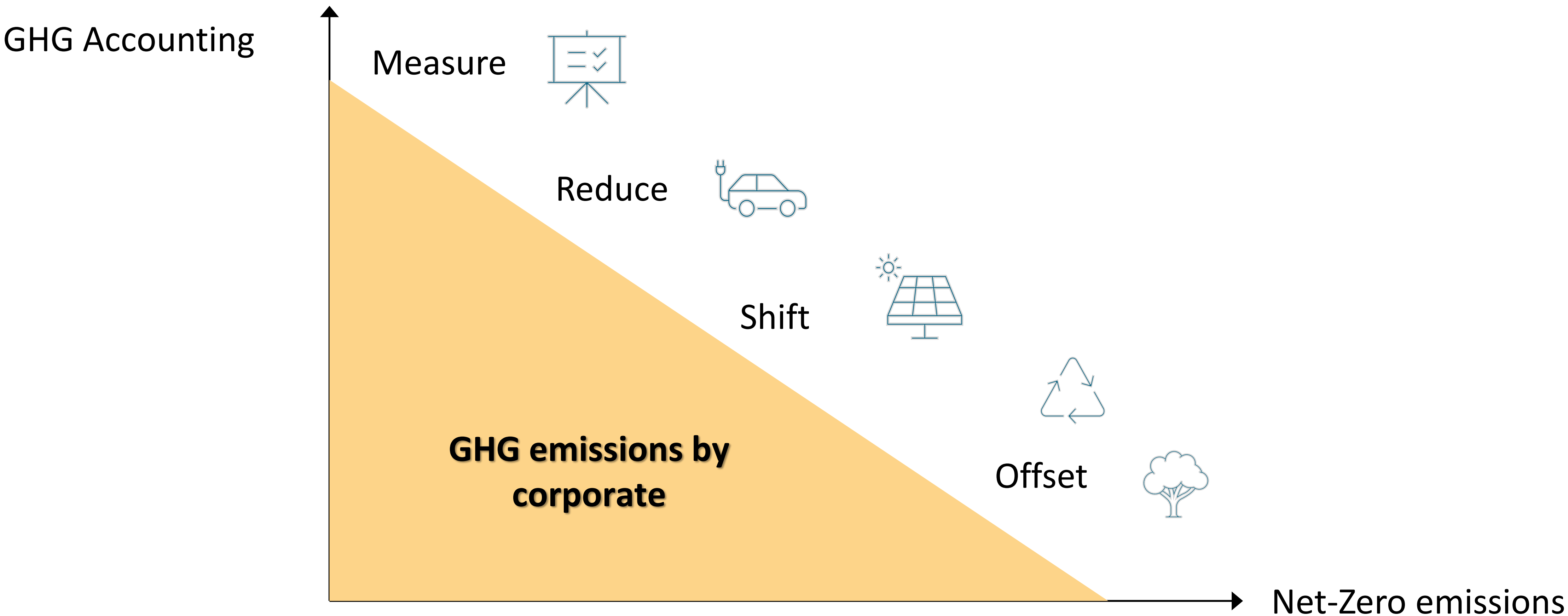
CARBON ACCOUNTING MANUAL GUIDE

For the calculation of BJC's greenhouse gas emissions

The purpose of this document is to provide additional details on the calculation methodology for Scope 1, 2, and 3 greenhouse gas (GHG) emissions of Berli Jucker Public Company Limited and its subsidiaries.

Why GHG Accounting



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Why GHG Accounting

- Tracking, verifying, and achiving corporate social responsibility goals
- Identifying opportunities to reduce waste and costs
- Benchmarking performance and identifying opportunties to improve comtetitiveness
- Participating in GHG emission markets
- Providing information to shareholders and stakehoders
- Participating in GHG reporting programs
- Assessing risk and liabilities and preparing for furture GHG policies

Standards

BJC

CDP

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

GRI

SEC

องค์กร rganization 2

ISO

ISO 14064

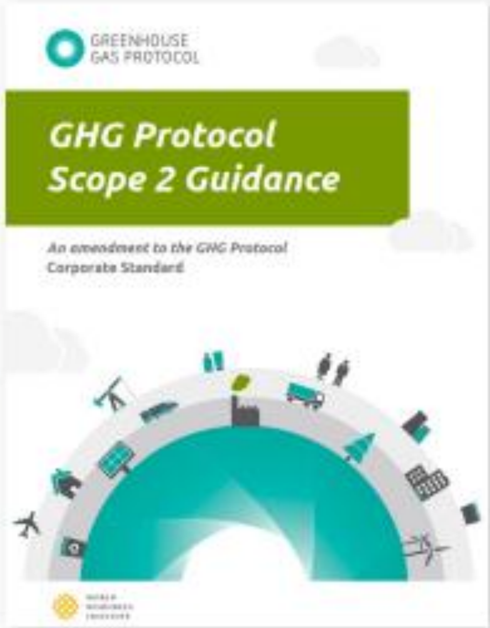
GREENHOUSE GAS PROTOCOL

Report Standard

Measure Standard

GHG protocol for inventory development

The Corporate Standard
Requirements and guidance for company-level GHG accounting



Scope 2 Guidance
Guidance for accounting for scope 2 emissions

Scope 3 Standard
Requirements and guidance for scope 3 accounting

Scope 3 Technical Guidance
Detailed guidance on calculating emissions for scope 3 categories

GHG Protocol standards available at: http://www.ghgprotocol.org/

GHG Accounting Principals

GREENHOUSE GAS PROTOCOL

Relevance	GHG inventories must contain information that internal and external users need for decision making
Completeness	Make a good faith effort to provide a complete, accurate, and consistent accounting of emissions
Consistency	Comparable data needed to track emissions over time
Accuracy	Data credible enough to use in decision making, calculations neither over nor under actual values, and uncertainties as far as practicable
Transparency	Disclose emissions info clearly, factually and neutrally

GHG accounting process

Set boundaries → Identify activities → Collect data → Calculate → Report → Manage quality

