KPMG for EUROPEAN RENTAL ASSOCIATION

Scopes 1, 2, and 3 carbon reporting guidance for the equipment rental industry

KPMG for the European Rental Association

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Executive summary

Advancing Carbon Reporting in the Equipment Rental Industry

Although the equipment rental industry has proven its sustainability credentials (ERA Manifesto on the environmental benefits of rental), rental companies face the challenge of quantifying their contribution to the fight against climate change. Measuring and reporting on carbon emissions are becoming key concerns. Stakeholders, from clients and investors to regulators, are now demanding transparency, sustainability targets, and climate impact breakdowns. While compliance with the EU's Corporate Sustainability Reporting Directive is imminent for larger companies operating in Europe, for small and medium rental companies this will become a point of attention in the medium term.

To serve its large members as well as small- and medium-sized companies through national rental associations, the European Rental Association (ERA) recognizes the importance of this issue and has taken a pioneering step by introducing the industry's first ever carbon reporting guidance. This comprehensive framework aims to harmonize practices and enhance accountability while setting a global example for equipment rental companies and a level playing field in the sector.

The carbon reporting guidance: tailoring the GHG Protocol for the rental industry

The current landscape lacks a unified methodology for calculating the carbon footprint of equipment rental companies. The first pillar of the ERA project is the guidance report, which proposes a step-by-step methodology for calculating corporate CO_2 emissions in Scopes 1, 2, and 3. Drawing from the established GHG Protocol, this report tailors methodologies to specifically address the rental industry's unique value chain. By aligning with the GHG Protocol, the ERA guidance ensures that users follow established standards while receiving sector-specific insights not available elsewhere. Whether a company is embarking on its carbon reporting journey or seeking to align with an industry best practice, this report provides concrete and actionable steps. It offers detailed guidance, data sources, and specific formulas for GHG emission calculations.

The report delves into direct emissions (Scope 1), indirect emissions from purchased energy (Scope 2), and all relevant categories of Scope 3. Special emphasis is placed on the most significant emission sources for the rental industry. In general, these emissions are related, first and foremost, to the equipment usage phase (ownership by the rental company and afterwards), which could represent more than 50% of the carbon footprint, and secondly, to upstream production emissions of acquired equipment. The guidance offers tailored calculation formulas to quantify emissions while allowing flexibility to adapt to data availability.

The Equipment Database: a starting point for a common and consistent industry resource

The second pillar of ERA's project introduces a valuable resource – the ERA rental equipment benchmark. As accurate emission estimation relies on specific equipment data, which today remains elusive, rental companies turn to approximations with a lack of relevant sources. The database addresses this matter by serving as a reference. It draws on industry-specific data provided by rental companies, OEMs, and lifecycle assessment analyses. Beyond carbon reporting, the database equips rental companies with a tool to respond to client inquiries about project-specific emissions. Utilizing this resource ensures consistency across the industry.

This version of the database acts as a starting point and will be enhanced in the future as more robust data becomes available.

With this project, the ERA stands behind the rental industry, advocating for better and more transparent carbon reporting. By embracing standardized methodologies and leveraging the equipment database, the industry can collectively advance towards its sustainability objectives. As collaborative efforts gain momentum, emissions decrease, and the environment benefits – a win for all.

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Introduction

With the increasing impact of climate change and the strengthening of related regulations, including CSRD application for 2025, **rental companies are confronted with challenging carbon reporting requirements**. Within the rental industry, **stakeholders are expecting companies to assess their sustainability** performance, set targets, and disclose progress. As a result, the need for a standardized methodology has emerged.

To that effect, **the ERA Sustainability Committee has developed the carbon emissions reporting guidance, specifically tailored to the rental industry.** The guidance is based on the GHG Protocol - the international standard for greenhouse gas reporting - with the primary objective of translating the general methodology into a specific, industry-tailored one. The guidance is supplemented by a database, providing a set of metrics for various types of equipment.

The guidance will assist rental organizations in understanding the GHG Protocol, implementing a carbon accounting process, and calculating Scope 1, 2, and 3 emissions, following a standardized methodology. It also acknowledges several challenges rental companies face in carbon emissions reporting and aims to address them effectively. Throughout this report, the terms leasing and rental are used interchangeably.

This report was led by the ERA Sustainability Committee, with support from KPMG in France. It was actively and collectively built with the regular participation of various leading rental players and leading OEMs contributing to the database.

What is the GHG Protocol?

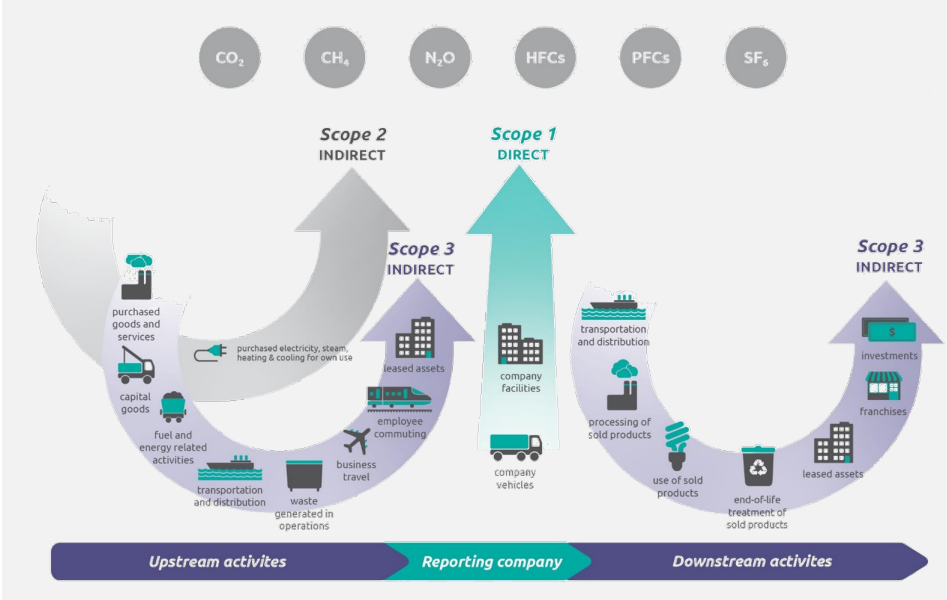
The Greenhouse Gas Protocol, also known as the GHGP, is the most widely used and renowned GHG emissions reporting methodology globally. It is also the methodology followed for CSRD application.

The GHGP was driven by the Carbon Disclosure Project (CDP), the United Nations Global Compact (UNGC), the World Resources Institute (WRI), and the Worldwide Fund for Nature (WWF). These organizations define and promote best practices in emissions reductions, aligning with climate science.

The GHG Protocol provides standards and guidance for companies and other organizations preparing a GHG emissions inventory. It covers the accounting and reporting of the GHGs covered by the Kyoto Protocol.

The standard assists companies in preparing a GHG inventory that represents a true and fair account of their emissions, **classified into 3 scopes:**

- **Scope 1** includes all direct GHG emissions from the combustion of stationary or mobile sources as well as refrigerant leakages
- **Scope 2** includes all indirect GHG emissions from the purchase of electricity, steam or heating sources
- **Scope 3** includes all indirect GHG emissions that occur in the value chain, including upstream activities (e.g., procurement, capital goods, upstream transportation, business travel, waste, upstream leased assets) and downstream activities (e.g., downstream transportation, downstream leased assets, use and end-of-life of sold products)



Sources: GHG Protocol, KPMG research & analysis

Understanding the rental business value chain

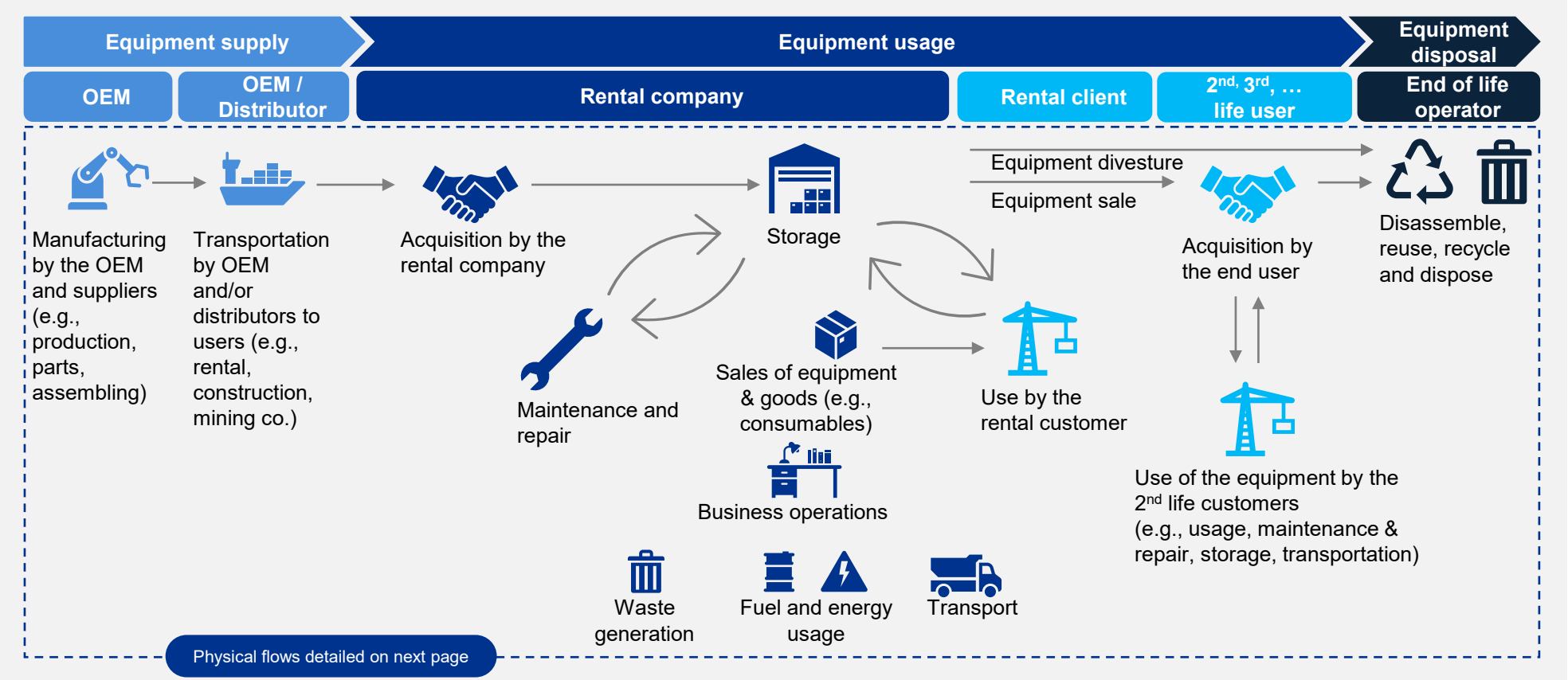
UNDERSTANDING THE VALUE CHAIN OF A RENTAL BUSINESS

EQUIPMENT RENTAL VALUE CHAIN - OPERATIONAL MAPPING

Carbon reporting is a comprehensive approach that offers a holistic perspective on the carbon footprint across the value chain. **This not only includes emissions directly produced by the reporting company, but also those generated by upstream and downstream partners.** In the rental industry, the value chain is closely tied to the equipment life cycle, which includes stages such as production, transportation, rental, sale and disposal.

By adopting an equipment-centric perspective, rental companies can gain a deeper understanding of their value chain. This approach enables them to identify the different areas of carbon emissions, thereby facilitating more effective carbon reporting.

Operational mapping of the rental industry value chain: focus on the main operations over the equipment life cycle



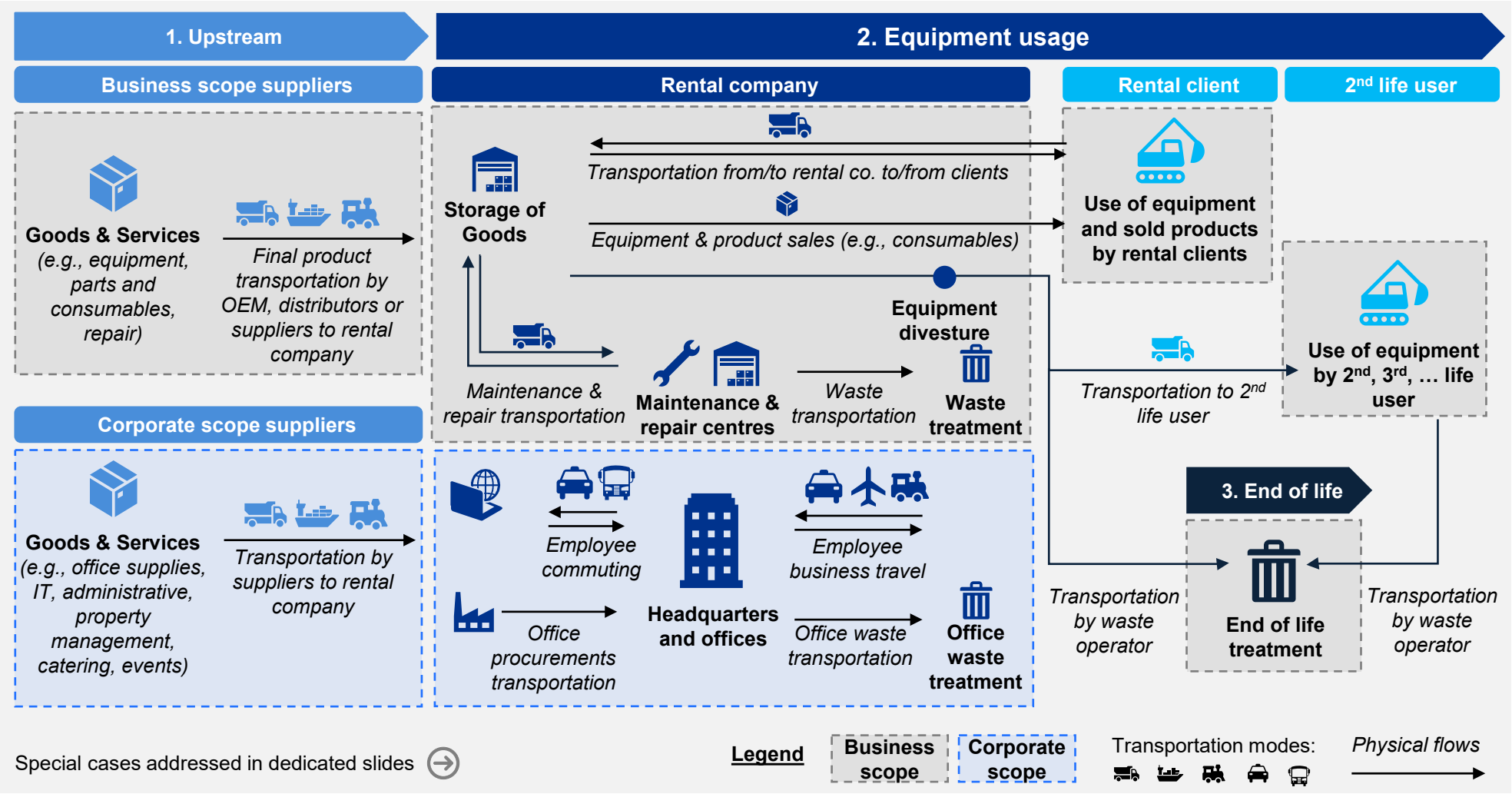
Sources: expert interviews, KPMG research & analysis

Equipment rental value chain – Physical flows mapping

Operational mapping can be enriched by detailing physical flows. Companies should account for all physical flows that, if disrupted, would affect business activities. For a better understanding of emissions, physical flows may be classified by value chain stages (upstream, usage, end of life) or according to other criteria, for example:

- Business scope: grouping the various flows related to the company's core activity, its key assets, and customer service
- Corporate scope: grouping all other flows related to auxiliary activities

Physical flows mapping of the rental industry value chain: focus on the main activities, classified by business and corporate scopes



Sources: expert interviews, KPMG research & analysis

VALUE CHAIN EMISSIONS CATEGORIZATION ACCORDING TO THE GHG PROTOCOL

The Greenhouse Gas (GHG) Protocol Corporate Standard classifies a company's GHG emissions into **three main scopes:**

- Scope 1 covers direct emissions from sources that the company owns or controls
- Scope 2 includes indirect emissions from the production of energy that the company purchases and uses
- Scope 3 involves all other indirect emissions not included in Scope 2, which occur within the company's value chain, both upstream and downstream. These Scope 3 emissions are further broken down into 15 smaller categories

This classification approach gives companies a structured framework to understand, examine, and compare their emissions.

