

Reducing scope 3 emissions through circular economy initiatives

An analysis of how Danish and European companies aim to reduce scope 3 emissions through circular economy initiatives

By Transition ApS and the Danish Business Authority
In collaboration with UN Global Compact Network Denmark

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Executive summary

The matter of taking action to reduce greenhouse gas emissions is of great urgency. As such, there has been an increase in the amount of regulations and market demands placed on companies to measure and reduce their carbon footprint, including emissions from their value chain. This analysis provides an insight into how leading Danish and European companies experienced within the field of sustainability are approaching the challenge of calculating and reducing their value chain emissions (scope 3), and specifically how they are applying circular economy initiatives to achieve reductions.

Scope 3 emissions are often the most difficult emissions to calculate and reduce as they occur due to activities in the value chain over which companies have less control than in their own operations. Consequently, companies are looking for more knowledge and best practices on how to collect data, calculate and reduce their scope 3 emissions. The principles of circular economy have the potential to aid companies in reducing their scope 3 emissions through less and better use of resources both upstream and downstream in the value chain, for instance by reducing material use, prolonging lifetime of products and reducing waste.

Through a survey and several case interviews, this analysis confirms that there is a growing awareness amongst companies regarding the reduction of their scope 3 emissions, and that more and more companies apply circular initiatives to do so. However, most of the circular initiatives implemented so far by the respondent companies tend to be targeted at areas of the value chain where the companies have greater operational control over the activities. Thus, initiatives in these areas seem to focus on i.e. reducing waste, substituting to less emitting materials or reducing material use. Therefore, the location of emissions in a company's value chain is pivotal to companies being able to apply reducing initiatives successfully.

The main challenges that companies face when addressing scope 3 emissions through circular economy relate to the quality and availability of data. A shortage of reliable data hinders good decision-making within companies when reducing emissions from activities in the value chain outside their operational control.

The increased focus on scope 3 emissions and interest in applying circular initiatives to reduce them amongst companies experienced within sustainability might act as a driving force in strengthening value chain collaborations and securing a more broad application of circular initiatives.

Overall conclusions of the analysis

- There is an increasing awareness of scope 3 emissions amongst the participating companies, both when it comes to calculating and setting reduction targets for these emissions – especially from the largest companies.
- More and more companies see the potential in reducing scope 3 emissions by using circular initiatives both upstream and downstream in the value chain.
 - Companies mainly tend to apply circular initiatives to activities that are upstream in the value chain, and where they to an extent have control and influence. Thus, the location of the emissions in the value chain is pivotal to the potential for applying reducing initiatives.
 - However, there is an increasing complexity of applied circular initiatives suggest an equally increasing maturity level amongst companies when applying circular initiatives,
- Obtaining good quality data is the main challenge for companies when both calculating scope 3 emissions and applying circular initiatives. This underpins the importance of aiding companies in sharing data across value chains.
 - Challenges differ across company size and industry, which indicates that companies may need different kinds of assistance with gathering and sharing data.
- Circular economy initiatives hold a great potential for being a driving factor in the green transition of businesses.
 - The increased focus on scope 3 emissions by experienced companies seems to be a strong driving factor for cooperation on data and circular initiatives across the value chain, which will also pave the way for less experienced companies in terms of both reducing emissions and in working with circular economy.
 - There is still a need for further exploration of how the principles of circular economy can accelerate the emission reduction efforts of businesses.

Introduction

There is a widespread consensus amongst world decision makers and experts that the current trajectory of increasing greenhouse gas emissions must be halted to reach the UN's Paris Agreement to keep the global average temperature above pre-industrial levels to 1.5°C¹. Furthermore, projections of the cost to the global economy related to the climate challenge are upwards of EUR 54 trillion by 2100², covering costs associated with extreme weather events, loss of biodiversity and other environmental impacts. Thus, there is a great global urgency for taking action to reduce greenhouse gas emissions³ at all levels. Companies experience an increasing demand for them playing a crucial role in reducing greenhouse gas emissions. These demands do not only come from customers and suppliers, but also from market regulations. Following the implementation of the Corporate Sustainability Reporting Directive⁴ (CSRD) in the European Union member states, more and more companies will be required to report on their greenhouse gas emissions, and take action in reducing them.

For companies to take on an active role in reducing their emissions, they must first gain insight into them. The most internationally acknowledged framework for calculating emissions is the Greenhouse Gas (GHG) Protocol⁵. The GHG Protocol is a comprehensive global standardized framework developed by the World Resources Institute and World Business Council for Sustainable Development. The GHG Protocol divides the emissions of a company into three scopes:

Scope 1: Direct emissions from sources that a company either own or control, such as emissions from the company's facilities (e.g. boilers, furnaces, process equipment) and vehicles.

Scope 2: Indirect emissions from purchased or acquired energy, such as electricity, steam, heat or cooling, which is generated off-site and consumed by the company.

Scope 3: All indirect emissions that occur in the value chain of

the company, both upstream and downstream, such as emissions from energy use, purchased products and materials, transportation, waste management or the use of products delivered by the company.

Once a company has calculated and gained an overview of its emissions based on the GHG Protocol, it can apply a variety of approaches to setting reduction targets, such as intensity targets, absolute targets, sector-based targets or targets that align with government goals and regulations at either local, regional or national level. A growing trend shows that more and more companies are committing to setting reduction targets through the Science Based Targets initiative (SBTi). Globally, more than 4.000 businesses and financial institutions are working with the SBTi to reduce their emissions⁶. The SBTi aligns with climate science and the Paris Agreement goals and lays out a framework to systematically track a company's progress towards achieving their reduction targets. SBTi also requires companies to evaluate and report on their progress across all three scopes of the GHG Protocol.

For many companies, a majority of their greenhouse gas emissions lie within scope 3. An analysis conducted by the Climate Disclosure Project concluded that on average across all sectors, scope 3 emissions account for 75% of total emissions⁷. In addition, an analysis of Danish production companies concluded that scope 3 typically accounts for upwards of 90% of the participating companies' total emissions³. Scope 3 is also often identified as the most difficult to calculate and act upon as these emissions occur in areas of the value chain where companies either have limited or no operational control.

More and more companies are reducing their scope 3 emissions by applying initiatives following the principles of circular economy, such as changing product designs, focusing on repairing, reusing and refurbishing, waste management and through other supply chain initiatives. These initiatives can extend the life of products, reduce the need for new materials, substitute

1 UN, Paris Agreement, 2015

2 Completing the picture – How circular economy tackles climate change, Ellen MacArthur Foundation and Material Economics, 2021

3 Greenhouse gas emissions are measured in CO₂ equivalents, calculated by conversion of the amounts of other gases to the equivalent amount of CO₂ with the same global warming potential. When this analysis mentions emissions as a general term, this is what is meant.

4 CSRD require large companies and listed companies to publish regular reports on the social and environmental risks they face, and on how their activities impact people and the environment.

5 [What is GHG Protocol?](#)

6 Science Based Targets Initiative - Companies taking action Dashboard

7 [CDP, Technical Note: Relevance of Scope 3 Categories by Sector: S.6](#)

materials for less hazardous, more recyclable and less emitting materials, all of which may contribute to an overall reduction of a company's scope 3 emissions. This is supported by the 2021 Circularity Gap Report, which claims that a global transition to a circular economy could reduce global greenhouse gas emissions by 39%⁸.

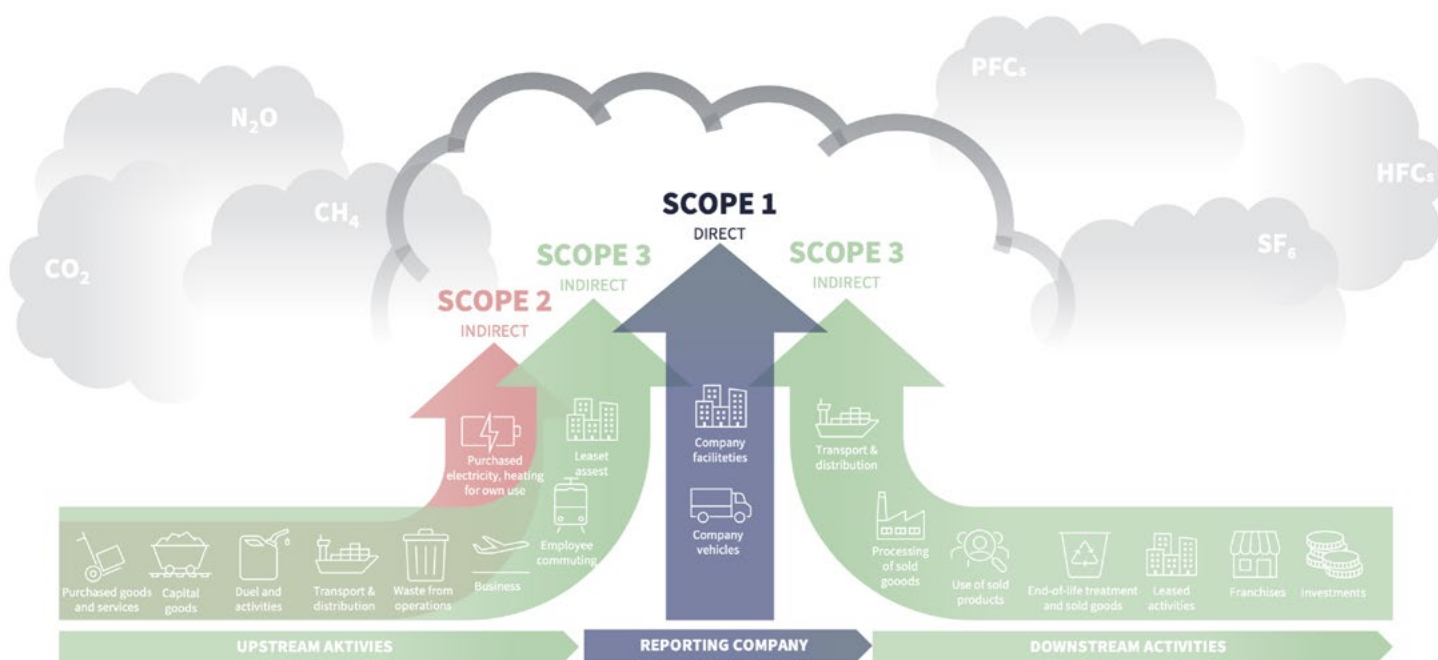
However, there are still limitations when using circular economy initiatives to reduce scope 3 emissions, as the principles of circular economy will not always have a reducing effect in the short term. For instance, the process of recovering and preparing a particular product for reuse could involve energy-intensive processes that will emit more than buying a new product. A positive reduction will therefore always rely on the actual implementation of the circular initiative and the systemic changes that are concurrently taking place within the larger circular systems.

The combination between scope 3 emissions and circular economy initiatives is a relatively new field of research. Therefore, there is still a considerable knowledge gap regarding how companies can utilize the principles of circular economy to reduce scope 3 emissions. This analysis focuses on and gives insight into

how leading Danish and European companies with experience within sustainability are applying circular economy initiatives to reduce their scope 3 emissions. Furthermore, this analysis can also serve as inspiration for companies on how circular initiatives can have positive effects on the reduction of scope 3 emissions and give insights into which circular initiatives are the most applied amongst the companies, as well as which barriers they are facing when applying them.

The analysis is divided into three sections:

1. **Methodology and data.** This section describes the methodological decisions and how the data for the analysis was collected.
2. **Presentation of collected data.** This section presents the collected data.
3. **Main conclusions.** This section discusses and reflects upon the results from the previous section and draws conclusions on the companies' work with calculating and reducing scope 3 emissions.



Developed based on the GHG Protocol

8 [The Circularity Gap Report, 2021](#)

Methodology and data

This analysis was developed by Transition and the Danish Business Authority in collaboration with UN Global Compact Network Denmark as part of a larger project with two outcomes:

- An analysis providing insight into how leading Danish and European companies experienced within the field of sustainability are approaching the challenge of calculating and reducing their greenhouse gas emissions and how they are applying circular economy initiatives.
- An inspirational catalogue with cases and a practical “how to”-guide for companies that seek knowledge and inspiration regarding identifying and implementing circular initiatives. The catalogue is based on 15 case interviews with companies that have implemented various circular initiatives. To support the analysis, the catalogue and some of its cases are referred to throughout, along with knowledge gathered from the interviews. The inspirational catalogue can be found in Danish on the Climate Compass website⁹.

The analysis is based on a survey shared with relevant companies from the Science Based Targets initiative with the help from UN Global Compact Network Denmark, from public databases such as the Climate Disclosure Project, as well as Danish companies selected from business support programmes such as

Klimaklar SMV, Grøn og Cirkulær Omstilling, Bæredygtig Bundlinje Bornholm and other similar programmes in Denmark.

Due to the scope of the analysis, it should be noted that the analysis is facing a risk of selection bias, as the targeted respondents of the survey were European companies and mostly Danish companies, who have already calculated their greenhouse gas emissions and/or are applying circular economy initiatives. In other words, it is reasonable to assume that the companies represented in the analysis are more advanced within the field of sustainability compared to the average European company.

Moreover, the data presented in the analysis reflects the respondent’s personal views and biases and have not been validated by a third party. The companies are “self-reporting”, which makes it difficult to confirm the objectivity of the collected answers.

The survey consisted of four components:

1. Calculating scope 3 emissions
2. Measurable targets to reduce emissions in scope 3
3. Circular economy initiatives to reduce scope 3 emissions
4. Measuring initiatives

The full survey can be found in Appendix 1.

Outcome of the survey

The survey generated 272 responses. The representatives of the companies participating in the survey are mainly CEO’s, Partners, Heads of Sustainability/Finance/QHSE or project or business development managers.

Of the respondent companies, 76% are from Denmark, while the second largest country representative is the UK with 5 % of respondents, as seen in Figure 1. As such, survey results may not be representative of companies outside of Denmark due to the selection bias. The challenges faced by companies in different countries can vary due to different legal, financial and cultural frameworks. Therefore, the results of the analysis should be interpreted with caution when considering businesses outside of

Denmark. See Appendix 2 for a list of names of the respondent companies that have contributed by answering the survey.

Out of the 272 survey respondents, the *Manufacturing* industry had the most representation at 39%, followed by *Wholesale and retail* at 16% and *Construction* at 9%. Due to the limited representation in some industries, the industries were grouped to obtain meaningful findings from the survey. This was done by first categorizing the industries of all respondents into 10 groups according to the 2014 edition of "Dansk Branchekode og standardgrupperinger" and then grouping these into five industry categories, as shown in Figure 2.

⁹ The Climate Compass is a digital tool for calculating greenhouse gas emissions developed by the Danish Business Authority in collaboration with the Danish Energy Agency (www.klimakompasset.dk)

Figure 1 Number of respondents according to country

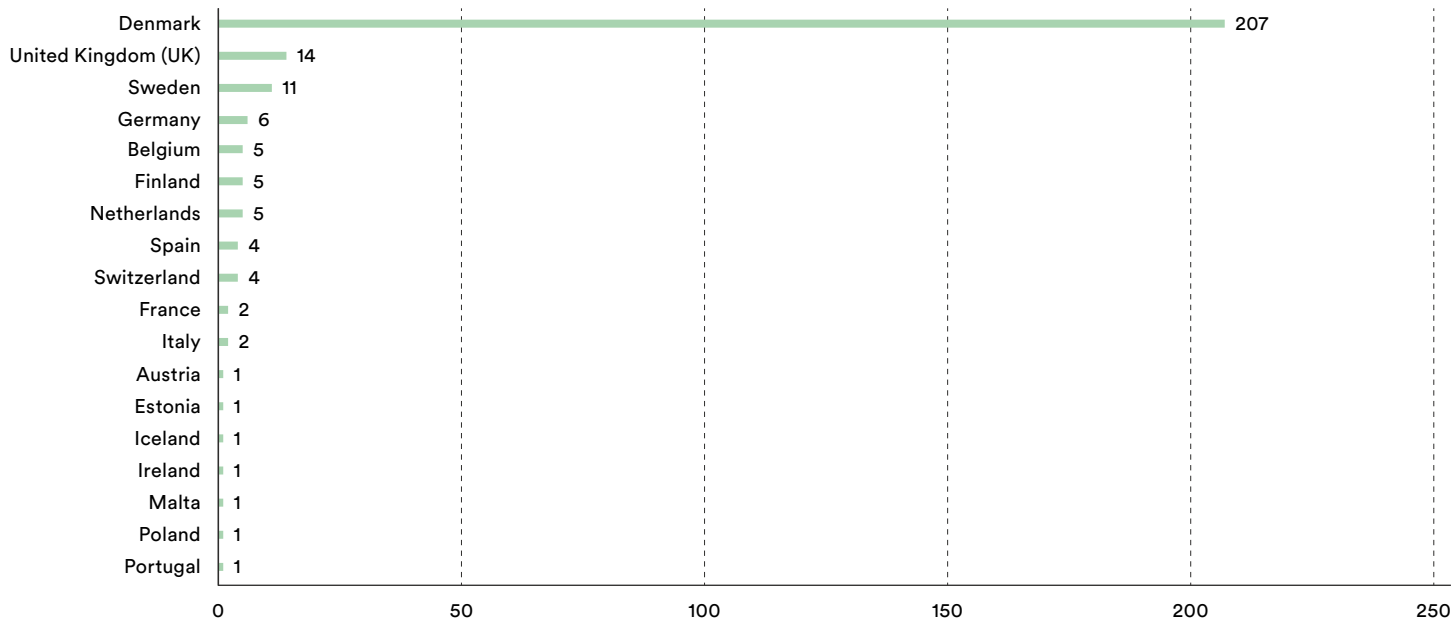


Figure 2 Distribution of respondents according to industry

Category	Industries within the category	Respondents	Respondents in total
Manu facturing, raw materials, and supply	Manufacturing	39,3%	122
	Raw material extraction	0,7%	
	Electricity, gas, and district heating supply	1,1%	
	Water supply; sewerage, waste management, and remediation activities	3,7%	
Trade and transportation	Wholesale and retail	15,8%	55
	Transportation	4,4%	
Services and IT	Information and communication technology	2,6%	48
	Finance	1,1%	
	Real estate	3,3%	
	Consulting	4,4%	
	Services	4,0%	
	Administration	0,4%	
Construction	Construction	9,2%	25
Other	Agriculture, forestry, and fishing	1,8%	19
	Public sector	0,7%	
	Education	0,4%	
	Healthcare	1,1%	
	Culture	1,1%	
	Tourism	1,8%	

Note: (1) % of all respondents

The analysis presents the results across three levels: one for all respondents, one for specific industries and one for company sizes. Figure 3 illustrates the chosen classifications for company size as well as the distribution of respondents according to

these. The survey received a slightly higher number of responses from companies with 250 or more employees (38%) and fewest from companies with 10-49 employees (17%).