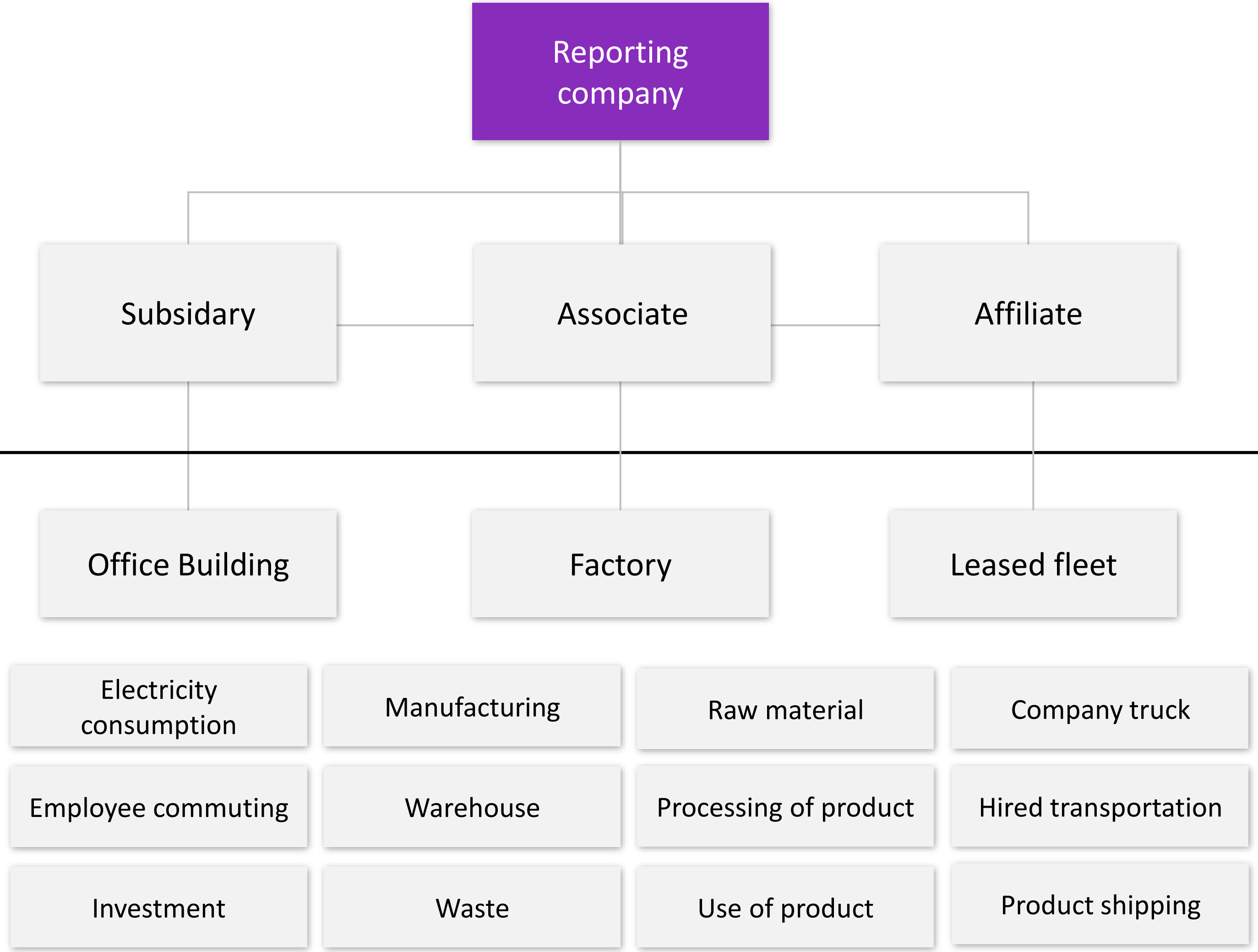
Boundaries

Organizational boundaries

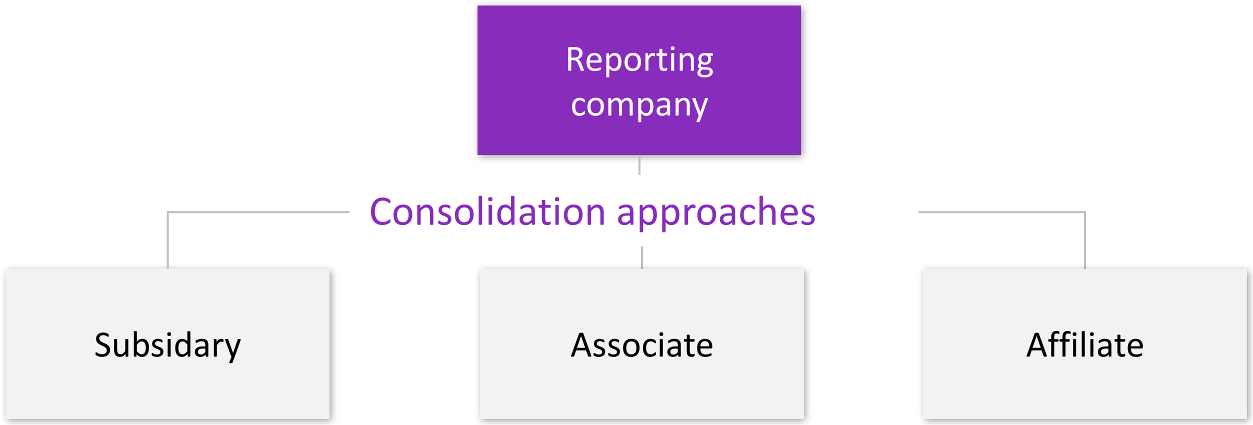
Organizartional boundarties determine which operations are owned or controlled by the company and therefore should be included in the inventory

Operational boundaries

Operational boundarties determine which operations and sources generate emissions, and which sources should be included in the inventory, and how these sources should be classified



Organizational boundaries



Consolidation approach	Definition	GHG Accounting
Equity share	% ownership	% owned
Financial control	Directs financial and operating policies to gain economic benefits	If YES: 100% If NO: 0% If joint: % Owned
Operational control	Authority to introduce and implement operating policies	If YES: 100% If NO: 0%

GHG Reporting Standards

Generally accepted GHG accounting principles provide a standardized framework for accurately reporting a company's GHG emissions. BJC group calculates its GHG emissions in line with the guidelines set by the Greenhouse Gas Protocol

- For Scope 1 and Scope 2 Emissions Reporting: BJC follows the GHG Protocol Corporate Standard and Scope 2 Guidance for these emissions.
    - Scope 1: Direct GHG emissions from sources that BJC owns or controls.
    - Scope 2: Indirect GHG emissions from the generation of electricity, heat, or steam that is produced off-site but purchased by BJC and its subsidiaries.
- For Scope 3 Emissions Reporting: Indirect GHG emissions from sources not owned or controlled by BJC but related to its activities. This includes emissions from product use, vendor supply chains, delivery services, outsourced activities, and employee travel and commuting (excluding travel within BJC’s transportation fleet).

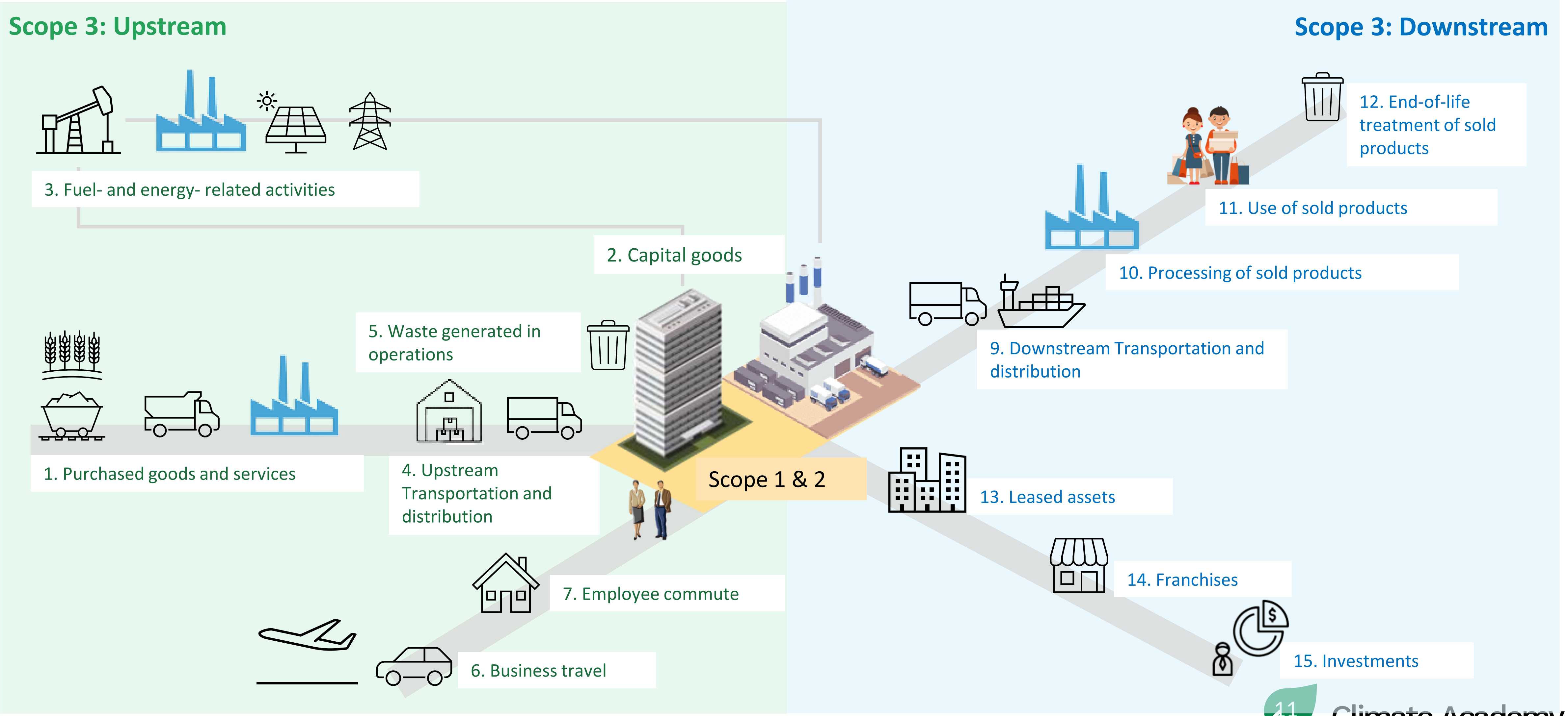
Although GHG accounting and reporting standards are continuously evolving, BJC adheres to principles derived from generally accepted financial accounting and reporting principles. These principles include relevance, completeness, consistency, transparency, and accuracy.