Greenhous Gas (GHG) Protocol scopes and categories: definitions and relevant examples from the rental industry

Scope		Definition
Scope 1	**Direct emissions**	Emissions directly generated from operations owned or controlled by the reporting company. The most significant emission sources for a rental company would be: • Fuel combustion from operating assets (e.g., heating of offices or depots) • Internal transportation of goods by the rental company • Transportation of equipment and goods to/from clients by the rental company
Scope 2	**Indirect emissions**	Emissions from the production of purchased electricity, steam, heating or cooling. The most significant emission sources for a rental company would be: • Energy consumption (electricity, heat, cooling) from operating assets • Energy consumption by mobile sources (electricity for electric vehicles) for internal transportation, carried out by the rental company • Energy consumption by mobile sources (electricity for electric vehicles) for transportation of goods to/from clients, carried out by the rental company

Sources: GHG Protocol, expert interviews, KPMG research & analysis

VALUE CHAIN EMISSIONS CATEGORIZATION ACCORDING TO THE GHG PROTOCOL

Scope 3 - upstream		Definition
3.1	Purchased goods & services	Emissions from upstream activities (cradle-to-gate) involved in the production of goods and services that the reporting company purchases within the reporting year. Significant emission sources for a rental company may include parts and consumables, office supplies, services (e.g., IT, property management, events), and maintenance and repair services carried out by third parties
3.2	Capital goods	Emissions similar to those of category 3.1 (upstream, cradle-to-gate) that relate to capital asset acquisitions within the reporting year. Significant assets for a rental company include equipment acquired from OEMs or other suppliers, real estate (e.g., offices, depots) and vehicles
3.3	Fuel & energy related activities (not included in Scope 1,2)	Emissions related to the production of fuels and energy purchased and consumed by the reporting company in the reporting year that are not included in Scopes 1 or 2. Category 3.3 includes upstream emissions of purchased fuels and electricity and transmission and distribution (T&D) losses (applicable on electricity, steam, heating and cooling)
3.4	Upstream transportation & distribution	Emissions from transportation and distribution of goods between a company's tier 1 suppliers and its own operations, using vehicles not owned or operated by the company. This category also includes third-party transportation and distribution services purchased by the company during the reporting year (including inbound and outbound logistics). The most significant operations for a rental company would be: • Transportation of equipment and associated products from tier 1 suppliers to the rental company • Transportation of goods and equipment between the rental company facilities, client sites, and service providers, carried out by a third party and paid for by the rental company
3.5	Waste generated in operations	Emissions from the disposal and treatment of waste generated by the company's operations and managed by third parties. Significant waste-generating operations for a rental company may include maintenance and repair, equipment disposal at end-of-life (if the equipment is not sold to other users), and office waste
3.6	Business travel	Emissions from the transportation of employees for business-related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars
3.7	Employee commuting	Emissions from the transportation of employees between their homes and their worksites. Commuting includes travel by automobile, bus, rail, air and other modes of transportation (e.g., subway, bicycling, walking)
3.8	Upstream leased assets	Emissions from the operation of assets that are leased by the reporting company (lessee) in the reporting year and not already included in the reporting company's Scope 1 or 2 inventories. The most significant emissions for a rental company would be: • Leased capital assets (e.g., real estate, vehicles) • Leased equipment from other suppliers for re-rental to clients (refer to special case #3 - operating leased assets for more information)

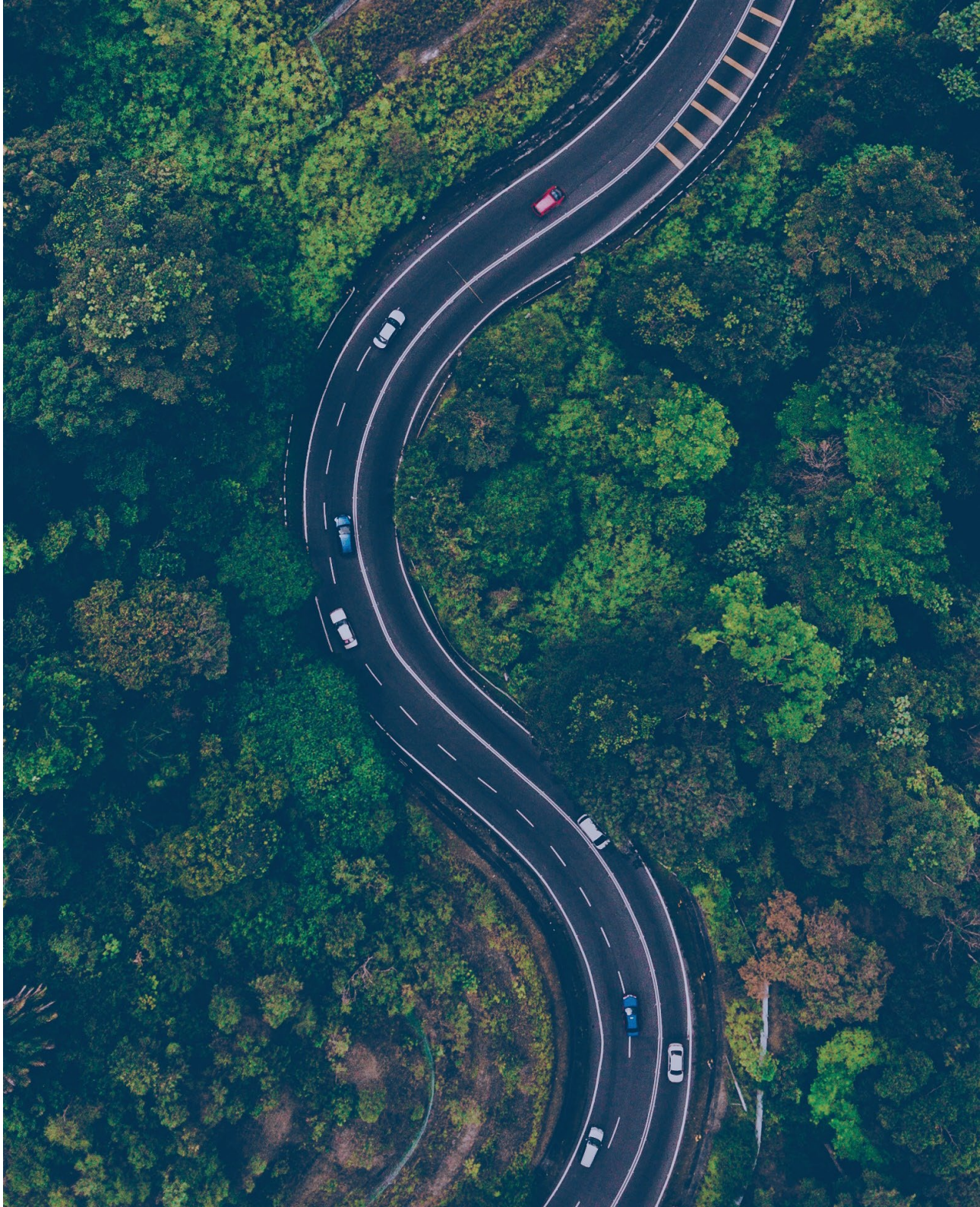
Sources: GHG Protocol, expert interviews, KPMG research & analysis

VALUE CHAIN EMISSIONS CATEGORIZATION ACCORDING TO THE GHG PROTOCOL

Scope 3 – downstream		Definition
3.9	**Downstream transportation & distribution**	Emissions from transportation and distribution of goods and sold products using vehicles not owned or operated by the reporting company. Outbound transportation and distribution services that are purchased by the reporting company are excluded from category 9 and included in category 4 because the reporting company purchases the service. The most significant operations for a rental company would be: • Transport of equipment to/from client sites, carried out by the client or a third party and not paid by the rental company
3.10	**Processing of sold products**	Emissions from processing of sold intermediate products by third parties (e.g., manufacturers) subsequent to sale by the reporting company. • Category 3.10 is generally marginal for a rental business
3.11	**Use of sold products**	Emissions generated from the use of products sold by the reporting company, including at least the Scope 1 and 2 emissions from end users. The most significant emissions for a rental company would be: • Use of sold equipment by the 2nd, 3rd, … life users, including regular maintenance and repair • Rental companies sell goods over the counter (e.g., consumables, personal protective equipment), however, only goods that generate emissions during use should be included in this category 3.11
3.12	**End of life treatment of sold products**	Emissions from the waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life. The most significant emissions for a rental company would come from the end-of-life treatment of equipment when it is sold to other users rather than being directly disposed of by the rental company
3.13	**Downstream leased assets**	Emissions resulting from the usage of equipment owned by the company (as the lessor) and leased to clients throughout the reporting period. This category is the most significant for a rental company, as it relates to the core business and includes emissions from equipment usage while rented by clients
3.14	**Franchises**	Emissions from the operation of franchises not included in Scope 1 or Scope 2. A franchise is a business operating under a license to sell or distribute another company's goods or services within a certain location. This category is applicable to franchisors (i.e., companies that grant licenses to others in return for payments, such as royalties for the use of trademarks and other services) • Unless operating under a franchise model, category 3.14 is generally not relevant for a rental business
3.15	**Investments**	Scope 3 emissions associated with the reporting company's investments in the reporting year, not already included in Scope 1 or Scope 2. This category is applicable to investors (i.e., companies that make an investment with the objective of making a profit). Investments are categorized as a downstream Scope 3 category because providing capital or financing is a service provided by the reporting company • Unless investments are made in other entities, category 3.15 is generally not relevant for a rental business

Sources: GHG Protocol, expert interviews, KPMG research & analysis

Carbon reporting principles and approach



Carbon reporting principles and process

Principles

Aligned with the principles of the GHG Protocol, this guidance aims to **translate the GHGP directives into methods tailored for the rental industry**. Its objective is to clarify industry specifics and **ensure consistency in calculation and estimation methods across the sector**. Serving as a complementary added-value resource, it is designed to help rental companies conduct and better understand their carbon reporting. Additionally, it includes an equipment metrics database, strongly recommended unless companies have robust qualitative data. Both the guide and the database are tools that facilitate emissions estimations for various purposes, including a client's project emissions.

As a common resource for the industry, the guidance considers various reporting approaches to benefit companies at all stages of maturity. The guide accommodates companies that may opt for different methodologies, depending on the desired level of precision and data availability.

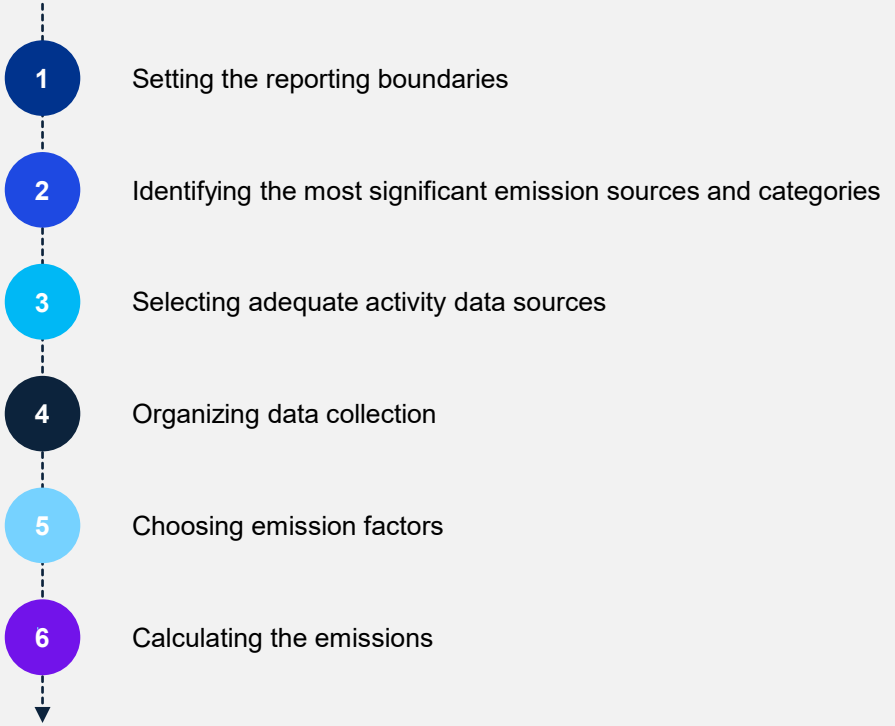
Conducting a carbon footprint assessment poses various challenges. They may be technical, managerial, internal, or related to external stakeholders. Before delving into the specifics of the process and its calculation methods, it is essential to highlight some key success factors:

- **Goal-oriented**: beyond meeting regulatory requirements, a carbon footprint should offer insight into emission sources and levels, aiding in the identification of reduction levers
- **Collaborative**: engaging various stakeholders (employees, middle management, suppliers, clients) throughout the process is essential
- **Representative:** a carbon footprint should reflect the company's emissions, achieved through careful boundary and methodology selection
- **Balanced between accuracy and simplicity:** to ensure the feasibility of a data-intensive and complex process, companies may prioritize significant emission sources, and use straightforward yet representative methods for others
- **Integrated and adaptable:** companies should aim to incorporate carbon reporting into their business processes and improve it gradually for better accuracy and efficiency. Sharing data with suppliers and clients will also help strengthen data and calculation methods.

Process

Prior to launching the calculations, it is important to have a comprehensive understanding of the tasks necessary for carbon reporting. This allows the company to plan and organize its work effectively. The following five-step process is applicable to any entity intending to conduct a carbon footprint assessment and should aid in improving the efficiency, quality, and success of the reporting process.

Carbon reporting process



1 SETTING THE REPORTING BOUNDARIES

To initiate carbon reporting, companies must first establish the reporting boundaries. This entails specifying the timeframe and the emission sources to be included. Boundaries should be set to produce a meaningful carbon footprint that aligns with the company's objectives. They may also evolve over time as a reporting company enhances its coverage or engages in M&A activities. The GHG Protocol uses the following principles to structure boundary delineation.

GHG Protocol principles to set the reporting boundaries

Accounting period

The carbon accounting period is based on an annual reference year and may cover a calendar or fiscal year.

The first reference year for which a company conducts its carbon accounting may be referred to as the baseline year.

Organizational perimeter

Organizational boundaries define the parts of an organization that will be included in the carbon accounting.

In the case of rental companies, the operational control approach is recommended.

Thus, all associated activities, countries, subsidiaries, (including small ones) or minority shareholding companies over which the rental company has operational control are to be included within the reporting.

Refer to the next page for more details on the organizational perimeter.

Operational perimeter

The operational perimeter further refines the organizational boundary by considering specific operational activities. It refers to the categories and GHG emission sources associated with the companies' operations included in the organizational scope.

The operational perimeter for a classic rental company includes the categories detailed in the chapter "Understanding the rental business value chain":

- Category 3.10 - Processing of sold products – is not relevant for the rental industry and can be excluded from the reporting
- Categories 3.14 – Franchises – and 3.15 – Investments – are to be included only if relevant for the business model of the reporting company

Focus on the organizational perimeter

To define the organizational boundary for carbon reporting, companies must select the most suitable approach among three options proposed by the GHG Protocol based on their business model and corporate structure.

The different types of approaches for setting the organizational perimeter

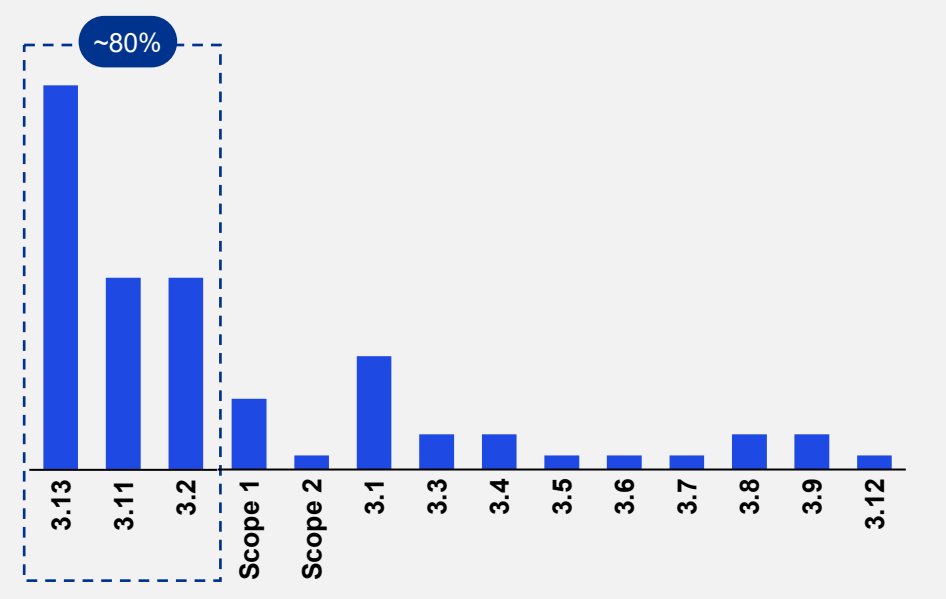
Approach	Definition	Corporate structure (examples)		
		Reporting company subsidiaries	Associated / affiliated companies	JV/partnership w/minority control
Equity share approach	The company accounts for emissions from operations according to its share of equity in the operations.	emission based on % equity share	emission based on % equity share	emission based on % equity share
Recommended approach **Operational control approach**	The company accounts for all emissions from operations over which it has operational control	100% of emissions	If the reporting company has significant influence over the operations, it must account for all emissions	If the reporting company has significant influence over the operations, it must account for all emissions
Financial control approach	The company accounts for all emissions from operations over which it has financial control (e.g., right to the majority of benefits, retains the majority of risks)	100% of emissions	If the reporting company has no financial control, then it can be excluded	emission based on % equity share

2 IDENTIFYING THE MOST SIGNIFICANT EMISSION SOURCES AND CATEGORIES

Carbon reporting can be a complex, data-intensive, and time-consuming process. Ideally, a company addresses all its emissions across the entire value chain using the best available methods. However, some categories and emission sources are more relevant to the company than others. **A company would be more focused on the emission sources that are most significant in its carbon footprint or those whose reduction it can influence**. Based on such criteria, a company can screen its emissions and identify those most relevant to it. Consequently, these emissions would be addressed with more attention and precise methods in the reporting. Other categories can be addressed using simpler methods, while remaining compliant with the GHG Protocol.

In general, **the most significant emissions of a rental company originate from the life stages of the equipment in its fleet**. Based on a review of multiple rental companies, the most substantial emissions in the rental industry come from the use of rented equipment by clients. The upstream production emissions of the equipment (category 3.2) and the use of sold equipment (category 3.11) also appear to be significant. It is important to note that the contribution of these categories (3.11 and 3.2) to the overall emissions varies depending on the holding period of assets; some models are short-term, others long-term. Category 3.2 can also fluctuate from one year to another as it only relates to equipment acquired during the reporting period.

Significance of emission categories for the rental industry



Sources: expert interviews, KPMG research & analysis

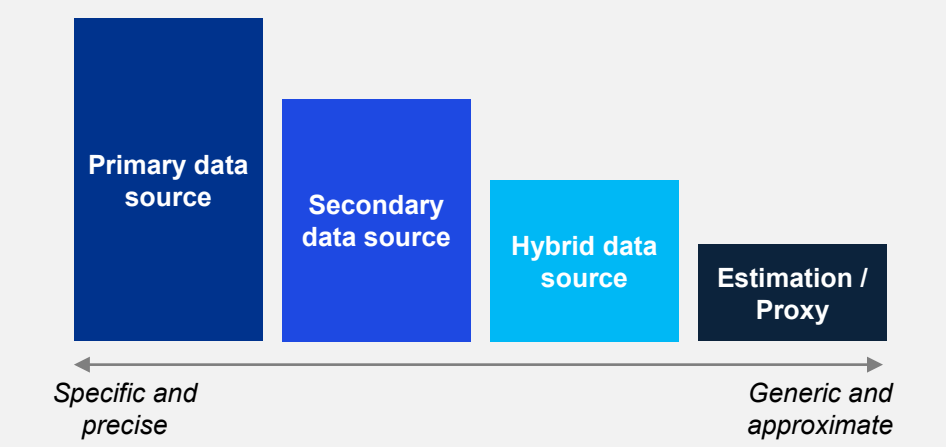
3 SELECTING ADEQUATE ACTIVITY DATA SOURCES

Various data sources may be used to calculate GHG emissions. **The reporting company determines which sources to use based on data availability and the desired level of precision**. The choice of data type may also affect the calculation method.

