The data logistics cannot deliver
Emissions reporting of logistics in Finland

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Abstract

In logistics, improved emissions data collection and interoperability of data can play a key role in achieving emissions reduction targets – not only in Finland but also globally. Thus, identifying the current emissions reporting practices and challenges is vital and enables more effective planning of the measures companies need to take to achieve compliance. In this study, two surveys were conducted in Finland to understand the views of companies regarding emissions data collection and reporting. A total of 123 shippers and 119 logistics service providers participated in the surveys. The results reveal that shippers have a growing interest in the topic and emissions reporting is considered an important part of business. However, among logistics service providers, the larger companies already collect and utilise emissions data, but the smaller ones neither collect emissions data nor have any actual interest in developing their practices in this regard. Therefore, actions are needed especially for smaller companies to adapt to the future.

Keywords: Emissions, logistics, reporting, data collection, road freight, survey

1. Introduction

In 2023, greenhouse gas emissions (GHG) from transport, excluding aviation, accounted for approximately 23% of Finland's total emissions—approximately 9.3 million tonnes. Of this, approximately 96% originated from road transport. Within road transport, passenger cars account for 52%, trucks for approximately 35%, vans for approximately 7%, buses for approximately 5%, and motorcycles and mopeds for approximately 1% (Siikavirta et al., 2024). Multiple different measures are needed throughout the transport sector to achieve Finland's goal of halving GHG emissions originating from the transport sector by 2030 compared to the 2005 level and completely eliminate the emissions by 2045 at the latest (Jääskeläinen, 2021). Improving and developing the collection and interoperability of logistics emissions data can play a key role in achieving emissions reduction targets not only in Finland but also globally.

Both identifying and verifying the emissions are important for better analysing and planning logistics and taking the most relevant and necessary actions to reduce emissions originating from the logistics sector (McKinnon, 2021). While customer requirements are vital in advancing green logistics practices (Huge-Brodin et al., 2020) and emissions reporting in logistics (Kallionpää et al., 2025)—and the development of digitalisation can support the implementation of emissions reporting (Lähde et al., 2020)—it is also generally recognised that there is a clear need for political guidance and regulation in this regard. Several sustainability-related directives are already in place, which guide and/or oblige companies to take green actions. One such initiative is the EU's CountEmissions EU, which aims to improve reporting throughout the logistic industry and guide companies to develop their emissions calculation and reporting according to the ISO 14083:2023 standard (European Commission, 2025a). However, before data can be reported and analysed, data collection issues must be addressed.

The literature on green logistics has identified the role of emissions data collection and reporting as an important enabler for reducing emissions, setting targets, and monitoring environmental impacts

(Doda et al., 2016; Dragomir, 2012; du Plessis et al., 2022; McKinnon, 2021; Rietbergen et al., 2015). It has also been recognised that there is a growing interest among companies in the environmental aspects of logistics operations, including the assessment and calculation of carbon emissions (Bauer et al., 2024). Previous studies have discussed both the benefits and targets of emissions data usage (Doda et al., 2016; Dragomir, 2012; du Plessis et al., 2022), and certain challenges in developing reporting have also been identified (Dobers et al., 2019). In addition, the perspectives of logistics service providers (LSPs) and shippers on green logistics practices have been studied both in combination and individually; moreover, the differences between these actors have also been examined (e.g., Huge-Brodin et al., 2020; Jazairy and von Haartman, 2021; Prataviera, 2024; Wehner et al., 2021). However, comparative analyses between LSPs and shippers remain scarce, particularly when it comes to emissions reporting in logistics; this clearly indicates a need for further research in this regard. Furthermore, the size differences among LSPs and the impact of different company sizes on emissions data usage and reporting have not been studied systemically thus far. This study aims to fill these research gaps, focusing particularly on logistics emissions reporting and comparative survey analysis between LSPs and shippers. It is important to study both actors' perspectives and analyse the differences between them to obtain a better understanding of logistics emissions reporting and ascertain how it can be further developed.

The aim of this study is to analyse the current status of emissions data collection and reporting of both shippers and LSPs of different company sizes; the focus is on companies operating in Finland. Certain companies studied in this paper have global operations and, thus, the results also provide a broader international perspective; however, the contact and questionnaire were aimed towards the Finnish subsidiary or business unit of such companies. It is important to collect data regarding the current situation, as a functional emissions data collection process is the initial first step towards implementing emissions mitigation processes. This study aims to answer the following three research questions:

1. What is the current status of emissions data collection and reporting in logistics and are there differences between LSPs and shippers and different company sizes in this regard?

2. How is logistics emissions data utilised among LSPs and shippers and are there differences between LSPs and shippers and different companies in this regard?

3. How do shippers and LSPs perceive their future visions regarding emissions data collection and use and are there differences between LSPs and shippers and different company sizes in this regard?

This introduction presented the background, aim, and research questions of this study. The second chapter provides a background of extant literature on emissions reporting. The third chapter describes the survey process and analysis methods utilised in this study. The fourth chapter describes the results obtained from both questionnaires, and the fifth chapter discusses these results. It should be noted that both questionnaires were implemented in spring 2023 and, thus, there was no public knowledge that the CountEmissions EU would establish a methodology for the calculation process, which builds on the international standard ISO 14083:2023.

2. Literature review

2.1. Importance of emissions data and reporting in logistics

Emissions reduction targets and low-emissions transport have long been included in international climate targets and lists of measures for emissions reduction. Historically, companies have paid attention to reducing GHG emissions since the late 1990s; ever since, there has been an increased debate on how companies manage and reduce the emissions they produce (Gibassier and Schaltegger, 2015). Currently,

logistics managers are under pressure to reduce environmental impacts, and companies are investigating several ways to decarbonise their global supply chains (Hettler and Graf-Vlachy, 2024; McKinnon, 2021; Rushton et al., 2022). Monitoring and reporting emissions data are natural first steps for decarbonising logistics (McKinnon, 2021), and effective logistics data-sharing and comparable emissions data are key enablers for achieving policy-driven emissions reduction goals (Stenzel and Waichman, 2023).

Environmental reporting enables the monitoring of GHG emissions and communicating the results of decarbonisation measures (Doda et al., 2016; Dragomir, 2012). The importance of emissions reporting is emphasised in examining, measuring, analysing, and comparing the impacts an organisation has had on the environment and climate and how they have been managed. Moreover, accurate emissions reporting is a critical prerequisite for target setting, which is, in turn, needed to ensure effective emissions reduction (Rietbergen et al., 2015). Emissions data can be utilised to estimate carbon emissions, report emissions according to legislation, and predict the amount of emitted carbon emissions of a customer's shipment (du Plessis et al., 2022). Without coherent and reliable emissions reporting by the company, it is difficult to monitor the actual impacts, which makes it difficult to achieve the necessary emissions reductions (Doda et al., 2016).

2.2. LSPs and shippers as implementers of emissions reporting

LSPs play a critical role in various stages of the supply chain; therefore, the sustainable development of LSPs is vital to achieving sustainable development throughout the supply chain (Brockhaus et al., 2013; Laari et al., 2018; Reinerth et al., 2018). Wehner et al. (2021) argue that LSPs' sustainable development occurs via operational processes, services at the customer interface, and actions that support those processes and services, including emissions calculation and carbon offsetting. Many LSPs interviewed in their study highlighted reg-

ularly reporting energy consumption and particularly reporting emissions. However, it appears that LSPs are still at the initial stages of maturing towards general sustainability (Wehner et al., 2021).

Moreover, certain LSPs exhibit greater ambition and provide more tangible green logistics solutions than those currently demanded by shippers (Huge-Brodin et al., 2020). Prataviera et al. (2024) state that LSPs are enthusiastic regarding adopting green logistics practices, but their implementation hinges on financial support from logistics customers. Liimatainen (2013) highlights that those logistics companies whose customers were interested in emissions had clearly more energy efficient operating practices and better monitoring methods compared to those whose customers were not interested in emissions. Jazairy and Von Haartman (2021) emphasise that shippers value emissions data, particularly for reporting and marketing purposes, and LSPs are actively responding to this demand. Liimatainen (2013) found that Finnish shippers appreciated the logistics emissions reporting capacity but were not yet ready to pay any extra for it to logistics companies (Liimatainen, 2013). Traditionally, costs, and utility dominate customers' criteria for selecting LSPs, while environmental issues are tertiary (Martinsen and Björklund, 2012; Bask and Rajahonka, 2017). However, tendering by shippers can have a clear impact on the level of emissions reporting (Dobers et al., 2019).

2.3. Factors affecting emissions reporting

Climate targets and environmental regulation have increased logistics companies' interest in emissions reduction and managing their carbon dioxide (CO2) emissions. Tang and Demeritt (2018) found that regulatory pressure was the strongest factor for companies to perform carbon emissions reporting according to the respective regulatory guidelines. Moreover, Patchell (2018) argued that as long as guidelines like GHG Protocol are voluntary, companies will only report scope 3 emissions (which include logistics) if they can perceive the financial benefit of it. Companies also need to receive a clear signal of possible upcoming regulatory changes in order to adopt new carbon emissions

reporting and reduction practices (Hickmann, 2017). The current environment-related regulations and guidelines that affect emissions calculations and reporting in logistics are introduced in Appendix 1.

