Beyond Boundaries:

A step-by-step guide for greenhouse gas emissions accounting in the software sector

initiative climat international

Private markets action on climate change

Produced in partnership with ERM

ERM

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INTRODUCING THE PROJECT TEAM

Introducing the iCI

The Initiative Climat International (iCI) is a global practitioner-led community of private equity firms and investors that seek to better understand and manage the risks associated with climate change. The iCI was originally launched as the iC20 (Initiative Climat 2020) in 2015 by a group of French private equity firms to contribute to achieving the Paris Agreement's objectives. The iCI has since expanded internationally and now counts over 240 members representing US $4 trillion as of July 2023'. Please see the full list of iCI members at the end of this document.

iCI's members share a commitment to reduce carbon emissions of private equity-backed companies and secure sustainable investment performance by recognising and incorporating the materiality of climate risk. In practice, this implies a commitment to effectively analyse and manage climate-related financial risk and greenhouse gas (GHG) emissions in their private equity portfolios, in line with the recommendations of the Financial Stability Board's Task Force for Climate-related Financial Disclosures (TCFD). Members commit to sharing knowledge, experience, and best practice, working together to develop resources that will help standardize practices across the industry.

The iCI is supported by the Principles for Responsible Investment (PRI), and is itself a supporting partner of the Investor Agenda, and is open to all private markets firms and investors to join.

Introducing ERM and the SustainAbility Institute by ERM

ERM is the largest global pure-play sustainability consultancy, partnering with the world's leading organisations to create innovative solutions to sustainability challenges and unlocking commercial opportunities that meet the needs of today, while preserving opportunity for future generations. ERM is a thought leader and contributes widely to key industry initiatives. The SustainAbility Institute by ERM is ERM's primary platform for thought leadership on sustainability. Engaging with experts across ERM and external partners, the Institute addresses the critical sustainability challenges facing private sector leaders and policymakers across all sectors and geographies.

www.erm.com • www.sustainability.com

Acknowledgements

The iCI Software Scope 3 Working Group was established to develop a harmonised approach to Scope 3 GHG emissions accounting and reporting for software companies. In partnership with specialist consultancy firm ERM, we have developed this guidance to set the standard for our industry.

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The design of this guidance document was kindly sponsored by Hg

Published July 2023.

PURPOSE OF THIS GUIDANCE

It is the intent of this guidance to help software companies account for their indirect or "value chain" greenhouse gas (GHG) emissions, referred to as scope 3 emissions, using a robust and credible approach based on the latest guidance, protocols and standards available.

It also aims to help software companies benchmark against peers, identify best practices and take action to reduce their value chain emissions.

For the purposes of this guide, a software company is defined as a business that creates, develops, markets, distributes, and sells computer software, including programs, applications, and operating systems. While the guidance was developed with a focus on privately held companies, the principles and recommendations are also more generally applicable to any software company.

As this guide is specifically focused on scope 3 for software companies, it can be considered as a supplement to the previously published Greenhouse Gas Accounting and Reporting for The Private Equity Sector guidance which offers broader and more general guidance accounting and reporting on scope 1 (direct emissions), scope 2 (indirect emissions from purchased energy) and scope 3 emissions. It is recommended that a company start with this previous guide if it has not begun reporting on scopes 1 and 2 emissions. While the previous guidance addresses scope 3 more generally, and is applicable across all sectors, this guide has been developed specifically to address the unique characteristics of scope 3 emissions in a software company's value chain (see Figure 1).

This guidance is based on the GHG Protocol Corporate Value Chain (Scope 3) Standard and is intended to support and contextualise, not replace, the use of this standard within the software sector in a consistent way. Similarly, it is aligned with the Science Based Targets Initiative (SBTi) accounting requirements for setting targets, which is described in more detail on p. 47. The intent is to go beyond these by identifying challenges, resources, and tips that are specific to the software sector and can help a software company identify, report, and ultimately reduce its scope 3 GHG emissions.

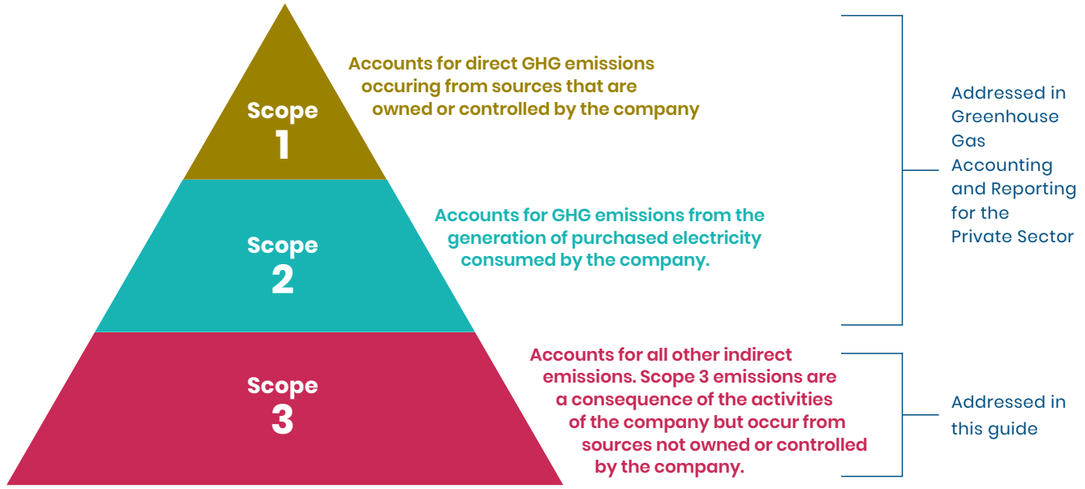
Regardless of where a company may be in terms of reporting scope 3 emissions, this guide seeks to reference available resources and recommend approaches.

The structure of the document is organised around 6 key steps:

1. Establish a governance structure.
2. Map the value chain and establish reporting boundaries.
3. Collect data and calculate emissions.
4. Set a target and track over time.
5. Report.
6. Take actions to reduce scope 3 emissions.

FIGURE 1

Scope of this guidance: an overview



INTRODUCTION

A critical factor in keeping global temperatures rise below 1.5°C is the ability of companies across all sectors to reduce or eliminate their greenhouse gas (GHG) emissions associated with their full value chain. Worldwide software sector revenue is expected to show an annual growth rate (CAGR 2023-2028) of 5.42%, resulting in a projected market volume of US$858bn by 2028[1]. With this anticipated rapid growth, it is even more urgent that software companies account for their GHG emissions and adopt a low-carbon growth strategy.

While companies in the software sector often report on part of their GHG inventory —specifically scopes 1 and 2—many find calculating scope 3 emissions challenging. Yet, according to the CDP scope 3 emissions typically represent around 75% of a company's total GHG emissions, and this percentage is likely to be higher for software companies.

A move to a more complete accounting of GHG is being driven by several factors including:

- **Customer demand:**
  Customers are increasingly integrating environmental performance into supplier selection criteria and have begun including contract language that holds suppliers to specific environmental standards. They expect companies to be transparent about their emissions and to demonstrate responsibility for their environmental impact.

- **Investor/Lender demand:**
  The Global Sustainable Investment Alliance (GSIA) reported that global investment in sustainable assets is expected to grow with a projected compound annual growth rate (CAGR) of 14%, reaching $53 trillion by 2025. Investors and lenders are assessing the environmental impact of a company when aligning capital and making investment decisions. Further, some private equity investors are required to report on emissions of investments (e.g., TCFD) and are making their own carbon commitments and in turn asking companies to report their scope 1, 2, and 3 emissions.

- **Reputation and brand value:**
  Companies are recognising that their reputation and brand value are tied to their environmental and social performance. Reporting on scope 3 emissions can help companies demonstrate their commitment to measuring and managing climate impact and enhance their reputation as responsible businesses.

- **Talent attraction and retention:**
  Surveys point to a growing number of employees that believe it is important that their employer is environmentally responsible. For example, a study by the European Investment Bank in 2023 found that 76% of Europeans (20-29) say the climate impact of prospective employers is an important factor when applying for a job, and 22% say it is even a top priority.

- **Regulations:**
  Regulatory frameworks that require scope 3 emissions disclosures are maturing in the EU, UK, USA and Asia (see Appendix II)

- **Voluntary frameworks:**
  In addition to regulations, voluntary reporting frameworks and initiatives are increasingly turning their attention to scope 3 emissions as a mechanism to collaborate, accelerate action, and align sector-wide decarbonisation pathways (see Appendix III).

By measuring and reducing scope 3 emissions, software companies can leverage value, create competitive advantages, and mitigate environmental, market, and regulatory risks.

[1] Statista (2023): Technology Market Insights: Software – Worldwide
www.statista.com/outlook/tmo/software/worldwide

SCOPE 3 IN THE SOFTWARE SECTOR:
WHAT IS IT AND WHY IS IT IMPORTANT?

Scope 3 encompasses emissions that are not produced by the companies themselves, or any assets controlled or owned by them (reported in scopes 1 and 2).

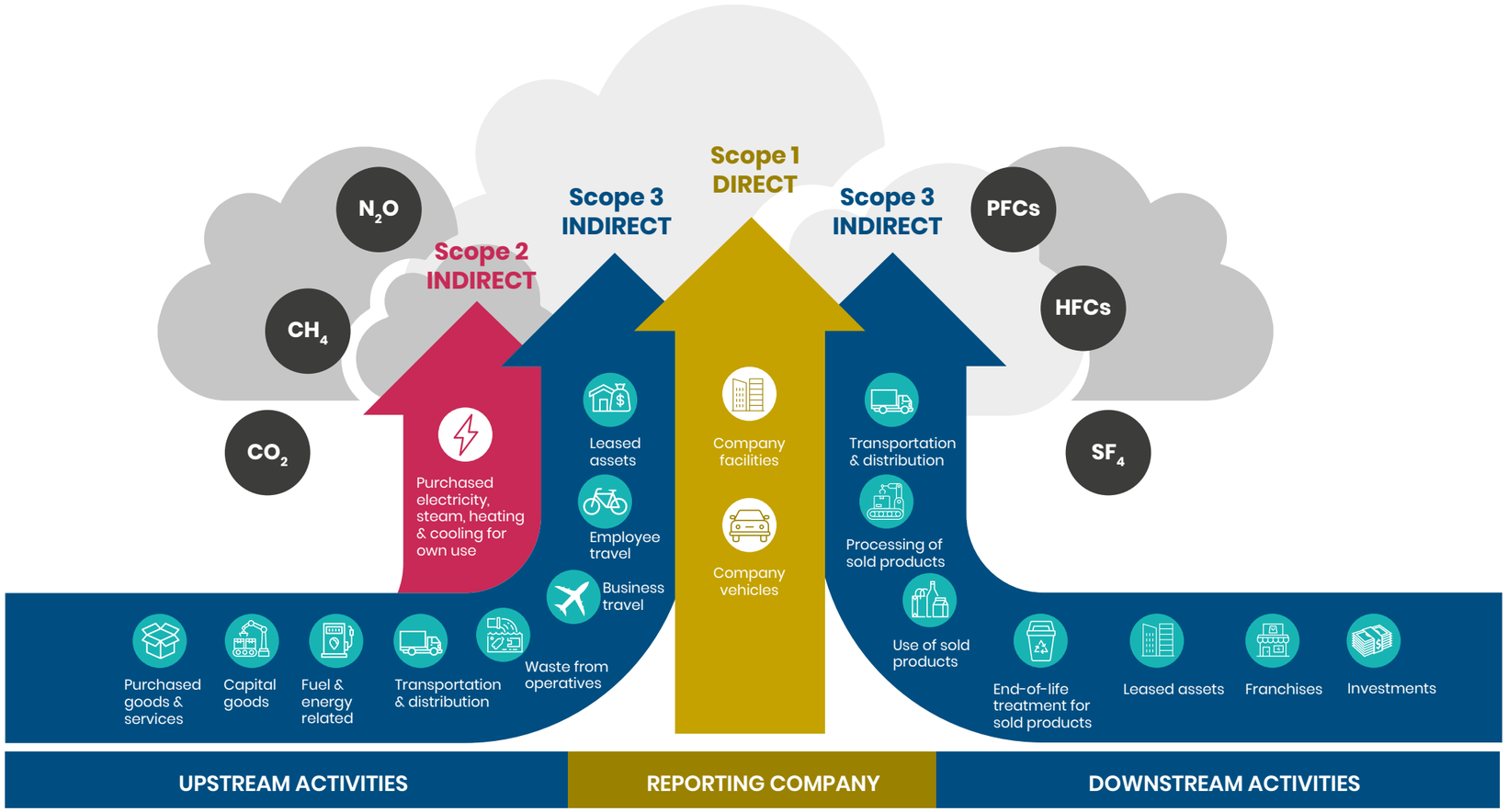
They are emissions generated by others up and down the value chain that a company is indirectly responsible for. The GHG Protocol, the world's most commonly used framework for assessing corporate GHG emissions, divides scope 3 emissions into 15 categories (Figure 2). Detailed descriptions of all 15 categories are available in Appendix I of this document and on p. 37 iCI and ERM's Greenhouse Gas Accounting and Reporting for The Private Equity Sector.

Scope 3 emissions are material in the software sector, and companies that measure their scope 3 emissions consistently report that these emissions are significantly higher than their scope 1 and 2 emissions (see Figure 3).

Software companies rely on digital infrastructure to operate. Computing hardware is needed for software development and for the supply to, and operation by, the customer. To operate, the software also depends on telecommunications networks and data centres to access hosted platforms and to transmit, store and process data. Hardware platforms, supporting infrastructure and the delivery mechanism can only run with electricity. Software imposes a significant third-party energy overhead in the value chain (see Figure 4 for a simplified overview of how electricity is consumed during the operation of software).

Emissions associated with developing and using software are inextricably linked with those of the broader ICT sector, which is thought to consume around 4-6% of global electricity and to generate 2-3% of GHG emissions, although estimates vary significantly.

FIGURE 2
Scope 3 emission classification



Source: WRI and wbcsd, 2011, Corporate Value Chain (Scope 3) Accounting and Reporting Standard

SCOPE 3 IN THE SOFTWARE SECTOR: WHAT IS IT AND WHY IS IT IMPORTANT?

FIGURE 3

Reported scope 1, 2 and 3 GHG emissions reported by eight software companies (Source: ERM analysis of CDP 2021/22 disclosures)

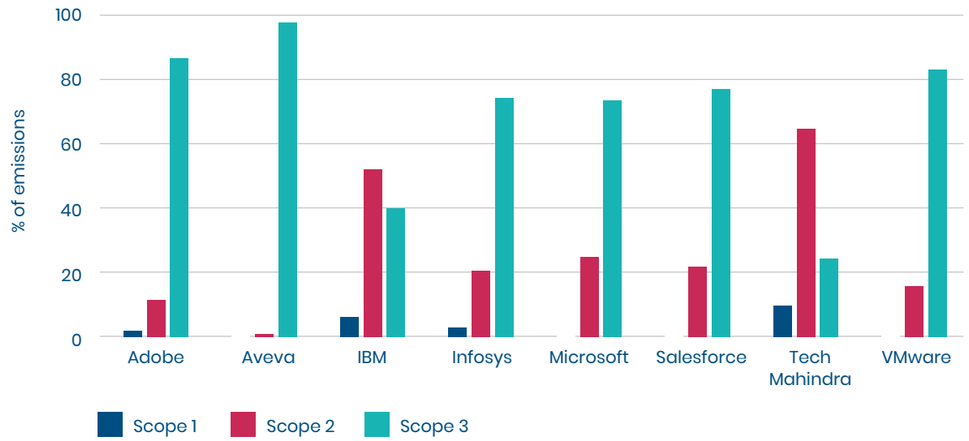
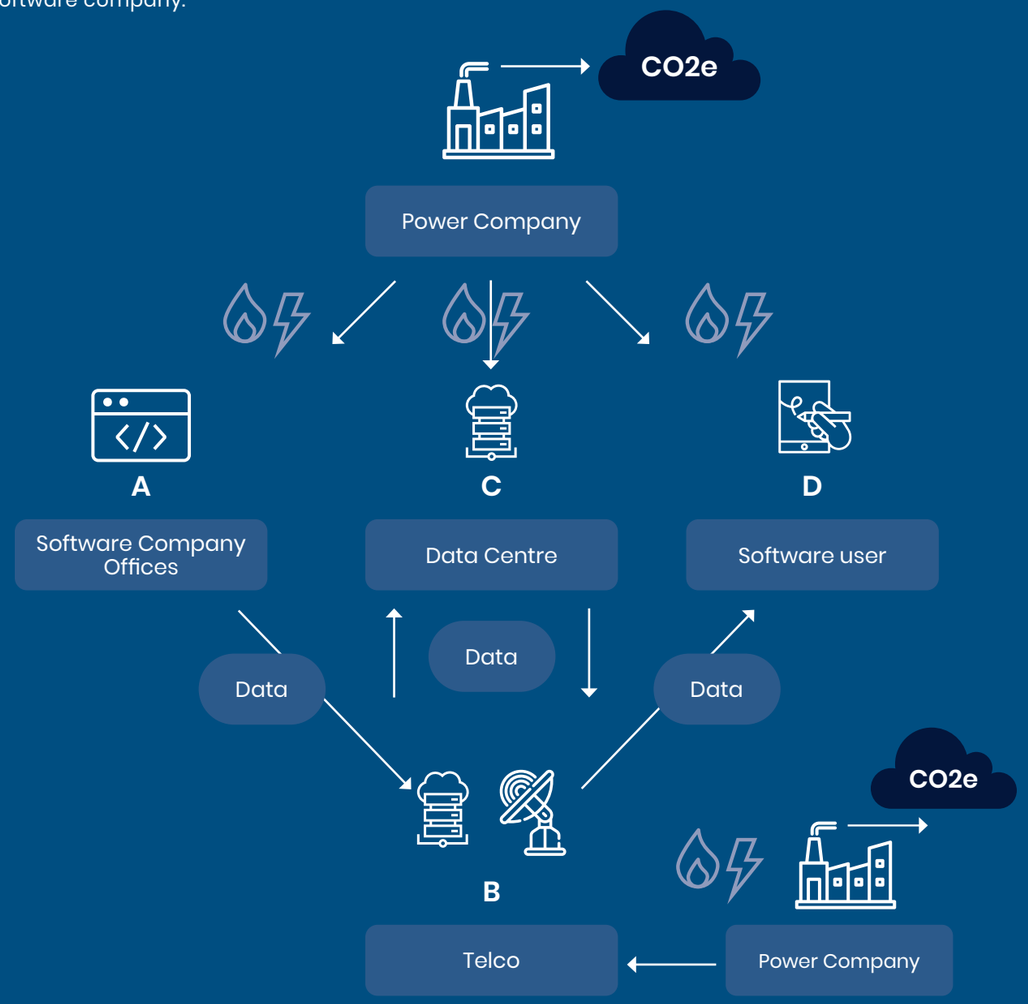


FIGURE 4

Simplified energy, data flows, and GHG emissions in the software value chain

In a typical Software as a Service (SaaS) model, software is created by the software developer (A) sending and receiving data through a telecommunications provider (B) to a data centre (C) which provides compute and store services. The end user (D) of the software may store software on their device but also send and receive data through a telecommunications company to the data centre. Each of these entities use machines, infrastructure and buildings that require energy from power companies (or onsite sources) to operate and cool equipment. This power generation typically results in GHG emissions which vary depending on the energy mix. Part of these emissions from the data centre, telecommunications company and software user will be scope 3 emissions for the software company.