As previously mentioned, a rental company's carbon footprint is closely related to emissions from the different life stages of its equipment. During the reporting process, the rental company will need to collect or set data for these stages, which will vary in terms of source and type. Rental companies can collect data from their telematics systems (for emissions from client usage) and from OEMs (for upstream production emissions). However, equipment-specific data (primary data) can be difficult to access, process, or may not be available at all. In many cases, rental companies will calculate averages based on alternative metrics. The most challenging data to set are usage emissions after sale (category 3.11) and end-of-life treatment (category 3.12), as these pertain to future operations not controlled by the rental company.

Collecting data for each individual piece of equipment can be exceedingly challenging. Rental companies can simplify the task by categorizing equipment into relevant families and sub-families. It is also important to note that different categorization systems may be used for the various GHG Protocol categories due to the diverse types of data involved.

Data source type, from highest to lowest precision level



Primary data source (or supplier-specific data)

This approach involves collecting cradle-to-gate data from suppliers (see appendix for definition). It is the most precise approach because it provides accurate emissions data for products/equipment but is difficult to obtain.

Secondary data source (or average-based data)

This approach involves collecting activity data (also called average-based) with the appropriate unit (e.g. kWh of electricity, litre of fuel purchased). It can be collected directly from IT systems or from data owners.

Hybrid data source

This approach is a combination of primary and secondary data sources to fill in gaps. This is a common approach for companies that have difficulties obtaining all required data from suppliers.

Estimation and proxy

When a company does not have sufficient data, the use of proxy data to fill in data gaps can be used. Proxy data is defined as data from a similar activity that is used as a stand-in for a given activity. However, improving accuracy over time should be a number one priority to reduce estimation and, consequently, the uncertainty of the overall footprint.

Sources: expert interviews, KPMG research & analysis

Focus on the different types of data

Definition, advantages and disadvantages of the different data types

	Definition	Advantages	Disadvantages
Supplier-specific	Estimates emissions by collecting actual emissions data based on the supplier (e.g., actual emissions per € based on suppliers)	• Most precise emission calculations • Most solid baseline to work on a decarbonization strategy	• Difficult to collect • Difficult and challenging results (requires very high data quality)
Average-based	Estimates emissions by collecting data on the mass (e.g., kilograms) or other relevant physical unit (e.g., units, litres, kWh)	• Relatively precise emission calculations • Provides an accurate baseline for decarbonization monitoring and steering	• Difficult to collect the right data • Time consuming • Requires relatively high data quality
Spend-based	• Estimates emissions by collecting data on the economic value of goods and services purchased (e.g., thousands of € in insurance services purchased) • A few steps are necessary when using the spend-based approach, such as excluding VAT from all monetary data, excluding charges which are already included in Scopes 1 and 2 (salaries, rents), excluding charges to avoid double counting with other Scope 3 categories (e.g., transportation of goods, business travel)	• Quickly accessible and easy to calculate • Gives a broad overview of emissions • Fosters the completeness of all activities from the reporting entity	• Imprecise methodology (emissions based on spending) • Difficult to monitor and reduce when implementing a decarbonization strategy

4 ORGANIZING DATA COLLECTION

Conducting a carbon reporting exercise is extremely data-heavy, as it requires organizations to collect relevant input data for all the scopes and emission sources within their organizational and operational boundaries and match these with relevant emissions. Therefore, reporting companies, particularly those conducting their first carbon accounting, should review the data needs and prioritize data collection based on data availability and the objective of their carbon accounting. Depending on the data needed, data collection may require the involvement of external parties (suppliers, clients).

Data collection framework

Plan your reporting journey from collecting data to calculating emissions

Involve your operational teams from the outset; this will facilitate the collection process and reporting practices

Implement a **custom-made reporting practice** for your company

1. Plan and involve

- **Plan your data collection** (1-2 months on average)
- **Involve the data holders** (e.g. logistics, purchasing department, country representative) from the outset

2. Prioritize efforts

- **Focus efforts and resources** on categories that have significant emissions
- Improve accuracy over time

Finding the right data can be complex, **so focusing efforts and resources on the categories that have the highest impact** is a priority (e.g., equipment usage by clients)

Categories in which reporting companies do have **leverage for decarbonization actions** (e.g., rental fleet) **should be prioritized too**

Emission calculation and estimates will improve over time and with expertise, as companies collect and share data with key partners such as OEMs

Collecting data can be complex (e.g., getting data from value chain for transport, travels, usage) so using **the simplest approach that can generate an acceptable level of accuracy is advisable**

Collect data with the **right level of disaggregation required** (e.g., by country, by activity, by entity)

4. Achieve simplicity

- Choose the **appropriate level of complexity**
- Collect data with the appropriate level of disaggregation

3. Keep track

- Multiple data sources and data holders can be hard to track
- Companies are constantly evolving, so their reporting practices will also evolve

Always **keep track of data sources**, estimations and hypotheses used for the carbon footprint

To comply with **CSRD** requirements and audits**, proof will be necessary**

Sources: KPMG research & analysis

5 CHOOSING EMISSION FACTORS

For all activity data included in the carbon footprint, the corresponding emission factors need to be associated. An emission factor is a representative value that correlates the GHG emissions of a product, equipment, material, or activity with the amount consumed or purchased by the rental company. Whenever feasible, multiple emission factor data points should be collected to validate the source.

Emission factors estimated in CO_2e (CO_2 equivalent) need to include all six greenhouse gases covered by the Kyoto Protocol: Carbon dioxide (CO_2), Methane (CH_4), Nitrous Oxide (N_2O), Hydrofluoro-carbons (HFCs), Perfluorocarbons (PFCs), and Sulphur Hexafluoride (SF_6).

There are three different methodologies to find an emission factor:

01 Generic emission factor

Find a generic emission factor from a reliable, recognized, and international database, which can be either publicly available (e.g., DEFRA) or private, accessible for a fee (e.g., Ecoinvent)

02 Supplier-specific emission factor

Ask suppliers to provide their emission factors for a given purchase of goods or services. This is considered a reliable source (supplier-specific method).

03 Carbon footprint or LCA of products

To get the most specific emission factor, a Life Cycle Analysis (LCA) is required. It is a methodology for assessing environmental impacts, including CO_2, associated with all the stages of a product's life cycle (from raw material extraction to end-of-life)

Examples of databases for generic emission factors

Data	Relevant scopes	Public or private database	Description
ADEME	Scopes 1, 2, 3	Public	French-based open source; partially updated annually; contains numerous physical and monetary emission factors
DEFRA	Scopes 1, 2, 3	Public	UK-based open source; updated annually; contains numerous physical emission factors
Exiobase	Scope 3	Public	EXIOBASE is a global, detailed multi-regional EEIO database; open source; updated annually; contains only monetary emission factors
E-Grid	Scope 2	Public	US-based open-source database; for electricity emission factors for the United States
IEA	Scope 2	Private	From IEA agency, a paid-access database; for electricity and heating emission factors across all geographies
Ecoinvent	Scopes 1, 2, 3	Private	Paid-access database; updated annually; contains numerous emission factors for all countries and primarily used for Life Cycle Analysis purposes
CEDA	Scopes 1, 2, 3	Private	Paid-access database; updated annually; contains monetary emission factors, for all countries
Re-diss / AIB	Scope 2	Public	US and EU open-source database, for residual mix market-based electricity emission factors

Category guidance and calculation methodologies

Scope 1 – Direct emissions from owned/controlled operations

Description

Scope 1 emissions are direct greenhouse gas (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles).

For a rental company, Scope 1 typically includes emissions related to the operation of real estate (e.g., heating), the transport of people and goods, and the usage of machines for internal operations in the depots.

Boundaries and possible exclusions

Scope 1 emissions correspond to:

- Emissions from **stationary combustion sources** that include the combustion of fossil fuel used in buildings and other stationary machines (e.g., natural gas, coal, fuel oil). Also, a part of biofuel emissions is to be included in Scope 1 (Methane (CH_4) and Nitrous Oxide (N_2O) emissions only)
- Emissions from **mobile combustion sources** that include the combustion of fossil fuel used in owned or controlled sources such as vehicles (e.g., petrol or diesel used in vehicles for the transportation of goods or for business travel)
  - Emissions from equipment transportation fall under Scope 1 when the rental company handles the transportation. However, if a third party provides the transportation (e.g., logistics company, rental client), these emissions are classified under Scope 3 (categories 3.4 or 3.9)
- **Fugitive emissions** that include the unintentional release of gas including those from refrigerant systems (e.g., refrigerants used in air conditioning produce fugitive emissions during their operational life)

The emissions to exclude from Scope 1 are:

- The CO_2 emissions from biofuels (e.g., biodiesel) or biomass that need to be reported separately (GHG B emissions). For more information, please refer to the calculation tools FAQ on the GHG Protocol website

Methodologies Panorama

1 applicable methodology is suggested in this guidance to report Scope 1 emissions:

1 "**Consumption-based**" methodology based on consumption data for stationary, mobile and fugitive emissions

Sources: GHG Protocol, KPMG research & analysis

1 Consumption-based Method – Stationary Emissions

Description

Stationary emissions originate from fixed sources like boilers or generators and result from fuel combustion in stationary applications.

They can be measured using the amount of fossil fuel and other stationary consumptions used.

The data can be either **directly collected** from measurement devices **or estimated** based on consumption metrics (e.g., for offices, fuel consumption for heating can be estimated by using the surface area (square metres) and the average consumption per square metre).

Data requirement & collection

To use this method, the reporting company can either:

- Collect the **quantity of fossil fuel / biofuel consumed** within a year. This includes natural gas (litres, kWh, GJ, m3), coal (kWh, litres) and other fossil fuel or biofuel consumption (litres, GJ, kg)
- Or **estimate fuel consumption based on average consumption metrics**

For real estate (e.g., offices), only energy consumed for the space occupied by the reporting company should be considered. Fuel consumption can be estimated by using the building's occupancy and consumption.

Fuel consumption can be gauged from several sources, including:

- Direct meter readings
- Purchase records (e.g., bills) provided by the suppliers, facility or office managers
- Fuel expenditures retrieved from accounting departments, converted into quantities using average prices

For real estate estimations, building occupancy can be provided by the facility managers. Average fuel consumption figures, for heating and other purposes, are typically available in public resources like DEFRA or other publicly available data (e.g., the French Ministry of Ecological Transition, Statista, Odysee-Mure)

Emission factors

The emission factor for each type of fuel considered is required, such as:

- Natural gas EF ($kgCO_2e$/litre, $kgCO_2e$/kWh)
- Coal EF ($kgCO_2e$/kWh, $kgCO_2e$/litre)
- Biofuel EF for CH_4 and N_2O (see DEFRA bioenergy table in $kgCO_2e$/litres, GJ or kg)

Emission factors can be obtained from specialized databases such as ADEME, DEFRA, Umwelt Bundesamt, EPA, ECCC, IEA, or other country-based databases.

Formulas for stationary emissions

Using fuel quantities

STATIONARY EMISSIONS =
Natural gas consumed (litres)
x
Natural gas EF ($kgCO_2e$/litre)
+
Biofuel consumption for CH_4 & N_2O only (litre, GJ, kg)
x
Biofuel EF ($kgCO_2e$/litre, GJ, kg)

To estimate real estate consumption using building occupancy

REAL ESTATE FUEL CONSUMPTION =
Building's occupied surface (m^2)
x
Average fuel consumption (litres/m^2)
OR
Building's occupancy rate (%)
x
Building's total fuel consumption (litres)

Sources: GHG Protocol, KPMG research & analysis

1 Consumption-based Method – Mobile Emissions

Description

Mobile emissions are produced by company-owned vehicles and equipment that burn fuel during operation. These mobile sources can include vehicles used for transporting people and equipment, as well as equipment used within the rental company's facilities**.**

They can be accounted for by applying the consumption-based method using the quantities of fuel consumed within the reporting year.

The data can be either **directly collected or estimated** based on consumption metrics (e.g., fuel consumption for a vehicle can be estimated by using the distance travelled (kilometres) and average fuel efficiency (litres/km)).

Data requirement & collection

To use this method, the reporting company can either:

- Collect **the quantities and types of fuel consumed** in mobile sources (e.g., litres of diesel or petrol, gallons)

If energy usage data is not available, companies may derive it from:

- Expenditures on fuel and/or electricity and their average prices
- Distance travelled (km) over the year and the vehicles' average fuel efficiency (litres/km).

Activity data can be sourced from:

- The HR department (fuel mileages, bills)
- The logistics department that can provide litres of fuel consumed by owned transportation vehicles
- The accounting department can provide data on fuel expenditures. These costs can then be converted into quantities using average fuel prices

To estimate vehicle fuel consumption, fuel efficiency can be referenced from technical specifications or the literature (e.g., car supplier websites).

Emission factors

The emission factor for each type of fuel considered is required to calculate emissions, such as:

- Diesel EF ($kgCO_2e$/litre)
- Petrol EF ($kgCO_2e$/litre)

Emission factors can be obtained from specialized databases such as ADEME, DEFRA, Umwelt Bundesamt, EPA, ECCC, IEA, or other country-based databases.

Formulas for mobile emissions

Using fuel quantities

MOBILE EMISSIONS =
Fuel consumed (litres) x Fuel EF ($kgCO_2e$/litre)

To estimate vehicle consumption using distance travelled

VEHICLE FUEL CONSUMPTION =
Distance travelled (km) x Vehicle fuel efficiency (litres/km)

Sources: GHG Protocol, KPMG research & analysis

1 Consumption-based Method – Fugitive Emissions

Description

Fugitive emissions are intentional or unintentional greenhouse gas releases from leaks in pressurized equipment and during the handling and storage of gases and liquids.

They can be accounted for by applying the consumption-based method using the quantities of refrigerants consumed by refrigeration equipment (air conditioner).

If the weight of refrigerant consumed is not available, alternative estimation methods and tools can be used, such as:

- The EPA recommendations, referencing default Emission Factors for refrigeration/air conditioning
- COPELAND, a free tool available to estimate refrigerant consumption (applicable for climate control of spaces accommodating humans)

Data requirement & collection

To use this method, the reporting company can either:

- Collect the type of refrigerants consumed (R410a, HFC) and weights (Kg)
- Or estimate the weight of refrigerants from cooling capacity (kW), max capacity of fluid consumption for an air conditioner (kg) and the annual leakage rate (%). These characteristics are generally indicated in the equipment manuals

The types and weights of refrigerants can be obtained from suppliers (kg of refrigerants charged for the year) or facility managers (bills).

Emission factors

The emission factor for each type of refrigerant considered is required to calculate emissions, such as:

- R410a EF ($kgCO_2e/kg$)
- R407 EF ($kgCO_2e/kg$)
- HFC EF ($kgCO_2e/kg$)

Emission factors can be obtained from databases such as ADEME or DEFRA

Formulas for fugitive emissions

FUGITIVE EMISSIONS =

Refrigerant consumed (kg)
x
Refrigerant EF ($kgCO_2e/kg$)

To estimate the quantity of refrigerant consumed for air conditioning

ANNUAL CONSUMPTION OF REFRIGERANT (KG) =

Cooling capacity (kW)
x
Kg of fluid per kW of refrigerant (kg/kW)
x
Annual leakage rate (%)

EXAMPLE

An office is equipped with 6 air conditioners for general climatization use (residential/office use), with the following technical specifications:

- Cooling capacity of 2.4 kW
- 0.250 kg of fluids per kW of fridge
- 15% rate annual leakage
- Refrigerant type : R410a

The annual refrigerant consumption from the 6 air conditioners is:

2.4 kW x 0.250 kg/KW x 15% x 6 air conditioners = 0.54 kg of refrigerant consumed per year

The emission factor for the R410a is 1,920 kgCO2e/kg of refrigerant

The total fugitive emissions are:

0.54 kg x 1,920 kgCO2e/kg = 1,036.8 kgCO2e

Sources: GHG Protocol, KPMG research & analysis

Scope 2 – Indirect emissions from energy purchases

Description

Scope 2 emissions are **indirect GHG emissions** associated with the purchase of electricity, steam, heat, or cooling.

These emissions are produced by external facilities that supply energy to the organization, such as power plants and district heating or cooling systems. While the reporting company itself does not directly produce these emissions, it is accountable for them due to its **consumption of the energy services provided.**

Boundaries and possible exclusions

Scopes 2 emissions correspond to:

- Indirect emissions **from electricity consumption** (e.g., electricity consumption by country offices, stores, buildings, warehouses, vehicles)
- Indirect emissions **from steam, heat and cooling consumption** (e.g., heat and cooling networks)

Methodologies Panorama

2 applicable methodologies are proposed to report Scope 2 emissions:

1. "**Location-based**" approach reflects the average emissions from a country or local grid

2. "**Market-based**" approach calculates emissions based on the specific electricity purchased by rental companies through individual energy contracts, rather than using the average emissions from the general grid mix

Companies are encouraged to report Scope 2 emissions using both methodologies.

Sources: GHG Protocol, KPMG research & analysis

1 LOCATION-BASED METHOD

Description

The **location-based method** calculates carbon emissions by reflecting the average emission intensity of the grids where energy consumption takes place. This means that emissions are determined using an average emission generation factor **specific to a defined geographic location**, such as a country, region, or subregion.