Operational boundaries

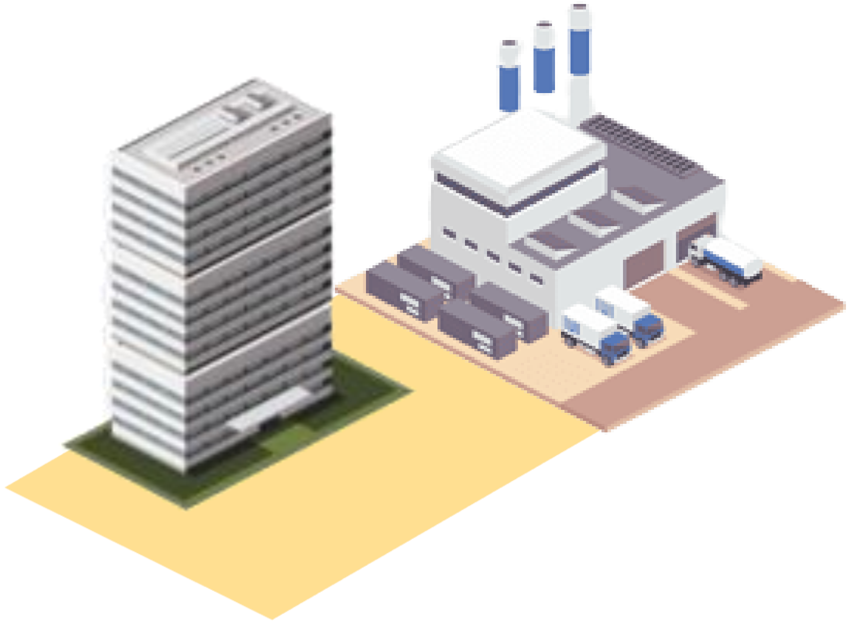
Scope 1: Direct emissions from sources that are owned or controlled by the company

Scope 2: Indirect emissions from the generation of purchased energy

Scope 3: All other indirect emissions from a company's value chain



Scope 1: Direct GHG emissions



Mobile combustion

GHG emissions resulting from the burning of fossil fuels in mobile sources that are owned or controlled by the reporting company such as vehicles, airplanes, ships, and trains. It includes the combustion of fuels like gasoline, diesel, and aviation fuel

Stationary combustion

GHG emissions from the burning of fossil fuels in stationary sources that are owned or controlled by the reporting company like power plants, industrial boilers, residential heating systems, and commercial furnaces. This includes the combustion of fuels such as coal, oil, natural gas, and biomass

Fugitive emissions

GHG emissions that occur during the production, processing, transportation, storage, and use of fossil fuels or other industrial processes that are owned or controlled by the reporting company . These emissions can come from leaks in air conditioning system, pipelines, storage tanks, or equipment's.

In-boundary waste treatment

GHG emissions that occur during the process of waste and wastewater treatment that are owned or controlled by the reporting company

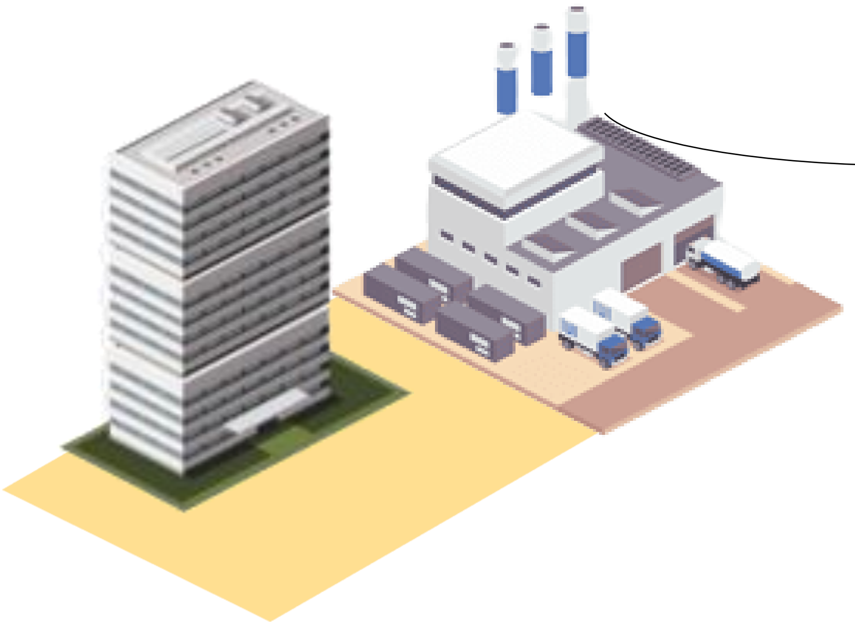
Other direct emissions

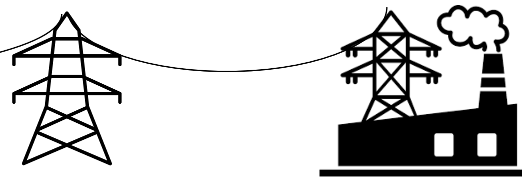
Other emissions include emissions from certain Industrial and agriculture processes

Scope 2: Indirect GHG emissions from energy use

Purchased electricity

GHG emissions from the generation of purchased electricity that is consumed in its owned or controlled equipment or operations





