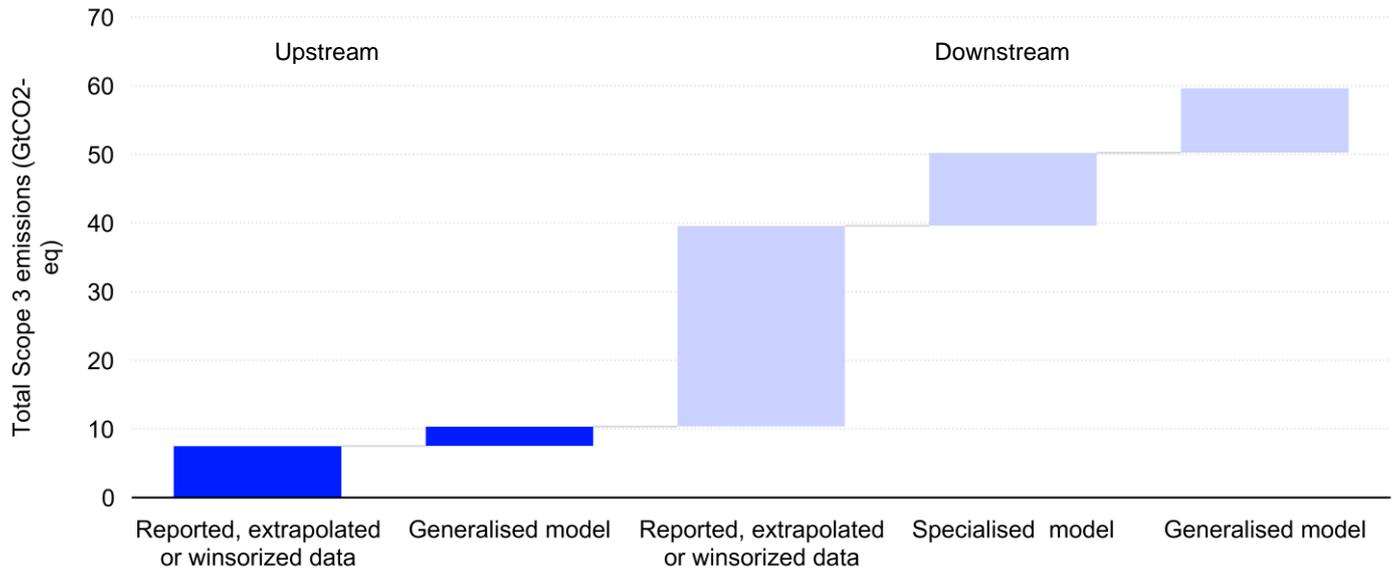


Source: FTSE Russell, January 2024.

<sup>23</sup> Due to methodological complexities and generally very low quality of disclosures in Financials, estimating Scope 3 emissions for financials (also often referred to as 'financed emissions') require separate modelling approaches and is excluded from the present analysis.

<sup>24</sup> The minimum quality requirements are currently deployed only for fossil fuel producers with a test against materiality of 'use of sold product' category. We are currently testing more advanced, sector-by-sector materiality filters, to align with the materiality assessment developed in this report (see Section 4).

**Figure 12. Model contribution to total Scope 3 emissions for upstream and downstream**



Source: FTSE Russell, January 2024. Note: Based on FTSE All-World 2021 universe.

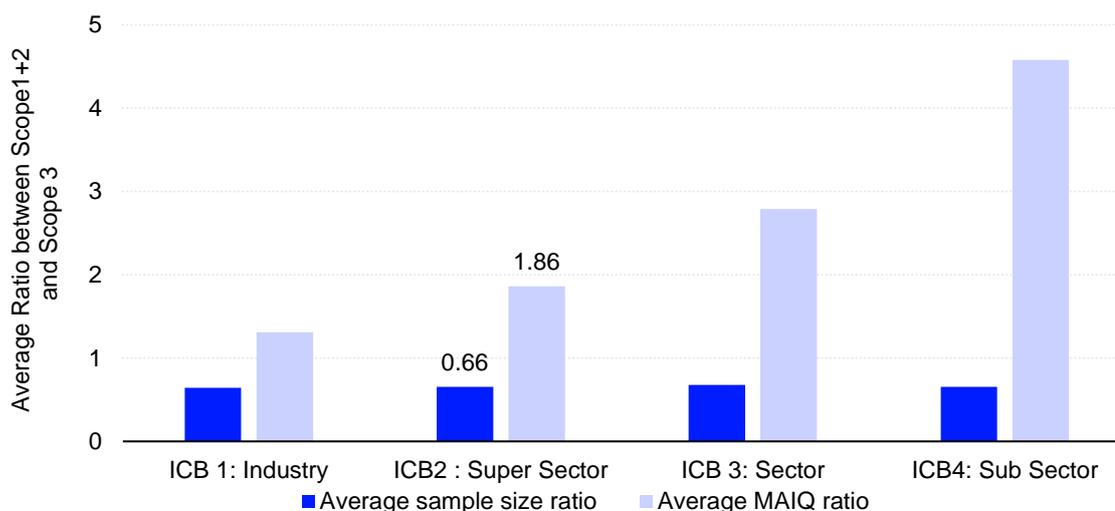
## 7. What is the quality of estimated data?