Hettler and Graf-Valchy (2024) mention marketing, customer requirements, investor pressure, and corporate governance as important drivers in carbon emissions reporting and the climate-related behaviour of a company. Furthermore, they highlight that the adoption of a corporate carbon management strategy can have a positive impact on corporate carbon emissions reporting (Hettler and Graf-Valchy, 2024). Dobers et al. (2019) also highlight the corporate-level approach and introduce corporate sustainability programs (CSP) to be one of the drivers for GHG emissions calculation in transport chains, as CSPs often define specific targets for emissions reduction. The cultural capabilities, senior management priorities, and leadership styles of organisations as well as financial factors affect the development of green practices (Huge-Brodin et al., 2020). Other drivers are commercial reasons related to satisfying contractual customer requirements as well the expectations for emissions reporting that come from business, government, and market conditions (Dobers et al., 2019). End users' or consumers' demand can also play a key role in determining green logistics practices in companies (Huge-Brodin et al., 2020). Moreover, Dobers et al. (2019) also highlight that the tendering processes of shippers may favour those LSPs that can provide actual emissions data, specifically related to the transport and logistics operations of the shipper. Digitalisation and the development of digital tools are also important drivers in logistics emissions reporting. Emissions reporting benefits from the development of digitalisation, which can contribute to the realisation of emission reduction related to transport volumes and driving performance (Lähde et al., 2020).

Dobers et al. (2019) argue that the major barriers for emissions calculations and accounting in transport and logistics by industry are related to the collection and exchange of data, the guidance and access to default data for cases where no measured data is available, and meth-

odological barriers. It is known that there are several different methods for calculating and reporting CO2 emissions (e.g., Kallionpää et al., 2025; Wild, 2021), which poses challenges to data reliability and comparability. Furthermore, other identified challenges are motivational barriers, information asymmetry and implementation costs. (Dobers et al., 2019).

3. Methodology

In this study, two separate online surveys were conducted. One survey was aimed for shippers and the other was aimed for LSPs. The surveys were implemented separately to better target the questions to different actors. The questions in both surveys were developed based on the series of interviews that were conducted prior to the surveys for both shippers and LSPs (Kallionpää et al., 2025). The interviews provided valuable information on the topic and the essential themes on the basis of which the questions for the surveys were created. The survey was selected as a data collection method because it provides an efficient means of collecting responses from a large sample. With surveys, the descriptive or explanatory data regarding facts, attitudes, opinions, and behaviour can be collected by asking people to respond to the same set of questions (Saunders et al., 2019). We used the online survey method to reach the respondents right away and see the results immediately after the answers were submitted. The design of questions and the structure of the survey are important aspects to obtain a good response rate and to ensure the validity and reliability of the collected data (Saunders et al., 2019; FSD, 2025).

Since the aim of this paper is not only to study both the current state and the future of the respondent companies, but also to generalise the results to the industry, we aim to describe and highlight differences in opinions and actions between LSPs and shippers. Therefore, both descriptive and inferential statistical methods have been employed in this study.

3.1. Data

Survey for shippers

The first survey was aimed at shipper companies that do not mainly manage logistics independently but outsource it to a service provider (Appendix 6). The questions were developed based on this aspect and based on insights already collected from the interviews. Mainly, the shippers were asked about the level of their current own-emissions reporting, the level of emissions reporting they obtain from their logistics' partners, as well as the desired level of emissions reporting and their knowledge of current standards and tools utilised. They were also asked whether they are obliged by any law, investor, partner, or funder to have a certain level of emissions reports. In addition, they were presented with a few claims regarding the role of emissions reporting for 2030 and to mention whether they believed that these were likely to occur. Ultimately, some basic background information was collected to enable filtering the users based on company size or by industry. For the analysis, revenue was used for grouping the shippers.

The sample dataset was purchased from MicroMedia and contained the main contact and industry information of employees working in leading roles in logistics, purchasing, shipping, and sustainability functions in companies that are part in industries where shipping material or products play a large role. In addition, all the interviewed companies that were identified as shippers were also directly contacted with the survey link. All the respondents also had the option of forwarding the survey link to others within their company. Since the survey was voluntary, the recipients also had the ability to choose not to answer and discard the message. Moreover, all the questions were optional; thus, respondents could leave any answer blank in case they chose not to answer. The invitation email to participate was sent out to 2,750 recipients that represented 1,040 different companies, as the aim was to reach as many shippers operating in Finland as possible to obtain shippers' opinions, actions, and future insights regarding the topic and

its development. For the survey, Microsoft Forms was used, and the survey was open from 16 May 2023 to 2 June 2023. A total of 123 answers were collected during this time, representing varied business areas and sectors, such as construction, forestry, manufacturing, technology, food industry, chemicals, and the trade sectors. The response rate for the contacted respondents was 4.5% and that for the contacted companies was 11.8%.

Survey for logistics service providers (LSPs)

The second survey was aimed at LSPs (Appendix 7). For this part as well, the insights from the interviews were used to formulate some of the questions. The questions were majorly similar to the first survey to enable a comparison of the results from the two respondent groups. The major differences were that while the shippers were asked what data they request from LSPs, the LSPs were then questioned regarding what data they are obliged to collect for they customers (such as shippers). Moreover, in background information, they were asked about their size, main customer industry (if applicable), and the transport modes they provide services in to enable grouping and filtering during the analysis. For the analysis, the LSPs were grouped according to personnel, which best describes the companies in Finland with a large proportion of small and medium-sized companies. In Finland, LSPs are mainly SMEs and microenterprises. Nearly half operate with just one truck, about one in six with more than five vehicles, and only around ten companies have fleets of over a hundred vehicles. The average company size is increasing. (SKAL, 2025)

The survey link, with a brief description of the project, was forwarded to the mailing lists of SKAL (Association for Finnish Transport and Logistics) and Logistiikkayritysten liitto (Association of Logistics Companies). SKAL has approximately 4,200 members and Logistiikkayritysten liitto has 30 members. SKAL and Logistiikkayritysten liitto were selected because these are the most relevant and distinguished associations to reach most of the LSPs operating in Finland, particularly in the road freight sector. In addition to the mailing lists, the same

message was also directly forwarded to the interviewed companies that were identified as LSPs. As with the first survey, the respondents were allowed to skip any questions or discard the message completely, and were permitted to forward the link within the company for others to take the survey. The sample comprised companies with known email addresses and, thus, the survey was sent out together to 3,780 companies. For this survey, Microsoft Forms was used, and 119 answers were collected from 31 May 2023 to 19 June 2023. With 119 responses, the response rate was 3.1%. We managed to reach small and medium-sized companies relatively well for the survey, as 34% of the respondents had less than 5 personnel and 36% had 5–20 personnel; 22 % of the respondents had more than 21 personnel. The distribution of respondent companies by size aligns quite well with the structure of the logistics sector (SKAL, 2025).

3.2. Statistical methods

The statistical analyses were conducted using IBM SPSS 29 software. The methods utilised for testing statistical significance were crosstabulation, Pearson Chi-square, and analysis of variance (ANOVA). Statistically significant difference between the groups was considered at $p < 0.05$; thus, α is set to 0.05.

Pearson Chi-square is a nonparametric test which is utilised to analyse nominal variables. Chi-square is used to measure the amount of discrepancy between observed frequencies and expected frequencies (Willard, 2020). The assumptions for using Chi-Square are that no more than 20% of the expected frequencies should be less than 5 and the lowest expected frequency should be greater than 1 (Tähtinen et al., 2020). If the Chi-square assumptions are not met, Fisher's Exact test is used to determine the statistical significance.

ANOVA examines the difference between means to ascertain if the observed differences are likely due to chance. The assumptions for using ANOVA are that there must be independent and random selec-

tion of subjects, the dependent variable can be measured on an interval or ratio scale, and the dependent variable is normally distributed (Willard, 2020).

4. Survey results

Since both surveys were designed similarly, the results are laid out based on the themes and both the results of shippers and LSPs are then presented together. For shippers, all the 123 collected answers are included in the analysis. Due to the low number of responses from sectors other than road freight transport, a few of the answers were filtered in LSPs. In the total of 119 responses from LSPs, 111 represented only road freight transport. Since the number for nonroad freight companies was small, the analysis is limited to the 111 answers that were focused on road freight.

4.1. Emissions data collection and reporting

Based on the surveys, approximately 79% of shippers have set emissions reduction targets for their companies, and 64% of shippers are currently tracking and reporting logistics emissions data. As compared to the LSPs, the responses are reversed, as 72% of LSP respondents have not set any targets for emissions reduction and 68% of LSPs do not currently track or report their emissions data. However, if the responses are grouped based on the stated size of the respondent, it is noted that larger companies tend to both set their targets and currently follow the emissions data (Table 4.1).