Calculating, reporting and reducing scope 3 emissions in the software sector

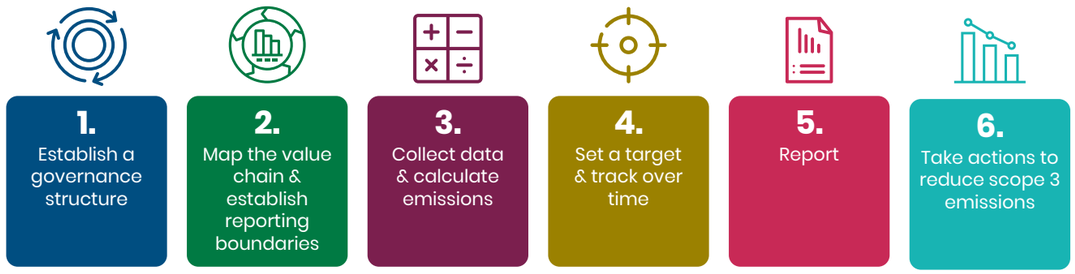
CALCULATING, REPORTING AND REDUCING SCOPE 3 EMISSIONS IN THE SOFTWARE SECTOR

This section outlines the approach to managing and calculating value chain GHG emissions in the software sector at a corporate level.

This Guidance outlines emerging governance best practices along with the steps to establish and manage a scope 3 GHG inventory (Figure 5). This process is documented along with examples, sources of additional guidance, helpful tools, and suggestions on how to reduce scope 3 emissions. Key terms have been defined in the glossary.

FIGURE 5

Six-step process for calculating, reporting and reducing scope 3 greenhouse gas emissions



The fundamental principles for GHG accounting (see blue box to the right) should be considered throughout the process of calculating scope 3 emissions.

GHG Protocol Accounting Principles

Completeness:
Account for and report on all GHG emissions sources and activities within the inventory boundary. Disclose and justify any specific exclusions.

Consistency:
Use consistent methodologies to allow for meaningful performance tracking of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.

Relevance:
Ensure the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users – both internal and external.

Accuracy:
Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information.

Transparency:
Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.

In practice, companies will face trade-offs between principles. For example, software companies may find that to initially complete their GHG inventories there will be a reliance on estimated data. This is faster and easier to implement, but it can also lead to significant uncertainties and inaccuracies, as data may not reflect a company's specific circumstances. As reporting matures, companies can gather data from a range of different sources and directly from suppliers, which provides a detailed and accurate account. However, this can also be time-consuming and resource intensive.

STEP 1:
ESTABLISH A GOVERNANCE STRUCTURE

1.
Establish a governance structure

Establishing strong governance practices from the outset is critical to provide accountability and support for the successful execution of GHG accounting.

Creating a governance framework is critical in enabling companies to measure and report GHG emissions, set carbon reduction targets and incentivise and reward action. It requires establishing clearly defined ownership of the accounting process and the strategic response to the data and insights it generates.

Since scope 3 accounting requires many different elements of the business to share data, a cross-functional working group can help to drive activity across functions. Alternatively, responsibilities can be assigned to ensure data holders feed into a GHG accounting manager. Figure 6 outlines an indicative governance structure, which typically falls within a wider ESG governance structure.

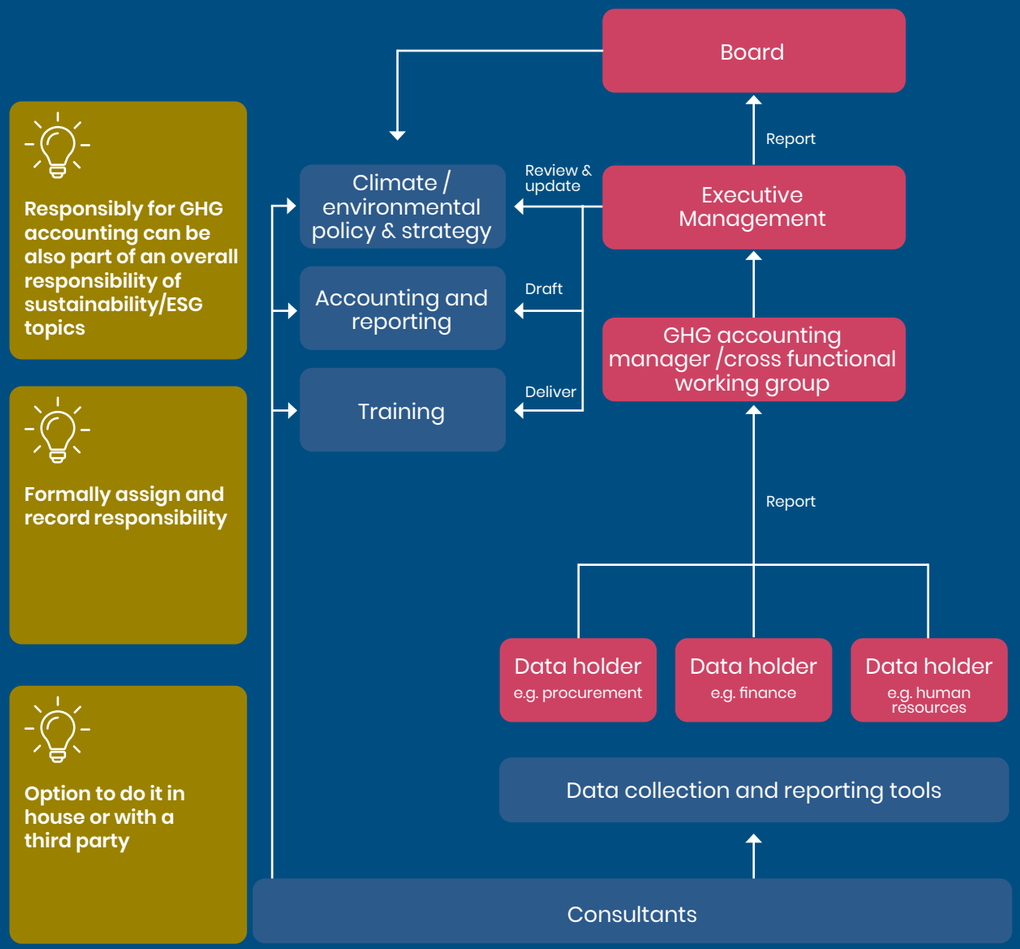
Management should also be visibly engaged, participating in regular communications with stakeholders, including the board, employees, investors, and customers, to signal support, provide updates, reinforce accountability structures, and build organisational buy-in.

The board plays an essential role. The board is responsible for overseeing strategy and reporting, putting them in a central position to ensure that the company carbon reduction targets are meaningful. Boards then help to keep the Management team accountable for progress. Increasingly, leading companies also provide incentives – monetary awards such as bonuses, shares, or a salary increase – for the management of climate-related issues, including the attainment of targets.

It should be noted that companies frequently seek out external expert support to guide them through the complexities of calculating emissions. Consultants can help drive the process of carbon reduction, from calculation, target setting, and planning to meet those targets.

Governance is one of the pillars of sustainability and environmental reporting. Increasingly, voluntary initiatives and regulatory regimes require disclosures from companies on how climate and ESG governance operates. For example, governance is one of 15 modules in CDP's climate questionnaire, with questions probing board and management oversight and the extent to which CEOs and staff are incentivised to drive action and attain targets. Governance is also a pillar of the TCFD's recommended disclosures and a core disclosure requirement under the EU Corporate Sustainability Reporting Directive (ESRS 2). See Appendix III for further information and links on these voluntary and mandatory regimes.

FIGURE 6
GHG accounting requires effective governance for successful execution



STEP 1:
ESTABLISH A GOVERNANCE STRUCTURE

CASE STUDY

Visma:
Governance to support knowledge sharing

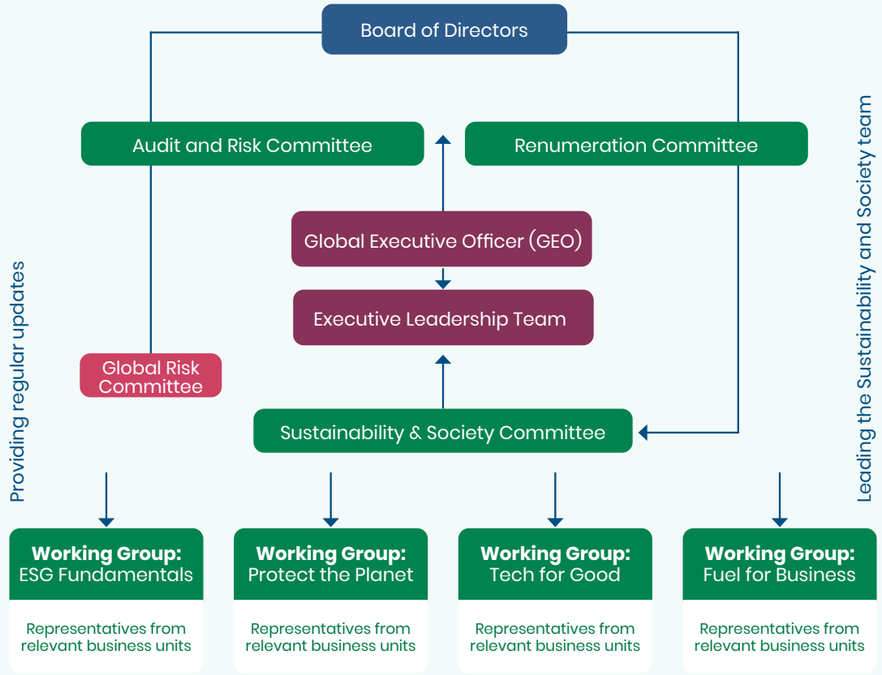
Visma is comprised of 170 companies supporting each other, so it has built its governance model to emphasise knowledge sharing. Its governance structure for sustainability ensures a two-way flow of information. Companies have regular meetings with regional leaders, called Sustainability Leads. These leads sit on the Sustainability Board where issues can be discussed with the Group sustainability function. The Board provides the arena to discuss ideas, make decisions, plan action, and package information.

For more see: www.visma.com/company/governance

CASE STUDY

Sage:
Embedding sustainability governance to manage risks and unlock value creation

Sage's CEO and Executive Leadership Team are accountable for its Sustainability and Society strategy, which is sponsored by its Chief People Office. The Executive Vice President for sustainability is responsible for designing and delivering the strategy, with support and oversight from a sustainability steering committee, which has senior representatives from across the business. The steering committee has established cross-functional working groups for each strategic priority. These collaborate throughout the year to calculate and report on progress. The Board has strategic oversight of the strategic direction and progress being made.



For more see: www.sage.com/en-gb/company/sustainability-and-society/

STEP 2:
MAP THE VALUE CHAIN AND ESTABLISH REPORTING BOUNDARIES

2.
Map the value chain & establish reporting boundaries

Companies should consider all 15 scope 3 categories and determine which are relevant to their business.

Mapping the value chain

To map - to the extent possible - scope 3 activities in the value chain companies should consider:

- All scope 3 categories, including all purchased, and sold, goods and services.
- Suppliers and other relevant value chain partners.

Companies' value chains can be dynamic and change throughout any given reporting year. Companies should choose a fixed point in time (usually at the end of their reporting year) and report GHG emissions relating to all suppliers used, or to any spend, in that reporting year. This fixed point in time should remain consistent in future annual measurement and reporting (see p. 25 for the recommended approach).

Excluding emissions from GHG inventories

Generally, any categories (combined) which represent less than 5% of the total footprint can be considered immaterial. However, exclusion of categories from the total footprint because of a lack of data is highly discouraged as it presents a potential greenwashing risk. It is common practice to estimate uncertain emissions first and refine over time. This also prevents the risk of a data spike when and if that data becomes available.

Allocating emissions within data centre environments

Some companies lease data centre space from third-party colocation suppliers (who provide the supporting infrastructure, including power and cooling). Within a colocation environment, the software provider may own and operate the servers and networking hardware, or they may depend on a cloud service provider to host their software products or services. The degree of operational or financial control, usually reflected in the contractual relationship between the software company and its hosting providers, is important in defining reporting scopes for all parties within data centre environments. This means that the energy consumed by the IT hardware may need to be differentiated from the energy consumed by the supporting data centre infrastructure for carbon reporting purposes. See Appendix V for a simplified schematic that explains reporting scopes in data centre environments. Check contract terms and detailed guidance on leased assets in the GHG Protocol's scope 3 guidance. If it falls into the company's scope 1 and 2, fuel and energy related activities (category 3 of scope 3) must also be addressed. Companies are advised to speak to their suppliers to clarify and to ensure there is no double counting.

Reporting boundaries

Companies are required to consider all scope 3 categories – but not all categories will be relevant to business activities, or material. Some scope 3 activities may not be applicable, for example, if a company does not operate franchises or have financial investments. Column 4 in Figure 7 highlights the common scope 3 activities that software companies typically deem to be irrelevant. However, companies should not rely on a sector view – an assessment should be carried out by the reporting company.

FIGURE 7

Relevant and material scope 3 activities in the software sector

Highly relevant & material - requires in-depth calculations	**Relevant but less material** - requires high-level assessment	**Potentially highly relevant & material** depending on the business model of the company	**Likely not to be relevant** and typically not reported on by software companies
	CATEGORY 3 **Fuel & energy related activities**		
	CATEGORY 4 **Upstream transportation & distribution**		CATEGORY 9 **Downstream transportation & distribution**
CATEGORY 1 **Purchased goods & services**	CATEGORY 5 **Waste generated in operations**	CATEGORY 8 **Upstream leased assets**	CATEGORY 10 **Processing of sold products**
CATEGORY 2 **Capital goods**	CATEGORY 6 **Business travel**	CATEGORY 13 **Downstream leased assets**	CATEGORY 12 **End of life treatment of sold products**
CATEGORY 11 **Use of sold products**	CATEGORY 7 **Employee commuting**	CATEGORY 15 **Investments**	CATEGORY 14 **Franchises**

Source: ERM analysis of CDP disclosures, 2023

STEP 2:
MAP THE VALUE CHAIN AND ESTABLISH REPORTING BOUNDARIES

To assess the relevance of each of the 15 scope 3 categories, companies should conduct a screening assessment. This requires companies to identify the relevant categories, using the criteria outlined in Table 1, and then to estimate their likely contribution using proxy data or industry average data .Examples of potential sources of data for this analysis are outlined under Step 4.

TABLE 1

Criteria for identifying relevant scope 3 activities.

Criteria	Key questions to consider
Size	Does the activity or purchase contribute significantly to the company's total anticipated scope 3 emissions? (Please note, however, that under the SBTi, all emissions need to be reported, even if perceived as negligible.)
Influence	Are these potential emissions that can be influenced by the company?
Risk	Do they contribute to the company's risk exposure (i.e., climate-related risks, litigation, reputational risks)?
Stakeholders	Are they deemed critical by stakeholders?
Outsourcing	Are the emissions generated via outsourced activities previously performed in-house?
Sector Guidance	Have the emissions been identified as significant by sector-specific guidance?
Other	Do they meet any additional criteria for determining relevance developed by the company or industry sector?

Source: GHG Protocol Scope 3 Calculation Guidance.

BOX 1

Influence - where can software companies exert influence in the tech stack?

This simplified model highlights where, and to what extent, software companies can typically control scope 3 emissions in the tech stack. This will vary according to business model and company specifics. Boxes in green illustrate where control can generally be directly applied, and yellow where companies have less influence. Even where influence may be limited, there are options to act. See Step 6 (p. 27) for suggestions.

In house model	Hosted in Colo	IAAS Infrastructure as a Service	PAAS Platform as a Service	SAAS Software as a Service
Applications & data	Applications & data	Applications & data	Applications & data	Applications & data
Runtime, Middleware, Operating System	Runtime, Middleware, Operating System	Runtime, Middleware, Operating System	Runtime, Middleware, Operating System	Runtime, Middleware, Operating System
IT hardware	IT hardware	IT hardware	IT hardware	IT hardware
Networking	Networking	Networking	Networking	Networking
Data Centre infrastucture overhead	Data Centre infrastucture overhead	Data Centre infrastucture overhead	Data Centre infrastucture overhead	Data Centre infrastucture overhead
The software company does everything. This means they control all the emissions either directly or through purchasing decisions.	The software company does not own the servers. There are different permutations depending on the degree of infrastructure the data centre operator provides.	The software company does not own the servers so the hardware is all provided, but they manage the rest. Bear in mind that the servers may be owned by a different entity than the one that runs the data centre.	The infrastructure, hardware and software platform are provided by a third party (or several third parties) and the software company just manages the applications and data.	Here the software company outsources everything and third parties provide a full service usually delivered through a web browser.