While the design of estimation strategies, including the careful calibration of the varying models can help to reduce the impact of weaknesses in input data, it ultimately cannot remove it. The quality of Scope 3 estimates is directly affected by the quality and the amount of Scope 3 data disclosed by the companies (see Section 4 and 5). Overall, available Scope 3 input data that can be used to produce estimates is of significantly lower quality compared to Scope 1 and 2 data.

Figure 13 shows that for a global index universe, a third less of the volume of input data is available. Furthermore, the data is also much more variable. This applies to the time series, with the median year-on-year variation for reported Scope 3 data being double that of Scope 1 and 2 data. However, this also applies to the cross section, with much higher variation in data within smaller peer groups – measured here as median adjusted interquartile range (MAIQR)<sup>25</sup> – reflecting variation in reported carbon intensities relative to the median reported value.

**Figure 13. Scope 3 estimation is constrained by smaller input data sample sizes with greater variability**

Average sample size and MAIQ ratio by ICB level (left) and median YoY change and IQR ratio for estimated and reported emissions (right)



Sample (2018-2021)	Median YoY change	IQR <sup>26</sup>
Scope 1+2 reported	9%	15.0
Scope 1+2 estimated	17%	28.4
Scope 3 reported	20%	69.1
Scope 3 estimated	21%	33.8

Source: FTSE Russell, January 2024. Note: Figures based on FTSE All-World 2021 universe. All disclosures included.

<sup>25</sup> MAIQR ratio = median adjusted IQR Scope 3/median adjusted IQR Scope 1 and 2. Sample size ratio = sample size Scope 3 / sample size scope 1 and 2

<sup>26</sup> IQR = quantile<sub>0.75</sub> – quantile<sub>0.25</sub>, represents the range of year-on-year-variation within the sample, with higher number suggesting more volatility among data for individual companies

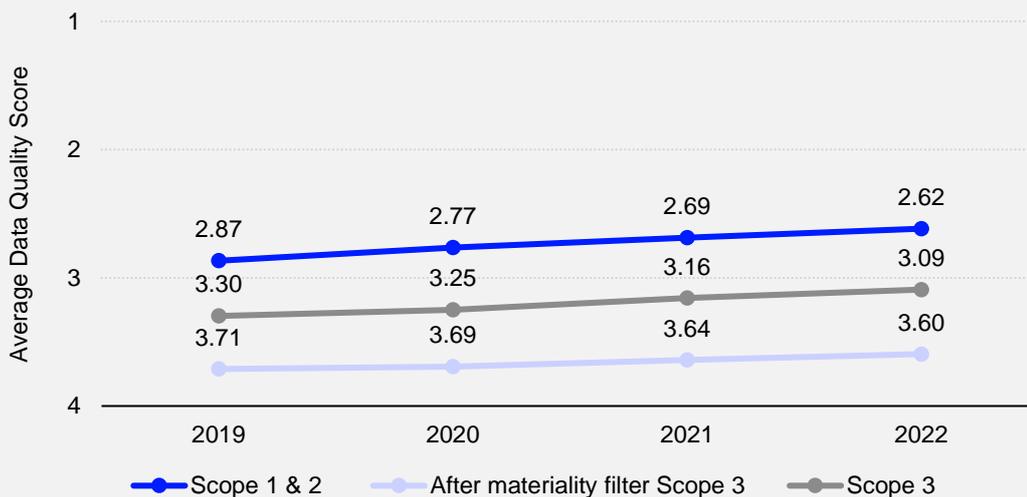
### Box 4. PCAF score of the final dataset

Proposed by [Partnership for Carbon Accounting Financials](#) (PCAF) data quality scores are assigned based on the level of confidence/ satisfaction of the method used for estimation of carbon emissions data, which are divided into three groups: reported emissions (score 1–2), physical activity-based emissions (score 2–3) and economic activity-based emissions (score 4–5).

Figure 14 provides a useful alternative lens on quality of the resulting Scope 1, 2 and 3 datasets, showing the average data quality score as proposed by PCAF for each of data sets between 2019 and 2022 for All-World Index constituents.

