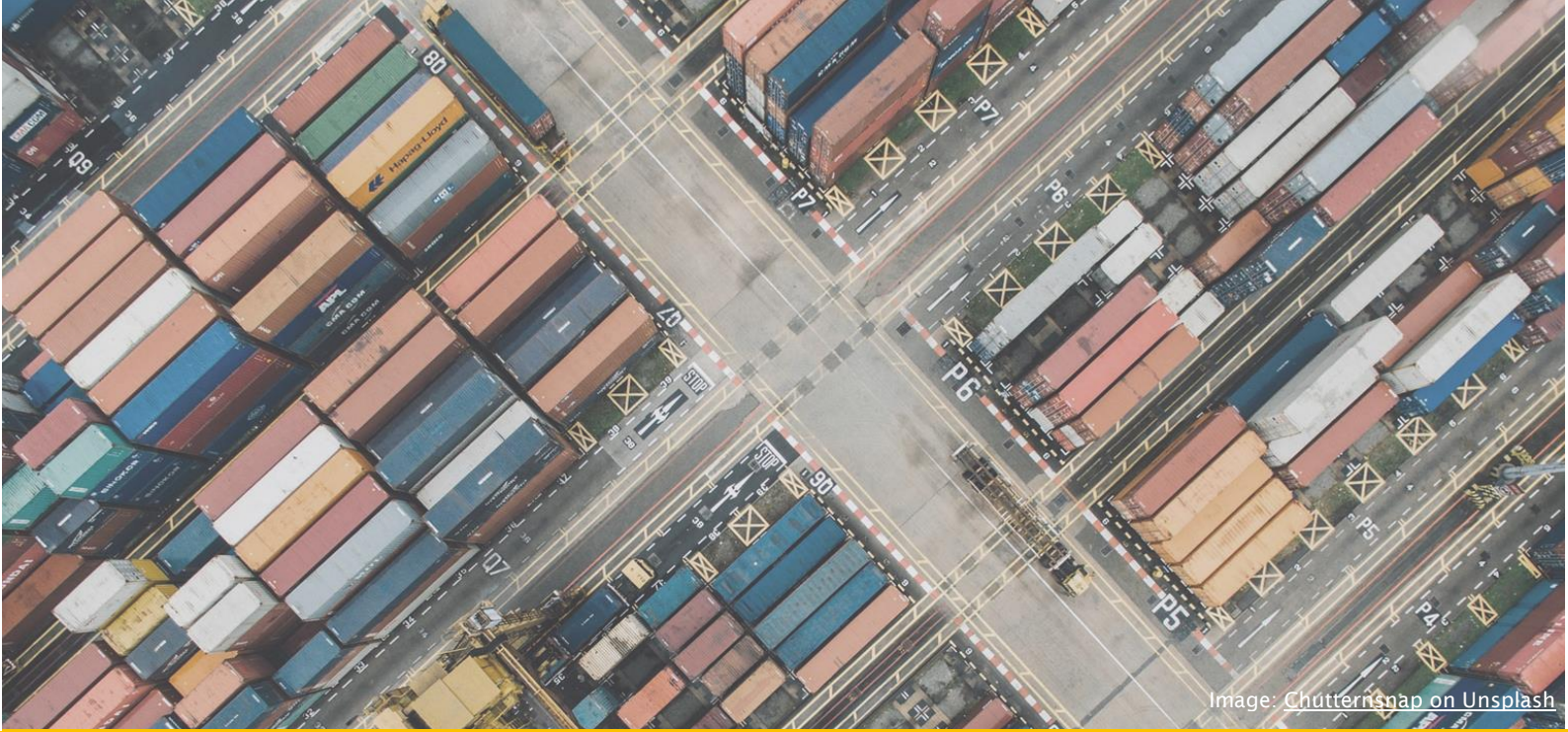




Decarbonizing Supply Chains

Systematically Managing and Reducing Supply Chain Emissions

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Summary

Supply chain emissions are a major source of corporate carbon emissions in many industries, but comparatively few companies manage them systematically. Their reduction is challenging because emissions occur across large and often globally dispersed supplier networks over which companies have limited influence.

This report examines how companies can systematically manage and reduce supply chain emissions, which reduction measures are available, and which data and data capabilities are required. It combines an explorative review of academic literature, industry reports and technical guidance with case studies of three large Swiss companies experienced in supply chain emissions management.

The main result is a process model that organisations can use to systematically manage and reduce their supply chain emissions:

- (1) **Project set-up and management buy-in:** secure senior-management commitment and resources, establish the business case and project plan, clarify responsibilities and build the required expertise.
- (2) **Supply chain emissions assessment:** map suppliers and purchases, calculate baseline emissions and identify the main emissions hotspots.
- (3) **Target setting and development of reduction measures:** combine top-down targets based on science-based pathways or peer benchmarks with bottom-up estimates of the reductions achievable through concrete measures.
- (4) **Implementation, monitoring and reporting:** assign responsibilities, implement and where appropriate pilot measures; monitor progress against targets and use internal and external reporting to maintain accountability and management attention.

The report identifies 14 concrete reduction measures across four areas: engaging existing suppliers, renewing the supplier portfolio, optimising products and materials, and embedding emissions targets within the organisation. Measures range from supplier capacity building and joint innovation, integrating emissions criteria into supplier selection, reducing purchasing volumes, substituting carbon-intensive materials, applying circular economy principles and incorporating emissions targets into procurement responsibilities and incentives.

Data are a critical enabler throughout the entire process. Companies need data to map supply chains, calculate emissions, identify hotspots, model reduction pathways, track measures and report progress. However, greater detail also increases data collection and management effort. Companies should therefore balance accuracy with effort and concentrate granular, supplier-specific data and advanced analysis on major emissions hotspots. Less significant sources can often be managed using less detailed approaches. Dedicated emissions management platforms can support integration, analysis and reporting, but should only be introduced where they reduce rather than add complexity.

Key recommendations for companies are therefore to:

- Secure management commitment and clear responsibilities and integrate supply chain emissions into strategic and operational decision-making.
- Focus resources on emissions hotspots, where close monitoring and targeted reduction measures can have the greatest impact.
- Balance accuracy with effort and increase data granularity where it materially improves decisions and progress tracking.
- Use a portfolio of measures combining supplier selection and engagement, product and material optimisation, and setting internal incentives.
- Monitor and report progress systematically to identify deviations, improve measures and maintain accountability and management attention.

Looking ahead, more transparent, data-driven and collaborative supply chains can become an important foundation for the transition towards a low-carbon economy. We hope that this report provides companies practical guidance for doing so.

Table of contents

1	Introduction	5
2	Approach	6
3	Drivers of supply chain emissions and challenges in reducing them	7
	3.1 Drivers of supply chain emissions	7
	3.2 Challenges in reducing supply chain emissions	8
4	Process model for managing and reducing supply chain emissions	9
	4.1 Project set-up and management buy-in	10
	4.2 Supply chain emission assessment	11
	4.3 Setting emission reduction targets	13
	4.4 Developing emission reduction measures	14
	4.5 Implementation, monitoring & reporting	16
5	Required data and data capabilities	17
6	Impact of systematic emissions management on emissions trends	20
7	Case studies	21
	7.1 Swisscom	21
	7.2 Swiss Federal Railways (SBB)	22
	7.3 Bühler	23
8	Conclusion and recommendations	24

1 Introduction

Companies are under growing pressure to reduce their carbon emissions and demonstrate measurable progress towards internationally agreed climate protection targets such as the Paris Agreement. For direct emissions from their own operations and indirect emissions associated with purchased energy—commonly referred to as Scope 1 and Scope 2 emissions—the principal reduction mechanisms are well established. These include improving energy efficiency, electrifying processes and switching to lower-carbon energy sources. Reducing supply chain emissions, however, is often considerably more challenging.

Supply chain emissions include the carbon emissions generated during the production and transportation of the goods and services purchased by a company. In many industries, supply chain emissions are by far the largest source of emissions (ISS Corporate Analytics, 2025). Their reduction is particularly difficult because they occur outside the company's direct operations, within upstream supply chains that may comprise hundreds or thousands of globally distributed suppliers. Companies often have only limited influence over these suppliers, while suitable low-emission alternatives may not yet exist or may not be known to purchasing organisations (Koh et al., 2023; Spiller, 2021).

Managing this complexity requires a targeted and systematic approach to identify the most significant sources of emissions and develop economically viable measures that deliver the greatest reductions. Doing this successfully depends on numerous success factors including management commitment, organisational willingness to drive supply chain decarbonisation, and expertise that reflects the specific sectoral and supply chain context (Zhang et al., 2023). Reliable and sufficiently granular data is equally important, because supply chain emissions are distributed across numerous products, materials, suppliers, locations, and stages of production. Without such data, companies cannot identify emission hotspots, distinguish major sources from less relevant ones, or direct limited resources towards the areas with the greatest reduction potential (Hettler & Graf-Vlachy, 2023).

