GSMA GeSI ENABLING DIGITAL SUSTAINABILITY ITU

Scope 3 Guidance for Telecommunication Operators

This guidance has been jointly developed by the GSM Association (GSMA), the Global Enabling Sustainability Initiative (GeSI) and the International Telecommunication Union (ITU-T).

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. GSMA's vision is to unlock the full power of connectivity so that people, industry and society thrive. Representing over 750 mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Industry Services and Solutions, Connectivity for Good, and Outreach.

ITU is the United Nations specialised agency for information and communication technologies (ICTs), driving innovation in ICTs with a global membership including 193 Member States and more than 900 companies, universities and international and regional organisations. Established in 1865, ITU is responsible for the global coordination of radio-frequency allocations and satellite orbits, the development of international technical standards, and supporting the improvement of ICT infrastructure in developing countries.
ITU-T Study Group 5 on Environment, Electromagnetic Fields and Circular Economy leads ITU standardisation work on sustainable digital transformation, developing standards on the use of ICTs to tackle environmental challenges in line with the UN Sustainable Development Goals and the UN Framework Convention

GeSI works with a range of international stakeholders committed to information and communication technology (ICT) sustainability and supports member initiatives in countries that tackle climate change, energy and resource efficiency, privacy and security, digital literacy and digital divide, human rights, as well as fostering collaborative and innovative approaches, ideas and joint initiatives. With these partnerships, GeSI is able to work towards its global vision of a greater evolution of the ICT sector to best meet the challenges of sustainable development.

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Introduction

Across the information and communication technology (ICT) sector, companies are responding to the climate crisis and rising greenhouse gas (GHGs) emissions. ICT companies are committing to reduce not only their own GHGs, but also the emissions resulting from their value chain, including their supply chain and customers.

Many companies are linking their commitments to the Science-Based Target Targets initiative [SBTi] and having them validated as Science-Based Targets (SBTs). For this, an accurate assessment of GHGs is essential to understanding and achieving SBTs. Two types of SBT's exist: long-term net zero targets and interim targets. More specifically, ITU-T, GeSI and the GSMA have previously established a 1.5˚C aligned decarbonisation trajectory for the ICT sector that requires a reduction of 45% between 2020 and 2030 ITU-T L.1470[1] [SBTi]. ITU-T L.1471[2] provides further guidance for further reductions to achieve net zero.

Reporting standards

The most widely used framework for establishing inventories of GHG emissions of companies is the Greenhouse Gas Protocol (GHGP) [GHGP-1], and many companies have been publishing the outcome of their inventories for many years. In addition, the guidance from the International Standardization Organization is given in ISO 14064-1: 2018[3], and national authorities provide guidance, e.g. the Bilans GES site[4] in France. Referring to organisations and companies in the ICT sector, ITU-T L.1420[5] gives specific guidance. However, current methodologies/guidelines for value chain reporting do not give enough practical guidance. Historically, this type of reporting has been seen as a voluntary add-on, but it has now become part of expected mainstream GHG reporting.

Scope 3 emissions

Current reporting of a company's own emissions (referred to as Scope 1 and 2) is often comprehensive. However, the inventory of value chain emissions (referred to as Scope 3) is more difficult, since this refers to emission sources outside the company's direct control, and this reporting is less complete than reporting of a company's own emissions. There is also substantial variation in reporting by ICT companies of Scope 3 with respect to coverage and transparency, making it hard to derive any trends. In particular, it is hard to make any generalised conclusions regarding the distribution of emissions between Scope 1, 2 and 3, let alone between Scope 3 Categories.

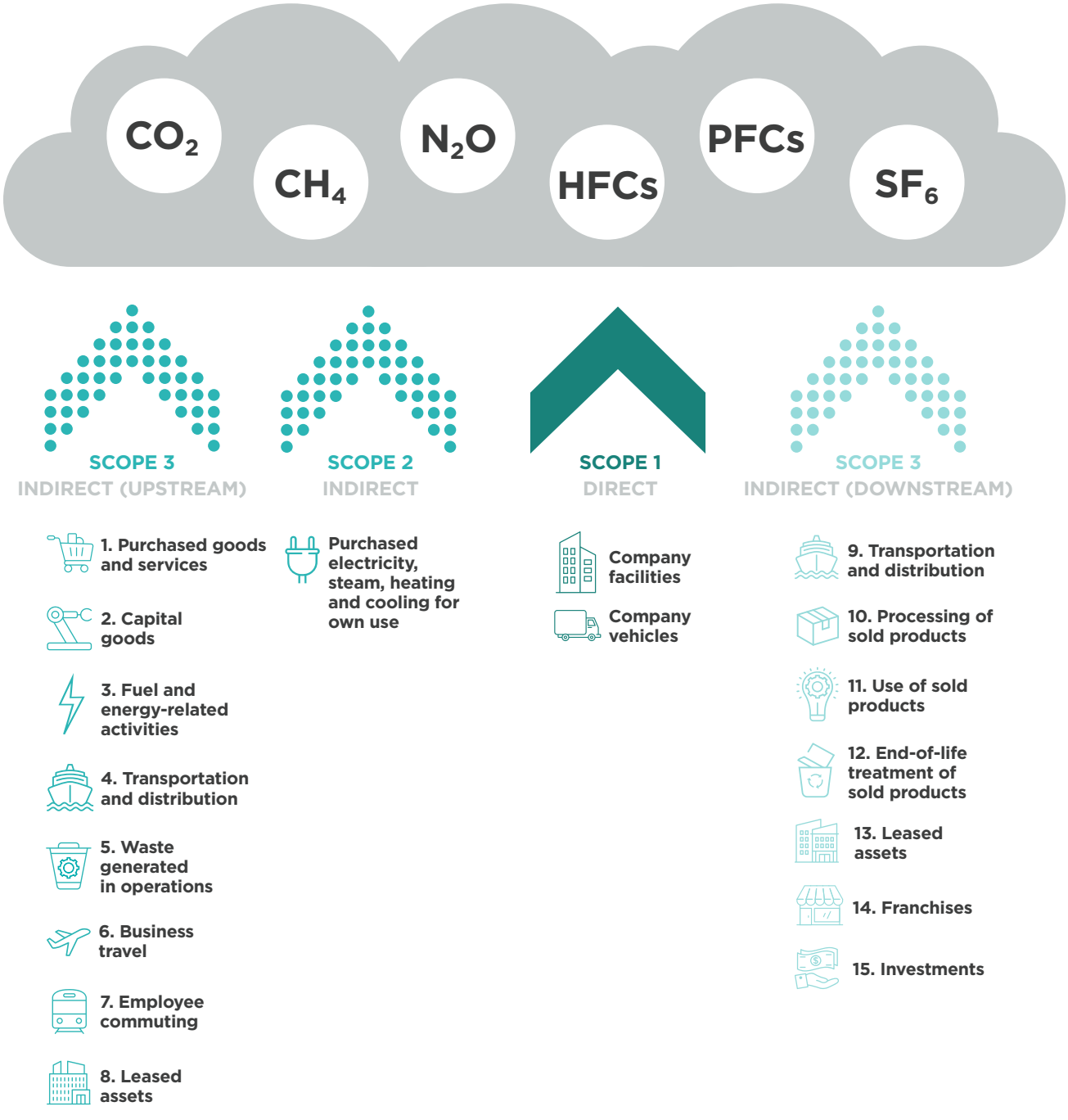
Also, the variation between electricity mixes in different markets has a great impact on the distribution of emissions. Many ICT companies are active in several countries while data is presented at a company level making it even harder to understand the relative magnitude of Scope 2 and 3. However, while the ratio between Scope 1, 2 and 3 emissions is supposed to vary across ICT operators, Scope 3 emissions often represent those that are the most substantial. See Figure 1.

This guidance harmonises methods for telecommunication operators to assess and report their Scope 3 GHG emissions, and to increase its coverage, and transparency. Based on criteria including association with the portfolios, control and complexity of reporting, this guidance prioritises Categories 1 to 2 and 11 (which addresses the life cycle impact of company portfolios) in particular and Category 3 (which is closely linked to Scope 1 and 2), although all Categories are addressed.

This guidance is intended to supplement, not supersede, existing standards. Thus, different parts present various levels of detailed guidance, as needed. Telecommunication operators wanting to claim conformity to other standards would need to consult them and cannot refer solely to this guidance.

1 ITU (2020), Recommendation ITU-T L.1470 (2020), Greenhouse gas emissions trajectories for the information and communication technology sector compatible with the UNFCCC Paris Agreement. Developed in cooperation with GSMA, GeSI and SBTi.
2 Recommendation ITU-T L.1471 (2021), Guidance and criteria for information and communication technology organisations on setting Net Zero targets and strategies.
3 Greenhouse gases — Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals.
4 bilans-ges.ademe.fr/en/accueil
5 ITU (2012), Recommendation ITU-T L.1420 (2012), Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organisations.

Figure 1 | Overview of Scope 1-3 emission Categories



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

A particular category of ICT companies consists of telecommunication network operators. This guidance is to support such companies by providing specific guidance that help their inventories and increase alignment between reporting companies.

Abbreviations and acronyms

CPE	Customer Premises Equipment
CO_2e	Carbon Dioxide Equivalent
EEIO	Environmentally Extended Input-Output Analysis
EF	Emission Factor
ESCO	Energy Services Company
GHG	Greenhouse Gas
GHGP	Greenhouse Gas Protocol
GVW	Gross Vehicle Weight
ICT	Information and Communication Technology
IoT	Internet of Things
IT	Information Technology
JV	Joint Venture
LCA	Life Cycle Assessment
PCF	Product Carbon Footprint
SBTi	Science-Based Target Initiative
TV	Television
Wi-Fi	Wireless Fidelity

Overview of Scope 3 categories

Scope 3 emissions cover a wide range of economic activities that are divided into 15 categories. These categories are introduced in GHGP-1 and detailed in Table 5.4 of the Corporate Value Chain (Scope 3) Accounting and Reporting Standard [GHGP-2].

Based on the prioritised activities for ICT companies outlined in ITU-T L.1420[6] and SBTi, the most significant categories for a network operator Scope 3 evaluation are as follows:

- **Purchased goods and services (category 1) including but not limited to:**
  - purchases related to offered services (cradle-to-gate)
  - purchases related to used services (life cycle)
- **Capital goods (category 2), including:**
  - own information technology (IT) equipment (cradle-to-gate)
  - own telecommunication towers
  - machinery
- **Fuel and energy-related activities (category 3) are:**
  - associated with the organisations own Scope 1 and Scope 2 emissions
  - see clarification in Category 3 section on EFs
- **Upstream leased assets (category 8), such as:**
  - leased IT equipment (cradle-to-gate)
  - leased telecommunication towers (Towercos)
  - leased IT or telecommunication facilities (cradle-to-gate)
- **Use of sold products (category 11), including Scopes 1 and 2 emissions:**
  - operation of products and services
  - use of support equipment necessary to operate the equipment (power supply and cooling)
- **Downstream leased assets (category 13), such as:**
  - Scopes 1 and 2 emissions due to operation of provided products and services

6 ITU (2012), Recommendation ITU-T L.1420 (2012), Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organisations.

Notes on scope and boundary of this guidance

Cradle-to-gate is defined as all GHG generating processes from the raw materials (e.g. mines for metal ore) to the gate of the operator. The gate of the operator refers to the arrival point of a purchased product.

Towercos are not mentioned in ITU-T L.1420[7] but are listed in this guidance as these are important from the perspective of operators.

Appendix I of ITU-T L.1420[8] provides a more extensive list covering further sources and all Scope 3 categories.

Scope 3 category 11 in the GHGP [GHGP-2] refers to the use-stage impacts at a first order level of effects (footprint) of the use of ICT sold products. This is not to be confused with all the second and higher order consequences of the use of those ICT sold products, as referred to in ITU-T L.1480[9].

Scope 1, 2 and 3 assessments do not cover the wider effect of GHG emissions of ICT organisations. Guidance to assess second order effects (e.g. enabling effects/avoided emissions) and higher order effects (e.g. rebound) is available in [b-L.1480[9]].

For further information, please see the following existing sector-specific guides to understand and determine which Scope 3 Categories to prioritise and include based on materiality and relevance for a company's Scope 3 target setting and subsequent reporting:

- Guidance for ICT Companies setting science-based targets [SBTi] (with contents equivalent to ITU-T L.Suppl.37)[10]
- Mobile network operators – A step-by-step guide for mobile network operators to setting climate targets[11]
- ITU-T Recommendations ITU-T L.1420[12], ITU-T L.1470[13] and ITU-T L.1471[14]

General guidance

This chapter provides guiding principles on how operators should assess Scope 3 emissions that are applicable to all Scope 3 Categories.

The main intention of this guidance is to provide consistency for telecommunication operators to calculate GHG emissions in their upstream and downstream value chains. It provides methodologies that are consistent with recommendations of the Greenhouse Gas Protocol for calculating emissions, which are tailored for each different Category.

The methodologies for each Category have been structured so that they are both useful and accessible for companies that are just getting started, as well as those that are more advanced in their calculation, measurement and assessment capabilities.

7 ITU (2012), Recommendation ITU-T L.1420 (2012), Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organisations.
8 ITU (2012), Recommendation ITU-T L.1420 (2012), Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organisations.
9 ITU (2022), Recommendation ITU-T L.1480 (2022), Enabling the Net Zero transition: Assessing how the use of ICT solutions impacts GHG emissions of other sectors.
10 ITU (2020), Supplement ITU-T L.Suppl.37 (2020), Guidance to operators of mobile networks, fixed networks and data centres on setting 1.5°C aligned targets compliant with Recommendation ITU-T L.1470
11 www.gsma.com/betterfuture/wp-content/uploads/2020/03/Setting_Climate_Targets_singles.pdf#page=34
12 ITU (2012), Recommendation ITU-T L.1420 (2012), Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organisations.
13 ITU (2020), Recommendation ITU-T L.1470 (2020), Greenhouse gas emissions trajectories for the information and communication technology sector compatible with the UNFCCC Paris Agreement. Developed in cooperation with GSMA, GeSI and SBTi.
14 Recommendation ITU-T L.1471 (2021), Guidance and criteria for information and communication technology organisations on setting Net Zero targets and strategies.

Prioritisation and enhancements

When assessing Scope 3 emissions, an initial screening of the magnitude of impacts is recommended, and then prioritisation of categories and sources that have the highest impact for further assessment. This is because a more accurate measurement or assessment of a Category that forms 20% of emissions, for example, will have a greater impact on the total result than accurately measuring a Category that only contributes 1% of emissions.

There is also recognition that Scope 3 emissions assessment can be a daunting task, as it involves the collection and combination of many data points. Operators should not expect to achieve a complete assessment when doing it for the first time. Most companies look to improve from year to year as data availability and quality increases and more standardised advice, such as this guidance, is made available. For the same reasons, this guidance will be subject to revision, as improvements to assessments are developed by the industry.

Electricity emission factors

A network operator footprint largely depends on the use of electricity and its carbon intensity. For this reason, the emission factor (EF) of grid electricity is important.

According to Life Cycle Assessment (LCA) practice, the electricity supply chain, transmission and distribution losses that occur between the point of production and the actual consumption of electricity are allocated to the ICT product footprint. However, for Scope 1 and 2 reporting all but the impacts occurring during the consumption are excluded, and instead allocated to Scope 3 (Category 3). Consequently, the emission allocated to Category 3 includes those corresponding to the electricity supply chain and transmission and distribution losses for Scope 1 and 2 emission sources.

For other Scope 3 Categories, the EFs to be used should include these impacts (i.e. electricity supply chain, transmission and distribution losses) when possible.

When economic modelling is used, for instance for Categories 1 and 2 of the Scope 3, it may not be possible to include the impacts of electricity supply chain and transmission and distribution losses. The reporting shall clarify any exclusion of electricity supply chain, transmission and distribution losses whether in Category 3 or others.