It shows that data quality for Scope 3 is consistently around one point lower on the PCAF scale than for Scope 1 and 2. Additionally, the quality score of the Scope 3 data set would appear around 0.4-0.5 points higher if no materiality check of Scope 3 disclosures was performed – or put another way, around half of the difference in PCAF scores between Scope 1 and 2 versus Scope 3 are caused by immaterial Scope 3 disclosures. All three scopes show a similar trend of improvement in quality over time. However, the quality of Scope 3 is currently improving more slowly than that of Scope 1 and 2.

**Figure 14. On average, Scope 3 has a more than 25% lower quality score than Scope 1 and 2**



Source: FTSE Russell, January 2024. Note: Due to a general lack of information on whether the reported emissions data has been verified by third parties, the curated data sets do not include any PCAF data quality scores of 1. For all three scopes, reported and extrapolated data has been given a PCAF score of 2. For the specialised production model, a score of 3 was given, and a score of 4 was assigned to the generalised model and winsorized data.

## 8. How should investors use Scope 3 data alongside Scope 1 and 2 emissions?

Evaluating Scope 3 emissions is crucial for a wide range of climate risk assessments, including carbon footprints, portfolio emissions exposures and transition risk assessments. This is particularly pertinent where Scope 3 emissions constitute the most material carbon risks for a company's business model. By including Scope 3 emissions in portfolio-level calculations, investors can gain a more comprehensive understanding of their impact and can make informed decisions to reduce emissions, manage risks, and align with net zero goals.

However, given the overall lack of maturity of available Scope 3 data investors should generally consider Scope 3 analysis with caution and be keenly aware of the pitfalls and limitations of the data set. The GHG Protocol offers high-level guidance for companies to estimate their own Scope 3 emissions, but it was not necessarily designed with portfolio aggregation in mind. The planned overhaul of the governance of the GHG Protocol could provide opportunities to address some of the challenges<sup>27</sup>, but data limitations are likely to persist for some time as reporting practices gradually improve.

Further, given the different relationship to management control and the inherently higher margins of uncertainty associated with Scope 3 data, it should be regarded as complementary to, and used in conjunction with, Scope 1 and 2 emissions analysis. In other words, investors should resist the temptation to simply aggregate emissions across all scopes into a single metric. In fact, aggregation in many cases risks conflating key trends, given their unequal size and the fact that material Scope 3 emissions are in many cases not yet captured in disclosures.

While prioritising the reduction of the most influential emissions is a sound strategy when aiming to minimise overall GHG emissions, the challenges of reducing emissions from different scopes vary at the firm level. Two companies, for example, can exhibit divergent performance in reducing Scope 1 and 2 emissions, while high levels of Scope 3 emissions can obscure these differences in aggregated emissions metrics, making it difficult to evaluate their respective emission reduction efforts or the ease of abatement.

### Integrating Scope 3 emissions into other climate metrics

We also note that integrating Scope 3 emissions data can significantly impact widely-used portfolio metrics. For example, incorporating Scope 3 can mechanically quadruple the Weighted Average Carbon Intensity (WACI) at portfolio level, make it significantly more volatile, and can also materially redistribute the final contribution of each sector to the portfolio carbon footprint (Figure 1).

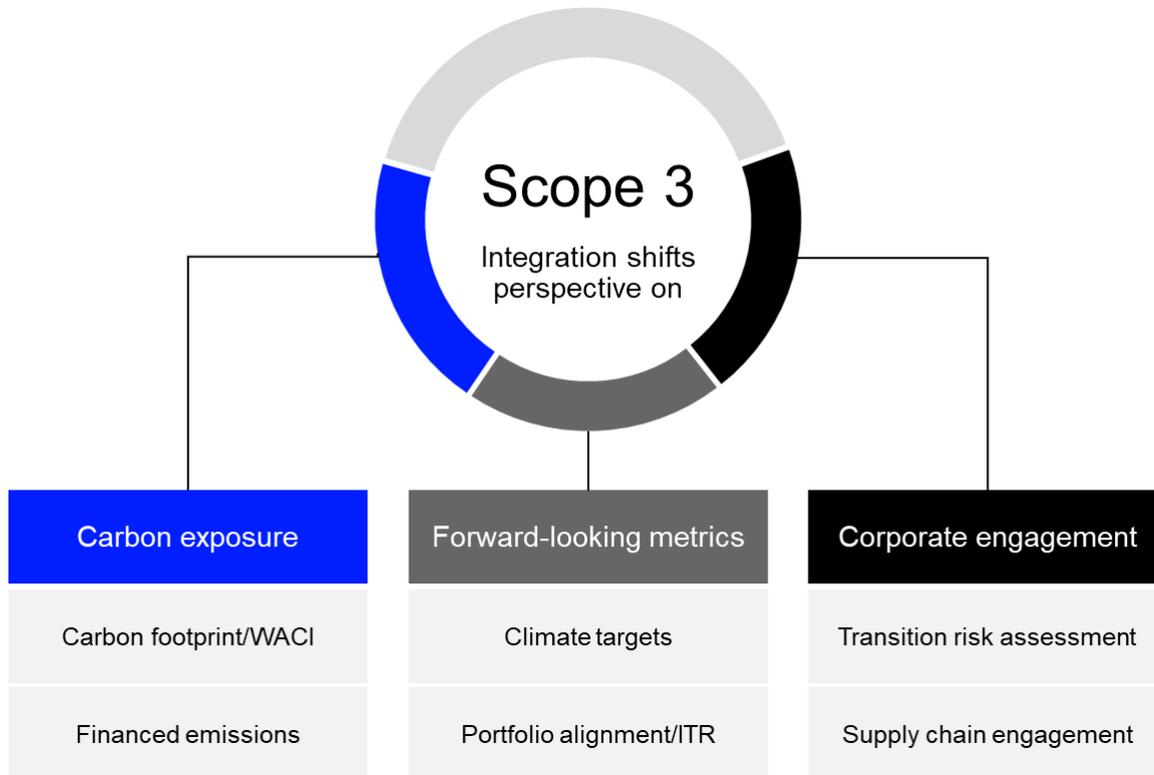
In portfolio alignment tools, Scope 3 emissions integration can similarly impact results at every level. This includes, for example, sectoral transition pathways, as well as the assessment of corporate GHG emissions reduction targets. In previous research on Implied Temperature Rise (ITR) metrics<sup>28</sup> we have shown that inclusion of 'Category 11: use of sold product' Scope 3 GHG emissions alone would result in a significant increase in portfolio temperature scores (see Figure 16), as well as a material re-ranking of sectors and companies in each sector.