Developing such an approach and the capabilities required to implement it can be demanding, particularly for organisations with limited internal resources for supply chain emissions management, as is often the case (Burnham, 2025). This report therefore examines how companies can manage supply chain emissions systematically, which key reduction measures are available and how data can support effective action. It addresses the following research questions:

- (1) What are the main drivers of supply chain emissions and the challenges involved in reducing them?
- (2) Which approaches can companies use to manage supply chain emissions systematically, and what are the most important reduction measures?
- (3) What types of data and data-related capabilities do companies require?
- (4) How does systematic supply chain emissions management affect emissions over time?

The remainder of the report is structured as follows. Chapter 2 outlines the research approach. Chapter 3 describes the main drivers of supply chain emissions and the challenges involved in reducing them. Chapter 4 presents a process model for managing and reducing supply chain CO₂ emissions. Chapter 5 summarises the data requirements and data-related capabilities needed for effective supply chain emissions management. Chapter 6 reviews evidence from the literature on how systematic CO₂ emissions management affects corporate emissions trends followed by chapter 7 which summarizes the practices and emissions trends identified in the case studies. Chapter 8 summarises the main findings and recommendations.

CO₂ is only one of several greenhouse gases (GHGs), contributing to global warming expressed in CO₂ equivalents (CO₂e). In practice, however, the term CO₂ is often used as shorthand for all GHG emissions. This report follows that convention and uses CO₂ (or carbon) to refer to total GHG emissions unless stated otherwise.

2 Approach

To answer the research questions, we combined a literature review with a case study approach. This allowed us to synthesise existing knowledge, specify and extend it through the practical experience of companies managing and reducing supply chain emissions.

We began with an explorative review of academic literature, industry reports and technical guidance on supply chain decarbonisation. The review focused on three areas: the main drivers of supply chain emissions and the challenges involved in reducing them; established processes and methods for measuring, managing and reducing these emissions, including the required data and analytical capabilities; and empirical evidence on how systematic emissions management affects emissions trends.

Based on the findings, we developed an initial overview of the main drivers, challenges and a process model for supply chain emissions management. We then used this model to identify and cluster the main data requirements and data-related capabilities needed for effective supply chain emissions management. We also synthesized empirical evidence on the relationship between systematic emissions management and emissions trends. Because evidence specifically addressing supply chain emissions is limited, studies covering overall corporate emissions were considered. This limitation must be considered when interpreting the results.

The literature findings were refined through case studies involving three large Swiss companies. The companies were selected to represent different industries and because they had substantial experience in managing supply chain emissions, including the systematic collection of relevant emissions data. This was confirmed by the fact that all three companies already use Sweep, a professional platform for supply chain emissions management. The companies were selected in collaboration with the study partner Swisscom, which also participated as a case study company and provided access to its network of Swiss sustainability professionals. Table 1 provides an overview of the selected companies. When interpreting the results, it should be noted that all three companies are large enterprises and generally have greater internal resources for emissions management than small and medium-sized enterprises. While this provided access to a broad range of experience, SMEs may face additional challenges, particularly due to more limited resources.

Company	Industry	#Employees	Interview partner(s)
Swisscom	Telecommunications	~20'000	Oliver Oberli, Head of sustainable procurement Res Witschi, Delegate for sustainable digitalization
SBB	Railway transport	~34'000	Charlotte Ahrend, Project lead sustainability
Bühler	Manufacturing	~12'000	Jessica Ruppen, Global supply chain sustainability manager

Table 1: Case study companies and interview partners.

Data were collected through semi-structured interviews of approximately 90 minutes with representatives responsible for Scope 3 emissions. The interview guide followed the process model developed from the literature and covered key challenges, management approaches, reduction measures and the use of data. Where available, participants also provided quantitative information on emissions trends and the effects of implemented or planned reduction measures. Sustainability reports and internal company documents were used to complement the interviews.

The research team used the case study findings to refine and extend the initial process model and the identified data requirements and capabilities. The research team comprised three researchers from Bern University of Applied Sciences with expertise in sustainability management, emissions analysis and economic methods, as well as a Swisscom representative with more than two decades of experience in corporate emissions management. This report presents the synthesised findings from the literature review and case studies.

3 Drivers of supply chain emissions and challenges in reducing them

3.1 Drivers of supply chain emissions

The Greenhouse Gas Protocol (WRI/WBCSD, 2004) is the global standard for corporate CO₂ emissions measurement and reporting. It distinguishes three scopes: Scope 1 covers all direct emissions from sources owned by the company; Scope 2 captures indirect emissions from purchased energy sources; and Scope 3 measures all indirect emissions occurring along a company's up- and downstream value chain, divided into 15 sub-categories.

Scope 3, Category 1 "Purchased Goods and Services" covers the cradle-to-gate CO₂ emissions associated with both purchased tangible goods and intangible services. It includes emissions from raw-material extraction, agriculture, processing, component manufacturing, packaging and other activities embedded in purchased goods, as well as emissions generated in providing purchased services. Scope 3, Category 2 "Capital Goods" similarly covers cradle-to-gate emissions from purchased investment goods, such as production machinery, transport fleets, and buildings. Transport from a direct supplier to the reporting company is reported separately under Scope 3, Category 4, while earlier transport stages are generally included in the product's cradle-to-gate footprint. In this report, supply chain emissions refer to emissions from Scope 3 Categories 1 and 2, even though the management of capital goods emissions may sometimes differ from other purchased goods and services because they are typically purchased less frequently and used over longer periods. Other scope 3 categories may also include emission occurring in upstream supply chains (e.g. fuel and energy related activities or upstream transportation) but are out of scope in this report.

Supply chain emissions are often among the largest elements of a corporate CO₂ footprint. According to a joint report by CDP and BCG (2024), Scope 3 emissions are, on average, 26 times higher than a company's combined Scope 1 and Scope 2 emissions. Across reported Scope 3 inventories, Categories 1 and 11—purchased goods and services and use of sold products—together account for around 70% of emissions. Nevertheless, only 41% actively engage with their suppliers on emissions issues, and only 15% have set concrete Scope 3 upstream targets.

ISS Corporate Analytics (2025) recently compared the size of Scope 3 emissions in all 15 categories from 2,394 companies reporting Scope 3 emissions across industries. Category 1, purchased goods and services, is the highest source of emissions in 6 out of 11 analysed industries, often exceeding 50% of total Scope 3 emissions (Figure 1). They are particularly high when companies purchase large volumes of carbon-intensive raw materials or products, outsource much of their production or rely on energy-intensive processes within complex, multi-tier supply chains. Category 2 emissions are generally smaller than Category 1 emissions but can represent a major source of emissions in industries with significant investments in infrastructure and capital assets. A low share of Category 1 and 2 emissions does not necessarily mean that supply-chain emissions are unimportant, but that other categories dominate.

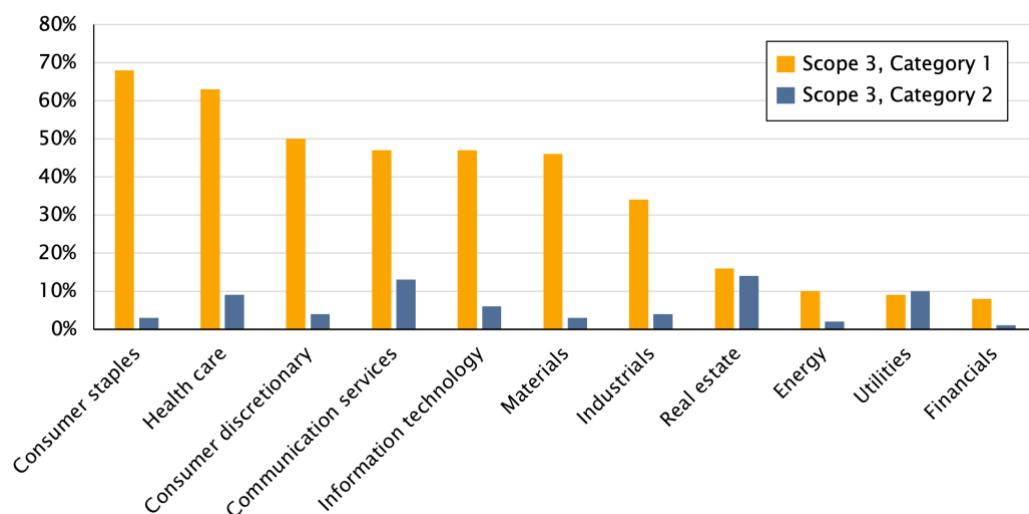


Figure 1: Share of supply chain emissions (Scope 3, Category 1 and 2) in total Scope 3 emissions, based on an analysis of 2,394 companies reporting Scope 3 emissions (ISS Corporate Analytics, 2025).