Figure 3 Distribution of companies across different industries and business sizes

	Total	Manufacturing, raw material, and supply	Construction	Trade and transportation	Services and IT	Other
1 to 9	24%	35%	10%	35%	11%	8%
10 to 49	17%	58%	7%	13%	18%	4%
50 to 249	22%	51%	11%	16%	18%	5%
250 or more	38%	45%	10%	18%	17%	9%

Note: n = 263. Respondents that answered “Don’t know” have been omitted.

The number of respondents included in each figure varies throughout the analysis. This is because companies that have not calculated their scope 3 emissions or applied any circular economy initiatives were excluded from parts of the survey relating to these topics. To ensure transparency, the number of included respondents (n) will be listed in a note below each figure, indicating how many have answered the specific question.

Presentation of survey results

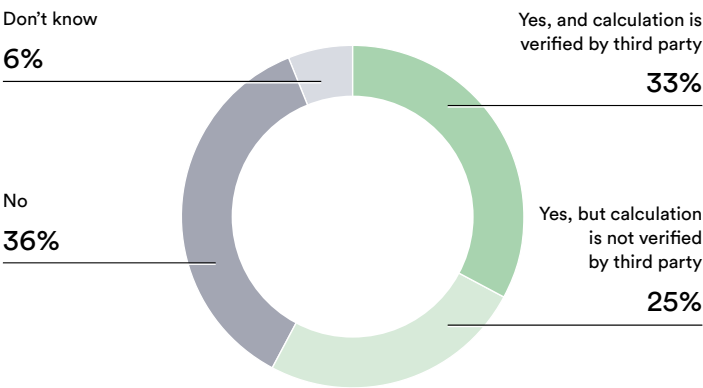
Calculating scope 3 emissions

Understanding the amount and source of a company's scope 3 emissions is crucial to being able to apply targeted initiatives to reduce them. The Greenhouse Gas (GHG) Protocol is a widely recognized framework for calculating a company's emissions, with emissions being categorised in scope 1, 2 and 3. Scope 3 emissions are indirect emissions that occur in a company's value chain, and they can be the most complex and challenging for companies to calculate, but often represent the largest portion of total emissions. By understanding a company's scope 3 emissions, it becomes easier to identify emitting activities throughout the value chain and develop effective strategies for applying targeted initiatives to reduce emissions.

As seen in Figure 4, more than half of the responding companies (58%) have calculated their scope 3 emissions. Additionally, as shown in Figure 4, 33% of the companies that have calculated their scope 3 emissions have also had their calculations verified by a third party, for instance through the Science Based Targets initiative. As expected, these percentages are relatively high as the targeted respondents were selected on basis of being experienced within scope 3 calculations, circular economy and/or sustainability. Thus, these numbers might not be representative of companies in general, as the targeted companies were expected to be more advanced within the field of sustainability.

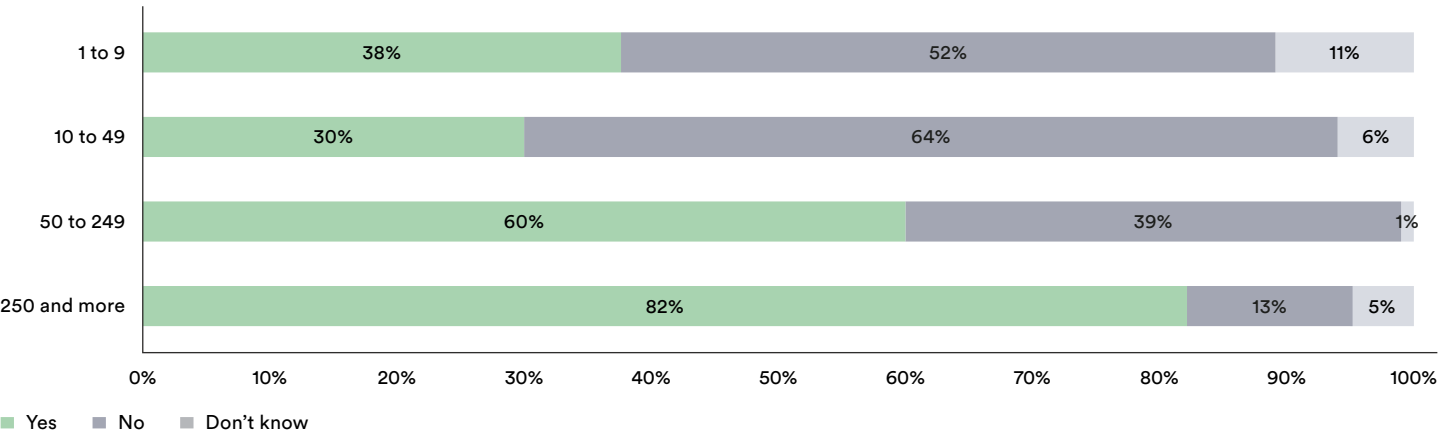
Figure 5 indicates that larger companies tend to calculate scope 3 emissions more than smaller companies. 82% of companies with 250 or more employees have calculated their scope 3 emissions compared to 38% of companies with 1 to 9 employees and 30% of companies with 10 to 49 employees.

Figure 4 Companies calculating all or parts of scope 3 emissions



Note: n = 269.

Figure 5 Companies' calculating all or parts of scope 3 emissions across company size

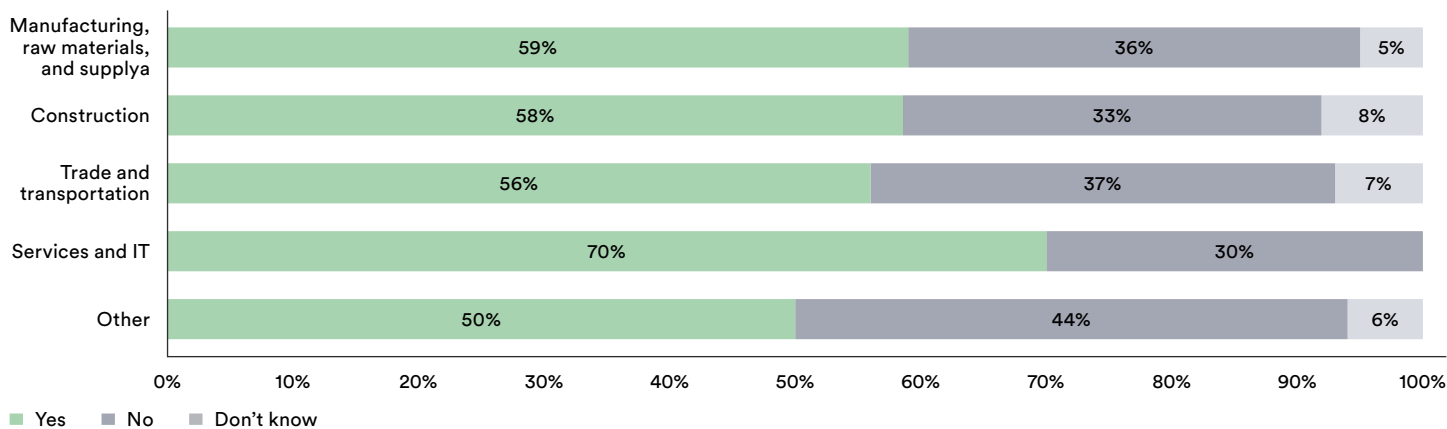


Note: n = 268. One company replied 'Don't know' to the question of company size, hence this respondent is not represented in Figure 5.

Figure 6 shows that there is only a slight variation between industries and the number of companies calculating scope 3 emissions. However, it also indicates that *Services and IT* tend to be the industry, where most companies calculate scope 3 emis-

sions. This might be because companies in these industries have their largest emissions in scope 3, and thus they have a greater incentive to calculate emissions in scope 3 to gain a complete picture of their emissions.

Figure 6 Companies calculating all or parts of scope 3 emissions across industries



Note: n = 261. Eight companies replied 'Don't know' to the question of which industry the company belongs to. These respondents are removed from Figure 6.

Sources of scope 3 emissions

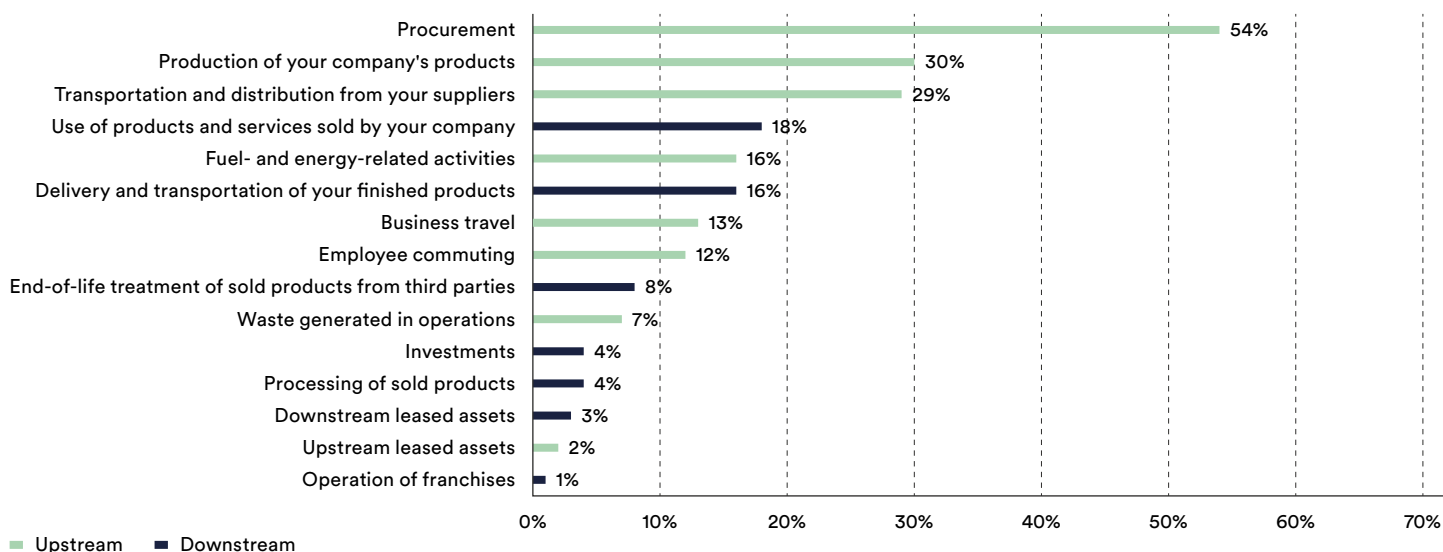
In the GHG Protocol, scope 3 emissions are divided into 15 categories reflective of a corporate value chain with the categories being further divided into upstream and downstream activities. The categories are intended to provide a framework within which companies can organise, understand and calculate their scope 3 activities.

The 15 scope 3 categories were used as a framework for the survey questions. However, for the purpose of making it more accessible for responding companies to answer the survey, the 15 categories were renamed. In Appendix 3, a full list of the official

GHG Protocol names of the categories can be found alongside a list of the names used in the survey and in this analysis. The appendix also shows which categories are upstream and which are downstream.

In the survey, respondents were asked to select which categories (up to three) that represent their largest sources of scope 3 emissions. These results can be seen in Figure 7, where 54% of the respondents selected *Procurement* followed by *Production of your company's products* with 30% and *Transportation and distribution from your suppliers* with 29%.

Figure 7 Companies' largest sources of scope 3 emissions distributed across the 15 scope 3 categories



Note: n = 142.

Figure 8 shows only the largest sources of emissions according to the survey's respondents. It is evident that larger companies select *Procurement* as their largest source of scope 3 emissions, while smaller companies tend to select *Production of your com-*

pany's products and *Transportation and distribution from your suppliers* as the categories that represent their largest sources of scope 3 emissions.

Figure 8 Companies' largest sources of scope 3 emissions across company size

	Procurement	Production of your company's products	Transportation and distribution from your suppliers	Use of products and services sold by your company	Waste generated in operations
1 to 9	16%	58%	37%	5%	16%
10 to 49	36%	57%	57%	7%	14%
50 to 249	55%	23%	16%	0%	3%
250 or more	66%	22%	27%	31%	5%

Note: n = 141.

When looking for the largest sources of emissions across industries in Figure 9, *Procurement* is the largest source of scope 3 emissions. Only companies in the *Trade and transportation* industry selected *Production of your company's products* as a larger source of scope 3 emissions with 52%, followed by *Transportation and distribution from your suppliers* with 48%. A reason

why the *Trade and transportation* industry selected *Production of your company's products* as the largest source might be due to the production that goes into producing vessels, whereas the transportation itself is attributed primarily to their scope 1 emissions.

Figure 9 Companies' largest sources of scope 3 emissions across industries

	Procurement	Transportation and distribution from your suppliers	Production of your company's products	Use of products and services sold by your company	Waste generated in operations
Manufacturing, raw materia, and supply	64%	33%	33%	18%	6%
Construction	50%	36%	7%	36%	29%
Trade and transportation	37%	48%	52%	11%	4%
Services and IT	48%	0%	19%	15%	4%
Other	63%	13%	13%	25%	0%

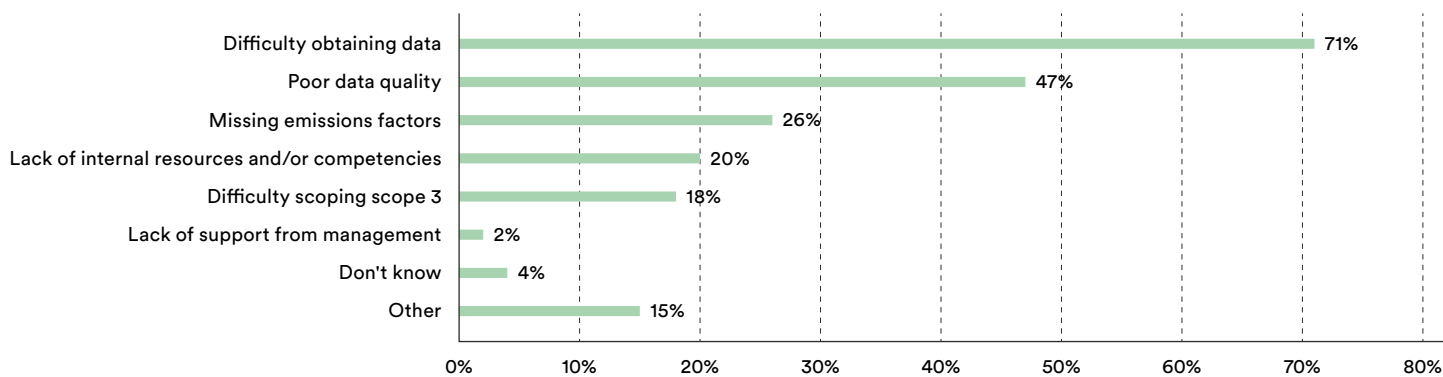
Note: n = 142.

Challenges when calculating scope 3

In the survey, participants were asked to identify which primary challenges they faced when calculating scope 3 emissions. They were given the option to select multiple challenges from a predefined list. The results, shown in Figure 10, indicate that

a majority of respondents identified data-related issues as their main challenges, as 71% of the respondents reported *Difficulties obtaining data* and 47% reported *Poor data quality* as an obstacle.

Figure 10 Biggest challenges when calculating scope 3 emissions

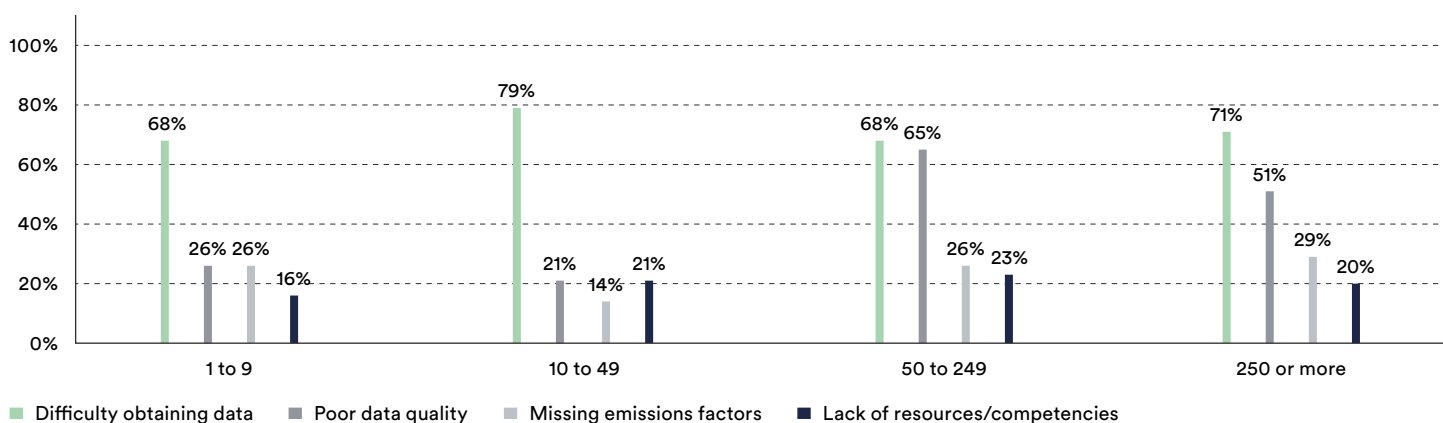


Note: n = 142.

The survey results also indicate that larger companies (those with 50 or more employees) tend to find *Poor data quality* to be a greater challenge than smaller companies, as seen in Figure 11.