These complex effects demonstrate how careful consideration by investors is required on how Scope 3 data is introduced into climate risk assessments and the portfolio management process.

<sup>27</sup> See: [The Greenhouse Gas Protocol, 'GHG Protocol Launches New Governance with Call for Steering Committee and Independent Standards Board Applications', \(2023\)](#), (Accessed: 11/01/2024)

<sup>28</sup> Haalebos, R. & Fouret, F. "Exploring ITR scores: Framing robust company-specific benchmarks and future company-level GHG emissions ranges" (2021). FTSE Russell.

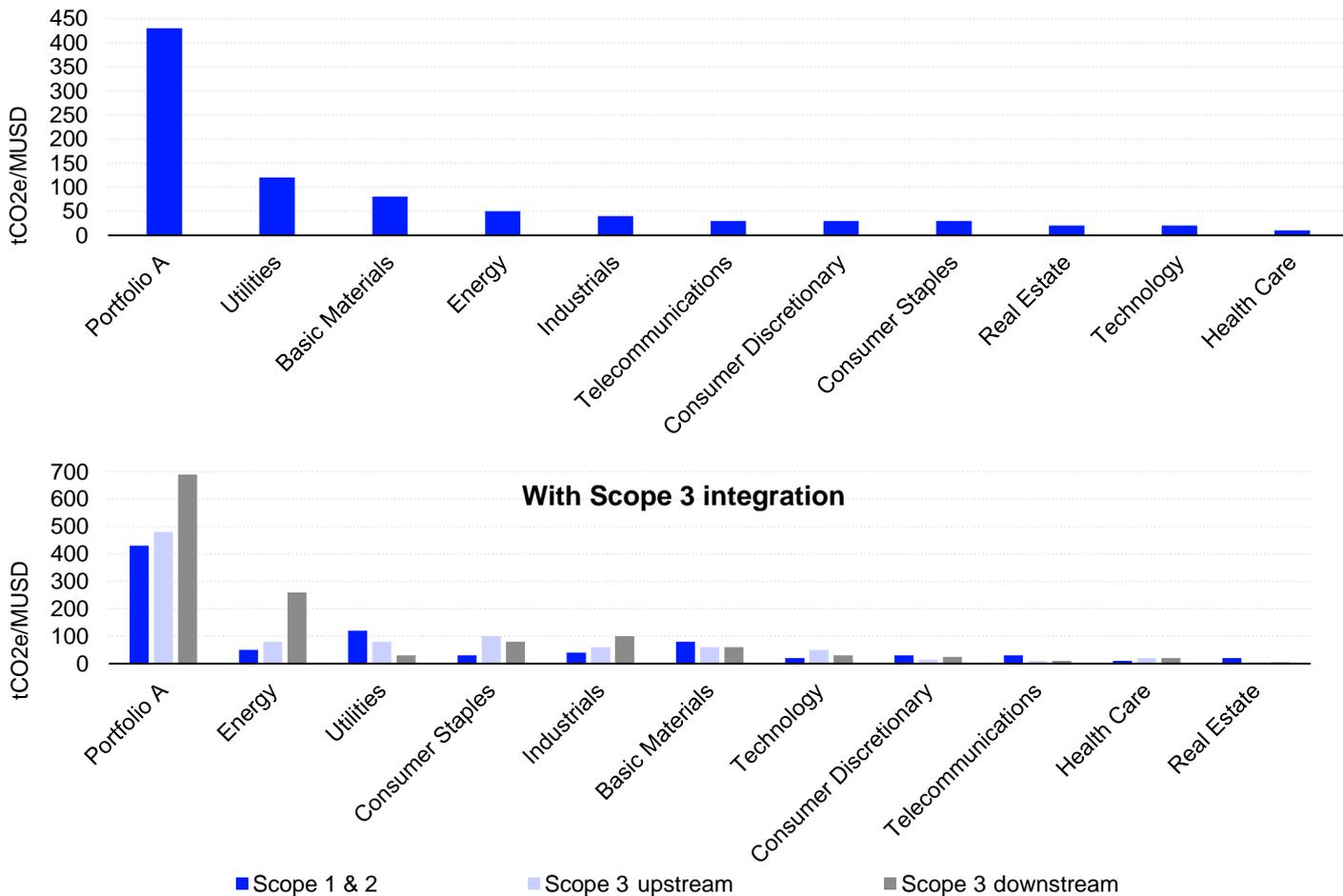
Figure 15: Scope 3 integration can comprehensively impact climate risk metrics