3.2 Challenges in reducing supply chain emissions

Despite their importance, supply chain emissions remain difficult for companies to reduce. A report from CDP and HSBC (2024) highlights several recurring challenges such as managing complex and geographically dispersed supplier networks, accessing reliable and frequently changing supply chain data, engaging suppliers, and achieving the necessary cultural shift within procurement, management and finance functions.

Based on self-reported and secondary data from 33 European manufacturing companies and interviews with four experts, Vieira et al. (2024) group challenges into three main areas: mapping the value chain, measuring Scope 3 emissions and actively managing them. Walker and Jones (2012) identified external and internal barriers based on interviews with seven companies. External barriers include information overload caused by the large volume of corporate social responsibility data, customers prioritising lower prices over lower CO₂ emissions and intercultural factors between purchasing organisations and suppliers such as language barriers. Internal barriers include limited resources, weak involvement of procurement teams and insufficient communication across departments.

The three case studies conducted for this report confirm many of these findings while highlighting additional practical challenges. These include the effort required to verify supplier-reported data and the limited visibility companies have beyond their direct Tier 1 suppliers. Interviewees also emphasised organisational difficulties, particularly in assigning clear responsibilities and selecting suitable indicators to track progress once reduction measures are implemented.

Table 2 brings together the challenges identified in the literature and the case studies and groups them into three overarching categories.

Category	Challenge
Organisation & resources	Defining clear responsibilities and corresponding targets
	Utilizing limited staff, time and budget effectively
	Improving cross-departmental collaboration (e.g. between sustainability and procurement teams)
	Building awareness and internal support
Suppliers & network	Managing a large and dispersed network of suppliers
	Engaging suppliers and obtaining required information
	Obtaining information from suppliers beyond Tier 1
	Overcoming cultural differences (e.g. awareness for climate issues, language barriers)
Data & measurement	Mapping complex supply chains and identifying emission hotspots
	Managing large volumes of CSR data without losing focus (information overload)
	Accessing reliable and volatile supply chain data
	Verifying supplier-reported data
	Finding practical ways to measure progress
	Supporting resource-constrained SMEs in collecting and providing the required data

Table 2: Challenges in decarbonizing the supply chain based on Walker & Jones (2012), CDP & HSBC (2024) Vieira et al. (2024) and the case studies.

4 Process model for managing and reducing supply chain emissions

Based on the literature review and case studies, we developed a process model that organisations can use to systematically measure and reduce their supply chain emissions. The process begins with project set-up and management buy-in, followed by an assessment of the current emissions profile across the supply chain. Companies then define emission reduction targets and develop measures to achieve them.

Target setting and measure development can take place in parallel. Top-down targets may be derived from science-based pathways or industry benchmarks, while the reduction potential of concrete measures is assessed from the bottom up. Comparing the two perspectives helps identify any gap between the desired level of ambition and the reductions achievable through currently available measures, thereby indicating whether further action is required.

The final step covers measure implementation, progress monitoring, and internal and external reporting. Monitoring results should be used to review targets regularly, adjust existing measures and develop additional measures where necessary. Throughout the process, appropriate data and the ability to analyse it effectively are essential for managing the complexity of global supply chains and supporting evidence-based decisions. Figure 2 summarizes the overall process and key activities per phase, which are described in detail in the following sections.

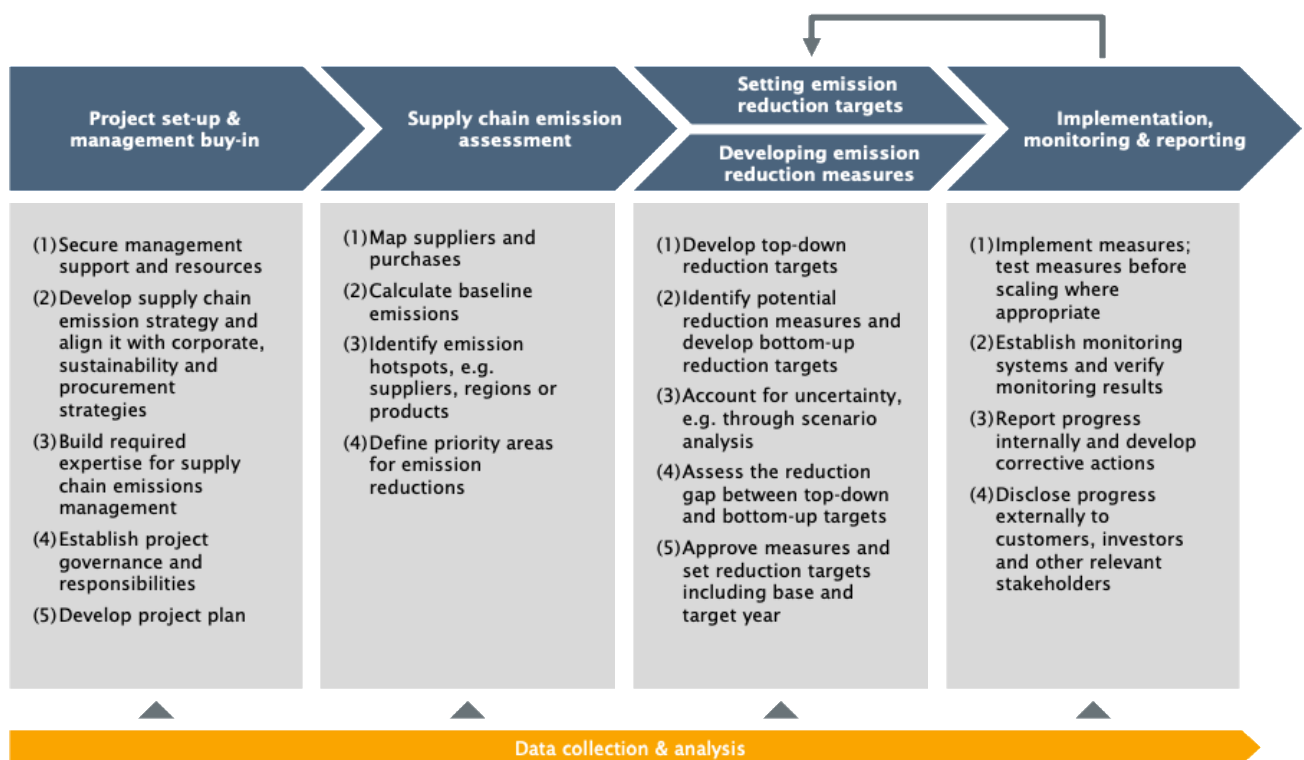


Figure 2: Process model for managing and reducing supply chain emissions.

4.1 Project set-up and management buy-in

Supply chain emissions management involves complex, long-term projects that require adequate internal resources and effective collaboration across relevant departments. Their success therefore depends on clear and sustained commitment from senior management, both to allocate the necessary resources and to give key stakeholders a formal mandate to work together (Cantor et al., 2013; Gattiker et al., 2014; Sajjad et al., 2020). Some of the case companies also integrated supply chain emissions into their sustainability and broader corporate strategies to ensure strategic alignment.

A clear business case can help secure management support and the required resources. All three case studies identified this as essential. The business case should explain both the opportunities and risks associated with supply chain emissions management (CDP & HSBC, 2024): Companies that invest early in low-emission supply chains can strengthen their climate resilience, improve their position with demanding customers and investors, and prepare proactively for regulatory requirements. Conversely, dependence on high-emission suppliers may create regulatory, financial and physical risks, including exposure to stricter carbon pricing and climate-related supply disruptions. CDP & HSBC (2024) estimate the financial benefits and costs of supply chain emissions management based on data from more than 23,000 disclosing companies. They show that the potential financial upside of addressing climate-related supply chain opportunities, at US\$ 165 billion, is more than eight times the US\$ 19.7 billion companies would need to invest to capture it. Table 3 summarizes main aspects that can be considered in a business case.

Type	Description
Market positioning	Stronger position with climate-conscious customers; potential access to new markets and revenue streams
Investor expectations	Improved attractiveness to investors and other capital providers considering emission aspects
Regulatory preparedness	Early preparation for stricter climate and supply chain regulation such as carbon pricing and lower future compliance costs or penalties
Cost efficiency	Potential savings through lower material use, greater efficiency, circularity, or improved procurement practices
Supplier dependency	Diversification and development of lower-emission suppliers can reduce long-term dependency risks
Supply chain resilience	Potential lower exposure to physical climate risks and disruptions affecting high-risk suppliers

Table 3: Opportunities of systematic supply chain emissions management to consider in a business case, based on CDP & HSBC (2024) and the case studies.

Another key success factor is the early involvement of the relevant functions across procurement, sustainability, R&D and controlling (Villena, 2019). Procurement contributes knowledge of suppliers and purchasing processes, sustainability specialists provide expertise in emissions measurement and reduction, and controlling can help integrate supply chain emissions into established processes, such as reporting and target monitoring.