The EFs for electricity must be specific to the conditions during which the electricity is consumed. This is because they are dependent on the energy mix of the grid, the origin of the fossil fuels and their mode of transport, as well as the effectiveness of the grid to deliver electricity. Commonly used source for EFs are the "Conversion Factors: Full Set" ([DESNZ] see WTT and overseas electricity), published annually by the UK Government Department for Energy Security and Net Zero and the Department[15] for Business; or the French ADEME database[16] by the Agence de la Transition Écologique; or the US EPA database, the SEAI database, the RTE database; or the International Energy Agency (IEA) "Emission Factors Database". More grid specific sources are preferable, especially if primary data is available from the utility that operates the electricity grid or the provider of electricity.

When selecting an EF, several options may exist (e.g. at combustion only, with and without transmission and distribution losses).

Moreover, it is important to consider import and export of electricity at a country level for calculation, according to the location-based approach.

The most recent data is always preferred; however, the most recent grid electricity average EFs (e.g. EEA, IEA) available at any given point in time often may not reflect the situation in the reporting year, as they are derived from national GHG inventories, and these are usually released with a two-year delay. A similar situation occurs with annual supplier specific EFs: even in countries where electricity labelling is mandatory, at the time when most corporate GHG inventories are prepared (January to February of the following year), information for the reporting year is, in many cases, still not available, and data from the previous year is the best available option.

15 www.gov.uk/government/collections/government-conversion-factors-for-company-reporting
16 bilans-ges.ademe.fr/en/accueil

Note: *Examples of free sources of data follow:*

- *Electricity factors for the US can be found* **here**
- *The SEAI publishes factors for Ireland, found* **here**
- *The RTE publishes the French electricity factor, found* **here**
- *The European EA found* **here**

Further guidance related to specific EF considerations for each Category is provided in the different chapters.

Generally, the principle of getting the most accurate EFs should prevail.

Activities in other economic sectors

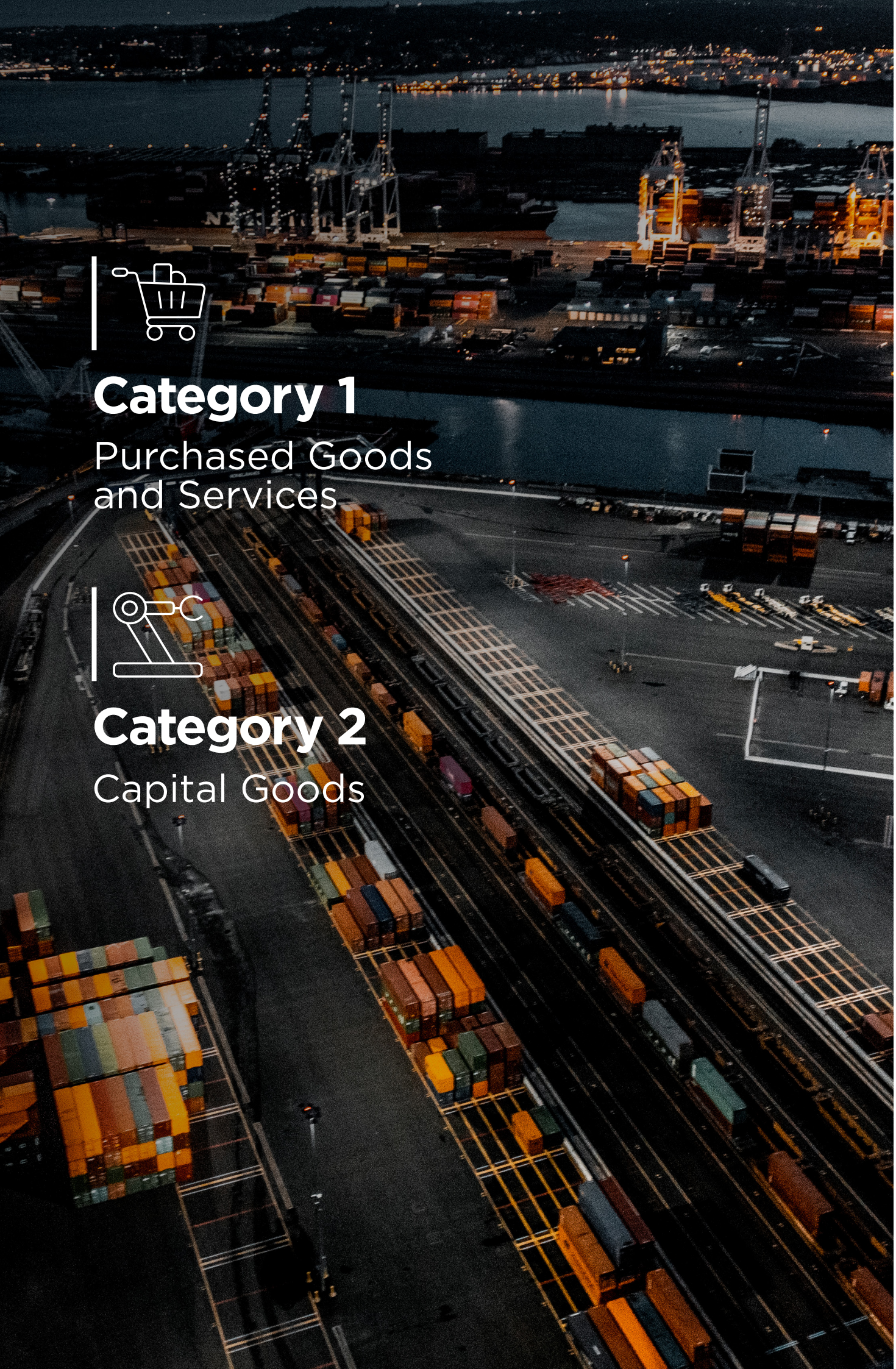
As some telecommunication operators are active in other sectors than information and communication technologies, such as banking or energy resell, it is recommended that the Scopes 1 to 3 of these activities be reported separately from their telecommunication activities.

Guiding principles

The principles of this guidance are as follows:

1. **Goal is reduction** – estimating emissions should be used to drive reduction efforts
2. **Hot-spotting** – focus time and effort on largest emission sources
3. **Keep it simple** – use the simplest approach that will give required accuracy and best support reduction goals
4. **Scale** – covering more emissions can help with business decisions
5. **Improve accuracy over time** – data availability and quality are improving each year
6. **Suitable for all** – approaches for both beginners and those who are more advanced
7. **Follow science-based principles** – related to net zero standards from ISO 14064-1: 2018[17] or the Science Based Targets Initiative [SBTi] or ITU-T Recommendations L.1470[18] and L.1471[19]
8. **Focus on mitigation** – carbon offsets, whether purchased by the telecommunication operator or a supplier or customer, shall not be considered as a valid means of reducing carbon dioxide equivalent CO_2e inventories

17 Greenhouse gases — Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals.
18 ITU (2020), Recommendation ITU-T L.1470 (2020), Greenhouse gas emissions trajectories for the information and communication technology sector compatible with the UNFCCC Paris Agreement. Developed in cooperation with GSMA, GeSI and SBTi.
19 ITU-T L.1471 (2021), Guidance and criteria for information and communication technology organisations on setting Net Zero targets and strategies.



Category 1

Purchased Goods and Services

Category 2

Capital Goods

Description

Across all sectors, on average, supply chain emissions are more than 10 times greater than operational emissions[20]. These emissions are embedded in the products and capital goods purchased or acquired by companies from suppliers. Calculation of these emissions improves a company's ability to make more informed decisions about their purchases and acquisitions.

This chapter provides guidance for companies on how to calculate cradle-to-gate emissions from purchased products and capital goods, not accounted for in other Categories. These are the emissions that arise from raw material extraction, production, assembly and transportation of products, as well as capital goods purchased or acquired in the reporting year, not otherwise included in Scope 1, 2 or 3 (Categories 3 to 8).

Purchased products (Category 1) include goods (tangible products) other than capital goods and services (intangible products). Capital goods (Category 2) are final products that have an extended life and value. They are not immediately consumed or further processed by companies but are instead used by them to manufacture a product, provide a service or sell, store, and deliver merchandise.

In this chapter Categories 1 and 2 have been combined to provide one set of guidance on how to calculate these emissions. This approach is taken to align with general procurement practices of telecommunication operators and therefore represents a more efficient way to calculate these emissions. The emissions from a particular purchase should be reported as either Category 1 or 2, and should not be double counted. To determine whether to account for a purchase as a purchased good or service (to be reported in Category 1) or capital good (to be reported in Category 2), companies are recommended to follow their financial accounting classification. For example, operational expenditure not related to the purchase of energy is to be reported in Category 1 and capital expenditure is to be reported in Category 2.

20 CDP - www.cdp.net

Category boundaries

Categories 1 and 2 include the cradle-to-gate emissions of all purchased products and capital goods, not included in Categories 3 to 8 or listed under special exclusions. For example, in the supply of goods, this includes all upstream emissions up to the point where the goods leave the supplier's factory (if the telecommunication operator arranges the delivery) or when the telecommunication operator takes receipt of the goods (if the supplier provides delivery).

As per GHGP [GHGP-2], specific categories of upstream emissions are separately reported in Categories 3 to 8 to enhance the transparency and consistency of Scope 3 reports, such as business travel, which should be reported under Category 6. See Categories 3 to 8 to understand what should be accounted for within them. All Categories of emissions are mutually exclusive, and a company should not double count emissions. To help avoid double counting, a company may choose to initially treat all purchases not related to the purchase of energy as Categories 1 and 2. As reporting advances, extract from Categories 1 and 2 any purchases that are material or where more precise data is available to report under Category 3 to 8.

Special exclusions:

While telecommunication operators have a responsibility for their upstream emissions, as they go through the entries in their purchasing records, there are some payments that they may choose to explicitly exclude.

Examples

- Regulatory payments, fees, charges, contributions or assessments required by a governmental body pursuant to legal requirements or regulations (e.g. taxation), as well as interest or penalties resulting from non- or late payment.
- Intercompany transactions between two subsidiaries within the same reporting boundary, unless a transaction realises them with an independent party, regardless of whether the subsidiary is wholly or partially owned. However, if the subsidiary is partly owned, then the company can choose to include a proportion of the emissions using the equity share consolidation approach.

Note: *Currently the following Categories are challenging to account for and approaches differ greatly between telecommunication operators: a) roaming agreements; b) interconnects; and c) content or media licences. At the time of publication, further alignment to provide specific guidance is under study.*

Depreciated, discounted or amortised goods:

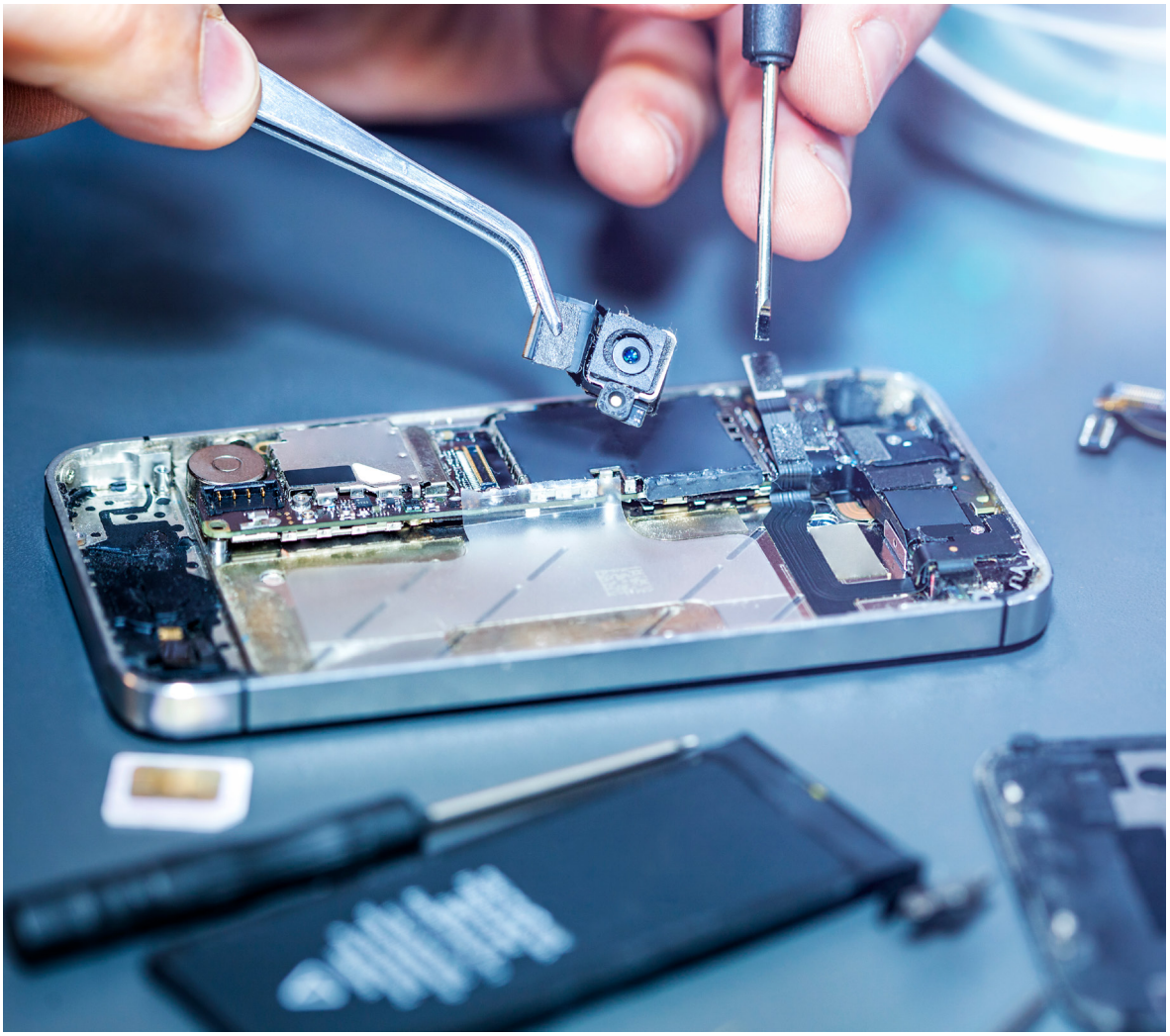
The total cradle-to-gate emissions from purchased products and capital goods shall be accounted for in the reporting year in which the company purchased or acquired them; see the GHGP [GHGP-2]. This approach differs from ISO 14064-1: 2018[21], which allows companies to depreciate emissions in line with economic depreciation. This guidance has chosen to align with the GHGP [GHGP-1] to ensure the timely reporting of emissions that have taken place. Therefore, the emissions from the production of capital goods should not be depreciated, discounted, or amortised over time. As a result of this approach, some emissions may fluctuate from year-to-year due to purchases of exceptional or non-recurring capital goods. If this is the case, companies should provide a rationale for these variations.

21 Greenhouse gases — Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals.

Reused, refurbished or repaired goods:

The emissions from purchased goods previously used should not include the emissions that arose from their extraction from raw materials, production and transportation associated with their original manufacture. Emissions that arise from any further extraction, production and transportation associated with such goods shall be accounted for by the telecommunication operator for the reporting year in which they purchased or acquired them. This includes the emissions incurred by the supplier to make the goods reusable (i.e. repair or refurbishment) prior to purchase by the telecommunication operator. Reused, refurbished and repaired goods constitute items of property that were previously owned by another company and restored to a usable condition prior to the purchase where necessary by the telecommunication operator. Examples are a mobile device that has been used by a customer before being reclaimed by the telecommunication operator or network equipment that has been used by telecommunication operator A, before being refurbished or repaired by the same company and purchased by telecommunication operator B. In this example, company A would account for the emissions that arose from the original manufacture of the network equipment. Operator B would account for any emissions incurred by operator A to make the network equipment available for purchase. Goods that are being purchased or acquired by a telecommunication operator as new after a cosmetic refurbishment where the item has not been used are specifically excluded from reused, refurbished and repaired goods. In this case, the product should be accounted for in full, including the emissions that arose from their extraction from raw materials, production and transportation associated with their original manufacture.