Table 4.1 The status of emissions reduction targets and tracking and reporting of emissions by shippers and LSPs (statistically significant).*

Shippers		
Revenue (million €)	Has set emissions reduction target*	Currently tracks and reports emissions*
50 or less (n = 23)	57%	44%
More than 50 (n = 74)	87%	70%
All (n = 97)	**79%**	**64%**
LSPs		
Personnel	Has set emissions reduction target*	Currently tracks and reports emissions*
Less than 5 (n = 40)	10%	10%
5–20 (n = 43)	19%	33%
21 or more (n = 26)	73%	65%
All (n = 109)	**28%**	**32%**

As seen from the table above, for small LSPs (20 or less employees, n = 83), only a minority has set targets or collect any data regarding emissions. However, this is done by a majority of the larger companies. Thus, while accounting the results for the volume of transport in Finland, it could be said that the reality is better than the table depicts. There is a statistically significant difference in the frequency of setting emissions reduction targets and tracking and reporting emissions between the LSP groups (statistical results in Appendix 2). For shippers, there is also a statistically significant difference in the frequency of setting emissions reduction targets and tracking and reporting emissions between groups (statistical results in Appendix 2).

With regard to the targets, the shippers usually mentioned either different relative decreased targets for emissions for either total or targets for different scopes. A few also explicitly stated that their aim was to be carbon neutral by a certain year. No common target year could be identified from the responses, as a few companies already had targets for the end of 2023, while a few of them aimed more towards 2040. For LSPs, the respondents also mentioned the actions taken

towards achieving the targets, and the common themes included engines with higher EURO class, changing to new driving powers, usage of renewable fuels, as well as focus on eco-driving to obtain fuel savings.

When asked about the aggregation level of emissions reporting, the total sum of logistics emissions is still often used. For shippers, it is also common to track emissions based on either the business location or on a specific route. The LSPs focus more on either customer- or route-based data. In addition, the shippers were asked about the current level of data they obtain from their logistics partners: 28% of the respondents were able to gain access to this data from their partners, whereas 25% did not have any access; 47% had access to a few of their partners, but not all of them. Here, the differences related to company size were minor, but it can be said that the larger companies had a slightly higher access to the data, as presented in Table 4.2. In addition, there is a statistically significant difference in accessing the data between the groups (statistical results in Appendix 3).

Table 4.2 The share of shippers with access to their logistics partner emissions based on shipper size (statistically significant).*

Shippers	**Access to data***		
Revenue (million €)	Access to all	Access to some	No access
50 or less (n = 22)	27%	18%	55%
More than 50 (n = 71)	28%	56%	16%
All (n = 93)	**28%**	**47%**	**25%**

However, when examining the desired data access among the shippers, 92% mentioned that they would like to have all emissions data regarding their logistics purchases. Currently, they mostly obtained this data as an annual total emission, but they were hoping to have both faster access to data as well as access to shipment-, route- and business-location-based emissions in the future. Moreover, approximately half of the shippers have also at least attempted to calculate

the carbon footprints per product but mentioned challenges with currently heavy process to obtain the data and insufficient resources to calculate this. On the other hand, 40% of LSPs mentioned that they are currently obliged to deliver emissions data to their customers, but only 5% of LSPs require this data from their own logistics subcontractors.

Further, shippers mainly get access to emissions data and reports through either Excel-files or PDF-documents that are received via email. This represents 73% of the respondents and even though it is currently the most common method, two thirds of shippers mentioned, that they would be willing to have the data through either one common cloud solution or directly to their own systems, such as ERPs. LSPs were also asked, whether any common national emissions data cloud would be suitable solution for collecting and sharing this data, but half of the respondents had no interest in a centralised system. These represented mainly the smaller LSPs that employed less than 5 persons.

4.2. Principles and standards

In addition to the current status of reporting, the survey also focused on the current level of knowledge regarding the existing standards and calculation methods. Here, it should be noted that the survey was open prior to the draft contents of CountEmissions EU that proposed to use the ISO 14083:2023 standard as the calculation method preference; thus, the respondents had no knowledge of which standard is utilised.

Shippers indicated that they have mostly based their reporting and targets on either the GHG Protocol or Science-Based Targets initiative (SBTi). These were also best known among the shippers that responded to the questionnaire. Of all the shipper respondents who answered this question, the GHG Protocol was known by 78% and SBTi by 72%. ISO 14083:2023 and the Nordic Swan Ecolabel were known by more than half (57% and 63%, respectively) of the shippers.

Based on the open responses, there were shippers that were deliberately not using any guidelines, as they saw those as a tool for LSPs instead. Concerns were also raised that following the guidelines requires a large amount of resources compared to the potential benefits. LSPs had less knowledge regarding the guidelines, as ISO 14083:2023 and The Nordic Swan Ecolabel were the most known ones, but still were only known by 37% and 45% of LSPs, respectively. GHG Protocol (13%) and SBTi (8%) were not known among the LSPs.

4.3. Data usage

The collected emissions data is considered a great decision planning tool among the shippers who responded to the survey. A large majority (81%) of shippers mentioned that the collected data is already used in their operations. This use includes, for example, sustainability reporting, route optimisation calculations, and progress tracking of targets. However, a majority of the LSPs (78%) explicitly mentioned that they do not use the data as part of the operations. As in other aspects, this was also more common within the smaller LSPs. This is depicted in Table 4.3.

Table 4.3 The share of respondents that use the emissions reporting data in their operations based on company size (statistically significant).*

Shippers	
Revenue (million €)	Selected 'Yes'
50 or less (n = 23)	70%
More than 50 (n = 73)	85%
All (n = 96)	**81%**
LSPs*	
Personnel	Selected 'Yes'
Less than 5 (n = 38)	8%
5–20 (n = 42)	19%
21 or more (n = 26)	46%
All respondents (n = 106)	**22%**

As evident from Table 4.3, there are differences in how the data is used in organisations of different sizes. There is a statistically significant difference in the frequency of using emissions reporting data between the LSP groups; however, among shippers, the difference is not statistically significant (statistical results in Appendix 4).

The LSPs who mentioned using the data as part of the operations mentioned that it supports different tasks of operational development, tracking, communications, and marketing; moreover, the data can also be used for planning future investments. In addition, 27% of LSPs mentioned that the emissions reporting also creates other values for the company. For example, value for customers, better brand value, doing 'the right thing,' and competitive advantage were mentioned.

4.4. Future of emissions data collection and use

In both surveys, the respondents were asked whether they see the different statements to be reality in 2030. The respondents were presented a statement, followed by a choice to be rated on a scale from 0 to 10, where 0 represents that the respondent feels that the realisation of the statement by 2030 is not likely at all and 10 represents that the realisation of the statement is highly likely by 2030. By selecting 5, the respondent reveals that the statement is neither highly unlikely nor highly likely. Further, a few of the statements were only displayed to the shippers and a few only to the LSPs. Therefore, these are left blank in the table. All the statements and the mean values are presented in Table 4.4, both based on all answers and the company size. For shippers, the company is identified as large if their stated annual revenue is larger than 50 million euros. For LSPs, the company is large if they are stated to have more than 50 employees in the company.

Table 4.4 The visions for 2030 among shippers and LSPs. The higher the mean value, the more likely the realisation of the statement (0 not likely at all…10 highly likely). The 'others' category includes all responses other than large companies. (statistically significant difference between LSP groups (large/others), ** statistically significant difference between shipper groups (large/others), *** statistically significant difference between both LSP groups (large/others), and shipper groups (large/others)).*

Statement	Shippers *all*	LSPs *all*	Shippers *large*	LSPs *large*	Shippers *others*	LSPs *others*
1. Our company has reached our emissions reduction targets (n (LSPs) = 107; n (Shippers) = 95)	8.0	5.9	8.2	7.1	7.4	5.7
2. Our company reports emissions periodically/annually*** (n (LSPs) = 107; n (Shippers) = 95)	9.2	5.1	9.5	9.1	8.3	4.5
3. Our company utilises emissions criteria for purchasing logistics services (n (Shippers) = 96)	8.0	-	8.2	-	7.3	-
4. Our company requires emissions reporting from LSPs** (n (Shippers) = 96)	8.3	-	8.6	-	7.5	-
5. Our logistics customers require regular emissions reporting* (n (LSPs) = 106)	-	5.2	-	9.3	-	4.5
6. Our company requires emissions reporting from our subcontractors*** (n (LSPs) = 105; n (Shippers) = 94)	8.0	4.3	8.4	9.3	6.9	3.4
7. Our logistics chain is developed based on emissions reduction targets* (n (LSPs) = 107; n (Shippers) = 96)	6.7	4.5	6.9	7.9	6.1	4.0
8. Our emissions calculation is based on an effectual calculation standard** (n (Shippers) = 96)	8.7	-	9.1	-	7.5	-