Purchased stream

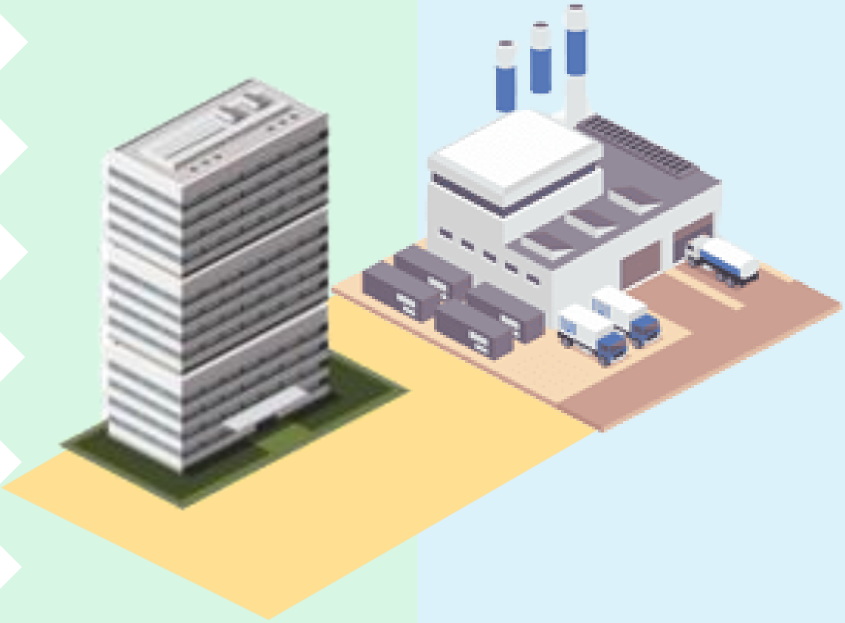
GHG emissions from the generation of purchased stream that is consumed in its owned or controlled industrial processes

Scope 3: Other indirect emisions

Upstream

Downstream

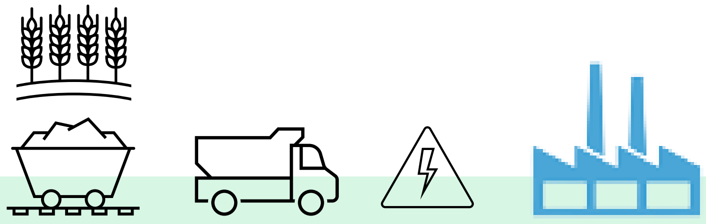
- 1- Purchased goods and service
- 2- Capital goods
- 3- Fuel and energy-related activities
- 4- Upstream transportation & distribution
- 5- Waste generated in operations
- 6- Business travel
- 7- Employee commuting
- 8- Upstream leased assets



- 9- Downstream transportation & distribution
- 10- Processing of sold products
- 11- Use of sold products
- 12- End of life treatment of sold products
- 13- Downstream leased assets
- 14- Franchises
- 15- Investments

Category 1 : Purchase goods and services

Emissions from extraction, production, and transportation of goods and services purchased or acquired by the reporting company in the reporting year, not otherwise included in Categories 2 - 8



Goods and services

All upstream (cradle-to-gate) emissions of purchased goods and services

Examples

- Cradle-to-gate emissions from raw material purchchased by a manufacturer
- Cradle-to-gate emissions Products for sale at a supermarket
- Cradle-to-gate emissions fresh food and produce pruchased by a restaurant

Calculation method

Supplier-specific

Product-level cradle-to-gate GHG investor data from suppliers

Hybrid method

Combination of supplier-specific activity data and seondary data to fill the gap

Average-data method

Collect data on the mass or other relevant units of goods and services purchased and multiply by the relevant secondary emission factors

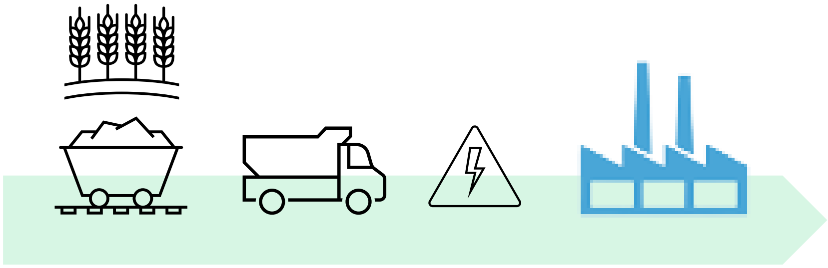
Spend-based method

Collect data on the economic value of goods and services purchased and multiply it by relevant secondary emission factors (EEIO data)

Category 2 : Capital goods

Emissions from extraction, production, and transportation of capital goods purchased or acquired by t he reporting company in the reporting year

Capital goods: Final products that have an extended life and are used by the company to manufacturer the product, provide a service, or sell, store, and deliver machindise. Companies should follow their own accounting classification as to which products are considered capital goods



Capital goods

All upstream (cradle-to-gate) emissions of purchased goods and services

Examples

- Embodied carbons from a construction of new building
- Life cycle emissions of machines bought by a manufacturer vehicles bought

Calculation method

Supplier-specific

Product-level cradle-to-gate GHG investor data from suppliers

Hybrid method

Combination of supplier-specific activity data and seondary data to fill the gap

Average-data method

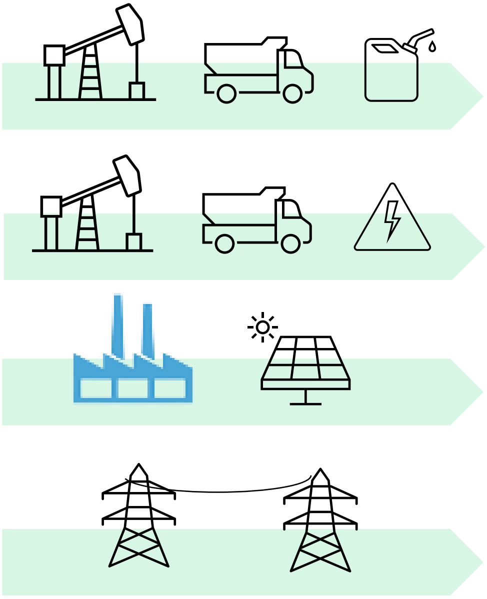
Collect data on the mass or other relevant units of goods and services purchased and multiply by th relevant secondary emission factors

Spend-based method

Collect data on the economic value of goods and services purchased and multiply it by relevant secondary emission factors (EEIO data)

Category 3 : Fuel- and energy- related activities

Emissions from extraction, production, and transportation of fuels and energy purchased and acquired by the the reporting company in the reporting year, not already accounted for in scope 1 and scope 2



1. Upstream emissions of purchased fuel
   Cradle-to-gate emissons excluding combustion
2. Upstream emissions of purchased electricity Cradle-to-gate excluding combustion
3. Generation of purchased electrcity that is sold to end users
   Emissions from the generation
4. Transmission and distribution losses
   Cradle-to-gate emissions including combustion

Calculation method

Supplier-specific

Collect data from fuel providers on upstream emissions of fuel consumed by the reporting company

Average-data method

Estimate emissions by using secondary (e.g. industry average) emission factors for upstream emissions per unit of consumption

Category 4 : Upstream transportation and distribution

- Emissions from transportation and distribution of products purchased by the reporting company in the reporting year between a company's tier 1 suppliers and its own operation <u>(in-bound transportation)</u>
- Emissions from <u>transportation and distribution services purchased</u> by the reporting company in the reporting year both in-bound and out-bound
- Transportation and distribution activites include: air, rail, road, waterborne transport, and warehouse

Calculation method

Fuel-based method

Determine or estimating the amoung of fuel consumed and apply the appropiate emission factor for that fuel