Note: *This is a relatively new area with many complexities, which where necessary are still under study.*



Applicability to telecom operators

Emissions from purchased products (including goods and services) and capital goods are significant, particularly in the telecommunications industry, where there are large and complex supply chains, that telecommunication operators rely on to operate their businesses and provide goods and services. For example, they include the emissions made by suppliers when manufacturing equipment is installed in a telecommunications network. Emissions from purchased products and capital goods are often far greater than a telecommunication operators own Scope 1 and 2 emissions.

Capital goods include but are not limited to property, plant, and equipment, such as:

- Buildings and facilities for manufacturing products or for delivering services, such as data centres, telephone exchanges, subsea cables and mobile towers
- Machinery to produce mobile devices and network equipment by manufacturers
- Vehicles acquired and used by the company to service customers

Purchased products may include but are not limited to:

- Items provided directly to customers or used by employees, such as devices
- Services that relate to developing and programming software
- Providing technology support to customers and employees
- Construction and physical network infrastructure maintenance
- Non-core activities, such as professional services and uniforms

Calculation method

Companies may employ the frequently used methods listed in Table 1 to calculate emissions from purchased products and capital goods. These methods are listed from the most general and simplistic to those that are most specific and detailed.

The first method uses secondary emissions data (i.e. industry average data), whereas the final two require companies to collect emissions data from suppliers. Collecting emissions data from suppliers can add a considerable time and cost burden. Therefore, companies should prioritise the collection of such data for products and capital goods that have relatively high emissions or suppliers relevant to a company's goals. A practical recommendation is to gradually improve emissions data over time starting with the industry average method.

Table 1 | Summary of data, benefits and challenges

Calculation method	Benefits	Challenges
Industry average method, estimating emissions by applying relevant secondary (e.g. industry average) EFs with physical or economic activity data. **Note:** *This is the spend-based method and average-data method of GHGP [GHGP-1].*	This method is a simple way of obtaining a comprehensive view of emissions. It is the most cost- and time-efficient method as the data requirements are less onerous. It is particularly useful in screening emissions sources when prioritising data-collection efforts. In addition, there are free sources, such as the Quantis evaluator models[1] as well as geographically specific sectorial models. A company can use this method as a placeholder to monitor its own Scope 3 targets until more specific emission data becomes available.	This method applies industry averages that do not always provide an accurate representation of the emissions from the products and capital goods purchased by the company. This situation occurs often in high-end ICT products that are non-homogeneous. As a result, it is difficult to measure and demonstrate results of reduction efforts. The use of industry averages also creates a linear relationship between activity data and emissions. As a result, companies can only reduce emissions by reducing activity, which may not always be an effective way for a company to run its business, make purchasing decisions or monitor its Scope 3 targets. The comparability of products can be impaired by using different industry EF databases. Often these databases are not regularly maintained, are not available in all regions and are difficult to map with company data. Moreover, industrial EFs based on economic characteristics are sensitive to conditions that have little relevance for emission levels. As a result, it is challenging to accurately reflect a global supply chain or any improvements in emission intensities.

[1] Quantis evaluator model is a free, web-based tool from Greenhouse Gas Protocol and Quantis to help companies make an initial, rough approximation of emissions throughout their value chain.

Calculation Method	Benefits	Challenges
Supplier-level allocation method, involves collecting Scope 1, 2 and 3 upstream emissions data from the supplier at a corporate, business unit, facility or activity level, together with physical or economic activity data. **Note:** *This is similar to the hybrid and supplier-specific methods of [GHGP-1].*	This method provides an efficient, repeatable and scalable way of calculating emissions specific to individual suppliers at a corporate, business unit, facility or activity level. This method allows for large-scale engagement with suppliers, which helps build awareness and focus on emissions in a company's supply chain. It enables companies to monitor supplier performance and make informed decision about their suppliers to drive emissions reductions beyond their own company. It also helps companies to monitor their own Scope 3 targets. Using this method allows an operator to follow the environmental and carbon performance, as well as future commitments of their suppliers corresponding to the granularity of the data.	Applying this method often results in a single average emissions value per supplier, which does not always provide an accurate representation of the emissions from the products and capital goods purchased by the company. This situation often occurs in high-end ICT products that could have non-homogeneous impacts. This method is more resource-heavy than the industry average method. The reliance on complete Scope 1, 2 and 3 data provided by suppliers, requires checking key data points and potential follow-up with suppliers. There can also be a lag between when emissions occur and when they are reported. Coverage of cradle-to-gate and cradle-to-grave scopes is challenging. However, the supplier-level allocation method (economic activity data) can reach this coverage if formulae are used consistently by all tier suppliers upstream and downstream.
Product-level method, involves collecting physical activity data and product-level cradle-to-gate GHG inventory data from suppliers. Can also include lifecycle-level data (LCA- based approach – see first note). **Note:** *This is the supplier-specific method of [GHGP-1].*	This method is considered the most detailed. Based on simplified LCA, it provides a way of calculating product emissions across applicable parts of their lifecycle. It is introduced here for Categories 1 and 2, but it could also help to provide input for several other Categories. It enables companies to monitor product performance and make informed decision about their purchases and the eco-design of products that can have a direct impact on emissions. It also helps companies to monitor their own Scope 3 targets.	This method is less efficient and scalable as it is more resource-intensive and requires specialist skills and data that may not be readily available. The accuracy of this method at a product-level can also be significantly reduced by the use of broad assumptions and high-level EFs.

Note: *Detailed LCA as a method is not compatible with reporting the impact of all products on an annual basis but is rather to be seen as a tool for creating an in-depth understanding of the environmental impacts of products. In this context, a simplified LCA using, for example, a parameterised model based on LCAs of a limited set of products would also be relevant. The ITU has currently defined a work item to develop guidance for such assessments. Meanwhile, the hardware section of GeSI/Carbon Trust, ICT sector guidance built on the GHGP product life cycle accounting and reporting standard* [22]*, provides initial guidance regarding a simplified LCA. Accordingly, the LCA-based approach does not mean fulfilment of ITU-T L.1410* [23] *for all individual products*.

Future updates and rebaselining

As more data gradually becomes available, companies are able to improve their calculation methods. This may result in changes in estimates of emissions year-over-year, that do not reflect actual changes in emissions but the change in modelling or data accuracy. If the change results in an insignificant difference in emissions estimates, then many companies are choosing not to "rebaseline". For this reason, it is important that companies describe their approach when they report these emissions, as well as any changes over time and their impact on their emissions. If the change results in significant differences in emissions estimates, companies are required to recalculate their base year emissions applying the new data sources and method across each relevant historic reporting period where data is available to enable year-on-year comparisons.

Companies that fail to rebaseline could incur a large change in emissions, which will result in a false interpretation. Where a company is unable to recalculate their base year emissions, such as where data is unavailable, then the company should describe the impact of this on their emissions. For example, if a company's Category 1 or 2 emissions decrease by 10%, where 5% of this reduction is due to an increase in the number of suppliers measuring and disclosing their emissions, the impact from the improvement in the data and method should be disclosed. See page 106 of the GHGP [GHGP-2] for guidance on base-year recalculations for improvements in data accuracy over time. Appendix C of the GHGP [GHGP-2] also provides a useful resource for developing a data management plan and improving data management.

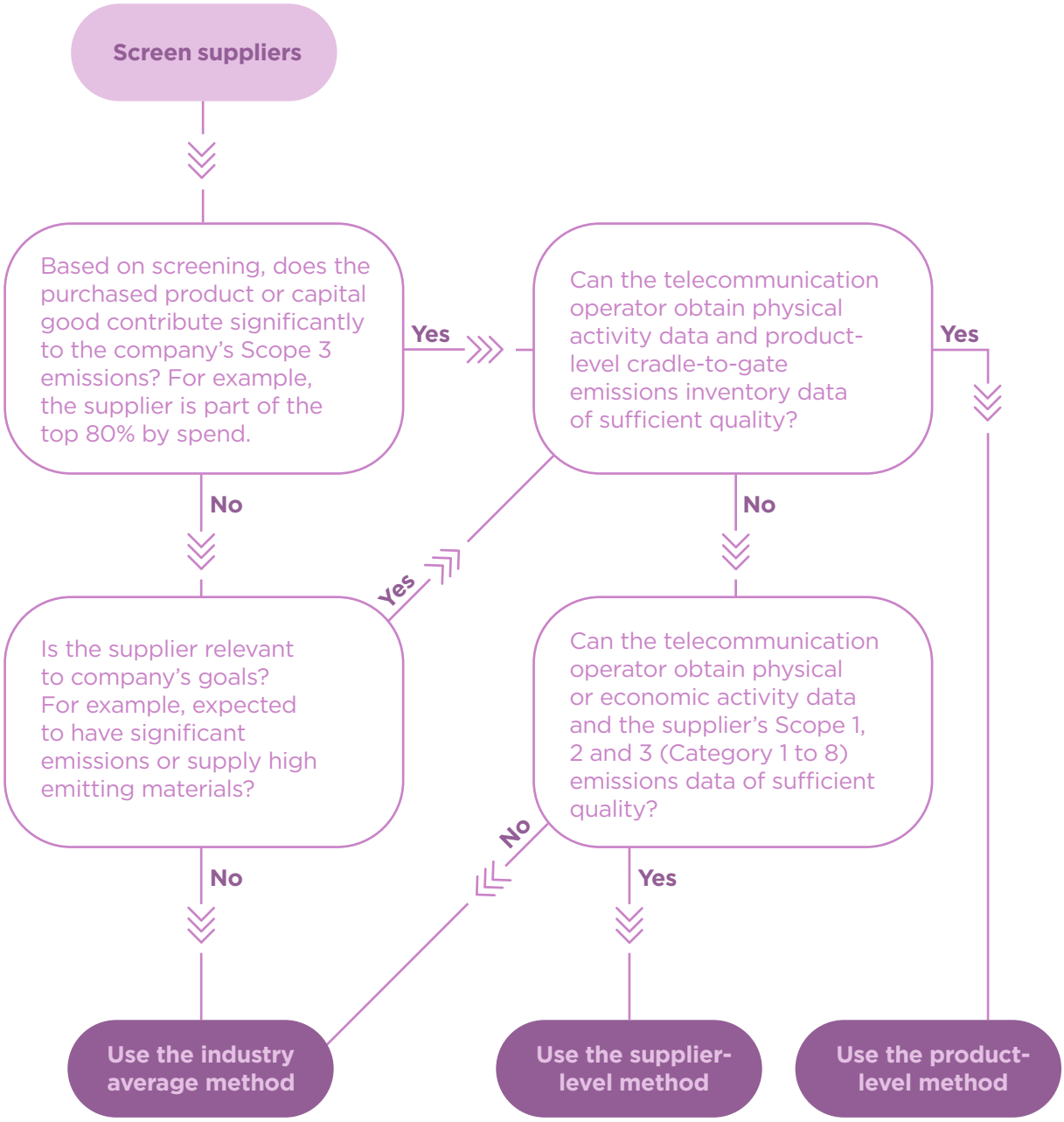
Calculation methods

Companies may use different calculation methods for different suppliers. Furthermore, companies may use different calculation methods for different purchased products or capital goods from the same supplier. For example, where a supplier provides network equipment and maintenance, the company can use methods that are more specific for the equipment and less specific for the maintenance. However, it is important to understand that more specific calculation methods may not always produce results that are a more accurate or comparable, as this would also depend on the quality of data and the feasibility of allocating data of a supplier across its customers.

The "accuracy derives from the granularity of the emissions data, the reliability of the supplier's data sources, and which, if any, allocation techniques were used"[24]. Therefore, the choice of calculation method depends on several factors, including the company's business goals, the volume of emissions, the availability of complete data and the quality of available data. Figure 2 provides a decision tree to help ICT companies determine the most appropriate calculation method for each purchased product or capital good. It is also important to recognise the different attributes of each calculation method. See Table 1 for a list of the calculation methods and their benefits and challenges.

22 www.gesi.org/research/ict-sector-guidance-built-on-the-ghg-protocol-product-life-cycle-accounting-and-reporting-standard
23 ITU (2014), Recommendation ITU-T L.1410 (2014), Methodology for environmental life cycle assessments of information and communication technology goods, networks and services.
24 ghgprotocol.org/sites/default/files/standards_supporting/Chapter1.pdf

Figure 2 | Decision tree to determine the most appropriate calculation method



Activity data sources

Activity data used for allocating emissions in the supplier-level allocation or industry average methods can be either physical or economic.

Table 2 | Activity data, benefits and challenges

Activity data	Example sources of activity data	Benefits	Challenges
Economic activity data is the amount spent, by product type or supplier, using market values (e.g. dollars).	• Purchasing records, such as from procurement software (this is the amount spent) • Accounts payable records	Economic activity data is a simple and effective way of obtaining a comprehensive view of activity with suppliers as long as people are aware of its challenges. It is cost- and time-efficient as the data is often readily available in a company's purchasing or financial records. **Note:** *Obtaining this data grouped by procurement Category may help when mapping to an emissions data source. Common types of procurement Categories found include telecommunication devices and network equipment.* *It is particularly useful in screening emissions sources when prioritising data collection efforts.*	This method ties emissions to economic activity, which does not always provide an accurate representation of the emissions from the products and capital goods purchased by the company. That is, a reduction in economic activity does not necessarily mean a decrease in physical activity and emissions. For example, a company may purchase the same product at less cost.
Physical activity data is the mass (in kgs) or number of units purchased. This may include the output of a process, period of equipment operation in hours or floor area of a building.	• Purchasing records, such as from procurement software (this is the quantity of finished products purchased) • Enterprise resource-planning systems • Bill of materials (this is a list of raw materials, components, or parts and the quantities of each that are required by a telecommunication operator to produce a finished product)	Physical activity data is considered as being more aligned to emissions i.e. if physical activity is reduced, then the associated emissions with this activity will decrease. It is particularly useful in monitoring and managing emissions from suppliers, that provide a range of products with different emission profiles. It enables companies to make more informed decisions about the emissions efficiency of their purchases and processes.	Obtaining this data is more resource heavy. In some cases, it may require the generation of new data, if the required activity data does not exist or cannot be estimated from existing sources. The reliance on multiple sources, requires checks to ensure the data is reliable and robust.

Emission data sources

A company's ability to calculate emissions depends on the availability and quality of its data. Product and supplier emissions data is more effective to track performance; however, in some cases it may be less reliable than industry average emissions data. When determining which is the most appropriate calculation method, companies can use the following minimum indicators as a guide to assess whether emissions data is of sufficient quality.

Industry average level data

Sources of industry average emissions data differ between economic and physical activity, and may include the following databases:

Economic activity:

- The Sustainability Consortium
- Quantis
- UK DEFRA
- Carnegie Mellon University
- Accuvio, including the International Energy Agency
- Exiobase
- US Environmental Protection Agency

Physical activity:

- Base Carbone
- UK DEFRA

When using such sources, companies shall be guided by the following principles to assess their appropriateness for Scope 3 reporting: relevance; completeness; consistency; accuracy; and transparency.

Note: *These databases can be outdated. Companies can use an inflation factor adjusted for power purchasing parity to help better align their activity with such databases, such as emissions value multiplied by an inflation factor from the reference year to the reporting year.*

Supplier-level data

Sources of supplier-level emissions data may include:

- statutory reporting
- reporting through the CDP's global disclosure system
- information acquired through direct requests the company has made to its suppliers

When using such sources, telecommunication operators should consider the following criteria as a guide to assess whether supplier-level emissions data is of sufficient quality:

- calculated in accordance with the GHGP [GHGP-1], [GHGP-2]
- complete for Scope 1 emissions
- complete for Scope 2 emissions (where available, use market over location data)
- complete for applicable upstream Scope 3 emissions (at a minimum this should include the supplier's Category 1 and 2 emissions)

Inventories should be verified by an independent third party to at least limited assurance across all Scope areas in order to ensure the reliability and quality of data.