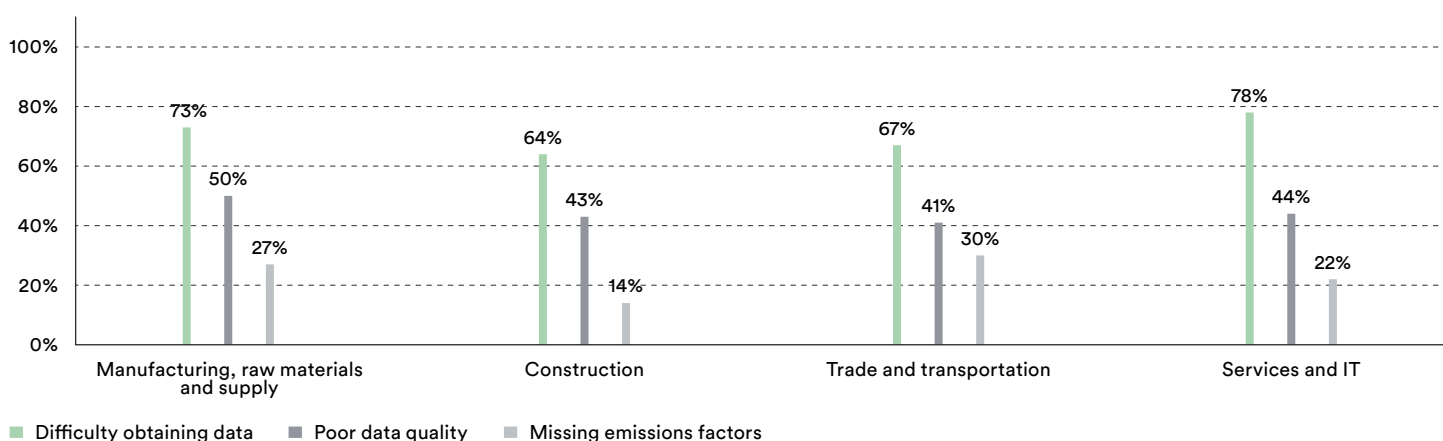
However, when examining the results across industries, as seen in Figure 12, there does not appear to be a significant difference in the challenges identified by respondents.

Figure 11 Biggest challenges when calculating scope 3 emissions across company size



Note: n = 141.

Figure 12 Biggest challenges when calculating scope 3 emissions across industries



Note: n = 141.

Additionally, 15% chose *Other* as a challenge. Many of these comments suggest that a lack of a standardised method or approach is a significant challenge as shown with the selected

comments provided below:

- Lack of standardised methods.
- The biggest challenge is that this is not an exact science.

Emission factors exist, but are they correct? And do they change as the world changes (which they should).

- Guidelines towards validation of data and System Boundaries setting for required comparison in order to validate effort.
- Similar products from different suppliers with different scope 3 impact (due to use of different tool/calculation methods).
- Lack of standards and robust methodology.
- Lack of international agreed standards for calculation.
- Some data are easy to find (procurement data), and some

emissions factors are easy (energy and “clean” materials), but many other indirect sourced products and items are difficult to come by.

- Methods for calculating scope 3 emissions for highly diverse procurement.
- Availability of emissions data from the transport partners.
- Lack of support from production facility.
- Getting accurate customer usage data to qualify calculations on product usage.
- Insights into how products are used when sold by channel partners/distributors.

Case



In 2020, Volvo Construction Equipment (Volvo CE) assessed its scope 3 emissions and subsequently committed to the Science Based Targets initiative with 2019 as baseline year. As a result, its reduction targets for scope 3 emissions have been reviewed and approved by the SBTi organization. With emissions from products in use being the predominant emission source, emission data from partners and suppliers was not part of the initial scope. However, Volvo CE has subsequently increased the scope to upstreams emissions and this process led to Volvo CE developing their own system and approach to collecting the data, as they struggled to find an effective system and standardized methodology. Volvo CE ended up using a manual system, where they sent an Excel file and guidelines to its suppliers, who then entered the relevant information and returned the file. As a result, Volvo CE is now exploring other methods for gathering data on emissions in the supply chain, and point out that a standard approach to data collection would be beneficial, as suppliers may receive multiple requests for information in different formats, which can make the process more challenging with companies requesting the same data in different ways.

Scope 3 reduction targets

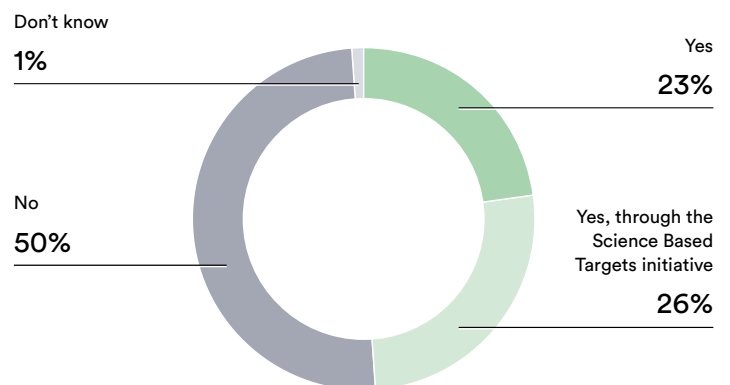
If a company has an understanding and overview of their scope 3 emissions, it allows them to set targets for reducing those emissions.

Some companies choose to keep their reduction targets private, while others choose to publicly announce them, for example through the Science Based Targets initiative (SBTi). SBTi is a programme where companies commit to certain reduction targets in alignment with climate science and the Paris Agreement goals. As shown in Figure 13, 49% of survey respondents have set specific targets for reducing scope 3 emissions, and over half of those companies have committed to SBTi.

The survey results also indicate that larger companies tend to set specific targets for reducing scope 3 emissions more frequently than smaller companies. As seen in Figure 14, 71% of companies with 250 or more employees have set reduction targets, compared to only 30% to 42% of companies with 1 to 249 employees. Furthermore, 50% of large companies have set their reduction targets through SBTi, compared to only 7% of smaller companies.

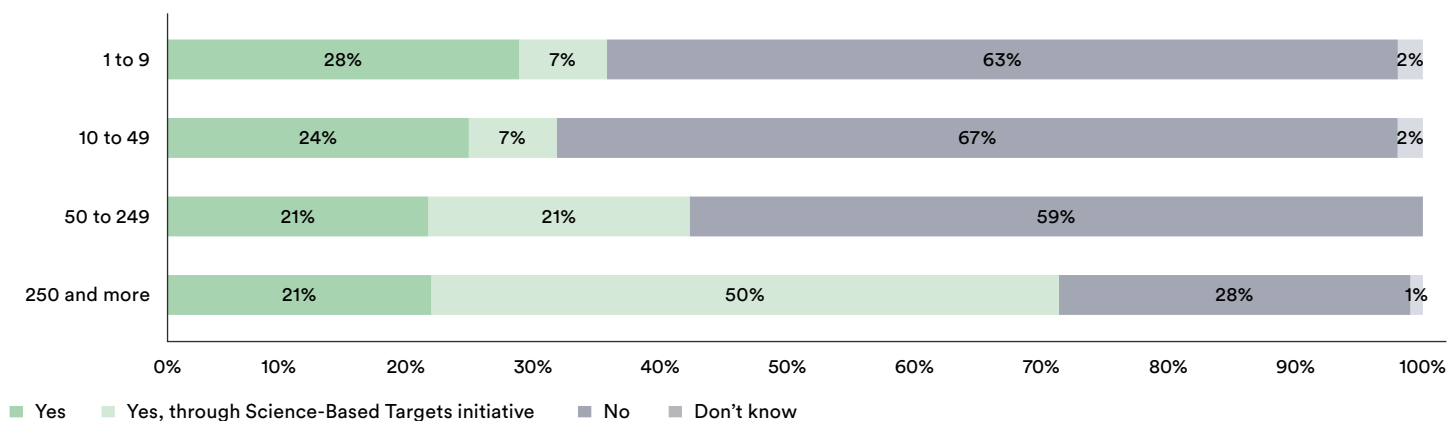
When looking across industries, Figure 15 shows that on average, 49% of survey respondents have set targets for reducing scope 3 emissions, except for companies operating in the *Service and IT* industry. 65% of companies in this industry have set reduction targets, and a significantly higher percentage have set their targets through SBTi.

Figure 13 Percentage of companies setting specific targets for reduction of scope 3 emissions



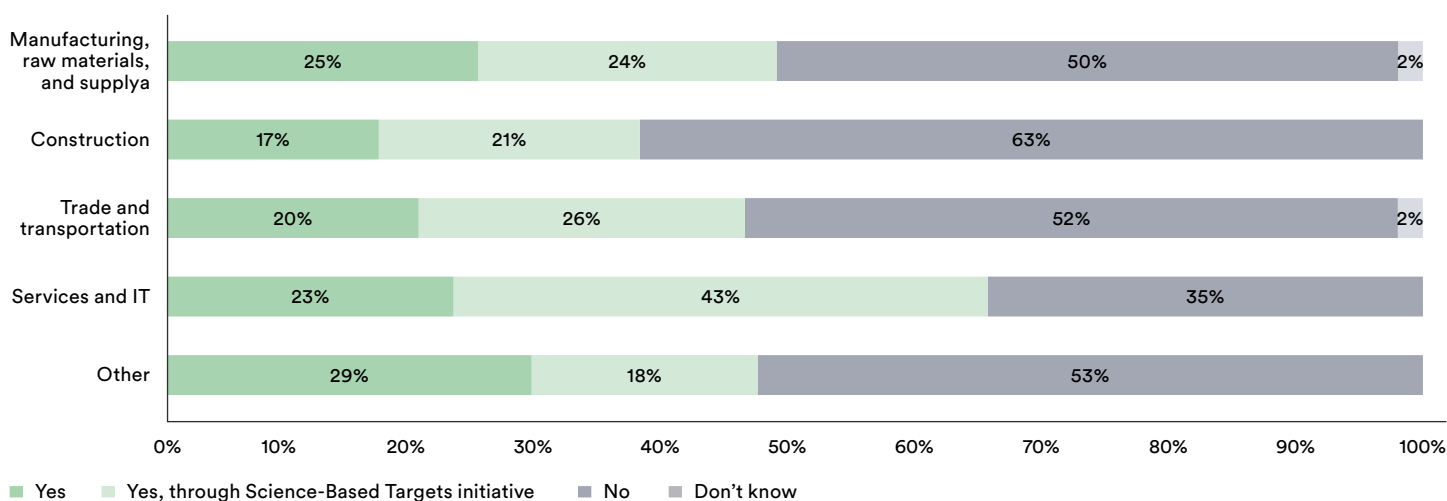
Note: n = 251.

Figure 14 Percentage of companies setting specific targets for reduction of scope 3 emissions across company size



Note: n = 250.

Figure 15 Percentage of companies setting specific targets for reduction of scope 3 emissions across industries



Note: n = 246.

Development of scope 3 reduction targets

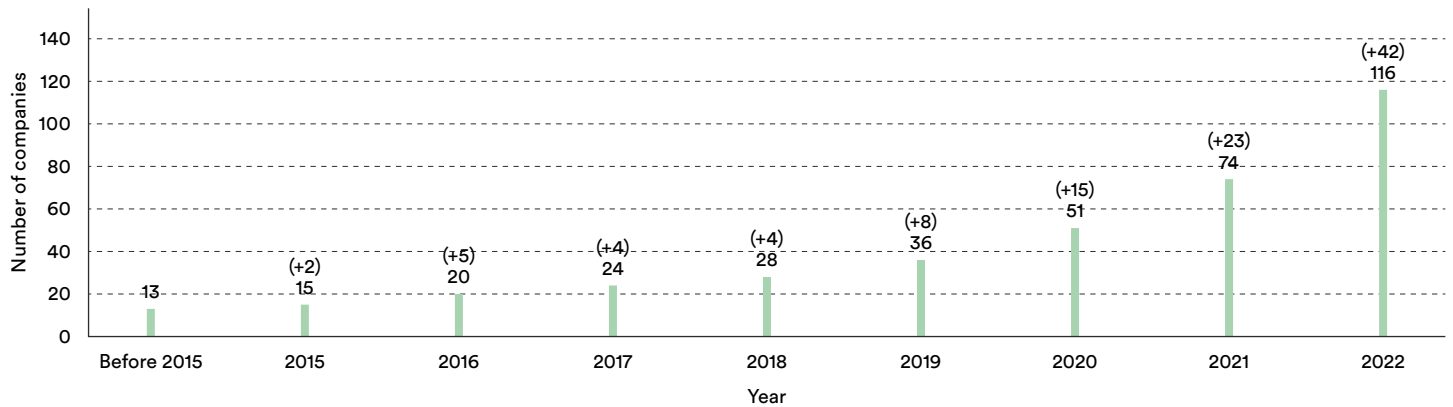
Working with understanding and reducing scope 3 emissions is new to most companies, but the field has gained popularity quickly in recent years. Figure 16 shows that the number of respondents who have set targets for reducing scope 3 emissions has increased by 707% from 2015 to 2022. Additionally, 66% of respondents set their first reduction targets in the last two years, with 53% of these targets being set in 2022.

A similar trend can be observed regarding companies setting reduction targets as part of the SBTi. The number of respondents having set their first reduction targets through SBTi grew from 4 in 2015 to 62 in 2022, which represents an increase of 1450%. Furthermore, 73% of respondents who set their reduction targets through SBTi did so between 2020 and 2022, and the majority of these (55%) were set in 2022, as shown in Figure 17.

This development is also underpinned in SBTi's own statistics. The Progress Report for 2021 shows that the number of SBTi companies increased at a record pace in 2021 – three times faster than in 2020¹⁰. In 2021, more than 1.300 companies set and committed to science-based targets, at a rate of over 110 companies per month, compared with 35 companies per month in 2020. Furthermore, the rate of companies' target validation more than doubled, from 20 per month on average in 2020, to 49 in 2021, reflecting the initiative's increasing technical capacity and resources to meet demand. In 2022, the SBTi has continued to experience exponential growth. In the first quarter, almost 500 companies have set or committed to setting science-based targets.

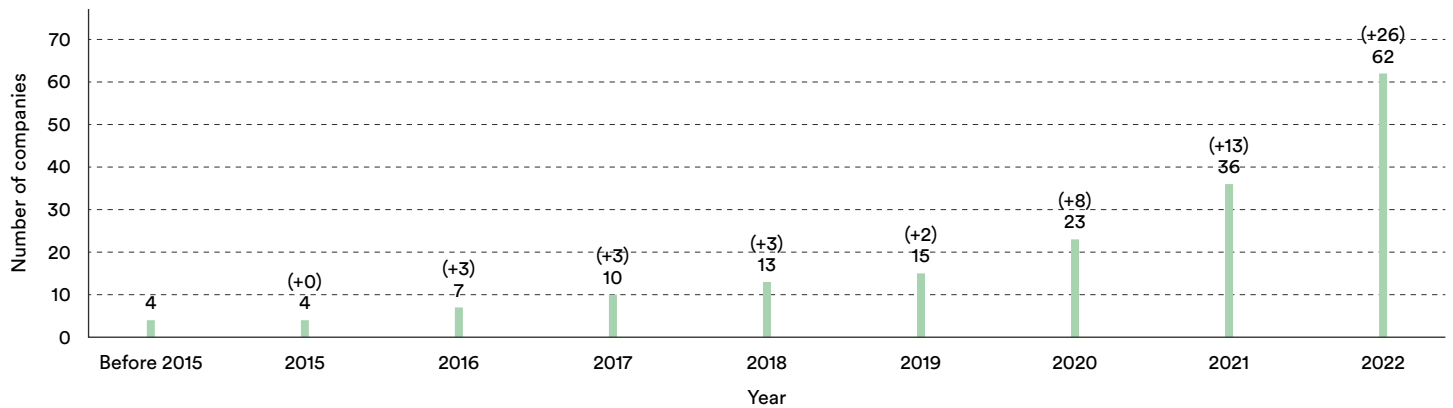
¹⁰ SBTi Progress Report, 2021

Figure 16 Year of first scope 3 target



Note: n = 122. Each bar shows the number of companies that have set scope 3 reduction targets (by year).

Figure 17 Year of first scope 3 target via SBTi



Note: n = 64. Each bar shows the number of companies that have set scope 3 reduction targets (by year).

Strategy for reducing scope 3 emissions

A climate strategy can be used as a tool to outline the steps needed to meet reduction targets. Figure 18 shows that only 20% of survey respondents have developed such a strategy, while 54% of respondents are in the process of developing one.

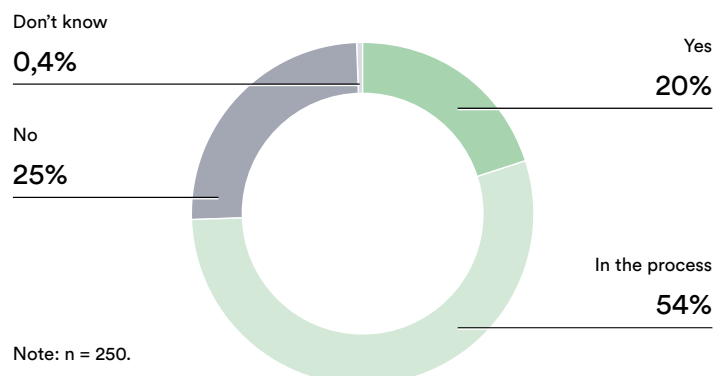
The survey results indicate that larger companies tend to have a climate strategy in place more frequently than smaller companies. As seen in Figure 19, only 14% of companies with 1-9 employees and 13% of those with 10-49 employees have a strategy for reducing scope 3 emissions, while 33% of companies with 250 or more employees already have a strategy in place. This may be due to larger companies having more resources dedicated to sustainability, meaning they often have departments dedicated only to sustainability, and thus also having a climate strategy. However, the survey also indicates that the smaller companies are in the process of developing climate strategies.

Figure 20 shows that 13% of respondents in the *Construction* industry and 12% in *Other* industries have a clear strategy for reducing their scope 3 emissions compared to respondents in the other three industries. The reasons behind the relatively small number of companies in *Construction* who have a clear strategy

for reducing scope 3 emissions cannot be determined based on the survey results.