Source: FTSE Russell, January 2024.

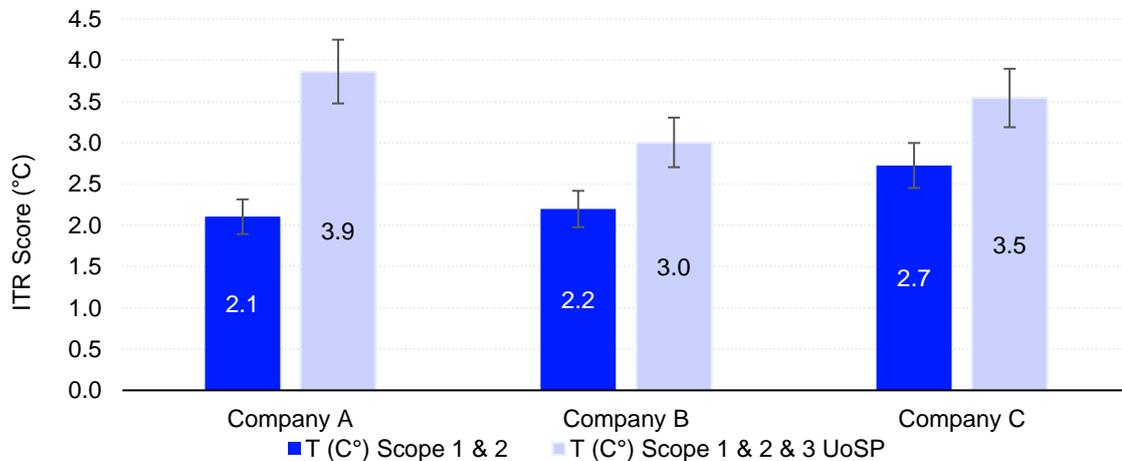
**Figure 16: Inclusion of Scope 3 emissions impacts WACI and ITR metrics**

Scope 3 integration changes the sector contribution to the final portfolio carbon footprint



Source: FTSE Russell, January 2024. Note: Weighted Average Carbon Intensity (WACI) of a fictive portfolio, 'Portfolio A', using both reported and estimated Scope 1, 2 and 3 emissions data.

Scope 3 integration can substantially increase and change the ranking of companies ITR scores



Source: FTSE Russell (2021), 'Exploring ITR scores: Framing robust company-specific benchmarks and future company-level GHG emissions ranges' Figure 6, p. 15.