Distanced-based method

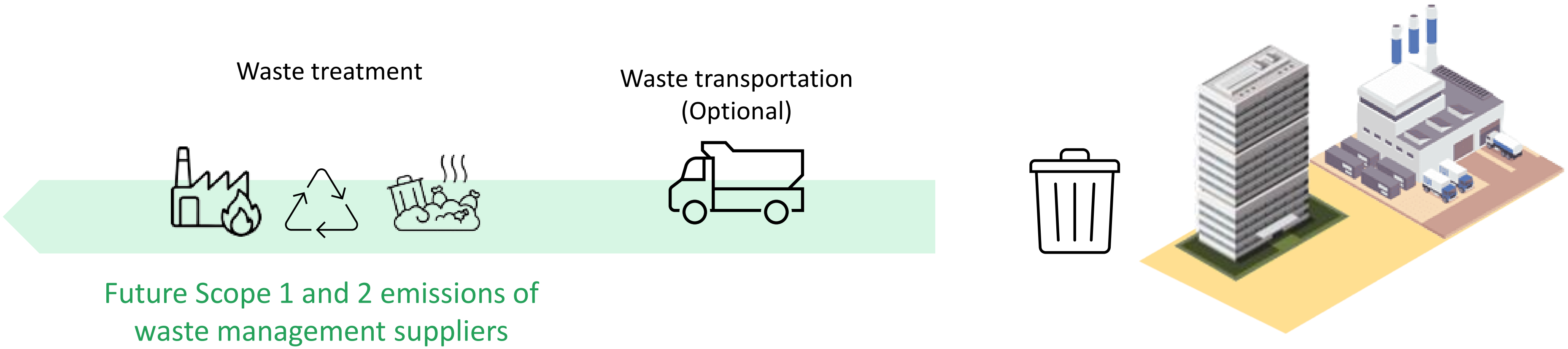
Determine the mass, distance, and mode of each shipment, then apply the appropiate mass-distnce emission factor for the vehicle used

Spend-based method

Determine the amount of money spent on each mode of business travel

Category 5 : Waste generated in operations

- Emissions from disposal of both solid waste and wastewater
- Emissions from transportatioon of waste (optional)



Calculation method

Supplier-specific method

Collect waste-specific scope 1 and 2 emisions data directly from waste treatment companies

Wqste-type-specific method

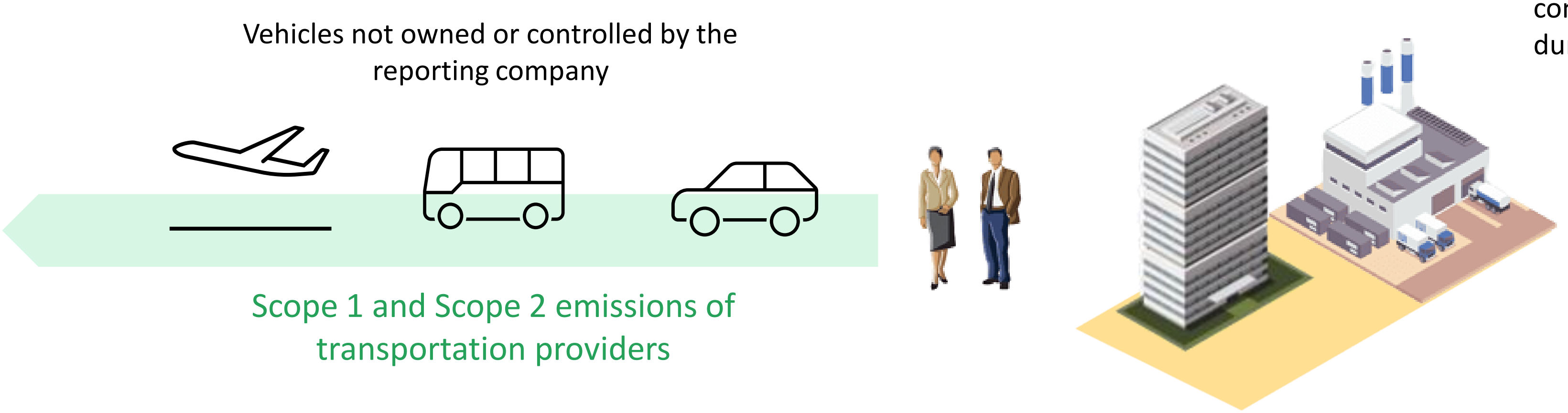
Use emission factors for specific waste types and waste treatment methods

Average-data method

Estimate emissions based on total waste going to each disposal method and average emission factors for each disposal method

Category 6 : Business travel

- Emissions from transportartion of employees for business related activities in vehicles owned and operated by thrid parties
- Business travel include: air, rail, bus, car, and hotel stays



Examples:

Emissions from flights travelled by company's executives on business trips during the reporting year

Calculation method

Fuel-based method

Determine or estimate the amoung of fuel consumed and applying the appropiate emission factor for that fuel

Distanced-based method

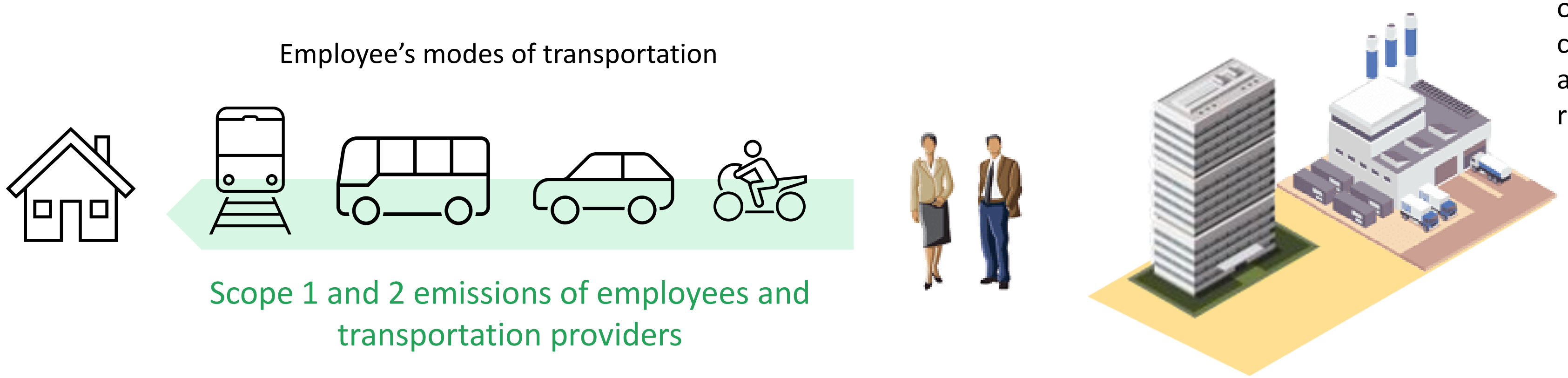
Determine the mass, distance, and mode of each shipment, then applying the appropiate mass-distnce emission factor for the vehicle used

Spend-based method

Determine the amount of money spent on each mode of business travel

Category 7 : Employee commuting

- Emissions from transportation of employees between home and their work sites
- Minimum boundary: Scope 1 and Scope 2 emissions of employees and transportation providers that occur during use of vehicles



Examples:

Emissions from fuel combustion of employee’s owned vehicles proportionate to the commutting between the reporting company and the employees’ home during the reporting year

Calculation method

Fuel-based method

Determine or estimating the amoung of fuel consumed and applying the appropiate emission factor for that fuel

Distanced-based method

Determine the mass, distance, and mode of each shipment, then applying the appropiate mass-distnce emission factor for the vehicle used