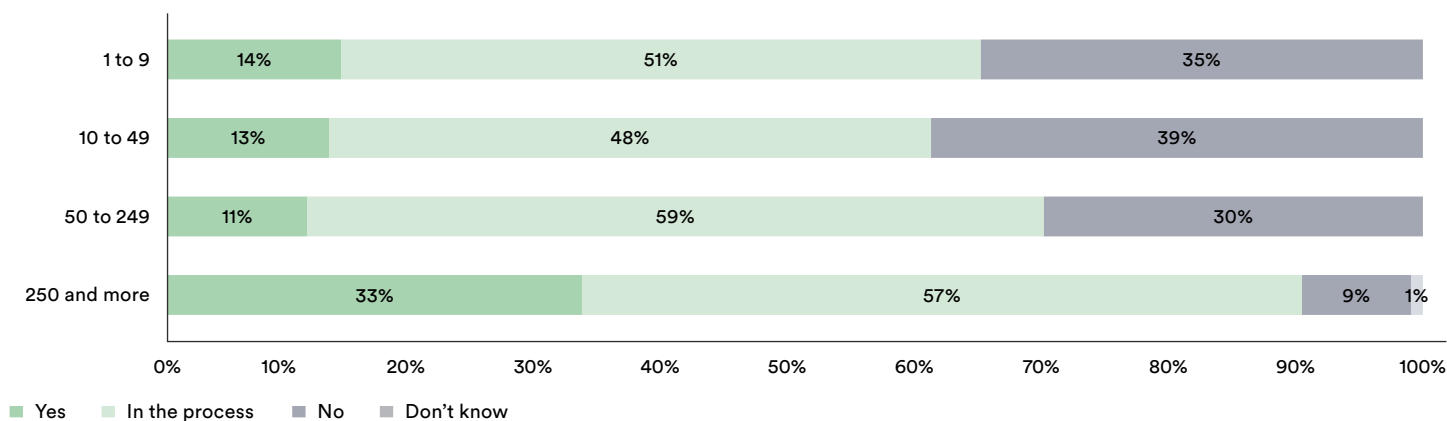
When considering the number of companies that are in the process of formulating a strategy to reduce scope 3 emissions, companies across industries, with the exception of *Construction* and *Other* industries, are working equally on a reduction strategy.

Figure 18 Companies with a clear strategy for reducing their scope 3 emissions



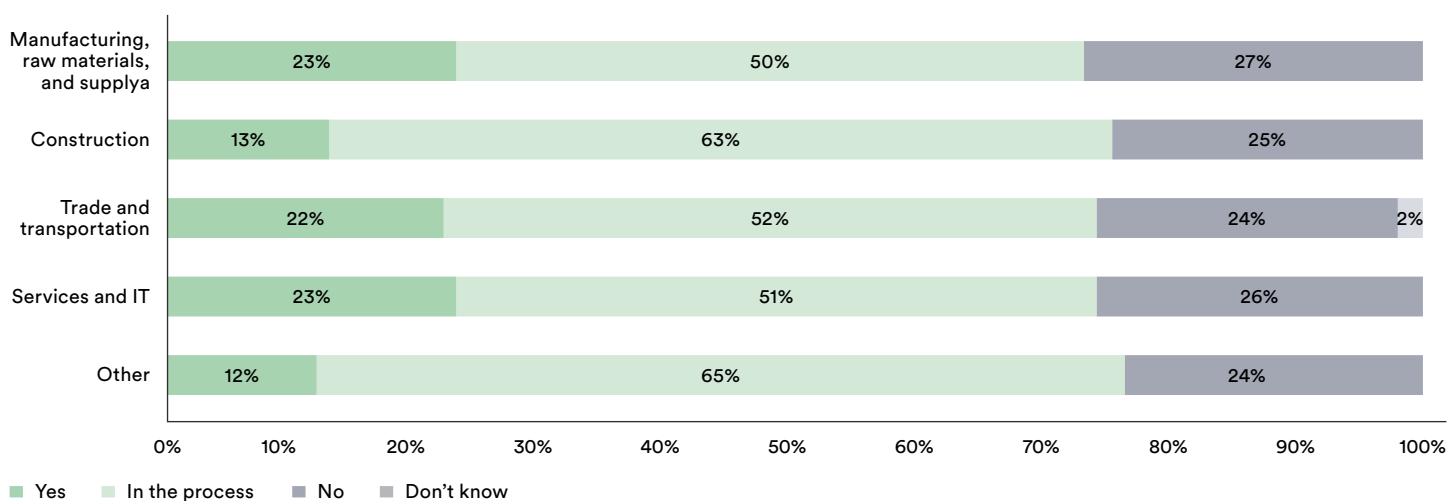
Note: n = 250.

Figure 19 Companies with a clear strategy for reducing their scope 3 emissions across company size



Note: n = 249.

Figure 20 Companies with a clear strategy for reducing their scope 3 emissions across industries



Note: n = 245.

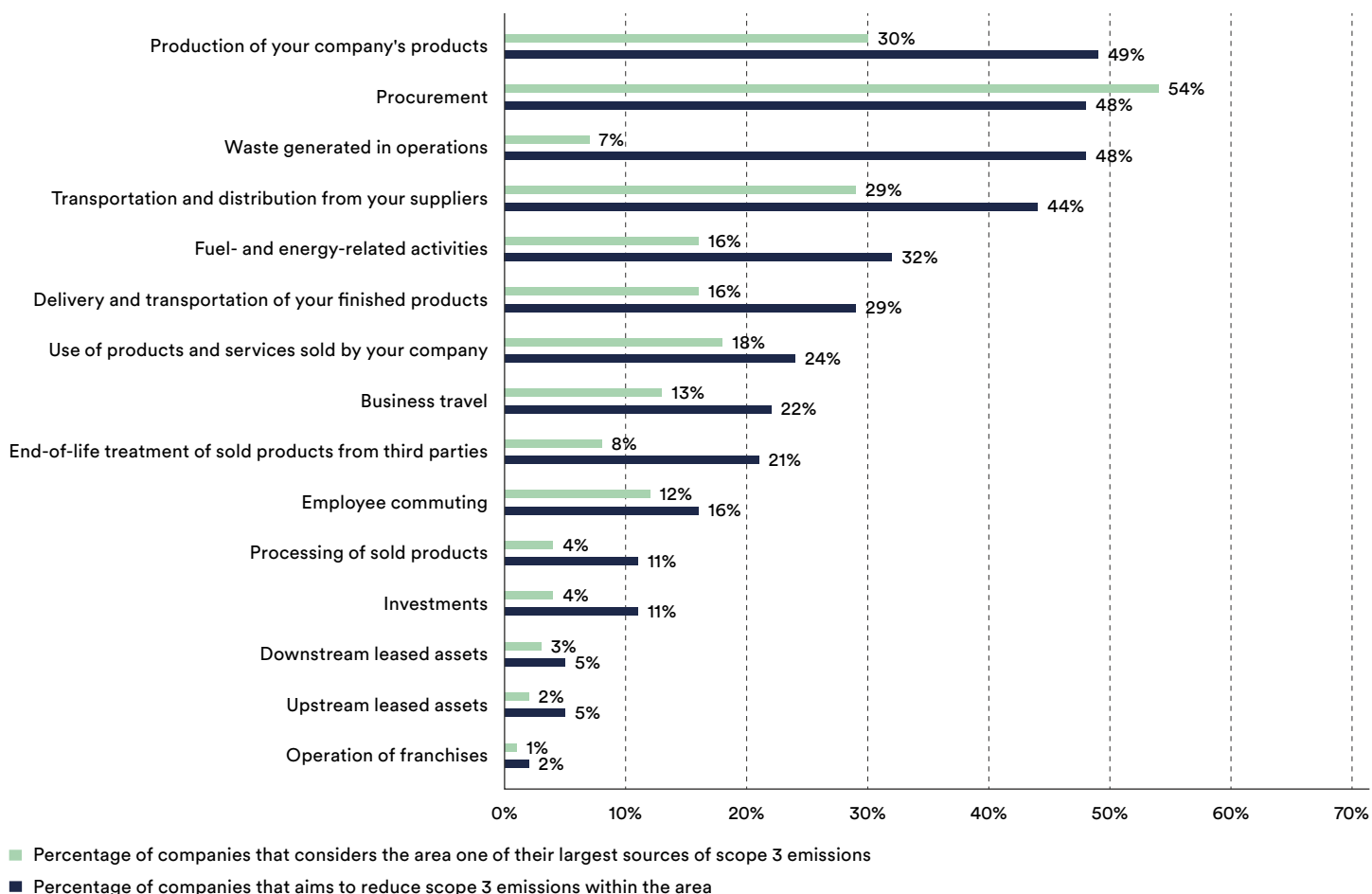
Reducing emissions across scope 3 categories

In the survey, the respondents were asked in which scope 3 categories they aim to reduce. In Figure 21, the selected categories are matched with the categories respondents consider to be their largest sources of scope 3 emissions.

Figure 21 shows that the respondents mainly aim to reduce scope 3 emissions related to the categories *Production of your companies' products* (49%) and *Procurement* (48%). This is co-

herent with the categories that the companies identified as their two largest areas of scope 3 emissions (Figure 7). Overall, this shows that most respondents aim to reduce scope 3 emissions within categories that are also considered the largest sources of scope 3 emissions. A high percentage of the companies (48%) aim to reduce emissions related to *Waste generated* in operations even though only 7% of respondents consider this area as one of their largest sources of scope 3 emissions.

Figure 21 Scope 3 categories in which companies aim to reduce emissions compared to the largest identified source of scope 3 emissions



Note: n = 246.

Reducing waste is most likely a common scope 3 initiative due to being an area where companies have direct influence, as well as it having a cost saving potential, a positive impact on reputation, and due to the relative ease of the implementation process. Furthermore, waste reduction is in compliance with regulations

and in alignment with environmental values. Even though, it may not account for a large share of emissions, it can be an effective method for companies to start reducing emissions and improve their reputation.

Case



15 years ago, Thortrans made the decision to achieve waste neutrality and all their waste methods were reassessed and changed. For example, more waste bins were placed around the office to encourage sorting practices, and these practices thus expanded to the warehouses. Thortrans also began to recycle multiple waste fractions internally. To achieve waste neutrality, the company had to invest in new machines in the warehouse to help process the waste fractions. The process was costly and time-consuming, but today Thortrans have successfully implemented a circular business model where they sort and sell metal, foils, plastics and styrofoam, and have machines that can break wood down into wood chips and compress wood shavings into wood pellets for reselling purposes. This practice is both circular as well as a good business for the company.

Scope 3 categories reduced in this case: Waste generated in operations (category 5)

Reducing scope 3 emissions through circular economy initiatives

Reducing scope 3 emissions can be challenging, as it can be difficult for companies to manage and take control over what takes place in certain areas of their value chain. The principles of circular economy provide a framework for companies to be able to realise a more efficient use of products and materials, for instance by redesigning products in order to use fewer, more recyclable and less emitting materials, by improving management of

waste, or by giving customers access to rather than ownership of products by selling products as a service. This section explores how the respondent companies have applied different circular economy initiatives to reduce scope 3 emissions, and sheds light on how circular economy initiatives are applied relative to which part of the value chain the initiatives are addressing.

The focus of this analysis is how circular economy initiatives can reduce scope 3 emissions. Circular economy initiatives are not relevant for reducing emissions in every scope 3 category, and therefore some of the categories, such as *Transportation and distribution from your suppliers* and *Business travels*, are not included in this section. Furthermore, applying circular economy initiatives to reduce scope 3 emissions can be effective within one category, but may transfer emissions onto another category or scope. This spill-over effect is not addressed in this analysis.

In the survey, respondents were presented with a series of generic circular economy initiatives and were subsequently asked to state which initiatives they have applied. The respondents had to indicate the progress level of each stated initiative as either:

1. Initiative identified
2. Initiative under development
3. Initiative implemented
4. Not applied
5. Don't know

Throughout the analysis, initiatives are grouped using these progress levels. The term “applied” is used when the initiatives in question are combined across the different levels, meaning the term encompasses all initiatives that have been identified, are under development and that have been implemented. The predefined circular economy initiatives are listed in Figure 22.¹¹

Figure 22 Possible circular initiatives to reduce scope 3 emissions

Resource reduction
Reducing material use e.g. through change of procurement or product redesign
Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials
Waste reduction
Reducing production waste e.g. through product design and industrial symbiosis
Reducing hazardous waste and sending less waste to landfill
Reducing customer waste e.g. through takeback, product-design, biobased materials
Better use of materials and products
Increasing product life span e.g. through resell, reuse and repair
Selling products as a service e.g. through renting and leasing
Providing access to multiple users that share the same product simultaneously
Phasing out single use of products and materials
Engaging with suppliers so that suppliers reduce their emissions

¹¹ The original question frame can be found in the full survey in Appendix 1.

Figure 23 shows that the most *applied* circular economy initiatives across the participating companies include:

- Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials (76%)
- Reducing material use e.g. through change of procurement or product redesign (72%)
- Reducing production waste e.g. through product design and industrial symbiosis (70%)
- Engaging with suppliers so that suppliers reduce their emissions (69%)

Figure 23 also shows that the least *applied* initiatives include:

- Selling a product as a service (33%)
- Providing access to multiple users to share the same product simultaneously (25%)

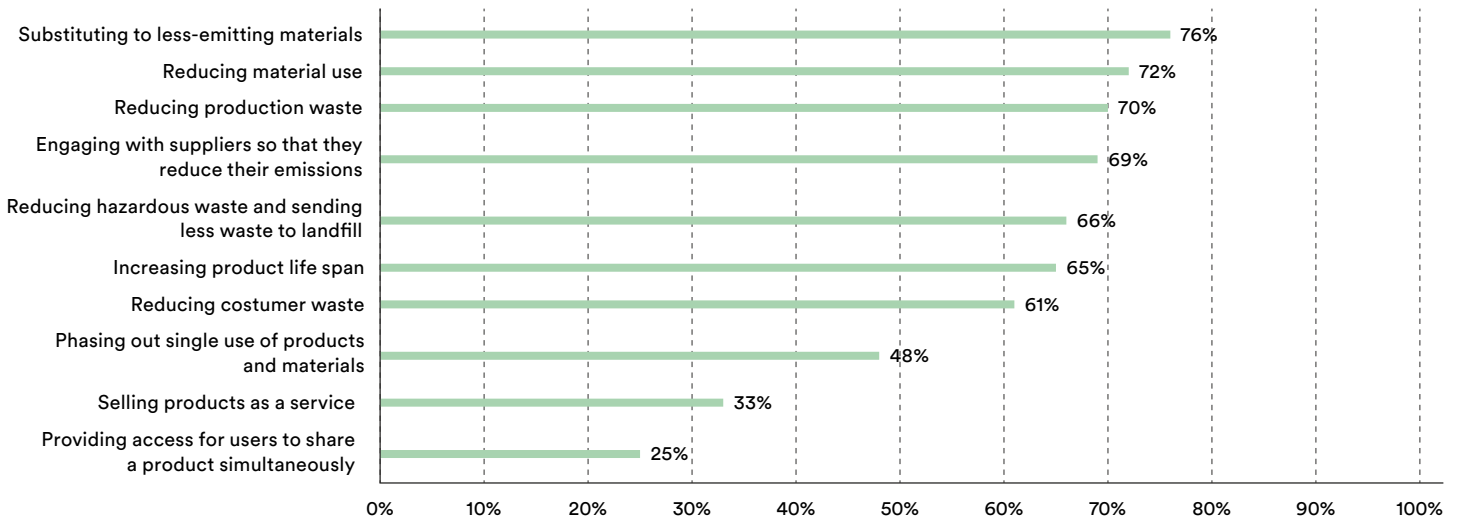
Figure 24 narrows in on the initiatives that have been *implemented* the most, which include:

- Reducing hazardous waste and sending less waste to landfill (33%)
- Increasing product lifespan (30%)
- Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials (29%)

Figure 25 shows the initiatives that are *identified and/or under development* and it shows that the most *identified and/or under development* include:

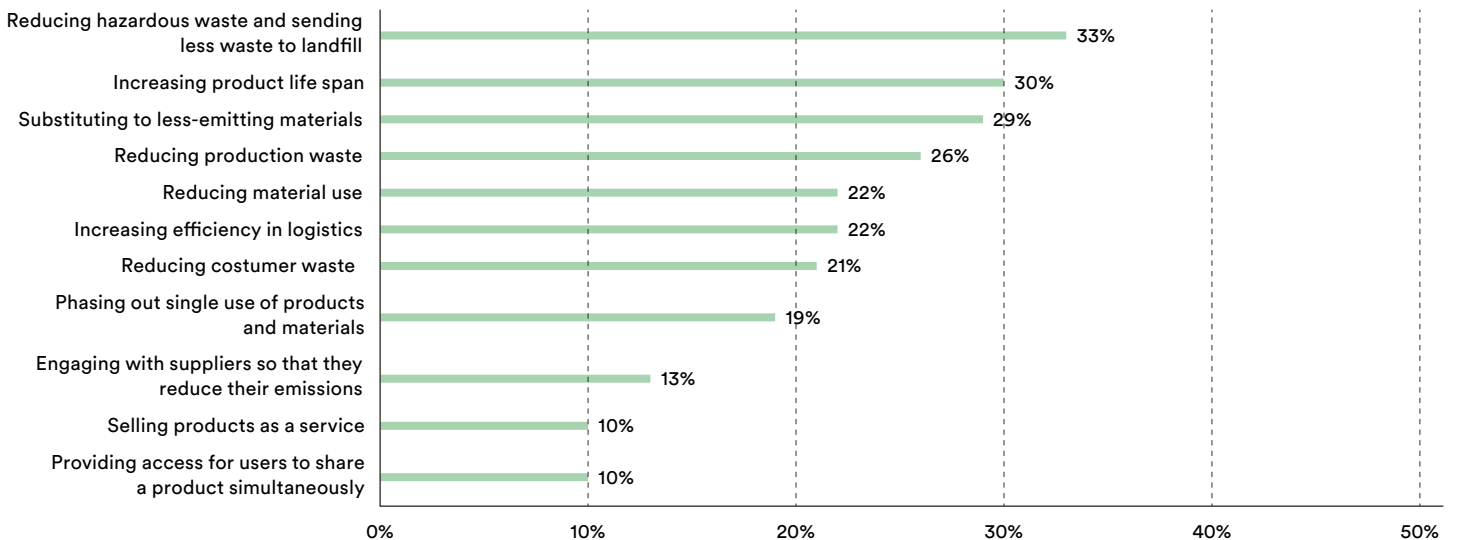
- Engaging with suppliers so that suppliers reduce their emissions (56%)
- Reducing material use e.g. through change of procurement or product redesign (49%)
- Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials (48%)

Figure 23 Percentage of respondents applying (i.e., *identified, developed, or implemented*) initiatives



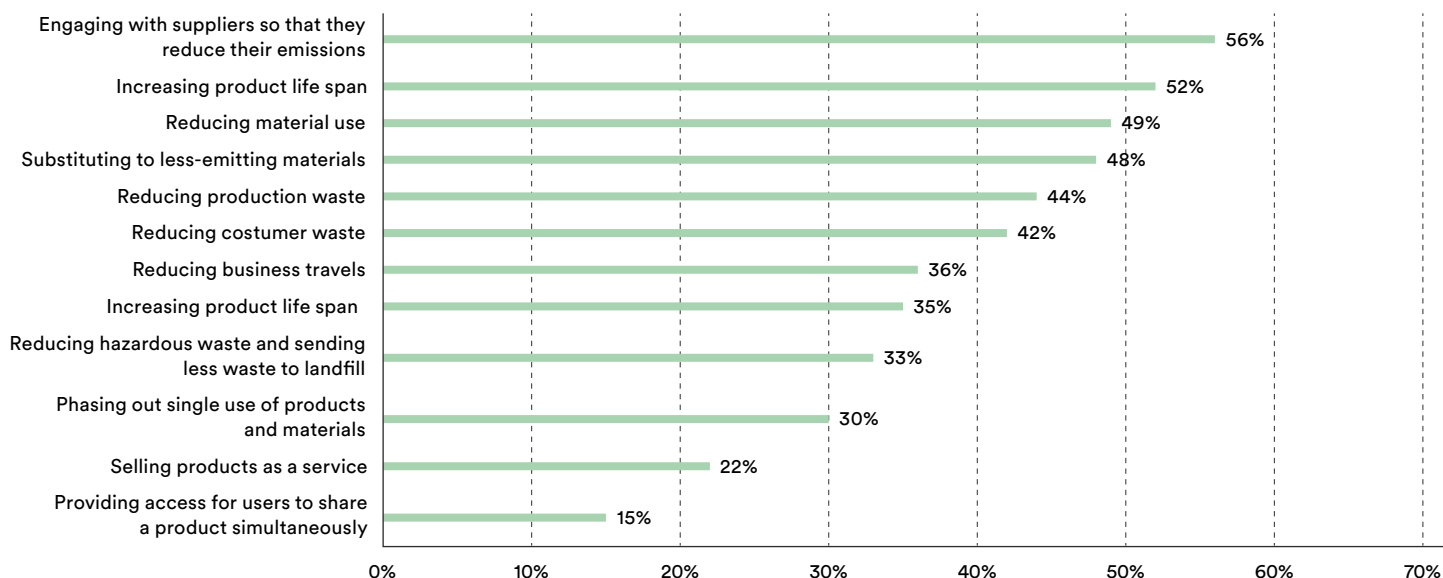
Note: n = 223.

