Global Compact Network Germany

DISCUSSION PAPER

SCOPE 3.1

Practical guidelines for data collection and calculation of greenhouse gas emissions in the supply chain

1. INTRODUCTION

As a part of their overall climate strategy, a growing number of companies are not only looking at their own organizational boundaries, but are instead expanding the scope of their carbon accounting practises to include the entire value chain. The main reasons behind this are stakeholder- and investor-driven initiatives such as the Science Based Targets initiative[1] and the CDP[2]. In order to mitigate their greenhouse gas (GHG) emissions, companies need to first identify the emissions hotspots of their organization, then collect data and finally compute the emissions. The Greenhouse Gas Protocol identifies 15 categories of so-called scope 3 emissions from upstream and downstream activities.[3] For most companies, the first category (scope 3.1) contributes to a major part of their GHG inventory. Scope 3.1 covers upstream GHG emissions from the production of purchased goods and services, which includes emissions generated during the extraction and production of raw materials, their processing as well as emissions from the transportation of purchased goods along the supply chain, but only up to tier 1 (direct) suppliers. Emissions from the transportation of goods between a company's tier 1 suppliers and its own facilities fall under scope 3.4, "Transport and distribution (upstream)".[4]

The **Peer Learning Group Climate** was launched in 2015 by the Global Compact Network Germany. In webinars and workshops, experts from large German enterprises share ideas and their experiences with corporate climate management and work together on developing business-oriented solutions. There are currently two parallel working groups consisting of nearly 20 companies from various sectors, including retail, electronic goods, energy, chemicals/pharmaceuticals, service industries, finance, mechanical engineering, transportation and technology. sustainable AG provides expert knowledge and acts as a moderator for the working groups. Previous discussions have focused on issues such as <2°C climate strategies, science-based targets, GHG data management, scope 3 materialty analysis, scope 3 data collection and reduction measures.

PRACTICAL GUIDELINES:

1) **Selecting a calculation method**
   Before collecting data, the purpose of calculating scope 3 emissions – whether it is for reporting purposes only or to use as a baseline for management – should be clearly defined. This determines whether companies should collect supply chain emissions with a high level of accuracy or if a rough estimate is sufficient.

2) **Working together with suppliers**
   Clear requests, precise instructions, and initiatives to standardise and coordinate GHG emissions data requests across companies can reduce the burden on suppliers.

3) **Selecting emission factors**
   LCA databases such as GaBi, GEMIS or ecoinvent provide useful secondary emission factors. The UK government also provides conversion factors for standard processes at no cost. The Greenhouse Gas Protocol provides additional helpful resources.

4) **Dealing with a broad range of purchases**
   When a company's purchased goods and services are highly diversified, the first step in estimating scope 3.1 emissions is to focus data collection on the goods and services that have the highest purchase expenditures and then cluster similar products into product groups.

5) **Dealing with data gaps**
   To fill existing data gaps, companies may use extrapolation or proxy data for similar products or processes to estimate scope 3.1 GHG emissions.

6) **Working with spend-based methods**
   With the Quantis Scope 3 Evaluator or with emission factors of the UK Department for Environment, Food and Rural Affairs (DEFRA), GHG emissions associated with purchase expenditures can be easily estimated for certain product groups based on "Environmentally Extended Input-Output" (EEIO) models.

1 Science Based Targets Initiative (2019): Website. www.bit.ly/ScienceBasedTargets

2 CDP (2019: Website. www.bit.ly/CDP_Website

3 Greenhouse Gas Protocol (2013): Technical Guidance for Calculating Scope 3 Emissions. www.bit.ly/ghgp-guidance

4 See Global Compact Network Germany (2019): Scope 3.4/3.9 – Practical guidelines for data collection and calculation of greenhouse gas emissions from up- and downstream transportation and distribution. www.bit.ly/DGCN_Scope-3-logistics-paper

Measuring and collecting data on GHG emissions within a company's upstream supply chain has been viewed as a particularly challenging task by practitioners. The challenges associated with collecting data and calculating scope 3.1 emissions based on the GHG Protocol methodology were discussed in the Peer Learning Group Climate of the Global Compact Network Germany (DGCN), where a series of solutions were also proposed. This paper makes the core findings of these discussions available to a broader audience and opens them up for further discussion.