Statement	Shippers *all*	LSPs *all*	Shippers *large*	LSPs *large*	Shippers *others*	LSPs *others*
9. Our logistics chain is planned with our LSPs (n (Shippers) = 94)	7.0	-	7.2	-	6.6	-
10. Our logistics chain is planned with our customers* (n (LSPs) = 107)	-	5.8	-	8.7	-	5.3
11. Our products have a carbon footprint label (n (Shippers) = 91)	6.1	-	6.3	-	5.5	-
12. Emissions reporting methods are consistent among the companies (n (Shippers) = 96)	6.9	-	7.1	-	6.3	-
13. Our company has a digital tool for emissions reporting** (n (Shippers) = 95)	8.0	-	8.4	-	6.5	-

Based on the above table, the size of the company slightly affected the answers among the shippers, as large companies tend to have a higher mean likelihood for the statements. However, the differences are not as large as those within the LSPs—where the large companies are generally on the positive end of the scale, while all the other companies on average are towards unlikeliness in most of the questions. For example, the mean value for LSPs that have emissions reporting in place by 2030 is 9.1 for large companies, which implies that it is seen as being highly likely, whereas for others it is 4.5, which implies that it is slightly more unlikely that likely. Based on these results, it can be summarised that smaller LSPs do not see the need for reporting emissions; thus, they also currently have no progress or plans to develop their emissions reporting. The statistical significance was tested between both LSP groups (large/others) and shipper groups (large/others) separately. In Table 4.4, the statistically significant differences are marked after the statement. All ANOVA test results are presented in Appendix 5.

5. Discussion and conclusion

This study investigated the state of logistics emissions data collection and reporting in Finnish companies using two separate surveys. This study explored how the respondents see the future of emissions reporting in logistics and how they would develop it in the future. The following three research questions were studied:

1. What is the current status of emissions data collection and reporting in logistics, and are there differences between LSPs and shippers and different company sizes in this regard?

2. How is logistics emissions data used among LSPs and shippers, and are there differences between LSPs and shippers and different companies in this regard?

3. How do shippers and LSPs perceive their future visions regarding emissions data collection and use, and are there differences between LSPs and shippers and different company sizes in this regard?

For the current status of emissions data collection and reporting (RQ1), it can be concluded that emissions reporting practices in companies are rather diverse and reporting is conducted on different scopes depending on the company. In certain cases, emissions reporting is not done at all. The results reveal that the share of companies that have set emissions reduction targets and who currently track and report emissions increases as the company size increases. Furthermore, there is also a clear difference between LSPs and shippers. The results provide an indication that shippers are currently more interested in implementing and developing emissions reporting as well as using the data compared to LSPs. Shippers are also more aware of the principles, standards, and guidelines related to emissions reporting and calculations than LSPs in general; however, for example, ISO 14083:2023 was not widely known by either shippers or LSPs. Further, the shippers set emissions mitigation targets for their operations

more often (79%) than the LSPs (28%) and the same also applies for reporting emissions in general (64% of shippers and 32% of LSPs track and report emissions). In particular, small LSPs (number of personnel less than 5) mostly do not monitor emissions and have not set any emissions reduction targets. However, the proportion of companies who have set emissions reduction targets is higher in larger LSPs (number of personnel 21 or more), as approximately two-thirds have both set emissions reduction targets (73%) and currently track and report emissions (65%).

These findings are in keeping with earlier studies, but provide more insights related to company sizes. Wehner et al. (2021) concluded that LSPs are still in the early stages in terms of developing sustainability, which is also evident in this study regarding the development of emissions reporting in general. Wehner et al. (2021) also stated that many LSPs highlighted regularly reporting emissions. This study reveals that particularly larger LSPs are more interested in emissions reporting than smaller ones. Furthermore, it is found that shippers value emissions data and LSPs are responding to this demand (Jazairy and Von Haartman, 2021). The shippers' interest appears to be evident in this study as well, and larger LSPs in particular are responding to this demand. Moreover, based on the results of this study, multiple shippers were in the process of planning systems for emissions reporting; however, as the survey was implemented before the knowledge that CountEmissions EU was going to establish ISO 14083:2023 as a calculation method, the process was still mostly ongoing and waiting for direct adaptation to CountEmissions EU requirements. For LSPs, particularly for the smaller ones, there was a strong negative attitude towards new reporting requirements.

Further, emissions data (RQ2) is currently rather widely used among the shippers (81%) based on the survey, and there were no large differences among shippers of various sizes. Shippers also raised several aspects for using the data. Reporting, route optimisation, tracking for set targets and realisation of reduction targets were mentioned as use-case examples. There were also comments regarding data collection

being a great decision support tool for planning. In addition, reporting purposes, route optimisation, and tracking for target setting have also been mentioned in extant literature (Doda et al., 2016; Dragomir, 2012; Rietbergen et al., 2015). For LSPs, particularly for smaller ones, there was much lower usage of data collection: only 8% (number of personnel fewer than 5) and 19% (number of personnel 5–20) of smaller LSPs were using the emissions data. From among the larger ones, 46% reported using the data. The ones that were using (mostly larger LSPs) such data mentioned that their data collection processes support their business operations in general as well as their development and investments plans; these processes also enable them to differentiate in the markets, as not all companies utilise the data. The larger LSPs use data also for marketing and communication to give value to their customers and to create better brand value. These purposes—marketing and meeting customer requirements—were also highlighted in extant literature (Dobers et al., 2019; Hettler and Graf-Valchy, 2024). Based on this study, the shippers' access to their logistic partner's emissions data varies substantially, with only approximately a quarter of all shippers with access to data from LSPs. Of course, this also affects the utilisation of data. The larger shippers had a slightly higher access to the data compared to smaller ones. However, almost all shippers mentioned the willingness to receive all emissions data regarding their logistics purchases. Interestingly, almost half of the LSPs mentioned that they are delivering emissions data to their customers, but only a minority require this data from their own logistics subcontractors.

With regard to the development of future (2030) aspects towards emissions reporting development in logistics (RQ3), it can be concluded that the shippers had a positive view regarding development in general as well as the setting and achieving of emissions mitigation targets. For LSPs, large companies mainly had same views as those of shippers, but the difference with smaller ones was obvious. Based on the survey, the shippers are highly likely to be active and request emissions data from their logistics partners in the future, but only the large LSPs are ready and willing to provide this information. This supports

the findings of Dobers et al. (2019), who emphasised that the tendering processes of shippers may favour those LSPs who can provide actual emissions data. Based on our survey, the smaller LSPs are not prepared for the growing expectations of providing emissions data to the shippers and customers in the future, even though it appears likely that they will have to. In other words, it appears that smaller LSPs do not see the need for emissions reporting; thus, they also have no progress or plans for developing their emissions reporting. However, large LSPs consider it highly likely that logistics chain development would be done in cooperation with the customers. The shippers also had a positive attitude towards this, but on a smaller scale.

In conclusion, the attitude towards emissions data collection and regulation differs between shippers and LSPs, but it should be noted that the size of the LSPs has an effect on this as well. Shippers are clearly ahead of LSPs, but their volume-wise level of reporting is rather good. However, based on the results, small LSPs have fallen behind and have a bigger step to take in development. There is a large gap between shippers and small LSPs, which could lead to smaller LSPs requiring to quickly adapt to the new market conditions. However, a few of them have currently no interest in developing data collection and reporting; the resources or knowledge how to proceed, as they do not expect their customers to require emissions data in the near future. Currently, customer, market and regulation pressure towards small LSPs seems to be weaker compared to larger ones. Therefore, small LSPs perceived reporting less important and do not see value in collecting and using emissions data. However, based on this study and literature, this will change; shippers will be highly likely to request data from their logistics partners (Huge-Brodin et al., 2020; Jazairy and Von Haartman, 2021). Pressure to report can also come from the requirements of end users and consumers (Huge-Brodin et al., 2020). There might be a risk that smaller LSPs will eventually fall out of the market. On the other hand, because the logistics sector is rather fragmented, the demand for LSPs' operations may result in customers having to use LSPs that do not monitor or report emissions, which

complicates achieving the emissions reduction targets set for the logistics sector. Instead, and compared to small LSPs, larger LSPs aim to be forerunners, and the shippers require or ask for emissions data from them. Thus, support is specifically needed for the small LSPs when emissions data is required more often. Providing support is also important because the sustainable development of LSPs is recognised to be vital to achieving sustainable supply chains (Brockhaus et al., 2013; Laari et al., 2018; Reinerth et al., 2018). In the future, a certain amount of pressure towards data collection will also come from legislation, even if it is still not mandatory. Based on the surveys, the binding pressure will ultimately come from the shippers.