Figure 24 Percentage of respondents implementing initiatives across categories



Note: n = 223.

Figure 25 Percentage of respondents identifying or developing initiatives across categories



Note: n = 223.

Again, *Providing access to multiple users* to share the same product simultaneously is the initiative that has been *identified and/ or is under development* the least with only 15%, which indicates that this type of circular initiative is not common amongst the respondents.

It is worth noting that the most *applied* circular initiative is applied by 76% of respondents, whereas the most *implemented* circular initiative is implemented by 33%, indicating that the participating companies have started by implementing the initiatives that are the most straightforward to work with.

However, the large percentage of *applied* initiatives indicates that companies are ambitious when *identifying* and *developing* initiatives, but that these are still in process of development and are therefore not ready to be implemented.

Some companies have applied initiatives that are not listed in the survey, and have described them as *Other*. These are initiatives such as: *Advising customers on materials based on CO₂ calculations* and *Implementing a carbon shadow price*. However, none of the initiatives listed in the "other" category were considered to be directly related to circular economy.

Case



FoodPeople has established a partnership with Frankly Juice through an industrial symbiosis partnership. Frankly Juice produces a variety of juices, one of which is carrot juice. As a result of this production, surplus carrot pulp is generated. FoodPeople collects and utilizes the surplus pulp from Frankly Juice's carrot juice production as a replacement for new carrots in their baked goods. Through this partnership, FoodPeople reduces emissions in their scope 3 by using a waste resource instead of newly produced carrots for their production.

Scope 3 categories reduced in this case: Procurement (category 1)

Applying circular economy initiatives

It is possible to evaluate the impact of circular economy initiatives in the value chain when looking at the combination of the specific categories of scope 3 emissions that the respondents

aim to reduce, as well as the specific circular economy initiatives they have applied to achieve the reductions.

12 Due to the previously outlined scope of the analysis, certain scope 3 categories have been left out and marked 'N/A'.

13 There will be a discrepancy between the percentages shown in Figure 21 and Figure 26, as the sample size of Figure 21 is 120, whereas the sample size of Figure 26 is 110.

Figure 26 provides an overview of the scope 3 categories that respondents aim to reduce crossed with the share of respondents applying related circular economy initiatives¹². The percentage of companies that aim to reduce their emissions within a given

category and who also have indicated that they use circular economy initiatives to do so is shown under each category¹³. This means that respondent companies that have indicated that they do not apply circular economy initiatives are not included.

Please note: The GHG protocol defines the scope 3 categories as being mutually exclusive. However, some circular initiatives have the potential to reduce several scope 3 categories, and as such they are presented in relation to several scope 3 categories in Figure 26. Furthermore, it should be noted that the coupling of the generic circular initiatives within relevant scope 3 categories in Figure 26 indicates how the circular initiatives theoretically could have an impact on the relevant categories, but it has not been verified by the respondents whether the initiatives have been applied with the purpose of reducing the actual or other scope 3 categories indicated in the figure.

Figure 26 Scope 3 categories that respondents aim to reduce crossed with the share of respondents applying related circular economy initiatives

Upstream

Scope 3 category	Circular initiative	Identified / Under development	Implemented
1. Purchased goods and services (Procurement) 40% of respondents	Reducing material use	61%	23%
	Substituting to less emitting materials	55%	28%
	Engaging with suppliers so they reduce their emission	60%	20%
2. Capital goods (Production of the company's products) 42% of respondents.	Reducing material use	48%	29%
	Substituting to less emitting materials	45%	39%
	Engaging with suppliers so they reduce their emission	57%	14%
3. Fuel- and energy-related activities (not included in scope 1 or 2) 28% of respondents	N/A	—	—
4. Upstream transportation and distribution (Transportation and distribution from your suppliers) 38% of respondents	N/A	—	—
5. Waste generated in operations 40% of respondents	Reducing production waste e.g., through product design and industrial symbiosis	53%	29%
	Reducing hazardous waste and sending less waste to landfill	38%	39%
	Phasing out single use of products and materials	35%	23%
6. Business travel 18% of respondents	N/A	—	—
7. Employee commuting 13% of respondents	N/A	—	—
8. Upstream leased assets 4% of respondents	Engaging with suppliers so they reduce their emissions	45%	27%

Downstream on next page →

Downstream

Scope 3 category	Circular initiative	Identified / Under development	Implemented
9. Downstream transportation and distribution (Delivery and transportation of your finished products) 25% of respondents	N/A	—	—
10. Processing of sold products 8% of respondents	Reducing customer waste e.g., through takeback, product design, biobased materials	30%	48%
	Reducing hazardous waste and sending less waste to landfill	13%	65%
	Phasing out single use of products and materials	48%	22%
11. Use of sold products (Use of product and services sold by the company) 20% of respondents	Increasing product life span e.g., through resell, reuse, and repair	36%	44%
	Reducing customer waste e.g., through takeback, product design, biobased materials	47%	27%
	Selling products as a service e.g., through renting and leasing	27%	20%
	Phasing out single use of products and materials	40%	18%
	Providing access to multiple users that share the same product	22%	13%
12. End-of-life treatment of sold products 17% of respondents	Reducing customer waste e.g., through takeback, product design, biobased materials	30%	48%
	Reducing hazardous waste and sending less waste to landfill	13%	65%
	Phasing out single use of products and materials	48%	22%
	Increasing product life span e.g., through resell, reuse, and repair	34%	55%
13. Downstream leased assets 4% of respondents	Selling products as a service e.g., through renting and leasing	0%	45%
	Providing access to multiple users that share the same product	18%	36%
14. Franchises 1% of respondents	N/A	—	—
15. Investments 8% of respondents	N/A	—	—

The analysis indicates that companies find that some emissions within the different scope 3 categories are more easily reduced than others, and that the location of the emissions in the value chain is pivotal for where companies prioritise applying circular economy initiatives. This becomes evident in Figure 26, as *Reducing production waste e.g. through product design and industrial symbiosis, Reducing customer waste e.g. through takeback, product-design, biobased materials, Increasing product life span e.g. through resell, reuse and repair, Reducing material use e.g.*

through change of procurement or product redesign and Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials are the most prevalent initiatives. What these initiatives have in common is that they can be implemented mainly through activities where companies have a certain control, for instance by altering product design or production methods.

This finding is further underpinned when looking at the scope 3

category *Waste generated in operations*, which is identified by 48% of all respondents as a category within which they aim to reduce their emissions, although only 7% consider this category as one of their largest sources of scope 3 emissions (as shown in Figure 21). Likewise, the initiative *Reducing production waste e.g. through product design and industrial symbiosis* has been identified/developed by 53% and implemented by 29%, which makes it one of the most frequently applied initiatives in the survey. Thus, it seems that the direct and visible impact companies can have on reducing emissions within the category *Waste generated in operations* makes it easier and more prevalent for companies to apply initiatives addressing this category.

Analysis of the numbers indicate that the respondent companies primarily apply circular economy initiatives to reduce upstream emissions rather than downstream emissions. Figure 26 indicates that the upstream categories *Procurement*, *Production of your company's products* and *Waste generated in operations* are the three categories within which a majority of respondents have aimed to reduce emissions. These are also the categories where circular initiatives to a larger extent seems to have been identified/developed and to some extent implemented compared to categories in the downstream value chain. This further supports the finding that the part of the value chain in focus is pivotal to the applicability of the circular initiative.

Furthermore, respondents have applied the initiative *Engaging with suppliers so that suppliers reduce their emissions* to a high degree. When engaging with suppliers, companies can exercise direct impact on otherwise unmanageable parts of the upstream value chain, for instance by imposing more strict demands upon an existing supplier. The initiative is focused on gaining a higher degree of control over the company's scope 3 emissions by developing a stronger relationship with other actors in the value chain. As the respondents have applied the initiative to a high degree, it indicates that the companies acknowledge that the reduction of scope 3 emissions cannot occur solely by changing internal processes.

Figure 26 also indicates that downstream categories such as *Use of products and services sold by your company* and *End-of-life treatment of sold products by thirds parties* mainly are addressed through initiatives such as *Reducing customer waste e.g. through takeback, product-design, biobased materials* and *Increasing product life span e.g. through resell, reuse and repair*, which again can be argued to be partially internal activities, meaning companies have a greater amount of operational control. However, circular initiatives such as *Selling products as a service e.g. through renting and leasing* and *Providing access to multiple users to share the same product simultaneously* are the least applied initiatives in the survey. With these initiatives, companies

maintain a certain degree of control over how their products are handled after leaving the company's gates, and thereby keep a certain control over the company's downstream emissions. This could indicate that these types of circular initiatives are more difficult to apply as they involve the changing of a company's business model, and thus are more complex. This is because it involves building a longer-term relationship with the consumers/users than in a traditional consumer transaction. Such a transition can be cost-intensive and has to involve a changing of mindsets in both company and customers. Applicability of these types of circular initiatives, the dynamics, the potential positive impact and the challenges related to application need further exploration.

When looking across industries and company sizes in Figure 27, the findings support the previous conclusion that companies across industries primarily aim to reduce emissions within upstream scope 3 categories, for instance by implementing waste initiatives, using less emitting materials and engaging with their suppliers. In addition to this, the circular initiatives that operate downstream and require that companies alter their business model, such as *Providing access to multiple users to share the same product simultaneously* and *Selling products as a service e.g. through renting and leasing*, are both scarcely applied across both company sizes and industries, which indicates that there is an overall struggle with these initiatives and underpin the need to further explore the challenges of applying these types of circular initiatives.

Figure 27 illustrates that amongst respondents in the *Manufacturing, raw materials and supply* industry and in the *Trade and transportation* industry, the most applied initiative is *Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials*.

Meanwhile, amongst respondents in the *Services and IT* and *Construction* industries, the most applied initiative is *Engaging with suppliers so that suppliers reduce their emissions*.

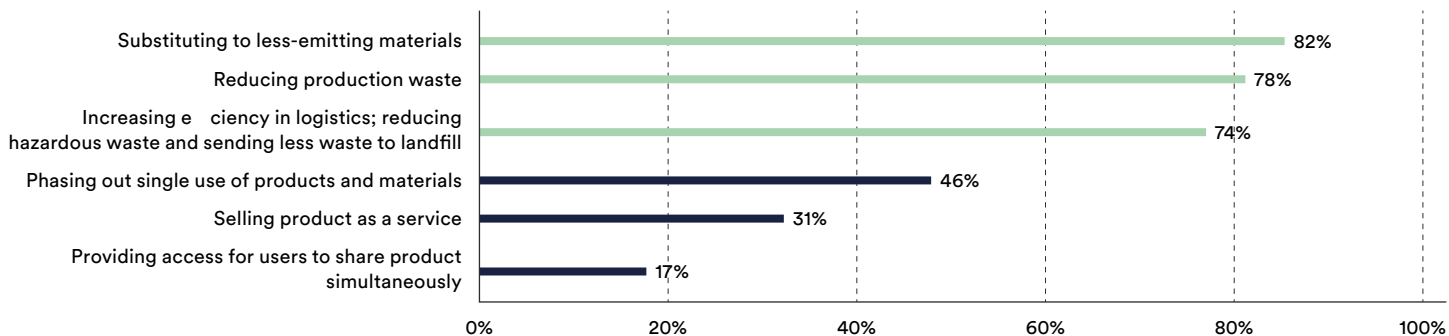
Across industries, the least applied initiatives are:

- Phasing out single use of products and materials
- Selling products as a service e.g. through renting and leasing
- Providing access to multiple users to share the same product simultaneously

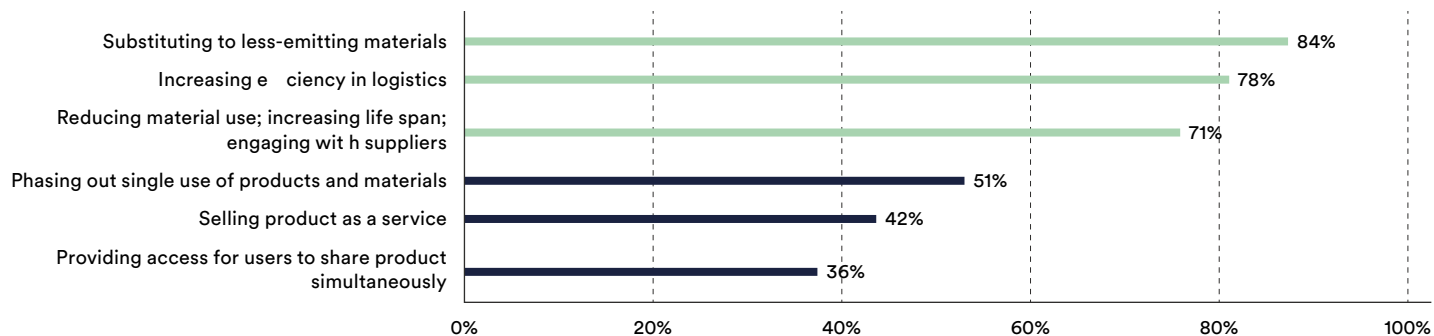
For respondents operating in the *Construction* industry only one other initiative, namely *Reducing customer waste e.g. through takeback, product-design, biobased materials*, is as rarely applied as the other three .

Figure 27 Most (green) and least (blue) applied circular initiatives across industries

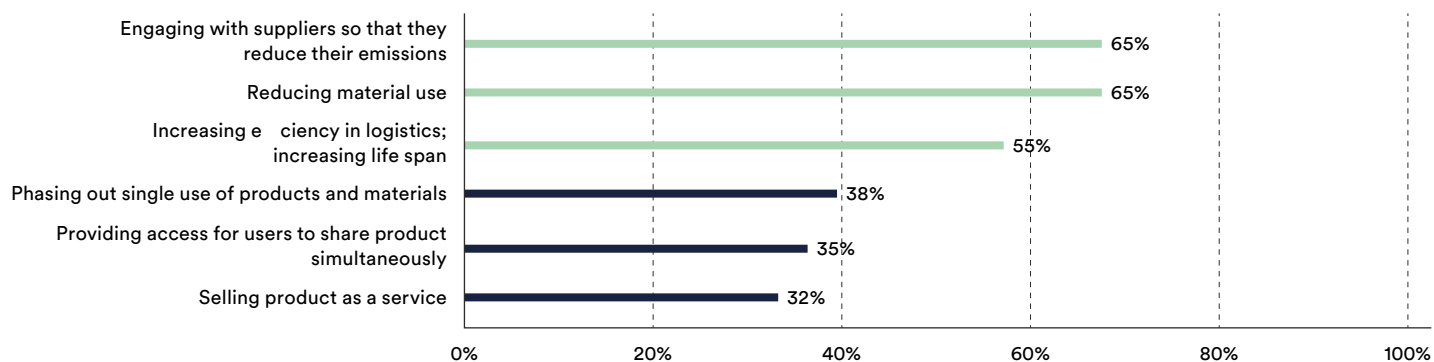
Manufacturing, raw materials, and supply



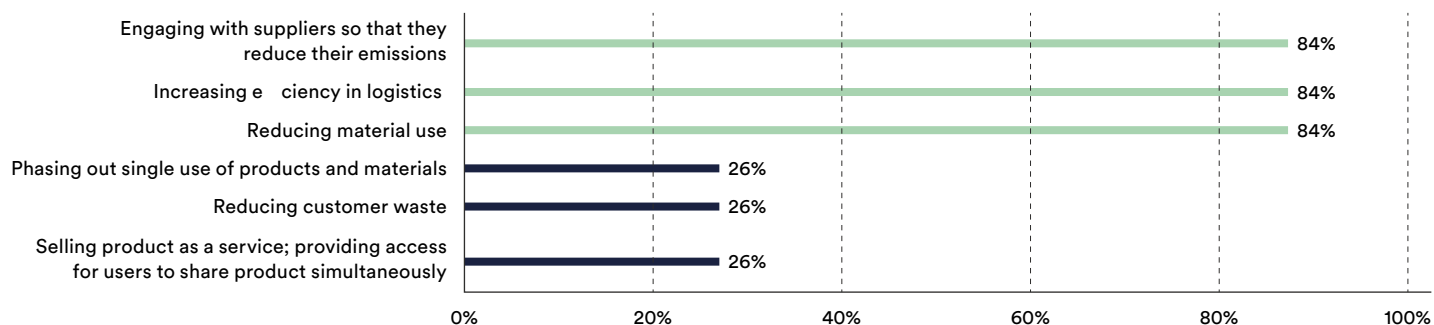
Trade and transportation



Service and IT



Construction



Note: n = 218.