2. KEY CHALLENGES

Companies are often confronted with a series of challenges when attempting to calculate their GHG emissions from scope 3.1 and collecting the required data from both their own procurement departments and their suppliers (see Figure 1). From a sustainability manager's perspective, these challenges primarily arise due to the difficulties associated with selecting an appropriate methodology, liaising with the purchasing department, processing the available data, and collaborating with suppliers. Some of those challenges are discussed in further detail below.

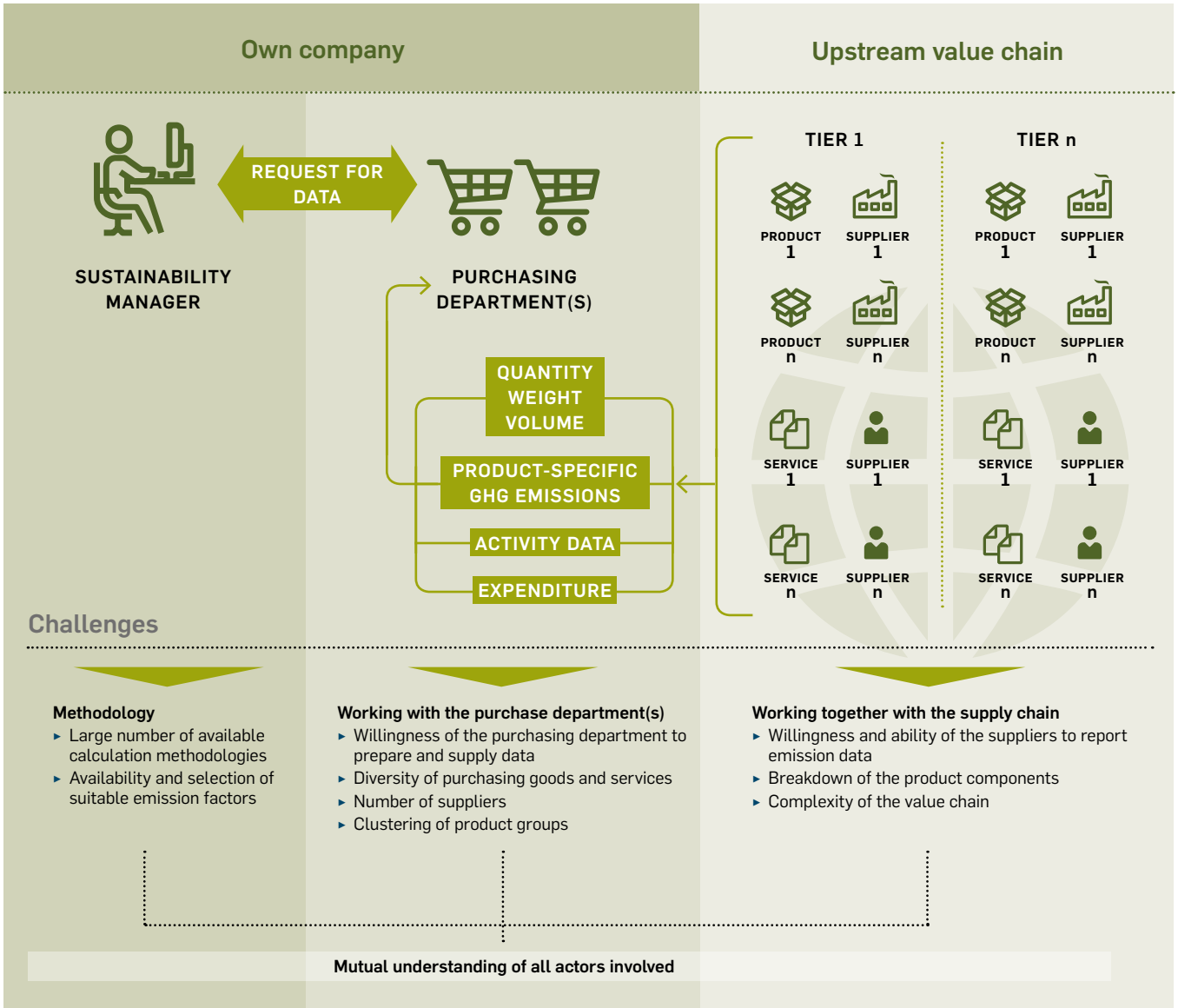

Figure 1: Challenges of data collection and calculation of scope 3.1 emissions from a sustainability manager's perspective