Overall, the differences between actors identified in this study affect the overall utilisation of emissions data and the level of emissions reporting. The differences also have an impact on the initial data for emissions calculations and their reliability as well as on the achievement of emissions reduction targets at the national level. The development of digitalisation and digital tools can play a key role in improving emissions data collection, reporting, and usage among companies. In other words, logistics emissions reporting requires enhancements in digitalisation, which can contribute to the implementation of emissions reductions related to total haulage and vehicle mileage. In addition, logistics emissions reporting enhances the capacity of LSPs to implement energy-efficiency measures.

This study provides new valuable information regarding emissions data collection, reporting, and future aspects from the perspectives of both shippers and LSPs. Moreover, this study contributes to extant literature by specifically addressing emissions data and reporting rather than the broader field of green logistics practices. The theoretical contribution of this study arises particularly from the comparison between shippers and LSPs as well as from the identification of the differences between them and the significant differences between different company sizes. This study clearly reveals that the company sizes of LSPs affect the level of emissions data collection and emissions

reporting. Therefore, this study also highlights the importance of support for smaller LSPs and the cooperation of different logistics actors in developing emissions reporting and finally attaining emissions reduction targets. With regard to practice, the managers of LSPs, particularly small hauliers, should recognise the importance of emissions reporting among shippers and develop their practices sooner than later. Moreover, politicians and government officials should help and support both shippers and LSPs to develop common reporting tools and practices.

As with any research, certain limitations must be acknowledged. In this case, the absence of unique identification numbers for companies during data collection introduces a potential risk of double counting in the analysis. While such occurrences are presumed to be infrequent, their presence cannot be definitively confirmed or excluded. In addition, the response rates of the surveys—11.8% for shippers and 3.1% for LSPs—are relatively low. Nevertheless, the number of observations remains sufficient for conducting statistical analyses. The low response activity is likely influenced by the large number of small-sized logistics companies in Finland, many of which likely lack the time or resources to participate in surveys. Additionally, smaller firms might perceive the survey topic as irrelevant to their operations, further reducing their motivation to respond. The findings of this study support this notion, as smaller companies tend to report lower levels of engagement in collecting and utilising emissions data.

With regard to the data, the representativeness of the respondents and their distribution across different company sizes cannot be directly compared to the logistics sector in Finland; this is because accurate and systematic statistical data on the size of LSPs is lacking. This represents an important area for development in Finland. However, most of the Finnish LSPs are SMEs and micro-enterprises, so the representativeness of the respondents can be considered good. Moreover, while this study is limited to Finland, the results support findings from other countries as well. In future, similar survey and analysis should be conducted in other countries and member states of the EU. A

comparison of the results among different countries would deepen the understanding of emissions reporting and its development and possibly lead to new recommendations for support tools within the EU or in a specific country. Moreover, in future, it would be beneficial to repeat this survey in Finland to monitor the development of the matter. As another avenue for future research, it would be interesting to create and test a pilot platform for the implementation of emissions calculations, study its use among different companies, and understand the views of these companies regarding such a platform.

Acknowledgements

The authors would like to thank the stakeholders of the LOLIPOP project and all the respondents. The data collection of this study was funded by the LOLIPOP project (VN/31379/2022), supported by the Finnish Government's analysis, assessment, and research activities.

References

Bask, A. and Rajahonka, M. (2017). "The role of environmental sustainability in the freight transport mode choice", International Journal of Physical Distribution and Logistics Management, Vol. 47 No. 7, pp. 560-602. https://doi.org/10.1108/IJPDLM-03-2017-0127

Bauer, R., Kummer, S., and Herold, D. (2024). "Understanding mechanisms influencing carbon emissions calculation for supply chains". In Skoglund, P. and Listou, T. (Eds.), A systematic literature review. Proceedings of the 36th Annual Nofoma Conference, Nofoma 2024, 20–43.

Brockhaus, S., Kersten, W. and Knemeyer, A.M. (2013). "Where do we go from here? Progressing sustainability implementation efforts across supply chains", Journal of Business Logistics, Vol. 34 No. 2, pp. 167-182. https://doi.org/10.1111/jbl.12017

Council of the European Union, (2025), "Fit for 55", available at: https://www.consilium.europa.eu/en/policies/green-deal/fit-for-55-the-eu-plan-for-a-green-transition/ (accessed 30 September 2025)

Dobers, K., Ehrler, V.C., Davydenko, I.Y., Rüdiger, D. and Clausen, U. (2019). "Challenges to Standardizing Emissions Calculation of Logistics Hubs as Basis for Decarbonizing Transport Chains on a Global Scale", Transportation Research Record, Vol. 2673 No. 9, pp. 502-513. https://doi.org/10.1177/0361198119844252

Doda, B., Gennaioli, C., Gouldson, A., Grover, D. and Sullivan, R. (2016). "Are Corporate Carbon Management Practices Reducing Corporate Carbon Emissions?", Corporate Social Responsibility and Environmental Management, Vol. 23 No. 5, pp. 257–270. https://doi.org/10.1002/csr.1369

Dragomir, V. D. (2012). "The disclosure of industrial greenhouse gas emissions: a critical assessment of corporate sustainability reports", Journal of Cleaner Production, Vol. 29-30 No. 7, pp. 222–237. https://doi.org/10.1016/j.jclepro.2012.01.024

du Plessis, M.J., van Eeden, J. and Botha, M. (2022), "Development of emissions intensity factors for a South African road-freight logistics service

provider", South African journal of industrial engineering, Vol. 32 No. 3, pp. 15–28. https://doi.org/10.7166/33-3-2788

Ecovadis, (2025). "Ecovadis", available at: https://ecovadis.com/ (accessed 30 September 2025)

European Commission, (2025a), "Count your transport remissions – CountEmissions EU", available at: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13217-Count-your-transport-emissions-CountEmissions-EU_en (accessed 30 September 2025).

European Commission, (2025b), "Corporate sustainability reporting", available at: https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en (accessed 30 September 2025)

FSD, (2025). The Finnish Social Science Data Archive (FSD). Research Methods Guidebook. https://www.fsd.tuni.fi/en/services/research-methods-web-resource/ (accessed 2 October 2025)

Gibassier, D. and Schaltegger, S. (2015). "Carbon management accounting and reporting in practice", Sustainability Accounting, Management and Policy Journal, Vol. 6 No. 3, pp. 340–365. https://doi.org/10.1108/SAMPJ-02-2015-0014

Greenhouse gas Protocol, (2025), "We set the standards to measure and manage emissions", available at: https://ghgprotocol.org/ (accessed 30 September 2025)

Hettler, M. and Graf-Vlachy, L. (2024). "Corporate Scope 3 Carbon Emissions Reporting as an Enabler of Supply Chain Decarbonization: A Systematic Review and Comprehensive Research Agenda", Business Strategy and the Environment, Vol. 33 No. 2, pp. 263–82. https://doi.org/10.1002/bse.3486

Hickmann, T. (2017). "Voluntary global business initiatives and the international climate negotiations: A case study of the greenhouse gas protocol", Journal of Cleaner Production, Vol. 169, pp. 94–104. https://doi.org/10.1016/j.jclepro.2017.06.183

Huge-Brodin, M., Sweeney, E. and Evangelista, P. (2020). "Environmental alignment between logistics service providers and shippers - a supply chain

perspective", The International Journal of Logistics Management, Vol. 31 No. 3, pp. 575-605. https://doi.org/10.1108/IJLM-04-2019-0101

Jazairy, A. and Von Haartman, R. (2021). "Measuring the gaps between shippers and logistics service providers on green logistics throughout the logistics purchasing process", International Journal of Physical Distribution & Logistics Management, Vol. 51 No. 1, pp. 25-47. https://doi.org/10.1108/IJPDLM-08-2019-0237

Jääskeläinen, S. (Editor) (2021). "Roadmap to fossil-free transport: Government resolution on reducing domestic transport's greenhouse gas emissions", available at: https://julkaisut.valtioneuvosto.fi/handle/10024/163260 (accessed 23 April 2025)

Kallionpää, E., Liimatainen, H., Viri, R. and Vaismaa, K. (2025). "Development of logistics emissions reporting – Shippers' and logistics service providers' perspective, Transportation Research Part D: Transport and Environment. Vol.150, 105083. https://doi.org/10.1016/j.trd.2025.105083

Laari, S., Töyli, J. and Ojala, L. (2018). "The effect of a competitive strategy and green supply chain management on the financial and environmental performance of logistics service providers", Business Strategy and the Environment, Vol. 27 No. 7, pp. 872-883. https://doi.org/10.1002/bse.2038

Liimatainen, H. (2013). Future of Energy Efficiency and Carbon Dioxide Emissions of Finnish Road Freight Transport. Väitöskirja. Tampereen teknillinen yliopisto, tuotantotalous, available at: https://urn.fi/URN:ISBN:978-952-15-3060-9 (accessed 23 April 2025)

Lähde, N., Rautavirta, M., Miettinen, A., Syrjänen, V.M., Paavola, T. and Lehtilä, O. (2020). Logistics digitalisation strategy. Publications of the Ministry of Transport and Communications 2020:13. available at: http://urn.fi/URN:ISBN:978-952-243-582-8 (accessed 2 October 2025)

McKinnon, A. (2021). "Towards a Carbon-Free Logistics", in Secchi, C. and Gili A. (Ed.), The Global Quest for Sustainability, the role of green infrastructure in a post-pandemic world, Ledizioni LediPublishing, Milan, Italy, pp 125-143.