Companies should also assess whether the necessary expertise is available internally, for example in emissions analysis and the development of reduction measures (DESNZ, 2024). Based on this assessment, they can decide whether to build the required capabilities internally or obtain external support, such as through specialised consultancies.

Once the key stakeholders have been identified, companies should establish a clear governance and project structure, supported by ownership at senior-management level. Operational responsibility for reducing supply chain emissions varied across case companies. It can be assigned to business units for example organised by region, which are then responsible for the emissions associated with their own procurement volumes. In one case company, responsibility was further allocated to individual product managers. This assignment of accountability close to operational decisions enables more detailed emissions tracking and makes responsibilities more tangible in employees' day-to-day work. Finally, effective implementation requires a project plan with clear responsibilities and timelines (SBTi, 2025).

4.2 Supply chain emission assessment

The aim of this step is to establish a quantitative overview of current emissions across the supply chain. This overview provides the foundation for setting targets and defining reduction measures. It should be updated regularly during the monitoring phase to track progress and account for new developments.

The analysis usually consists of two consecutive steps. First, baseline emissions are calculated by recording the quantities of goods and services purchased and estimating the emissions associated with them (Section 4.2.1). Based on these results, a hotspot analysis is then conducted to identify the main sources of emissions (Section 4.2.2).

4.2.1 Calculating baseline emissions

To calculate baseline emissions, companies must identify the types and quantities of goods and services they purchase and convert this purchasing data into CO₂ emissions using appropriate emission factors. These factors serve as conversion values that link purchased products and services to the emissions associated with their production. Several calculation approaches are available, each differing in accuracy, data requirements and implementation effort.

Units of purchasing data and emission factors

The units used to record purchases must be compatible with those of the corresponding emission factors. Two main approaches are typically distinguished (WRI/WBCSD, 2013):

- **Spend-based approach:** Purchases are recorded in monetary terms, such as expenditure on IT services in CHF. Emissions are then calculated using monetary emission factors, for example kilograms of CO₂ per Euro spent on IT services.
- **Activity-based approach:** Purchases are recorded in physical units. For example, raw materials may be measured in tonnes, requiring emission factors expressed in quantity of CO₂ per tonne. Alternatively, products may be recorded by the number of units purchased, requiring emission factors expressed in quantity of CO₂ per item.

Granularity of emission factors

Purchasing data and emission factors may also be recorded at different levels of granularity. For example, they may refer to a specific product model, such as a MacBook Pro 2026, to products from a particular supplier, such as Apple, or to the average emissions of a broader product category, such as IT hardware. Two main approaches are typically distinguished (WRI/WBCSD, 2013):

- **Supplier-specific factors:** Emission factors are calculated for individual suppliers, their products or product groups and therefore reflect actual emissions as closely as possible. An example is the emissions associated with a specific laptop model from a particular manufacturer. This approach generally requires supplier-specific CO₂ data.
- **Industry-average factors:** Average emission factors are used for a product category or industry, such as the emissions associated with an average laptop or with IT hardware in general. These factors are typically obtained from emission-factor databases such as ecoinvent or Environmentally-Extended Input-Output Models such as EXIOBASE.

Supplier-specific approaches allow companies to track improvements by individual suppliers more accurately, but they require more detailed data and closer supplier collaboration than approaches based on industry averages. Industry-average factors can also serve as a benchmark to verify the plausibility of supplier-specific data (WRI/WBCSD, 2013). Similarly, activity-based calculations make changes in purchasing volumes directly visible, whereas spend-based calculations may be distorted by price changes even when the quantity purchased remains unchanged.

The case studies show that different combinations of calculation methods are possible. The key is to identify an appropriate balance between accuracy and effort: the chosen level of detail should support meaningful emissions tracking without creating disproportionate data and resource requirements. Many companies therefore adopt a hybrid approach, applying activity-based data and supplier-specific emission factors to major emission sources that require close monitoring, while using spend-based data and industry averages for less significant purchases.

The case studies confirm this trade-off: companies typically start with spend-based and industry-average data to get a first sense of where the hotspots lie. As their data quality and internal capabilities improve,

they may gradually move towards activity-based calculations and supplier-specific factors for emission hotspot, where the effort clearly pays off.

When calculating baseline emissions, companies should already consider for which years the inventory will be established, as emission-reduction targets are usually defined against a specific base year (WRI/WBCSD, 2004). They should also determine how frequently the data will be updated, which sources will provide the revised figures, and how the recurring update process for ongoing monitoring will be organised, for example through manual data entry or automated interfaces with other internal systems (WRI/WBCSD, 2013).

4.2.2 Identifying of hotspots

Following the calculation of baseline emissions, a hotspot analysis should identify the suppliers, product categories, materials, regions or supply chain stages responsible for the largest shares of emissions (UNEP/SETAC Life Cycle Initiative, 2014). The analysis should rank emission sources by their absolute contribution, for example through a Pareto or ABC analysis. Where relevant, absolute emissions can be complemented by intensity indicators, such as emissions per unit purchased or per Euro spent, to distinguish high-volume purchases from carbon-intensive products. Data quality and uncertainty should also be assessed, depending on the credibility of the emission factor source. Emission hotspots can be further assessed across additional criteria. For example, one case study company mapped the company's ability to influence individual suppliers and their strategic importance. Figure 3 illustrates two types of analysis to identify emission hotspots and the influence that can be exerted over them.

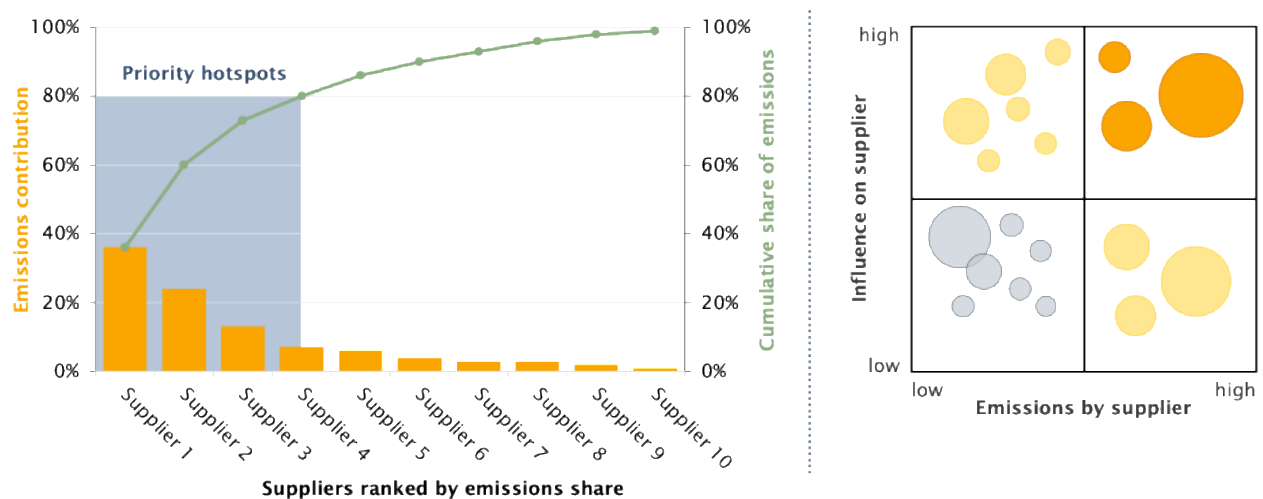


Figure 3: Illustration of a Pareto analysis used to identify the suppliers that contribute most to emissions (left, based on CO₂ Analysis, 2026), and an assessment of suppliers based on their emissions and the degree of influence the company can exert over them (right, based on approach Swisscom).

4.3 Setting emission reduction targets

Based on the status quo analysis, companies can define concrete CO₂ reduction targets. Two complementary approaches can be distinguished: top-down and bottom-up target setting (Margolick & Russell, 2001). In the top-down approach, overarching targets—such as science-based reduction pathways—are defined first and then translated into targets for individual business units, purchasing categories or supplier groups. The bottom-up approach starts with concrete, implementable measures. Companies assess which reduction opportunities can realistically be realised and use the results to estimate the total achievable reduction (see Section 4.4 on CO₂ specific reduction measures).

The choice of base year and target year is important for both approaches (SBTi, 2026b). The base year provides the reference point against which progress is measured, while the target year defines the period available for implementation. Both should be selected carefully including intermediate targets, as changes in organisational boundaries, procurement volumes, data quality or exceptional business conditions can affect the comparability and credibility of the target.

In practice, combining the two approaches is recommended to balance ambition with operational feasibility. This combination reveals the gap between the reductions desired and those that can be achieved through identified measures (McKinnon & Piecyk, 2012). Most case companies began with a top-down target and subsequently used a bottom-up assessment to evaluate whether it was achievable.