2.1. Selection of a calculation method, collection of the relevant data and collaboration with the procurement department

An analysis of scope 3.1 emissions must begin with an understanding of the available calculation methods. However, the wide array of methods and the complexity of data required often makes the process of choosing an appropriate calculation method challenging. Depending on the calculation method, the following information should be obtained (also compare Figure 1):

- Product-level GHG emissions arising from direct suppliers (tier 1) and their upstream chains (tier 2 to tier n)
- Quantities purchased (specifically the number of units, weight and purchase value)
- Purchasing expenditure for acquired products and services
- Supplier-level activity data (proportional energy and fuel consumption, waste, etc.)

In addition, regardless of the calculation method, data collection and emissions calculation require the purchasing department to be both willing to and capable of preparing and providing the required data. Without clear commitment from top executives, these conditions are often not met.

2.2. Limited availability of primary data

Primary data refers to specific activities within a company's value chain and provides greater accuracy than secondary data – which only reflects industry averages or proxy values. However, specific primary data on product-level GHG emissions from tier 1 suppliers is rarely available or is of poor quality.

2.3. Selecting appropriate emission factors

The identification of appropriate secondary data sources and emission factors also involves considerable effort and is fraught with challenges. Using emission factors, GHG emissions can be calculated in terms of units (e.g., kg CO_2e per kg weight of a particular good), purchasing expenditure (e.g., kg CO_2e per Euro purchase value for a particular product group), or activity data (e.g., kg CO_2e per kWh). The type of emission factors required in each case depends on the chosen calculation method.

2.4. Dealing with a very broad spectrum of purchased goods and services

In practice, the broader the spectrum of goods and services purchased, the greater the challenges associated with collecting data and calculating emissions. In the event that there are thousands of suppliers and purchased products, these should be bundled into product groups. In some companies, there are uncertainties around the criteria used for grouping products.

2.5. Managing data gaps

Due to limited data availability, many companies can initially only include a part of their purchased goods and services in their scope 3.1 emissions calculations. Therefore, they often question the appropriateness of extrapolating collected emissions data to the rest of their purchases, for which there is no available data. Similarly, for certain specific processes, emission factors are not available, resulting in data gaps that companies need to fill otherwise.

2.6. Complexity in the provision of spend-based methods

When first embarking on an analysis of scope 3.1 emissions, specifically in the case of limited data availability, the use of emissions calculation methods based on purchase value is a suitable approach. However, the sheer range of available methods with their specific advantages and disadvantages makes the entire process complex and unwieldy.

3. SOLUTIONS TO COMMON CHALLENGES

3.1. The GHG Protocol methodology

The GHG Protocol[5] provides comprehensive information and examples on data collection and calculation of scope 3 emissions. There are four methods for calculating GHG emissions from purchased goods and services (Table 1):

SUPPLIER-SPECIFIC METHOD
Collection of primary data from suppliers on product-specific GHG emissions for purchased goods and services. This includes cradle-to-gate GHG inventory data, i.e. all the emissions from the extraction or production of raw materials, their processing, and the transport of of purchased goods along the supply chain, but only up to tier 1 (direct) suppliers. Suppliers should be asked to provide the relevant background information, such as the calculation methods used and the quality of the data.

5 Greenhouse Gas Protocol (2013): Technical Guidance for Calculating Scope 3 Emissions. www.bit.ly/ghgp-guidance

AVERAGE-DATA METHOD
Supply chain emissions are quantified by multiplying activity data (amount, weight or another unit of purchased goods and services) by cradle-to-gate emission factors (e.g., tonnes CO_2e per tonnes of product) based on industry-average data.
SPEND-BASED METHOD
Emissions are estimated by using the economic value of purchased goods and services and multiplying it by cradle-to-gate emission factors (e.g., kg CO_2e per Euro purchase value) based on "Environmentally Extended Input-Output" (EEIO) models.
HYBRID METHOD
Combining the supplier-specific method (for which data is available or has been requested) with the average-data or spend-based method to fill data gaps: **Step 1:** Collecting data on product-specific supply chain emissions or at least allocated scope 1 and scope 2 emissions from direct suppliers **Step 2:** Calculating upstream emissions based on available suppliers' activity data (material input, upstream transport, product-related waste outputs) using the average-data or spend-based method **Step 3:** Calculating scope 3.1 emissions for purchased goods and services for which the supplier has not provided any emissions data by applying the average-data or spend-based method using secondary data.