Note: *Where available, market-based Scope 2 emissions from suppliers should be used over location data. This approach differs from the GHGP [GHGP-1] and ISO 14064-1: 2018*[25]*, which requires companies to report Scope 2 emission using location and market data, also known as dual reporting. This guidance has chosen to align with SBTi [SBTi] to allow telecommunication operators to monitor and drive improvements in the sourcing of low-carbon electricity in their supply chain. For this reason, it is important that telecommunication operators describe their approach when they report these emissions, as well as any changes over time and their impact on emissions.*

Product-level data

Sources of product-level emissions data may include:

- information from suppliers
- published carbon footprints
- LCAs published for similar products

25 Greenhouse gases – Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals.

When using such sources, companies shall be guided by the following basic LCA principles, to assess their appropriateness for Scope 3 reporting: relevance, completeness, consistency, accuracy, transparency and conservativeness.

Note: *This approach is not yet applied widely, and its delivery method is under study. At the time of publication, there is no comprehensive framework for product-level estimates based on simplified LCA. The GeSI ICT sector guidance*[26] *explains approaches for simplified LCA, such as parameterised models. Telecommunication operators may also refer to ITU-T L.1410*[27] *for guidance on boundary setting, transparency of assumptions and the overall framing of estimates. However, fulfilling the details of a full LCA study is not expected and not seen as possible in a reporting context.*

Calculation

The following calculation formula is used in the industry. Table 3 lists the methods by level of data activity and emissions data in order of how specific and detailed the calculation is to the purchased product or capital good and ends with the most general and simplistic. Refer to the GHGP [GHGP-1] for further formulas.

Purchased products and capital goods emissions (tCO2e) =

Emissions data (e.g. kgCO2e per kg or piece, subscription or dollar)

x

Activity data (e.g. kgs or number of pieces, subscriptions or dollars)

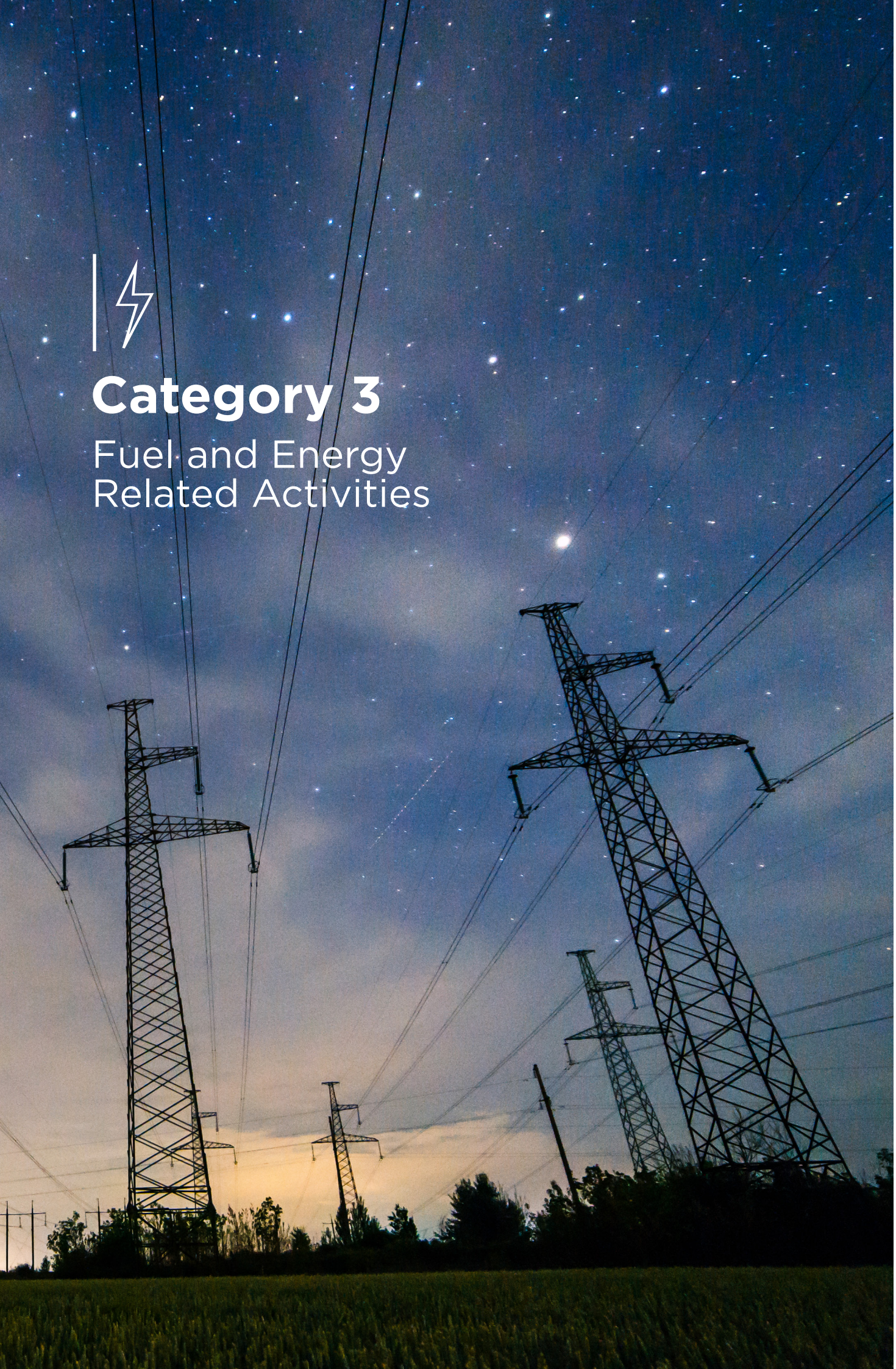
÷ 1,000

Table 3 | Summary of activity data and emissions data

Method	Emission data	Activity data
Product level	Product-level EF for each purchased product or capital good (e.g. $kgCO_2e$/kg or $kgCO_2e$/piece or $kgCO_2e$ subscription).	**Physical activity data:** Quantities or units of products of capital goods purchased (e.g. in kg or number of pieces or subscription).
Supplier level (physical activity)	Supplier's Scope 1, 2 and 3 (Category 1 to 8) emissions data per quantities or units of products of capital goods purchased (e.g. $kgCO_2e$/kg or$kgCO_2e$/piece).	**Physical activity data:** Quantities or units of products of capital goods purchased (e.g. in kg or number of pieces).
Supplier level (economic activity data) *See note*	Supplier's Scope 1, 2 and 3 (Category 1 to 8) emissions data per unit of economic value (e.g. $kgCO_2e$/$ of revenue). *Tip Supplier revenue for the reporting year must be normalised to the telecommunication operator's currency. This currency convention should align with the company's financial reporting system.*	**Economic activity data:** Amount spent on products or capital goods purchased using market values (e.g. in US dollars).
Industry average (physical activity)	Representative EF for each type of purchased product or capital good (e.g. $kgCO_2e$/kg or $kgCO_2e$/piece).	**Physical activity data:** Quantities or units of products or capital goods purchased (e.g. in kg or number of pieces).
Industry average (economic activity data) **Note:** *See Appendix 1 for further detail on applying the supplier level economic activity data method.*	Environmentally extended input-output (EEIO) EF for each type of purchased product or capital good per unit of economic value (e.g. $kgCO_2e$/$).	**Economic activity data:** Amount spent on products or capital goods purchased, by product type, using market values (e.g. in US dollars.)

26 GeSI, Carbon Trust (2022). ICT sector guidance built on the GHG Protocol product life cycle accounting and reporting standard. Brussels: GeSI. www.gesi.org/research/ict-sector-guidance-built-on-the-ghg-protocol-product-life-cycle-accounting-and-reporting-standard

27 ITU (2014), Recommendation ITU-T L.1410 (2014), Methodology for environmental life cycle assessments of information and communication technology goods, networks and services.



Category 3

Fuel and Energy Related Activities

Description

This Category consists, as specified in the GHGP [GHGP-2], of extraction, production and transportation of fuels and energy purchased or acquired by the telecommunication operators in the reporting year, not already accounted for in Scope 1 or Scope 2, including:

a| upstream emissions of purchased fuels (extraction, production and transportation of fuels consumed)

b| upstream emissions of purchased electricity (extraction, production and transportation of fuels consumed in the generation of electricity, steam, heating and cooling consumed)

c| transmission and distribution losses (generation of electricity, steam, heating, as well as cooling that is consumed (i.e. lost) in a transmission and distribution system) reported by end user

d| generation of purchased electricity that is sold to end users (generation of electricity, steam, heating and cooling that is purchased and sold to end users) – reported by utility company or energy retailer only

For electricity sold to end users, itemisation and recording of emissions associated with these sales are recommended in Scope 3, Category 3 reporting.

Category boundaries

This Category includes all upstream emissions from the extraction, production and transportation of fuels consumed, also known as cradle-to-gate emissions related to Scope 1 and 2 energy and fuel usage. Emissions related to fuel combustion are accounted for in Scopes 1 and 2.

The fuel- and energy-related emissions (i.e. supply chain, transport and distribution losses) of other Scope 3 Categories are accounted for within those Categories, following the same calculation approach as in this chapter.

Note: *Emissions due to the construction of facilities and machinery used for the extraction and production of fuel and energy are not referred to in the GHGP and therefore are not expected to be included.*

Applicability to telecom operators

In the telecommunications industry, this Category is significant due to the large amounts of electricity used to operate the network.

Calculation method

To calculate the emissions in this Category, activity data (consumption of fuel, electricity, district heat or steam) is multiplied by an appropriate EF. The activity data for the fuel and electricity consumption should be the exact amounts used to calculate Scope 1 and 2 emissions.

The following formulae are used:

For fuel

Fuel-related emissions =
Fuel used (t, l or m^3)
x
Supply chain EF for that fuel ($kgCO_2e$/t, l or m^3)

Note: *The supply chain EF for fuels covers extraction, production and transportation.*

Note: *The supply chain EF for fossil fuels is typically referred to as that from Well-to-Tank.*

For electricity consumption

Electricity-related emissions =
Electricity used (kWh)
x
Supply chain EF for electricity generation ($kgCO_2e$/kWh)
+
Electricity used (kWh)
x
Transport and distribution losses EF ($kgCO_2e$/kWh)

Note: *The supply chain EF for electricity covers extraction, production and transportation of fuels consumed in the generation of electricity, steam, heating and cooling.*

For district heat and steam

District heat- and steam-related emissions =
energy used in (GWh)
x
Supply chain EF
+
District heat- and steam-related emissions =
Energy used in (GWh)
x
Transportation and distribution losses EF

EFs sources

The EFs are different when applying a market-based and a location-based approach to calculating emissions.

When market-based assessments are performed, companies should take into account the upstream life-cycle impact of the production of the additional renewable energy, as well as the upstream life-cycle impacts of any grid electricity used. When location-based assessments are performed, the total upstream life-cycle impact of the grid electricity consumed shall be taken into account.

For general guidance, please refer to the EFs chapter in the General Guidance chapter.

Category 4

Upstream Transport and Distribution

Description

This Category includes all transport and distribution paid by the reporting organisation, regardless of whether the actual transport and distribution occurs upstream, between the organisation's sites, or downstream, according to the guidance in the GHGP [GHGP-1].

This Category excludes emissions from operations of vehicles owned or operated by the telecommunication operator that are already accounted for in Scope 1. In summary, it includes all transport and distribution services that the company pays for, either directly or indirectly, associated with the goods procured or sold. Emissions associated with the transport and distribution of purchased goods that are paid for by the supplying company have already been accounted for in Category 1 and must not be double counted in Category 4.

Calculating emissions from this Category based on primary data is complex and depends on the availability of data, processes and IT systems in place. Sometimes those limitations are so significant that reporting companies may choose to calculate emissions from this Category with a less accurate method or use certain proxies.

Category boundaries

This Category includes the emissions related to the use of fuel or electricity by vehicles of transport and distribution providers assigned by the telecommunication operator (cars, vans, trucks, trains, ships, etc.) as well as emissions resulting from the supply chain of this fuel or electricity (e.g. well to tank) and applicable distribution losses.

Optionally, it can include emissions associated with manufacturing those vehicles, logistics facilities or infrastructure.

Note: *The emissions associated with transport via both internal combustion engines and electric vehicles shall be taken into account.*

GHGP [GHGP-2] states that reporting the unladen backhaul of transportation (i.e. the return journey of an empty vehicle) is optional. However, its inclusion is recommended in the inventory for this Category.

According to GHGP [GHGP-1], emissions from distribution, such as warehousing, shall also be considered under Category 4. If the storage facility is owned by the telecommunication operator, emissions from heat and electricity shall be reported as Scopes 1 and 2 and shall not be included here. GHG emissions calculation options range from either high level (average-data method) or detailed (site-specific).

Applicability to telecom operators

It is recommended to assess this Category as it is generally relevant for telecommunication operators, however this Category is not usually among the most carbon-intensive ones.

Telecommunication companies do not typically see significant emissions identified from upstream distribution, such as warehousing; therefore, it is not customarily prioritised to gather site-specific data.

Calculation method

Calculating emissions from transportation

As outlined in the following example, it may be impractical or impossible to collect data from each transportation partner or supplier. In such cases, a decision shall be made on which activity data to collect and, based on that, an appropriate method selected.

Of the approaches listed in Table 4, information in the spend-based method column is considered to have the lowest accuracy, followed by that headed distance-based, with fuel-based being the most accurate. Combinations of the three are possible, and detailed accounting practices that outline which approach is used in which situation are recommended.

Table 4 | Methods for accounting for transport-related emissions

Method type	Spend-based	Distance-based	Fuel- or electricity-based
Activity data type	Amount spent on transportation by type, in monetary values	Mass or volume of goods transported by mode of transport, actual or estimated distances, online maps or calculators	Fuel/electricity consumed, fuel/electricity type
Activity data source and method recommendation	Invoices, internal financial systems GHGP [GHGP-2]	Estimates (internal/from the carrier or operator) GLEC framework[28]	Actual data from carrier or operator GLEC framework[29]
EF	$kgCO_2e/\$$, $kgCO_2e/€$	$kgCO_2e/t\text{-}km$	$kgCO_2e/l$ $kgCO_2e/kWh$

28 Smart Freight Center (2022), What is the GLEC Framework? - How to implement items | Smart Freight Centre – How to implement items, www.smartfreightcentre.org/en/how-to-implement-items/what-is-glec-framework/58/

29 Smart Freight Center (2022), What is the GLEC Framework? - How to implement items | Smart Freight Centre - How to implement items, www.smartfreightcentre.org/en/how-to-implement-items/what-is-glec-framework/58/

Method type	Spend-based	Distance-based	Fuel- or electricity-based
EF source	EEIO databases GHGP [GHGP-3]	GLEC database[30], DEFRA database	GLEC databases[31]
Formula	∑ (amount spent on transportation by type [$;€]) x relevant EEIO EFs per unit of economic value [kgCO_2e/$; €])	∑ (mass of goods purchased (mass or volume) x distance travelled in transport leg (km) x EF of transport mode or vehicle type (kgCO_2e/t or volume/km)	Amount of fuel or electricity used x emissions factor for fuel or electricity

A variation of the spend-based approach could also include GHG emissions that are estimated based on the purchase price and a typical share of freight costs for products (e.g. 5%) and for services (e.g. 1.0% or 1.5%). These costs are deducted before calculating the emissions for purchased goods and services or capital goods. Expenses calculated in this way for upstream logistics are multiplied by an appropriate EF per unit of currency for logistics. For example, this factor can be generated based on the answers from logistic suppliers to the CDP Supply Chain Programme or from EF databases.