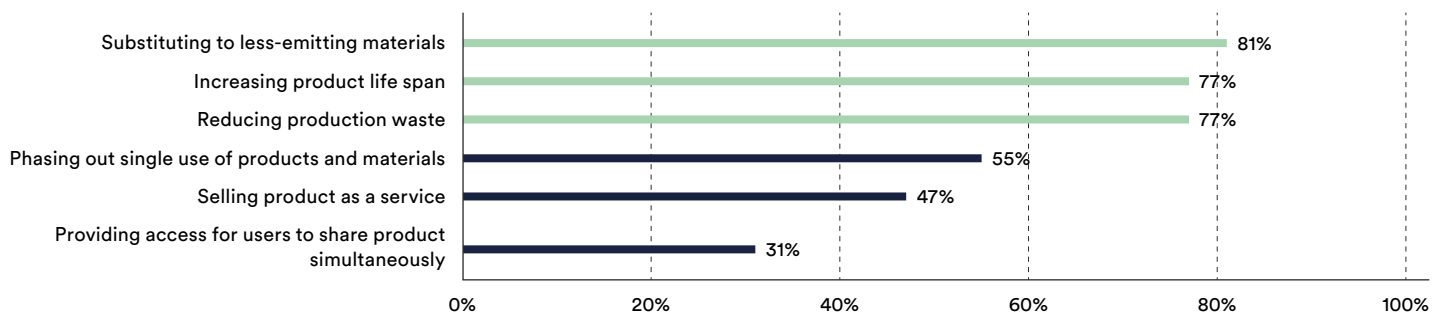
Figure 28 shows that the most and least applied initiatives vary when crossed with company size, though Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials is the most applied initiative selected across all company sizes except for companies with 10 to 49 employees.

Across company size, the three least applied initiatives are:

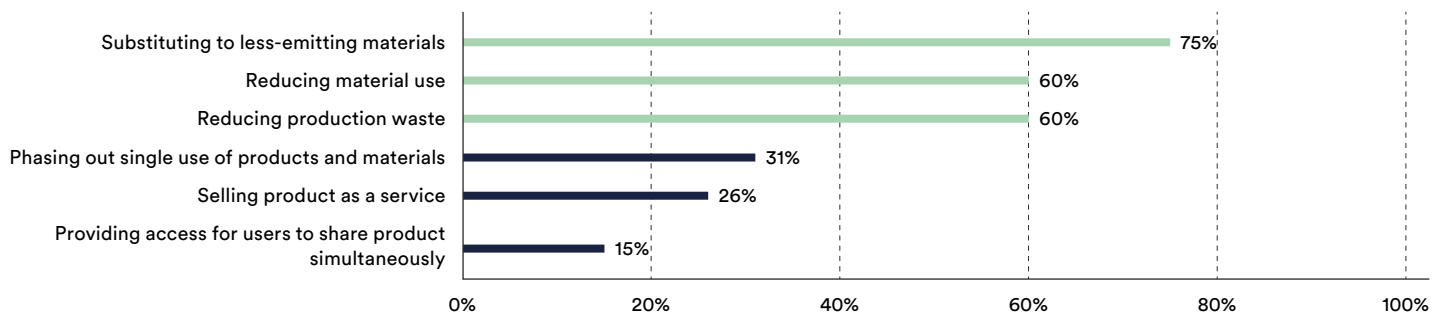
- Phasing out single use of products and materials (49%)
- Selling products as a service e.g. through renting and leasing (35%)
- Providing access to multiple users to share the same product simultaneously (29%)

Figure 28 Most (green) and least (blue) applied circular initiatives across company sizes

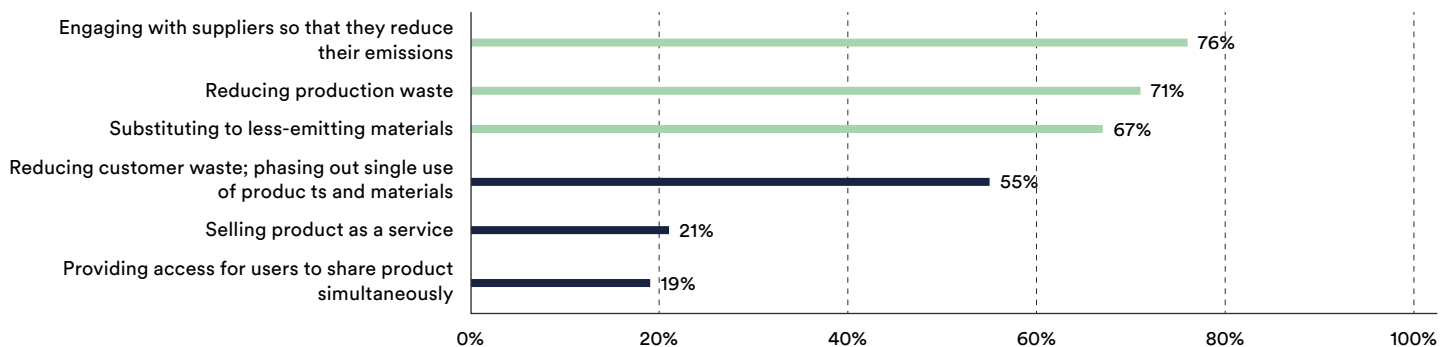
1-9



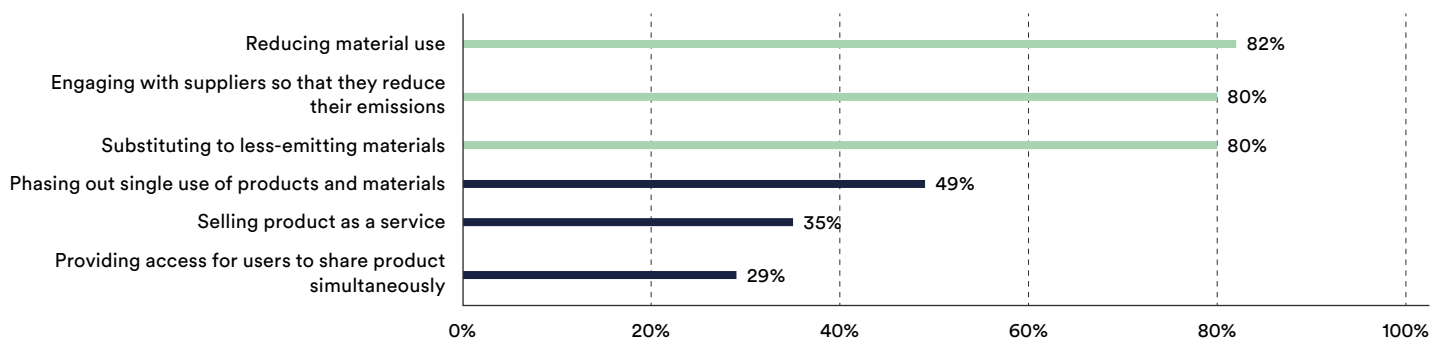
10-49



50-249



250+



Note: n = 223.

Case



The sustainability department of Flying Tiger Copenhagen has implemented an initiative referred to as the "Raw Material Guideline." The guideline is a list of materials that are prioritized for sourcing new products. The materials are ranked on a scale from 1 to 6, with 1 being the most sustainable and 6 being the least sustainable. The buyers of Flying Tiger Copenhagen are instructed to prioritize purchasing materials that have a high ranking on the scale.

Scope 3 categories reduced in this case: Procurement (category 1), End-of-life treatment (category 12)

Challenges when applying circular economy initiatives

The participants were asked to identify obstacles they encounter when applying circular initiatives. As shown in Figure 29, the main barriers to applying circular initiatives are:

- Lack of data from value chain (53%)
- Lack of financial or human resources (43%)
- Lack of knowledge of potential circular initiatives (37%)
- Uncertain economic gains (32%)

19% of the respondents chose Other as a barrier with the following selected comments:

- *We have already identified how to reduce the use of steel through redesign and purchasing steel with less embodied carbon. However, there is currently still a lack of steel products on the market with less embodied carbon*
- *Lack of material(s) of sufficient quality [that can be used] without running into regulatory red tape*
- *Many [of these] have not even considered their impact*
- *Most of our raw material is collected at recycling facilities, but we still need to purchase new spare parts. The value chain of these parts quickly ends up in far flung Asian factories of huge size and distance to DK. A purchaser would need to purchase volumes in the billions of dollars to even hope to have the slightest influence. Hence, the "box" I am missing*

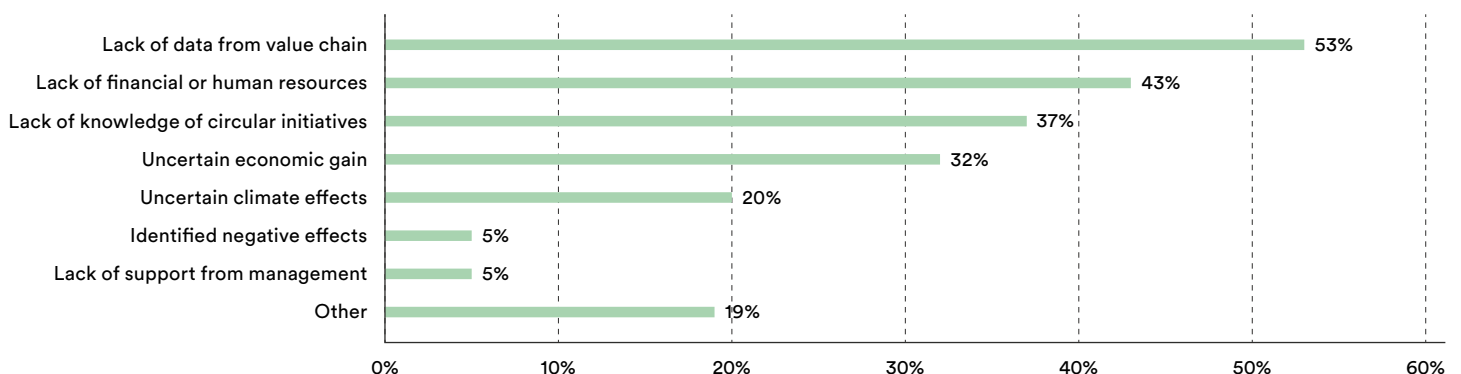
above could be coined "Because the manufacturers of the goods that we purchase are enormous and far away, and no alternative supplier exist, we are to some extent powerless"

- *Uncertainty of how well the initiatives will be welcomed by customers*
- *Negative perception of recycled worktops*

According to the responses in the Other category, several participants indicated a lack of demand from customers and the market, as well as a lack of materials and focus from suppliers as barriers to implementing circular initiatives.

Lack of data in the value chain and Lack of financial or human resources are barriers that might also contribute to the difficulties with developing and implementing circular economy initiatives where companies have little impact in the value chain. Understanding data is crucial for being able to target reducing initiatives to impact emissions. Without data, companies will navigate blindly when addressing scope 3 emissions. Furthermore, the cost-intensive nature of converting into a new circular business model can underpin why the initiatives such as *Selling products as a service e.g. through renting and leasing* and *Providing access to multiple users to share the same product simultaneously* are the least applied initiatives. Further investigations into how to tackle these challenges are needed.

Figure 29 Barriers companies face when applying circular initiatives to reduce scope 3 emissions



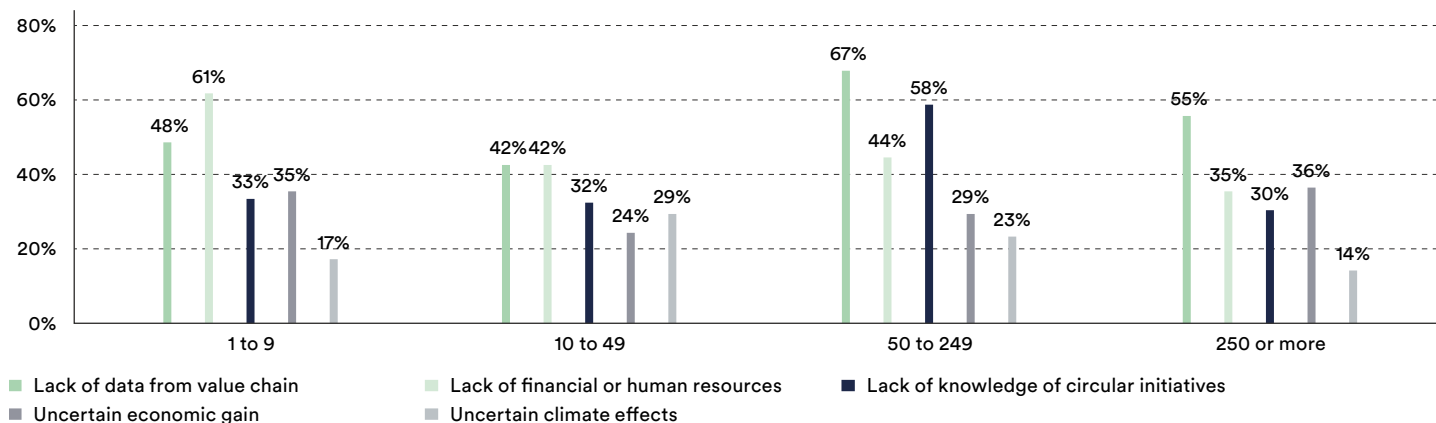
Note: n = 219.

Figure 29 also shows that only 5% of respondents considered *Lack of support from management* to be a barrier to implementing circular initiatives. This might be a result of managements recognizing the value of the implementation of circular initiatives. This could be due to the fact that sustainability is an increasing business advantage as well as a way to mitigate the challenges of being compliant with future regulations.

Figure 30 illustrates that *Lack of data from the value chain* is the biggest challenge for companies with 50 or more employees when attempting to implement circular initiatives. This is also

a significant challenge for companies with 1 to 49 employees, however a larger percentage of these companies mainly struggle with a *Lack of financial or human resources*. This may be attributed to the limited resources available to smaller companies in terms of for instance buying new equipment to alter their production or hiring employees to initiate and implement initiatives. The finding that main challenges differ across company size while the least applied initiatives remain the same (i.e. downstream initiatives in areas with less operational control), underpins the need to explore what hinders application even more.

Figure 30 Barriers companies face when applying circular initiatives to reduce scope 3 emissions across company size



Note: n = 219.

Figure 30 also indicates that a lack of knowledge of circular initiatives appears to be a much bigger challenge for companies

with 50 to 249 employees than for smaller companies.

Case



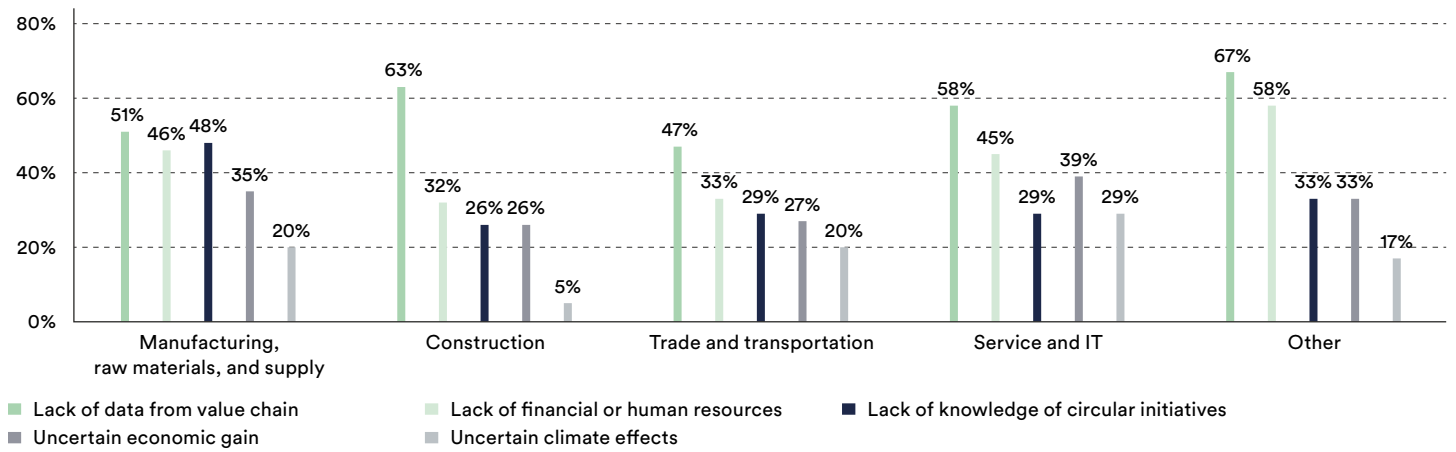
Nilfisk received support from an external consulting firm for calculating the company's scope 3 emissions, which provided a strong foundation for the internal sustainability team to continue their work. However, cross-departmental collaboration and knowledge dissemination were crucial for ensuring the quality of the scope 3 calculations and the implementation of circular initiatives. For example, the product management team had a better understanding of product characteristics and data than the Sustainability team. With strong knowledge dissemination, the Sustainability team gained insight into products and related data, which facilitated the calculation of scope 3 initiatives and improved the development of fitting circular initiatives. The calculations showed that procurement and use of products were amongst their largest sources of emissions, and thus Nilfisk focused their attention Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials and Increasing product life span e.g. through resell, reuse and repair in an effort to reduce these emissions.

Scope 3 categories reduced in this case: Procurement (category 1), End-of-life treatment (category 12)

Figure 31 shows that a *Lack of data from the value chain* is the main challenge across all industries. Additionally, a significantly higher percentage, 48%, of companies operating in the *Manu-*

facturing, raw materials and supply sectors respond that they struggle with a *Lack of knowledge of circular initiatives*.