4.3.1 *Top-down target setting*

In the top-down approach, companies use external reference frameworks, such as scientifically grounded pathways or industry benchmarks to derive their reduction targets.

Science Based Targets initiative (SBTi)

The Science Based Targets initiative provides companies with a standardised framework for defining emission-reduction targets aligned with the goals of the Paris Agreement. Targets are considered science-based when they are consistent with pathways that limit global warming to 1.5°C or well below 2°C. For Scope 3 emissions, the SBTi requires companies to include supply chain emissions in their targets when these account for a sufficiently large share of their overall footprint. External validation by the SBTi can strengthen the credibility of the targets among investors, customers and the wider public. The initiative also provides sector-specific guidance for calculating science-based targets.

Benchmarking

Benchmarking provides an additional basis for target setting by comparing a company's emissions intensity, reduction trajectory and targets with those of competitors or similar organisations (Budde & Kidschun, 2023). Relevant sources may include industry associations or specialised benchmarking databases, e.g. by CDP. Such comparisons help companies assess their position within the sector and formulate targets that are competitive. Peer benchmarking can complement science-based pathways by showing whether the targets set by peer companies are more or less ambitious than those pathways.

4.3.2 *Bottom-up target setting*

In the bottom-up approach, targets are developed on the basis of internally identified reduction opportunities (Nicolajsen et al., 2025). The starting point is a systematic assessment of concrete measures and the development of a corresponding transition plan. Companies examine which technical, organisational, procurement-related or supplier-specific changes are realistically feasible, how much each measure could reduce emissions and within what timeframe it could be implemented. A list of potential measures is provided in the next section.

The main advantage of this approach is that the resulting targets are directly linked to operational measures and are therefore more likely to be regarded as realistic by the teams responsible for implementation (Nicolajsen et al., 2025). However, targets derived solely from currently available measures may fall short of the reductions required by scientifically grounded pathways, may therefore lack ambition, and thus should complement top-down target setting. The case studies showed that targets should also be aligned with the company's overall strategy, procurement priorities, and growth outlook, as each of these factors can directly influence supply chain emissions. Across the cases, targets were often initially defined using a top-down approach to establish an ambitious overall goal, while the detailed transition pathway and required measures were developed in a subsequent step.

4.4 Developing emission reduction measures

Emission reduction measure development typically focuses on the emissions hotspots identified in the status-quo analysis, as these are likely to offer the greatest reduction potential. Each measure should be assessed in terms of its expected emissions impact, implementation costs and feasibility. This enables the company to select a portfolio of measures that delivers meaningful reductions within available financial and organisational resources. The combined impact of the measures is then compared with the overall CO₂ reduction ambition to identify any remaining need for action.

Because future costs and impacts are inherently uncertain, scenario analysis is recommended. Best-case and worst-case scenarios can be developed for each measure to estimate possible ranges of costs and emissions reductions. This requires assumptions about the organisation's future development and modelling techniques that account for uncertainty (Bieser et al., 2024; WRI/WBCSD, 2011). The resulting package of measures, together with the targets defined in the previous step, is typically reviewed and approved by senior management.

The following sections present measures identified in the literature and case studies, grouped into four categories and summarised in Table 4.

Engaging existing suppliers

Existing suppliers often offer significant potential for reducing supply chain emissions because established business relationships provide a foundation for collaboration. Engagement typically begins with systematic data collection, as described in Section 4.2.1, combined with clear expectations regarding emissions reporting and reduction. Companies may define supplier-specific targets, establish minimum requirements and incorporate obligations into contracts (CDP & HSBC, 2024).

Some suppliers may already have their own CO₂ reduction targets and publicly report their progress, which can be incorporated into the company's measure planning, as one case company did. Smaller suppliers or those in lower-income countries, however, may lack the expertise, resources or technical capabilities required to reduce emissions. Capacity-building measures, such as training and knowledge sharing, can therefore play an important role. Supplier participation and strong performance may be encouraged through incentives such as contract extensions, preferential terms or public recognition (Karaman et al., 2024; CDP & HSBC, 2024).

The case studies indicate that supplier engagement is increasingly moving beyond bilateral relationships. Companies are forming sector-wide alliances to align requirements, increase their collective influence over shared suppliers and reduce the burden created by differing reporting expectations. Collaboration may also include pilot projects and innovation initiatives aimed at developing new low-emission products, materials or production processes.

Renewing supplier portfolio

When selecting new suppliers, companies have an opportunity to integrate emissions-related criteria into procurement processes from the outset. They can be included in tenders, supplier assessments and contract-award decisions alongside established criteria such as price and quality. This requires close cooperation between procurement, sustainability teams and the business units responsible for defining technical requirements (Villena, 2019).

Where existing suppliers repeatedly fail to meet defined minimum requirements despite clear expectations and appropriate support, replacing them may be considered. Contract termination should generally be treated carefully, particularly where alternative suppliers are limited or disengagement could create adverse social or economic consequences (Karaman et al., 2024).

Optimising products and materials

The case studies indicate that companies can also reduce supply chain emissions by reconsidering what and how much they purchase, rather than focusing exclusively on how suppliers produce it. Swisscom, for example, replaces physical SIM cards with eSIMs and virtualises TV boxes through app-based alternatives, eliminating the need for certain physical products altogether and thereby avoiding unnecessary material and energy use.

Further measures identified across the case companies include replacing emissions-intensive products or materials with lower-emission alternatives and reassessing make-or-buy decisions. Circular economy principles can create additional reduction opportunities through reuse, refurbishment, recycling and the extension of product lifespans. SBB, for example, reuses rails that retain sufficient service life instead of replacing them with newly produced ones, thereby avoiding emissions associated with new

production (Stocker, 2025). Swisscom increases the refurbishment rate of its own devices, such as routers or traded smartphones, to reduce the volume of new materials purchased each year.

Internally embed emission targets

The effectiveness of supplier- and product-related measures depends substantially on their integration into internal processes. Procurement teams must consider emissions as a standard decision criterion. Awareness can be strengthened through training and regular feedback on performance gaps, achievements and emerging opportunities (Karaman et al., 2024; CDP & HSBC, 2024).

Clear responsibilities, suitable KPIs and integration into procurement policies and decision-making processes are also important. Internal incentive or recognition systems can reinforce implementation by rewarding teams for progress against emission indicators, such as the share of suppliers providing emissions data, improvements in data quality or reductions achieved. In this way, emissions reduction becomes part of procurement practice rather than a separate sustainability activity (CDP & HSBC, 2024).

Category	Measure	Description
Engage existing suppliers	Establish data collection & monitoring	Establish emission reporting from suppliers through and progressively improve data quality and coverage
	Set supplier emissions targets & requirements	Define clear emission reduction targets for suppliers and incorporate sustainability requirements into contracts
	Capacity building	Offer training, knowledge sharing on emission management to suppliers
	Create incentives	Reward emission reporting and reductions through incentives such as contract extensions, preferential terms or public recognition.
	Form sector alliances	Collaborate with other companies to increase collective influence and reduce redundant and inconsistent reporting requirements for shared suppliers.
	Collaboration on pilots & innovation	Work with suppliers on pilot projects and initiatives to develop lower-emission products, materials and production processes.
Renew supplier portfolio	Integrate emissions criteria in supplier selection	Include emissions-related requirements in procurement processes, tenders and supplier evaluations
	Replace suppliers	Consider switching suppliers in case suppliers repeatedly fail to meet defined minimum requirements or in case low emission alternatives from other suppliers become available
Optimize products & materials	Reduce purchase volume	Review which products and quantities are genuinely required
	Replace materials & products	Substitute emissions-intensive products and materials with lower-emission alternatives, and reassess relevant make-or-buy decisions
	Apply circular economy principles	Extend product and material lifespans through reuse, repair, refurbishment, or recycling
Internally embed emission targets	Build awareness and engagement	Strengthen procurement capabilities through internal trainings and provide regular feedback on achievements, gaps, and new opportunities
	Develop policies and assign responsibilities	Embed emissions targets in procurement policies and KPIs (e.g. share of suppliers reporting emissions, reductions achieved) and assign clear responsibilities
	Create internal incentives	Introduce recognition or incentive systems linked to emission targets

Table 4: Overview of measures for reducing supply chain emissions based on CDP & HSBC (2024), Karaman et al. (2024) and the case studies.

4.5 Implementation, monitoring & reporting

Implementation

Implementing the selected measures requires clear responsibilities, timelines and resources. A phased approach is often effective: pilot projects with selected key suppliers allow companies to test measures, gain experience and refine their approach before expanding the programme across the supply chain (U.S. EPA, n.d.).