Martinsen, U. and Björklund, M. (2012). ”Matches and gaps in the green logistics market”, International Journal of Physical Distribution and Logistics Management, Vol. 42 No. 6, pp. 562-583. https://doi.org/10.1108/09600031211250596

The Nordic Swan Ecolabel, (2025). “Joutsenmerkki - The Nordic Swan Ecolabel”, available at: https://joutsenmerkki.fi/briefly-in-english/ (accessed 30 September 2025)

Patchell, J. (2018). “Can the implications of the GHG protocol’s scope 3 standard be realized?”, Journal of Cleaner Production, Vol. 185, pp. 941–958. https://doi.org/10.1016/j.jclepro.2018.03.003

Prataviera, L. B., Creazza, A. and Perotti, S. (2024). “A call to action: a stakeholder analysis of green logistics practices”, The international journal of logistics management, Vol. 35 No. 3, pp. 979–1008. https://doi.org/10.1108/IJLM-09-2022-0381

Reinerth, D., Busse, C. and Wagner, S.M. (2018). “Using country sustainability risk to inform sustainable supply chain management: a design science study”, Journal of Business Logistics, Vol. 40 No. 3, pp. 241-264. https://doi.org/10.1111/jbl.12190

Rietbergen, M. G., van Rheede, A., and Blok, K. (2015). “The target-setting process in the CO2 performance ladder: Does it lead to ambitious goals for carbon dioxide emissions reduction?”, Journal of Cleaner Production, Vol. 103, pp. 549–561. https://doi.org/10.1016/j.jclepro.2014.09.046

Rushton, A., Croucher, P. and Baker, P. (2022). “The Handbook of Logistics and Distribution Management – Understanding the Supply Chain”, 7th ed. Kogan Page.

Saunders, M. N. K., Lewis, P. and Thornhill, A. (2019). Research methods for business students. 8th edition. Harlow: Pearson.

SKAL, (2025). ”Maanteiden tavaraliikenne on merkittävä toimiala ja työllistäjä [Road freight transport is a significant industry and employer]”, available at: https://skal.fi/vaikuttaminen/toimialasta/ (accessed 30 September 2025)

Smart Freight Centre, (2025). “The GLEC Framework”, available at: https://www.smartfreightcentre.org/en/our-programs/global-logistics-

emissions-council/calculate-report-glec-framework/ (accessed 30 September 2025)

SBTi. (2025), "Science Based Targets. Driving Ambitious Corporate Climate Action", available at: https://sciencebasedtargets.org/ (accessed 30 September 2025)

Siikavirta, H., Cederlöf, M., Skoglund, K. and Ruponen, V. (Editors) (2024). Annual Climate Report, Publications of the Ministry of Environment 2024:36, available at: http://urn.fi/URN:ISBN:978-952-361-171-9 (accessed 24 April 2025)

Stenzel, A., and Waichman, I. (2023). "Supply-chain data sharing for scope 3 emissions", Climate Action, 2, 7, Article 7. https://doi.org/10.1038/s44168-023-00032-x

Tang, S., and Demeritt, D. (2018). "Climate change and mandatory carbon reporting: Impacts on business process and performance", Business Strategy and the Environment, Vol. 27, pp. 437–455. https://doi.org/10.1002/bse.1985

Tähtinen, J., Laakkonen, E. and Broberg, M. (2020). Tilastollisen aineiston käsittelyn ja tulkinnan perusteita. Turun yliopiston kasvatustieteiden tiedekunnan julkaisuja C: 22, 2. uudistettu painos. Turun yliopiston kasvatustieteiden laitos. ISBN: 978-951-29-8090-1 (PRINT) 978-951-29-8091-8 (PDF), ISSN: 1237-764. 251 s., available at: https://urn.fi/URN:ISBN:978-951-29-8091-8

Wehner, J., Taghavi Nejad Deilami, N., Altuntus Vural, C. and Halldórsson, Á. (2021). "Logistics service providers' energy efficiency initiatives for environmental sustainability.", The international journal of logistics management. Vol. 33 No. 5, pp. 1–26. https://doi.org/10.1108/IJLM-10-2019-0270

Wild, P. (2021). "Recommendations for a future global CO2-calculation standard for transport and logistics", Transportation Research Part D: Transport and Environment, Vol. 100, pp. 2-15. https://doi.org/10.1016/j.trd.2021.103024

Willard, C. A. 2020. Statistical Methods: An Introduction to Basic Statistical Concepts and Analysis. 2nd Edition. Milton: Taylor and Francis, 2020. Web. 367 p. ISBN: 978-0-429-26103-9 (ebk)

Appendix 1.

Environmental regulations and guidelines	Description and aim	Reference
EU's Fit for 55	The EU's climate package, which includes several measures, aims to provide a balanced framework for achieving the EU's climate targets.	Council of the European Union, 2025
CSRD	The Corporate Sustainability Reporting Directive (CSRD), which modernised and strengthened the rules concerning the social and environmental information that companies must report.	European Commission, 2025b
CountEmissions EU	CountEmissions EU initiative (published in summer 2023) aims to establish harmonised practices and databases for calculating and reporting GHG emissions within the EU for both passenger and freight transport. CountEmissions EU defines the calculation method for emissions in accordance with ISO 14083:2023 standard.	European Commission, 2025a
GLEC Framework	The Global Logistics Emissions Council (GLEC) Framework supports companies to calculate their logistics emissions in compliance with ISO 14083:2023 standard.	Smart Freight Centre, 2025
GHG Protocol	The Greenhouse gas (GHG) Protocol is an established comprehensive globally recognised and standardised framework to measure and manage GHG emissions, classifying GHG emissions into three subsets: Scope 1 (direct), 2 (purchased energy) and 3 (indirect).	Greenhouse gas Protocol, 2025
SBTi	Science Based Targets initiative (SBTi) enables companies to set emissions targets and ensure that their actions support the Paris Agreement's goal of halving greenhouse gas emissions by 2030 and reaching net zero by 2050.	SBTi, 2025
EcoVadis	EcoVadis, a globally recognised assessment platform, measures corporate sustainability beyond SBTi.	Ecovadis, 2025

Environmental regulations and guidelines	Description and aim	Reference
The Nordic Swan Ecolabel	The Nordic Swan Ecolabel is the official ecolabel of the Nordic countries. It checks that products fulfil certain criteria using several methods, and the Swan logo demonstrates that a product is a good environmental choice.	The Nordic Swan Ecolabel, 2025

Appendix 2.

According to the Chi-square test, there is a statistically significant difference between the LSP groups in

- the frequency of setting emissions reduction targets ($df = 2$; $\chi2(2) = 34.181$; $p < 0.001$) and
- tracking and reporting emissions ($df=2$; $\chi2(2) = 22.179$; $p < 0.001$)

In analysing the frequency of setting emissions reduction targets among shippers, Chi-square assumptions were not met (25% of cells had expected count less than 5), thus Fisher's exact test was used for analyses. According to the test, the difference was statistically significant ($p = 0.006$) (two-tailed). According to the Chi-square test, there is a statistically significant difference between the shipper groups in

- the frequency of tracking and reporting emissions ($df=1$; $\chi2(1) = 5{,}461$; $p = 0.019$)

Appendix 3.

According to the Chi-square test, there is a statistically significant difference in accessing the data (df=2; $\chi 2(2) = 15.531$; $p < 0.001$) between the groups.

Appendix 4.

According to the Chi-square test, there is a statistically significant difference between the LSP groups in

- the frequency of using emissions reporting data (df=2; $\chi 2(2) = 13{,}588$; $p = 0.001$).

In analysing the use of emissions reporting data among Shippers, Chi-square assumptions were not met (25% of cells had expected count less than 5), thus Fisher's exact test was used for analyses. According to the test, the difference was not statistically significant ($p = 0.127$) (two-tailed).

Appendix 5.