Table 1: Scope 3.1 calculation methods according to GHG Protocol "Technical Guidance for Calculating Scope 3 Emissions"

3.2. Solutions proposed by the Peer Learning Group Climate

3.2.1. Selection of the calculation method

The goals for developing a scope 3 inventory and the availability of data should both be carefully considered before selecting a calculation method. If a company wants to identify its emission hotspots or roughly estimate its supply chain emissions, recommended methods are the spend-based method or the average-data method. The final choice depends on what information – purchase expenditure or mass-based information (quantity, weight, or volume) – is more readily available for each product group.

If the company's goal is to actively manage its scope 3.1 emissions, it is necessary to collect high-quality data that would allow the company to track its progress towards GHG reduction targets. This is accomplished by using primary data that directly relates to specific activities in the reporting company's value chain. Companies may either request relevant cradle-to-gate emissions data from their suppliers or work with their suppliers to assess the product carbon footprint.

However, this is a time-consuming process and poses a significant cost burden for the companies. Table 2 presents the advantages and disadvantages of the different calculation methods.

3.2.2. Support and guidance for suppliers in the provision of primary data

More and more large companies are requesting cradle-to-gate emissions data, activity data and even information on management approaches for dealing with corporate GHG emissions from their goods and service suppliers. However, the response rate and the quality of the supplied data is often unsatisfactory. This may be due to the added bur-

METHOD	ADVANTAGES	DISADVANTAGES
Supplier-specific method	▸ Potentially the most accurate method ▸ Allows tracking of emissions reductions in the supply chain ▸ Good baseline for GHG management	▸ High effort required for data collection when there are multiple suppliers ▸ High quality of primary data not guaranteed
Average-data method	▸ Minimal effort (with weight-based industry-average values) ▸ Improved accuracy when using the reporting company's own breakdown of upstream processes and using average data for each processing step	▸ Limited accuracy when using generic average data ▸ Generally insufficient regional differentiation ▸ Only under some circumstances appropriate as a baseline for management
Spend-based method	▸ Minimal effort (depending on the method/tool) ▸ Good basis for identification of GHG emissions hotspots and preliminary estimate of emissions for reporting purposes ▸ Regional differentiation in some cases possible	▸ Limited accuracy ▸ Poor baseline for GHG management
Hybrid method	▸ Pragmatic middle ground ▸ Tracking of progress possible in some cases ▸ Good baseline for GHG management (for primary data share)	▸ High effort required for data collection

Table 2: Advantages and disadvantages of different calculation methods

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Experience from recent years has shown that larger suppliers usually have access to the required data. With smaller companies, however, you have to be a bit more 'hands on' if you want to increase the response rate. It is not enough here to merely pass on emissions data questionnaires (however structured and standardized they may be). Ideally, information and data exchange must take place through the purchasing departments, although we are aware that this increases the overheads for internal resources.

den these requests place on the supplier and their lack of knowledge and experience with GHG accounting. Some companies may also fail to explain the business value of investing in GHG accounting and management. Moreover, many companies lack the market power or level of purchasing volume that would allow them to actively motivate their suppliers to provide data.

To facilitate primary data collection from suppliers, companies should remove as many hurdles as possible that stand in the way of suppliers responding to customer requests. This can be achieved by providing clear instructions with a concise structure, answering queries in a timely manner, and by implementing initiatives across companies to standardize and coordinate requests for data. Software solutions or online systems that facilitate data entry can support these efforts. The CDP Supply Chain Program, for example, is a step in this direction. It standardizes the request for climate data by enabling suppliers to respond to the requests of multiple clients with a single questionnaire, thus reducing the reporting burden.[6]

To assess the quality of suppliers' data, companies should also request supporting documentation on the methodology and data sources used. If the emissions data is not of sufficient quality, companies may request activity data instead, from which the GHG emissions can be estimated. However, suppliers are often hesitant to provide confidential or proprietary information. Suppliers' confidentiality can be protected with non-disclosure agreements, which help build trust. Alternatively, suppliers can ensure the quality of their emissions data by obtaining third party verification of their data rather than submitting detailed activity data and confidential information to the company.