Monitoring

An effective monitoring and reporting system enables companies to track progress against the baseline and reduction targets, identify deviations and take corrective action (WRI/WBCSD, 2004). Measures and targets should be integrated into existing planning and decision-making processes (SBTi, 2026a). Data sources, data flows and update intervals should ideally be defined during the status quo analysis. Automated interfaces with procurement, supplier management and financial systems can reduce manual work, while validation procedures and documented assumptions improve data quality and consistency (CDP & HSBC, 2024).

It is advisable to link observed emission reductions to individual measures in order to assess their effectiveness and identify where corrective action may be needed. Activity-based calculations directly reflect changes in purchased quantities, whereas spend-based results must be adjusted for price changes. Supplier-specific emission factors should be updated regularly, particularly after reduction measures have been implemented. Industry-average factors are less suitable for tracking such changes; moving towards supplier-specific data for emission hotspots can therefore improve monitoring over time (see Section 4.2.1).

Regular verification helps ensure that reported data and emission reductions are reliable. This may involve supplier self-assessments, document reviews or on-site audits. Because audits can be resource-intensive, companies should define clear criteria for when they are required and seek opportunities to collaborate with other organisations and share audit results (Villena, 2019).

Internal reporting and external disclosure

Monitoring results should be reported regularly in a form that supports management decisions. For example, senior management may receive quarterly updates, while the board reviews progress annually. A defined reporting cycle creates accountability and keeps emissions reduction on the management agenda (Transition Plan Taskforce, 2024).

External reporting of Scope 3 emissions is also becoming increasingly important. Frameworks such as CDP and the Corporate Sustainability Reporting Directive establish regulatory or market-driven expectations for transparency and comparability. Consistent disclosure allows companies to communicate progress and strengthen the confidence of investors, customers and other stakeholders (CDP & HSBC, 2024).

5 Required data and data capabilities

In complex supply chains involving large numbers of globally distributed suppliers, mapping the supply chain can itself be a major undertaking. Outlining these networks and calculating the associated emissions require data from numerous internal and external systems. Companies must also conduct advanced analyses, translate the results into reports tailored to different audiences, and ensure that users with different roles and responsibilities can access the information relevant to them. In addition, the system must capture measures, targets, responsibilities and reduction pathways. For monitoring purposes, the underlying data should be updated regularly, ideally through automated interfaces. The effective and targeted use of these data is therefore a critical success factor in supply chain emissions management.

Based on the process model, Tables 5 and 6 summarise the key data requirements and capabilities for each phase. Meeting these requirements can be particularly challenging in extensive supply chains, where companies must retain sufficient detail while maintaining an overview of the overall system. The case studies showed that relying on conventional spreadsheet tools can result in a fragmented landscape of interdependent files, tables and databases that is difficult to maintain and control. Companies may therefore consider whether dedicated tools could support emissions management more effectively. However, such tools should genuinely reduce complexity rather than add further administrative effort. Their value lies in making data management, analysis and reporting more efficient, without shifting attention away from reducing emissions towards managing the tool itself. Atlantic Ventures and Swisscom published the Sustainability Software Radar, which provides an overview of more than 300 sustainability tools, 84 of which focus specifically on supply chains (Swisscom & Atlantic Ventures 2026).

Phase	Activity	Main data requirements
Project set-up & management buy-in	Secure management support and resources	• Business case incl. expected benefits, regulatory, financial, reputational and other risks • Estimate of required resources
	Develop supply chain emission strategy and align it with corporate, sustainability and procurement strategies	• Corporate, sustainability, and procurement strategy
	Build required expertise for supply chain emissions management	• Expertise requirements and gaps
	Establish project governance and responsibilities	• Organisational and business-unit structures • Information on decision-making authority
	Develop project plan	• Key activities including timelines, milestones and accountabilities
Supply chain emission assessment	Map suppliers and purchases	• Suppliers, product categories, products
	Calculate baseline emissions	• Activity- or spend-based purchasing data • Compatible supplier-specific or industry-average emission factors
	Identify emission hotspots, e.g. suppliers, regions or products	• Results of previous analysis • Further meaningful supplier-specific data such as influence on suppliers or their strategic relevance
	Define priority areas for emission reductions	• Results of previous analysis
Setting CO ₂ reduction targets & developing CO ₂ reduction measures	Develop top-down reduction targets	• SBTi guidance and sector pathways • Peer benchmarks
	Identify potential reduction measures and develop bottom-up reduction targets	• Hotspot analysis results • Measure reduction potential, cost estimates and feasibility
	Account for uncertainty, e.g. through scenario analysis	• Best- and worst-case assumptions for the variables affecting the costs and impacts of each measure
	Assess the reduction gap between top-down and bottom-up targets	• Results of previous analysis
	Approve measures and set reduction targets including base and target year	• Results of previous analysis • Company strategy and growth outlook
Implementation, monitoring & reporting	Implement measures; test measures before scaling where appropriate	• Documented measures and expected impacts • Lessons learned from pilot projects
	Establish monitoring systems and verify monitoring results	• Baseline and reduction targets • Regularly updated procurement volumes and emission factors • Data flows linked to specific measures • Data quality criteria and thresholds for critical deviations
	Report progress internally and develop corrective actions	• Meaningful progress indicators
	Disclose progress externally to customers, investors and other relevant stakeholders	• Existing sustainability reporting structures and requirements

Table 5: Main data requirements by phase and activity.

Phase	Data capability	Description
Project set-up & management buy-in	User and access management	Role-based access rights, function-specific views and dashboards for management, procurement, sustainability, controlling and suppliers
	Business-case development	High-level calculation of expected costs, benefits, risks and reduction potential to support management decisions
Supply chain emission assessment	Supply chain mapping	Flexible mapping of organisational units, regions, suppliers across multiple tiers, purchasing categories, products and materials
	Purchasing-data integration	Integration of purchasing data in different units, including expenditure, item counts, mass and other physical quantities
	System integration	Interfaces with procurement, ERP, supplier-management and financial systems, including configurable update intervals and automated data transfers
	Emissions calculation	Conversion of purchasing volumes into emissions using compatible emission factors and transparent calculation methods
	Emission-factor management	Direct access to industry-average databases and the ability to directly access and enter supplier-specific factors, also through dedicated supplier accounts
	Data-quality management	Automated completeness, consistency and plausibility checks
	Hotspot identification	Automated Pareto, ABC, intensity and further multidimensional analyses to identify the largest and most relevant emission sources
	Aggregation and drill-down	Flexible aggregation and drill-down across suppliers, products, categories, regions, organisational units and supply chain tiers
Setting CO ₂ reduction targets & developing CO ₂ reduction measures	Top-down target setting	Development of reduction pathways based on frameworks such as the Science Based Targets initiative, sector pathways and industry benchmarks
	Measure recommendations	Context-specific suggestions for potential reduction measures based on hotspots
	Supplier reduction targets and plans	Direct access to key suppliers' emissions reduction targets and plans to incorporate them into the company's own reduction planning.
	Measure configuration	Creation and adjustment of company-specific measures
	Linking measures and emissions	Direct connection of measures to the suppliers, products, materials or categories whose emissions they are intended to reduce
	Impact modelling	Calculation of reduction pathways for individual measures and the aggregated measure portfolio
	Uncertainty and scenario analysis	Development of best-case, expected-case and worst-case scenarios for measures
	Bottom-up target setting	Development reduction pathways based on the combined reduction potential of defined measures
	Gap analysis	Comparison of top-down ambition with bottom-up potential to identify remaining reduction gaps
	Target management	Recording of base years, target years, interim targets and reduction pathways at corporate, business-unit, category, supplier and product levels
	Measure and target allocation	Direct connection of targets and measures to the suppliers, products, materials or categories whose emissions they are intended to reduce
	Responsibility management	Assignment of owners for implementation, data updates and target achievement, supported by role-specific permissions and views
Implementation, monitoring and reporting	Regular data updates	Automated and manual updates of purchasing volumes and emission factors from internal systems, suppliers and external databases at defined intervals
	Implementation tracking and impact attribution	Monitoring of implementation status and impact for each measure and mapping of observed emission reductions to specific measures
	Progress monitoring	Dashboards showing progress against baselines, interim milestones and final targets at different levels of aggregation
	Anomaly detection	Automated identification of unusual developments, missing data, target deviations and overdue actions
	Internal reporting	Generation of decision-oriented reports for operational teams, senior management and governing bodies
	External reporting	Generation of disclosures aligned with standards and regulatory requirements
Cross-cutting capabilities	Audit trail and version control	Documentation of data changes, calculation methods, assumptions, approvals and recalculations over time
	Data lineage and transparency	Traceability from reported results back to purchasing records, suppliers, emission factors and calculation steps
	Collaboration and workflows	Structured task assignment, data requests and approvals across internal teams and suppliers
	Export and interoperability	APIs and export functions for further analysis in other systems
	Security	Secure data storage, compliance with data-protection requirements

Table 6: Main required data capabilities by phase.