Formula:

Transport and distribution emissions =
(PV Products x *x*%
+
PV Services x *y*%)
***xEF logistics per currency unit**

Where:

PV Products is the purchase volume for products in units of currency

PV Services is the purchase volume for services in units of currency

X% is the estimated percentage of freight costs in the value of purchased products

Y% is the estimated percentage of freight costs in the value of purchased services

EF is the EF for logistic services in CO_2e per currency unit

As a less accurate variation of the fuel- or electricity-based method involves estimating fuel use based on vehicle efficiency:

∑ (total distance travelled [e.g. km]
×
fuel or electricity efficiency of vehicle [e.g. l/km])

or

∑ (total fuel spend [$;€]/
average fuel price [$/l;€/l])

or

∑ fuel consumed (l)
×
(mass or volume of company's goods
÷
mass or volume of goods transported)

The recommended calculation, including activity data and method

As outlined in Table 4, several internal and external factors are required for reporting. A significant step towards understanding emissions from this Category comes from deploying the distance-based method based on the GLEC framework[32], the Network for Transport Measures[33] or [b-EN 16258] and their corresponding EFs. Setting up this method is highly recommended as it comes from a reputable source and contains the most relevant EFs. See Tables 5 and 6.

30 Smart Freight Center (2022), What is the GLEC Framework? - How to implement items | Smart Freight Centre - How to implement items, www.smartfreightcentre.org/en/how-to-implement-items/what-is-glec-framework/58/
31 Smart Freight Center (2022), What is the GLEC Framework? - How to implement items | Smart Freight Centre - How to implement items, www.smartfreightcentre.org/en/how-to-implement-items/what-is-glec-framework/58/
32 Smart Freight Center (2022), What is the GLEC Framework? - How to implement items | Smart Freight Centre - How to implement items, www.smartfreightcentre.org/en/how-to-implement-items/what-is-glec-framework/58/
33 Network for Transport Measures to be introduced.

Table 5 | An overview of the activity data required for setting up calculation according to the distance-based method

Category	Activity data	Source	Comments
Weight info	List of materials and volumes	The telecommunication operator	If possible, the supplier
	Weight per material	Supplier	
	Packaging (primary, secondary and tertiary)	Supplier	
	Container	Supplier	
Route info	Distances per route	Supplier or distance calculator	
	Uplift factor	GLEC	To account for the differences between transportation emissions on different continents
	Transport mode	Supplier	
	Transport type	Supplier	
	CO_2e EF	GLEC[34], DEFRA	

Table 6 | Final calculations of upstream transport emissions

Category	Activity data	Comments
Weight calculation	**Total device weight** = volume of devices x weight of a device	
	Total packaging weight = primary + secondary + tertiary packaging	Separate packaging calculations if needed (material per box, the weight of boxes, etc.)
	Total weight = total device weight + total packaging weight	
	Total weight incl. container = total weight + container weight	Only applicable for truck transport
Route calculation	**t-km (per transport)** = distance x total weight	Total weight includes container weight in case of truck transport
	kg CO_2e (per transport) = km x CO_2e EF	CO_2e EF needs to include 'uplift factor' depending on continent
	Total kg CO_2e = sum of kg CO_2e transported	Final result

34 Smart Freight Center (2022), What is the GLEC Framework? - How to implement items | Smart Freight Centre - How to implement items, www.smartfreightcentre.org/en/how-to-implement-items/what-is-glec-framework/58/

Calculation example

Company A is about to receive a shipment of 2,750,000 handset units from the manufacturer. Each handset weighs 0.131kg.

The transport route consists of three separate legs. The shipment is housed in a 40-foot (12.192-metre) container. See Tables 7 and 8.

Table 7 | Calculation example – Part 1

Route	Distance, km	Transport type	Transport specification	Total distance	Weight, t	Weight x distance,
t-km						
Input	Input	Input		Input	Calculation	Distance x weight
Start to port A	50	Road	Rigid truck 26-32t gross vehicle weight (GVW)	50	606	30,300
Port A to port B	600	Sea	General cargo 10-20kt deadweight	600	510	306,000
Port B to end	325	Road	Rigid truck 26-32t GVW	325	606	196,950

Table 8 | Calculation example – Part 2

Route	Uplift	CO_2 EF, kg CO_2e/t-km	CO_2e emissions, kg
Input	Assumption from GLEC	GLEC emissions database	Calculation
Start to port A	22%	0.087 + 22% uplift = 0.106	30,300 x 0.106 = 3,212
Port A to port B		0.016	306,000 x 0.016 = 4,896
Port B to end		0.087	196,950 x 0.087 = 17,135
			Total emissions 25,243

Weight calculation

Pieces: amount (volume) x weight per unit (kg/unit)

2,750,000 x 0.131 = 360,250kg = 360t

Packaging: weight of packaging (in total) = 150t

Subtotal = 510t

Total including container = 606t

The total emission from the transportation of this shipment is calculated at 25,243t CO_2e.

Links to other Scope 3 Categories and instructions

- If including upstream emissions in Category 4, Category 1 to 2 calculation shall exclude these upstream transport emissions to avoid double counting.

Category 5

Waste Generated in Operations

Description

This Category includes emissions from third-party disposal and treatment of waste that is generated in the operations owned or controlled by a company. This Category includes emissions from the disposal of both solid and liquid waste.

Only waste treatment in facilities owned or operated by third parties is included in Scope 3, Category 5. Waste treatment taking place at facilities owned or controlled by the telecommunication operator is accounted for in Scope 1 and 2.

Applicability to telecom operators

The emissions from waste for telecommunication operators typically account for a minor part of Scope 3 emissions; however, they must be addressed. It is acknowledged that waste generation and waste treatment practices are closely correlated and are an important indicator of a company's circularity endeavours and of its contribution to other environmental impacts. Wastewater is typically considered non-material, as the amounts of direct water used by telecommunication operators are low, as are discharges to water.

As telecommunication operators do not manufacture their own products, this Category generally accounts for a small proportion of emissions. Therefore, this Category and associated method description do not have any specificities for telecommunication operators. Hence application of the general method detailed in GHGP, *Life Cycle Databases*[35].

Note: *Regarding emissions associated with energy or materials recovery, please also refer to the GHGP [GHGP-3].*

35 ghgprotocol.org/life-cycle-databases

Category boundaries

Different types of waste generate different types and quantities of GHGs. Similarly, different waste treatment activities result in different amounts of emissions.

Typical sources of waste for telecommunication operators include:

- Real estate waste (e.g. offices, data centres, technical sites, shops)
- E-waste (e.g. network equipment, employee equipment)
- Marketing and campaign materials
- Network installation and repair (e.g. gravel, asphalt, sludge, poles, back-up batteries, cables, metal)
- Special handling waste (e.g. lightbulbs, fire extinguishers, etc.)

Waste treatment activities may include:

- Landfill disposal
- Recovery for recycling
- Incineration
- Composting
- Waste-to-energy or energy-from-waste – i.e. combustion of municipal solid waste to generate electricity

A telecommunication operator's Scope 3 emissions from waste generated in operations derive from Scope 1 and 2 emissions of waste managed by waste management companies.

According to GHGP [GHGP-2], it is optional to include transportation of waste and, if it is included, Category 4 guidance should be followed.

Companies may use any one of the following methods to calculate emissions from waste generated in their operations, but managed by third parties:

M1 Supplier-specific method – this method is relevant when the waste treatment company is able to directly provide its own Scope 1 and 2 emissions data.

M2 Waste-type-specific method – this method is relevant when no supplier-specific data is available. It calculates waste emissions based on the classification of waste types, which are further divided into different treatment methods. In this method, specific EFs based on waste type and treatment activity are applied.

M3 Average data method – this method is relevant when no detailed information on waste is available, other than total waste. Splitting the waste by different disposal methods is based on estimation, and average EFs are further applied.

Many waste operators charge for waste disposal by the method used, so disposal methods may be identified from their invoices. The choice of calculation method will likely depend on the country in which the operations are carried out. When countries have strict legislation on waste tracking, it can be easier for companies to track their waste than in those countries that do not. Similarly, some countries prohibit landfilling, so care should be taken not to include emissions from landfilling when using the average-data method for these countries.

Calculation method

Inputs

The following is relevant for M1:

1 Company-specific data on waste collected from the waste-treatment companies. Data includes Scope 1 and Scope 2 emissions allocated to the waste collected from the telecommunication operator

The following is relevant for M2:

1 Total mass in tonnes of waste generated per waste type (e.g. insulation, paper, waste electrical, electronic equipment)

2 Treatment method applied per waste type. Options include re-use[36], open-loop[37], closed-loop[38], combustion, composting, landfill or anaerobic digestion[39]

3 Waste type-specific and waste treatment-specific EFs

The following are relevant for M3:

1 Total mass in tonnes of waste generated

2 Proportion of waste treated by different methods (landfill, incineration, recycling)

3 Average waste treatment-specific EFs based on all waste disposal types[40]

Best practice in reporting waste includes detailed reporting on waste sent to landfills and incineration (where possible relevant for all Methods). Certifications such as "zero waste to landfill" and "zero waste to incineration" are encouraged.

Formula

Examples of calculations and some specificities are available in GHGP [GHGP-2].

Links to other Scope 3 Categories and instructions

- End-of-life of sold equipment, particularly e-waste, shall be reported in Category 12

36 Information on materials re-used, as opposed to disposed of by recycling or landfill.
37 Open-loop recycling is defined as a process of recycling material, whereby new products are created.
38 Closed-loop recycling is defined as a process of recycling material where the original purpose of the product is retained.
39 Includes energy recovery.
40 EF databases that support waste management and reporting include, but are not limited to, DEFRA, as shown in their 2022 conversion factors; full set available at www.gov.uk/government/collections/government-conversion-factors-for-company-reporting and ADEME

Category 6

Business Travel

Description

This Category 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.

Emissions from business travel may arise from travel by air, rail, bus and car (e.g. business travel in rental cars, employee-owned vehicles) other than employees commuting to and from work that are accounted for in Category 7.

Emissions from travel in vehicles owned or controlled by the telecommunication operator are accounted for in Scope 1 (for fuel use) or Scope 2 (for electricity use). Corresponding supply chain and transmission and distribution losses are accounted for in Scope 3, Category 3.

Applicability to telecom operators

Many telecommunication operators that have performed extensive Scope 3 screening have noted that emissions from business travel typically account for a minor part of total Scope 3 emissions.

Nevertheless, telecommunication operators report emissions for this Category and take measures to encourage sustainable travel options and audio or video conferencing for business-related activities.

Category boundaries

Emissions from business travel by employees during the reporting year in vehicles not owned or operated by the telecommunication operator are included. Companies may optionally include emissions from business travellers staying in hotels.

Calculation method

Companies may use one of the following methods, in descending accuracy:

1. Fuel-based method, which involves determining the amount of fuel consumed during business travel (i.e. Scope 1 and Scope 2 emissions of transport providers) and applying the appropriate EF for that fuel

2. Distance-based method, which involves determining the distance and mode of business trips, then applying the appropriate EF for the mode used

3. Spend-based method, which involves determining the amount of money spent on each mode of business travel transport and applying secondary (EEIO) EFs

It is best practice to use either the fuel- or distance-based method for calculating business travel emissions when possible. The fuel-based method is preferred if business travel contributes significantly to Scope 3 emissions (based on screening) or if engagement with travel providers is relevant to the business goals.

These methods are described in further detail in Category 4.

Fuel-based method

If data is available on the amount of fuel consumed during business travel by type or mode of transport, companies may apply the fuel-based method. The calculation method for the fuel-based method is the same as that in Category 4, with the difference that the source for activity data are the travel providers or travel agencies. For a description of this method, see Category 4.

Business travel emissions =
fuel used (t, l or m^3)
×
Combustion EF for that fuel ($kgCO_2e$/t, l or m^3)

Distance-based method

The distance-based method is preferred if business travel does not significantly contribute to Scope 3 emissions (based on screening) or if engagement with travel providers is not relevant to business goals.

Emissions are calculated by multiplying the distance travelled in each type or mode of transport by an EF for the mode used, generally expressed in passenger-km.

Business travel emissions =
Σ (total distance travelled by mode of transport [vehicle-km or passenger-km]
×
vehicle-specific EF [tCO_2e/vehicle-km or tCO_2e/passenger-km])

Activity data and EFs follow

Distance travelled by mode of transport (vehicle-km/year) or (passenger-km/year)

These data are sourced from the travel agencies with which the telecommunication operator works. Where possible, distance data should disclose details, such as the country of travel (since transportation EFs vary by country) and the specific type of vehicles used for travel (e.g. the EF of a high-speed train is different to one that is a regional or a light rail).

EF, specific by country and by mode of transport (tCO_2e/vehicle-km or tCO_2e/passenger-km)

Note: *The GHGP [GHGP-2] does not demand the inclusion of the fuel supply chain for this Category, in contrast to Category 4.*

Consequently, the impact of travelling is underestimated compared to that of transport. The GHGP [GHGP-2] further states that companies may adopt multipliers or other corrections to account for emissions due to radiative forcing[41] (e.g. air trails) arising from aircraft transport. This guidance recommends telecommunication operators consider supply chain and radiative forcing to follow best practice. In any case, companies should disclose the specific factors used and what they entail.

Specifically for air travel, if the company has enough data, it can differentiate between long-haul, short-haul or domestic flights and consider the class (economy, premium, business, first), since the relevant EF differs considerably. If the class is unknown, the company can use the 'average passenger' EF[42].

Spend-based method

If it is not possible to use either the fuel- or distance-based methods, companies may use the spend-based method.

The calculation method is the same as the spend-based method described in Category 4, with the difference that the activity data is the amount spent on business travel by type or mode of transport (instead of the amount spent on transportation by type or mode of transport). For a description of this method, see Category 4.

Links to other Scope 3 Categories and instructions

- This Category covers rental vehicles. Emissions from leased vehicles that are not included in Scope 1 or 2 are accounted for in Scope 3, Category 8.
- Emissions from transportation of employees to and from work are accounted for in Scope 3, Category 7.
- EFs for different modes of transportation used for distance-based method are the same EFs used for calculating emissions associated with Category 7.

41 According to DEFRA (UK), emissions from aviation have both direct (CO_2, CH4 and N_2O) and indirect (non-CO_2 emissions e.g. water vapour, contrails, NOx) climate change effects. Organisations should include the indirect effects of non-CO_2 emissions when reporting air travel emissions to capture the full climate impact of their travel. However, it should be noted that there is significant scientific uncertainty around the magnitude of the indirect effect of non-CO_2 aviation emissions and it is an active area of research.

42 EF databases include but are not limited to the EPA's GHG Emission Factors Hub (United States Environmental Protection Agency) or the UK government's conversion factors for company reporting of GHG emissions.

Category 7
Commuting

Description

According to GHGP [GHGP-2], this Category includes emissions due to travel of employees from their homes to their workplaces.

Emissions related to remote work belongs to this Category. Reporting these emissions is recommended as it helps to create data sets for evaluating ICT's effects of remote work; however, it is classified as voluntary by the GHGP [GHGP-2].

Emissions from employee commuting may arise from the following:

- Car travel (by own or shared vehicle).
- Bus travel.
- Rail travel.
- Boat travel.
- Other modes of transportation (e.g. metro, taxi, e-bike).

Companies may also include emissions from teleworking, and it is recommended that telecommunication operators do so (see Calculation Method in this chapter for further details).

Companies can use information from employee surveys or use proxy data to estimate travel distances.

EFs for vehicles and public transportation are widely available, typically expressed in tCO_2e/passenger-km travelled.

Applicability to telecom operators

Many telecommunication operators that performed extensive Scope 3 screening analysis report that emissions from employee commuting typically account for a minor part of total Scope 3 emissions.

Nevertheless, telecommunication operators report emissions for this Category and take measures to encourage sustainable commuting options and audio or video conferencing for business-related activities.

Category boundaries

The minimum boundaries include all emissions associated with the transportation of employees to and from their places of employment using vehicles not owned or controlled by the telecommunication operator.

"Employees" are staff members of entities and facilities owned, operated or leased by the telecommunication operators. They may include employees of other relevant entities (e.g. franchises, 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 telecommunication operator.

Note: *Depending on the contractual situation, commuting of consultants etc. may be accounted for in Category 1, in which case it does not need to be included here.*

According to GHGP [GHGP-2], companies may also include emissions from teleworking, and it is recommended that telecommunication operators do so.