In the case of real estate where the actual energy consumption is not known, **an estimation can be derived from a generic average consumption per square meter applied to the relevant surface.**

Data requirement & collection

To use this method, the reporting company needs to collect energy consumption data:

- The quantity of electricity consumed (kWh) **for each country**
- The quantity of steam, heat and cooling consumed (kWh) for each country or specific regions (e.g., steam and cooling network from Paris)

For real estate, only the energy used for the space occupied by the reporting company should be considered. If the amount of electricity consumed cannot be directly collected, it can be estimated using the same approach outlined in Scope 1 - Stationary Emissions, substituting fuel with the required form of energy (electricity, steam, heat or cooling).

Electricity used by vehicles or other assets managed by the reporting company should also be included. If these usage data are not directly available, they can be estimated using the same approach outlined in Scope 1 - Mobile Emissions, substituting fuel with electricity.

Energy consumption can be gauged from several sources, including:

- Direct meter readings
- Purchase records (e.g., bills) provided by the suppliers, facility or office managers
- Electricity expenditure retrieved from accounting departments, converted into quantities using average prices

Emission factors

The emission factors needed are **location-based**, such as country grid emission factors ($kgCO_2e/kWh$).

They can be retrieved from databases such as ADEME, DEFRA, Umwelt Bundesamt, EPA, ECCC, IEA, or any specific country-based public database.

Formula for indirect emissions from electricity purchases

INDIRECT SCOPE 2 EMISSIONS, LOCATION-BASED =
Electricity consumed per country (kWh) **x** **Location-based EF ($kgCO_2e/kWh$)**

If the electricity consumed is not known, the estimation methods for real estate and vehicles outlined in Scope 1 can be applied.

Sources: GHG Protocol, KPMG research & analysis

2 Market-based Method

Description

The **market-based method** accounts for the emissions from electricity that companies have purposefully chosen (or are constrained to choose). This approach **assigns emissions based on the electricity supplier or product**, including power generators and the acquisition of energy attribute certificates. The method reflects the specific emissions of the electricity purchased by the rental company rather than that of the general grid of the country.

The same activity data required for the location-based approach is also required for the market-based approach. The distinction lies in the emission factors to be applied.

Data requirement & collection

To use this method, the reporting company needs to collect the same activity data as in the location-based approach. As stated before, energy consumption (electricity, steam, heat or cooling) can be either retrieved directly or estimated using appropriate methods outlined in Scope 1.

Emission factors

In a market-based approach, emission factors should reflect the intensity of GHG emissions specifically for the energy production consumed by the reporting company.

From the least to the most precise, the **emission factors that can be applied are:**

- Grids' average EF. Example of sources: ADEME, DEFRA, IEA or eGRID
- Residual mix EF that account for energy production data minus voluntary purchased amounts. Example of sources: RE-DISS, AIB
- Supplier-specific EF provided by energy suppliers
- Power Purchase Agreements (PPAs) providing details on contracted electricity emissions
- Energy attribute certificates including renewable certificates and guarantees of origins, offering insights into the environmental data of energy consumed

Formula for indirect emissions from electricity purchases

The same formula as the location-based approach applies to calculate emissions according to the market-based approach, except for the emission factors to be used.

INDIRECT SCOPE 2 EMISSIONS, MARKET BASED =
Electricity consumed (kWh) **x** **Market-based EF ($kgCO_2e/kWh$)**

If the electricity consumed is not known, the estimation methods for real estate and vehicles outlined in Scope 1 can be applied.

Sources: GHG Protocol, KPMG research & analysis

Category guidance and calculation methodologies – SCOPE 3 upstream & downstream activities

3.1 – Purchased goods and services

Description

Category 3.1 includes **all upstream (i.e., cradle-to-gate) emissions from the production of products purchased or acquired** by the reporting company in the reporting year. Products include both goods and services. To conduct the reporting, the company should evaluate its annual purchases by **collecting and analysing procurement data** (e.g., categorization by type, quantities, expenditures, supplier information, GHG emission data availability). To simplify the process, the company can categorize its purchases. The company should then identify appropriate reporting methods for the different types of purchases, focusing more on the most significant or emission-intensive ones.

Boundaries and possible exclusions

- Category 3.1 corresponds to all emissions from **product purchases** during the reporting year such as:
  - Spare parts and consumables for equipment, repair and maintenance purposes (e.g. connectors, chains, wheels, tires, oils, battery chargers)
  - Office supplies (e.g., paper, pen, ink)
  - Packaging (e.g., cardboard, plastic)
- This category also includes emissions **related to hotel nights** (for business purposes) **and restaurant meals** (if the company has a company restaurant for employees):
  - Hotel nights per type of hotel (1, 2-, 3- or 4-star hotels)
  - Meals per type of meal (e.g., average meal, meat-based, plant-based)
- Emissions from services purchased for the company need to be included such as **maintenance, marketing, insurance, banking, consulting and telecommunication services**
- The reporting company decides on a relevant categorization system for its purchases that aligns with the desired level of precision and the applicable calculation methodologies
- Emissions from **products and services that are to be excluded** (to avoid double counting):
  - Equipment and furniture purchased that are included in category 3.2 - Capital goods
  - Services purchased if already included in scope 1, 2 or 3 (e.g., renting, energy and transportation)
  - Some expenses are irrelevant for the reporting and need to be excluded (e.g., taxes, wages costs, depreciation and amortization, intercompany expenses)

Methodologies Panorama

3 applicable methodologies are proposed to report emissions related to category 3.1:

1. "**Supplier**" method, leveraging the specific carbon footprint from suppliers
2. "**Average-based**" method, based on the quantity or other relevant units of products purchased along with relevant secondary emission factors (e.g., industry average)
3. "**Spending**" method, based on the financial cost for all services and/or products purchased

Sources: GHG Protocol, KPMG research & analysis

1 Supplier Method

Description

This method **relies on specific information about the GHG emissions of suppliers and their products**. It calculates emissions for specific purchased items or services (e.g., spare parts, subcontractor maintenance). Feasibility and accuracy depend on the quality of the GHG emissions data provided by the suppliers.

Data requirements & collection

To use this method, the reporting company should collect either:

- The **quantity of products bought from each supplier** during the reporting period
- **Spending per supplier** during the reporting period

These activity data can be collected either:

- Internally, from purchase records (e.g., bills) provided by the accounting or IT department
- Externally, from the suppliers themselves

Emission factors

Specific supplier or product emission factors are required for this method:

- Option 1: the supplier provides **the carbon intensity for each product** or service bought (tCO_2e/product or tCO_2e/€)
- Option 2: the supplier has calculated its global carbon footprint (Scopes 1, 2 and 3). **Supplier-specific carbon intensity** can then be calculated by dividing the carbon footprint (tCO2) by turnover (€)

Therefore, the sources for obtaining the required emission factors are:

- EF provided by the supplier
- Or EF calculated by the reporting company based on GHG emissions data provided by the supplier

Formulas for purchased goods and services emissions

Using product carbon intensity

EMISSIONS FROM PURCHASED GOODS AND SERVICES =
Quantity of products bought (#) x Product carbon intensity (tCO_2e/unit)

Using the monetary carbon intensity

EMISSIONS FROM PURCHASED GOODS AND SERVICES =
Product and/or services spending (€) x Supplier carbon intensity (tCO_2e/€)

If monetary carbon intensity (tCO2e/€) is not provided by the supplier, it can be calculated by the reporting company:

SUPPLIER CARBON INTENSITY (tCO_2e/€) =
Supplier carbon footprint (Scopes 1, 2 and 3 – tCO_2e) / Supplier turnover (€)

Sources: GHG Protocol, KPMG research & analysis

2 AVERAGE-BASED METHOD

Description

The average-based approach involves **collecting the quantity of products purchased** (e.g., unit, weight, number of hotel nights, meals) and applying the appropriate emission factors obtained from specialized databases.

Data requirements & collection

To use this method, the reporting company should collect the quantities of products or services purchased during the reporting year, such as:

- Quantities of **spare parts or consumables** purchased (e.g., wheels, chains, oils)
- Quantities of **office supplies** purchased (e.g., pens, paper, boxes)
- Weight of **packaging** bought (e.g., kg/tons of cardboard, plastic, metals)
- Number of **hotel nights** purchased by hotel type (e.g., 1 to 4-star)
- Number of **meals** consumed by meal type (e.g., fish, beef, poultry, plant-based, average meal)

These quantities of products or services purchased can be collected internally from purchase records (e.g., bills) provided by the accounting department, the IT department or office managers.

Emission factors

The emission factors needed are **generic for each type of product or service**:

- EF for the products (e.g., $kgCO_2e$/unit of products)
- EF for the packaging (e.g. $kgCO_2e$/kg or tons)
- EF for hotel nights and meals ($kgCO_2e$/number of hotel nights/meals)

They can be retrieved from specialized databases, such as ADEME, DEFRA or public LCAs.

Formulas for purchased goods and services emissions

EMISSIONS FROM PRODUCTS SUCH AS SPARE PARTS AND SMALL OFFICE SUPPLIES =

Number of products purchased (#)
x
EF for the products ($kgCO_2e$/unit)

EMISSIONS FROM PACKAGING =

Weight of packaging purchased per type of material (kg)
x
EF of the material ($kgCO_2e$/kg)

EMISSIONS FROM HOTEL NIGHTS AND MEALS* =

Number of hotel nights purchased per type of hotel (#)
x
EF of the hotel ($kgCO_2e$/hotel night)

**This formula also applies to meals*

Sources: GHG Protocol, KPMG research & analysis

3 SPENDING METHOD

Description

This approach ranks as **the least accurate** among the three since it relies on expenditures and generic monetary emission factors. Accuracy is also influenced by the depth of classification of the procured goods and services.

Although **primarily recommended for services**, it is also applicable to goods when alternative methodologies prove unsuitable.

For details on the types of goods and services to be considered, refer to the section on boundaries and potential exclusions.

Data requirements & collection

To use this method, the reporting company should collect:

- Expenditures for **services acquired**, such as maintenance, banking, insurance, consulting, marketing, communication
- Expenditures for **products purchased,** including furniture and spare parts

This financial information can be sourced from the accounting department (e.g., purchasing records), the IT department or office managers.

Emission factors

For this method**, monetary emission factors for services and products** are needed ($kgCO_2e/€$, $kgCO_2e/\$$, …).

They are generic for each type of product or service and can be retrieved from specialized databases, such as ADEME, Exiobase, CEDA.

Formulas for purchased goods and services emissions

EMISSIONS FROM PURCHASED GOODS AND SERVICES =
Amount spent on a product (€, $, ...) x Monetary EF for the product ($kgCO_2e/€$, $kgCO_2e/\$$, ...)

This formula applies to both products and services

Sources: GHG Protocol, KPMG research & analysis

3.2 – Capital goods

Description

Category 3.2 includes **all upstream (i.e., cradle-to-gate) emissions from the production of capital goods acquired** by the reporting company in the reporting year.

Capital goods are **final products that have an extended life** and are used by the company to manufacture a product, provide a service, or sell, store, and deliver merchandise. For a rental company, assets acquired to constitute the fleet are considered capital goods.

Boundaries and possible exclusions

- Category 3.2 corresponds exclusively to emissions from the acquisition of **assets such as**:
  - Equipment, both for rental and internal operations
  - IT devices
  - All other capital goods such as real estate (e.g., buildings, parking), vehicles and furniture
- Only assets acquired **during the reporting year** should be accounted for
- In line with the GHG Protocol, asset depreciation is not considered
- Some products, such as IT devices, are treated differently by different companies. Some consider them as assets, while others categorize them as purchases. The reporting company can decide whether to classify emissions related to the purchase of these products under category 3.1 or category 3.2 according to its accounting standards.

Methodologies Panorama

4 applicable methodologies are proposed in this guidance for reporting emissions related to category 3.2:

- **For equipment:**

1 "**Supplier"** method, based on the carbon footprint of equipment provided by OEMs

2 "**Weight and material**" method, based on the weight and primary material composition of the equipment

- **For assets other than equipment:**

3 "**Average-based**" method, based on average asset-specific EF applied to assets acquired (e.g., surface, unit), depending on the asset type (e.g., building, vehicle, furniture)

- **For all types of assets:**

4 "**Spending**" method, based on expenditures incurred for the acquisition of equipment, IT materials and other assets

Sources: GHG Protocol, KPMG research & analysis

1 Supplier Method - Equipment

Description

The supplier method is **a precise method that relies on the carbon footprint data provided by OEMs.** This encompasses the entire upstream life cycle from raw material extraction to transportation, manufacturing and assembly of the final product.

Data requirements & collection

To use this method, the reporting company should collect the **quantity of equipment acquired** (e.g. units of 6m scissor lifts) during the reporting year

These quantities could be sourced from:

- Purchase records (e.g., bills) provided by the accounting department
- Or suppliers (OEMs)

Emission factors

The emission factor needed to apply this method is the upstream production (cradle-to-gate) EF of the equipment (Kg CO_2/equipment)

Currently, equipment upstream emission factors are not readily available. However, much like the rental industry, OEMs and specialized companies are actively working on environmental data. As a result, these factors are expected to become more accessible in the future.

Equipment upstream emission factors can be:

- Provided by the OEM or retrieved from LCAs
- Estimated based on the database provided with this guidance
- Estimated based on industry-specific literature

Formula for capital goods emissions

UPSTREAM EMISSIONS FROM ACQUIRED EQUIPMENT =
Units of equipment acquired (#) x Upstream EF of each item of equipment ($kgCO_2e$/equipment)

Sources: GHG Protocol, KPMG research & analysis

2 Weight and materials Method - Equipment

Description

The weight and materials approach is **an estimation method** that relies on:

- The **weight** of an item of equipment, including battery weight for electric equipment
- The **primary raw material composition** (e.g., steel, iron, plastic, lithium)

Data requirements & collection

To use this method, the reporting company should determine the weight of the equipment (kg) and its breakdown into primary raw material.

The same methodology applies for:

- **Large equipment** (e.g., dumpers, excavators, forklifts, modules)
- **Small equipment** (e.g. chainsaws, floor grinders)

The necessary data regarding the weight and material composition of each item of equipment can be sourced from OEMs

Emission factors

The emission factors to consider should represent the upstream operations involved in the production of the equipment (cradle-to-gate):

- **Raw materials EF** (e.g., steel, plastic PET) ($kgCO_2e/kg$)
- **Transformation and production process EF** (available in databases such as ADEME or Ecoinvent)

They can be retrieved from specialized databases, such as ADEME, DEFRA or public LCAs.

Formula for capital goods emissions

UPSTREAM EMISSIONS FROM SMALL & LARGE EQUIPMENT =

Total weight of equipment (kg)

x

∑ [% of each primary raw material

x

(Raw material EF ($kgCO_2e/kg$) + production process EF ($kgCO_2e/kg$))]

EXAMPLE

During the reporting year, the company purchased 40 clamps. As no information on the carbon footprint of the equipment is available, the weight and material method may be applied. The weight and material composition is available on the technical sheet: each clamp is composed of 100% steel and weighs 3.40 kg, totaling 136 kg for all 40 clamps.

The emission factor for steel is available public databases.
- 2.21 kgCO2e/kg for steel and iron (ADEME)

However, this emission factor does not consider the transformation process where raw materials are converted and assembled into a final equipment. The company should thus add to the calculation **an emission factor for the transformation process**, such as:
- 0.397 kg CO2e/kg for galvanizing the steel and iron (ADEME, Base impact)
- 0.0352 for steel rubbing (ADEME, Base Impact)
- 0.186 for steel turning (ADEME, Base Impact)

Total upstream emissions for the 40 clamps are:

136 kg x (2.21 + 0.397 + 0.0352 + 0.186) $kgCO_2e/kg$ = 384.6 $kgCO_2e$

Sources: GHG Protocol, KPMG research & analysis

3 AVERAGE-BASED METHOD – OTHER ASSETS

Description

The average-based method is an approach that relies on collecting the **quantities of assets acquired during the reporting year using adequate units and applying an average asset-specific emission factor.**

The unit used to quantify the asset varies, for example:

- For buildings and/or parking spaces, total surface area is used
- For IT equipment, vehicles and office furniture, they can be counted in units

Data requirements & collection

To use this method, the reporting company needs to organize its assets into categories and collect the quantities acquired in each category, such as:

- The **total surface area in square meters of buildings** (e.g., offices, commercial stores) **and parking spaces**
- The number of computers, smartphones, and other **IT devices**
- The number of **vehicles** by vehicle type (SUV, hybrid, city car)
- The number of **office furniture** items such as desks, chairs, cupboards

The required data can be obtained internally from purchase records (e.g., bills) provided by the accounting department, IT department or office managers

Emission factors

The **emission factors required are specific to each asset type** and should represent the upstream operations involved in producing the asset. For example:

- Buildings EF in $kgCO_2e/m^2$
- IT devices EF in $kgCO_2e$/unit

They can be retrieved from specialized databases, such as ADEME, DEFRA or public LCAs.

Formulas for capital goods emissions

UPSTREAM EMISSIONS FROM BUILDINGS AND PARKING SPACES =
Surface area of building/parking acquired (m^2) x EF for buildings/parking spaces (kg CO_2e/m2)

UPSTREAM EMISSIONS FROM IT, VEHICLES, FURNITURE =
Units of each asset acquired (#) x EF for the asset ($kgCO_2e$/unit)

Sources: GHG Protocol, KPMG research & analysis

4 Spending Method – All assets

Description

If none of the previous methodologies can be applied, the reporting company can use the spending method, the least precise of the four, that relies on **expenditures incurred for the acquisition of assets during the reporting year** (e.g., equipment, IT devices).

Data requirements & collection

To use this method, the reporting company should categorize its acquired assets and collect the **annual asset-related expenditures** such as those for equipment and IT devices. This financial data can be sourced from the accounting department.

Emission factors

The emission factors needed are **monetary EF for each asset type, such as:**

- Monetary EF for equipment (e.g., manufacturing of industrial equipment) ($kgCO_2e/€$, $kgCO_2e/\$$, …)
- Monetary EF for IT devices, vehicles,… ($kgCO_2e/€$, $kgCO_2e/\$$, …)

They can be retrieved from databases, such as ADEME, Exiobase, CEDA

Formula for capital goods emissions

UPSTREAM EMISSIONS FROM CAPITAL GOODS =
Amount spent to acquire the assets (€, $, ...) x Monetary EF for the asset ($kgCO_2e/€$, $kgCO_2e/\$$, ...)