6 Impact of systematic emissions management on emissions trends

Professional emissions management is not an end in itself; its value depends on whether it leads to measurable reductions in supply chain emissions. We found no literature directly examining this question for supply chain emissions specifically, but for Scope 1 emissions. We still describe this literature (summarized in Table 7) and briefly discuss if it might apply to supply chain emissions as well.

Downar et al. (2021) and Tomar (2023) both used difference-in-differences approaches designs to examine emission impacts of mandatory Scope 1 disclosure and reached comparable results. Downar et al. (2021) examined the disclosure requirement introduced under the UK Companies Act 2006, effective from 2013, and found that affected firms reduced their emissions by approximately 8 % relative to a control group of European firms over the period 2009–2018. Tomar (2023) examined the U.S. Greenhouse Gas Reporting Program (GHGRP), introduced in 2008, using a considerably larger sample of 14,713 companies with Canadian firms as a control group, and found a similar reduction of approximately 8 % over the period 2008–2013.

Bauckloh et al. (2023) also examined the GHGRP but compared U.S. companies to European firms. They found a more nuanced pattern: emissions intensity improved significantly, but no statistically significant effect emerged for absolute emissions. Matisoff (2013), by contrast, examined both voluntary and mandatory disclosure regimes among U.S. fossil fuel power plants using panel data and found no measurable effect on emissions. They point to the importance of regulatory design and complementary measures.

Source	Country	Sample	Observed years	Direction and magnitude of effect
Matisoff (2013)	U.S.	935 fossil fuel power plants	1994-2007	No effect
Downar et al. (2021)	UK	1,257 companies	2009-2018	8 % reduction
Bauckloh et al. (2023)	U.S.	1,454 companies	2007-2016	No effect on absolute emissions but reduction in CO ₂ intensity
Tomar (2023)	U.S.	14,713 companies	2008-2013	8 % reduction

Table 7: Literature on the effects of corporate Scope 1 emissions disclosure on emissions trends.

How well these findings can be transferred to supply chain emissions depends on the underlying mechanisms. Downar et al. (2021) attribute their result primarily to stakeholder and investor pressure: disclosure increases transparency, which in turn creates pressure on management to act. This mechanism plausibly extends to supply chain emissions. Tomar (2023) attributes the effect to peer benchmarking. A comparable dynamic could emerge for supply chain emissions: as more companies disclose supply chain emissions, benchmarking against peers may likewise increase pressure on management to act.

Beyond the studies summarised in Table 7, Carter et al. (2026) provide more closely related, though indirect, evidence on Scope 3 emissions specifically. Using the U.S. Securities and Exchange Commission's (SEC) 2021 announcement of a potential Scope 3 disclosure mandate as a shock, they find that U.S. firms likely to be affected reduced their foreign import volumes compared to unaffected firms. However, this evidence reflects a shift in sourcing behaviour rather than a directly measured emissions reduction.

Despite the limited literature base, it is reasonable to assume that systematic emissions management can contribute to emission reductions across all scopes by improving the understanding of key emission drivers and enabling more targeted reduction measures. However, context-specific factors may offset or even outweigh these effects. For example, business growth can increase procurement volumes and, consequently, supply chain emissions despite active emissions management.

Given the limited empirical literature directly examining this relationship for supply chain emissions, the following chapter draws on the three case studies to complement the available evidence with company-specific insights into emission trends and the measures underlying them.

7 Case studies

This chapter showcases the three case studies, their approach to supply chain emissions management, how emissions have changed over time, which targets the companies have set, and how they plan to achieve them. The findings are based on interviews and the analysis of internal and public documents, e.g. sustainability reports.

Overall, the case studies present a nuanced picture. All three companies selected 2018 or 2019 as their base year and set SBTi targets for 2030 or 2035. Their Scope 3 emission reduction ambitions (including various Scope 3 categories) range from 27.5% to 90%, reflecting differences in company context and available reduction opportunities. According to their own reporting, all three companies have already achieved reductions through targeted measures and expect further progress. In some cases, however, these gains were partly offset by business growth and the associated increase in purchasing volumes.

7.1 Swisscom

Swisscom is Switzerland's largest telecommunications company and published its first sustainability report in 1999. In line with SBTi requirements, the company has committed to achieving net-zero emissions across its entire value chain by 2035. Scope 3 emissions account for more than 95% of Swisscom's total emissions, with around 80% attributable to Scope 3 Category 1 and a minor share to Category 2. Swisscom aims to reduce all Scope 3 emissions by 90% between 2018 and 2035.

Swisscom is using its sustainability data platform to allocate emissions to specific areas of responsibility, such as individual products or product groups. The aim is for managers to monitor emissions performance as regularly as financial performance. Over time, this should encourage employees to incorporate emissions data into routine decision-making rather than treating it as a separate sustainability exercise.

Swisscom calculates around 80% of its supply chain emissions using a spend-based approach. By 2025, its supply chain emissions had fallen by approximately 46% compared with the 2018 base year (Figure 4). This reduction was driven mainly by the decarbonisation efforts of key suppliers of traded products and purchased network and infrastructure equipment. Swisscom also participates in industry alliances, such as the JAC Cooperation, to align and consolidate supplier requirements with industry peers and strengthen its collective negotiation power. Additional measures include circular economy practices, such as reducing the emissions associated with Swisscom-branded devices and extending their useful lives through refurbishment.

Swisscom calculates product carbon footprints for individual products. This enables the company to quantify the effects of specific measures and track progress at product level, rather than relying solely on company-wide aggregates that may obscure where improvements are occurring. As Oliver Oberli, head of sustainable procurement puts it: "If I could choose a data point, I would wish for it to become the norm to have the CO₂ footprint on each product, just like it says on each food item how much sugar it contains."

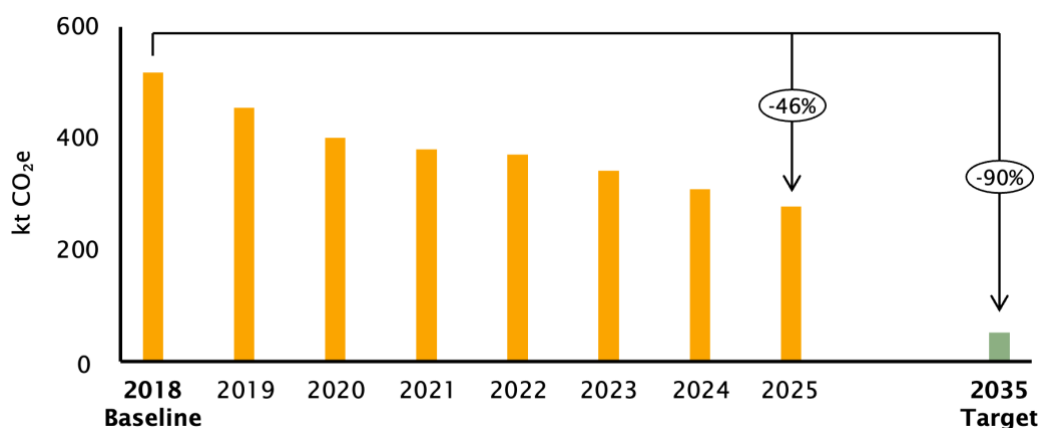


Figure 4: Swisscom supply chain emission (Scope 3, Categories 1 and 2) trend (orange) and target (green), excluding Vodafone IT and Fastweb. Note: Swisscom's 2030 reduction target applies to total Scope 3 emissions. For this visualization, we assumed that the same relative reduction rate applies to Scope 3 Category 1 emissions.

7.2 Swiss Federal Railways (SBB)

Swiss Federal Railways (SBB) is Switzerland's national railway operator. Its procurement activities cover areas such as rail infrastructure, rolling stock and construction projects, making materials including steel, aluminium and concrete major sources of supply chain emissions. Sustainability is one of SBB's nine group objectives, and sustainable procurement is explicitly included in its corporate strategy. Its Scope 3 emissions are approximately 15 times higher than its combined Scope 1 and Scope 2 emissions. SBB has set a target to reduce these emissions by 30% between 2018 and 2030.

SBB currently calculates around 80% of its supply chain emissions using a spend-based approach but aims to increase its use of activity-based data. To support this transition, the company is implementing a sustainability data platform. Introducing the platform has created challenges, particularly in integrating it with existing internal systems. An important early lesson was the need to plan the data architecture carefully from the outset, including interfaces with procurement and ERP systems. As Charlotte Ahrend, Project Lead Sustainability at SBB noted: "When implementing a sustainability platform, it is important to think about the data architecture and connections between the different systems."