Training courses on relevant topics as well as expert publications such as those from the DGCN[7] represent additional sources of support for suppliers. In any case, given the considerable effort involved in collecting GHG inventory data, it is important that suppliers understand that there is significant business value to the data.

6 CDP (2019): Supply chain program. www.bit.ly/CDP-Supply-Chain

7 Global Compact Network Germany (2019): Publications. http://bit.ly/DGCN_Publications

3.2.3. Selection of emission factors from secondary sources

The availability of suitable emission factors is central to the accurate calculation of scope 3.1 GHG emissions. Popular databases for industry-average emission factors include GaBi[8], ecoinvent[9] and Gemis.[10] Moreover, the UK Government[11] annually publishes a number of secondary emission factors for materials, including building materials, electronic equipment, metals, plastics and paper. Additional databases and data sources for life cycle emissions are listed in the GHG Protocol.[12] Business practices of CDP A List companies related to calculating GHG emissions provide further ideas for choosing appropriate emission factors (see Table 5).

3.2.4. Prioritizing and clustering – managing a broad spectrum of purchased goods and services

Businesses that purchase thousands of different products and services are advised to prioritize activities in their value chain before calculating their scope 3.1 emissions:[13] Data collection efforts should be focused on materials, products and services that are expected to have the most significant GHG emissions, offer the most significant greenhouse gas emission reduction opportunities and are most relevant to the company's business goals.

Alternatively, if detailed information is required to estimate the size of the GHG emissions from purchased goods and services is not available, companies may rank their purchased materials, products and services in terms of their relative financial significance. According to the GHG Protocol, a standard approach is to initially concentrate on goods and services that constitute 80% of the total purchasing expenditure. In addition, goods and services that individually account for at least 1% of the total purchase value, or that are relevant for another reason (such as specific risks and opportunities), should be considered. In cases where there is a very long list of suppliers, the same logic can be applied when prioritizing who to actively approach and request data from.

8 thinkstep (2019): Life Cycle Assessment (LCA) with GaBi Software. www.bit.ly/thinkstep-GaBi_EN

9 Ecoinvent (2019): Website. www.bit.ly/Ecoinvent

10 Internationales Institut für Nachhaltigkeitsanalysen und -strategien (2019): GEMIS - Globales Emissions-Modell integrierter Systeme. www.bit.ly/IINAS-Gemis_EN

11 UK Government (2019): Greenhouse gas reporting: conversion factors 2019. www.bit.ly/UK-conversion-factors (see Conversion factors 2019: condensed set (for most users), sheet "Material use")

12 Greenhouse Gas Protocol (2019): Life Cycle Databases. www.bit.ly/ghgp-databases

13 World Resources Institute and WBCSD (2011): Corporate Value Chain (Scope 3) Accounting and Reporting Standard. www.bit.ly/ghgp-Scope3AcRepStd

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If the 80/20 rule cannot be applied to individual expenditure transactions for goods and services suppliers, since the volume of purchasing transactions is too large, it can be helpful to cluster goods and services into product groups. Thereby you generate a clearer picture of the purchasing situation, and, subsequently, identify possible approaches for estimating emissions.

When using secondary data and calculating scope 3.1 emissions based on the average-data or the spend-based method, bundling products into product groups is a good way to reduce complexity. Companies are advised to first select a calculation method and then check the level of aggregation of available emission factors, or, if using EEIO tools, verify the coverage and rationale used for clustering sectors and regions. Companies should follow this rationale when clustering their own purchased products into product groups to simplify calculation.

In many companies, precise distinctions need to be made between different purchasing areas. For example, a spend-based calculation is often useful in the case of centralized procurement of operating resources, while primary data or weight-based secondary data is used for raw materials (or homogeneous materials and products such as textiles in retail companies).