## Box 6. How big of a problem is double counting?

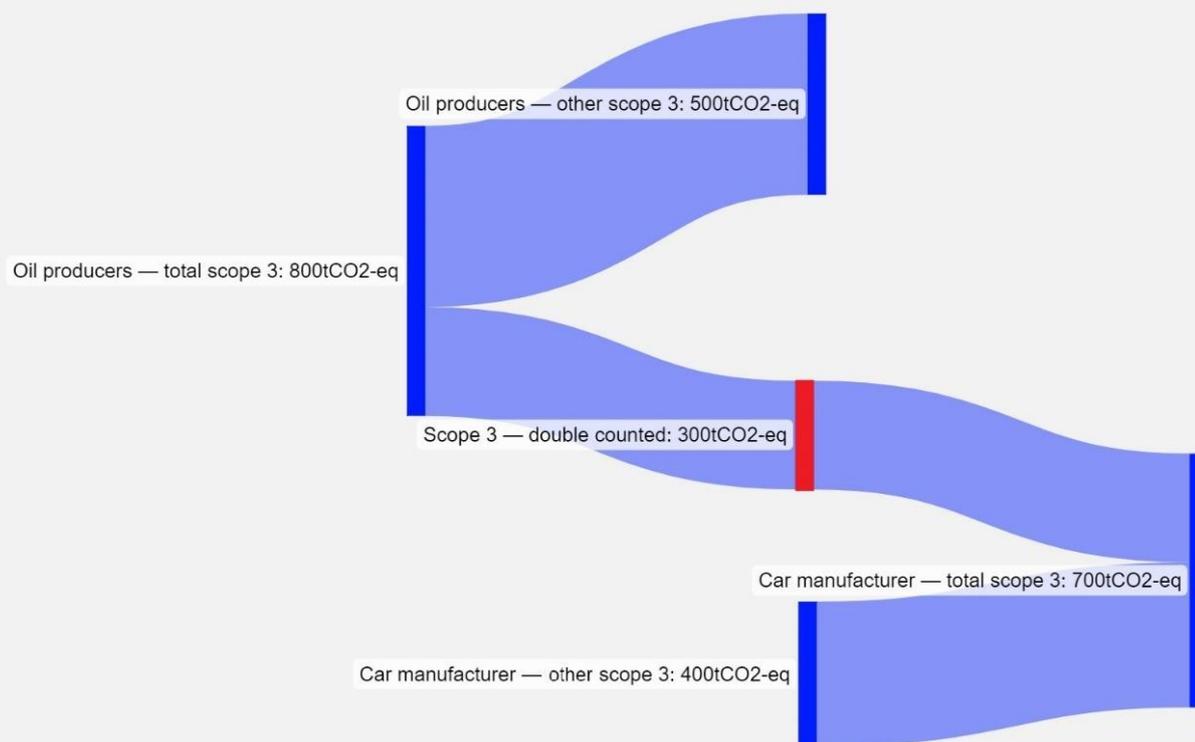
Double counting of portfolio emissions can occur when a single portfolio holds multiple companies from the same supply chain. Double counting can occur because all indirect emissions (Scope 2 or Scope 3) are ultimately the direct emissions (Scope 1) from other actors, such as companies, governments, or households. Additionally, Scope 3 emissions themselves can be double counted, if two entities operate within the same value chain.

Figure 17 provides a stylised example of double counting, using two portfolio companies: an oil producer and a car manufacturer. Scope 3 emissions associated with 'Category 11: use of sold products' are counted twice, as the oil producer considers the emissions produced when its oil is burned, while the car manufacturer includes the emissions generated by the combustion of the same oil in its engine vehicles, leading to double accounting.

In practice, it is often impossible to accurately determine the extent of double counted emissions in a portfolio, as the exact supply relationships between individual portfolio companies across extended global value chains are typically unknown. Furthermore, it is often overlooked that a substantial portion of Scope 3 emissions reported by companies relates to emissions generated outside of the boundaries of the portfolio, as they relate to Scope 1 emissions of SMEs, governments (including state-owned enterprises) and households.<sup>29</sup>

While double counting can be a concern in some contexts – for example, when the distinction of emission sources is crucial, such as during the estimation of total emissions or the purchase of offset credits<sup>30</sup> – it is typically less of a concern in most portfolio management contexts. Here, the objective is typically to provide an overview of the asset's exposure towards carbon-intensive processes and transition risk for portfolio constituents, where potential double counting can be considered part of Scope 3 emissions measures design rather than a limitation.<sup>31</sup>

**Figure 17. Example of double counted emissions for Scope 3**



Source: FTSE Russell, January 2024.

<sup>29</sup> See: [Generation IM, 'Listed Company Emissions', \(2021\)](#). (Accessed: 30/11/2023)

<sup>30</sup> See: [The Greenhouse Gas Protocol, 'Scope 3 Frequently Asked Questions', \(2022\)](#). (Accessed: 01/12/2023).

<sup>31</sup> Condon, Madison, What's Scope 3 Good For? (March 22, 2023). Boston Univ. School of Law Research Paper Forthcoming, 56 UC Davis Law Review 1921 (2023). Available at SSRN: <https://ssrn.com/abstract=4396819> or <http://dx.doi.org/10.2139/ssrn.4396819>

## 9. Where does this leave companies, investors and regulators?

### Recommendations for companies

While the reporting burden is substantial, it is crucial for companies to redouble efforts to enhance Scope 3 reporting – not least because a combination of investor demands and fast-moving regulation will increasingly compel such disclosures. Focusing disclosures on the most material Scope 3 categories can provide efficiencies for companies and provides the most value for investors and other stakeholders.