According to the ANOVA test, the difference between LSP groups was statistically significant in

- statement 2 ($F(1, 105) = 22.367$, $p<0.001$)
- statement 5 ($F(1, 104) = 25.443$, $p<0.001$)
- statement 6 ($F(1, 103) = 39.815$, $p<0.001$)
- statement 7 ($F(1, 105) = 19.541$, $p<0.001$)
- statement 10 ($F(1, 105) = 14.036$, $p<0.001$)

The difference was not statistically significant between LSP groups in

- statement 1 ($F(1, 105) = 25.857$, $p=0.100$)

According to the ANOVA test, the difference between shipper groups was statistically significant in

- statement 2 ($F(1,93) = 10.353$, $p=0.002$)
- statement 4 ($F(1, 94) = 4.680$, $p=0.033$)
- statement 6 ($F(1, 92) = 10.218$, $p=0.002$)
- statement 8 ($F(1, 94) = 9.061$, $p=0.003$) and
- statement 13 ($F(1, 93) = 9.607$, $p=0.003$)

The difference was not statistically significant between shipper groups in

- statement 1 ($F(1, 93) = 3.626$, $p=0.060$)
- statement 3 ($F(1, 94) = 3.775$, $p=0.055$)
- statement 7 ($F(1, 94) = 2.119$, $p=0.149$)
- statement 9 ($F(1, 92) = 1.089$, $p=0.299$)
- statement 11 ($F(1, 89) = 1.041$, $p=0.310$)
- statement 12 ($F(1, 94) = 1.981$, $p=0.163$)

Appendix 6.

Survey for shippers

Emission reduction targets and internal reporting

1. Has your company defined targets for reducing emissions?
   - ○ Yes
   - ○ No
2. What are these targets like (e.g., quantitative, percentage-based, target year) and how their achievement is monitored?
3. Does your company carry out internal monitoring and reporting of logistics emissions?
   - ☐ Yes
   - ☐ No
4. At what level of detail is logistics emissions monitoring carried out?
   - ☐ Product-specific
   - ☐ Product batch-specific
   - ☐ Shipment-specific
   - ☐ Pallet-specific
   - ☐ Transport route-specific
   - ☐ Site-specific
   - ☐ Total transport emissions
   - ☐ Customer-specific
   - ☐ Other
5. What metrics does your company use for monitoring and reporting logistics emissions?
   - ☐ Emissions per km
   - ☐ Emissions per tonne-kilometer
   - ☐ Emissions per transport
   - ☐ Emissions per route
   - ☐ Emissions per shipment
   - ☐ Emissions per pallet
   - ☐ Fuel consumption (liters)
   - ☐ Carbon dioxide emissions (tonnes)
   - ☐ Fuel consumption per transport performance (liters/tonne-kilometer)
   - ☐ Fuel consumption per traffic performance (liters/kilometer)
   - ☐ Energy consumption (MJ or kWh)
   - ☐ Other

6. What kind of digital tools or solutions does your company use for emissions reporting?
7. Has your company conducted carbon footprint assessments for individual products?
   - ○ Yes
   - ○ No
8. What kind of experiences have been gained from these carbon footprint assessments (e.g., calculation workload, smoothness of the process)?
9. Do you perceive that carbon footprint assessments have provided any benefit or value to your company?
   - ○ Yes
   - ○ No
10. What kind of benefit or value?

Transport emissions reporting

11. Do logistics service providers report emissions caused by the transport services your company has ordered?
    - ○ Yes
    - ○ No
    - ○ Some report, some do not
12. Would you like logistics service providers to report emissions caused by the transport services your company has ordered?
    - ○ Yes
    - ○ No
13. What emission and transport efficiency indicators do logistics service providers report?
    - □ Emissions per km
    - □ Emissions per tonne-kilometer
    - □ Fuel consumption (liters)
    - □ Carbon dioxide emissions (tonnes)
    - □ Fuel consumption per transport performance (liters/tonne-kilometer)
    - □ Fuel consumption per traffic performance (liters/kilometer)
    - □ Energy consumption (MJ or kWh)
    - □ Other
14. How often do logistics service providers report?
    - □ In real time

- ☐ Weekly
- ☐ Monthly
- ☐ Quarterly
- ☐ Annually
- ☐ Other

15. At what level of detail is emissions reporting carried out?
    - ☐ Product-specific
    - ☐ Product batch-specific
    - ☐ Shipment-specific
    - ☐ Pallet-specific
    - ☐ Transport route-specific
    - ☐ Site-specific
    - ☐ Total transport emissions
    - ☐ Other
16. How is reporting from logistics service providers technically carried out?
    - ☐ Written report (e.g., PDF or Excel as an email attachment)
    - ☐ Digitally via a shared tool or cloud platform
    - ☐ Digitally via direct integration between systems
    - ☐ Other
17. What kind of digital tools or solutions do you use for reporting the emissions of logistics service providers?
18. What principles form the basis of your emissions reporting? Do you use standards or guidelines for emissions reporting?
    - ☐ GHG-Protocol (Greenhouse Gas Protocol)
    - ☐ Science Based Targets (SBT)
    - ☐ ISO 14083:2023
    - ☐ Nordic Swan Ecolabel
    - ☐ GLEC Framework (Global Logistics Emissions Council)
    - ☐ EN 16258:2012
    - ☐ Other
19. Are you familiar with the different standards related to emissions reporting?

	I am familiar	I am familiar, but it is not applicable to us	I have never heard of it
GHG-Protocol (Greenhouse Gas Protocol)	○	○	○

	I am familiar	I am familiar, but it is not applicable to us	I have never heard of it
Science Based Targets (SBT)	○	○	○
ISO 14083:2023	○	○	○
Nordic Swan Ecolabel	○	○	○
GLEC Framework	○	○	○
EN 16258:2012	○	○	○

20. If a standard is not applicable to your company, please explain why.

Preferred emissions reporting

21. What environmental impact and efficiency indicators would you like logistics service providers to report?
    - ☐ Fuel consumption (liters)
    - ☐ Carbon dioxide emissions (tonnes)
    - ☐ Fuel consumption per transport performance (liters/tonne-kilometer)
    - ☐ Fuel consumption per traffic performance (liters/kilometer)
    - ☐ Energy consumption (MJ or kWh)
    - ☐ Utilisation rate of loading space on laden trips (% of weight and volume capacity used)
    - ☐ Empty running share (% of total traffic performance)
    - ☐ Harmful emissions (NOx, CO, fine particulate matter)
    - ☐ Other
22. How often would you like logistics service providers to report?
    - ☐ In real time
    - ☐ Weekly
    - ☐ Monthly
    - ☐ Quarterly
    - ☐ Annually
23. At what level of detail should the logistics service provider's reporting be?
    - ☐ Product-specific
    - ☐ Product batch-specific
    - ☐ Shipment-specific
    - ☐ Pallet-specific

- ☐ Transport route-specific
- ☐ Site-specific
- ☐ Total transport emissions
- ☐ Other

24. How should the reporting be technically carried out?
    - ☐ Written report (e.g., PDF or Excel as an email attachment)
    - ☐ Digitally via a shared tool or cloud platform
    - ☐ Digitally via direct integration between systems
    - ☐ Other
25. Other possible development areas for emissions reporting?

Emissions reporting in transport service procurement

26. How important do you consider a logistics service provider's ability to report emissions when you procure transport services?
    - ☐ We require reporting capability from all logistics service providers
    - ☐ We are willing to pay for reporting through a separate agreement
    - ☐ We prefer providers with reporting capability, even if the price is higher
    - ☐ We prefer providers with reporting capability if offers are otherwise similar
    - ☐ Reporting capability is not important
27. Could you describe in more detail how emissions reporting is reflected in your transport service procurement?

Requirements and expectations for emissions reporting

28. Do your customers have requirements or expectations regarding emissions reporting?
    - ○ Yes
    - ○ No
29. What kind of requirements or expectations do they have?
30. Do financiers or investors have requirements or expectations regarding emissions reporting?
    - ○ Yes
    - ○ No
31. What kind of requirements or expectations do they have?
32. Does your company require emissions reporting from your subcontractors (e.g., raw material suppliers)?

- ○ Yes
- ○ No

Utilisation of emissions reporting

33. Does your company use the data obtained from emissions reporting?
    - ○ Yes
    - ○ No
34. How does your company use emissions reporting data?
35. Does the use of emissions data create value?
    - ○ Yes
    - ○ No
36. What kind of value?
37. What kind of digital solutions does your company use to utilise emissions data?

Future of emissions reporting

How likely do you think the following statements will be realized by 2030?

Choose from a scale of 0–10 the option that best describes your view (0 not likely at all…10 highly likely).

		Not likely at all									Highly likely
38.	Our company has achieved the set emission reduction targets	0	1	2	3	4	5	6	7	8	9	10
39.	Our company reports emissions periodically or annually	0	1	2	3	4	5	6	7	8	9	10
40.	Our company uses emissions reporting criteria in the procurement of transport services	0	1	2	3	4	5	6	7	8	9	10
41.	Our company requires logistics service providers to report emissions	0	1	2	3	4	5	6	7	8	9	10
42.	Our company requires subcontractors (e.g., raw material suppliers) to report emissions	0	1	2	3	4	5	6	7	8	9	10
43.	Our company's supply chains are designed on the terms of emission reduction targets	0	1	2	3	4	5	6	7	8	9	10

		Not likely at all										Highly likely
44.	Our company's supply chains are planned in cooperation with the logistics service providers	0	1	2	3	4	5	6	7	8	9	10
45.	Our company's products have carbon footprint label	0	1	2	3	4	5	6	7	8	9	10
46.	Our company has a digital tool for reporting emissions	0	1	2	3	4	5	6	7	8	9	10
47.	Our emission calculation is based on a specific valid standard	0	1	2	3	4	5	6	7	8	9	10
48.	Emissions reporting practices are consistent between different actors	0	1	2	3	4	5	6	7	8	9	10

49. Briefly describe what you think an ideal emissions report would be like and how it could be ideally utilised?

Background information

You may leave a question blank if it is not relevant to your company or you cannot answer it.