SBB focuses on four main levers for reducing supply chain emissions:

- Procuring products with lower CO₂ emissions
- Extending product lifetimes through circular economy practices
- Optimising construction methods and using lower-emission materials
- Integrating emissions criteria into procurement and supplier-development processes

One practical example is the refurbishment and reuse of small overhead contact-line components, which began in 2020. SBB plans to extend this approach to additional rail-technology components. Similarly, when shorter rail sections are replaced, rails with sufficient remaining service life are reused rather than discarded.

As shown in Figure 5, supply chain emissions declined by 15% between 2020 and 2023 but subsequently increased, resulting in an overall rise of 3% between 2018 and 2025. As SBB expands its infrastructure and rolling stock in line with federal requirements, its supply chain emissions are expected to increase further. The measures described above may offset part of this growth. However, SBB states in its 2025 sustainability report that, because of the company's expansion, it is unlikely to achieve its SBTi target of reducing emissions by 30% by 2030.

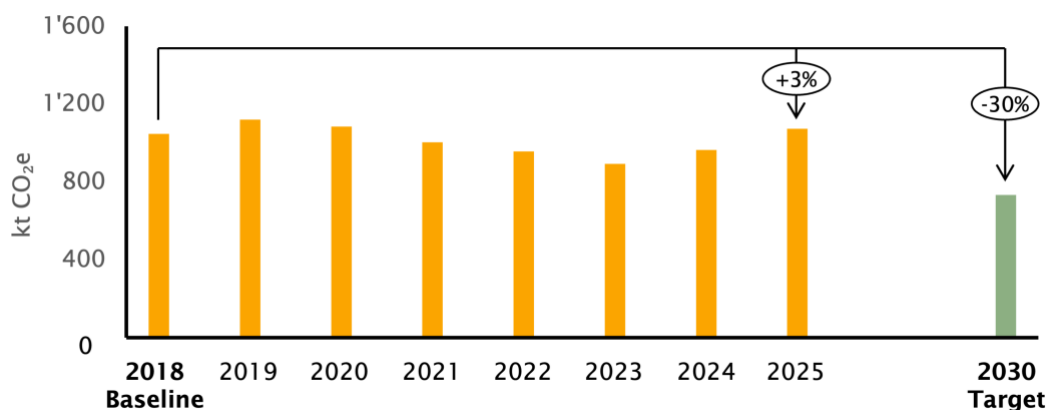


Figure 5: SBB supply chain emission (Scope 3, Category 1 + 2) trend (orange) and target (green). Note: SBB's 2030 reduction target applies to total Scope 3 emissions. For this visualization, we assumed that the same relative reduction rate applies to Scope 3 Category 1 emissions.

7.3 Bühler

Bühler is an internationally active technology group headquartered in Switzerland that develops solutions for the food and feed industries as well as for advanced materials. As the category “use of sold products” is the main contributor to Bühler’s Scope 3 emissions, supply chain emissions account for only 2% of total Scope 3 emissions. Nevertheless, they represent the largest source of upstream Scope 3 emissions. Bühler calculates these emissions using a spend-based approach. Between the 2019 base year and 2025, supply chain emissions decreased by 48% driven by a mix of procurement, supplier, and market-related developments. In alignment with SBTi, Bühler aims to reduce emissions from Scope 3.1, 3.4 and 3.9 by 27.5% by 2030 (Figure 6).

Working closely with its suppliers, Bühler focuses on four main areas:

- Strategic supplier management
- Internal training and process integration
- Shifting procurement volumes towards suppliers with lower carbon footprints
- Product and process innovation

Strategic supplier management centres on engaging key suppliers through structured campaigns conducted via the company’s carbon-management platform, Sweep. These campaigns support the systematic collection of data on supplier emissions, reduction targets and transition plans. According to Bühler, this approach has been particularly helpful for smaller suppliers, which often have limited resources for independently tracking and reporting emissions. Beyond data collection, Bühler works directly with suppliers on pilot projects and innovation initiatives to jointly develop and implement emission-reduction measures.

To monitor progress at supplier level, Bühler introduced a climate score based on three requirements: whether a supplier reports its Scope 1 and Scope 2 emissions, has established an emissions-reduction target, and has developed a transition plan. The score provides a structured overview of supplier climate performance and helps identify areas requiring further engagement.

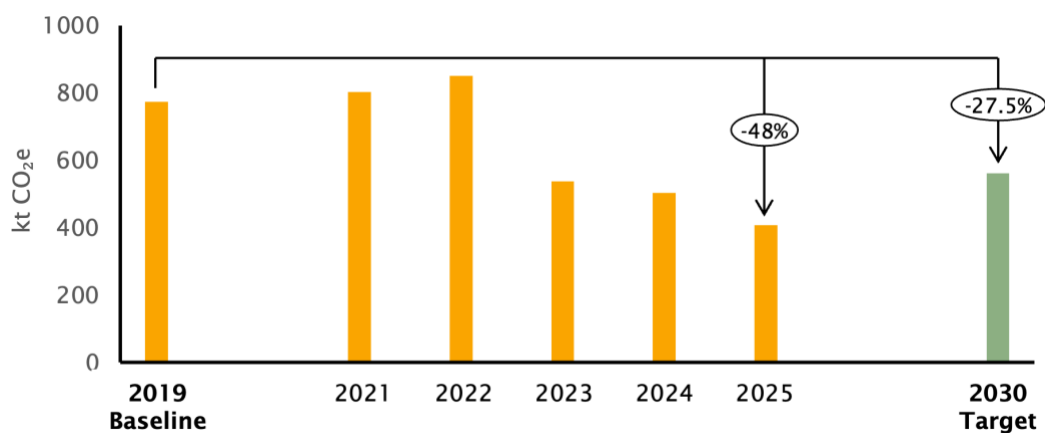


Figure 6: Bühler supply chain emission (Scope 3, Category 1) trend (orange) and target (green). Note: Bühler's 2030 reduction target applies to Scope 3 categories 1, 4 and 9. For this visualization, we assumed that the same relative reduction rate applies to Scope 3 Category 1 emissions.

8 Conclusion and recommendations

Across many industries, supply chain emissions are a major contributor to total corporate emissions, yet only a relatively small share of companies manage them systematically. The literature review and case studies identified persistent challenges to reducing supply chain emissions across three main dimensions: organisational and resource constraints, the complexity of supplier networks, and difficulties related to data availability and emissions measurement.

To help companies address these challenges, we developed a process model comprising five main steps: management buy-in and project set-up, supply chain emissions assessment, target setting, development of reduction measures, and implementation, monitoring and reporting. In addition, we identified 14 specific emissions reduction measures across four categories: engaging existing suppliers, renewing the supplier portfolio, optimising products and materials, and embedding emissions targets within the organisation. This approach is not intended to be exhaustive. Variations, alternative approaches and additional measures will be appropriate depending on the specific circumstances of each company. Ultimately, companies need to develop an approach that reflects their own context, priorities and available resources.

The availability, quality and effective use of data are critical success factors throughout this process. Data are required at every stage, from mapping suppliers and purchases to identifying emissions hotspots, monitoring implementation and reporting results. Dedicated data platforms can support these activities but have to be implemented mindfully so they genuinely reduce complexity rather than add further administrative effort. Therefore, companies need to strike an appropriate balance between data accuracy and the resources required to collect, manage and analyse increasingly granular information. More detailed data and analyses should be prioritised for major emissions hotspots. These areas require closer tracking, targeted reduction measures, and clearly assigned responsibilities, while smaller emissions sources can be managed with less granularity.

Although the literature on the actual effects of systematic supply chain emissions management remains limited, the available evidence and insights from the three case studies suggest that systematic measurement, management, and the identification and implementation of reduction measures can make an important contribution to reducing supply chain emissions. Regular internal and external reporting can further reinforce these efforts by increasing management attention, creating accountability and keeping emissions reduction on the organisational agenda. At the same time, emissions trends remain influenced by company-specific factors such as growth, changes in procurement volumes and shifts in the supplier or product portfolio. Systematic management should therefore not be understood as a guarantee of declining absolute emissions, but as an important foundation for understanding emissions drivers, prioritising interventions and improving the effectiveness of reduction efforts over time.

Based on the findings of this report, companies seeking to reduce supply chain emissions should focus on a small number of core priorities:

- Secure management commitment and clear responsibilities to ensure that emissions reduction is embedded in strategic and operational decision-making.
- Focus resources on emissions hotspots, where close monitoring and targeted reduction measures can have the greatest impact.
- Balance data accuracy with effort, using more granular and supplier-specific data where it materially improves decisions while avoiding unnecessary complexity elsewhere.
- Combine supplier engagement with procurement and product-related measures rather than relying on a single type of intervention.
- Monitor progress systematically and report regularly to maintain accountability, management attention and continuous improvement.

Looking ahead, more transparent, data-driven and collaborative supply chains can become an important foundation for the transition towards a low-carbon economy. We hope that this report provides companies practical guidance for doing so.

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