Sources: GHG Protocol, KPMG research & analysis

3.3 – Fuel and energy activities not included in Scopes 1 & 2

Description

Category 3.3 includes **emissions related to the extraction, production and transportation of fuel and energy purchased and consumed** by the reporting company in the reporting year that are not included in Scope 1 or Scope 2.

Boundaries and possible exclusions

- Category 3.3 corresponds exclusively to emissions from:
  - **The upstream flows related to purchased fuel and electricity** (extraction, production and transportation of fuel and electricity)
  - **Transmission and distribution losses**, from the T&D systems of electricity, steam, heat and cooling
- The calculation of emissions is based on the consumption of fuel, electricity, steam, heat and cooling, and associated with the appropriate upstream and T&D losses EF
- Category 3.3 **excludes emissions from the combustion** of fuel, electricity, steam, heat and cooling (already included in Scopes 1 and 2)

Methodologies Panorama

One applicable methodology is proposed in this guidance:

1. "**Consumption-based**" method, based on energy consumption (fuel, gas, electricity, steam, heat and cooling) and the appropriate emission factor

Sources: GHG Protocol, KPMG research & analysis

1 Consumption-based Method

Description

The consumption-based method accurately quantifies emissions by accounting for **upstream processes** and **transmission and distribution (T&D) losses** associated with fuel and electricity consumed.

Data requirements & collection

To use this method, **refer to Scope 1 and 2 activity data** and collect:

- Litres of fuel consumed (from stationary or mobile sources)
- Kg of gas consumed (from stationary sources)
- KWh of electricity consumed
- KWh of steam, heat and cooling consumption

Emission factors

The emission factors needed are:

- EF from upstream emission of fuel ($kgCO_2e$/litres)
- EF from upstream emission of gas ($kgCO_2e/m^3$, litres, kg, kWh)
- EF from upstream emission of electricity ($kgCO_2e$/kWh)
- EF from T&D losses of electricity, steam, heat or cooling ($kgCO_2e$/kWh)

They can be retrieved from databases such as ADEME, DEFRA, Umwelt Bundesamt, EPA, ECCC, IEA, or any specific country-based database.

Formula for category 3.3 emissions

EMISSIONS FROM FUEL AND ENERGY ACTIVITIES NOT INCLUDED IN SCOPES 1 & 2=

Scope 1 & 2 energy consumption (e.g., litres, kWh)
x
Upstream EF for fuel, electricity, steam, heat and cooling ($kgCO_2e$/litres, kWh, etc.)
+
T&D losses for electricity, steam, heat and cooling ($kgCO_2e$/kWh)

EXAMPLE

You consumed 1,000 litres of fuel (petrol) in 2023.

The fuel EF for petrol comprises a combustion portion (2.20 $kgCO_2e$/litres*) and an upstream portion (0.491 $kgCO_2e$/litres)[1].

Emissions from Scope 1 will be 2,200 $kgCO_2e$/litres

Emissions from Scope 3 will be 491 $kgCO_2e$/litres

(*) based on the ADEME database

(1) ADEME database

Sources : GHG Protocol, KPMG research & analysis

3.4 – Upstream transportation and distribution

Description

Category 3.4 covers **emissions from the transportation and distribution of products** purchased by the reporting company within the reporting year that circulate **in vehicles/facilities not owned or operated by the reporting company**.

This category includes emissions from transportation and distribution services purchased by the reporting company, either directly or through an intermediary.

The scope encompasses outbound logistics for sold products, inbound logistics, and transportation and distribution between the company's own facilities.

Boundaries and possible exclusions

Category 3.4 corresponds exclusively to emissions from the energy consumption related to:

- **Inbound transportation from tier 1 suppliers to the rental company's facilities** such as warehouses and stores, using any transportation mode
- **Internal transportation** between the rental company's own operations (e.g. from the warehouse to a store or to a maintenance centre)
- **Storage of equipment** in warehouses, distribution centres and retail facilities managed by third parties and financially covered by rental companies
- **Outbound transportation** between the company's facilities and clients' sites (e.g., from the rental company's warehouses to a client's construction site), when financially covered by the rental company

Emissions to exclude from that category are:

- Emissions from transportation already included in Scope 1 or Scope 2, when transportation is made internally in vehicles owned or controlled by the reporting company
- Emissions from downstream transportation that are not financially supported by the rental company, which need to be included in category 3.9 - Downstream transportation and distribution

Methodologies Panorama

Calculating emissions from transportation and distribution when these services are managed by third parties can be complex. The main challenges arise from gathering precise data on the goods transported, obtaining the necessary information from suppliers, and dealing with the variety of transportation methods involved.

3 applicable methodologies are proposed in this guidance for reporting emissions related to category 3.4:

1. "**Consumption-based**" method, based on the fuel and/or energy consumption for each of the transportation vehicles or storage spaces
2. "**Distance-based**" method, based on the distance travelled and the mass transported (tons.km) for each transportation vehicle
3. "**Spend-based**" method, based on expenditures incurred for transportation

Sources: GHG Protocol, KPMG research & analysis

1 Consumption-based Method

Description

The consumption-based method is based on **the consumption from transportation vehicles** (fuel, electricity) and **storage spaces** (electricity, refrigerants).

The consumption-based method should be used when rental companies can collect or determine the amount of fuel and energy consumed by the providers for the transportation and/or storage of goods.

Data requirements & collection

To use this method, the reporting company needs to collect:

- The **types and quantities of fuel consumed** (e.g., diesel, gasoline, CNG) by the transportation vehicles
- The **quantity of energy consumed by storage space**

If direct energy usage data is not available, companies may derive it from:

- Expenditures on fuel or electricity and their average prices
- Distance travelled by vehicles and their respective energy efficiency (fuel or electricity)

The type and quantities of fuel or energy consumed can be collected from:

- Supplier invoices
- Suppliers, based on transport management systems
- Fuel receipts and accounting records for fuel-related expenditures

Emission factors

The emission factor for each type of fuel or energy considered is required to calculate the emissions, such as:

- Fuel EF including upstream and combustion ($kgCO_2e$/litre)
- Electricity grid EF ($kgCO_2e$/kWh), location-based

Emission factors can be retrieved from databases such as IEA, DEFRA, ADEME, Ecoinvent. Electricity grid EF databases are mentioned in the Scope 2 methodology.

Formula for upstream transportation & distribution emissions

EMISSIONS FROM UPSTREAM TRANSPORTATION & DISTRIBUTION =

For fuel consumption

Quantity of fuel consumed (litres)
x
EF for the fuel (kg CO_2e/litre)

For electricity consumption

Quantity of electricity consumed (KWh)
x
EF for the electricity grid (Kg CO_2e/KWh)

Sources: GHG Protocol, KPMG research & analysis

2 Distance-based Method

Description

The distance-based method quantifies emissions from transportation based on **the distance travelled and the weight transported for each mode of transportation**.

This method involves computing ton-kilometres, by multiplying the distance travelled by the weight of goods transported and applying the appropriate emission factor.

This method is the most widely used to calculate transportation emissions.

Data requirements & collection

To use this method, the reporting company needs to collect, **for each mode of transportation** (e.g., air, train, bus, car):

- **The mass of goods transported** (tons)
- **The distance travelled** (km)

Multiplying the mass by the distance gives a ton-kilometre unit which is a measure representing one ton of goods transported over 1 kilometre.

Activity data for inbound transportation, internal transportation and outbound transportation when financially supported by the rental company should be gathered.

Activity data can be sourced from:

- Transportation providers (for inbound, internal and outbound transportation)
- Expense receipts and systems (e.g., from the logistics team)

If actual distance travelled is unavailable, companies may use the shortest theoretical distance.

Emission factors

The emission factors needed are **transportation mode-specific EF,** expressed in tons.km (e.g., kgCO_2e/ton.km for trucks or cargo planes)

They can be gathered from databases such as ADEME, DEFRA, US or other national databases, or obtained directly from transportation service providers.

Formulas for upstream transportation & distribution emissions

EMISSIONS FROM UPSTREAM TRANSPORTATION & DISTRIBUTION =
For each transportation mode: Tons.km transported (ton.km) x EF for the transportation mode (kg CO_2e/ton.km) OR
For each transportation mode: Average weight transported (tons) x Total distance travelled (km) x EF for the transportation mode (kg CO_2e/ton.km) OR
For each transportation mode: Total weight transported (tons) x Average distance travelled (km) x EF for each transportation mode (kgCO_2e/ton.km)

Sources: GHG Protocol, KPMG research & analysis

3 Spending Method

Description

If none of the previous methodologies can be applied, the reporting company can use the spending method, the least precise of the three, that relies on **expenditures incurred for transportation.**

Data requirements & collection

To use this method, the reporting company needs to collect:

- **Transportation expenditures by transportation mode** (e.g., air, train, bus, car)
- **Storage expenditures**

Expenditures are available within the reporting company data and can be collected from internal data systems (e.g., financial accounting systems), bills or invoices.

Emission factors

The emission factors needed are **monetary EF** for each transportation mode expressed per unit of economic value (e.g., kgCO_2e/€)

They can be retrieved from databases, such as ADEME, Exiobase, CEDA.

Formula for upstream transportation & distribution emissions

EMISSIONS FROM UPSTREAM TRANSPORTATION & DISTRIBUTION =

For each transportation mode:

Amount spent on transportation (€, $)
x
Specific monetary EF for transportation mode (Kg CO_2e/€, $)

Sources: GHG Protocol, KPMG research & analysis

3.5 – Waste generated in operations

Description

Category 3.5 includes **emissions from third-party waste disposal and treatment** generated in the reporting company's owned or controlled operations during the reporting year. This category includes emissions from the disposal of both solid and liquid waste, as well as wastewater.

Boundaries and possible exclusions

Category 3.5 corresponds exclusively to waste originating from the reporting company's operations and treated by third parties. This encompasses the disposal of:

- **Non-hazardous waste from corporate offices** (e.g. paper, plastic, office furniture, food waste)
- **Non-hazardous waste from spare parts and consumables** (equipment maintenance and repair) during the rental period
- **Waste from electrical and electronic equipment from IT devices** (e.g. computers, smartphones)
- **Equipment disposed of as waste by the rental company** to third parties and not resold to other buyers

When equipment is resold by the rental company to other acquirers, their end-of-life treatment emissions are excluded from category 3.5 and included in category 3.12 (end-of-life treatment of sold products).

Only waste treatment in facilities owned or operated by third parties is included in Scope 3.

Methodologies Panorama

Category 3.5 requires information on the amount and type of waste, and their treatment method. In Europe, some of the information is available as waste disposal and reporting are regulated by law. However, gathering and sorting this data from service providers can be challenging.

One methodology is proposed in this guidance for reporting emissions related to category 3.5.

1 "**Waste type**" method, based on the weight of waste disposed of and the waste treatment methods

Sources: GHG Protocol, KPMG research & analysis

1 Waste type Method

Description

This relatively precise method relies on **the weight and type of waste disposed of** and **the treatment method used**, such as incineration, landfill, recycling, or storage.

Data requirements & collection

To use this method, the reporting company should collect:

- **The waste material composition** (e.g., plastic, cardboard, metal, WEE, organic, etc.)
- **The quantity of each waste type/material produced** (tons)
- **For each waste type, the waste treatment methods applied** (e.g. landfill, recycling, storage, incineration)

The types and quantities of waste can be:

- Collected from waste collection providers
- Estimated based on the yearly purchases and percentage of annual waste

If the waste treatment method is not known by the reporting company, it can be estimated based on average end-of-life treatment scenarios per material (e.g., plastic, steel, etc.) published on Eurostat, the European Union database.

Emission factors

The emission factors needed are **waste type-specific and waste treatment-specific emission factors** (e.g. plastic waste recycling in kgCO_2e/tons)

The emission factors should include end-of-life processes only. Emission factors may include emissions from transportation of waste.

They can be retrieved from databases, such as DEFRA, ADEME or Ecoinvent.

Formula for emissions related to waste generated in operations

EMISSIONS FROM WASTE GENERATED IN OPERATIONS =

For each waste type/material and waste treatment method:

Quantity of waste type (e.g., plastic) by waste treatment method (e.g. recycling) (tons)
x
EF for the waste type and treatment method (e.g., plastic recycling) (kg CO_2e/tons)

Sources: GHG Protocol, KPMG research & analysis

3.6 – Business travel

Description

Category 3.6 includes **emissions from the transportation of employees for business-related activities in vehicles owned or operated by third parties**, such as aircraft, trains, buses, and passenger cars.

Boundaries and possible exclusions

Category 3.6 corresponds exclusively to **travel related to business activities**.

Emissions may arise from private or public service providers operating automobile, air, rail, bus or other modes of transportation.

Emissions to exclude from that category are:

- Emissions from transportation of employees to and from work, that are accounted for in category 3.7 (employee commuting)
- Emissions from transportation in vehicles owned or controlled by the rental company, that are accounted for in either Scope 1 (for fuel) or Scope 2 (for electricity)
- Emissions from leased vehicles operated by the rental company, not included in Scopes 1 or 2, and accounted for in Scope 3 - category 8 (upstream leased assets)

Methodologies Panorama

3 methodologies are proposed in this guidance for reporting emissions related to category 3.6

1. "**Consumption-based**" method, based on the amount of fuel and electricity consumed during business travel and the appropriate emission factor
2. "**Distance-based**" method, based on the travelled distance by mode of transportation and the appropriate emission factor
3. "**Spend-based**" method, based on the amount of money spent on each mode of business travel and the application of monetary emission factors

Sources: GHG Protocol, KPMG research & analysis

1 Consumption-based Method

Description

This method is based on **energy consumption** from vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars.

It is applicable when the rental company can collect or determine the amount of fuel or electricity consumed by the provider for business travel.

This method is similar to method 1 (consumption-based) of Category 3.4 (upstream transportation and distribution).

Data requirements & collection

To use this method, the reporting company needs to collect:

- The **quantities and types of fuel consumed** (e.g., litres of diesel, gasoline, CNG).
- For an electric vehicle, **electricity consumption** (kWh)

If energy usage data is not available, companies may derive it from:

- Expenditures on fuel and/or electricity and their average prices
- Or the distance travelled by vehicle type and their respective fuel/electric efficiency

The types and quantities of fuel consumed, electricity consumption, as well as the distance travelled, can be collected from:

- Purchase records (obtained from the transportation service providers)
- Fuel purchase records
- Transport management systems

To estimate vehicle fuel or electricity consumption, efficiency can be referenced from technical specifications or the literature.

Emission factors

The emission factor for each type of fuel or energy considered is required to calculate the emissions, such as:

- Fuel EF including upstream and combustion ($kgCO_2e$/litre)
  - For example, Petrol EF is 2.70 $kgCO_2e$/litre; 2.20 $kgCO_2$ for combustion and 0.491 for upstream[1]
- Electricity grid EF ($kgCO_2e$/kWh), location-based

Emission factors can be retrieved from databases such as IEA, DEFRA, ADEME, Ecoinvent. Electricity grid EF databases are mentioned in the Scope 2 methodology.

Formula for business travel emissions

EMISSIONS FROM BUSINESS TRAVEL =

For fuel consumption:

Quantity of fuel consumed (litres)
x
EF for fuel ($kgCO_2e$/litre)

For electricity consumption:

Quantity of electricity consumed (KWh)
x
EF for the electricity grid ($kgCO_2e$/KWh)

(1) ADEME database

Sources : GHG Protocol, KPMG research & analysis

2 Distance-based Method

Description

This method is based on **the distance travelled for business purposes.**

It involves determining the distance travelled by vehicle type and applying the appropriate emission factor.

Rental companies may apply this method **when data on fuel use is unavailable.**

Data requirements & collection

To use this method, the reporting company should collect:

- **Aggregate distance travelled by employees for each mode of transport** (e.g., air, train, bus, car) over the reporting year. It is expressed in vehicle.km or passenger.km
- When possible: **countries of travel and specific types of vehicles used**

Multiplying the number of passengers by the distance gives a passenger.kilometre unit which is a measure representing one passenger travelling 1 kilometre.

Activity data can be collected:

- Automatically, from the travel service providers (e.g., a travel agency) or from internal expense and reimbursement systems
- By **creating annual surveys on travel:**
  - Either addressed to all employees
  - Or addressed to a representative sample of employees from which companies may extrapolate the total data

Emission factors

The emission factors needed are **specific EF for each transportation mode expressed in km or passenger.km** (e.g., $kgCO_2e$/passenger.km for train or plane). The reporting company can typically apply default national EF.

They can be retrieved from databases, such as ADEME, DEFRA, US database, national databases, or obtained from travel agencies.

Formula for business travel emissions

EMISSIONS FROM BUSINESS TRAVEL =

For each transportation mode:

Distance travelled by vehicle type (vehicle.km, passenger.km)
x
Specific EF for the transportation mode ($kgCO_2e$/vehicle.km, $kgCO_2e$/passenger.km)

Sources: GHG Protocol, KPMG research & analysis

3 Spend-based Method

Description

If none of the previous methodologies can be applied, the reporting company can use the spending method, the least precise of the three, that relies on **expenditures incurred for business travels**.

This method is similar to method 3 (spend-based) of category 3.4 (upstream transportation and distribution).

Data requirements & collection

To use this method, the reporting company needs to collect transportation expenditures from business travel using market values (e.g., euros). These should be categorized by mode of transport (e.g., air, train, bus, car).

Expenditures are available within the reporting company data and can be collected from internal data systems (e.g., financial accounting systems), bills or invoices.

Emission factors

The emission factors needed are **monetary EF for business for each transportation mode per unit of economic value** (Kg CO_2e/€).

They can be retrieved from databases, such as ADEME, Exiobase, CEDA.

Formula for business travel emissions

EMISSIONS FROM BUSINESS TRAVEL =
For each transportation mode: Amount spent on business travel (€, $) x Specific monetary EF for transportation mode (Kg CO_2e/€, $)

Sources: GHG Protocol, KPMG research & analysis

3.7 – Employee commuting

Description

Category 3.7 includes **emissions from the transportation of employees between their homes and their worksites**.