This assessment allows companies to define their reporting scope – the relevant categories to the business. The GHG Protocol states companies should account for all scope 3 emissions and disclose and justify any exclusions.

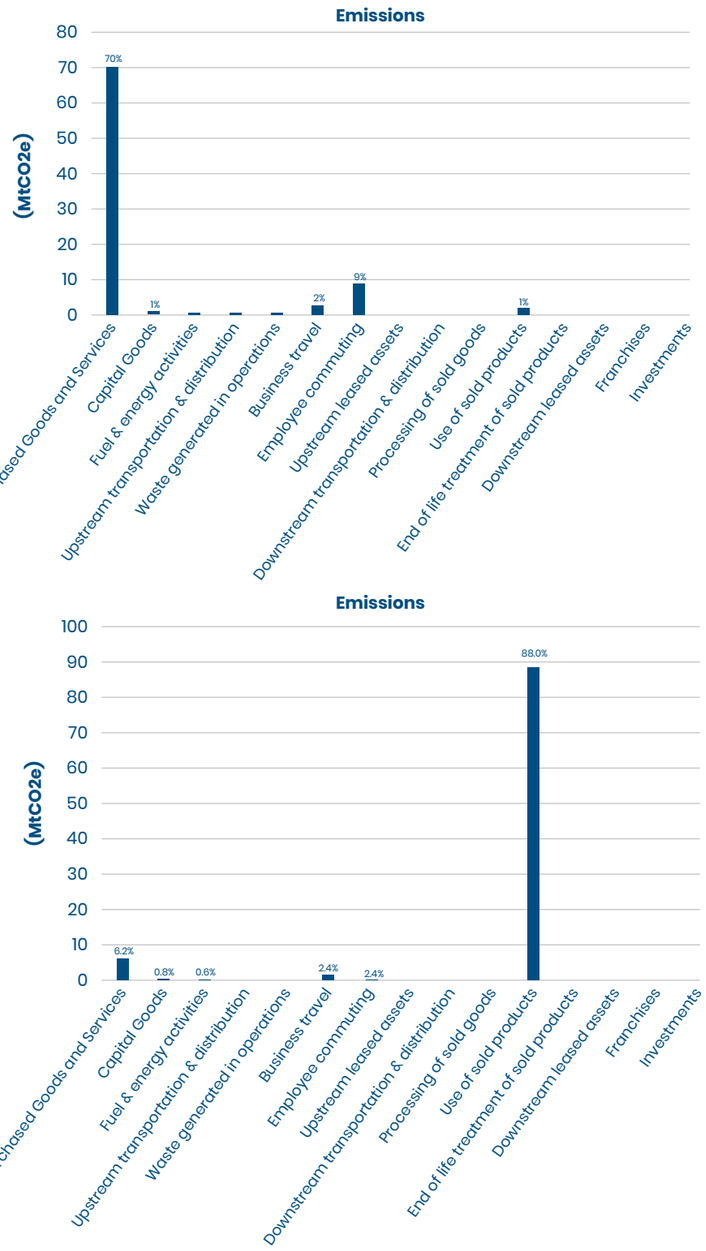
In general, the categories which software providers report on vary considerably, which means companies cannot base assessments of relevance solely on reporting by peers. This variation reflects the rich diversity of business models in the sector (for example, where they sit in the "tech stack" see Box 1). There may be other causes for variation, for example, some companies may lack data to assess the significance of certain categories.

This variation is highlighted overleaf in Figure 8, which shows scope 3 emissions disclosures of two software companies.

STEP 2:
MAP THE VALUE CHAIN AND ESTABLISH REPORTING BOUNDARIES

FIGURE 8

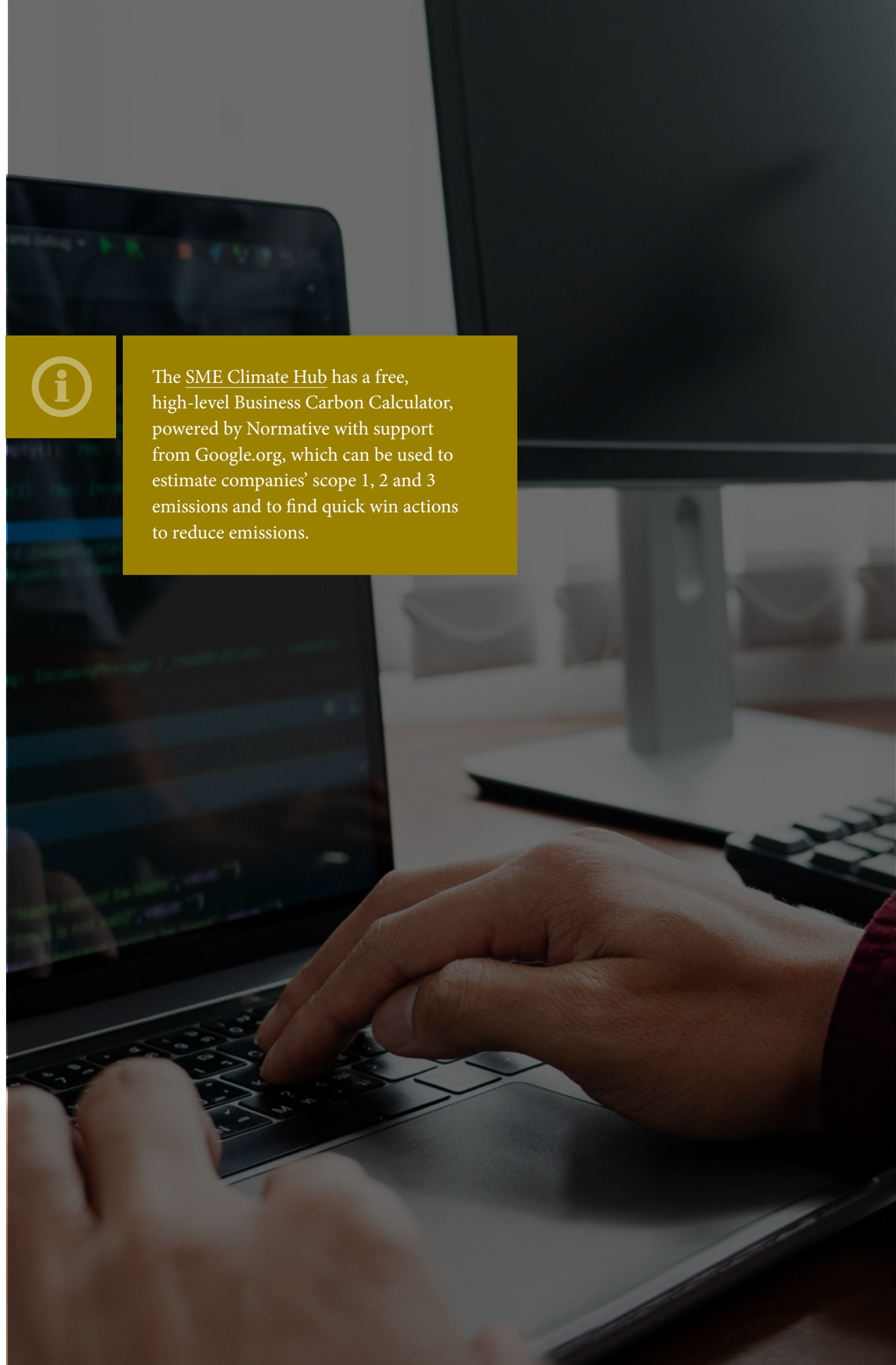
Scope 3 emissions reported by two software companies, Gocardless (2021) and AVEVA (2022)



Global bank payments platform Gocardless' scope 3 emissions profile is focused on purchased goods and services and capital goods (categories 1 and 2), business travel and employee commuting (categories 6 and 7) and use of sold products (category 11).

Industrial software company AVEVA's scope 3 emissions profile is focused on purchased goods and services and capital goods (categories 1 and 2), business travel and employee commuting (categories 6 and 7), and use of sold products (category 11).

Source: Gocardless: and CDP



The SME Climate Hub has a free, high-level Business Carbon Calculator, powered by Normative with support from Google.org, which can be used to estimate companies' scope 1, 2 and 3 emissions and to find quick win actions to reduce emissions.

STEP 3:
COLLECT DATA AND CALCULATE EMISSIONS

3.
Collect data & calculate emissions

Companies can use a variety of approaches and data sets to estimate their scope 3 emissions.

Conducting screening helps to inform whether a scope 3 category is relevant and supports companies to prioritise data collection. This is important because a more accurate measurement or assessment of a category that forms 20% of emissions, for example, will have a greater impact on the total result than accurately measuring a category that only contributes 1% of emissions.

A mixture of methods – with varying degrees of accuracy - is available to companies to calculate scope 3 emissions. Companies should, where possible, aim to collect primary GHG intensity data directly from suppliers for high-priority activities, which allows progress to be meaningfully tracked and benchmarked, and also helps to expand awareness of GHG emissions management and transparency through the value chain. However, it is important to balance this with costs and resources.

Data collection for scope 3 involves many data points, often many from external sources, and each category has its own methodology and required data sets. A company will need to work with its finance and procurement teams to identify a full list of suppliers the company works with, and then to determine who owns the business relationship with each, as those individuals will likely need to reach out to collect primary data. This entails not only a complex data process but a coordinated people process.

Most companies look to improve year on year as data availability and quality increase, and more standardised guidance is produced. Tips on how to address data gaps are outlined on p.47 of Greenhouse Gas Accounting and Reporting for The Private Equity Sector.

Once data has been collected, consolidated GHG emissions per category are calculated in tonnes of carbon dioxide equivalent ($tCO2_e$) to allow for consistency.

In the remainder of this section, we highlight how to produce these consolidated figures, focusing on the categories likely to be highly relevant to the software sector (Figure 7), and categories where there is an opportunity for companies in the sector to exert influence. For the other remaining categories, we highlight sources of calculation guidance available elsewhere.

Key Definitions

Primary data – data collected from specific activities or suppliers within a company's value chain.

Secondary data – calculated using industry average data or other estimation techniques.

What to include in scope 3 inventories.

Data on all greenhouse gases – carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydroflurocarbons (HFCs), perflurocarbons (PFCs) nitogen trifluoride (NF_3), and sulphur hexafloride (SF_6) if they are emitted in the value chain. These are reported as tCO_2 equivalent.

What is not included within scope 3 inventories

Carbon removals.
Carbon removals and/or offsetting should be reported separately.

Enabling emissions:
If products and services have helped others reduce their emissions this should be reported separately. The GHG Protocol is expected to provide further guidance shortly (it was under consultation at the time of writing).

Emission factors (EF)

Emissions factors are an essential input to carbon accounting. They provide a representative value that attempts to relate the quantity of greenhouse gas emissions with an activity that releases it. EFs vary in the breadth of activity they cover. Some cover single sources (for example the carbon associated with a country's grid in any particular year) while others cover entire supply chains. While sometimes less accurate than using primary data (e.g., specific LCA data), EFs are helpful when data is expensive, time-consuming, and/or difficult to obtain. More information on sources of EFs is available in Appendix A p. 89. in Greenhouse Gas Accounting and Reporting for The Private Equity Sector

STEP 3:
COLLECT DATA AND CALCULATE EMISSIONS

Category 1: Purchased Goods and Services & Category 2: Capital Goods

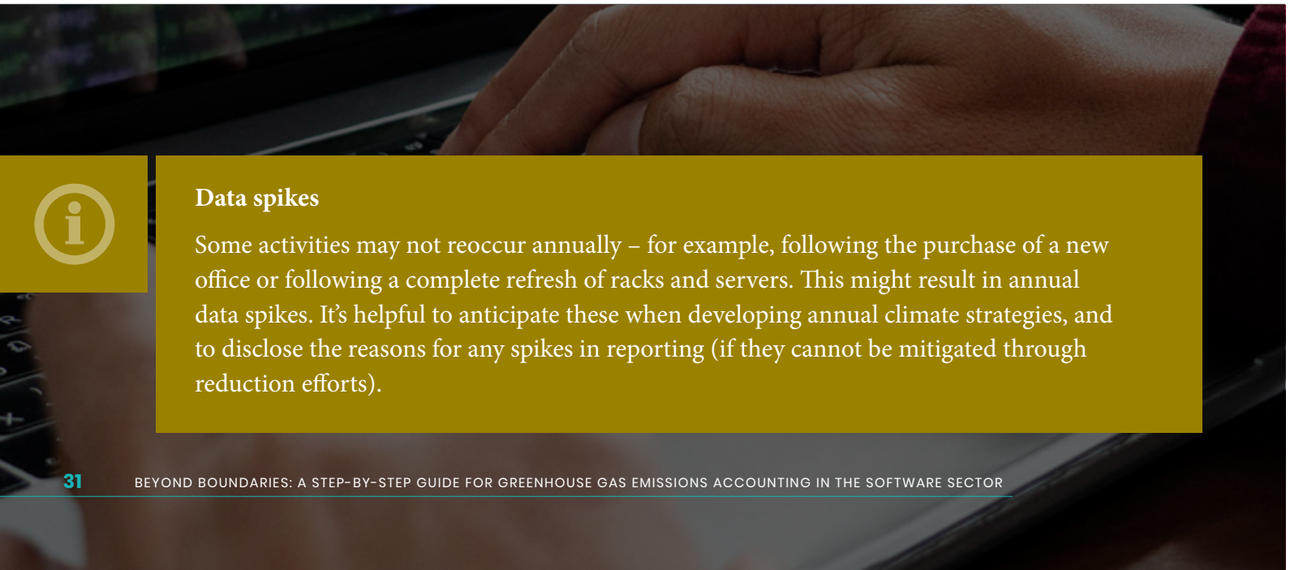
These categories are relevant for all software companies. Purchased goods and services include (but are not limited to) services relating to developing and programming software, cloud services, professional services, and items used by employees such as electronics. Capital goods will also be relevant to all companies in the sector. Capital goods include (but are not limited to) the purchase of servers, generators, building materials and vehicles used by the company.

The approaches available to estimate these via the calculation outlined in Figure 9, is the same and so has been combined to provide one set of guidance.

Guidance on activity data is outlined in Table 2. There are three methods for assessing emissions: the industry-average method; the supplier method; and the product method which are detailed in Table 3. The table outlines the respective strengths and weaknesses of each methodology and provides guidance on where to find supporting data. A decision tree to help determine the most appropriate method to use is detailed in Figure 10.

To support transparency, companies should report which methodology it uses. In its 2021 Carbon Impact Report, global bank payments platform GoCardless details all the categories to which it applies the spend-based method to. It includes insurance & pensions, food, real estate services, legal services, accounting services, furniture, repair of goods, and employment services.

GOCARDLESS



Data spikes

Some activities may not reoccur annually – for example, following the purchase of a new office or following a complete refresh of racks and servers. This might result in annual data spikes. It's helpful to anticipate these when developing annual climate strategies, and to disclose the reasons for any spikes in reporting (if they cannot be mitigated through reduction efforts).

FIGURE 9

The calculation for assessing category 1 & 2 emissions

Emissions from purchased products and capital goods = Emissions factor x activity data

TABLE 2

Activity data for category 1 and 2 calculations

What data is needed?	Pros/Cons	Where to find data?
Amount spent, by product type, using market values (i.e., $, € or £).	**+** Cost and time efficient as readily available. **X** Not always representative of emissions – a reduction in spend may not lead to a true reduction of emissions.	Purchasing records e.g. from procurement. Accounts payable records.
Mass, volume, quantity (e.g. in kilogrammes), or a number of units purchased. This may include the output of a process, period of equipment operation in hours, or floor area of a building.	**+** Better aligned to emissions, more useful for monitoring suppliers, and enables informed decisions. **X** Resource intensive to obtain data and relies on checks to ensure data is reliable.	Purchasing records e.g., from procurement. Enterprise resource planning systems. Bill of materials (the raw materials, components, or parts and the quantities of each).
Supplier specific data (emissions intensity).	**+** Most accurate data, most useful for monitoring suppliers, and most helpful in enabling informed decisions in tackling these emissions. **X** Resource intensive to obtain, suppliers may not have adequate processes in place to share data, relies on data checks to ensure the data is reliable.	Direct supplier engagement. Supplier disclosures.