Spend-based method

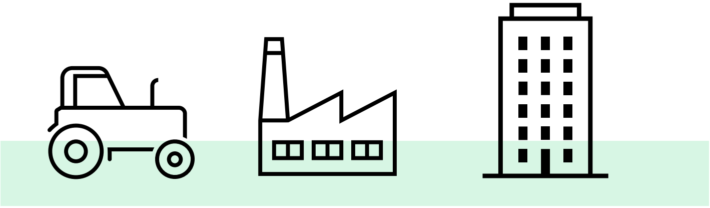
Determine the amount of money spent on each mode of business travel

Category 8 : Upstream leased assets

- Emissions from operation of assets leased from a thrid party company, that are not included in the reporting company's Scope 1 and Scope 2
- Minimum boundary: Scope 1 and Scope 2 emissions of lessors that occur during the reporting company's operation of leased assets

Examples: Emissions associated with electricity used in a leased office which is not already included in the reporting company's scope 1 and 2

Leased assets



Scope 1 and 2 emissions of lessors that occur during company's operation of leased assets

Whether leased assets are included in scope 1 and 2 or scope 3 depends on the type of lease and the consolidation approach the company chose

	Operational control	Financial control	Equity share
Financial lease	Scope 1 2	Scope 1 2	Scope 3
Operational lease	Scope 1 2	Scope 3	Scope 3

Calculation method

Asset-specific method

Collect asset-specific fuel and energy use data and process and fugitive emission data or scope 1 and 2 emissions data from individual leased assets

Lessor-specific method

Collect the scope 1 and 2 emissions from lessor (s) and allocating emissions to the relevant leased asset (s)

Average data method

Estimat emissions for each leased asset, or group of leased assets, based on average data, such as average emissions per asset type or floor space

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Category 9 : Downstream transportation and distribution

- Emissions from thrid party transportation and distribution of reporting company's products, where it is not an in-bound transportation from a supplier and is <u>not paid for by the reporting company</u>
- Emissions from customers traveling to retail stores (optional)

Examples: Emissions from shipping of the reporting company's products to its customers in other countries, where the shipping cost is paid for by the distributor

Calculation method

Fuel-based method

Determine or estimating the amoung of fuel consumed and applying the appropiate emission factor for that fuel

Distanced-based method

Determine the mass, distance, and mode of each shipment, then applying the appropiate mass-distnce emission factor for the vehicle used

Spend-based method

Determine the amount of money spent on each mode of business travel

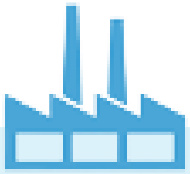
Scope 3

Category 10 : Processing of sold products

Emissions from the processing of intermediate products sold in the reporting year, by downstream third-party companies, after the reporting company sold the products to them

Examples: Emissions from a production of tipe by tire manufacturer where rubber is the intermediate product

Intermediate products



Scope 1 and 2 emisions of thrid-party companies that occur during processing

Final products

End user

Calculation method

Site-specific method

Determine the amount of fuel and electricity used and the amount of waste generated from processing of sold intermediate products by the thrid party and applying the appropiate emission factors

Average-data method

Estimate emissions for processing of sold intermediate products based on average secondary data, such as average emissions per process or per product

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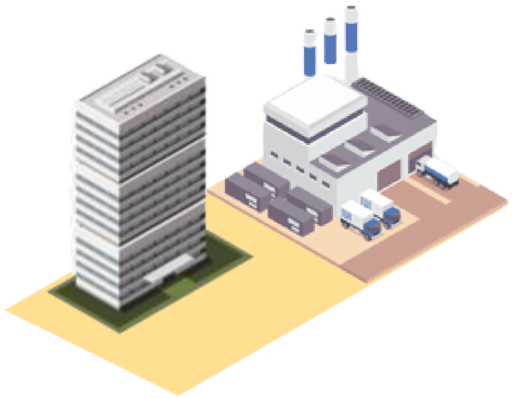
Scope 3

Category 11 : Use of sold products

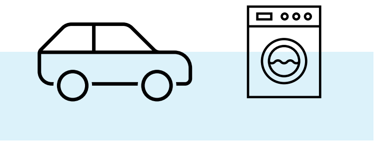
Emissons from the use (by end users) of goods and services sold by the reporting company, over the expected life time of the product

Examples: Emissions from fuel combustion during the expected useful life of a vehicle sold, indirect emissions from the refrigeration of an alcoholic beverage sold by the retailer and the consumer

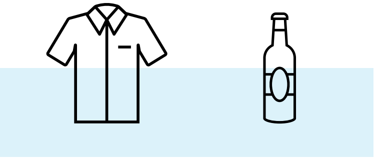


Sold products

End user



Direct use-phase emissions of sold products over their expected life i.e. Scope 1 and 2 emissions of end users



Indirect use-phase emissions of sold products over their expected life i.e. Scope 1 and 2 emissions of energy that indirectly consume during use
(Optional)

Calculation method

Products that consume energy during use

Estimate life time use phase emissions by breaking down the use phase, measuring emissions per product and aggregate emissions

Fuel

Collect fuel use data and multiply them by representative emission factors

GHG that emitted from products during use

Collect data on GHG contained in the product and multiply them by the percent of GHGs relewased and GHG emission factors

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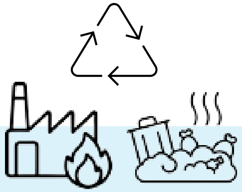
Category 12 : End-of-life treatment of sold products

Emissons from waste disposal and treatment of products sold by the reporting company

Sold products

End user

Waste treatment



Future Scope 1 and Scope 2 emissions of waste management companies that occur during disposal or treatment

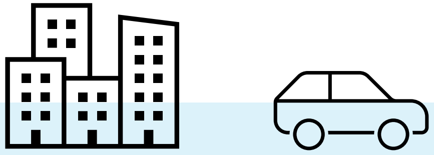
Calculation method

Supplier-specific method	Waste-type-specific method	Average-data method
Collect waste-specific scope 1 and 2 emisions data directly from waste treatment companies	Use emission factors for specific waste types and waste treatment methods	Estimate emissions based on total waste going to each disposal method and average emission factors for each disposal method

Category 13 : Downstream leased assets

Emissons from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year, not included in Scope 1 and Scope 2 of the lessor

Leases



Scope 1 and Scope 2 emissions of lessees that occur during operation of leased assets

Whether leased assets are included in scope 1 and 2 or scope 3 depends on the consolidation approach of the reporting company

Operational control	Financial control	Equity share
Scope 3	Scope 3	Scope 1 2

Calculation method

Asset-specific method

Collect asset-specific fuel and energy use data and process and fugitive emission data or scope 1 and 2 emissions data from individual leased assets

Lessor-specific method

Collect the scope 1 and 2 emissions from lessor (s) and allocating emissions to the relevant leased asset (s)

Average data method

Estimate emissions for each leased asset, or group of leased assets, based on average data, such as average emissions per asset type or floor space

Category 14 : Franchises

Emissons from the operation of franchises (by franchisees) not included in the reporting company's Scope 1 and Scope 2

Franchisor

Franchise license

Retailer or restaurant

Franchisee

Scope 1 and Scope 2 emissions of franchises that occur during operation of franchises

Life cycle emissions associated with manufacturing or contructing franchises (Optional)

Calculation method

Franchise-specific method

Collect site-specific activity data or scope 1 and 2 emissions data from franchisees

Average data method

Estimate emissions for each franchise, or group of franchises, based on average statistics, such as average emissions per franchise type or floor space