Companies may include **emissions from teleworking** in this category (i.e., employees working remotely), which correspond to the consumption of electricity related to computer use.

Boundaries and possible exclusions

Category 3.7 corresponds exclusively to emissions from employees commuting **between their homes and the rental company worksites.**

Emissions may arise from automobile, bus, rail and other modes of transportation (e.g., subway, bicycling, walking)

"**Employees**" refers to full-time employees who work within the rental companies. Companies may also include:

- Employees of other relevant entities (e.g., franchises or outsourced operations) in this category
- As well as consultants, contractors, and other individuals who are not employees of the company, but commute to facilities owned and operated by the company

Methodologies Panorama

3 methodologies are proposed in this guidance for reporting emissions related to category 3.7

1. "**Distance-based**" method, based on the annual distance travelled per employee and per mode of transport between their homes and worksites
2. "**Average-data**" method, based on estimating emissions from employee commutes based on national average data
3. "**Consumption-based**" method, adapted for personal automobile commuting, which involves determining the amount of fuel or electricity consumed for work commutes and applying the appropriate emission factor

Sources: GHG Protocol, KPMG research & analysis

1 Distance-based Method

Description

The distance-based method involves **determining the distance travelled per mode of transportation** and applying the appropriate emission factor. Reporting companies may include emissions from teleworking (i.e., employees working remotely) in this category, which pertains to the electricity consumption associated with computer use.

Data requirements & collection

To use this method, the reporting company needs to collect:

- **Aggregate distance travelled by employees per mode of transport** (e.g., train, bus, car) over the reporting year. It is expressed in vehicle.km or passenger.km
- When possible: **specific types of vehicles used**

Activity data can be collected through **annual surveys to identify commuting habits,** such as:

- Distance travelled between home and worksite
- Number of one-way travels per day (e.g., 2, or 4 if employees have lunch at home)
- Number of commuting days per year depending on estimated working days and excluding teleworking days
- Mode of transportation (e.g., subway, train, petrol car, electric car, classic bike, electric bike)
- If possible, car-pooling scheme (average occupancy per vehicle)

Rental companies may extrapolate from a representative sample of employees.

Emission factors

The emission factors needed are:

- EF for each mode of transport expressed in km or passenger.km (e.g., $kgCO_2e$/passenger.km for train). The reporting company can typically apply default national EF.
- EF for the electricity grid ($kgCO_2e$/kWh), location-based

Emission factors can be retrieved from databases such as DEFRA, ADEME, US database or other national databases. Electricity grid EF databases are mentioned in Scope 2.

Formula for employee commuting emissions

EMISSIONS FROM EMPLOYEE COMMUTING =

For each mode of transportation:

Distance travelled (vehicle-km, passenger.km)
x
Specific EF for the transportation mode ($kgCO_2e$/vehicle.km, $kgCO_2e$/passenger.km)

DISTANCE TRAVELLED BY MODE OF TRANSPORT =

Number of employees (#FTEs)
x
One-way distance between home and work (km)
x
Number of one-way distance per day (#)
x
Number of commuting days per year (#)

EMISSIONS FROM TELEWORKING =

Total number of employees (#FTEs)
x
Average teleworking days per year (#days)
x
Average computer usage hours per day (h)
x
Average computer power (kW)
x
EF for the electricity grid ($kgCO_2e$/kWh)

Sources: GHG Protocol, KPMG research & analysis

2 AVERAGE-BASED METHOD

Description

If company-specific data is unavailable, reporting companies may use **average secondary activity data to estimate distance travelled and mode of transport**.

Such estimations require making several assumptions, which add uncertainty to the emissions calculations.

Data requirements & collection

To use this method, the reporting company needs to determine:

- **The commuting habits of its employees to set average commuting emissions per person** ($kgCO_2e$/person): breakdown of transport modes used by employees, commuting distance per day, working days per year
- **The number of employees**

The average secondary data (commuting emissions or average habits) can be collected from various sources such as national transportation departments, governmental or public agencies, national statistics publications, private databases. For example:

- Moneybarn (IEA) which estimates emissions per employee for each country
- National publications and private statistics sources such as INSEE, gov.UK, US Bankrate, Statista

Emission factors

The emission factors needed are:

- EF for each mode of transport expressed in km or passenger.km (e.g., $kgCO_2e$/passenger/km for train).Typically, default national EF may be applied
- EF for the electricity grid ($kgCO_2e$/kWh), location-based

They can be retrieved from databases, such as ADEME, DEFRA, US Database or other national databases. Electricity grid EF databases are mentioned in Scope 2.

Formula for employee commuting emissions

EMISSIONS FROM EMPLOYEE COMMUTING =

Total number of employees (#FTEs)
x
Average commuting emissions per employee ($kgCO_2e$/FTE)

OR

Total number of employees (#FTEs)
x
National average per mode of transport (%)
x
Average commuting distance per employee per day (km/day)
x
Average number of working days per year (#days/year)
x
EF for each transportation mode ($kgCO_2e$/vehicle.km, $kgCO_2e$/passenger.km)

EXAMPLE

The reporting company counts 300 FTEs as of the end of the reporting year. Detailed data on commuting habits is not available; the average-based method can be used. The breakdown of FTEs per country is: 100 employees in the UK, 150 in France, and 50 in Ireland. Each country has a total of 255 working days in the year.

The average commuting emissions per country presented in the Moneybarn database are: 0.002 kgCO2e/day for the UK, 0.001 kgCO2e/day for France, and 0.002 kgCO2e/day for Ireland

As a result, total emissions for commuting are:

255 working days x (100 x 0.002 + 150 x 0.001 + 50 x 0.002) = 114.75 $kgCO_2e$

Emissions from teleworking can be estimated using the same formula mentioned in method 1 – Distance-based method.

Sources: GHG Protocol, KPMG research & analysis

3 Consumption-based Method

Description

The consumption-based method is **suitable when rental companies can accurately collect or determine the amount of fuel or electricity consumed by employees for commuting**. This method is generally applicable for car travel. Although accurate, data collection can be complex and challenging.

Method 3 is similar to method 1 (consumption-based) of Category 3.4 (upstream transportation and distribution).

Data requirements & collection

To use this method, the reporting company should collect:

- The **types and quantities of fuel consumed** (e.g., diesel, gasoline) for commuting
- For an electric vehicle, **electricity consumption** (kWh)

If energy usage data is not available, companies may derive it from:

- Expenditures on fuel and/or electricity and their average prices
- Or the distance travelled by vehicle type and their respective fuel/electric efficiency

The types and quantities of fuel consumed, electricity consumption, as well as the distance travelled can be collected from:

- Fuel purchase records, from which fuel quantities can be extracted
- Transport management systems
- Annual surveys of employees to identify the quantity of fuel used for commuting

To estimate vehicle fuel or electricity consumption, efficiency can be referenced from technical specifications or the literature.

Emission factors

The emission factor for each type of fuel or energy considered is required to calculate emissions, such as:

- Fuel EF including upstream and combustion ($kgCO_2e$/litre)
  - For example, Petrol EF is 2.70 $kgCO_2e$/litre; 2.20 $kgCO_2$ for combustion and 0.491 for upstream[1]
- Electricity grid EF ($kgCO_2e$/kWh), location-based

Emission factors can be retrieved from databases such as IEA, DEFRA, ADEME, Ecoinvent. Electricity grid EF databases are mentioned in the Scope 2 methodology.

Formula for employee commuting emissions

EMISSIONS FROM COMBUSTION ENGINE VEHICLES =
Quantity of fuel consumed (litres) **x** **EF for fuel ($kgCO_2e$/litre)**

EMISSIONS FROM ELECTRIC VEHICLES =
Quantity of electricity consumed (kWh) **x** **EF for the electricity grid ($kgCO_2e$/kWh)**

Emissions from teleworking can be estimated using the same formula mentioned in method 1 – Distance-based method.

(1) ADEME database

Sources : GHG Protocol, KPMG research & analysis

3.8 – Upstream leased assets

Description

Category 3.8 includes **emissions from the operation of assets that are leased by the reporting company (as lessee)** in the reporting year and not already included in the reporting company's Scope 1 or Scope 2 inventories.

Boundaries and possible exclusions

Category 3.8 corresponds to emissions from the operation of assets leased by the rental company. If the operational approach is used by the rental companies, **category 3.8 should not be addressed.** Refer to the next table for more information on leasing agreements and boundaries.

If the rental company leases an asset for only part of the reporting year, it should **account for emissions for the portion of the year that the asset was leased.**

A rental company's Scope 3 emissions from upstream leased assets include the Scope 1 and Scope 2 emissions of lessors (depending on the lessor's consolidation approach).

Emissions to exclude from category 3.8 are:

- Emissions from assets that are owned and leased to others (typically equipment that is rented out to clients): the rental company is regarded as a lessor and emissions are accounted for in downstream leased assets (3.8)
- Emissions of leased assets that are already accounted for in Scopes 1 or 2.

Categorization of emissions for upstream leased assets

	Type of leasing arrangement	
	Finance/capital lease	**Operating lease**
Equity share or financial control approach used	Lessee has ownership and financial control, therefore emissions from fuel combustion are included in Scope 1, and emissions from use of purchased electricity are included in Scope 2.	If the lessee does not have ownership or financial control, emissions associated with fuel combustion and use of purchased electricity are to be reported under Scope 3 (upstream leased assets).
Operational control approach used	Lessee has operational control, therefore emissions from fuel combustion are included in Scope 1, and emissions from use of purchased electricity are included in Scope 2.	Lessee does have operational control, therefore emissions from fuel combustion are included in Scope 1, and emissions from use of purchased electricity are included in Scope 2. **Most represented case for leased assets**

Methodologies Panorama

2 methodologies are proposed in this guidance for reporting emissions related to category 3.8:

1. "**Consumption-based**" method, which involves either collecting asset-specific data on fuel, energy use and fugitive emissions or estimating these emissions using average data

2. "**Lessor-specific method**", which involves collecting the Scope 1 and Scope 2 emissions from the lessor(s) and allocating emissions to the relevant leased asset(s)

Source: GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard, KPMG research & analysis

1 Consumption-based Method

Description

This method involves collecting asset-specific data (e.g., site-specific) on energy and refrigerant consumption from individual leased assets, such as cars, parking lots or buildings.

The data can be either **directly collected or estimated** based on average data (e.g., energy consumption for a building can be estimated by using the average emissions per asset type or floor space).

Data requirements & collection

To use this method, the reporting company can either:

- Collect **direct consumption data:** asset-specific fuel and electricity use, as well as steam, heating and cooling consumption
- Or **estimate the energy consumption based on average metrics**. For example, for offices, total energy consumption can be estimated by using the surface area operated by the company (m^2) and average consumption per square meter (kWh/m^2)

Direct consumption data can be sourced from meter readings, purchase records (e.g., bills) or energy, converted into quantities using average prices.

For estimation, several literature sources can be used depending on the asset type. For real estate, national energy consumption metrics can be found in sources like: EIA, gov.uk, Ministère de la transition écologique (France), Odyssee-Mure.eu.

Emission factors

The emission factor for each type of fuel, energy or fugitive gas considered is required to calculate the emissions, such as:

- Fuel EF ($kgCO_2e$/litre) or electricity EF ($kgCO_2e$/kWh)
- EF of fugitive emissions, such as R410a EF ($kgCO2_e$/kg)

Emission factors can be retrieved from databases such as IEA, DEFRA, ADEME, Ecoinvent. In some cases, they can also be obtained from the suppliers or energy contracts (e.g., PPA contracts).

Formulas for upstream leased assets emissions

EMISSIONS FROM UPSTREAM LEASED ASSETS =

For fuel and electricity use:

Quantity of energy consumed (litres, kWh)
x
Specific EF for the energy source ($kgCO_2e$/litre, $kgCO_2e$/kWh)

For fugitive emissions:

Quantity of refrigerant leakage (kg)
x
EF for the refrigerant ($kgCO_2e$/kg)

If specific asset emission factor is available:

Number of assets (units)
x
Average EF per asset type ($kgCO_2e$/unit/year)

CONSUMPTION ALLOCATION FROM LEASED BUILDINGS NOT SUBMETERED =

Building's surface occupancy rate (% of total building surface)
x
Building's total energy use (kWh)

OR

Surface occupied by the reporting company per country (m^2)
x
Average kWh per square metre for the country (kWh/m^2)

Sources: GHG Protocol, KPMG research & analysis

2 LESSOR-SPECIFIC METHOD

Description

This method utilizes the lessor's carbon reporting to calculate the leased asset's emissions. It involves collecting the lessor's Scope 1 and Scope 2 emissions and allocating a relevant proportion to represent the leased asset's emissions. The method is feasible when the lessor's Scope 1 and Scope 2 emissions data are available.

Data requirements & collection

To use this method, the reporting company needs to:

- **Collect the Scope 1 and Scope 2 emissions from the lessor(s)**
- **Allocate a proportion of these emissions to the leased asset(s)**

To allocate the corresponding portion of emissions to the leased assets, the reporting company must use an appropriate allocation key, such as surface area for real estate or the number of assets.

Scope 1 and Scope 2 emissions may be published or obtained from the lessor.

Formula upstream leased assets emissions

EMISSIONS FROM UPSTREAM LEASED ASSETS =

Lessor's Scope 1 & Scope 2 emissions ($kgCO_2e$)

x

[Area, quantity, … of the leased asset
/
Total area, quantity,… of lessor's assets]

Sources: GHG Protocol, KPMG research & analysis

3.11 – Use of sold products

Description

Category 3.11 includes **emissions from the use of goods and services sold by the rental company** in the reporting year. For a rental company, the category mainly concerns equipment sold to subsequent users after their ownership although other products may also be included, such as fuel and personal protective equipment. When calculating emissions related to the use of sold equipment, rental companies may encounter several challenges as reporting is based on future equipment use by users not affiliated with the reporting entity. **Several factors introduce uncertainties into the calculations of this category. These factors include the real lifespan of the machine, future usage patterns, equipment retrofitting, changes in motorization and the future type of fuel used.** Consequently, rental companies may need to define multiple hypotheses for calculating the emissions covered in this category.

Boundaries and possible exclusions

- The GHG Protocol divides emissions from the use of sold products into two types:
  - **Direct use-phase** emissions
  - **Indirect use-phase** emissions
- Direct use-phase emissions of sold products are **mandatory**, while reporting indirect use-phase emissions **may be necessary**, particularly when they are expected to be significant
- **Direct use-phase** emissions include three types of products:
  - Products that directly consume energy (fuel or electricity) during use such as equipment, automobiles and electronics
  - Fuels and feedstocks such as petroleum products and natural gas
  - Greenhouse gases and products that contain or form greenhouse gases that are emitted during use such as refrigeration and air-conditioning equipment
- This guidance **covers specific methodologies for equipment and fuel sold** by the rental company. Methodologies for other types of products can be found in the GHG Protocol
- Category 3.11 includes **the total expected lifetime emissions** from all relevant products sold in the reporting year across the company's asset portfolio

Methodologies Panorama

Companies are required to provide a description of the methodologies and assumptions used to calculate emissions under category 3.11

The following methodologies are proposed in this guidance:

- **For equipment** sold by the rental company that directly consumes energy (fuel or electricity) during use:

1. "**Average equipment metrics**" method
2. "**Adapted historical consumption**" method

Rental companies may use the most convenient method depending on available data. Some of the equipment metrics are common with category 3.13

- **For fuels** sold by the rental company

3. "**Fuels**" method

Sources: GHG Protocol, KPMG research & analysis

1 AVERAGE EQUIPMENT METRICS METHOD – EQUIPMENT SOLD

Description

This method uses **the remaining lifetime coupled with average metrics on equipment usage**. These average metrics (average consumption or average usage emission factor) are specific to the equipment and independent of equipment usage intensity. The data needed can be estimated in several ways, some of which are detailed in this guidance.

Data requirements & collection

To use this method, the reporting company should collect:

- **Total operating hours after sale** (hours)
- **Average $_{usage}$ metrics**:
  - **Average consumption** of the equipment (litres/hours, kWh/hour), also used in category 3.13 – method 2
  - Or average **usage emission factor** ($KgCO_2e$/operating hour), also used in category 3.13 – method 3

Total operating hours after sale can be estimated using different approaches depending on available data.

The average energy consumption of the equipment (litres/hour, kWh/hour) can be estimated following the same approach outlined in category 3.13. It could be based on the rental company field knowledge and telematics data, OEM specifications, the rental equipment database provided with this guidance, or an estimate using the engine specifications and equipment usage cycle.

Emission factors

The required emission factor depends on the formula being applied:

- **For formula A, based on the equipment's average energy consumption:**
  - For combustion engine equipment: fuel EF, including upstream and combustion ($KgCO_2e$/litre)
  - For electric equipment: location-based electricity grid EF ($kgCO_2e$/kWh)

  These EF can be obtained from databases such as ADEME, DEFRA, Umwelt Bundesamt, EPA, ECCC, IEA, or specific country-based databases.

  Electricity grid EF databases are mentioned in Scope 2.
- **For formula B, the emission factor needed to apply this method is the average equipment usage EF** (Kg CO_2/hour). Currently, equipment usage emission factors are not readily available. However, much like the rental industry, OEMs and specialized companies are actively working on environmental data. As a result, these factors are expected to become more accessible in the future. The equipment usage emission factor can be:
  - Provided by the OEM
  - Estimated based on the database provided with this guidance
  - Estimated based on industry-specific literature

Formulas for use of sold product emissions

EQUIPMENT USAGE EMISSIONS AFTER SALE =	
A	Total operating hours after sale (hours) x Average consumption (litres/hour, kWh/hour) x EF for fuel/electricity ($kgCO_2e$/litre, $kgCO_2e$/kWh)
	OR
B	Total operating hours after sale (hours) x EF for equipment usage ($kgCO_2e$/operating hours)

The challenge of these formulas is to estimate the number of future operating hours after the sale. The following methodologies propose approaches that could be used to estimate these hours.