3.2.5. Using extrapolation and proxy techniques to fill data gaps

The GHG Protocol identifies extrapolation and proxy techniques as completely legitimate procedures in assessing scope 3.1 GHG emissions. To estimate the total sum of scope 3.1 emissions, many companies extrapolate the emissions calculated for a particular part of their purchases to other purchased goods and services with comparable emission intensities. One such example is BASF, who calculate scope 3.1 emissions for 80% of their purchased products based on product weight and then extrapolate these emissions to 100% of their purchase volume (see table 5). If suitable emission factors for a particular process or product are not readily available, companies can resort to industry proxy data, i.e. available emissions data for comparable processes or products.

3.2.6. Working with the spend-based method

The spend-based method can be used to perform an initial screening of scope 3.1 emissions when there is limited availability of primary data, or when there is a large range of purchased goods and services.

Estimating upstream emissions using EEIO models

So-called "Environmentally Extended Input-Output" (EEIO) models provide a suitable starting point for an initial screening of scope 3.1 emissions. Input-output tables show the financial and commodity flows between different economic sectors and regions. With EEIO models, based on the purchasing activity in a given sector and region, the corresponding "shares" of the direct and indirect environmental impact of the sector can be determined. Well-known EEIO models are Exiobase, Eora, GTAP and WIOD (see Ta-

	EXIOBASE 3[14]	Eora Multi-Regional Input-Output Database[15]	Global Trade Analysis Project (GTAP)[16]	World Input Output Database (WIOD)[17]
Coverage	„Monetary" version: ▸ 44 countries ▸ 5 'Rest-of-the-World' regions ▸ 200 products ▸ 163 industries ▸ 417 emission categories ▸ 663 raw materials	„Full Eora" version: ▸ 190 countries ▸ Nearly 16,000 sectors ▸ 2720 environmental indicators	▸ 20 aggregated regions ▸ 121 countries ▸ 65 sectors	▸ 43 countries & a rest-of-the-world model ▸ 56 sectors ▸ Environmental data for 28 EU countries und 15 other larger countries
Timeframe	1995-2011	1990-2015	2004, 2007, 2011, 2014	2000-2014
Cost	Free of charge after registration	Cost of a licence available upon request; free for academic users	>5,500 € for GTAP database 10 and GTAP-E extension with emission data	Accessible free of charge
Evaluation	▸ Difficult to access for beginners with EEIO models ▸ Can only be accessed via a professional database solution ▸ Data source for the estell tool from sustain	▸ Difficult to access for beginners with EEIO models ▸ Can only be accessed via MS Access (MATlab Workspace variables data)	▸ Difficult to access for beginners with EEIO models ▸ Requires specialist software GTAP Agg ▸ Basis for the PwC Escher tool	▸ Difficult to access for beginners with EEIO models ▸ Data basis for the Quantis Scope 3 Evaluator and the estell tool from sustain

Table 3: Comparison of multi-regional input-output models with environmental data

14 Exiobase (2019): Website. www.bit.ly/exiobase

15 KGM & Associates (2019): The Eora Global Supply Chain Database. www.bit.ly/Eora-MRIO

16 Global Trade Analysis Project (2019): Website. www.bit.ly/GTAP-databases

17 World Input-Output Database (2019): Website: www.bit.ly/WIODatabase

ble 3). These differ with respect to the country and region covered, the timeframes and (license) costs. Generally, the information provided is only accessible via specilized software products and professional databases such as MS Access, and may also be difficult to interpret.

Estimating upstream emissions using EEIO tools

Tools and services that are based on multi-regional EEIO models are helpful in calculating upstream emissions. Table 4 provides a comparison of various EEIO tools and services. The Scope 3 evaluator from GHG Protocol and Quantis is a free web-based tool that is suitable for a rough initial spend-based estimate of Scope 3.1 emissions, despite considerable limitations on the accuracy of the calculation. Users that are reluctant to enter company data into an online tool can determine the appropriate emission factors by entering US$1 per sector/product group and use them outside the tool. It should be noted that the Scope 3 Evaluator includes an inflation-adjustment, but must be converted to Euro prices.[18]

With an increasing level of professionalization of corporate climate management, companies are advised to pursue more accurate calculations of their GHG emissions. Here, systain (estell) and PricewaterhouseCoopers (ESCHER) both offer tools and calculation services based on established EEIO models that allow for a more detailed analysis with more up-to-date data compared to the free tools.