Category 15 : Investments

Emissons associated with the reporting company’s investments in the reporting year, not included in Scope 1 and Scope 2

- Equity
- Debt
- Project fiance

Investee

Scope 1 and 2 emissions of investees that occur during the operations of the investments

Investments may be included in a company’s Scope 1 and Scope 2 depending on its organizational boundary

Equity investments	Operational control	Financial control	Equity share
Under company’s control	Scope 1 2		Scope 1 2
Not company’s control	Scope 3		Scope 1 2

Calculation method

Equity investments

Account for proportional scope 1 and 2 emissions of the investment that occur in the reporting year

% Equity ownership x (scope 1 + 2)

Debt investments (Known use of proceeds)

Account for proportional scope 1 and 2 emissions of the investment that occur in the reporting year

Debt investment / (Total debt + Total equity*) x (scope 1 + 2)

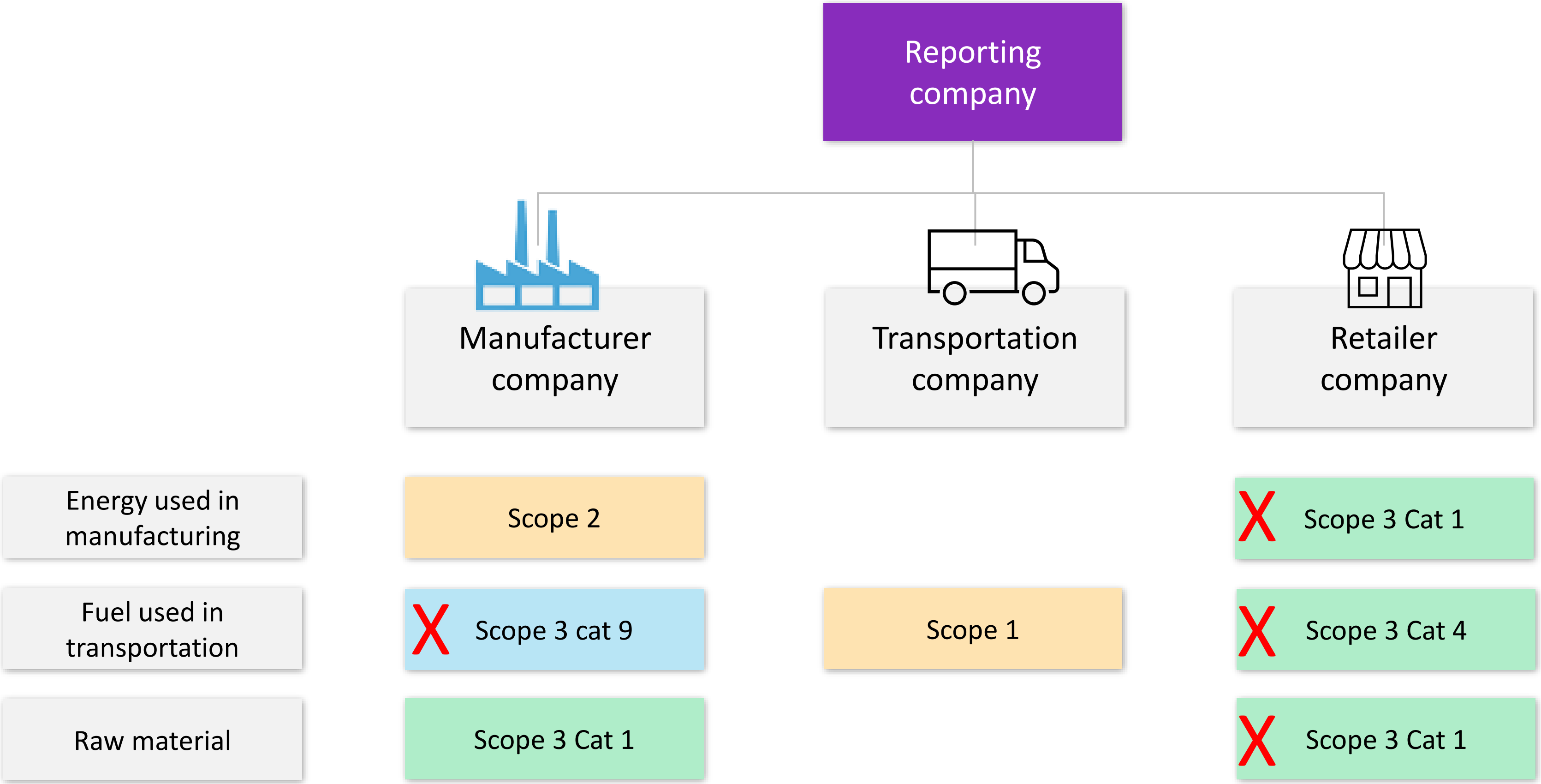
* Market Capitalization for publicly listed company

Project finance

If the reporting company is an initial sponsor or lender of a project, also account for the total projected lifetime scope 1 and 2 emissions projects financed during the reporting year (report seperately from scope 3

Double Counting

Reporting company MUST avoid double counting of emissions from the same activity as it consolidates emissions of the companies with related transactions within the group



Identifying activities

1. Create list of activites
2. Create list of purchased and sold good and services
3. Create list of suppliers

Prioritize data collection

Company should consider these elements as it priorities data collection

1. Most signification GHG emissions produced
2. Most significant reductions expected
3. Most relevant to company's business goals

Company can further screen the actities and products with these approaches

1. Emission-based screening
   Screen activities and products by their total emissions
2. Financial-based screening
   Screen activities and products by their economic value
3. Other criteria

Other criteria for identifying relevant activities

Criteria	Description
Size	They contribute significantly to the company's total anticipated scope 3 emissions (see section 7.1 for guidance on using initial estimation methods)
Influence	There are potential emissions reductions that could be undertaken or influenced by the company (see box 6.2)
Risk	They contribute to the company's risk exposure (e.g., climate change related risks such as financial, regulatory, supply chain, product and customer, litigation, and reputational risks) (see table 2.2)
Stakeholders	They are deemed critical by key stakeholders (e.g., customers, suppliers, investors, or civil society)
Outsourcing	They are outsourced activities previously performed in-house or activities outsourced by the reporting company that are typically performed in-house by other companies in the reporting company's sector
Sector guidance	They have been identified as significant by sector-specific guidance
Other	They meet any additional criteria for determining relevance developed by the company or industry sector

Source: Table 6.1 from the Scope 3 Standard

Emissions calculation

Emissions = AD x EF **x** Global Warming Potential (GWP) **=** carbon dioxide equivalent (CO_2e) of emissions