- **Reporting in each sector should focus on providing robust data at least for the two most material Scope 3 emission categories (see table 4).** Additional categories can be required where business models differ substantially from sector peers, but to ensure data comparability and provide confidence that material emissions are not omitted, reporting in the most material sector categories should nonetheless be maintained.
- **Where companies set Scope 3 emissions targets, they should at least cover the most material emissions categories in their sector.**
- **Companies should prioritise primary data** based on direct measurements where available. Where estimates are required, firms should be transparent on calculation methods (particularly where these are amended).

### Recommendations for investors

It is critical for investors to consider Scope 3 emissions in assessing transition risks for companies and portfolios. However, it is imperative for investors to also remain clear-eyed about the limitations of currently available data (both reported and estimated) and maintain a focus on the most material Scope 3 data.

- **Investors should systematically identify, and focus on, the most material Scope 3 categories** in available data to enhance robustness and comparability consistency over time and remain mindful of the inherent data limitations.
- **Analysis should generally refrain from aggregating Scope 3 emissions with Scope 1 and 2 data** for most use case and treat them as separate, though complementary metrics. For most use cases, they should also distinguish systematically between upstream and downstream Scope 3 emissions.
- **Estimates generated by multi-model approaches should be preferred**, which can help to attenuate the weaknesses of individual models, making estimates more robust and reducing their volatility.
- **Where Scope 3 data is integrated into other portfolio metrics (such as WACI or alignment metrics like ITR), impacts need to be carefully evaluated**, and may require maintaining separate Scope 3 versions of such metrics.

### Recommendations for regulators

Despite recent progress on adoption of Scope 3 emissions disclosures in existing frameworks, regulators still provide too much discretion regarding the selection and reporting of Scope 3 emissions categories.

- **Regulators and standard-setters need to be mindful that Scope 3 emissions data – whilst important – is still in its development phase.** Whilst encouraging the provision and use of Scope 3 data can be useful in certain contexts (e.g. climate risk reporting) it should be considered too immature to mandate its use for example, in climate investment strategies.
- **Strengthen and harmonise technical Scope 3 reporting guidance, particularly on how to measure and report on 'Category 1: Purchased goods and services' emissions**, given it is among the largest and most material of the Scope 3 categories. This imposes a particularly heavy reporting burden on companies, and exhibits generally low reported data quality and comparability.

Upcoming changes to the governance framework of the GHG Protocol could provide momentum for this.

- **Provide greater sector-by-sector guidance on which type of Scope 3 emissions should be regarded as material** based on available empirical evidence. Regardless of their business model, firms should be encouraged to always report on the most material categories in their sector to enhance data quality, foster comparability, and reduce greenwashing risks.

## 10. What else to read on Scope 3

The GHG Protocol's *Corporate Value Chain (Scope 3) Accounting and Reporting Standard* (2011)<sup>32</sup> and its calculation guidance, *Technical Guidance for Calculating Scope 3 emissions* (2013)<sup>33</sup> provide the methodological foundations of Scope 3 emissions research today. However, numerous other reports and research papers on the topic provide a useful resource to investors and have informed our research. We provide a non-exhaustive list below.

### On data quality

- *Corporate Carbon Strategies and Greenhouse Gas Emission Assessments: The Implications of Scope 3 Emission Factor Selection* (2012)<sup>34</sup>
- *Understanding the Importance of Scope 3 Emissions and the Implications of Data Limitations* (2021)<sup>35</sup>
- *Carbon Emissions: Under the MicroScope3* (2022)<sup>36</sup>
- *Omission Impossible* (2023)<sup>37</sup>
- *Data Quality Considerations for Estimating Financed Emissions* (2023)<sup>38</sup>

### On materiality

- *CDP Technical Note: Relevance of Scope 3 Categories by Sector* (2022)<sup>39</sup>
- *ESG Book: Scope 3 is the Magic Number* (2023)<sup>40</sup>
- *Scope 3 emissions: Data quality and machine learning prediction accuracy* (2023)<sup>41</sup>

### On double counting

- *The growing importance of Scope 3 greenhouse gas emissions from industry* (2018)<sup>42</sup>
- *Listed Company Emissions* (2021)<sup>43</sup>

### On Lifecycle Analysis (LCA) which provided the foundations for the design of GHG protocol

- *The Computational Structure of Life Cycle Assessment* (2002)<sup>44</sup>
- *The Importance of Carbon Footprint Estimation Boundaries* (2008)<sup>45</sup>
- *Categorization of Scope 3 Emissions for Streamlined Enterprise Carbon Footprinting* (2009)<sup>46</sup>
- *Uncertainty Implications of Hybrid Approach in LCA: Precision versus Accuracy* (2019)<sup>47</sup>
- *What's Scope 3 good for?* (2023)<sup>48</sup>

<sup>32</sup> See: [The Greenhouse Gas Protocol, 'Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard, Supplement to the GHG Protocol Corporate Accounting and Reporting Standard' \(2011\)](#). (Accessed: 01/12/2023).