Figure 31 Barriers companies face when applying circular initiatives to reduce scope 3 emissions across industries



Note: n = 214.

Lastly, fewer companies operating in the *Construction* industry and *Trade and transportation* industry experience a *Lack of financial and human resources* as a barrier compared to companies in the other industries. This barrier appears to be more

prevalent for companies in the *Other* category. Upon further examination of this category, it was found that most, if not all, companies in the healthcare, education and culture sectors struggle with a lack of resources.

Case



KLS PurePrint underwent a cradle-to-cradle certification process, which involved documentation of the materials used, including chemicals. According to KLS PurePrint, the goal was not primarily to eliminate harmful chemicals, but to gain a comprehensive understanding of the materials to make informed decisions. The process included contacting suppliers to gather data, which led to some suppliers being replaced as they did not want to share the data with the company.

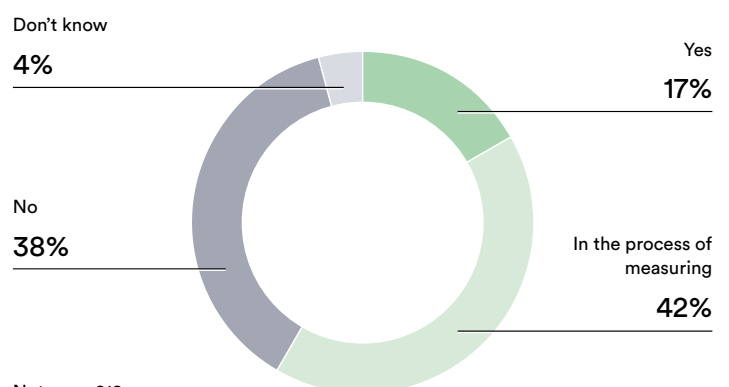
Scope 3 categories reduced in this case: Procurement (category 1), Use of sold products (category 11), End-of-life treatment (category 12)

Measuring and tracking impact

It is essential to measure and track the impact of implemented initiatives to determine the effectiveness of the initiative as well as the overall progress of the combined efforts to reduce a company's scope 3 emissions. However, as shown in Figure 32, 38% of respondents have not yet measured the effects of their scope 3 initiatives. 17% of respondents have measured the effects, while 42% are currently in the process of measuring.

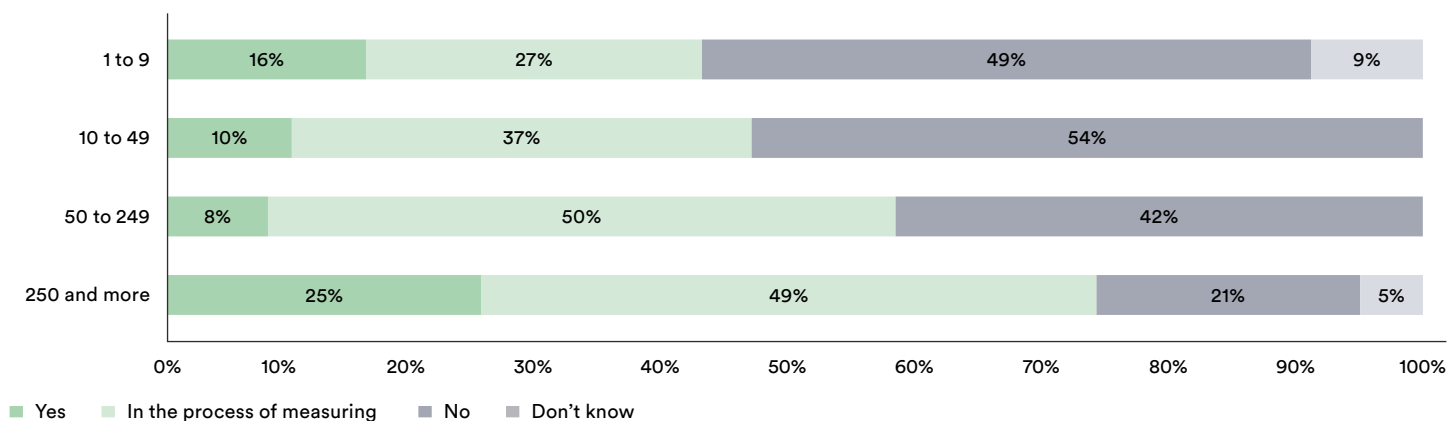
Larger companies, as shown in Figure 33, tend to measure the effects of their initiatives more than smaller companies. Companies that have set reduction targets, as shown in Figure 34, have a higher percentage of measuring the effects of their initiatives compared to those who have not set targets.

Figure 32 Companies' efforts in measuring reductions of the implemented initiatives



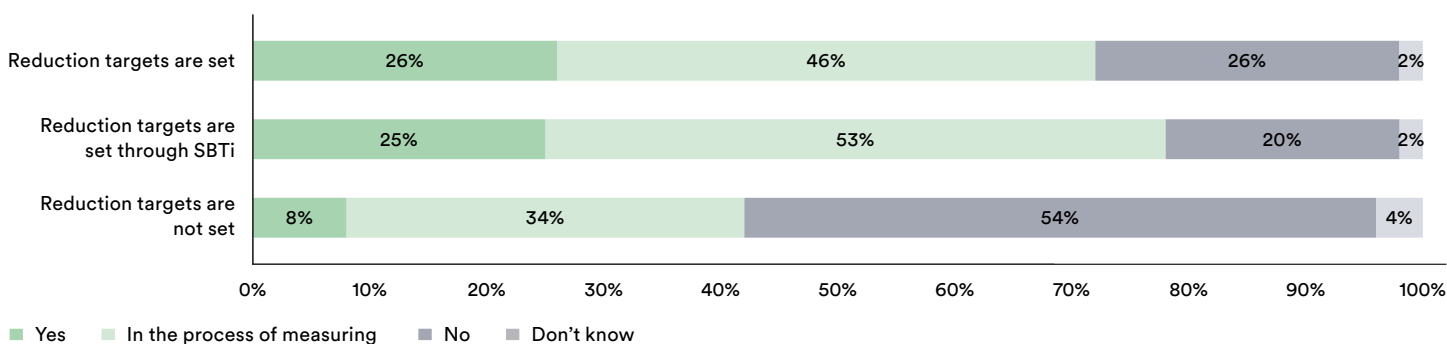
Note: n = 218.

Figure 33 Companies' efforts to measure reductions of the implemented initiatives across company size



Note: n = 218.

Figure 34 Companies' efforts to measure reductions of the implemented initiatives crossed with target-setting

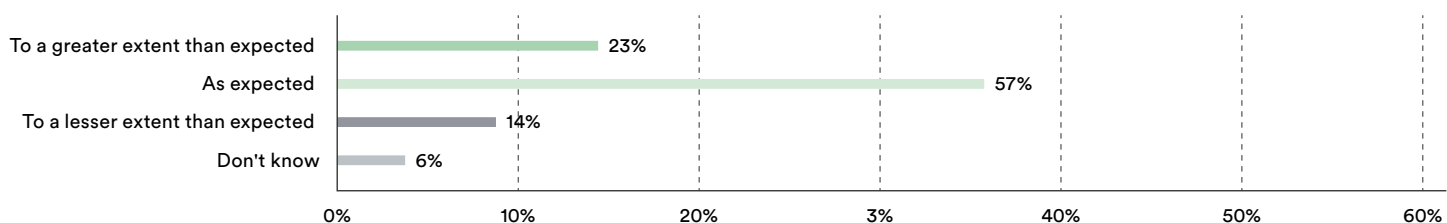


Note: n = 215. Each bar shares information about companies that have either set reduction targets, set reduction targets through SBTi, or not set reduction targets.

Figure 35 shows that 57% of those who have measured the effects of their initiatives indicate that they reduced emissions as expected, 23% indicate that they had a greater effect than expected, and 14% say they had a lesser effect. Many companies,

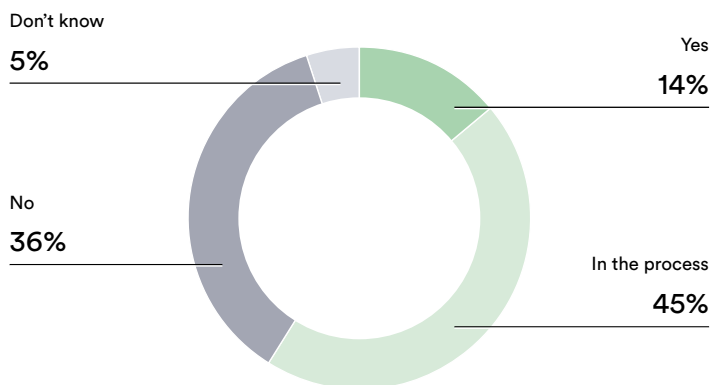
as shown in Figure 36, are still in the process of implementing systems to track and follow-up on their initiatives, showcasing that more companies are working towards measuring effects of their circular economy initiatives.

Figure 35 The extent to which implemented initiatives for companies' scope 3 emissions had an effect



Note: n = 128.

Figure 36 Companies' implementing a system to track and follow up on scope 3 initiatives



Note: n = 217.

Overall, the results suggest that companies may have difficulties with measuring the impact of their circular initiatives, and may not fully understand their effects. There could be a variety of reasons as to why more companies are not assessing the impact of their scope 3 initiatives. Some possible explanations include:

- Assessing the impact of scope 3 initiatives can be difficult as the emissions sources are often outside of a company's direct control.
- Many companies have identified Lack of data in the value chain as a challenge, which can hinder measuring effects.
- Measuring the impact of scope 3 initiatives can be time-consuming and require specialized expertise, which some companies may not have.
- Without regulatory or market incentives some companies may not see the value in assessing the impact of their initiatives.
- Some companies may not fully understand the significance and importance of scope 3 emissions, and therefore they may not prioritize measuring the impact of their initiatives.
- The circular transition within companies might still be in its early stages, meaning there is nothing to measure, since some initiative's effects take several years to become measurable.

External assistance in calculating and reducing scope 3 emissions

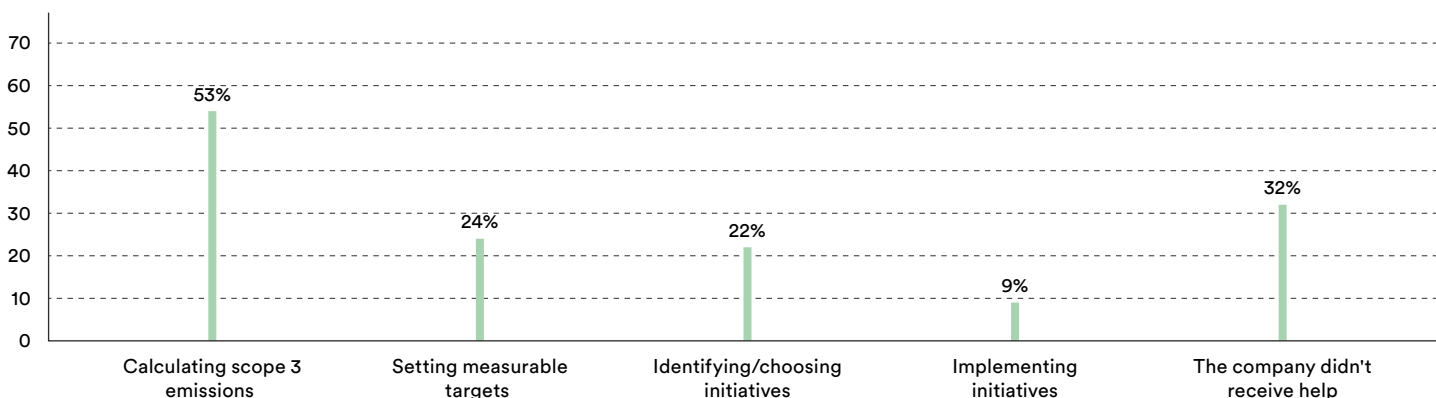
Calculating scope 3 emissions and identifying possible initiatives to reduce these can be difficult, and thus some companies seek external assistance to help with these tasks. Figure 37 shows that a majority of companies (53%) have received external help in calculating their scope 3 emissions. In comparison, only 9% of the respondents received help implementing the chosen initiatives. A total of 32% of the respondents did not receive any help from an external organization.

As shown in Figure 38, external help is used more frequently by larger companies, especially for calculating scope 3 emissions and setting measurable targets. However, a higher percentage of companies with 1 to 9 employees have used external help to

identify and choose initiatives compared to other sizes of companies. This might be due to the selection bias, and due to some companies being targeted for the survey through programmes where companies with 1-249 employees received help to initiate circular initiatives.

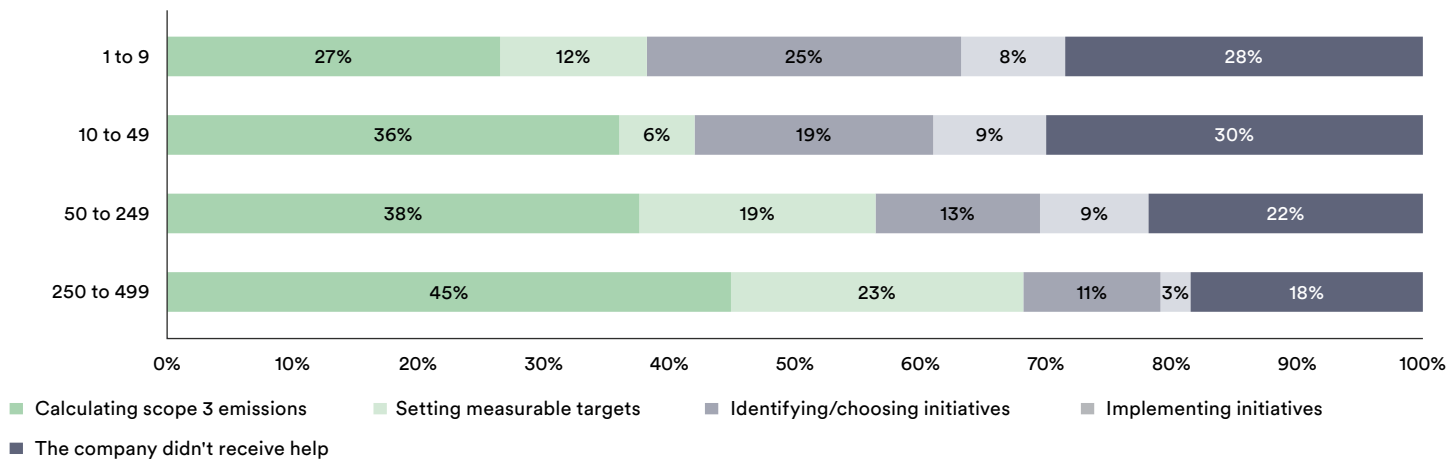
Figure 39 shows that companies in the *Construction* industry have not received as much help from external organizations as other industries. It is not clear why companies in *Construction* receive less external help compared to other industries. Without in-depth interviews with relevant companies, it is difficult to determine the specific reasons for this discrepancy.

Figure 37 Companies receiving help from external organizations to work with scope 3 emissions



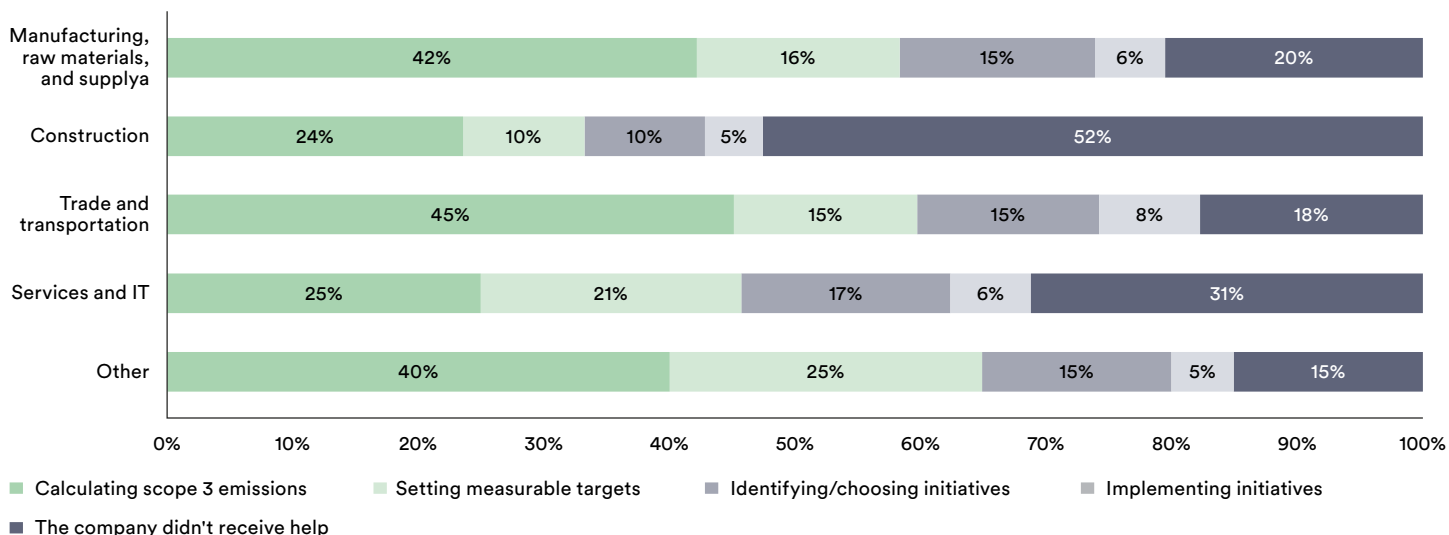
Note: n = 217.

Figure 38 Companies receiving help from external organizations to work with scope 3 emissions crossed with company size



Note: n = 217.

Figure 39 Companies receiving help from external organizations to work with scope 3 emissions across industries



Note: n = 213.

Main conclusions

More and more companies take on an active role and responsibility when dealing with climate change. While many companies have come far in calculating and reducing scope 1 and 2 emissions, scope 3 emissions remain a challenge for most companies. An increasing number of companies are seeing the potential in applying circular economy initiatives to reduce emissions in scope 3 through less and better use of resources, both upstream and downstream in the value chain. This can be done for instance by reducing material use, prolonging the lifetime of products and reducing waste. The objective of this analysis has been to give an insight into how Danish and European companies leading within the field of sustainability apply circular economy initiatives as a way of reducing their scope 3 emissions.