FIGURE 10

Decision tree to determine the most appropriate method for category 1 and 2 calculations

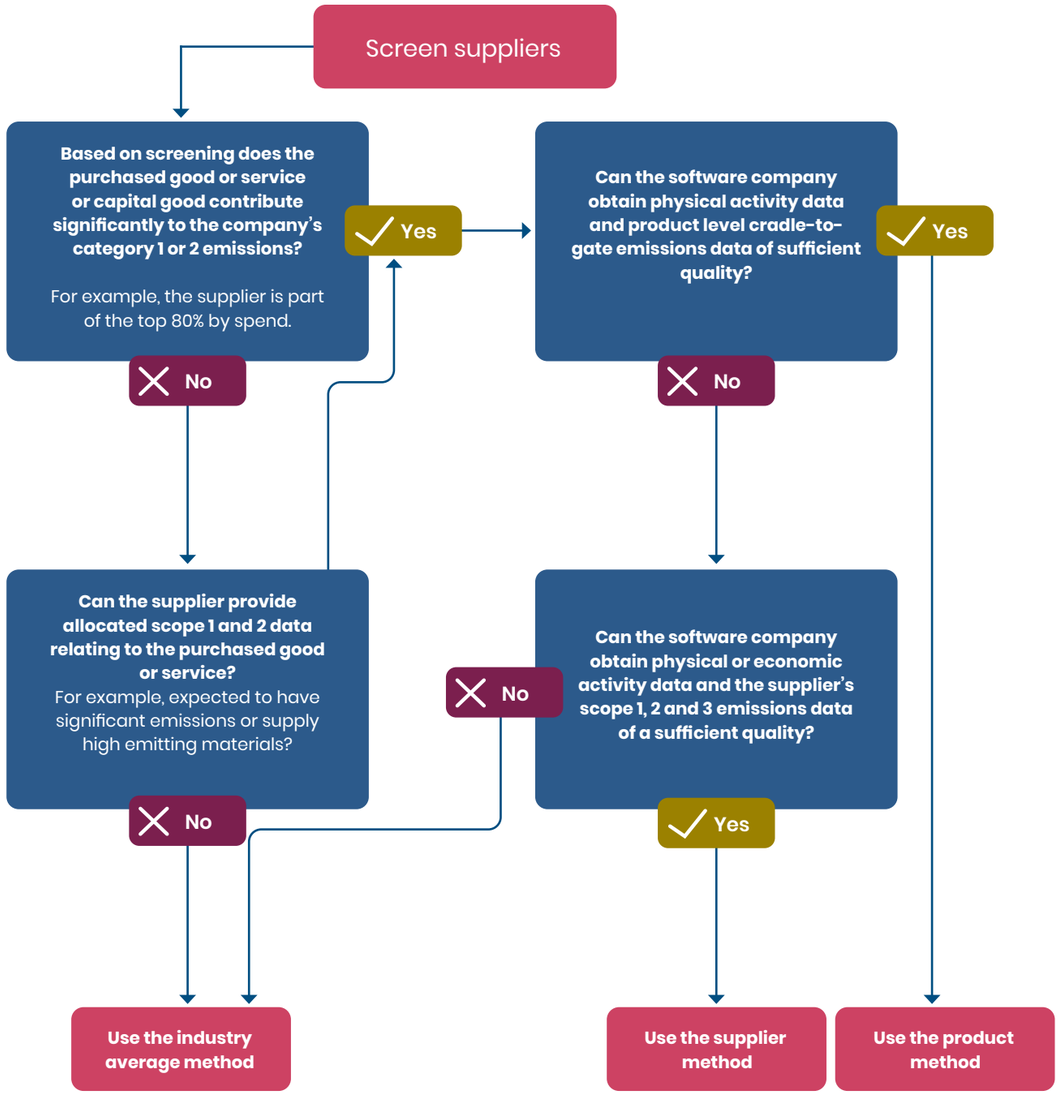


TABLE 3

Emissions data methodologies, benefits, challenges and data sources

Calculation methods	Pros/Cons	What data is needed and where to find it	Emissions data that will be generated
Industry average method (spend-based method or/and average data method) *Estimating emissions using secondary data sources*	**Pros** • Cost-effective. • Time efficient. • Helpful for initial screening. • Helpful for initial prioritisation. **Cons** • Not very accurate. • Not supplier specific. • May require external support. • Too crude to drive informed decarbonisation activity.	**Activity data (see Table 2 above).** **Industry average level data e.g. via Ecoinvent.** **Economic activity i.e.** • The Sustainability Consortium • Carnegie Mellon University • The UK Government • US Environmentally Extended Input-Output **Physical activity i.e.** • Base Carbone • The UK Government	Representative emissions for each type of purchased product or capital good (e.g., $kgCO_2e/kg$ or $kgCO_2e$/piece).
Supplier method (supplier-level allocation method) *Calculating emissions of products and services using data directly from suppliers*	**Pros** • Efficient, repeatable, scalable. • Supports follow on engagement with suppliers. • Encourages climate action in the supply chain. • Can be used to inform decision on which suppliers to work with. **Cons** • More resource intensive. • Requires a check ensure data covers all scope 1, 2 and 3 emissions associated with the product/service. • Likely requires follow-ups with suppliers to clarify data.	**Activity data (if allocating) + supplier data obtained via:** • Statutory reporting. • Voluntary reporting through the CDP global disclosure system. • Directly from suppliers.	Supplier's scope 1, 2 and 3 (Category 1 to 8) emissions data per quantities or units of products of capital goods purchased (e.g., $kgCO_2e/kg$ or $kgCO_2e$ /piece). Supplier's scope 1, 2 and 3 (Category 1 to 8) emissions data per unit of economic value (e.g., $kgCO_2e$ /$ of revenue).
Product method (product-level method, or product carbon foot printing) *Calculating emissions of products from "cradle to gate"*	**Pros** • Very detailed. • Allows comparison between products and services. **Cons** • Can be expensive and time consuming. • Unlikely to be scaleable. • If calculation relies on many assumptions, it can be less accurate.	• Information from suppliers (see Box 2). • Published carbon footprints. • LCAs for similar products • Product life cycle database, Ecoinvent.	Product level emissions for each purchased good (e.g. $kgCO_2e/kg$ or $kgCO_2e$ /piece or $kgCO_2e$ per subscription).

STEP 3:
COLLECT DATA AND CALCULATE EMISSIONS

BOX 2

Product method | Data directly from suppliers

More and more suppliers are sharing the GHG emission data related to their products and services directly to customers. This direct supplier data reduces dependence on estimates.

Companies using this data should try and understand any limitations and assumptions built into their suppliers' own calculations. See for example p. 55 for more on allocating carbon to the cloud.

Purchased electronics:
Many manufacturers of electronics like Apple, Dell and Lenovo, provide data sheets with detailed information on the environmental characteristics of their products, including their carbon emissions.

Purchased cloud services:
Cloud service providers such as Google, AWS and Microsoft have tools, data, and dashboards to allow their customers to attribute GHG emissions to their use of the cloud.

Companies using this data should try and understand any limitations and assumptions built into their suppliers' own calculations. See for example p. 23 for more on allocating carbon to the cloud.

While it is good practice to assess all suppliers over the year, there may be a very long tail of suppliers which do not provide any material or meaningful impact (i.e., low spend with small suppliers). Companies may exclude these based on the principles of relevancy and accuracy and focus on - at least - the top 80% of suppliers by spend. However, please also note the rules the SBTi have in place regarding the exclusion of emissions for target setting purposes (Box 3, p. 24).

Purchased Goods and Services: worked example using supplier specific method

Company A has purchased office supplies, hardware, software development tools, components that are used with in a data centre such as networking equipment and storage devices. The results are summarised below.

Total emissions of purchased goods by Company A is calculated as follows:

Purchased Good	Quantity	Supplier-specific emissions factor (Kg $C0_2e$/kg)
Hardware	1000	0.15
Storage Devices	50	0.75

Note: The activity data and emissions factors are illustrative only, and do not refer to actual data.

Total emissions of purchased goods by Company A is calculated as follows:

$\sum$ *(quantities of good purchased (units) × supplier-specific emission factor of purchased good or service (e.g., kg CO2e/kg))* =

Hardware = *1000 X 0.15= 150 $KgCO_2e$*
Storage Devices = *50 X 0.75 = 37.5 $KgCO_2e$*
Total emissions (Kg) = *187.5 $KgCO_2e$*
Total emissions (tonnes) = *187.5 / 1000 = 0.1875 tCO_2e*

Carbon neutrality
Some suppliers are increasingly claiming they are carbon neutral, however, this doesn't mean that a company can account for purchases from such suppliers as zero emissions and it would not cover all suppliers' scope 3 emissions. Companies have to report the absolute emissions of a product or service, and then choose to report separately that these emissions have been offset by a third party.

Clean data
Not everything purchased falls under Category 1. Companies can exclude costs of rights and licences and permits. Emissions from waste management companies should be reported under scope 3, category 5. Emissions from purchased energy should be reported as scope 2 emissions and the associated fuels reported under category 3.

Category 6: Business travel

Emissions from employee travel for business related activities via aircraft, trains, buses, rental cars and taxis, and employee-owned vehicles can be material for companies in the software sector. Companies should report emissions for this category, where material. Suggestions on how to reduce them are outlined under Step 6.

TABLE 4

Category 6 | Emissions methodologies and data sources

What data is needed and where to find it	Where to find this data	How to calculate
Fuel consumed. (t, l or m^3).	• **Travel providers/agencies** • **Expense records** • **Procurement**	Fuel used X Combustion emissions factor for that fuel ($kgCO_2e$/t, l or m^3). Emission factors are available here.
Distance travelled (passenger miles/km per transport mode). **For air travel, if possible, distinguish between long-haul, short-haul, domestic flight and economy, premium, and first.**	• **Travel providers/agencies** • **Expense records** • **Procurement**	Σ (total distance by mode of transport) X vehicle-specific emission factor. Emission factors are available here.
Spend for each reporting month and country (£ spent per transport mode).	• **Expense records** • **Procurement**	Σ (amount spent by transport type) x relevant EEIO[2] emission factor.

If collecting data from all employees is not feasible, companies can extrapolate from a representative sample of employees. For more guidance, see p84 and Appendix A of the GHG Protocol Scope 3 Calculation Guidance.

Companies can optionally include the emissions associated with business travellers staying in hotels. Emission factors for hotel stays can be sourced via the Cornell Hotel Sustainability Benchmarking Index Tool.

[2] EEIO refers to Environmentally-extended input-output (EEIO). It is a form of analysis that provide a simple and robust method linking spend with environmental impacts, such as GHG emissions.

Category 7: Employee Commuting

Emissions from employee travel to and from their workplace. It also includes the emissions associated with home working. Many companies in the sector report emissions for this category and take measures to encourage more sustainable options to their employees.

TABLE 5

Category 7 | Emissions methodology and data sources

What data is needed	Where to find this data	How to calculate
Fuel consumed. (t, l or m^3).	• **Annual employee survey**	Fuel used X Combustion emissions factor for that fuel ($kgCO_2e$/t, l or m^3) Emission factors are available here.
Distance travelled for all transport legs (passenger miles/km per transport mode).	• **Annual employee survey** • **Online maps and calculators** • **Proxy data**	Σ (total distance by mode of transport) X transport mode-specific emission factor. Emission factors are available here.
Average-data (estimated emissions based on national data on commuting patterns).	• **National survey data on average commuting distances, modes of transport, and commuting days per week**	Σ (total number of employees X % of employees using mode of transport X one way commuting distance (vehicle-km or passenger-km) X 2 X number of commuting days per year X emission factor of transport mode (kg CO_2e/vehicle-km or kg CO_2e / passenger-km)). Emission factors are available here.

Monthly travel reporting and calculation, with emission factors reflecting the country of travel, lends itself to more accurate and useful data points.

Public transport data from the European Commission provides EU and international averages for bus, rail, tram and metro use.

COLLECT DATA AND CALCULATE EMISSIONS

Calculating the GHG impact from working from home

The global COVID pandemic led to a systemic change in how people work. Even with workers now moving back to the office, many companies continue to offer flexible work options, including hybrid and remote working, to their staff.

From a carbon reporting perspective this means understanding the emissions created by the equipment used to perform work remotely, and includes home heating and cooling, lighting, power to computers and other home office equipment. It can be calculated by:

FIGURE 11

The calculation for remote working

$$\sum \textit{number of workdays from home} \times \textit{quantity of additional energy consumed per remote working day (kWh)} \times \textit{EF for energy source (kg } CO_2e/kWh)$$

Homeworking is currently an optional disclosure under Employee Commuting (Category 7), however leading companies are increasingly choosing to assess and disclose these, as they can no longer be deemed immaterial. EcoAct's Home Emissions Whitepaper outlines a robust approach to assessing these. The UK Government GHG Conversion Factors spreadsheet also supplies factors based on FTE working hours, removing the need for employees to understand their energy consumption.

Estimating emissions from hybrid working

To gather data to support this assessment, companies are using check-in apps, or data from office key cards, to track where employees are working each day. To understand home energy consumption, staff surveys are increasingly being used (for example by Salesforce) annually to help inform assumptions on the nature of the energy being used in people's homes.

Category 11: Use of sold products.

This category accounts for the emissions generated by users of software during its operation, which companies estimate for each sold product over its expected lifetime. Software doesn't consume energy directly - rather energy is indirectly consumed when software runs on electronic devices. See the GHG Protocol Scope 3 Accounting and Report Standard, table 5.8, for definitions of direct and indirect emissions for sold products. Reporting these emissions is voluntary and cannot be counted towards the two-third threshold required for scope 3 targets under the SBTi. Targets to reduce scope 3 emissions that fall outside the minimum boundary established by the GHG Protocol are not required but are encouraged if significant. However, leading software companies are reporting this category as they can be material and it is therefore important to measure and assess these emissions. Step 6 outlines options to reduce emissions from this category.

FIGURE 12

The calculation for category 11 emissions

$$\textit{Category 11 emissions} = \sum \textit{(total lifetime expected use of product x number sold in reporting period x electricity consumed per use (kWh) x emission factor for electricity (kg } CO_2e/kWh)$$

STEP 3:
COLLECT DATA AND CALCULATE EMISSIONS

TABLE 6

Category 11 data | What to source and where to find it

What data is needed?	Where to find data
• **Estimated lifetime of the software** • **Quantities of licences or products/services sold** • **Estimated number of uses per each licence of products/services sold** • **Electricity consumption per use** • **Global distribution**	• Internal data systems • Sales records • User surveys • Industry associations • Direct modelling

Measuring the energy consumption of software is not a trivial task and there isn't a single, generally accepted approach as different platforms require different strategies. Some tools work only with Intel CPUs, others only with a particular operating system, for example. Some of the most common include:

- **Intel Power Gadget and Intel PowerLog,** which works with Mac or Windows on Intel PCs
- **Powerstat,** which works with Linux on compatible Intel PCs
- **PowerTop,** which works on Linux with AMD or Intel devices, and tested on virtual machines
- **Perf,** which works on Linux with Intel devices, but doesn't work on virtual machines
- **Nvidia.smi,** which works on Linux with Nvidia GPU devices
- **Green Metrics Tool,** which works on Linux

More guidance, and links to additional tools, is outlined in this GitHub blog, from Microsoft, and another from Salesforce. This is an evolving space, so companies are encouraged to review new tools. Be sure to consider the emissions related to the use of monitors too, as well as hard drives and laptops.

Use of Sold Products: worked example

Company A has launched an AI-tool on the market. User data suggests that each user of the software accesses the software around 60 times a year. Sales data shows it sold 10,000 licences this year, half of which were sold in Germany and the remainder in the UK. Each licence allows the user to access the tool for one calendar year. Company A sources data on electricity consumed per use from industry reports and electricity emission factors from government data. The results are summarised below.

Product	Total uses over lifetime per licence	Number of licences sold	Electricity consumed per use (kWh)	Electricity emissions factor (kg CO_2e/Kwh)
Software A Germany	60	5000	0.22	0.5
Software A UK	60	5000	0.22	0.4

$\sum$ *(total lifetime expected use of product X number sold in reporting period x electricity consumed per use (kWh) x emission factor for electricity (kg CO e/kWh).*

Software A in Germany
60 x 5000 x 0.22 x 0.5 = 33,000 kgCO_2e

Software A in UK
60 x 5000 x 0.22 x 0.4 = 26,400 kgCO_2e

Total emissions (kg) = *59,400 kgCO_2e*
Total emissions (tonnes) = *59.4 tCO_2e*

CASE STUDY

Aveva:
Continuous improvement in assessing energy used by sold products.

AVEVA has developed a custom model to estimate the energy required by customers to use its software. It refined the model based on feedback from third-party experts, although admits that its data is a best estimate. AVEVA plans to refine the model by: engaging customers to collect further data around their utilisation of its software; reflecting the use of renewable power at data centres supporting its software; and, by obtaining data on the general efficiency of the IT infrastructure used in the deployment of its software. It currently assumes no renewable power for customers or data centres but intends to collect data from a representative sample to help update its model.

Source: AVEVA 2021 Sustainability Report

Other categories

If a company chooses to set a science-based target with the SBTi, it's important to complete a full GHG inventory, even for negligible emissions. In Table 7, we outline key sources of guidance to support companies in calculating emissions associated with other scope 3 categories. Unless otherwise specified, further guidance on calculating these is available in the GHG Protocol Scope 3 Calculation Guidance.

TABLE 7
Sources of calculation guidance for other scope 3 categories

Category	Where to find calculation guidance
CATEGORY 3 **Fuel & energy activities**	This category relates to the emissions associated with producing the fuels used to generate electricity or heat. This may be significant because of the large amounts of energy consumed in data centres or over large numbers of technical sites. See ITU, GeSi and the GSMA's Scope 3 Guidance for Telecommunication Operators for detailed guidance on how to calculate.
CATEGORY 4 **Upstream transportation and distribution**	This is likely to be a minor part of scope 3 emissions for the software sector as Transportation and Distribution is typically relatively small with a move away from distribution of physical media (e.g. CDs). However, companies still assess this category as logistics paid for by the reporting company can be an area where there is more information availability and influence.
CATEGORY 5 **Waste generated in operations**	Emissions in this category are likely to be a minor part of scope 3 emissions for the software sector; however, this could be significant if companies are generating large volumes of electronic waste (WEEE).
CATEGORY 8 **Upstream leased assets** CATEGORY 13 **Downstream leased assets**	Software companies may find that upstream leased assets are material if they operate colocation within a data centre. Detailed guidance is available via the ITU, GeSi and GSMA's Scope 3 Guidance for Telecommunication Operators.
CATEGORY 9 **Downstream transportation and distribution**	Generally this category isn't relevant as software is now distributed online. However, this will depend on each company's business model.
CATEGORY 10 **Processing of sold products**	Generally this category isn't relevant as software is now distributed online and there is no physical sold product. However, this will depend on each company's business model.
CATEGORY 12 **End of life treatment of sold goods**	Not relevant to the software sector unless physical products are also being sold. These would be treated similarly to how the calculation is conducted for waste disposal.
CATEGORY 14 **Franchises**	Unlikely to be relevant but might be dependent on specific company activities. If relevant, please see p. 130 of the GHG Protocol's Technical Guidance for Calculating Scope 3 Emissions.
CATEGORY 15 **Investments**	If your company has material investments, see ERM and iCI's Greenhouse Gas Accounting and Reporting: Guidance for Private Equity which provides detailed guidance on calculating category 15 emissions.