Sources: GHG Protocol, KPMG research & analysis

Approaches to estimate total operating hours after the sale of an item of equipment

As previously mentioned, predicting the future operating hours of an item of equipment after its sale is a complex task. **This metric is inherently difficult to estimate as it depends on factors that remain uncertain at the time of reporting.** The actual lifespan of the sold equipment can indeed be longer or shorter than its theoretical one. However, the reporting company needs to determine the assumptions that best reflect the future usage of the equipment and calculate the emissions accordingly. An approach based on lifetime in hours is generally more accurate than one based on lifetime in years. By using lifespan in hours, the company does not have to consider annual usage intensity (operating hours/year), which could vary from one user to another.

TOTAL OPERATING HOURS AFTER SALE =

Total lifetime (hours)
–
Total operating time under the ownership of the rental company (hours)

Data collection:

- **Total lifetime (in hours)** can be sourced from the equipment's technical documentation or obtained from OEMs
- **Total operating time under the ownership of the rental company (in hours)** can be determined from the rental company's records (e.g., telematics data or the duration of ownership in years, multiplied by annual rental utilization hours)

In many cases, however, the required metrics, measured in hours, may not be available. The reporting company can then use a method that takes into account the equipment's lifespan and the duration of rental ownership, both measured in years. This method also includes a parameter for utilization intensity, enabling years to be converted into future operating hours.

TOTAL OPERATING HOURS AFTER SALE =

[Total lifetime (years) – ownership duration by the rental company (years)]
x
Future utilization intensity (operating hours/year)

The formula is less accurate than the one based on the metrics measured in hours. It lacks the notion of intensity of use over past years during ownership by the rental company.

Data collection:

- **Total lifetime (in years)** can be sourced from the equipment's technical documentation or obtained from OEMs
- **Ownership duration by the rental company (years)** may be determined from the company's records by using the acquisition and sale dates.
- **Future utilization intensity (operating hours/year)** involves a degree of uncertainty as it depends on the future usage pattern. To define this hypothesis, some rental companies rely on their data, knowing that future use will be different from past rental use. Generally, equipment use outside a rental model is less intensive. The rental company can estimate their rental usage intensity (operating hours/year) and apply a reduction factor to represent future usage.

EXAMPLE

The rental company sold a scissor lift during the year it is currently reporting.

The total lifetime of the scissor lift is 10,000 hours, as indicated in OEM specifications. It was used for 6,000 hours under the ownership of the rental company (estimated from telematics). The average consumption of the equipment is 4.3 litres/hour; it was retrieved from the ERA benchmark of rental equipment available with this guidance.

The diesel emission factor is 3.16 $kgCO_2e$/litre (ADEME, non-road diesel)

Usage emissions after sale = **[10,000 - 6,000] x 4.3 x 3.16 = 54,352 $kgCO_2e$**

Sources : KPMG research & analysis

2 ADAPTED HISTORICAL CONSUMPTION METHOD – EQUIPMENT SOLD

Description

Instead of using the average consumption per hour of an item of equipment to estimate emissions, this method uses a broader estimate, i.e. yearly consumption of the item of equipment. The rental company **estimates this metric capitalizing on its historical data. As mentioned before, equipment use outside a rental model is different (generally less intensive). Consequently, the reporting company needs to take this difference into consideration when estimating future emissions for equipment usage.**

Data requirements & collection

To use this method, the reporting company needs to estimate:

- **Total operating years after the sale** (years). It can be calculated using the equipment's technical specifications and the acquisition date by the rental company
- **Average annual consumption under the rental model** (litres/year, kWh/year), which can be quantified based on historical records, telematics or the past carbon reporting of the rental company
- **Annual usage intensity reduction factor (to represent non-rental usage),** a factor representing future equipment usage. In this guidance, this factor is expressed as a "reduction" factor because, in general, usage of the equipment after the sale will be less intensive than under the rental model. For example, if the yearly usage of an item of equipment is estimated to be 40% lower after its sale, the ratio would be 1-0.4 = 0.6.

Emission factors

The emission factors needed are:

- For combustion engine equipment: fuel EF, including upstream and combustion (kgCO2e/litre)
- For electric equipment: location-based electricity grid EF (kgCO2e/kWh)

They can be retrieved from databases, such as ADEME, DEFRA, Umwelt Bundesamt, EPA, ECCC, IEA, or any specific country-based database. Electricity grid EF databases are mentioned in scope 2.

Formula for use of sold products emissions

EMISSIONS FROM USE OF SOLD EQUIPMENT =

Total operating years after sale (years)
x
Average annual consumption under rental model (litres/year, kWh/year)
x
Annual usage intensity reduction factor (to represent a non-rental usage)
x
EF for fuel/electricity ($kgCO_2e$/litre, $kgCO_2e$/kWh)

TOTAL OPERATING YEARS AFTER SALE =

Total lifetime (years)
–
Total operating years under ownership of the rental company (years)

EXAMPLE

The rental company sold an equipment during the year it is currently reporting.

The total lifetime of this equipment is estimated to be 12 years by the OEM. The rental company owned the equipment for 9 years. Based on its data for these 9 years, the average annual diesel consumption of the equipment was 4,450 litres/year.

The equipment was acquired by a construction company. The rental company estimates that the usage will be less intensive. It considers that, on average, the annual usage by the construction company will be half of that of the rental company. Therefore, the annual usage intensity reduction factor set by the rental company is 60%.

The diesel emission factor is 3.16 kgCO2e/litre (ADEME, non-road diesel).

Usage emissions after sale are estimated as follows:

[12 - 9 years] x 4,450 l/h x 60% x 3.16 KgCO2e/l = 25,312 kgCO2e

Sources: GHG Protocol, KPMG research & analysis

3 FUELS METHOD – FUELS SOLD

Description

This method is specifically used to calculate the direct use-phase emissions from fuels sold. The calculations involve multiplying the quantities of fuels sold by the combustion emission factors for each fuel.

If fuels are sold for use in equipment provided by the rental company, the latter should **avoid double-counting** the same emissions, for both the rented equipment and the fuel sold (refer to special case #2 – fuel supply services for more info).

Data requirements & collection

To use this method, the reporting company needs to collect **the total quantities of fuels sold** (e.g., kWh) from the sales register.

Emission factors

The emission factors needed are **combustion EF of fuels** (e.g., $kgCO_2e$/litre)

They can be retrieved from databases, such as ADEME, DEFRA, Umwelt Bundesamt, EPA, ECCC, IEA, or any specific country-based database.

Formula for use of sold product emissions

EMISSIONS FROM USE OF SOLD FUELS=
Quantity of each fuel sold (litres) x EF for the combustion of each fuel ($kgCO_2e$/litres)

Sources: GHG Protocol, KPMG research & analysis

3.12 – End-of-life treatment of sold products

Description

Category 3.12 includes **emissions from the waste disposal and end-of-life treatment of products sold by the company** during the reporting year. This category includes the total expected end-of-life emissions from all products sold in the reporting year. Particularly for a rental company, **category 3.12 concerns equipment sold to other users, as well as consumables, site goods, personal protective equipment, and other products sold to rental clients.**

Boundaries and possible exclusions

Category 3.12 corresponds to operations related to the waste disposal and end-of-life treatment **exclusively for products sold by the rental company.**

All packaging involved from the point of sale by the reporting company to the end-of-life after consumer use should be included with sold products (e.g., packaging used to transport products from to the point of retail and any packaging that is disposed of prior to the end-of-life of the final product)

Emissions to exclude from category 3.12 are:

- Emissions from waste generated by operations of the reporting company, already accounted in category 3.5 (e.g., from spare parts for equipment maintenance)

Methodologies Panorama

Emissions calculations may require assumptions regarding end-of-life treatment methods. **Reporting companies must provide a description of the methodologies and assumptions used in calculating emissions.**

End-of-life treatment methods (e.g., landfilling, incineration, and recycling) are described in category 3.5 (waste generated in operations) and apply to both category 3.5 and category 3.12.

2 applicable methodologies are proposed in this guidance for reporting emissions related to category 3.12:

1. "**Waste-type specific**" method, based on the weight of waste disposed of and waste treatment methods
2. "**Manufacturer-based**" method, which involves collecting the emissions results for end-of-life treatment, computed by the product manufacturer

Sources: GHG Protocol, KPMG research & analysis

1 Waste-type specific Method

Description

The waste-type specific method is a precise approach that involves collecting the total mass of sold products by material type and identifying the corresponding end-of-life treatment methods (e.g., incineration, landfill, recycling, or storage). The methodology is similar to

Data requirements & collection

To use this method, the reporting company needs to collect:

- **Total mass of sold products** (kg), broken down by material type (e.g., plastics, steel) to identify the quantity for each material
- **For each material type, the waste treatment methods applied** (e.g. landfill, recycling, storage, incineration)

The types and quantities of materials can be obtained from product-specific data (e.g., technical sheet).

For the end-of-life-treatment methods to be considered, rental companies can rely on:

- Their own research and internal data on how the sold products are treated
- European Union data: Eurostat average end-of-life treatment scenarios per material

Emission factors

The emission factors needed are **waste type-specific and waste treatment-specific emission factors** (e.g. plastic waste recycling in kgCO2e/tons).

They can be retrieved from databases, such as DEFRA, ADEME or Ecoinvent.

Formula for emissions related to the end-of-life treatment of sold products

EMISSIONS FROM THE END-OF-LIFE TREATMENT OF SOLD PRODUCTS =
For each waste type and waste treatment method:
Quantity of waste type (e.g., plastic) by waste treatment method (e.g. recycling) (tons)
x
EF for the waste type and treatment method (e.g., plastic recycling) (kg CO_2e/tons)

Sources: GHG Protocol, KPMG research & analysis

2 Manufacturer-based Method

Description

When available, the rental company can refer to the end-of-life treatment results produced by suppliers. Although not widely available currently, this data could become increasingly accessible in the future. For example, end-of-life treatment emissions may be available in LCAs produced by the OEMs for their equipment.

Data requirements & collection

To use this method, the reporting company should collect:

- The quantities of products sold
- End-of-life emissions for the products, calculated by the suppliers

Emission factors

The emission factors required correspond to the end-of-life treatment emissions of the products considered (kg CO_2e/unit). If available, these emission factors can be obtained from the manufacturers (e.g., OEMs for equipment). They are generally included in LCAs but can also be requested from manufacturers. In specific cases, specialized external parties may produce LCAs containing these emission factors.

Formula for emissions related to the end-of-life treatment of sold products

EMISSIONS FROM THE END-OF-LIFE TREATMENT OF SOLD PRODUCTS=

Quantity of product sold (#)
x
Product EF for End-of-life (kgCO^2e/unit)

Sources: GHG Protocol, KPMG research & analysis

3.13 – Downstream leased assets

Description

This category is applicable to lessors (i.e., companies that receive payments from lessees). It includes emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year that are not already included in Scope 1 or Scope 2.

Category 3.13 includes **emissions from the usage of equipment owned by the rental company** (as the lessor) **and leased to clients** throughout the reporting period.

This category is **directly related to the core business of a rental company** and holds significant importance in its expected carbon footprint. Reporting emissions from equipment usage requires the rental company to have technical knowledge about the leased equipment and an understanding of its utilization by the client.

Boundaries and possible exclusions

- Category 3.13. corresponds exclusively to the emissions generated from the operation of a leased asset. For a rental company, this refers to the emissions generated by a client's use of the rented equipment (it excludes upstream production emissions and other lifecycle emissions)
- Equipment rented to the client may be owned, leased on a long-term basis (special case #3 – operating leased assets) or rented out by the reporting company from another provider (special case #4 – re-rental of equipment)
- Emissions generated by equipment leased by the rental company (as the lessee) and used for internal operations are accounted for under Scope 1, Scope 2, or Scope 3 - Category 3.8.
- Equipment that neither consumes energy nor generates fugitive gas during operation does not produce usage emissions to be considered in category 3.13
- If the rental company leases an item of equipment for more than a year, reporting should only cover the period corresponding to the reporting year
- Double counting emissions should be avoided for multiple items of equipment used in conjunction on the client's site (special case #1)

Methodologies Panorama

To quantify emissions associated with equipment usage, data on consumption and client utilization patterns are required. This data can be diverse, complex, and is sometimes unavailable. **Therefore, for a rental company to establish a feasible and relevant methodology, it should first analyze its fleet, categorize it, and identify the available data**. Additional metrics can be obtained from telematics, OEMs, and suppliers. This guidance also provides a database with key metrics to support companies in reporting their equipment-related emissions. **Based on the available data and the desired level of precision, the rental company can then decide on the appropriate methodology to apply.** Different methodologies may be used for different equipment categories.

3 applicable methodologies are proposed in this guidance to report emissions related to category 3.13.

1. "**Energy consumption**" method, based on the actual quantity of energy consumed by the equipment

2. "**Usage time and average consumption**" method, based on usage time of the equipment and average energy consumption: to be used when the actual quantity of energy consumed is not available

3. "**Usage time and average emissions**" method, similar to method 2, and also applicable when the actual quantity of energy consumed is not available. It utilizes the equipment's average emissions instead of its energy consumption.

The methodologies have been outlined for equipment fuel and electricity consumption. These formulas can also be applied to quantify fugitive emissions from refrigeration equipment. In this case, fuel or electricity consumption should be substituted with the fugitive gas leakage, and the corresponding emission factor should be used.

Sources: GHG Protocol, KPMG research & analysis

1 Energy consumption Method

Description

This method is **the most accurate way to determine emissions**, relying on the specific amounts of energy (fuel and electricity) consumed by the equipment during the rental period. It becomes practical for rental firms to implement this method **when they have the capability to gather the required data**, typically through telematics systems embedded within the equipment.

Data requirements & collection

To use this method, the reporting company should collect **the quantity of fuel and electricity** (litres, kWh) **consumed by the equipment** during its usage by clients.

The rental company's telematics systems and data logs can provide this information. However, not all assets are currently equipped with telematics sensors. Even when data is available, it may be complex to process for use in this method. Consequently, this method may not be feasible for all equipment in the fleet. In such cases, the rental company can resort to alternative methodologies.

Emission factors

Emission factors for fuel or electricity consumed are required:

- For combustion engine equipment: the fuel EF, including upstream and combustion ($kgCO_2e$/litre)
- For electric equipment: location-based electricity grid EF ($kgCO_2e$/kWh)

These emission factors can be retrieved from databases, such as ADEME, DEFRA, Umwelt Bundesamt, EPA, ECCC, IEA, or any specific country-based database. Electricity grid EF databases are mentioned in Scope 2.

Formulas for downstream leased asset emissions

EQUIPMENT USAGE EMISSIONS =

For combustion engine equipment

Quantity of fuel consumed (litres)
x
EF for fuel ($kgCO_2e$/litre)

For electric equipment

Quantity of electricity consumed (KWh)
x
EF for the electricity grid ($kgCO_2e$/KWh)

A combination of both formulas can be applied to quantify emissions for hybrid equipment.

EXAMPLE

The rental company leases an electric mini-excavator to a client in France.

The company retrieves the quantity of energy consumed over the reporting year from its telematics data, e.g., 6,000 kWh.

The average France electricity grid EF is 0.052 (ADEME, electricity, 2022 average mix).

Equipment usage emissions = **6,000 x 0.052 = 312 kgCO2e**

Sources: GHG Protocol, KPMG research & analysis

2 USAGE TIME AND AVERAGE CONSUMPTION METHOD

Description

In many cases, rental companies lack the capability to directly measure or collect the quantities of energy consumed during equipment usage by the client. In these cases, this method enables the reporting company **to estimate emissions based on equipment usage time by applying average energy consumption** (fuel, electricity).

Data requirements & collection

To use this method, the reporting company needs:

- **The usage time** over the reporting year (hours), either collected from telematics data (trackers) or estimated based on the company's data records
- **The average energy consumption** of the equipment (litres/hour, kWh/hour) Depending on available data, average consumption can be based on:
  - Rental company field knowledge and telematics data
  - OEM specifications
  - Rental equipment database provided with this guidance
  - An estimate using the engine specifications and equipment usage cycle (e.g., an average load factor to be used with the engine power)

In this method, reporting precision depends on activity data. The more representative the data (usage time and average energy consumption) is of the equipment and its usage, the greater the precision. However, applying activity data to each asset is complex. Reporting companies can categorize similar equipment and apply the methodology to each category.

Emission factors

Emission factors for the fuel or the electricity consumed are required:

- Fuel EF, including upstream and combustion (kgCO2e/litre)
- For electric equipment: location-based electricity grid EF (kgCO2e/kWh)

These emission factors can be retrieved from databases such as ADEME, DEFRA, Umwelt Bundesamt, EPA, ECCC, IEA, or any specific country-based database. Electricity grid EF databases are mentioned in scope 2.

Formulas for downstream leased asset emissions

EQUIPMENT USAGE EMISSIONS =

For combustion engine equipment

[Annual usage time (hours) x average consumption (litres/hour)]
x
EF for the fuel ($kgCO_2e$/litre)

For electric equipment

[Annual usage time (hours) x average consumption (kWh/hour)]
x
EF for electricity grid ($kgCO_2e$/kWh)

When annual usage time cannot be collected from telematics data, it may be estimated by the rental company.

ANNUAL USAGE TIME =

Rental duration (days) x average daily usage (hours/day)

The rental duration (in days) is almost always available in the billing documents or in sales and financial tracking data.

As for average daily usage, the rental company can determine it based on:

- The rental company's field knowledge
- The rental equipment database provided with this guidance
- Industry-specific literature

EXAMPLE

The rental company leased a diesel forklift for 240 days. Its average consumption is 3.9 l/h (from OEM specifications). The average daily usage is set based on the ERA benchmark of rental equipment to 3.1 hours. The diesel emission factor is 3.16 kgCO2e/litre (ADEME, non-road diesel).

Equipment usage emissions = **[240 x 3.1] x 3.9 x 3.16 = 9,169 kgCO2e**

Sources: GHG Protocol, KPMG research & analysis

3 USAGE TIME AND AVERAGE EMISSIONS METHOD

Description

This method is similar to method 2. It applies when the quantities of energy consumed by the equipment are not available. Instead of using an average consumption metric, **this method uses an average utilization emission factor for the equipment**.