Increasing awareness of scope 3 emissions

Even though scope 3 often covers the largest part of a company's emissions, companies frequently opt out of calculating these emissions due to the complexity of retrieving data from the company's value chain. However, calculating scope 3 emissions is the first step for companies to gain the necessary insights that allow them to identify where their largest emissions occur and subsequently implement targeted initiatives for reducing their climate impact.

The results of the survey show that there is an increasing focus amongst companies working with sustainability on calculating and reducing scope 3 emissions. Almost 60% of the participating companies have calculated or are currently in the process of calculating their scope 3 emissions. The analysis also shows that there is only a slight variation across industries, which indicates a general cross-industrial awareness of the importance of calculating scope 3 emissions. However, company size appears to be a factor, as 82% of large companies have calculated their scope 3 emissions, while only less than 40% of small and medium sized companies have done so.

The growing awareness of scope 3 emissions across industries can be due to several aspects. The impact of climate change and environmental issues is gaining increasing attention, and companies are under pressure from investors, clients and consumers who are progressively demanding that companies act on their environmental impact. Companies are also faced with market regulations. Furthermore, many companies view participation in the sustainable transition as a possibility to improve their reputation and increase competitiveness.

The results of the analysis further underline a growing awareness

and understanding of the importance of not only calculating but also taking action towards reducing scope 3 emissions amongst companies, as the number of respondents setting targets for reducing scope 3 emissions increased by 707% from 2015 to 2022, with most of these targets being set within the last two years.

The growth in number of climate targets set by the companies could be a result of a tendency where an increasing number of companies want to align their emission reductions with the Paris Agreement goals, and to publicly demonstrate their commitment to a sustainable transition. It could also be due to a growing number of initiatives, regulations and programmes aimed at addressing these emissions put in place by governments, non-governmental organisations and industry groups. Furthermore, many organisations and initiatives, such as the Climate Disclosure Project, the UN Global Compact, the We Mean Business coalition and the Task Force on Climate-related Financial Disclosures (TCFD) have been promoting the use of climate targets and providing guidance and support for companies to set them. This is further underpinned in the survey, as the number of respondents setting and/or having set their first reduction targets through the Science-Based Targets initiative has grown with an increase of 1450% from 2015-2022, with 73% of these having been set between 2020 and 2022.

Reducing scope 3 emissions through circular initiatives

The analysis clearly shows a link between addressing scope 3 emissions and circular economy. The two scope 3 categories that hold the biggest sources of emissions reported by respondents are *Procurement* (54%) and *Production of your company's products* (30%), both areas in which circular economy initiatives have the potential to reduce emissions.

However, the analysis also gives insight into companies' maturity levels regarding applying circular economy initiatives to reduce scope 3 emissions. The most applied circular initiatives amongst the responding companies are:

- Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials (76%)
- Reducing material use e.g. through change of procurement or product redesign (72%)
- Reducing production waste e.g. through product design and industrial symbiosis (70%)

These initiatives target areas of the value chain where companies tend to have greater operational control over the activities, which indicates that the location of the emissions in a company's value chain is pivotal to the potential for applying reducing initiatives.

This is further underpinned by the finding that while 48% of the participating companies aim to reduce emissions related to the scope 3 category *Waste generated in operations*, only 7% of companies consider this area to be one of their largest sources of scope 3 emissions. Waste reduction is most likely a common scope 3 initiative due to a high degree of operational control within the company, its cost saving potential, positive impact on reputation, as well as compliance with regulations and alignment with environmental values, all of this potentially making waste reduction a 'low-hanging fruit'.

In addition, the analysis indicates that companies primarily focus on applying circular initiatives to reduce emissions in companies' upstream value chains rather than downstream. One reason for this could be that it is difficult to target impactful circular initiatives in certain areas of the value chain where companies have less control or influence on the activities compared to within their own operations.

The analysis shows that companies across all industries and sizes have responded that they have *identified* or are in the process of developing initiatives to a higher degree than they have actually successfully *implemented* initiatives. This indicates that the responding companies are still increasing their level of maturity regarding applying circular initiatives. The growing maturity level is also evident since initiatives that are either *identified* or *under development* are becoming increasingly more complex and are evidently more and more targeted at areas of the value chains where companies have limited operational control, such as *Engaging with suppliers so that suppliers reduce their emissions* and *Reducing customer waste e.g. through takeback, product-design, biobased materials*. This shows that companies are trying to expand their efforts to reduce scope 3 emissions beyond their own production and area of control.

The two least applied initiatives are *Selling products-as-a-service* and *Providing access to multiple users to share the same product simultaneously*, which both aim to reduce downstream emissions. These initiatives can potentially have a greater impact on the company's operations than for instance *Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials*, as they tend to fundamentally change a company's business model to include less emitting practices

overall. But initiatives like these are hard to apply, as converting to a new business model can be costly both economically and in relation to changing clients' mindset from ownership to access.

Data is the main challenge

The main challenges that companies face when assessing scope 3 emissions are primarily related to data. When calculating scope 3 emissions, most of the responding companies identify *Difficulty obtaining data* (71 %) as their main challenge followed by *Poor data quality* (47%).

When looking across different company sizes, there is a pattern of larger companies identifying *Poor data quality* as a bigger challenge than smaller companies do. There could be several reasons as to why larger companies might have a harder time with data quality when calculating scope 3 emissions as compared to smaller companies. Firstly, larger companies often have more experience in the process of collecting and calculating data than smaller companies. Another reason might be that larger companies often have more complex operations and supply chains, which in turn makes data collection and management more difficult. They may also have more dispersed operations, making it harder to collect and standardize data on scope 3 emissions across different locations and business units. Lastly, larger companies are now starting to face compliance requirements on how they are working to reduce their climate impact. As a result, these companies may have higher expectations for data quality and most likely also more stringent data management processes, potentially making it more challenging to obtain and maintain accurate and reliable data.

The analysis indicates that the main barrier companies face when implementing circular initiatives is the *Lack of data from the value chain*. This can make it difficult for companies to decide on the best course of action for reducing scope 3 emissions through circular initiatives in the value chain. This issue is evident as 56% of the participating companies have identified or are developing initiatives regarding *Engaging with suppliers so that suppliers reduce their emissions*, but only 13% have implemented these initiatives, indicating the difficulties this holds. For further analysis it might be interesting to investigate which areas of the value chain companies need to acquire data from and what kind of data is needed¹⁴, as well as what the needs are for standardization and structuring of data in common data formats, and how IT-systems and IT-infrastructure can be developed to better support companies in obtaining and handling the data¹⁵.

14 Data promoting circularity upstream and downstream in the value is addressed in the analysis [Looping on data – Best practices and barriers for sharing data in circular business models](#) by the Danish Business Authority (2021)

15 Work is already ongoing in this area at the EU-level e.g. with the Commission's proposal for digital product passports in the Ecodesign Regulation and related analyses. Examples are e.g. work in [Battley Pass](#) (CIRPASS) and the EU TSI analysis on [Circular economy transition through standardization of product data in automated processes in Denmark](#)

Furthermore, for small companies *Lack of financial or human resources* is also a significant challenge. Additionally, medium sized companies reported a greater *Lack of knowledge of circular initiatives* compared to smaller companies. These results indicate that companies may require different types of assistance depending on e.g. their size and maturity level.

It is important to note that the participating companies in this analysis are relatively experienced in working with sustainability. Thus, even though the analysis indicates that these companies are increasing their maturity levels regarding increasing engagement with different actors in the value chains, they are still in a learning phase. This means that the companies that are even more inexperienced within the field of sustainability are facing an even steeper learning curve and greater challenges when wanting to start applying circular initiatives to reduce scope 3 emissions.

Circular economy initiatives as a driver for the green transition of businesses

The analysis shows that there still is a need for further exploration of how the principles of circular economy can be used to accelerate the emission reduction efforts of businesses. However, the increasing focus on scope 3 emissions and interest in applying circular initiatives to reduce them amongst experienced companies might also act as a strong driving factor in the strengthening of value chain collaborations. Through implementing circular economy initiatives to reduce scope 3 emissions, companies can gain more control over their emissions and engage in closer relationships with other actors across the value chain. Thereby they can also pave the way for less experienced companies in terms of both reducing scope 3 emissions and in working with circular economy. As such, the adoption of the principles of circular economy and reducing scope 3 emissions can be seen as two mutually reinforcing agendas contributing to propelling the green transition of businesses.

14 Data promoting circularity upstream and downstream in the value is addressed in the analysis *Looping on data – Best practices and barriers for sharing data in circular business models* by the Danish Business Authority (2021)

15 Work is already ongoing in this area at the EU-level e.g. with the Commission's proposal for digital product passports in the Ecodesign Regulation and related analyses. Examples are e.g. work in *Bathey Pass (CIRPASS)* and the EU TSI analysis on *Circular economy transition through standardization of product data in automated processes in Denmark*

Appendix 1

Distributed survey

Background questions

1. Which company do you represent in this survey? (Optional)

Write a comment

2. What is your title?

Write a comment

3. In which industry does your company primarily operate?



4. How many employees does your company currently employ?

- 1) 1 to 9
- 2) 10 to 49
- 3) 50 to 249
- 4) 250 to 499
- 5) 500 or more
- 6) Don't know

5. In which country is your company located?



Calculating scope 3 emissions

Scope 3 emissions covers all the indirect emissions (not included in scope 1 and 2) that occur in your company's value chain both upstream and downstream emissions. In other words, scope 3 emissions are the result of activities which are not owned or controlled by your company, for example procurement of raw materials, equipment, waste generated in operations and end-of-life treatment of sold products.

6. Has your company calculated all or part of its scope 3 emissions prior to this date?

- 1) Yes
- 2) No
- 3) I don't know

7. Which areas are your company's largest sources of scope 3 emissions?
Please select up to three areas.

- 1) Procurement
- 2) Production of your company's products
- 3) Fuel- and energy-related activities (not included in scope 1 or 2)
- 4) Transportation and distribution from your suppliers
- 5) Waste generated in operations
- 6) Business travel
- 7) Employee commuting
- 8) Upstream leased assets
- 9) Deliver and transportation of your finished products
- 10) Processing of sold products
- 11) Use of products and services sold by your company
- 12) End-of-life treatment of sold products from third parties
- 13) Downstream leased assets
- 14) Operation of franchises
- 15) Investments
- 16) Don't know

8. Is your calculation of scope 3 emissions verified by a third party?

- 1) Yes
- 2) No
- 3) Don't know

9. What were and are the biggest challenges when calculating your company's scope 3 emissions?

- 1) Difficulty obtaining data
- 2) Poor data quality
- 3) Lack of internal resources and/or competencies
- 4) Difficulty scoping scope 3
- 5) Missing emission factors
- 6) Lack of support from management
- 7) Other (please elaborate)

Measurable targets to reduce emissions in scope 3

The following questions focus on how your company approach setting measurable targets for reduction of scope 3 emissions.

10. Has your company calculated all or part of its scope 3 emissions prior to this date?

- 1) Yes
- 2) Yes, through the Science Based Target initiative
- 3) No
- 4) Don't know

11. When did you set your first scope 3 target?

[dropdown with years – remember don't know]

12. Does your company have a clear strategy for reducing its scope 3 emissions?

- 1) Yes
- 2) In the process
- 3) No
- 4) Don't know

Initiatives to reduce scope 3 emissions

The following questions focus on the specific initiatives that your company is either considering to implement or have already implemented to reduce scope 3 emissions.

13. In which areas does your company aim to reduce scope 3 emissions?

- 1) Procurement
- 2) Production of your company's product
- 3) Fuel- and energy-related activities (not included in scope 1 or 2)
- 4) Transportation and distribution from your suppliers
- 5) Waste generated in operations
- 6) Business travel
- 7) Employee commuting
- 8) Upstream leased assets
- 9) Deliver and transportation of your finished products
- 10) Processing of sold products
- 11) Use of products and services sold by your company
- 12) End-of-life treatment of sold products from third parties
- 13) Downstream leased assets
- 14) Operation of franchises
- 15) Investments
- 16) Don't know

14. This question is key to the analysis and we appreciate your time and efforts to fill it out.
Which of the following initiatives have your company applied to reduce scope 3 emissions?

	Initiative identified	Initiative under development	Initiative implemented	Not applied	Don't know
Resource reduction					
Reducing material use e.g. through change of procurement or product redesign					
Substituting to less emitting materials e.g. through recycled or biobased materials instead of virgin materials					
Waste reduction					
Reducing production waste e.g. through product design and industrial symbiosis					
Reducing hazardous waste and sending less waste to landfill					
Reducing customer waste e.g. through takeback, product-design, biobased materials					
Better use of materials and products					
Increasing product life span e.g. through resell, reuse, and repair					
Selling products as a service e.g. through renting and leasing					

Providing access to multiple users that share the same product simultaneously					
Phasing out single use of products and materials					
Engaging with suppliers so that suppliers reduce their emissions					
Transportation					
Increasing efficiency in logistics by reducing transport distances or shifting to more efficient modes of transportation					
Reducing business travels e.g. through video conferences, work from home					
Other (Tekstboks)					

15. Many of the beforementioned initiatives focus on circular initiatives for example by reducing material use or keeping products and materials in circulation for as long as possible e.g. through repair, reuse, and recycling.

What barriers are your company facing, when seeking to apply circular initiatives to reduce scope 3 emissions?

- 1) Lack of knowledge of potential circular initiatives
- 2) Lack of support from management
- 3) Lack of data from value chain
- 4) Lack of financial or human resources
- 5) Uncertain economic gain
- 6) Uncertain climate effects
- 7) Identified negative effects
- 8) We have not implemented circular initiatives
- 9) Other (please elaborate)

16. If your company is not applying circular initiatives to reduce scope 3, is it something you are considering?
- 1) Yes
 - 2) No
 - 3) Don't know

Success of initiatives

The following questions explore your company's success of implementing scope 3 initiatives.

17. At the current point in time, has your company been able to measure the reductions of the implemented scope 3 initiatives?
- 1) Yes
 - 2) In the process of quantifying
 - 3) No
 - 4) Don't know
18. To which extent did the implemented initiatives affect your company's scope 3 emissions as of present day:
- 1) To a greater extent than expected
 - 2) As expected
 - 3) To a lesser extent than expected
 - 4) Don't know
19. Has your company managed to successfully implement a system or procedure to track and follow up on the implemented scope 3 initiatives?
- 1) Yes
 - 2) In the process
 - 3) No
 - 4) Don't know
20. In working with scope 3 emissions, did your company receive any help from an external organization? If so, in which context:
- 1) Calculating the company's scope 3 emissions
 - 2) Setting measurable targets for reducing emissions in scope 3
 - 3) Identifying and choosing initiatives for meeting the agreed upon targets
 - 4) Implementing the chosen initiatives
 - 5) The company did not receive any help from an external organization
 - 6) Don't knows

21. If you have any further comments about your company's work with emissions in scope 3, please elaborate: (optional)

Write a comment

Anonymity and further participation

Please answer the questions below before finishing the survey.

1. We wish to be listed as a company that participated in this survey (your answers will not be disclosed)
2. I am open to being contacted for further questioning and possibly participating in a case study interview. Please insert email here

Thank you for participating in this survey.

Appendix 2

Companies that have contributed by answering the survey

Buddha Bikes	GRÜNBAG APS	LC Packaging International B.V.	Arcadis
Nemlig.com	PILLOWTALKS	Sabro A/S	HUBER+SUHNER Group
BEWI	KONTRA Coffee	Prysmian Group	Apotea AB
Kvadrat	CIRCLE-use	Autoliv	Ahlstrom
Beyond Coffee	Bang & Olufsen	royal unibrew a/s	Flying Tiger Copenhagen
Foodpeople	Hoyrup & Clemmensen	Lamington Group	
ACERA Tech ApS	Landsbankinn	SITA	
JL Østerlars	ACTIAM	Letbek A/S	
Metroselskabet	Spectre A/S	Maersk	
Straatagets Kontor aps	Szerelmey Ltd Strandbygaard A/S	Logitrans A/S	
Christiansøfarten ApS	Middelfart Kommune	TagTomat	
ReFlow	NaverGruppen as	VAER	
Hedeselskabet	Fritz Hansen A/S	Hiflux Filtration A/S	
MV Tryk a/s	Aluproff	Ammeraal Beltech Modular A/S	
Adiso ApS	Dragon AS	FlowCon International	
Per Aarsleff A/S	Mad Med MEST	Niebuhr Gears A/S	
Woodliving	Dansk Plast A/S	DTK Group	
Plandent A/S	Aarhus Vand	FERROVIAL	
UPM Raflatac	Rosendahl design group a/s	BRØL	
KLS PurePrint A/S	Skagerak	Eurocon CNC&Process	
Hasle Refractories	EWH BioProduction ApS	Danish Energy Management	
BurntWood	Aasted ApS	Neptun	
Nordic Wood Industries	OKQ8 Scandinavia (Q8 Danmark A/S)	Daarbak Group	
Siemens A/S	Pihl Holding	DFDS	
Conscious Warrior	BAKANO design	SMALLrevolution	
IKEA Denmark	L&T	Port of Aarhus	
CleverCoffee ApS	Vasakronan	Nilfisk A/S	
Novenco Building & Industry			

Appendix 3

Comparison of scope 3 categories

Comparison of scope 3 category names

	GHG Protocol name and number of scope 3 category	Name of scope 3 category in this analysis
Upstream	1. Purchased goods and services	Procurement
	2. Capital goods	Production of your company's products
	3. Fuel- and energy-related activities	Fuel- and energy-related activities
	4. Upstream transportation and distribution	Transportation and distribution from your suppliers
	5. Waste generated in operations	Waste generated in operations
	6. Business travel	Business travel
	7. Employee commuting	Employee commuting
Downstream	8. Upstream leased assets	Upstream leased assets
	9. Downstream transportation and distribution	Delivery and transportation of your finished products
	10. Processing of sold products	Processing of sold products
	11. Use of sold products	Use of products and services sold by your company
	12. End-of-life treatment of sold products	End-of-life treatment of sold products from third parties
	13. Downstream leased assets	Downstream leased assets
	14. Franchises	Operation of franchises
	15. Investments	Investments