<sup>33</sup> See: [The Greenhouse Gas Protocol, 'Technical Guidance for Calculating Scope 3 Emissions', \(2013\)](#). (Accessed: 12/01/2024).

<sup>34</sup> See: Downie, J. & Stubbs, W. (2012). Corporate Carbon Strategies and Greenhouse Gas Emission Assessments: The Implications of Scope 3 Emission Factor Selection. Business Strategy and the Environment. Volume 21, Issue 6 (412-422).

<sup>35</sup> See: Ducoulombier, F. (2021). *Understanding the Importance of Scope 3 Emissions and the Implications of Data Limitations*. The Journal of Impact and ESG Investing Summer 2021, 1 (4) 63 - 71

<sup>36</sup> See: [Man Institute, 'Carbon Emissions: Under the MicroScope 3', \(2022\)](#). (Accessed: 12/01/2024).

<sup>37</sup> See: [LGIM, 'Scope 3: Omission impossible', \(2023\)](#). (Accessed: 12/01/2024).

<sup>38</sup> See: Tang, K; & al (2023). *Data Quality Considerations for Estimating Financed Emissions*. Oxford Sustainable Finance Group.

<sup>39</sup> See: [CDP, 'CDP Technical Note: Relevance of Scope 3 Cby Sector', \(2023\)](#). (Accessed: 12/01/2024).

<sup>40</sup> See: [Scope 3 - ESG Book](#). (Accessed: 12/01/2024).

<sup>41</sup> See: Nguyen, Q. & al. (2023). *Scope 3 emissions: Data quality and machine learning prediction accuracy*. PLOS Climate. <https://doi.org/10.1371/journal.pclm.0000208> (Accessed: 12/01/2024).

<sup>42</sup> See: Hertwich, E.G. & Wood, R. (2018). *The growing importance of Scope 3 greenhouse gas emissions from industry*. Environ. Res. Lett. 13 104013.

<sup>43</sup> See: See: [Generation IM, 'Listed Company Emissions', \(2021\)](#). (Accessed: 30/11/2023)

<sup>44</sup> See: Heijungs, R. & Sug, S. (2002). *The Computational Structure of Life Cycle Assessment*. ECOE, volume 11.

<sup>45</sup> See: Matthews, H.S., & al (2008). *The importance of carbon footprint estimation boundaries*. Environ Sci Technol. 2008 Aug 15;42(16):5839-42. doi: 10.1021/es703112w.

<sup>46</sup> See: Huang, Y.A. & al. (2009). Categorization of Scope 3 Emissions for Streamlined Enterprise Carbon Footprinting. Environ. Sci. Technol. 2009, 43, 22, 8509–8515.

<sup>47</sup> See: Perkins, J. & Suh, S. (2019). *Uncertainty Implications of Hybrid Approach in LCA: Precision versus Accuracy*. Environmental Science & Technology 2019 53 (7), 3681-3688 DOI: 10.1021/acs.est.9b00084

<sup>48</sup> See: Condon, Madison, *What's Scope 3 Good For?* (March 22, 2023). Boston Univ. School of Law Research Paper Forthcoming, 56 UC Davis Law Review 1921 (2023). Available at SSRN: <https://ssrn.com/abstract=4396819> or <http://dx.doi.org/10.2139/ssrn.4396819>

# Annex

**Table A: Models used for Scope 3 estimation**

	Model	Description	Strengths	Limitations
	Extrapolation	Assigns carbon intensity based on the most recent reported value of intensity by the company	Requires only reported intensities Produce stable results, close to the actual value Results are easily interpretable	Does not account for possible variation in intensities Can only be used for short-time frames (i.e. maximum two years)
By production output	Production model  (downstream only)	Calculates Scope 3 downstream carbon emissions based on fossil fuel production of companies	Scope 3 downstream emissions are estimated using physical data Provides an upper bound for Scope 3 downstream emissions	Limited to fossil fuel producing companies
	By sector membership	Sector median	Calculates carbon intensity based on the median carbon intensity of a company's peer-group	Requires only industry classification and region Stabilises prediction for areas of low disclosure rates Easily interpretable results
Regression model		Calculates carbon intensity based on linear regression prediction using ICB classification and region as regressors	Requires only ICB classification and region Stabilises prediction for groups with low disclosure rates	Heavily relies on sector taxonomy to assign peer-groups Assumes that firms that disclose have a similar carbon intensity to non-disclosers
Input-output model  (upstream only)		Assigns carbon intensity based on macro-level output and emissions data for each country and industry	No accounting 'lower-bound' (i.e., no emissions source is too unimportant to count) Provides theoretical intensity for an activity without biases from emissions disclosures	Does not account for annual trends other than inflation Assumes that firms that disclose have a similar carbon intensity to non-disclosers

Source: FTSE Russell, September 2023

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