Data requirements & collection

To use this method, the reporting company requires:

- **The usage time** over the reporting year (hours), which can be obtained from telematics data (trackers) or estimated based on the company's data records
  - The same estimation approach outlined in method 2 can be applied
- **The average equipment usage Emission Factor** (Kg CO_2/operating hour)

As with method 2, reporting precision depends on the usage time and equipment usage EF. The more representative the data is of the equipment and its usage, the greater the reporting precision.

Emission factors

The emission factor needed to apply this method is the **average equipment usage EF** (Kg CO_2/hour)

Currently, equipment usage emission factors are not readily available. However, much like the rental industry, OEMs and specialized companies are actively working on environmental data. As a result, these factors are expected to become more accessible in the future.

The equipment usage emission factor can be:

- Provided by the OEM
- Estimated based on the database provided with this guidance
- Estimated based on industry-specific literature

Formula for downstream leased asset emissions

EQUIPMENT USAGE EMISSIONS =

Annual usage time (hours)
x
EF for equipment usage (kg CO_2e/operating hour)

EXAMPLE

The rental company leased a telehandler for 270 days.

The rental company doesn't have specific metrics about this equipment.

Based on the ERA benchmark of rental equipment provided with this report, the average daily usage of similar telehandlers is 2.2 hours, and their usage emissions are 16.9 kgCO2e/hour.

Equipment usage emissions = **[270 x 2.2] x 16.9 = 10,039 kgCO2e**

Sources: GHG Protocol, KPMG research & analysis

Addressing special cases in the rental business

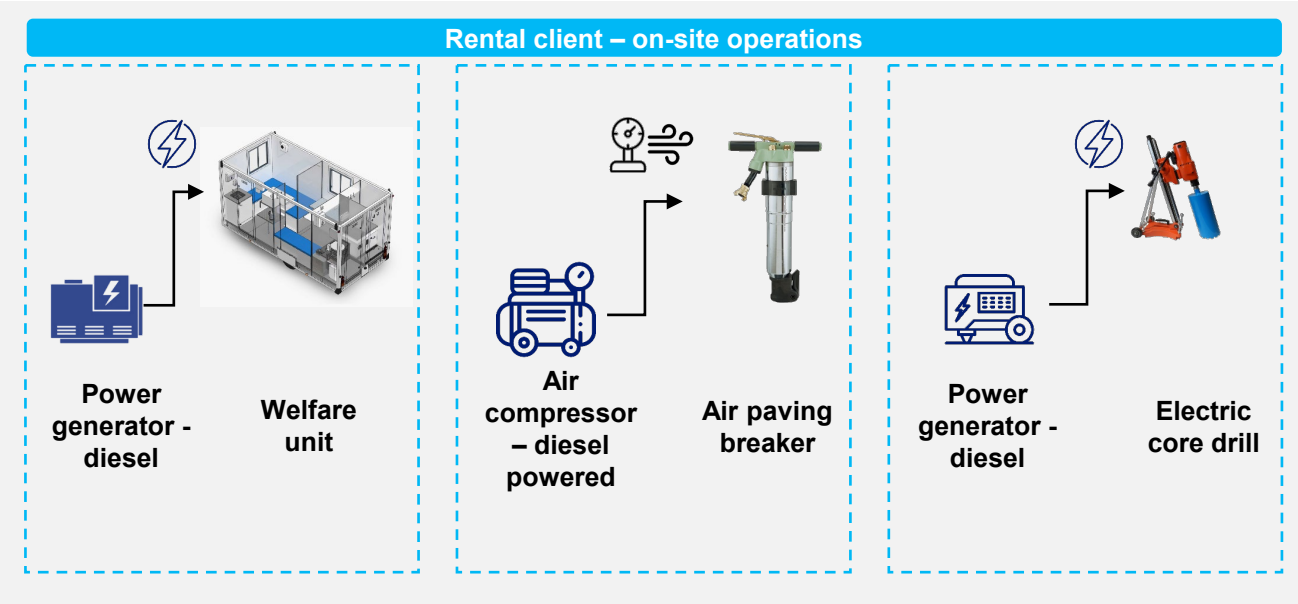
ON-SITE COMBINATION OF RENTAL EQUIPMENT

Description

The **on-site combination of rental equipment occurs when the rental company provides two or more interdependent units to the client**, as shown in the illustrated examples.

In these cases, energy provided by one item of equipment is consumed by the other one(s), typically an electricity generator supplying power to a welfare unit. The usage of both units corresponds to a single emission source. In the illustrated examples, the emission source is the combustion of fuel producing the energy consumed in the system.

Special operational case – illustrative examples



The risk of double counting emissions

In situations where several items of equipment are used in conjunction on-site, there may be a risk of double counting emissions associated with their usage.

This can occur because:

- The rental company may not have sufficient information on how the equipment is installed or used on-site
- Or the information is not visible to the team carrying out the carbon reporting

Addressing this issue to avoid double counting primarily means that rental companies have to improve information regarding the use of rented equipment.

Sources: GHG Protocol, expert interviews, KPMG research & analysis

FUEL SUPPLY SERVICES

Description

In addition to providing clients with equipment, rental companies offer a wide range of services including **fuel supply and refill**.

Generally, this scenario is rare in the equipment rental industry, but it can occur to meet specific client needs or at specific sites (e.g., refuelling services for power generators on a site).

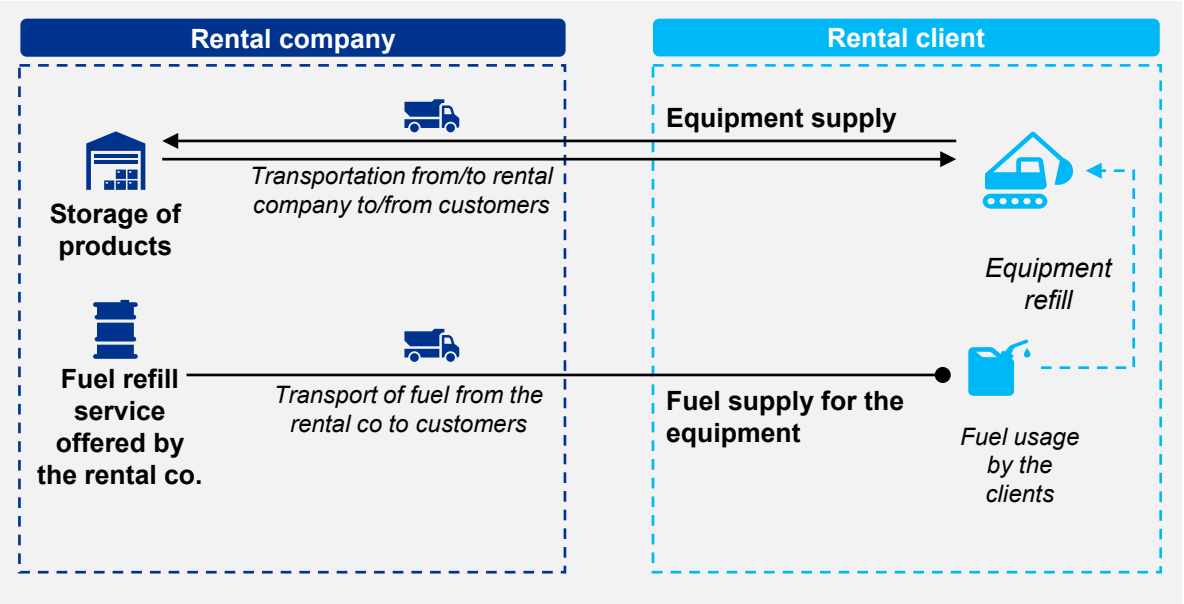
Emissions from the equipment's usage are generated by the combustion of the provided fuel. Both elements correspond to a single source of emissions.

The risk of double counting emissions

The risk of double counting emissions refers to the usage of the equipment being added to the combustion of the fuel.

This can occur because the rental company may not have the information about how the supplied fuel is used. Or the information is not visible to the team carrying out the carbon reporting.

Business Model special case – illustrative example



Proposed approach for carbon reporting

When a rental company provides the fuel, two operating models are possible:

- The fuel is provided and transported by the rental company itself
- The fuel is provided by the rental company but transported by a third party

The carbon reporting approach recommended is detailed in the table below.

Carbon reporting recommendations for fuel supply services

Operation	Emissions description	Categorization (service done by the rental company)	Categorization (service done by a third party)
Usage of fuel by customers	Combustion emissions of the fuel	Category 3.13 (downstream leased assets)	Category 3.13 (downstream leased assets)
Transportation of fuel to the customer	Emissions from mobile sources transporting the fuel	Scopes 1 or 2 (transportation carried out by the rental company with combustion-engine / electric vehicle)	Category 3.4 (upstream transportation and distribution)

Sources: GHG Protocol, expert interviews, KPMG research & analysis

OPERATING LEASED ASSETS

Description

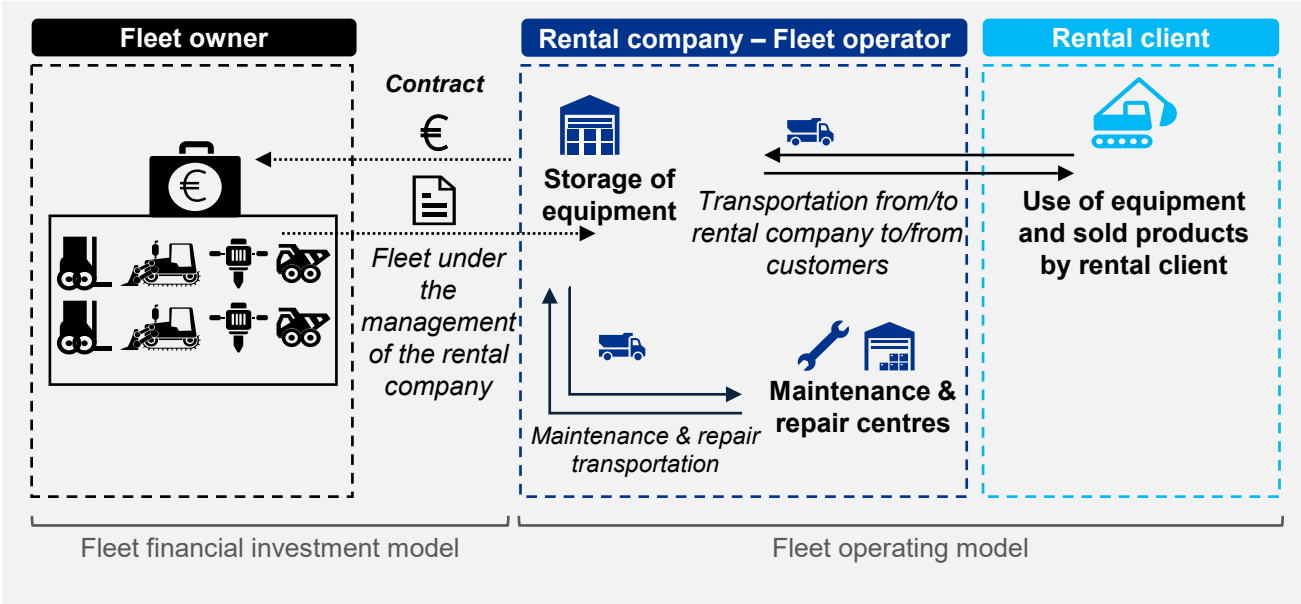
In some exceptional cases, rental companies may decide to constitute their fleets through long-term asset leases:

- The rental fleet is an asset owned by a different company than the rental company, such as a financial institution, which also undertakes the capital expenditure (CapEx)
- Or the rental fleet is put under the management of the rental company under a contract such as a long-term lease contract

In these cases, it is assumed that the rental company oversees and operates the rental fleet.

Generally, this scenario is rare in the equipment rental industry.

Business model special case – illustrative example



Proposed approach for carbon reporting

The fleet is leased by the rental company ("lessee"):

- In general, according to the GHGP, emissions originating from the operation of a leased fleet by the reporting company are classified under category 8 (upstream leased assets) if they are not already accounted for under Scopes 1 and 2. However, this is not a typical scenario in the case of a rental company, as the fleet is not used for their internal operations but is provided for clients
- In the case of a rental company, the equipment is used by the rental client, and it is recommended that the corresponding emissions be classified under category 3.13 (downstream leased assets)
- Given that the equipment is leased, the lessee – the rental company – may not account for upstream and production emissions linked to the assets.

Sources: GHG Protocol, expert interviews, KPMG research & analysis

RE-RENTAL OF EQUIPMENT

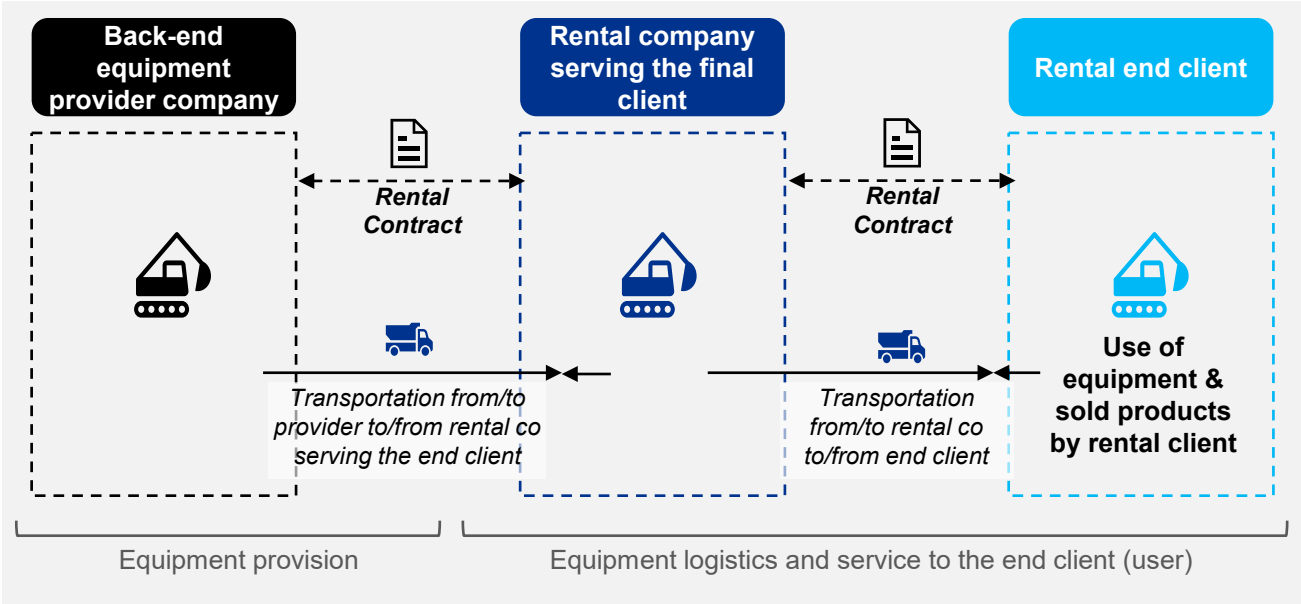
Description

A rental company may not have a specific item of equipment to serve a client. And in some cases, to fulfil the client's needs, they may source it from third parties:

- The rental company serving the end client procures the equipment from a supplier – often another rental company - and then re-rents the machine to its client
- At the end of the contract between the end client and the rental company, the equipment is returned to its provider (here, referred to as the back-end equipment provider)

Though not prevalent across the industry, some rental companies may regularly come across this scenario.

Business model special case – illustrative example



Proposed approach for carbon reporting

From a carbon reporting perspective, addressing this situation is similar to addressing special case 3 (operating leased assets).

The equipment is rented by the rental company from another provider and then re-rented to the client. It is recommended that the usage emissions be classified under category 3.13 (downstream leased assets) - the same treatment as for equipment owned by the rental company.

Given that the equipment is rented from the provider on a short-term basis to address a specific client demand, it is recommended that the rental company does not account for upstream and production emissions associated with the equipment.

Sources: GHG Protocol, expert interviews, KPMG research & analysis

List of acronyms

GHG	Greenhouse gas
EF	Emission factor
CO2e	CO_2 equivalent
CSRD	Corporate Sustainability Reporting Directive; an EU directive, applicable since 1 January 2024
T&D	Transmission and distribution
LCA	Life cycle analysis
FTE	Full-time equivalent, unit of measure proportional to the number of hours worked by an employee

List of resources

The ERA benchmark of rental equipment	A database of upstream emissions and usage metrics for 100 items of equipment developed by the ERA based on an industry benchmark and provided with this report
ERA website	The European Rental Association (ERA) is the representative association of the equipment rental industry in Europe
ERA CO2 Calculator	A free-to-use tool developed by the ERA to estimate emissions of equipment over its lifetime
GHG Protocol scope 3 reporting	GHG Protocol reporting standard to account for emissions across the value chain, falling under scope 3
GHG Protocol – Tools & resources	A set of cross-sector, country-specific, and sector-specific tools, third-party life cycle databases, and FAQs
GHG Protocol - Calculation tools FAQ	A list of the most asked questions regarding the GHG Protocol calculation tools
ADEME	EF database: French-based open source; partially updated annually; contains numerous physical and monetary emission factors
DEFRA	EF database: UK-based open source; updated annually; contains numerous physical emission factors
Exiobase	EF database: Global, detailed multi-regional EEIO database; open source; updated annually; contains only monetary emission factors
E-Grid	EF database: US-based open-source; for electricity emission factors for the United States
IEA	EF database: From IEA agency, paid-access; for electricity and heating emission factors across all geographies
Ecoinvent	EF database: Paid-access; updated annually; contains numerous emission factors for all countries and primarily used for Life Cycle Analysis purposes
CEDA	EF database: Paid-access; updated annually; contains monetary emission factors, for all countries
Re-diss / AIB	EF database: US and EU open-source, for residual mix market-based electricity emission factors
EPA recommendations	EF database: Referencing default Emission Factors for refrigeration/air conditioning
COPELAND	Free tool available to estimate refrigerant consumption (applicable for climate control of spaces accommodating humans)
Moneybarn (IEA)	IEA resource estimating commuting emissions per employee for each country
Eurostat waste generation and treatment	European Union data, providing waste management data for EU countries, by waste management operations and type of material
Responsible sourcing of HVO	Private report published by Action Sustainability to study environmentally responsible practices in the procurement of hydrotreated vegetable oil (HVO).

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