50. What is your company's main industry?
    - ○ Primary production
    - ○ Construction
    - ○ Forest industry
    - ○ Metal industry
    - ○ Technology industry
    - ○ Food industry
    - ○ Chemical industry
    - ○ Other industry
    - ○ Trade
    - ○ Other service
51. Other industry, what?
52. Other service, what?
53. What is your company's annual turnover?
54. What is the share of exports in your turnover?

55. What modes of transport are used in your company's transport chains (in Finland and abroad)?
    - ☐ Road transport
    - ☐ Rail transport
    - ☐ Air transport
    - ☐ Water transport
56. What is your company's annual transport volume (Finland + abroad)? Specify the unit used (e.g., tonnes, tonne-kilometers or similar).
57. Have you outsourced your company's transport operations, i.e. is your transport handled by an external company?
    - ○ Yes
    - ○ Partly
    - ○ No
58. How many transport service agreements do you have?
    - ○ 1
    - ○ 2–3
    - ○ 4–5
    - ○ 6–8
    - ○ 9 or more

Finally, you are free to comment on the survey and topics related to the survey.

59. Comments

Appendix 7.

Survey for logistics service providers (LSPs)

Emission reduction targets

1. Has your company defined targets for reducing emissions?
   - ○ Yes
   - ○ No
2. What are these targets like (e.g., quantitative, percentage-based, target year) and how their achievement is monitored?
3. Does your company have a certified environmental management system?
   - ○ Yes
   - ○ No

Emissions reporting

4. Does your company monitor and report emissions data?
   - ○ Yes
   - ○ No
5. At what level of detail is emissions monitoring carried out?
   - ☐ Product-specific
   - ☐ Product batch-specific
   - ☐ Shipment-specific
   - ☐ Pallet-specific
   - ☐ Transport route-specific
   - ☐ Site-specific
   - ☐ Customer-specific
   - ☐ Total transport emissions
   - ☐ Other
6. What kind of indicators does your company use for monitoring and reporting emissions?
   - ☐ Emissions per km
   - ☐ Emissions per tonne-kilometer
   - ☐ Emissions per transport
   - ☐ Emissions per route
   - ☐ Emissions per shipment
   - ☐ Emissions per pallet
   - ☐ Fuel consumption (liters)
   - ☐ Carbon dioxide emissions (tonnes)

- ☐ Fuel consumption per transport performance (liters/tonne-kilometer)
- ☐ Fuel consumption per traffic performance (liters/kilometer)
- ☐ Energy consumption (MJ or kWh)
- ☐ Other

7. What environmental impact and efficiency indicators does your company report to stakeholders?
   - ☐ Fuel consumption (liters)
   - ☐ Carbon dioxide emissions (tonnes)
   - ☐ Emissions per km
   - ☐ Emissions per tonne-kilometer
   - ☐ Fuel consumption per transport performance (liters/tonne-kilometer)
   - ☐ Fuel consumption per traffic performance (liters/km)
   - ☐ Energy consumption (MJ or kWh)
   - ☐ Other
8. How often do you report to stakeholders?
   - ☐ In real time
   - ☐ Weekly
   - ☐ Monthly
   - ☐ Quarterly
   - ☐ Annually
   - ☐ Other
9. What is the level of detail in emissions reporting to stakeholders?
   - ☐ Product-specific
   - ☐ Product batch-specific
   - ☐ Shipment-specific
   - ☐ Pallet-specific
   - ☐ Transport route-specific
   - ☐ Site-specific
   - ☐ Total transport emissions
   - ☐ Other
10. How is reporting to stakeholders technically carried out?
    - ☐ Written report (e.g., PDF or Excel as an email attachment)
    - ☐ Digitally via a shared workspace or cloud service
    - ☐ Digitally via direct integration between systems
    - ☐ Other
11. What kind of digital tools or solutions do you use for emissions reporting?

12. How do you view the potential initiative of reporting fuel consumption, energy consumption and emissions through a national centralized data platform to customers and other stakeholders?
    - ☐ Interesting initiative
    - ☐ We are not willing to share data with a national portal
    - ☐ We are interested, if it makes reporting easier
13. What are the principles of emissions reporting? Do you use standards or guidelines as a basis for emissions reporting?
    - ☐ GHG-Protocol (Greenhouse Gas Protocol)
    - ☐ Science Based Targets (SBT)
    - ☐ ISO 14083:2023
    - ☐ Nordic Swan Ecolabel
    - ☐ GLEC Framework (Global Logistics Emissions Council)
    - ☐ EN 16258:2012
    - ☐ Other
14. Are you familiar with the different standards related to emissions reporting?

	I am familiar	I am familiar, but it is not applicable to us	I have never heard of it
GHG-Protocol (Greenhouse Gas Protocol)	○	○	○
Science Based Targets (SBT)	○	○	○
ISO 14083:2023	○	○	○
Nordic Swan Ecolabel	○	○	○
GLEC Framework	○	○	○
EN 16258:2012	○	○	○

15. Does your company require emissions reporting from subcontractors?
    - ○ Yes
    - ○ No
16. What kind of emissions reporting does your company require from subcontractors?
17. How would you like to develop your emissions reporting?

Customer requirements and expectations for emissions reporting

18. Does your company face requirements or expectations from customers regarding emissions reporting?
    - ○ Yes
    - ○ No
19. What kind of requirements or expectations do customers have?
20. Do authorities impose requirements or expectations regarding emissions reporting (e.g., environmental permit)?
    - ○ Yes
    - ○ No
21. What are these requirements or expectations?

Utilisation of emissions reporting

22. Does your company use the data obtained from emissions reporting?
    - ○ Yes
    - ○ No
23. How does your company use emissions reporting data?
24. Does the use of emissions data create value?
    - ○ Yes
    - ○ No
25. What kind of value?
26. What kind of digital solutions does your company use to utilise emissions data?
27. How do you think the use of emissions data could be improved?

Future of emissions reporting

How likely do you think the following statements will be realized by 2030?

Choose from a scale of 0–10 the option that best describes your view (0 not likely at all…10 highly likely).

		Not likely at all									Highly likely
28.	Our company has achieved the set emission reduction targets	0	1	2	3	4	5	6	7	8	9	10
29.	Our company reports emissions periodically or annually	0	1	2	3	4	5	6	7	8	9	10

		Not likely at all										Highly likely
30.	Our transport customers require regular emissions reporting	0	1	2	3	4	5	6	7	8	9	10
31.	Our company requires emissions reporting from subcontractors	0	1	2	3	4	5	6	7	8	9	10
32.	Our company's transport chains are planned based on emission reduction targets	0	1	2	3	4	5	6	7	8	9	10
33.	Our company's transport chains are planned in cooperation with the customer company	0	1	2	3	4	5	6	7	8	9	10

Background information

You may leave a question blank if it is not relevant to your company or you do not know the answer.

34. How many employees work in your company? An approximate range is sufficient.
35. What is your company's annual turnover?
36. What share of your turnover comes from your largest customer?
37. Which branches of industry are main transport customers?
    - ☐ No single clear main industry
    - ☐ Primary production
    - ☐ Construction
    - ☐ Forest industry
    - ☐ Metal industry
    - ☐ Technology industry
    - ☐ Food industry
    - ☐ Chemical industry
    - ☐ Other industry
    - ☐ Trade
    - ☐ Other service
38. Other industry, what?
39. Other service, what?
40. What modes of transport are used in your company's transport chains?
    - ☐ Road transport
    - ☐ Rail transport

- □ Air transport
- □ Water transport

41. What is your company's annual total traffic performance in kilometers? (Please indicate the performance with an accuracy of one hundred kilometers, if possible)
42. What is your company's annual total transport performance in tonne-kilometers? (Please indicate the performance with an accuracy of one thousand tonne-kilometers, if possible.)
43. What is your company's annual fuel consumption in liters? (Please indicate the consumption with an accuracy of one hundred liters, if possible.)
44. What is the average consumption of your fleet in the main industry transports? (l/100 km, for the industry you selected above. If your company does not have one clear main industry, leave this question unanswered.)
45. What is the share of empty running in your total traffic performance as a percentage?

Finally, feel free to comment on the survey and any issues related to its topic.

46. Comments