Calculation method

Travel-related

Referring to employee surveys, proxy data and other ways of collecting information regarding travel patterns of employees, companies may use one of the following methods to estimate emissions:

- Fuel-based method, which involves determining the amount of fuel consumed during commuting and applying the appropriate EF for that fuel.
- Distance-based method, which involves collecting data from employees on commuting patterns (e.g. distance travelled and mode used for commuting) and applying appropriate EFs for the modes used.
- Average-data method, which involves estimating emissions from employee commuting based on average (e.g. national) data on commuting patterns.

Fuel-based method

If data is available on the quantity or amount spent on fuel by employees for commuting, companies may apply the fuel-based method. The calculation method for the fuel-based method is the same as in Category 4.

Where data is available on distance travelled by employees, the distance-based method is used in preference to the average-data method.

If company specific data is unavailable, companies may use average secondary activity data to estimate distance travelled and mode of transport. A company may collect average secondary data from sources, such as national transportation departments, ministries or agencies, national statistics publications or industry associations.

Distance-based method

Companies should collect data on employee commuting habits (preferably annually), e.g. through a survey or use of proxy data, to determine:

- Total distance travelled by employees over the reporting period (e.g. passenger-kilometres).
- Mode of transport used for commuting (e.g. train, metro, bus, car, bicycle).

While doing so, companies should try to get the best possible representativeness of employees taking into consideration differences in local travel patterns, potentially using statistical methods, such as confidence intervals, to understand the quality of their data. Companies usually extrapolate from a representative sample of employees to represent the total commuting patterns of all employees. For telecommunication operators doing business in more than one country, it is best practice to extrapolate the sample of employees by country to the rest of employees of this country. Mobility patterns vary a lot depending on the country. In European countries, employees are more likely to use public transport, whereas in Latin America or the Middle East, commuting by car is frequent.

Once the company has determined total annual distance travelled by each mode of transport, apply EFs for each mode of transport (usually expressed in units of GHG [CO_2, CH_4, N_2O] emitted per passenger-km travelled), according to the following formula.

CO_2e emissions from employee travel are obtained by first summing across all employees to determine total distance travelled using each vehicle type.

Employee commuting emissions are calculated by summing across each transport mode =

Total distance travelled by vehicle type (vehicle-km or passenger-km) = Σ (daily one-way distance between home and work [km] × 2 × number of commuting days per year)

Then, sum across vehicle types to determine total emissions:

kg CO_2e from employee commuting = Σ (total distance travelled by vehicle type [vehicle-km or passenger-km] × vehicle-specific EF [kg CO_2e/vehicle-km or kg CO_2e/passenger-km])

Average-data method

In order to estimate distance travelled and mode of transport, companies may collect secondary data to determine:

- Average daily commuting distances of typical employees.
- Average modes of transport of typical employees.
- Average number of commuting days per week and average number of weeks worked per year.

Such estimation requires making several simplifying assumptions, which add uncertainty to the emissions estimates.

Employee commuting emissions = Σ (total number of employees X% of employees using mode of transport × one way commuting distance [vehicle-km or passenger-km] × 2 × number of commuting days per year × EF of transport mode [kg CO_2e/vehicle-km or kg CO_2e/passenger-km])

Further reading

- GHG Protocol Calculation Tool, GHG Emissions from Transport or Mobile Sources, developed by World Resources Institute, available at **www.ghgprotocol.org/calculation-tools/all-tools**
- U.S. EPA Climate Leaders GHG Inventory Protocol, 'Optional Emissions from Commuting, Business Travel and Product Transport', available at **nepis.epa.gov**
- For UK organisations, the Department for Transport provides guidance and a calculation tool for work-related travel, available at **www.gov.uk/government/publications/environmental-reporting-guidelines-including-mandatory-greenhouse-gas-emissions-reporting-guidance**
- Public transport data from the European Commission on Transport breaks down the EU and international percentage averages for bus, rail, tram and metro use, available at **ec.europa.eu/clima/eu-action/transport-emissions_en**
- Private transport data from 'Japan Guide', based on surveys on commuting times in several countries worldwide, available at **www.japan-guide.com/topic/0011.html**
- Average speed of transport provided by the Mobility in Cities Database, available at **www.uitp.org/publications/mobility-in-cities-database/**
- The approach of two UK-based banks to calculating homeworking emissions outlined in the EcoAct Homeworking Emissions Whitepaper, available at **info.eco-act.com/en/homeworking-emissions-whitepaper-2020**

EFs for different modes of transportation can be collected via publicly available data from global and local transportation emission databases, transport companies, local ministries or agencies[43].

Remote work-related emissions

For additional energy usage in the home, calculate the corresponding contributions to Category 7 by:

Additional home energy use emissions =

Σ number of workdays from home
×
quantity of additional energy consumed per remote working day (kWh)
×
EF for energy source (kg CO_2e/kWh)

Further reading

Further guidance on calculating emissions related to remote work is available from initiatives, such as:

- **EcoAct, info.eco-act.com/en/homeworking-emissions-whitepaper-2020**
- **Carbon Trust/Vodafone, www.vodafone-institut.de/wp-content/uploads/2021/06/CT_Homeworking-report-June-2021.pdf**

Links to other Scope 3 Categories and instructions

- The calculation method for the fuel-based method is the same as that in Category 4.
- EFs for different modes of transport used for the distance-based method are the same as those used in Category 6.

43 Some examples from telecommunication operators include: Quantis suite tool, Ecoinvent database EFs, DEFRA Guidelines, UK Government GHG Emission Conversion Factors for Company Reporting, VTT Lipasto and Finnish Railway in Finland, Ministry of the Environment and the National Urban Person Trip Survey from the Ministry of Land, Infrastructure, Transport and Tourism in Japan, Ministry of Environment's Low Carbon Green Event Guidelines in Korea, National GHG Accounts Factors in Australia.

Category 8

Upstream Leased Assets

Description

The GHGP [GHGP-2] uses the terminology 'lessee' and 'lessor'. A company that rents an asset owned by someone else (e.g. as a mobile operator leasing space in a cell tower) is called a 'lessee'. A company that lets an asset to someone else (e.g. as a Towerco leasing space to a mobile operator) is called a "lessor".

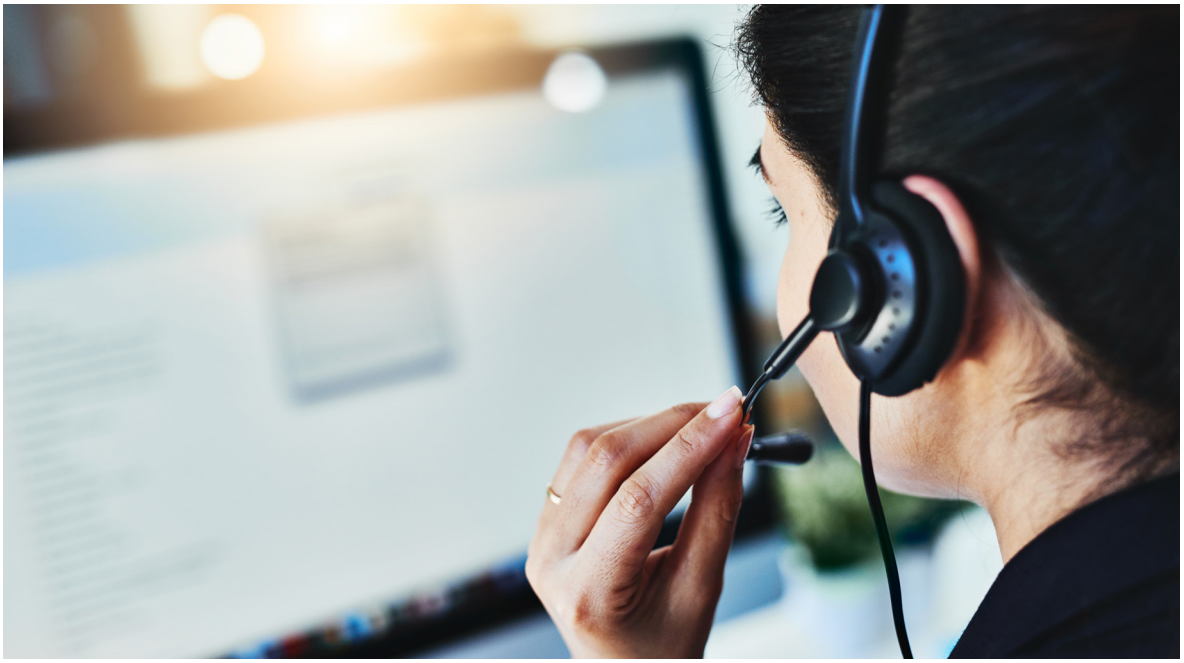
Operators of ICT infrastructure can on occasion be lessors (leasing assets to customers, including other ICT operators) and at other times lessees (leasing assets from other organisations, again including other ICT operators).

Before assigning any emissions to Categories 8 or 13, first ensure that these are the correct Categories for consideration. This is especially important when distinguishing between the purchase of a service and the leasing of an asset. From the customer's point of view, if it is the former (i.e. the purchasing of a service) then refer to the Category 1 chapter, if the latter, then continue with this chapter. Drawing this distinction is often easier when dealing with physical as opposed to virtual assets. The wording of contracts may clarify such matters.

When an asset is leased, the GHGP [GHGP-2] requires any emissions associated with operating the asset to be accounted for by one of the parties under Category 8 or 13 (see later). The GHGP [GHGP-2] goes on to say that the reporting of life-cycle emissions associated with the manufacture or construction of the asset is optional.

In the case of the lessor, the telecommunication operator will have purchased the asset and will therefore have already included the embodied emissions in its Category 1 or 2 emissions. In the case of the lessee, it is left to the discretion of the telecommunication operator to determine whether it chooses to further its accountability by reporting on the embodied emissions. The remainder of this chapter only covers operating emissions.

Note: *If a company moves from an asset-leasing model to an ownership model, and under the leasing model it had elected not to report life-cycle emissions, then it will see an increase in overall emissions. This is because under the ownership model it will need to report the upstream lifecycle emissions under Scope 3, Categories 1 and 2.*



Category boundaries

Scope 3, Category 8 accounts for emissions associated with upstream leased assets (i.e. when the telecommunication operator rents assets from a third party). Category 13 accounts for emissions associated with downstream leased assets (i.e. assets that are let to a third party by the telecommunication operator). The guidance for Category 13 is often the flip side of that for Category 8 and for this reason the two Categories are combined.

Whenever an organisation accounts for an emission under Scope 3 it is important that this emission be also reported by another organisation as either Scope 1 or 2. For most Scope 3 Categories, this matter is often clear, and the allocation occurs automatically. However, in the case of Categories 8 and 13 this allocation is often not straightforward and may, on occasion, either not occur at all, or may lead to a double counting of Scope 1 or 2 emissions. Such a situation can arise because the two reporting organisations simply make their own, but conflicting, interpretations of the GHGP [GHGP-2], or because the GHGP [GHGP-2] itself leads to this situation. The latter contradiction is covered in more detail later.

Applicability to telecom operators

Within the ICT industry, there are multiple examples of lessee and lessor relationships. Table 9 provides a few examples.

Table 9 | Examples of lessee and lessor relationships

Example	Network operator as lessee	Network operator as lessor
Rented office space.	Network operator rents office space from a third party.	Network operator lets office space to a lessee.
A towerco owns and manages a set of 'passive' towers, which it leases to one or more operators who install 'active' telecommunication equipment, powered by electricity to process data and voice flows.	Network operator rents cell tower capability from a lessor.	Network operator lets cell tower capability to lessee.
Colocation data centre in which a business can rent space for servers and other computing hardware.	Network operator rents space in a Colocation data centre from another ICT company.	Network operator runs a Colocation data centre and lets space to a lessee.
Local Loop Unbundling in which a competing operator can place its own equipment in an incumbent's telephone exchange (central office).	Network operator rents space in an incumbent's telephone exchanges.	Incumbent operator lets space in its telephone exchanges to its competitors.
An Energy Services Company (ESCO) providing power supply services, equipment or associated maintenance services.	An ICT company leases equipment or capacity from the ESCO.	ICT company acts as an ESCO.

The remainder of this chapter does not seek to make recommendations aligned to any of the specific use cases detailed in Table 9, but rather it provides generic guidance that is applicable irrespective of the use case. The guidance is based on the GHGP [GHGP-2] and takes account of different control approaches and types of lease. Where alternative options exist within the construct of the GHGP[GHGP-2], it is left to the company to decide which direction to take in agreement with the other party to the leasing arrangement. It also seeks to resolve contradictions and anomalies that arise out of the GHGP [GHGP-2].

In all cases, there are two guiding principles:

1 One of the leasing entities must adopt the Scope 1 and 2 emissions associated with the joint leasing arrangement.

2 All carbon accounting arrangements are to be included in the lease contract.

Calculation method

Attributing emissions between Scopes 1 and 2, and Scope 3

Before considering how to address either Scope 3, Category 8 or 13 emissions, it is important first to ensure a correct attribution between Scopes 1 and 2, and Scope 3. For example, where one business is supplying space to a third party, this often comes with the provision of power, heat or cooling. The question of attribution then becomes one of allocating the Scope 1 and 2 emissions associated with these services to either the provider of the space or the user of the space, while recognising that Scope 1 and 2 emissions should only be reported by one entity.

The GHGP Scope 3 guidance proposes different ways of achieving this allocation depending on which consolidation approach the telecommunication operator has selected to set its organisational boundaries and the type of lease.

The first step is to identify which of the following consolidation approaches in the GHGP [GHGP-1] a company uses to set its organisational boundaries:

- Equity share
- Financial control
- Operational control

Note: *Setting a preferred approach to the corporate GHG-reporting boundary lies outside the Scope of this guidance. For more information on this matter, see chapter 3 of the GHG Protocol [GHGP-1].*

The second step is to determine the type of lease.

GHGP [GHGP-1] distinguishes between two types of lease; "finance or capital" and "operating". These are defined as follows.

Finance or capital lease: A type of lease that enables the lessee to operate an asset and gives the lessee all the risks and rewards of owning the asset. Assets leased under a capital or finance lease are considered wholly owned assets in financial accounting terms and are recorded as such on the balance sheet.

Operating lease: A type of lease that enables the lessee to operate an asset, like a building or vehicle, but does not give the lessee any of the risks or rewards of owning the asset. Any lease that is not a finance or capital lease is an operating lease.

A capital or finance lease is treated like an asset on a company's balance sheet, while an operating lease is an expense that remains off the balance sheet. Think of a capital lease as more like owning a piece of property and an operating lease as more like renting it.

Capital leases are counted as debt. They depreciate over time and incur interest expense. For example, to be classified as a capital lease under U.S. Generally Accepted Accounting Principles (GAAP)[44], any one of four conditions must be met:

- A transfer of ownership of the asset at the end of the term.
- An option to purchase the asset at a discounted price at the end of the term.
- The term of the lease is greater than or equal to 75% of the useful life of the asset.
- The present value of the lease payments is greater than or equal to 90% of the asset's fair market value.

Alternatively, if evaluated under International Financial Reporting Standards (IFRS)[45], there is one more criterion that can be used to qualify a lease as a capital lease:

- The assets under the lease are specialised so that only the lessee can utilise them without major changes being made to the assets.

44 www.fasb.org
45 www.ifrs.org

Operating leases are used for the short-term leasing of assets and are similar to renting as they do not involve any transfer of ownership. Periodic lease payments are treated as operating expenses and appear as debit on the income statement, impacting both operating and net income. In contrast, capital leases are used to lease longer-term assets and give the lessee ownership rights.

For each case of a leased asset, it is recommended that the team responsible for compiling the company's GHG inventory contact their finance department to establish whether the asset is included on the company's balance sheet. This will establish the type of lease involved according to Table 10.

Table 10 | Type of lease

Classification on balance sheet	Role of telecommunication operator	
	Lessee	**Lessor**
Included	Capital lease	Operating lease
Excluded	Operating lease	Capital lease

GHGP Guidance on Scope allocation to Lessees

Table 11 explains how emissions from leased assets are categorised.