STEP 4:
SET TO A TARGET AND TRACK OVER TIME

4. Set a target & track over time

To reduce exposure to climate risks and demonstrate progress to investors and stakeholders, companies should set a target to reduce their scope 3 GHG emissions and monitor progress over time.

Setting a target

Setting targets to reduce scope 3 emissions can drive value for companies and reduce their exposure to climate risk. It can improve resilience in the company and its supply chains, reduce exposure to potential pass-through costs from suppliers via carbon pricing mechanisms, help to attract talent and increase staff satisfaction and retention (read more about the commercial value in on p. 9 in the introduction).

The low carbon transition is also creating demand for goods and services with a low carbon intensity. Companies and, increasingly, the public sector are actively seeking to partner with vendors and suppliers that have similar climate ambitions to theirs. For example, the UK government requires that all companies bidding for contracts worth over £5 million must commit to reaching Net Zero by 2050 (for more information on Net Zero see Table 8).

Businesses are signing up to a growing range of targets and commitments. Appendix IV outlines those made by companies in the software sector, which is summarised in Figure 13. It is increasingly accepted however, that for targets to have a meaningful impact and contribute towards tackling climate change they should be aligned with the latest climate science. Emerging best practice is to reduce emissions on a trajectory to keep global warming to 1.5°C above pre-industrial temperatures.

The standard setter Science Based Targets initiative (SBTi) has quickly become synonymous with science-based targets (see Box 3). Software companies should note that their ICT partners and suppliers have worked with the International Telecommunications Union (ITU), the UN agency for ICT, and SBTi, to create a sector-specific decarbonisation pathway for device manufacturers, mobile and fixed network operators, and data centre operators in line with the goals of the UNFCCC Paris Agreement (see Box 4). Alongside it, the ITU and GSMA (Global System for Mobile Communication Association), published further guidance on how to set targets in line with the pathway.

Yet targets can come in a range of different formats, allowing companies to pick a goal that is most reflective of their own circumstances. The Corporate Value Chain (Scope 3) Accounting and Reporting Standard (Chapter 9) sets out detailed guidance on the types of targets companies can set on scope 3, and their respective pros and cons. A summary of some of the most common targets set within the software sector is outlined below in Table 8 and in Table 9.

FIGURE 13
Climate targets of 25 companies in the software sector

Public commitment

8	SBTi
7	Nominal target
7	Net zero
4	Scope 3 focused targets
1	Carbon neutrailty

Note: numbers exceed total number of companies because of multiple commitments.
Source, ERM analysis of the CDP disclosures of 25 software companies.

Reporting boundaries

Companies are required to consider all scope 3 categories – but not all categories will be relevant. Some scope 3 activities may not be relevant, for example, if a company does not operate franchises or have financial investments. Column 4 in Figure 7 highlights the common scope 3 activities that software companies typically deem to be irrelevant. However, companies should not rely on a sector view – an assessment should be carried out by the reporting company.

STEP 4:
SET TO A TARGET AND TRACK OVER TIME

TABLE 8

Examples of common targets set by software companies

	Carbon neutrality targets	Science-based targets (near term and/or net zero)	Net Zero targets	Nominal target
Definition	This can be achieved by reducing GHG emissions and by mitigating carbon dioxide from the atmosphere through carbon withdrawals (such as carbon capture and storage) or via projects outside of the value chain.	Targets to reduce GHG emissions in line with the rate of decarbonisation required to keep global temperature increase below 1.5°C. Reductions cannot be achieved through offsetting.	A target to achieve net zero emissions by a particular date, frequently set to 2050, which is achieved via decarbonisation of scope 1, 2 and 3 emissions and the offsetting/removal of any emissions through credible means.	A target which commits companies to climate action but isn't linked to the trajectory of GHG emissions reductions required by the Paris Agreement.
Who has adopted?	Dell, Amazon, Microsoft.	SAP, Oracle, Gocardless, Adobe	Salesforce, Google	Autodesk, Workday, Snowflake, Zoom
Pros	Provides finance for emission reduction projects outside the value chain that would not otherwise exist and which may bring wider ESG benefits.	Improves company resilience. Strengthens reputation. Lighter touch SME option available. Provides targets for companies in growth.	Long-term credibility. Builds reputational and competitive advantage. Simple to communicate, allows compensation activities.	Aligned with business objectives and planning cycles, tailored to specific business, and working culture.
Cons	NGOs highlight concerns that these targets can be achieved via external projects alone, effectively creating a "licence to pollute". They argue that both direct and indirect action is required to avoid the worst effects of climate change, not one or the other.	Resource intensive to establish. Requires significant resources to achieve. Optional reporting categories, such as the GHG emissions associated with indirect use of sold products, can't be counted towards SBTi targets.	Due to the permitted use of offsetting, NGOs highlight the same concerns as carbon neutrality targets. Further, if net zero targets have been set for the long-term, i.e. 2050, without interim targets there are concerns that this allows companies to delay action to reduce GHG emissions.	Not necessarily aligned with international policy direction; can have limited credibility if not sufficiently ambitious.

BOX 3

The Science Based Targets initiative and scope 3 emissions

Science-based targets provide a clearly defined pathway for companies to reduce greenhouse gas (GHG) emissions, helping prevent the worst impacts of climate change and future proof business growth. As of May 2023, five thousand companies have committed to science-based targets via the SBTi. Of these, almost 300 are from the software and services sector.

Targets are considered 'science-based' if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement – limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C. This requires both long-term and near-term ambitious GHG reduction targets. Companies can choose to have their targets validated independently by the Science Based Target initiative (SBTi).

When committing to science-based targets, companies must complete a scope 3 inventory covering gross scope 3 emissions for all its emissions sources according to the minimum boundary of each scope 3 category set out by the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.

Companies may then exclude 5% of emissions from their GHG inventory for near-term targets while for long-term targets, exclusions must not exceed 10%.

Targets to reduce scope 3 emissions that fall outside the minimum boundary of scope 3 categories are not required but are nevertheless encouraged when these emissions are significant. Companies may cover these emissions with a scope 3 target but cannot count towards the achievement of SBTi targets.

For companies that are defined by the SBTi as an SME, only scope 1 and 2 emissions are required to be covered by the target, although SMEs are encouraged to measure and reduce scope 3 emissions.

Scope 3 targets can be framed as absolute reduction targets, emission intensity targets, or supplier or customer engagement targets (see table 9). To ensure consistency with the most recent climate science and best practices, targets must be reviewed, and if necessary, recalculated and revalidated, at a minimum every 5 years.

Absolute Reduction Targets	Economic Intensity targets	Customer engagement targets
✓ Simple to communicate, low data requirement; and environmentally robust.	✓ Provides for flexibility for companies in growth; increases comparability between firms.	✓ Valuable for companies still developing a strategy for scope 3 emissions reduction; can only in the near term targets and must meet specific criteria (see c19 p.27 of the SBTi Target Validation Protocol)
✗ Does not allow for comparison with peers; target can be challenging for companies that are growing.	✗ Less environmentally robust; can be challenging to track if companies experience financial losses.	✗ Hard to communicate; impact less certain.

STEP 4:
SET TO A TARGET AND TRACK OVERTIME

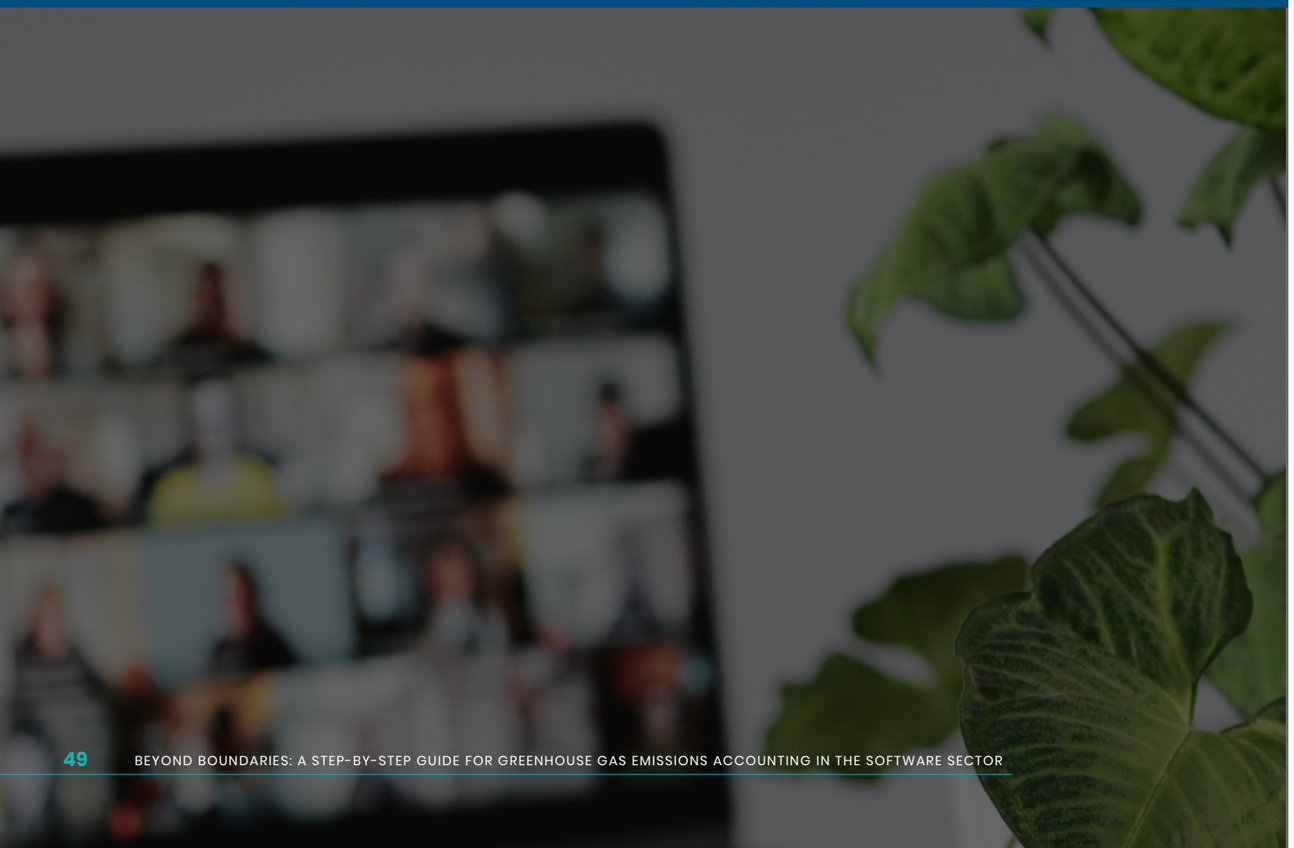
BOX 4

A decarbonisation pathway for digital infrastructure

The SBTi approved emissions trajectory sets out how scope 1 and 2 GHG emissions for each ICT infrastructure sub-sector will need to reduce between 2020-2030 and establishes a long-term ambition.

- **Mobile network operators adopting the SBT are required to reduce emissions by at least 45% between 2020-2030**
- **Fixed network operators adopting the SBT are required to reduce emissions by 62% between 2020-2030**
- **Data centre operators adopting the SBT will need to reduce emissions by 53% between 2020-2030**

Full details are provided in the official ITU standard, GHG emissions trajectories for the ICT sector compatible with the UNFCCC Paris Agreement (Ref: Recommendation ITU L.1470) and the SBTi Guidance for the ICT sector.



Tracking changes over time

To support measuring progress over time, it is important to select a single year as a base year to track change against. Ideally, this should be the earliest reporting year where data and calculations are reliable and representative of normal operations. Under the SBTi, this must be no earlier than 2015 and have "forward looking ambition." Changes in the base year are expected to be communicated to the SBTi.

Companies may need to recalculate base year emissions if changes occur that have a significant impact on the GHG inventory. For example:

- Structural changes, such as mergers, acquisitions, divestments, which have a significant impact on the magnitude or sources of emissions, or that alters the ownership or control or emissions between entities.
- Changes in calculation methodologies, improvements in data accuracy, or the discovery of significant errors.
- Changes in the categories or activities included in scope 3 activities.

In some instances, the base year could be retrospectively recalculated or restated e.g., for significant changes in company structure and activities, or to correct significant errors. In other instances, a new base year should be selected. However, base years should not be recalculated for acquisition (or insourcing) or divestiture (or outsourcing) of a facility or business unit that did not exist in the base year, nor should they be recalculated for organic growth or decline. For more information, please refer to Chapter 9 of the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.

BOX 5

The role of carbon credits in GHG emission mitigation

Companies that have set ambitious climate targets are increasingly turning to the purchase of carbon credits to mitigate (or 'offset') their emissions. Through offsetting, companies finance action somewhere in the world that removes carbon from the air or prevents it from being emitted. While some critics highlight concerns that offsets allow companies to avoid cutting their emissions whilst claiming carbon neutrality, supporters say, if done properly, offsetting can channel funds to support conservation and projects that reduce emissions. It is important to acquire offsets from a credible, internationally recognised registry (such as VERRA or Gold Standard) and to disclose specifically the source of offsets used. Any offsets used must be reported separately from a company's emissions and cannot be presented as a net amount.

More guidance is available from GHG Protocol Project Accounting Guidance and the Oxford Offsetting Principles.

See also the SBTi's requirements on the use of offsets in its FAQ "Does SBTi accept all approaches to reducing emissions?"

STEP 5:
REPORT

5.
Report

A credible GHG emissions report presents information and data based on the principles of relevance, accuracy, completeness, consistency, and transparency.

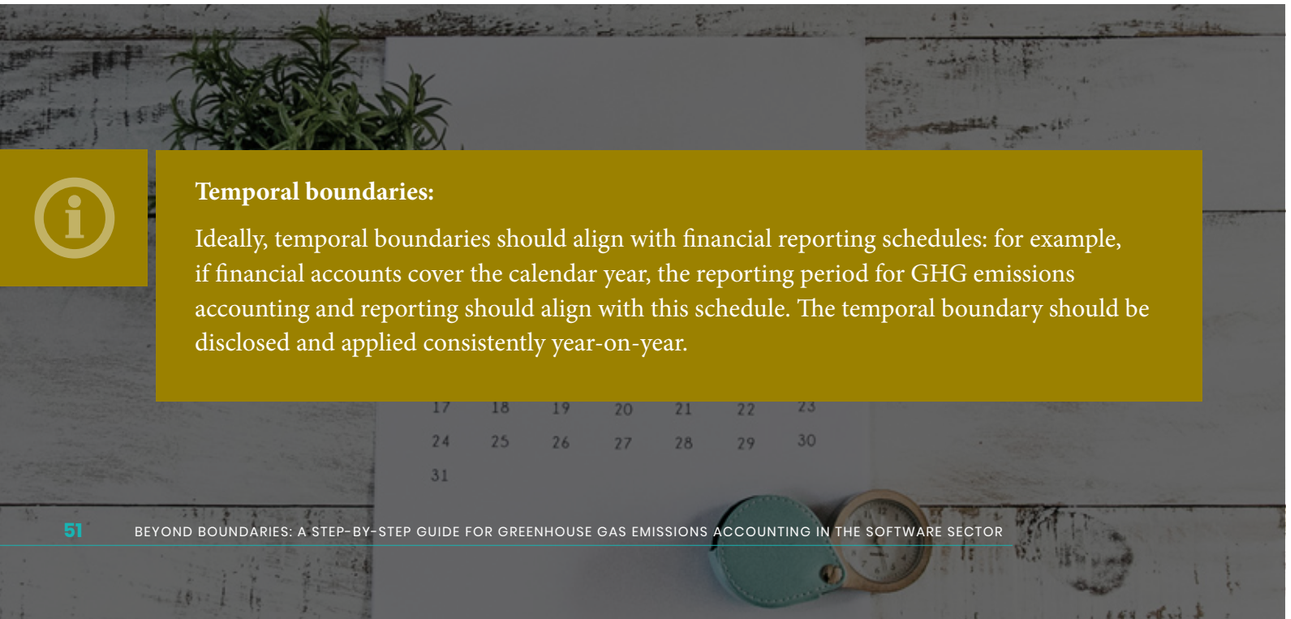
Leading companies are publicly reporting scope 3 emissions, recognising the value created for the company, investors, and customers.

Good practice is to report on at least an annual basis and strive to create a report that is as relevant, transparent, accurate, consistent, and complete as possible. To support the principle of transparency, reports should openly acknowledge limitations and include information relating to any changes in the calculation methodology.

The GHG Protocol outlines information that companies should report when disclosing scope 3 emissions. (See Chapter 11 of the GHG Protocol Corporate Value Chain (Scope 3) Reporting and Accounting Standard).

New legal frameworks in the US, EU and the UK are also helping to define minimum reporting expectations in relation to scope 3. These are summarised in Appendix II and III and a summary of disclosure requirements via two of these – the EU's mandatory Corporate Sustainability Reporting Directive and the US' SEC's Enhancement and Standardisation of Climate-Related Disclosures - are outlined in table 10 along with key voluntary frameworks, the GHG Protocol and the recommendation of the Task Force on Climate Related Financial Disclosures.

Software companies are encouraged to engage with stakeholders – including their investors – to identify the most relevant approach to reporting.



Temporal boundaries:

Ideally, temporal boundaries should align with financial reporting schedules: for example, if financial accounts cover the calendar year, the reporting period for GHG emissions accounting and reporting should align with this schedule. The temporal boundary should be disclosed and applied consistently year-on-year.

BOX 6

Assurance: enhancing credibility of claims

It is good practice to carry out third-party assurance as it enhances the credibility of published GHG data.

The assurance process often involves a review of the company's processes and data management systems, which can help identify inefficiencies and areas where emissions reductions can be achieved. Progress against targets can also be assured to provide credibility to sustainability claims.

Increasingly, assurance is mandatory and be required by law, for example under the EU's Corporate Sustainability Reporting Directive where all in-scope companies will be required to disclose and assure scope 3 emissions.