Estimating upstream emissions with spend-based emission factors

Another pragmatic approach to obtaining a rough estimate of GHG emissions in the supply chain is to use the spend-based emission factors provided by the UK Department for Environment, Food and Rural Affairs (see Table 4). This database provides conversion factors from British Pound Sterling to kg CO_2 for 106 product groups and sectors based on the Standard Industrial Classification (SIC). However, these emission factors were only updated up to 2011. Nevertheless, after prioritizing the company's purchased goods and services and bundling them into product groups, companies can use these emission factors to obtain a rough estimate of their scope 3.1 emissions. It should be noted that these emission factors are based on Pounds Sterling 2011 (incl. VAT) and must be converted into Euro values for the reporting year using the currency inflation rate, the conversion rate and by adjusting the sales tax.

	EEIO Tools and Services			**Databank for spend-based emission factors**
	Scope 3 Evaluator[19]	**estell[20]**	**ESCHER[21]**	**Indirect emissions from the supply chain (UK DEFRA)[22]**
Sectors and regions covered	▸ 36 sectors ▸ No regional differentiation	▸ Approximately 50 countries/regions ▸ Over 400 economic sectors ▸ Over 100 sustainability indicators aggregated into the most significant impacts	▸ 121 countries ▸ 20 aggregated regions ▸ 65 sectors	106 commodity groups or sectors according to the Standard Industrial Classification (SIC, 2007)
Timeframe	2009	Updated annually for the given fiscal year	Updated annually for the given fiscal year	2007-2011
Cost	Free of charge	1500 Euro for calculating scope 3.1 emissions based on an Excel template; further analyses available upon request	Price on request	Free of charge
Data source	Based on the WIOD database and the Open IO database	OECD, World Bank, EXIOBASE, BEA, ILO, German Environment Agency	Based on GTAP (version 10)	GTAP, VCAIT, CDIAC
Evaluation	▸ Suitable for a first rough approximation ▸ Accessible and user-friendly ▸ Adjusts automatically to inflation ▸ Rough sector differentiation ▸ No regional differentiation	▸ Paid service provided by the company systain ▸ Good country and sector differentiation ▸ Straightforward application of complex EEIO models ▸ Updated data	▸ Paid service provided by the company PwC ▸ Good country and sector differentiation ▸ Straightforward application of complex EEIO models ▸ Updated data	▸ List of spend-based emission factors (in Pounds Sterling 2011) available at no charge ▸ Need to convert manually to the Euro value of the current year ▸ No regional differentiation ▸ Well suited for initial rough estimation

Table 4: Comparison of EEIO tools, services and databases

18 For details regarding the methodological foundations of the emission factors see Greenhouse Gas Protocol and Quantis (2017): Documentation of the data and calculations to support the Greenhouse Gas Protocol Scope 3 Screening Tool. www.bit.ly/Scope-3-Evaluator_methodology

19 GHG Protocol und Quantis (2019): Scope 3 Evaluator. www.bit.ly/Scope3Evaluator

20 Systain (2019): Estell. www.bit.ly/systain-estell

21 PwC Deutschland (2019): Economics Advisory. www.bit.ly/ESCHER (in German)

22 UK Department for Environment, Food and Rural Affairs (2014): „Table 13" - Indirect emissions from the supply chain. www.bit.ly/DEFRA-SupplyChain

4. BUSINESS EXAMPLES

The CDP's A list names the companies that received the highest scores for transparency and performance in dealing with climate change. A review of the GHG emissions reports of selected German CDP A list companies provides a good insight into the current business practices for collecting data and calculating scope 3.1 GHG emissions. Table 5 outlines their approaches and calculation methods. This overview reveals that most companies use the average-data method or the spend-based method to assess their scope 3.1 emissions. In some cases, they also conduct a detailed lifecycle assessment (e.g. BASF and Deutsche Telekom). The supplier-specific method is only used at thyssenkrupp and INDUS (for services), and Telekom plans to use the supplier-specific method if reliable supplier data can be collected via the CDP Supply Chain Program in the future.