Table 11 | Emissions from leased assets: Leasing agreement and boundaries (lessee's perspective)

	Type of leasing arrangement	
	Finance/capital lease	**Operating lease**
Equity share or financial control approach used	Lessee does have ownership and financial control, therefore emissions associated with fuel combustion are Scope 1 and with use of purchased electricity are Scope 2.	Lessee does not have ownership or financial control, therefore emissions associated with fuel combustion are Scope 3 and with use of purchased electricity are Scope 3.
Operational control approach used	Lessee does have operational control, therefore emissions associated with fuel combustion are Scope 1 and with use of purchased electricity are Scope 2.	Lessee does have operational control, therefore emissions associated with fuel combustion are Scope 1 and with use of purchased electricity are Scope 2 (see note). **Note:** *Some companies may be able to demonstrate that they do not have operational control over a leased asset held under an operating lease. In this case, the company may report emissions from the leased asset as Scope 3 but must state clearly in its GHG inventory report the reason(s) that operational control is not perceived.*

Source: Appendix F of GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard

Where using the Operational Control Approach, the note to Table 11 allows the company to reverse the guidance in certain circumstances.

The GHGP Scope 2 standard adds further guidance as follows:

All leases confer operational control to the lessee or tenants, unless otherwise noted.

In some leased building arrangements, tenants do not pay for electricity individually. However, this should not exempt tenants from reporting the emissions from that energy use. Scope 2 includes energy that is acquired and consumed.

Therefore, if a company is a tenant in a leased space or using a leased asset and applies the operational control approach, any energy purchased or acquired from another entity (or the grid) shall be reported in Scope 2.

The word 'acquired' was added in the Scope 3 Standard (p28) to reflect circumstances where a company may not directly purchase electricity (e.g. a tenant in a building), but where the energy is brought into the organisation's facility for use.

On-site heat generation equipment, such as a basement boiler, typically falls under the operational control of the landlord or building management company. Tenants therefore would report consumption of heat generated on-site as Scope 2. If a tenant can demonstrate that they do not exercise operational control in their lease, they shall document and justify the exclusion of these emissions.

The default position of the GHGP is that a lessee operating under the Operational Control approach should count emissions associated with fuel used for heat, cooling or power generation, and electricity supplied in their Scopes 1 and 2 respectively, with the lessor counting them as Scope 3, Category 13. However, the GHGP then goes on to say this need not be followed if operational control is not perceived by the lessee.

GHGP Guidance on Scope allocation to lessors

In principle, the position of the lessor should be the inverse of the lessee. For example, if the lessee considers the emission should be allocated to Scope 3 then the lessor should be allocating them to either Scope 1 or Scope 2 or both.

Points of confusion

There is a scenario under an Operating Lease where, according to the GHGP, neither entity in the leasing arrangement declares an emission as Scope 1 or 2. This occurs when the lessor works to the Operational Control approach, but considers the lessee to have operational control, and the lessee works to the Financial Control approach, but does not have financial control. In a similar fashion there is another scenario where both entities in a leasing arrangement declare the same emission as Scope 1 or 2.

To avoid any such confusion, this guidance recommends that Scope 1, 2 and 3 allocations be covered in lease contract clauses under 'Contractual clauses'.

Note: *If the lessor (e.g. a Towerco) and the lessee (e.g. a telecommunication operator) belong to the same company group and are each reporting separately, then either the lessor or the lessee must elect to account for Scopes 1 and 2 and the other party reports as Scope 3. If just the group is reporting, then all operational emissions shall be counted as Scopes 1 and 2.*

Note: *Companies leasing building space while referring to ITU-T L.1420*[46] *need to include the associated Scope 1 and 2 emissions within their Scope 1 and 2 accounts under Measurement or assessment of emissions.*

Once the allocation of emissions between the lessee and lessor for Scopes 1 and 2 versus Scope 3 has been resolved, then the actual emissions can be evaluated.

46 Recommendation ITU-T L.1420 (2012), Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organisations.

The entity best placed to do this is the one deemed to 'own' the Scope 1 and 2 emissions. That organisation should evaluate the emissions according to standard GHGP principles and then inform the corresponding Scope 3 entity of the emissions it should report. There may be cases where some emissions covered by a single leasing arrangement are dealt with differently to others. For example, where a lessee rents space within the lessor's premises to install and run their own equipment and receives sub-metred electricity, then this may be agreed between the parties (preferably within the contract) to transfer operational control, and thereby the Scope 2 allocation, from the lessor to the lessee. At the same time, the electricity used to run support services provided by the lessor, such as cooling or antenna sharing may be deemed to remain under the operational control of the lessor who then retains the Scope 2 allocation[47].

Contractual clauses

The GHGP [GHGP-1] provides for the possibility of using contractual clauses to assign ambiguous ownerships of emissions.

"To clarify ownership (rights) and responsibility (obligations) issues, companies involved in joint operations may draw up contracts that specify how the ownership of emissions or the responsibility for managing emissions and associated risk is distributed between the parties. Where such arrangements exist, companies may optionally provide a description of the contractual arrangement and include information on allocation of CO_2e-related risks and obligations." (page 20)
To avoid any doubt, it is recommended that any lease set out the assignment of all relevant emissions between Scopes 1, 2 and 3 for both lessee and lessor. This should be done in such a way as to avoid any exclusion of emissions from Scopes 1 and 2, as well as the avoidance of any double counting in Scopes 1 and 2.
It is further recommended that even where the GHGP seems to offer no such confusion, it would still be best practice to outline all relevant emission attributions within a lease.

In addition to the contract outlining the allocation of emissions, it should also state that the entities deemed to 'own' any Scope 1 or 2 allocations agree to inform the other party of the emissions measured so they can report it under their Scope 3 footprint.

Draft contract clauses addressing these recommendations are available from the Chancery Lane Project[48].

Transparency

Whenever emissions are reported as Scope 3, Category 8 or 13, it is recommended that the reporting entity be transparent as to the method used to reach this position and explain any contractual arrangements covered by the agreement.

Note: *This does not require disclosure of actual contractual clauses. Wording of the contract can be kept confidential.*

47 For data centres, the PUE metric may be useful in allocating energy use to either the physical plant or the IT infrastructure.
48 chancerylaneproject.org/climate-clauses/allocating-scope-1-2-and-3-emissions-for-leased-assets/

Summary of Scopes 1 and 2, and Scope 3 decision steps

1| Identify all material ownership or use models within a company's leasing arrangements i.e. who owns what, who supports what, who operates what, who is the beneficiary of use.

For each ownership model and by agreement between the lessee and lessor:

2| Establish which reporting boundary approach each company has selected.

3| Establish the type of lease (i.e. capital (finance) or operating), subsequent steps are as follows:

4| EITHER:

a| Allocate all Scope 1 and 2 emissions associated within the contract between the lessor and the lessee according to the GHGP guidance.

OR;

b| Allocate all Scope 1 and 2 emissions associated within the contract between the lessor and the lessee according to contractual agreement.

c| If option a) or b) leads to either a non-allocation of emissions to Scopes 1 and 2, or a double allocation of such emissions then, by contractual agreement, ensure that all relevant emissions receive a Scope 1 and 2 allocation to one of the contracting parties.

5| Whichever approach is taken under entry #4, the details should be called out in a specific language within the lease specifying how GHG emissions are allocated between the lease participants such that:

6| EITHER:

a| The lessor reports emissions as Scope 1 or Scope 2 and the lessee reports emissions as Scope 3, Category 8.

OR;

b| The lessor reports emissions as Scope 3, Category 13 and the lessee reports emissions as Scopes 1 or Scope 2.

7| The entity taking any Scope 1 and Scope 2 allocation shall evaluate the emissions according to standard GHGP principles and then inform the corresponding Scope 3 entity of the emissions it should report. Details of this agreement should also be included in the lease.

8| Reporting entities should be transparent as to the method used to evaluate reported emissions and explain all arrangements covered by contractual agreement.

Category 9

Downstream Transport and Distribution

Description

This Category includes transport and distribution of products sold by the telecommunication operator to the end customer (if not paid for by the telecommunication operator), including retail and storage (in vehicles and facilities not owned or controlled by the telecommunication operator).

According to the GHGP [GHGP-2], companies may include emissions from customers travelling to and from retail stores, which can be significant for companies that own or operate retail facilities. It is recommended that telecommunication operators include such emissions based on customer surveys or proxy data, considering number of customers and average means of transport and shop distances.

Links to other Scope 3 Categories and instructions

In line with other Scope 3 emissions from purchased services, downstream transport and distribution would be reported as Category 1 if specific data cannot be acquired. The typical situation is that transportation services can be specified and reported separately. Normally, this would mean that downstream transportation would be reported in this Category. However, in practice telecommunication operators may not distinguish between upstream and downstream transports in their records but keep all kinds of transport services accounted for as one post. For this reason, the telecommunication operator's transportation and distribution are typically accounted for jointly under Categories 4 and 9 and reported as Category 4 upstream transportations (as an element of purchased services that can be accounted for separately).

Category 10

Processing of Sold Products

This Category includes the further processing of intermediate products (e.g. material, component) sold to downstream companies and is normally not considered relevant to telecommunication operators.

Category 11

Use of Sold Products

Description

As stated in the GHGP [GHGP-2], this Category includes emissions from the use of goods (tangible products) and services (intangible products) sold by the telecommunication operator in the reporting year. Companies are required to include direct use-phase emissions of sold products over their expected lifetime,[49] which are the Scope 1 and 2 emissions of end users associated with the energy consumption of sold products during their entire use, such as the electricity consumption of a set-top-box used by a customer. Indirect emissions resulting from goods and services sold may also be included. However, this is not mandatory.

Calculating emissions from Category 11 typically requires data on product energy use and representative product use profiles reflecting how customers are expected to use the products. The accuracy of product energy models, user profiles and associated emissions can be improved through the collection of field data.

49 GHG Protocol, *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*, puts the emissions associated with the entire lifetime at the year of sales. ISO 14064-1 2018 (Greenhouse gases — *Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals)* however allows for depreciation. For telecommunication operators it is recommended to follow GHG Protocol, *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*.

Category boundaries

The direct use-phase emissions of sold products over their expected lifetime (i.e. the emissions of end users that occur from the use of products that directly consume electricity).

Indirect emissions resulting from sold goods and services sold may also be included, although this is not mandatory, telecommunication operators are encouraged to report them. The telecommunication operator shall decide where it makes sense to report indirect emissions, taking into account how significant they are, how well they can estimate them and how much influence they have to mitigate them. If indirect emissions are included in Category 11, the telecommunication operator shall make clear in the accounting practices which indirect emissions are included, and how they are calculated.

Examples of indirect emissions include:

- Device electricity consumption of all users sold a mobile subscription regardless of whether they were sold a mobile device from the telecommunication operator.
- Televisions (TVs) used with set-top boxes provided by the telecommunication operator.
- Devices used to view media content provided by the operator (TV and set-top box).
- Internet of Things (IoT) devices provided by other suppliers.

Emissions arising from sold services are more complex to assess, and for this reason this Guidance focuses solely on products.

The following devices are often sold by telecommunication operators and are accounted for in this Category:

- Mobile devices, such as smartphones, laptops, tablets, smartwatches and audio devices that are sold to the customers.
- Customer Premises Equipment (CPE), such as routers, decoders, optical network terminals and Wi-Fi-boosters installed in customers' houses.
- Business solutions provided to customer. This could include operation of equipment, such as computers, data centre products, including servers, storage systems, networking equipment, and systems combining the above elements. Other energy consuming equipment sold to customers, such as IoT/machine-to-machine (M2M) devices, TV sets or monitors, shall also be considered.

Note: *Regarding enterprise customers, if the service sold by operators includes cooling and power supply, this should be taken into account when assessing the Category 11 emissions.*

Applicability to telecom operators

Emissions derived from the use of products sold are considered material for telecommunication operators and are often within the top three highest emission Categories of Scope 3.

Therefore, it is important to measure or assess and report these emissions appropriately and to take measures aimed at encouraging both a sustainable design of the products and a responsible purchasing and use of the equipment and devices by customers.

Calculation method

Companies may use one of the approaches listed in Table 12:

Table 12 | Calculation method for Category 12

Approach	Method	Application
1	Multiplying the number of sold products by the total lifetime energy use associated with each model, corresponding to a representative energy profile, lifetime and EF representing global conditions.	Particularly suited to goods that have a relatively small proportion of emissions during their use phase compared to their entire life cycle, and for which product carbon footprint (PCF), LCA or eco-rating data is available.
2	Multiplying the number of sold products by the annual energy use associated with each model in each country, the equipment lifetime and the country's EF for electricity.	For all other goods.

Calculating emissions from Approach 1

It is best practice to use this approach for products, such as mobile devices, since their use stage does not represent a significant share of emissions compared to their overall life-cycle emissions. As there is some publicly available data providing the specific emissions of the use stage for some models (e.g. PCF, LCA or Eco Rating data), this can be used to make an estimate of the lifetime use-stage emissions.

Emissions from use of mobile devices =

∑ lifetime use-stage emissions (tCO_2e)
×
number of devices

Activity data and EFs follow:

- Number of devices: number of products, per type of device, model, supplier and country.

Telecommunication operators can consider either the number of mobile devices sold to customers, or the number of mobile devices purchased by the company that are aimed to be sold to customers, since these figures do not significantly vary in a reporting year and the latter may be easier to obtain and track.

- Product emissions of the lifetime use stage, per model and supplier (tCO_2e).

The source of these emissions may be publicly available in PCF or LCA studies that are disclosed by manufacturers for their specific models, or that are provided by the suppliers to the Eco Rating[50] initiative. For models without PCF, LCA or Eco Rating data, the use-stage emissions can be estimated based on average emissions of the same type of device from different brands.

Special attention should be paid to which grid EF was used to calculate the use phase throughout the life cycle and its applicability to the country from where the devices draw electricity.

Calculating emissions by Approach 2

It is best practice to use this approach for computer equipment, servers, data centres, routers, decoders and Wi-Fi boosters. Telecommunication operators can also use this approach for mobile devices, instead of Approach 1.

Emissions from use of other sold products =

∑ Energy consumption (kWh/year)
×
lifetime (years)
×
EF (tCO_2e/kWh)

Activity data and EFs follow:

- Number of devices: number of pieces of equipment installed in or shipped to customers per type of device, model and country.
- Annual energy consumption of the device (kWh/year): this is calculated based on the following:
  - » Energy characteristics of the equipment: energy consumption (in kWh) in different power modes (full power, low power and standby) for routers, decoders and Wi-Fi boosters, per device and country together with a use profile. It is best practice to use data that follows a standardised testing protocol or supplier information data of each specific model. If data for a specific device or model is not available, the energy consumption can be estimated based on the average consumption of similar devices with primary data or on the applicable version of European Code of Conduct on energy consumption of broadband equipment.
  - » Equipment use profile for different power modes (full power, low power and standby), per device and country (hours per year): primary or field data is preferred, such as in-house data on how devices are being used on average by a significantly large population, however secondary data sources can also be used to supplement, for example public sector or non-governmental organisations reports on hours of TV watched per day for the average household or average time spent on a mobile device.

50 Based on information provided by manufacturers, Eco Rating initiative assesses each device comprehensively and assigns an overall Eco Rating score out of a maximum of 100 to indicate the environmental performance of the device over its entire lifecycle. Regarding climate, it displays the GHG emissions of the device over its entire life cycle.

- Equipment lifetime (year): this is estimated lifetime of the equipment, per type of device and model. Ideally, this should be done by using the best estimate of operational lifetime, which should be based on available information on actual goods use (e.g. statistics for similar goods, networks and services or commercial information) and should model real life as closely as possible. Telecommunication operators shall strive to collect primary data on energy consumption and user profiles. In the absence of primary or field data, secondary data should be sought, such as actual user profiles including household surveys. If information on actual use of goods, networks and services cannot be found, economic statistics may be used to estimate the operating lifetime, such as depreciation time. However, such estimates are considered to be less accurate and should be avoided. In practice, it is often difficult to put a value on the lifetime of a product, but the telecommunication operator should strive to derive the best possible estimate.