TABLE 10

Minimum requirements: common GHG accounting reporting metrics for scope 3

Status	Framework	Required disclosures

Voluntary	The GHG Protocol	• Total scope 3 emissions reported separately by scope 3 category.
		• For each scope 3 category, total emissions of GHGs (CO_2, CH_4, N_2O, HFCs, PFCs and SF_6) in metric tonnes of CO_2 equivalent.
		• A list of scope 3 categories and activities, and justifications for any exclusions.
		• For each scope 3 category,
		  • A description of the types and sources of data, including activity data, emission factors, and GWP values, and a description of data quality.
		  • A description of the methodologies used, allocation methods, and assumptions.
		  • The % of emissions calculated using data obtained directly from suppliers or other value chain partners.
		• A base year, the rationale for choosing that base year, recalculating policies.
		• Exclude any purchased, sold or transferred carbon credits. These may be reported separately.

Legal requirement for companies in scope	The EU Corporate Sustainability Reporting Directive (proposal for ESRS E2 – Climate Change)	• GHG emission reduction targets for scope 1, 2 and 3 GHG emissions and whether these are science-based and compatible with limiting warming to 1.5°C • Gross Scope 3 GHG emissions • GHG emissions in metrics tonnes of CO_2e for each significant Scope 3 category and reporting boundaries considered, the calculation methods, and calculation tools, and justification for any exclusions. • Update scope 3 inventories every three years and in case of major changes • Disclose the % of emissions calculated via primary data obtained via suppliers and value chain partners. • Exclude any purchased, sold or transferred carbon credits.
Legal requirement for companies in scope	The US SEC's proposal for the Enhancement and Standardisation of Climate-Related Disclosures for Investors	• Disclosure of scope 3 if material or if a company has set reduction targets that include scope 3. • Separate break out of significant scope 3 categories is required as well as the total emissions associated with scope 3. • Limited reporting requirements for smaller reporting companies.
Largely voluntary; some countries such as the UK mandate these disclosures	The Taskforce for Climate Related Financial Disclosures	• Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks. • GHG emissions should be calculated in line with the GHG Protocol methodology. • GHG emissions and associated metrics should be provided for historical periods to allow for trend analysis. • Organisations should describe their key climate-related targets and whether the target is absolute, or intensity based, the timeframe over which the target applies, the base year from which progress is measured, and key performance indicators used to assess progress against targets.

STEP 6:
TAKE ACTIONS TO REDUCE SCOPE 3 EMISSIONS

6.
Take actions to reduce scope 3 emissions

Insights from the GHG scope 3 inventory will help ensure action is targeted to address the most material sources of GHG emissions in the value chain. In this section, we look at how to begin addressing some of the most material emission sources in a software company's value chain. This should be part of a robust decarbonisation roadmap.

Work with suppliers to address emissions from purchased goods and services and capital goods (categories 1 and 2)

Companies can reduce their scope 3 emissions by choosing which services and products they buy, or vendors they buy from (bearing in mind that some suppliers may cite higher GHG emissions as they are more robust or mature in their carbon accounting), or by encouraging their suppliers to calculate their GHG inventory, set their own targets, reduce their own emissions, and utilise more renewable energy. GHG emissions and other climate criteria can be built into supplier selection and into contracts. To start out, a detailed, sector agnostic suggestions of scope 3 reduction levers for value chains have been outlined by the Science Based Target Initiative.

As cloud services and data centre-related emissions are material to software companies choose a vendor that uses renewable energy and, consider the climate commitments of your vendors and whether they align with your long-term objectives. For example, you can review the Science Based Target Initiative's database of companies that have adopted an approved science-based target, explore whether the vendor is a signatory to the Carbon Neutral Data Centre Pact (CNDCP), or check whether they are working to the Infrastructure Mason's Climate Accord (see Box 7).

Table 11 provides a snapshot of existing commitments (as of March 2023) of some of the largest cloud services and data centre operators, but it is always best to check the latest position to see whether ambitions have changed. Some advice on how to engage with data centre operators and cloud providers is outlined in figure 14.

BOX 7
Voluntary climate commitments in the data centre sector

Climate Neutral Data Centre Pact. An industry-led scheme which commits signatories to being carbon neutral by 2030. www.climateneutraldatacentre.net/

The Infrastructure Mason's (IM) Climate Accord. An initiative to improve GHG accounting for digital infrastructure to drive the industry to carbon neutrality. climateaccord.org/

TABLE 11
Commitments made by software company's ecosystem partners

Name	Type of Service	Carbon neutral, Climate neutral or Net Zero target	SBTi Near Term target	SBTi Net Zero target	CDP Disclosure	Signatory to the Carbon Neutral Data Centre Pact	Signatory Infrastructure Mason's Climate Accord
Alibaba	Cloud	✓	✓	✓	✓	No information publicly available	No information publicly available
Alphabet/ Google	Cloud	✓	✓	No information publicly available	✓	✓	✓
AWS	Cloud	✓	✓	No information publicly available	✓	✓	✓
Cloudflare	Cloud	✓	No information publicly available	No information publicly available	✓	No information publicly available	No information publicly available
Linode/ Akamai	Cloud	No information publicly available	✓	✓	✓	No information publicly available	No information publicly available
Lumen	Cloud	No information publicly available	✓	No information publicly available	✓	No information publicly available	No information publicly available
Microsoft Azure	Cloud	✓	✓	✓	✓	✓	✓
Oracle	Cloud	✓	No information publicly available	No information publicly available	✓	No information publicly available	No information publicly available
OVHCloud	Cloud	✓	No information publicly available	No information publicly available	No information publicly available	✓	No information publicly available
China Telecom	Data centre	✓	No information publicly available	No information publicly available	✓	No information publicly available	No information publicly available
Cyxtera	Data centre	No information publicly available	No information publicly available	No information publicly available	No information publicly available	No information publicly available	✓
CyrusOne	Data centre	No information publicly available	✓	No information publicly available	✓	✓	✓
Digital Realty	Data centre	✓ (EU portfolio)	✓	No information publicly available	✓	✓	✓
Equinix	Data centre	✓	✓	No information publicly available	✓	✓	✓
Iron Mountain	Data centre	✓	✓	✓	✓	✓	✓
Kyndryl	Data centre	✓	✓	✓	No information publicly available	✓	No information publicly available
NTT	Data centre	✓	✓	✓	✓	✓	✓
Telehouse/ KDDI	Data centre	✓	✓	No information publicly available	✓	✓	No information publicly available
Vantage	Data centre	No information publicly available	No information publicly available	No information publicly available	No information publicly available	✓	✓

Key Commitment made; Target approved

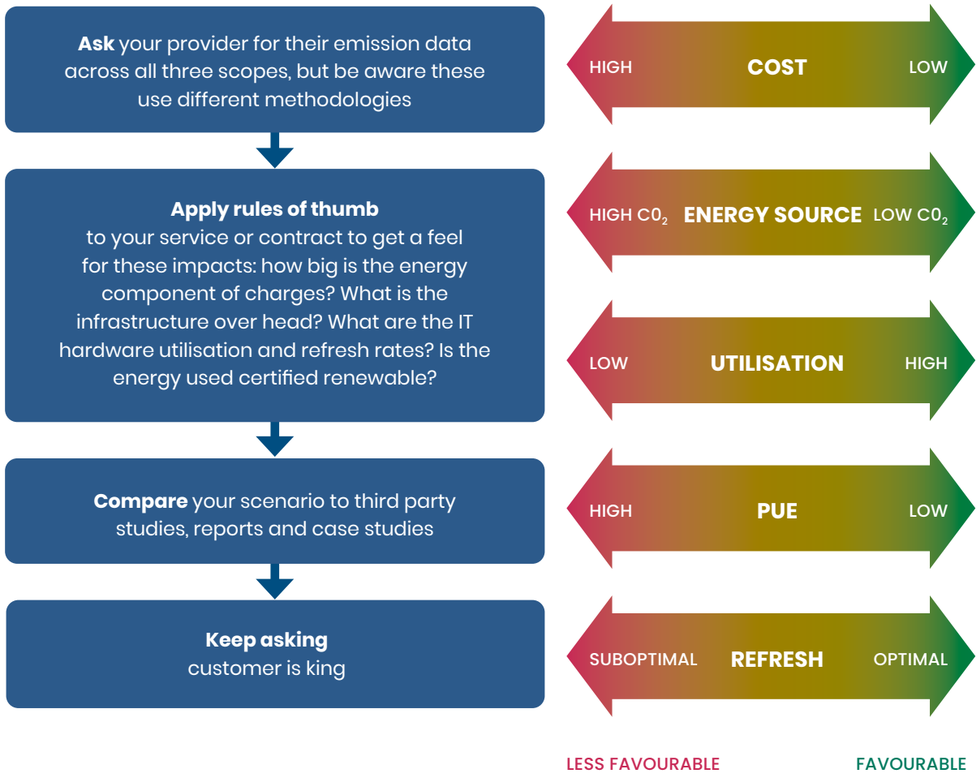
Note: This list is not exhaustive and provides a snapshot at March 2023. Although type of service has been indicated, in reality many providers provide multiple offerings across both categories

Source: ERM analysis of publicly available information, 2023

FIGURE 14

Engaging with cloud providers and data centre operators

Software companies should engage with cloud providers, data centre operators and managed hosting providers to develop a deeper understanding of the emissions generated by data centres. Few suppliers, if any, will have complete data but the act of asking is important. Granularity can be improved over time. See the glossary on p. 82 for definition of PUE, utilisation, and refresh.



Supplier engagement is primarily focused on increasing adoption of science-based targets by suppliers or to encourage reductions of greenhouse gases. To achieve this, growing numbers of companies are inserting new sustainability clauses into contracts to encourage suppliers to adopt science-based targets (see Box 8), provide sustainability disclosures, and provide low-carbon products and services.

Other companies develop supplier engagement and action plans, as well as programmes to develop resources and toolkits for suppliers, and set supplier engagement targets (see Box 3 for more on supplier engagement targets). Others engage with strategic suppliers through the CDP supply chain program – CDP are a not-for-profit group that runs a global disclosure system for investors, companies and cities, states, and regions.

For additional ways to engage suppliers, see the "10 discussion points for software companies to engage with their suppliers and partners" (Box 9) and read the Exponential Roadmap's Supplier Engagement Guide

BOX 8

The Chancery Lane Project

The Chancery Lane Project is a collaborative initiative of international legal and industry professionals that create new, practical contractual clauses ready to incorporate into commercial agreements. The content is free to use and available to all.

https://chancerylaneproject.org/about/

Allocating carbon to the cloud

When talking to cloud service providers, software companies should be aware that scope 3 accounting is still at an early stage of development across the industry. This makes it difficult to rely on third party scope 3 figures as a basis for comparison without sense checking the data. There are two reasons for this. Firstly, approaches and assumptions differ and will result in variation: in cloud environments in particular, methodologies for attributing carbon systematically and reliably are still evolving. Secondly, there may be significant differences in the completeness of reporting. A cloud services provider that has chosen to include all scope 3 categories in its reporting may seem to compare unfavourably with one that has only reported against a few, but in fact has done a more thorough job in terms of degree of disclosure.

CASE STUDY

SAP, Adobe: Engaging suppliers through CDP

In 2022, SAP and Adobe were among the software companies which received an A-rating in CDP's climate change assessment, which recognises companies which raise the level of climate action across its value chain, and for taking action to measure and reduce climate risk within its supply chain.

The CDP ratings recognise that purchasing organisations have the potential to incentivise significant environmental changes in their supply chain. However, in 2021, just 43% of organisations disclosing via CDP reported that they engage with their own suppliers on GHG emissions and climate change strategies.

CDP assesses performance on supplier engagement using a company's response to selected questions on governance, targets, scope 3 emissions, and value chain engagement in the CDP.

CASE STUDY

Salesforce: Integrating sustainability into contracts

Salesforce has recently introduced its Sustainability Exhibit, a document that places binding commitments upon suppliers to combat the climate emergency in a way which is both rigorous and appropriate to the company's size, which it has begun to incorporate into its procurement contracts. It requires suppliers to:

- Establish a science-based target aligned with reduction pathways to limit global warming to 1.5°C.
- Provide the product/service on a carbon neutral basis.
- Develop and implement a plan of continuous improvement to reduce the carbon footprint and environmental impact of the provision of goods and services.

CASE STUDY

Visma: Building in sustainability when selecting data centres

Software firm Visma chooses which data centres to use based on a range of factors including:

- **Distance to customers:** How far does the data need to travel from the data centre to where it's consumed?
- **Energy efficiency of hardware:** How energy efficient is the data centre provider's hardware? Do they have the latest equipment, and do they take steps to minimise power consumption?
- **Availability of renewable energy:** What's the carbon intensity of the local electricity grid? How much CO_2 is released per every kilowatt hour (kWh) produced?

CASE STUDY

Microsoft: Prioritising suppliers to engage with

In January 2020, Microsoft committed to operate 'carbon negative' by 2030 and to reduce its scope 1, 2 and 3 by 55%. To deliver this, it has introduced contractual obligations for supplier to disclose data for scope 1, 2 and 3 GHG emissions via the CDP.

To understand how mature their suppliers were in respect to climate action, Microsoft completed a maturity assessment to define a high-level intervention roadmap.

Those with a high impact, but low level of overall maturity will be targeted by the company's procurement teams who engages directly with them to support them in emissions disclosure and training.

BOX 9

Engaging directly with suppliers: 10 discussion points for software companies to engage with suppliers and partners

As companies develop their understanding of the materiality of scope 3 emission sources and set decarbonisation targets, they will need to enact a strategy for engagement with suppliers and partners. Below are 10 areas to explore whilst engaging.

1. Materiality and positioning

a. Is it a key supplier and what is their contribution to your total scope 3 emissions?
b. How does the supplier impact the ability to deliver products or services?
c. What is the level of engagement and influence with the supplier?
d. Who owns the relationship within the organization?
e. In what ways do they contribute to the success of the business?

2. Maturity of sustainability strategy, GHG emissions reporting and target setting

a. Has the supplier provided information in the public domain on its carbon emissions and do these include relevant scope 1 and align to good practice standards (e.g., GHG Protocol)?
b. Has the supplier set emissions reduction targets and do these cover the products and services provided by the supplier / partner to the Company?
c. Has the supplier adopted targets which are science based, with long-term and near-term target?
d. Is the supplier part of climate and sustainability related reporting initiatives such as CDP?

3. Engagement and reporting

a. How is the supplier willing to engage on the emissions associated with the products it provides?
b. Is it willing to provide specific information associated with the products and services it provides?
c. If data is provided on the GHG emissions associated with the products and services, does it cover scope 1, 2 and 3 emissions? If not, why?

4. Decarbonisation levers

a. What plans does the supplier have to optimise and decarbonise the relevant product or service provided to the company?
b. How can the company track this decarbonisation?
c. To what extent does the company use renewable energy? For data centres, does the operator have a Power Purchasing Agreement (PPA) with a renewable energy provider supported by Guarantees of Origin or Renewable Energy Certificates?

6. Circularity

a. How does the supplier approach the topic of circularity and the circular economy?
b. Does the supplier offer product take back, refurbishment, remanufacture and resale and has it taken steps to identify the carbon saved through such schemes?
c. What proportion of the products and services applicable to the company are subject to such schemes?
d. In data centres, how frequently are servers refreshed and what happens to those that are replaced?

7. Training, engagement, and capacity Building

a. Is there an opportunity for the company and the supplier to work together to build capacity in respective organisations in support of achieving decarbonisation goals?

8. Providing commercial incentives to suppliers

a. Is there scope for the company and supplier to incorporate recognition of decarbonisation performance into commercial agreements?

9. Efficient modes of transport

a. Is there opportunity for the supplier to use efficient modes of transport?
b. Identify route optimisation and other efficiency measures

10. Is there scope to support suppliers:

a. Switch to renewable energy sources?
b. Identify energy efficient opportunities (e.g. cooling, upgrading equipment, energy management systems)?

STEP 6:
TAKE ACTIONS TO REDUCE SCOPE 3 EMISSIONS

Category 11: Tackling use of sold products

Sustainable software development has traditionally focused on cost, speed, and agility rather than on the potential to minimise the emissions and energy needed to run it, though this is changing. A global effort to collaborate on green software design is gaining momentum. In May 2021, Microsoft, Thoughtworks, GitHub and others established the Green Software Foundation (GSF), a membership-based non-profit organisation aimed at developing a network of people, standards, tooling and best practices for green software. The GSF has already developed eight core principles for green software design (see Box 10). They have also curated some useful open-source resources and tools for software developers.

Membership of industry initiatives such as the GSF might be a useful first step for a company to explore how to limit the emissions associated with the use of their software by end users. Additionally, companies can consider assessing the power consumption of their products and benchmark against competitors and introducing new policies and practices so that green software principles are considered as an integral part of product development. Some companies also run Hackathons to help stimulate green innovation in software design.

CASE STUDY

AVEVA

AVEVA: Greening software

Global software company AVEVA recently announced in Davos that it was establishing a Centre of Excellence for Software Sustainability.

It is working to establish a baseline in its customers saved and avoided emissions, to help inform its future focuses and targets.

It is also focused on developing and deploying green product design principles in its software.

CASE STUDY

GOCARDLESS

Gocardless: Tackling the energy used by consumers when using software services

Gocardless' reporting has highlighted that the energy used by its consumers in using its services has an impact. It is committed to reducing this through:

- Improved measurement of the associated energy use of its service.
- Efficiency improvements through digital design.
- Engagement with customers to improve their sustainability and help them move towards renewables and net zero.

BOX 10

The eight principles of green software design

1. **Carbon**
Developers should build software that offers value to users, while producing fewer carbon emissions.

2. **Electricity**
Energy-efficient applications use software components that do not consume much energy.

3. **Carbon intensity**
Intensity refers to the amount of carbon emissions that is generated for every kilowatt per hour of electricity that is used. Companies should aim to ensure as much of this electricity is from renewable sources as is possible, which has a lower carbon intensity.

4. **Embodied, or embedded carbon**
Embodied carbon is how much carbon is released when companies develop and dispose of electronic devices. For software companies, the goal is to help expand the expiry date on hardware by making it obsolete as it struggles with software that pushes its limits.