Company	Scope 3.1 emissions (in metric tons CO_2e)	Calculation method	Approach in calculating emissions
BASF	55.466.000	Average-data method and spend-based method	▸ **Activity data:** Purchasing volume of goods and services purchased in the reporting year ▸ **Emission factors:** Weight-based average data obtained from publicly and commercially available data sources (GaBi, ecoinvent, PlasticsEurope) as well as from internal LCA database; spend-based emission factors from UK DEFRA ▸ **Calculation:** Purchased products: weight-based calculation for 80% of purchased products and extrapolation to 100%; Packaging: material composition determined and weight-based calculation based on material compositions of each packaging group; Purchased technical goods and services: spend-based calculation using purchasing volume.
Bayer	7.209.000	Spend-based method	▸ **Activity data:** Purchasing volume (in monetary terms) of purchased goods and services ▸ **Emission factors:** Spend-based emission factors from GTAP10 (PwC ESCHER tool) ▸ **Calculation:** Spend-based calculation based on purchasing volume with the PwC ESCHER tool
Deutsche Telekom	4.233.999	Average-data method and spend-based method	▸ **Activity data:** Amount of procured end devices; purchasing volume per purchase category for other purchased goods and services ▸ **Emission factors:** Internal and public PCF studies for procured end devices; input-output database sector-specific emission factors for purchase categories ▸ **Calculation:** Based on average data and purchasing expenditure; calculation with primary data from the CDP Supply Chain Program to be performed in the future
INDUS Holding	18	Hybrid method	▸ **Activity data:** Volumes of purchased goods and services ▸ **Emission factors:** DEFRA 2017; supplier-specific emission factors derived from sustainability reports of service providers ▸ **Calculation:** Combination of supplier-specific and spend-based method
Siemens	14.685.982	Spend-based method	▸ **Activity data:** Purchasing volume differentiated by country of origin and product type from the internal procurement system ▸ **Emission factors:** Spend-based emission factors from Exiobase, WIOD and BEA (from systain's estell tool) ▸ **Calculation:** Spend-based calculation based on purchasing volume with systain's estell tool
thyssenkrupp	37.000.000	Hybrid method	▸ **Activity data:** Components and materials used in products ▸ **Emission factors:** Supplier specific data and industry-average data ▸ **Calculation:** Hybrid method

Table 5: Methods applied by selected German CDP A List companies to calculate scope 3.1 emissions (based on CDP questionnaires 2018)

5. CONCLUSION AND RECOMMENDATIONS

Companies are under increasing pressure to demonstrate transparency and accountability throughout the entire value chain. The emissions category "Purchased goods and services" represents the largest proportion of the GHG inventory for most companies. When dealing with scope 3.1 emissions, a clearly defined business goal for conducting a scope 3 assessment is fundamental to selecting an appropriate calculation method. Companies should balance trade-offs between the level of accuracy desired and the effort put into data collection depending on their individual business objectives. If the company wants to actively track and reduce its GHG emissions in the supply chain, then high-quality data is required. If the aim is merely to estimate scope 3.1 emissions for public reporting, then a spend-based calculation with low accuracy may be sufficient.

Even among German companies mentioned on the CDP A list, hardly any are in a position to assess their scope 3.1 emissions purely based on primary data. Estimates are predominantly made using industry-average data and EEIO databases or tools. While this allows companies to obtain a figure to include in their scope 3 GHG emissions balance sheet, it does not provide them with a reliable basis for active GHG emission management.

Improving data quality and expanding coverage to all purchased goods and services are iterative processes. Companies should not be deterred by the complexity of data collection and calculation and simply begin by making a reasonale initial estimation of their scope 3.1 emissions. Improving cooperation with suppliers will lead to a gradual improvement of the primary database for upstream emissions and ultimately enable companies to effectively reduce their GHG emissions.

FURTHER READING

World Resources Institute und WBCSD (2011):
Corporate Value Chain (Scope 3) Accounting and Reporting Standard.
www.bit.ly/ghgp-Scope3AcRepStd

World Resources Institute und WBCSD (2013):
Greenhouse Gas Protocol – Technical Guidance for Calculating Scope 3 Emissions.
www.bit.ly/ghgp-guidance

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Through a series of discussion papers, the German Global Compact Network invites you to take part in a professional exchange of ideas covering the topics of climate management.

If you have any suggestions or additions to make to this paper, or would like to be an active participant in future discussions on the topics covered by the Peer Learning Group Climate, please get in touch with

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