Note: *Each sale of a product should consider the expected lifetime for that sale. For this reason, the first sale of a product need not consider subsequent operating time associated with reuse, while the sale of reused products need not consider the lifetime associated with the original sale. Moreover, the lifetime of an original sale of a product and for a refurbished product of the same kind may differ.*

If field data of the exact number of devices that are connected at any given moment is available and the total power consumption for all devices is a known quantity, then this number can be used and multiplied by the lifetime of the devices.

Grid EFs should follow the General Guidance chapter. In addition, EFs for electricity consumption of products sold should be specified by country[51]. It is recommended to use the most recent, most representative grid EF at the time that the device is sold. Otherwise, projected changes in the grid EF (according to recognised sources, such as the IEA, government report or the grid provider) can also be used. It is recommended that the approach used should be clearly indicated in the accounting practices.

The telecommunication operator should report information on average use profiles, assumed product lifetimes and other underlying assumptions in their accounting principles.

Links to other Scope 3 Categories and instructions

- Product life cycle emissions from LCAs, PCFs or similar can be used for both Categories 1 and 2 (cradle-to-gate emission) and Category 11 (use stage).

- Devices whose use-phase emissions are captured in Category 11 can, under certain circumstances, have a negative impact on Category 1. Specifically, the duration of the first use of refurbished materials has a significant impact on the carbon assessment result. The use of reused, refurbished and repaired goods with a short first use can even have negative carbon consequences, as it contributes upstream to increase the speed of their replacement by new material. Thus, extending first use should be considered in assessing carbon of the use of reused, refurbished and repaired goods materials[52].

- As some CPE may be leased instead of sold (e.g. routers, set-top boxes), some companies report these emissions in Category 13. However, the calculation methodology presented here in Category 11 is better suited for such products and shall be applied. In the accounting practices, the telecommunication operator shall make clear what is leased, what is sold and what calculation methodology is used.

- The number of devices accounted for in Category 11 shall match the number of devices accounted for in Category 12 if there is uncertainty in the exact number of devices that reach end-of-life in a given year.

51 EF databases include, but are not limited to, IEA since there are some national carbon footprint registers that may require their country-specific EFs for electricity. Currently there is no way to apply a market-based accounting method for Category 11, since it is not possible to know what type of electricity each consumer uses. Therefore location-based factors shall be used.

52 librairie.ademe.fr/dechets-economie-circulaire/5241-evaluation-de-l-impact-environnemental-d-un-ensemble-de-produits-reconditionnes.html

Category 12

End-of-Life Treatment of Sold Products

Description

The GHG Protocol determines that this Category includes "emissions from waste disposal and treatment of products sold by the telecommunication operator (in the reporting year) at the end of their life". From an accountability perspective this Category is important, but data challenges make it hard to address, especially since the share of products coming back to telecommunication operators may be limited while official waste statistics may not be available.

The treatment of end-of-life methods includes landfill, incineration and recycling, and therefore there can be a reporting crossover with respect of Category 5 emissions.

Inclusion of end-of-life treatment of sold goods is particularly challenging with regards to lacking access to accurate data, need for assumptions about end-of-life preferences of customers, low accuracy of supplier EFs and limited availability of country-specific data.

Category boundaries

Category 12 includes emissions from the waste disposal and treatment of products sold by the telecommunication operator (in the reporting year) at the end of their lives. This Category includes the total expected end-of-life emissions from all products sold in the reporting year. This means that operators need to make an assumption about the development of waste handling (e.g. take it to be the same as that current), of distribution of waste treatments and of share of take-back for a future setting decided by the operating lifetime.

This would include emissions other than Scope 1 and 2 associated with take-back services for disposal provided by the telecommunication operator unless accounted for in Categories 1 and 2.

For applicable devices sold by the telecommunication operators, see **Category 11.**

Applicability to telecom operators

For a telecommunication company, reporting on this Category will often be constrained by the data availability, as well as an assumption being made in respect of customer behaviour. Typically, products are separated into Categories, such as retail or business-to-business and then a further breakdown is applied in terms of what the product type is (mobile handset, headset etc.), an assumption is made in respect of average weight of a specific product type and the assumed waste treatment, together with the end-of-life emissions factor.

For equipment that is taken back by the telecommunication operator, the assumed waste treatment should be in line with actual treatment. For the remining share, the average waste handling situation of the country could be considered to provide the most likely assumption on waste treatment. If country-specific data is not available, regional or global averages may be used.

Calculation method

The emissions of this Category could be calculated as follows:

Emissions from take-back and disposal of devices =

Σ (total weight of devices sold [t]
×
share of waste fraction per unit weight
×
EF per treatment method)

Total weight of devices shall be based on Category 11. EFs per waste treatment methods should follow Category 5.

Additionally, the emissions associated with the take-back disposal service are calculated as:

Emissions from end-of-life treatment of sold products =

Σ (total weight of devices scrapped [t]
×
share of waste fraction per unit weight
×
EF per treatment method)

Based on this method, the total emissions per CO_2e are calculated[53].

End-of-life treatment might be different in the future as technology for waste recovery may evolve, however current approaches to end-of-life treatment shall be assumed.

53 Sources of EFs include DEFRA, ADEME etc.; see General Guidance chapter.

Category 13

Downstream Leased Assets

Description

This category includes emissions from the operation of assets that are owned by telecommunication companies (acting as lessor) and leased to other entities.

Applicability to telecom operators

This Category is handled in line with Catergory 8; please see **Category 8 chapter**.

Calculation method

As CPE (e.g. routers, set-top boxes) is often leased to customers instead of sold, some telecommunication operators choose to report those emissions in Category 13 as opposed to Category 11. However, as the methodologies presented in Category 11 are well suited to these types of devices, if a telecommunication operator chooses to report emission from leased assets in Category 13, it can still apply the methodologies presented in Category 11 of this Guidance or it can use, year after year, data related to the active installed CPEs in customer premises. In that case, the emissions shall be calculated as follows, aggregating the following sums for each CPE model and country:

Downstream leased asset emissions =

$\sum$ Number of active installed CPEs in the considered year for the considered CPE model
×
Energy consumption per unit in the considered year for the considered CPE model [kWh]
×
EF for the considered country [tCO_2e /kWh]

Note: *the number of active installed CPEs in customer premises can be considered for instance on 31 December of the considered year or as the average number over the considered year.*

Category 14

Franchises

Description

This Category includes emissions from a telecommunication operator's operation of franchises not included in Scope 1 or 2. A franchise is a business operating under a licence to sell or distribute another company's goods or services within a certain location.

The life-cycle emissions associated with manufacturing or constructing franchises are considered optional by the GHGP [GHGP-2]

Relevant operations of telecommunication operators under this Category follow:

1 Licensed operation of another operator's network - this is also known as a Branded Partner Market and refers to licensed use of the brand of another operator in the same region to operate a network.

2 Franchised retail stores.

Applicability to telecom operators

This is typically not a significant emission Category for telecommunication operators.

Calculation method

The best option is always to use reported Scope 1 and 2 emission data from the operation of franchises, but if such data is not available:

1 Emissions for licenced operation of another operator's network (Branded Partner Markets) is calculated on a per item factor (i.e. per base station), where number of items is known, otherwise it is calculated on a per customer basis. Data needed:

- Number of items or customers.
- EFs that can be calculated using a pro-rata apportionment of own operations as input.

2 Emissions for Retail Franchises are calculated based on the number of retail stores or the floor area of the stores (m^2). Data needed:

- Number of stores or floor area of stores.
- Typical electricity consumption per store and floor area.
- Estimated EF based on country electricity factor.

Category 15

Investments

Description

This Category is applicable to investors (i.e. companies that make an investment with the objective of making a profit) and companies that provide financial services[54]. Category 15 is designed primarily for financial institutions but is also relevant to other entities with investments not included in Scope 1 and Scope 2. As such it may also apply to investments by telecommunication operators.

This Category includes Scope 3 emissions associated with the telecommunication operator's investments in the reporting year, not already included in Scope 1 or Scope 2. Companies using the equity share consolidation approach[55] include their share of Scope 1 and 2 emissions from their equity investments in this Category. This contrasts with companies that apply the operational or financial control consolidation approach, which accounts for all emissions of their investments in their Scope 1, 2 and applicable Scope 3 Categories.

Relevant operations under this Category include equity share emissions related to:

1 Joint Ventures (JVs), if not captured under Scope 1 and 2 or Scope 3 (Category 8).

2 Tower companies, if not captured under Scope 1, 2 or 3 (Category 8).

3 Minority shareholdings

Category boundaries

The GHGP[GHGP-2] states that when Scope 3 emissions are significant compared to other sources of emissions, investors should also account for the Scope 3 emissions of the investee company. This guidance recommends that Scope 3 emissions of the investee companies should always be screened. It also aligns with the GHGP [GHGP-2] and encourages telecom operators to investigate to take into account remaining Scope 3 Category 15 emissions.

Moreover, when investee companies are not in the telecommunication sector, separate Scope 1 to 3 accounting is recommended for these investee companies, by sector of activity of investment.

54 Investments are categorised as a downstream Scope 3 Category by GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard, because the provision of capital or financing is seen as a service provided by the telecommunication operator.
55 See chapters 3 and 4 of the GHG Protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporting-Standard_041613_2.pdf.

Applicability to telecom operators

Depending on the business model and subsequent consolidation approach according to [b-GHGP 2], this Category can be a significant contributor to a telecommunication operator's Scope 3 inventory.

Calculation method

The most accurate approach is to use reported primary emission data from the operations. However, if this is not available, the following alternatives shall be applied:

- Emissions for JVs are calculated as the Scope 1 and 2 emissions (either as reported or if not reported then estimated), plus an estimate of the JVs Scope 3 emissions (based on the pro rata ratio of the reporting companies own Scope 3 or Scope 1 and 2 emissions).
- A proportion of the emissions is allocated to the telecommunication operator based on apportionment using the equity share.
- For a Towerco JV, the proportional allocation of Scope 3 emissions based on its own operations is not considered suitable due to the different nature of operations and the potential for significant overestimation. Towercos include only the building and maintenance of network towers. To estimate Scope 3 emissions, publicly available data or primary data should be used from the Towerco's annual reporting and used to estimate the emissions associated with Categories 1, 2 and 3 that were identified as the most material areas of the footprint.
- Minor shareholdings emissions can be estimated based on the sector-estimated EF, which considers the location of the operations and the share ownership percentage.

The telecommunication operator should strive to exert influence as much as possible on companies that report their emissions in their Scope 3: Category 15 to publish transparent data related to their Scope 1, 2 and 3 emissions.

Reporting

This chapter describes how an organisation should prepare the GHG report to inform external and internal parties. In accordance with ITU-T L.1420[56], the organisation shall consider the following when planning and preparing its energy and GHG report:

- Purpose and objectives of the report.
- Intended use and users of the report.
- Overall and specific responsibilities for preparing the report.
- Frequency of the report.
- Period for which the report is valid.
- Report format.
- Data and information to be included in the report.
- Policy on availability and methods for dissemination of the report.

Reporting on Scope 3 emissions must contain:

- Description of the reporting organisation.
- Reporting period covered, at a minimum annually.
- Documentation of organisational boundaries.
- Documentation of operational boundaries.
- Documentation of Category boundaries.
- Description of the quantification methodologies per Category used within the framework of the study.
- Principles for collection of activity data and EFs per Category.
- Consideration on uncertainty relative to the GHG emissions assessed per Category.
- Results of the Scope 3 GHG emissions assessment, for each of the relevant 15 Categories identified in the GHGP [GHGP-2] and ITU-T L.1420[57].
- Recalculations, including corrections of the corresponding clauses of the previous chapters.

It is recommended that the reporting telecommunication operators pursue at least limited external assurance on their Scope 3 data, while striving for reasonable assurance.

56 ITU (2012), Recommendation ITU-T L.1420 (2012), Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organisations

57 ITU (2012), Recommendation ITU-T L.1420 (2012), Methodology for energy consumption and greenhouse gas emissions impact assessment of information and communication technologies in organisations

Appendix

Application of Supplier-level Allocation Method (economic activity data) – Categories 1 and 2

This Appendix gives formulae and examples for calculations using the Supplier-level allocation method (economic activity data). Note: The numbers used in the examples are fictive and are for illustrative purposes only.

Alternative A

1| EF for a Supplier – total emission approach

Equation A.1 shows how the EF for a Supplier in year Y is calculated with the total emission approach.

EF for Supplier in year Y (CO_2e/currency) =

Σ (Supplier S1, S2, S3 C1-8)$_Y$
÷
(Supplier revenue sales)$_Y$ (A.1)

S1: *Supplier Scope 1;* ***S2:*** *Supplier Scope 2;* ***S3:*** *Supplier Scope 3:* ***Cn:*** *Category n*

Example:

For Y=2020, 3 Mt/€30 billion = 0.1 kgCO_2e/€.

2| Supplier-allocated emission towards an Operator – total emission approach

Equation A.2 shows how Supplier-allocated emissions towards an Operator is calculated with the total emission approach.

Emissions for Supplier-allocated emissions towards Operator in year Y (CO_2e) =

(Operator spend per Supplier)$_Y$
×
(Supplier S1, S2, S3C1-8)$_Y$
÷
(Supplier revenue sales)$_Y$ (A.2)

Example: for Y=2020, €500 million × 3 Mt/€30 billion = 50,000 tonnes CO_2e.

Alternative B

Note: This alternative is mainly intended for supplier's Units. Potentially it could also apply for contact centre services (with emissions specified per centre and country).

Depending on the Supplier's organisational structure and the level of commercial collaboration a Supplier's Unit may be a Business Unit, a Development Unit or similar.

1| EF for Supplier Unit types

This approach allocates the supplier's Category 1 emissions (S3C1) based on the Unit's share of overall procurement, and supplier's Scopes 1 and 2 and Scope 3, Categories 2 to 8, based on the proportion of Unit in sales by the supplier. These are then divided by revenue of the sale of the Unit to derive an EF for the Unit.

Equation B.1 shows how the EF for Supplier Unit type n in year Y is calculated.

(CO_2e/currency)$_{U.\ n,\ Y}$ (CO_2e/currency) =

((Share of Supplier's total procurement)$_{U.\ n,Y}$
×
Supplier S3C1$_Y$
+
(share of Supplier's sales compared to total sales)$_{U.n,Y}$
×
Supplier S1.2, S3C2-8$_Y$))
÷
(revenue sales)$_{Un,Y}$ (B.1)

Examples:

Unit type 1 in year Y=2020, ((60% × 2 Mt + 50% × 1 Mt))/€15 billion = 0.113 kg CO_2e/€.

Unit type 2 in year Y=2020, ((40% × 2 Mt + 50% × 1 Mt))/€15 billion = 0.0866 kgCO_2e/€.

2| Supplier-allocated emissions towards Operator – Unit allocation emission approach

Equation B.2 shows how Supplier-allocated emissions towards the telecommunication operator is calculated for year Y with the Unit allocation emission approach.

Supplier allocation to Operator upstream Scope 3Y (CO_2e) =

$$\sum(CO_2e/currency)_{U.n,Y} \times (Operator\ purchase\ from\ Supplier,\ currency)_{Un,Y} \quad (B.2)$$

Example: Unit type 1 and Unit type 2 in year 2020. 0.113 $kgCO_2e$/euro × €325 million + 0.0866 $kgCO_2e$/euro × € 175 million = 51.88 $ktCO_2e$ = 51 880 tCO_2e.

3| EF for a Supplier (aggregation of equipment) – Supplier Unit approach

Equation B.3 shows how the EF for a Supplier towards an Operator in year Y is calculated with the Supplier Unit approach.

(Supplier EF towards Operator)Y (CO_2e/currency) =

$$\sum(CO_2e/currency)_{Un,Y} \times Operator\ purchase\ share\ from\ Supplier,\ \%)_{U.n,Y} \quad (B.3)$$

Example: Unit 1 and 2 in year 2020. 0.113 kg CO_2e/€ × 65% + 0.0866 $kgCO_2e$/€ × 35% = 0.103 $kgCO_2e$/€.

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