5. **Energy proportionality**
Energy proportionality is the relationship between how much a device is used and the electricity the device uses. The goal of this principle is to maximize the energy efficiency of the hardware by ensuring a high rate of utilization.

6. **Networking**
Sent and received data travels across multiple devices that are connected in the network, including routers, switches and servers. Each of these devices contains embedded carbon and uses electricity. The objective is to decrease carbon emissions and increase the energy efficiency of the software by reducing the size of the data, as well as how far it must travel across the network.

7. **Demand shaping**
This describes working closely with providers to move the demand for computing power to another time or region and shaping it to match the supply that's available.

8. **Measurement and optimization**
Implementation of long-term, consistent optimization strategies can boost the overall carbon efficiency of software.

Source: Free Microsoft course: The Principles of Sustainable Software Engineering (33mins)
The Principles of Sustainable Software Engineering - Training | Microsoft Learn

STEP 6:
TAKE ACTIONS TO REDUCE SCOPE 3 EMISSIONS

Categories 6 and 7: Reducing employee travel and remote-working related emissions

Most companies have opportunities to directly reduce emissions associated with employee and business travel. The simplest way to reduce these emissions is to minimise travel altogether. Technology solutions to connect with clients and partners have helped many companies avoid unnecessary travel. Travel policies can also allow companies to exert more influence over how staff travel for work. Many companies also promote low-carbon driving and cycle-to-work schemes to incentivise the use of lower-carbon methods of transportation. Where practicable, some companies operate electric shuttle buses from transport nodes to offices to reduce commuter emissions or have introduced an internal price on carbon to help ensure carbon is priced into travel decisions. Tackling emissions generated through hybrid working is more challenging, but companies have started to bring forward strategies to tackle these, as outlined in the following case studies.

CASE STUDY

Developing leading sustainable travel programmes

Salesforce's vision is to have the world's most sustainable travel programme, with a leading business travel policy to tackle travel related GHG emissions. By 2030 it is aiming for a 50% reduction in business travel emissions intensity (emission/ $ revenue) relative to FY19.

To reach this target, Salesforce is developing programmes to change behaviour, grow the market for Sustainable Aviation Fuel, electrify ground transportation, and optimize travel booking technology and reporting to empower responsible travel choices. It also mobilizes, collaborates with, and enables others to catalyse material changes in the global travel value chain and is a founding member of the Sustainable Aviation Buyers' Alliance.

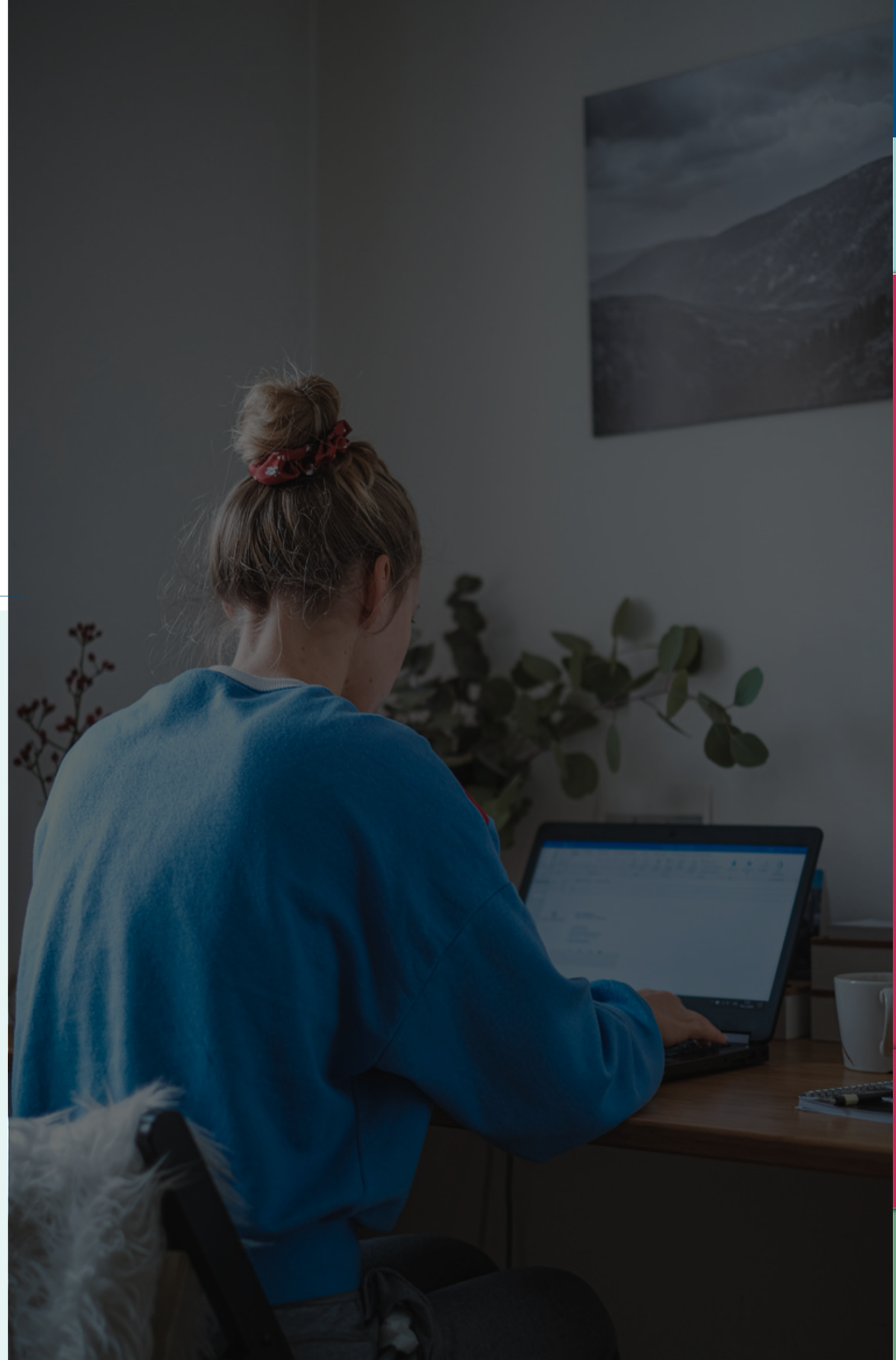
CASE STUDY

Supporting homeworkers to use less heat

Gocardless is developing an incentive scheme and a long-term approach to tackle homeworking employees' heat emissions. The company:

- Conducts annual surveys of commuting and homeworking.
- Has identified short-term opportunities to decarbonise heat as part of a home-working package.
- Is incentivising renewable energy uptake amongst staff.
- Is seeking longer-term opportunities to decarbonise home-heating.
- Is aiming for 75% of homeworking employees to be using renewable energy at home by 2027, and 100% by 2035.

A good scope 3 decarbonisation strategy will capture the low hanging fruit (even if small), while investing in dealing with the most significant ones that take more resources and time. As the Scope 3 inventory is reviewed annually, action plans and programmes will need to be reviewed and revised to keep on track for achieving targets set in Step 4. These should sit within a wider roadmap and plan to achieve target commitments.



STEP 6:
TAKE ACTIONS TO REDUCE SCOPE 3 EMISSIONS

Climate action check list

Below are some recommended areas to consider in order to build out and deepen action to embed GHG accounting, reporting and strategy within the business. These are likely to be the types of questions that investors, clients and other stakeholders may ask the company.

01 CARBON FOOTPRINT GOVERNANCE:

a. **Is there an understanding of the company's carbon footprint?**
b. **Who owns the steps and overall approach outlined in this guidance?**
c. **Are the resources in place to deliver it (board support, budget, time, capacity?)**
d. **Is the approach aligned with best practice e.g., Greenhouse Gas Protocol?**
e. **Has the management team considered assurance of the GHG calculations?**

02 UNDERSTAND MATERIALITY OF SOURCES OF EMISSIONS/ENERGY USE:

a. **Is there an understanding of the sources of emissions and energy use across Scope 1, Scope 2, and the sub-categories of Scope 3?**
b. **What has been done to understand the sources by geography, business unit etc?**

03 VALUE CHAIN ASSESSMENT AND PERFORMANCE:

a. **Where do emissions sit in the value chain of the organisation?**
b. **Who are the key stakeholders and what level of influence does the company have?**
c. **What Management Information (MI) is available associated with data centres and cloud services (e.g., the power usage effectiveness (PUE), % renewable energy usage, heat reuse) and other infrastructure?**

04 CUSTOMER AND REGULATORY REQUIREMENTS:

a. **What is the current or expected forthcoming demand from customers to reduce emissions?**
b. **What is the expected exposure to future regulatory scope 3 disclosure requirements?**

05 PRODUCTS AND SERVICES:

a. **Is there an opportunity to introduce green software principles to reduce the energy consumption of products and services by end users?**
b. **To what extent do products and services currently support customers in helping to reduce their carbon emissions and meet decarbonisation targets?**
c. **Is there a commercial benefit in describing or quantifying this carbon reduction enabling benefit, and to align emerging good practice in disclosing this benefit (e.g., avoided GHG emissions)?**
d. **What measures are in place to ensure that reporting and communication on GHG emissions will not be perceived as greenwashing?**

06 TARGET SETTING:

a. **What process was followed to set decarbonisation targets, and is it science based?**
b. **Does target setting align with sector specific requirements and guidance for the ICT sector?**
c. **If the company is an SME, was a streamlined route to approved SBTis for SMEs adopted or has a commitment been made via the SME Climate Hub?**
d. **Are targets aligned with ensuring global warming is limited to 'well below 2 degree' or '1.5' temperature targets?**
e. **What is the physical boundary of the targets, e.g., does this cover all of the company's locations, business units?**
f. **Are the targets time-bound?**

STEP 6:
TAKE ACTIONS TO REDUCE SCOPE 3 EMISSIONS

07 DECARBONISATION LEVERS:

a. **What decarbonisation is likely to happen "organically" without the company acting (e.g., decarbonisation of wholesale electricity generation, improvements in efficiency of equipment, reduction of data centre emissions in line with sector initiatives, etc)?**

b. **Where can decarbonisation be influenced? What is the extent to which these can contribute toward meeting targets and when is investment required?**

c. **Can GHG reductions be achieved through the upgrading and improving efficiency of legacy assets (e.g., ICT equipment and systems)?**

d. **If servers are used in-house, why? What are the total emissions associated with running these in-house compared to moving to the cloud?**

08 FURTHER AREAS FOR EXPLORATION:

a. **Strategies for clean energy that includes goals to reduce energy consumption and improving energy efficiency.**

b. **Increasing use of renewable energy.**

c. **Electrification of fleets, buildings and processes that rely mostly on fossil fuel consumption.**

d. **Upgrading network equipment and wireless network infrastructure.**

e. **The use of carbon credits to achieve goals and the risks associated with their use (e.g., price fluctuation, availability of high-quality credits)**

f. **Plans for a circular economy, particularly in respect to ensuring that ICT hardware and network equipment is either reused, resold, remanufactured, and recycled.**

09 VALUE CHAIN ENGAGEMENT:

a. **Determine which decarbonisation targets and initiatives key suppliers (e.g., data center providers) have committed to.**

b. **Engage with suppliers to understand their plans, information reporting, and the extent to which they can help targets to be met.**

c. **Consider how to work with suppliers, peers, industry bodies or governmental organizations to identify the regulatory and policy hurdles to achieving GHG targets.**

10 BUSINESS INTEGRATION:

a. **Develop an action plan to implement the decarbonisation levers identified and ensure investment (Capex/Opex) been included in budgets and business plans.**

Reference Section

APPENDIX I

Overview of the 15 scope 3 categories

GHG emissions related to purchased or acquired goods and services

CATEGORY 1

Purchased goods & services

Emissions from activites up to manufacturing of raw materials parts & containers/packing materials.

CATEGORY 2

Capital goods

Extraction, production, and transportation of capital goods purchased or acquired.

CATEGORY 3

Fuel & energy-related activities

Upstream emissions of purchased electricity (extraction, production & transportation of fuels consumed by the company).

CATEGORY 4

Upstream transportation & distribution

Transportation and distribution of products and services purchased by the company between the company's major suppliers and its own operations (in vehicles and facilities not owned or controlled by the company).

CATEGORY 5

Waste generated in operations

Disposal and treatment of waste generated due to company operations (in facilities not owned or controlled by the reporting company).

CATEGORY 6

Business travel

Transportation of employees for business-related activities in non-company owned vehicles.

CATEGORY 7

Employee commuting

Transportation of employees between their homes and their worksites (in vehicles not owned or operated by the company).

CATEGORY 8

Upstream leased assets

Operation of assets leased by the company in the reporting year and not included in scope 1 and scope 2.

GHG emissions related to sold goods and services, franchises and investments

CATEGORY 9

Downstream transportation & distribution

Transportation and distribution of products sold by the company's operations and the end consumer (not paid for by the company), including retail and storage (in vehicles and facilities not owned or controlled by the company).

CATEGORY 10

Processing of sold products

Processing of intermediate products sold by downstream companies (e.g. manufacturers).

CATEGORY 11

Use of sold products

End use of goods and services sold by the company.

CATEGORY 12

End-of-life-treatment of sold products

Waste disposal and treatment of products sold by the company at the end of their life.

CATEGORY 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.

CATEGORY 14

Franchises

Operation of assets owned by the company (lessor) and leased to other entities, not included in scope 1 and scope 2 - reported by franchisor.

CATEGORY 15

Investments

Operation of investments (including equity and debt investments and project finance), not included in scope 1 or scope 2.

APPENDIX II

GHG reporting drivers: Global, regional and country-level regulations and policy that impact the software sector and its value chain.

The range of policy interventions that relate to corporate GHG reporting is increasing rapidly. The EU leads, with multiple instruments driving greater transparency of emissions across all scopes, as illustrated by the selection below. In particular, the European Green Deal is driving much greater scrutiny of the whole business value chain together with associated emissions. While some instruments are still in development all are expected to be in force in the short to medium term.

Jurisdiction	Instrument	Status & link
	TCFD: Taskforce on Climate Related Financial Disclosures: This industry initiative was established to improve transparency of climate related risk and in the UK large, listed companies are required to make disclosures consistent with this framework. In Hong Kong, the HKMA (Monetary Authority) guidance and reporting requirements are aligned with TCFD, as is reporting guidance from both Hong Kong and Singapore Exchanges (HKEX ad SGX) and reporting requirements in Japan and India (see below) are also TCFD aligned.	In force Link
	Japan's Corporate Governance Code recommends all listed companies make climate risk disclosures. Prime market listed companies have been obliged to meet TCFD requirements since 2022	In force
	Hong Kong Monetary Authority Supervisory policy management for climate risk management requires initial disclosures by 2023 and aligned with TCFD by 2025	Due 2025
	Indian Securities and Exchange Board requires top 1000 companies to prepare business responsibility and sustainability report (BRSR) and sets sustainability reporting on a par with financial reporting. Disclosure based on recognised international frameworks: GRI. SASB, TCFD.	In force
	China Securities Regulatory Commission issued guidance on environmental disclosures for publicly listed companies in 2021, to be made compulsory by end of 2022. Reporting aligned with GRI.	In force
	Corporate Sustainability Reporting Directive Companies captured by this legislation will be required to disclose information on social and environmental impacts including Scope 3 reporting	Due 2023 Link
	Industrial Emissions Directive (IED) Recast This legislation aims to minimise industrial pollution and applies to large data centres with embedded diesel plant. The update will include LCA and supply chain reporting.	Due 2027 Link
	EU Taxonomy Provides a framework that classifies business activities against sustainability criteria and therefore enables investors to identify and select sustainable investment targets.	In force Link
	Energy Efficiency Directive (EED) Recast Imposes new reporting requirements on data centres relating to activity, location and energy use, renewables consumption and waste heat reuse.	Due 2023 Link
	Corporate Sustainability Due Diligence Directive (CSDDD) Provides a legal framework for value chain governance in terms of human rights and environmental impacts.	Due 2023 Link
	Securities and Exchange Commission (SEC) Rules for Climate Related Disclosures Sets out new rules for disclosure for public companies of Scope 1 and 2 emissions, and also Scope 3 emissions if material.	Due 2023 Link
	Green Public Procurement (GPP) for data centres and cloud services This GPP sets out criteria that enable public authorities to ensure they are able to make sustainable choices when purchasing services.	In force Link
	Climate Corporate Data Accountability Act (California) All companies doing business in the state with over $1Bn revenue must report the full range of emissions with third party verification.	Due 2026 Link
	Streamlined Energy and Carbon Reporting (SECR) Obliges companies in the UK to report on energy consumption and associated GHG emissions through their financial reporting to Companies House.	In place Link
	UK Government Public Procurement Note (PPN) This requires suppliers to commit to net zero by 2050 and sets out how their Net Zero Plans are taken into account in the procurement of major Government contracts.	In place Link
	Mandatory Climate Risk Disclosures From 2024/25, large, listed entities and large financial institutions will be required to disclose climate risks. Disclosure of scope 3 emissions is also being considered.	In place Link

APPENDIX III

Beyond Government policies: Voluntary initiatives and industry commitments

While policy makers have been developing regulatory instruments to correct market failures and drive cloud service providers and data centre operators towards higher levels of GHG disclosure and accounting, legislation has not been the only route. Non-governmental organisations and industry bodies have also been active, in some cases driving ambition beyond regulatory requirements, both in terms of global reach and outcomes. As a result, there are multiple initiatives, voluntary agreements and self-regulatory undertakings currently underway relating to carbon disclosures.

A selection is listed below:

Driver	Initiatives related to ICT	Status & link
	Climate Neutral Data Centre Pact Self-regulatory initiative by data centres and cloud service providers to improve sustainability performance, achieve climate neutrality and develop metrics.	In place Link
	IMasons Climate Accord Aims to harmonise reporting of embedded energy in data centres and declare it for all materials	Due 2023 Link
	EPEAT / Global Electronics Council The EPEAT ecolabel covers products and services from the technology sector. Software is out of scope but EPEAT is relevant for hardware in the value chain.	In place Link
	Open Compute Project – OCP Long running collaborative initiative to improve capability and sustainability in computing design. Significant software related activities underway.	In place Link
	EU Code of Conduct for Data Centre Energy Efficiency Longstanding self regulatory initiative based on best practice toolkit, now adopted as reference standard for regulations like EU Taxonomy.	In place Link
	Green Software Foundation Working to support greener software, with working groups on standards, policy, and opensource.	In place Link
	Global Enabling Sustainability Initiative A coalition of digital technology companies providing resources, information and best practice on decarbonisation through digital deployment.	In place Link
	Greencloud Initiatives by Temenos Aims to help customers with digital transformation to low carbon through open cloud platforms	In place Link

Driver	Initiatives not specific to ICT	Status & link
	Race to Zero – UNFCCC UN backed global campaign to drive reduction across all scopes in line with Paris Agreement. Aimed at businesses, cities, regions and investors.	In place Link
	Carbon Disclosure Project - CDP Global carbon disclosure system for all organisations to report. Supply chain programme now scrutinises scope 3, where reporting should align with SBTi.	Due 2027 Link
	Science Based Targets Initiative – SBTi Coalition calls on companies to set ambitious and science-based emissions reduction targets in line with a 1.5^{C} future.	In place Link
	We Mean Business Global non-profit coalition working with the world's most influential businesses to take action on climate change.	In place Link

APPENDIX IV

Individual Corporate Actions and Initiatives

In recent years there has been a significant increase in the carbon reduction and reporting activities undertaken by individual companies as part of their corporate social responsibility programmes or in response to customer and investor requirements. Other drivers for this change include the increasing scope and ambition of ESG related regulation which will bring many more companies within scope of legislation, often for the first time, and the increasing availability of standards, tools and metrics to help organisations navigate the process (see below). Nevertheless, software providers in general are focusing on elements that are within their control, scopes 1 and 2, rather than scope 3 where the most material impacts are likely to be enacted, both in the supply chain and in use of sold product.

Provider	Initiative	Target Scopes & link
Adobe	**Adobe** 100% renewable power commitment without purchasing unbundled RECs, aggregated PPAs, data centre efficiency measures and travel reduction.	1-2 Link
ADP	**ADP** Multiple initiatives to improve efficiency and upgrade equipment, adopt electric vehicles, solar power and fuel cells.	1-2 Link
AVEVA	**Aveva** Developed custom model for use of sold product emissions, developing green architecture principles and launching a supplier engagement plan.	3 Link
Azure	**Azure / Microsoft** 100% renewable energy, electrifying vehicle fleet, driving supplier reporting through procurement, internal carbon tax, carbon removal programme.	1-3 Link
Oracle	**Oracle** 2025 goals aim for 100% renewable energy use, 25% reduction in air travel emissions and 80% of key suppliers to have emissions reduction targets.	1-3 Link
Salesforce	**Salesforce** 100% renewable energy use, multiple projects, supplier engagement activity to encourage supply chain emissions reductions through contracts.	1-3 Link
Tencent Cloud	**Tencent Cloud** Colocating data centres with renewable supply, biofuels, efficiency improvements and DCIM (Data Centre Infrastructure Management).	1-2 Link
Workday	**Workday** Operates on 100% renewable power, offsets other emissions. Aggregated clean energy deal, investment in nature based solutions.	1-3 Link
Zoom	**Zoom** Energy efficiency initiatives for office, energy use and provider audits, green energy purchase opportunities, 100% renewables target by 2030.	1-3 Link

APPENDIX V

Climate disclosure reporting standards, frameworks, metrics and tools

The range of methodologies, standards, frameworks and metrics for greenhouse gas reporting has expanded dramatically over the past decade and the result is a complex multitude of approaches that can be very confusing. The priority, therefore, is to identify the most important resources for Scope 3 reporting and to understand the main differences between the approaches that are currently available. Some approaches are free at the point of use, some are publicly developed but subject to a charge, and some are proprietary, and sold as a service or commercial offering.

Methodologies provide formal, step-by-step guidance for calculating emissions, including boundary setting. For example, the GHG Protocol explains how to account for carbon against all three Scopes and within Scope 3, the 15 categories. While the GHG Protocol is generic and covers multiple sectors, associated ICT Sector Guidance has been developed specifically for digital technology.

Tools include a wide range of offerings to help companies address their carbon emissions, and there is some cross-over with methodologies depending on definition. Approaches include a software carbon intensity scoring methodology developed by the Green Software Foundation, EcoVadis, EcoIndex, Ecochain and Green Coding Berlin. The ICT Footprint project website provides a useful overview of different methodologies, standards and tools for carbon reporting activity relevant to ICT.

Standards provide a formal benchmark or an agreed approach that provides consistency, enables comparison and gives quality assurance. Outside the GHG Protocol, which is a standard as well as a methodology, there are few formal standards relating to Scope 3 reporting in digital technology. The ITU has developed a standardised methodology for ICT carbon emissions, the Institution of Engineering and Technology (IET) covers carbon accounting for IT hardware and International Organization for Standardization (ISO) has also developed a range of data centre sustainability standards.

Metrics are criteria against which activity or organisations can be measured. Common data centre metrics like Carbon Usage Effectiveness (CUE) are now formally standardised through ISO to ensure a consistent approach so that reporting and comparisons are robust.

APPENDIX VI

Allocating emissions associated with operational power consumption in hosted environments: a simplified schematic.

In hosted or colocation (colo) environments, carbon is either attributed according to operational or financial control. This can present confusion as to who reports what and risks double counting of emissions.

For example, a software provider which runs its own servers in its own data centre would report the electricity consumed by their IT as scope 2 and the electricity consumed by the supporting data centre infrastructure as scope 2 (and any fuel consumption or fugitive F-gases associated with that infrastructure as scope 1). However, if a software provider runs its own IT hardware, but it is hosted in third party colo, then it would report electricity consumed by its IT hardware as scope 2 and the energy consumed by the supporting infrastructure as scope 3. If hosted on third party servers, then the energy consumed by both the IT hardware and infrastructure are reported as scope 3.

In reality there are more contractual layers applicable within data centre environments and work is continuing to develop a methodology to attribute carbon to cloud services in a systematic way.

Software provider owns hardware and data centre

Reports IT hardware power consumption as scope 2 and infrastructure power consumption as scope 2 (+ scope 1 if burning fuel).

Software provider owns hardware but hosted in colo

Reports IT hardware power consumption as scope 2 and infrastructure energy as scope 3.

Software provider hosted by cloud provider that runs their own data centre

Reports IT hardware and infrastructure power consumption as scope 3.

Software provider hosted by cloud provider in third party colocoation data centre.

Reports IT hardware and infrastructure power consumption as scope 3.

Owned/operated by software provider.

Owned/operated by Cloud service provider.

Owned/operated by colo.

**Numbers in the diagram refer to reporting scope for software provider under each scenario*

See also this useful Uptime blog providing a more detailed explanation of scope reporting in colocation environments

GLOSSARY

Avoided emissions:
Sometimes referred to as Scope 4 emissions, these are carbon reductions attributable to a product or entity elsewhere in the value chain or outside it. A software application to optimise logistics may deliver significant carbon reductions for a delivery company, for example. There are no formal standards yet in place to account for avoided emissions.

Carbon / Climate Neutral:
Where the sum of GHG emissions that can not be reduced is offset by natural carbon sinks and/or carbon credits. PAS 2060 is the relevant international standard. Reduction is the priority but good quality offsets are allowed for residual emissions. The inclusion of the value chain is encouraged but not obligatory and it does not include a prescribed trajectory.

CDP:
CDP is a not-for-profit charity that, for the last 20 years, has established and operated the global system for organisations to report greenhouse gases publicly and manage their environmental impacts. See www.cdp.net

Carbon Offsets:
The reduction or removal of GHG emissions indirectly via projects outside of the value chain.

Decarbonisation:
This is the reduction and elimination of greenhouse gas emissions from products, services, organisations, countries or other entities. This may involve adopting renewable sources or low emission equipment. Entities must decarbonise in order to meet carbon targets.

Embedded or embodied emissions:
These are the emissions associated with a product or service before it reaches the customer or before the use phase – materials, manufacture, transportation, etc. Digital devices tend to be energy intensive to manufacture even if they are efficient to use, so embodied emissions are an important consideration.

GHG inventory:
The quantity of GHG emissions (by mass) associated with an activity product, individual or entity, both direct and indirect. The GHG Protocol is the international standard for GHG accounting and it classifies emissions into three scopes depending on the degree of operational control.

- **Scope 1:** A reporting organisation's direct GHG emissions.
- **Scope 2**: A reporting organisation's emissions associated with the generation of electricity, heating/cooling, or steam purchased for own consumption.
- **Scope 3:** All other indirect emissions attributable to activities that are not owned or controlled by the organisation. There are 15 scope 3 categories, covering the whole value chain, from embedded emissions in equipment, to emissions associated with use of sold goods or services.

Global Warming Potential (GWP):
Simplistically this is how powerful a greenhouse gas is in terms of its ability to trap heat and warm the atmosphere. Greenhouse gases vary in terms of their ability to trap heat. Methane is more than 25 times more powerful than carbon dioxide as a GHG and sulphur hexafluoride is nearly 25,000 times more powerful.

Greenhouse gases (GHG):
Simplistically these are gases that trap heat in the Earth's atmosphere and therefore contribute to the greenhouse effect. Without these, the earth would be uninhabitable as temperatures would yo-yo between extremes. However, as the proportion of GHGs rises, more heat is trapped, leading to global warming. GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and water vapour (H_2O), which occur naturally but their concentration is being increased by human activity. Some GHGs are man-made and include hydrofluorocarbone (HFC), perfluorocarbons (PFC) and sulphur hexafluoride (SF_6).

Greenwashing:
Greenwashing is an attempt to present an activity or entity as more sustainable than it really is, usually for public relations purposes. This may include buying offsets in preference to robust decarbonisation actions or emphasising trivial sustainability credentials while ignoring more significant impacts. Policy measures are already in place to limit greenwashing in the EU and look set to be strengthened in future.

Net Zero:
Net zero (e.g. net zero emissions or net zero economy) refers to achieving a balance between emissions going into and out of the atmosphere. A credible net zero target requires a reduction in Scope 1, 2 and 3 GHG emissions, consistent with reaching net zero emissions no later than 2050. Any residual emissions that cannot be eliminated need to be offset using natural carbon sinks (e.g. trees, the ocean and soil) or man-made carbon removal methods (e.g. carbon capture and storage). It is important to note that net zero emissions cannot be achieved by only offsetting emissions but require steep reductions in carbon emissions.

PUE: Power Usage Effectiveness:
The ratio between the total power consumed by a data centre facility and the power consumed by the IT activity it hosts. Essentially a measure of the infrastructure overhead. A PUE of 2 means that for every KWh of power consumed by the IT, the same is required to run the infrastructure. The closer the ratio is to 1, the lower the overhead and the more efficient the facility. PUE is not a measure of IT efficiency, only the efficiency of the supporting infrastructure.

Refresh rates:
In a data centre context, this means the replacement cycle of the servers, or of their core processing functions. Because processor efficiency improves so rapidly, new servers outperform older ones and therefore the server estate should be upgraded regularly to optimise IT efficiency. However, energy is not the only consideration – other sustainability factors should also inform this decision.

Science Based Targets:
Science based targets demonstrate ambition in rigour in decarbonisation activity. Net Zero Targets are considered to be science based if they are in line with what is deemed necessary to meet the goals of the Paris Agreement. The Science Based Targets Initiative (SBTi) provides a comprehensive methodology for companies developing and adopting a Science-Based Target.

Science Based Targets Initiative (SBTi)
Is a partnership between the Carbon Disclosure Project, the United Nations Global Compact (UNGC), World Resources Institute (WRI) and the World Wide Fund for Nature (WWF). It adopts the GHG Protocol carbon footprinting methodology which was developed by WRI.

The SME Climate Hub:
The SME Climate Hub is a non-profit global initiative that empowers small to medium sized companies to take climate action and build resilient businesses for the future. It provides a wealth of guidance, tools and resources that have been designed to empower smaller companies to make an internationally recognised climate commitment, measure, and report on their emissions.

Utilisation:
How busy the servers are in a data centre. A server that is idling – not doing any useful work - will still use power, like putting the washing machine on without any clothes in. So it is important to optimise server workloads. High utilisation means the computing capacity of the servers is being used to good effect. Cloud environments generally have much higher utilisation than traditional computing environments and therefore are more efficient.

Zero Carbon:
An activity or product that emits no GHG emissions during its use phase. This does not mean, however, that other parts of the life cycle are carbon free. For example, hydrogen emits no carbon during combustion, but hydrogen production can be carbon intensive.

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INITIATIVE CLIMAT INTERNATIONAL SIGNATORIES

iCI counts 243 organisations, who represent over $3 trillion AUM. The member base is global with regional chapters in North America, Europe, and Asia Pacific.

17 Capital
21 Centrale Partners
3i
Abénex Capital
Abrdn
Access Capital Partners
Acofi Gestion
Activa Capital
Activate Capital
Adagia Partners
Adamantem Capital
Adams Street Partners
Advent International Corporation
AE Industrial Partners
Affinity Equity Partners
Albarest Partners
Alchemy
Alliance Entreprendre
Allianz Capital Partners GmbH
AlpInvest Partners
AltamarCAM
Alter Equity 3P
Alven
Amethis
Amundi PE
Andera Partners
Antin Infrastructure Partners
AP3
AP6
Apax France
Apax Partners
Apicap
Arcano Partners
ARCH EM Partners
Arcus Infrastructure Partners
Ardian
Ares Management
Argos Wityu Partners S.A
Arjun Infrastrucute Partners Ltd
Arkéa Capital
Arsenal Capital Partners
Astorg
Atlante Gestion
Axcel Management
Azulis Capital
BAI Capital Management
Basalt Infrastructure Partners
BayPine
BC Partners
Bee Up Capital
Berkshire Partners
BlackFin Capital Partners
Blisce
BlueGem
Bowmark Capital
Bregal Investments
Bridgepoint
Caisse des Dépôts et Consignations
Cambridge Associates
Capital Croissance
Capital Dynamics
Capital Export
CapMan Plc
CAPZA
Carlyle
Castik Capital
Cerea Partners
Certior Capital
CGE Partners
Charterhouse Capital Partners LLP
Chequers Partenaires S.A
Church Commissioners for England
Cibus Investments Limited
CIC Private Debt
Ciclad
Cinven
Clayton, Dubilier & Rice
Coller Capital
Conquest Group
Crédit Mutuel
Credit Suisse
Crescent Point Group
Cube Infrastructure Managers
Cubera Private Equity
CVC Capital Partners
Demeter Partners
DigitalBridge
Duke Street
Educapital
Eiffell Investment Group
EIG
Ekkio Capital
EmergeVest
EMK Capital
Energy Impact Partners
EQT
Equistone Partners Europe
Eurazeo
Eutopia Gestion
Everstone Capital
Experienced Capital
Exponent
Flexstone Partners SAS
FnB Private Equity
Foresight Group
Fremman Capital
Freshstream
FSN Capital
Galiena Capital
GENEO Partenaires
General Atlantic
GHO Capital
Global Infrastructure Partners
Glory Ventures
Greenpeak Partners
Hamilton Lane
Hanover Investment Managers
HarbourVest Partners
Helios Investment Partners
Hermes GPE
Hg
Highlight Capital
Horizon Capital
Hosen Capital
I Squared Capital Advisors
IDG Capital
IDIA Capital Investissement
Idinvest Partners
IG4 Capital
IH International Advisors
IK Investment Partners
Inflexion
Infracapital
Infrared Capital Partners
Infratil
InfraVia Capital Partners
Innovafonds
Intermediate Capital Group
Investcorp
Investindustrial
Isatis Capital
IXO Private Equity
John Laing Group
Kayne Anderson Capital Advisors
Keensight Capital
Kepler Chevreux Invest SAS
Kerogen Capital
Kieger AG
KKR
Kohlberg & Company
Korelya Capital
Latour Capital
Lauxera Capital Partners
LBO France
LFPI Gestion
LGT Capital Partners
Lightrock Capital
Lightspeed China Partners
Livingbridge
LT Capital
LYFE Capital
M80 Partners
Main Capital
Mayfair Equity Partners LLP
MBO & Co
MCapital
Meanings Capital Partners
Mérieux Equity Partners
MidEuropa
Momentum Invest
Montagu
Montana Capital Partners AG
Montefiore Investments
Morrison & Co
Motion Equity Partners
Naxicap Partners
NCI
Neuberger Berman
NextStage AM
NIO Capital Management
NiXEN
NORD Holding
Nordic Capital
NorthEdge Capital
Oak Hill Advisors
Oakley Capital
Ocean Link Partners
ODDO BHF Private Assets
Omnes Capital
One Rock Capital Partners LLC
Onex
Pacific Equity Partners
PAI Partners
Palatine Private Equity
Pantheon Ventures
Parquest Capital
Partech
Partners Group
Pechel
Permira
Polaris
Pollen Street Capital
Quadrille Capital
Qualium Investissement
RB Capital
Restone Capital
Revaia
Richland Capital
Ring Capital
Riverstone
Roc Partners
Rothschild & Co
Sagard Private Equity Partners
Samara Capital
Seraya Partners
Seventure Partners
Silverfleet Capital
Siparex Groupe
Sparring Capital
Stafford Capital
StepStone Group
Stirling Square
Stonepeak
Suma Capital
Swen Capital Partners
TA Associates
TDR Capital
TowerBrook
TPG
Triton
Trocadero Capital Partners
Turenne Groupe
UI Investissement
Unigestion
Vantage Infrastructure
Vauban Infrastructure Partners
Vendis Capital
Veritas Capital
Verod Capital Management
Vespa Capital
Warburg Pincus
Weinberg Capital
Yotta Capital

initiative climat international

Private markets action on climate change