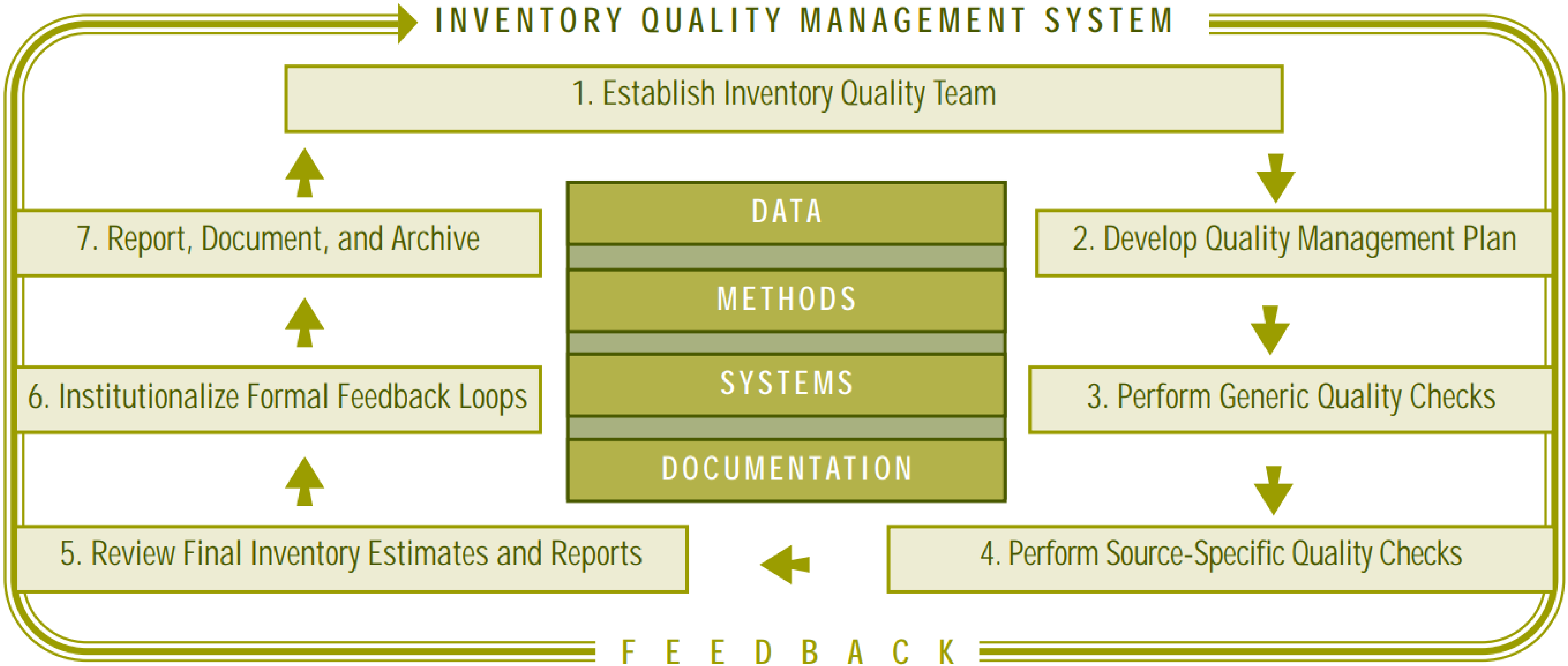
Activity Data (AD) = Data which combines information on the extent to which a human activity takes place

Emission factor (EF) = Coefficients which quantify the emissions or removals per unit activity

GHG	GWP
CO_2	1
CH_4	28
N_2O	265
HFCs	4 - 12,400
PFCs	6,690 - 11,100
SF6	23,500
NF3	16,100

Source: IPCC, AR5

Managing GHG inventory quality



BJC

Identify Scope 3 activities of BJC - Upstream emissions

Category	BJC HQ	Big C	BIGC DC	BJC Move	BJL	BJF	CPC	RIL	TBC	TGI	TMG
1. Purchase goods and services	√	√	√	√	√	√	√	√	√	√	√
2. Capital goods	√	√	√	√	√	√	√	√	√	√	√
3. Fuel and energy-related activities	√	√	√	√	√	√	√	√	√	√	√
4. Upstream transportation & distribution		√	√	√	√	√	√	√	√	√	√
5. Waste generated in operations	√	√	√	√	√	√	√	√	√	√	√
6. Business travel	√	√	√	√	√	√	√	√	√	√	√
7. Employee commuting	√	√	√	√	√	√	√	√	√	√	√
8. Upstream leased assets											

Identify Scope 3 activities of BJC - Downstream emissions

Category	BJC HQ	Big C	BIGC DC	BJC Move	BJL	BJF	CPC	RIL	TBC	TGI	TMG
9. Downstream transportation & distribution		√									
10. Processing of sold products											
11. Use of sold products		√									
12. End of life treatment of sold products		√				√	√	√	√	√	√
13. Downstream leased assets											
14. Franchises											
15. Investments	√										

Remark:

	Name code	**Business group**
Berli Jucker Foods Ltd.	BJF	Consumer
Berli Jucker Cellox Co., Ltd.	CPC	Consumer
Rubia Industries Ltd.	RIL	Consumer
Thai Beverage Can Co., Ltd.	TBC	Packaging
Thai Glass Industries PLC	TGI	Packaging
Thai Malaya Glass Co., Ltd.	TMG	Packaging
Big C Supercenter PLC	BIG C	Retail
Big C Distribution	BIG C DC	Others
BJC Move	BJC MOVE	Retail
Berli Jucker Logistics Co., Ltd.	BJL	Retail

Remark for scope 3 GHG emission of BJC Group

No	Category	Related activities
1	Purchased goods and services	Items purchased from Big C for resale, raw materials for manufacturing BJF, CPC, RIL, TBC, TGI, and TSS, as well as water and office supplies within the BJC Group.
2	Capital goods	Acquisition of equipment and tools, and establishment of new branches under Big C. Some parts not reported due to missing emission factor data. reported due to the lack of data on emission factors.
3	Fuel- and energy related activities	Electricity and fuel usage in scope 1 and Scope 2
4	Upstream transportation and distribution	Transportation of raw materials and products
5	Waste generated in operations	Third-party disposal and treatment of waste including landfill, Incineration without energy recovery and wastewater treatment
6	Business travel	Transportation of employees for business-related activities by car
7	Employee commuting	Employee commuting to and from work by car, motorcycle, and shuttle bus
8	Upstream leased assets	Electricity used in leased buildings
9	Downstream transportation and distribution	Transportation of finished products from manufacturing facilities to customers or distribution centers
10	Processing of sold products	-
11	Use of sold products	The energy consumption or emissions associated with the use of products by customers
12	End-of-life treatment of sold products	End-of-life treatment of sold products takes place in companies whose products are packaged for example BJF, CPC, RIL, TGI
13	Downstream leased assets	Electricity usage of the tenants.
14	Franchises	Electricity used of franchises
15	Investments	Emissions occur but have not been estimated for BJC HQ

BJC

Remark for scope 3 GHG emission of BJC Group

No	Category	Exclusion
1	Purchased goods and services	Logistic businesses are excluded from this category due to nonrelevant to purchased goods and services. Only Items purchased from Big C for resale, raw materials for manufacturing BJF, CPC, RIL, TBC, TGI, and TSS are calculated.
2	Capital goods	Packaging, Consumer, and Logistic & Engineering businesses are excluded from this category due to nonrelevant to capital goods.
3	Fuel- and energy related activities	No material exclusions
4	Upstream transportation and distribution	Upstream transportation and distribution by company within BJC Group are excluded to avoid double counting at group level.
5	Waste generated in operations	Logistic businesses are excluded from this category due to nonrelevant to waste generated in operations. Emissions from the transportation of waste are excluded from this category due to insufficient data to estimate emissions.
6	Business travel	Retail businesses and air travel activity are excluded from this category due to insufficient data to estimate emissions
7	Employee commuting	Emissions from employee teleworking are excluded from this category due to staff working from home being a minority.
8	Upstream leased assets	Retail, Packaging, Consumer and Engineering businesses are excluded from this category due to nonrelevant to upstream leased assets.

Remark for scope 3 GHG emission of BJC Group

No	Category	Exclusion
9	Downstream transportation and distribution	Retail businesses are excluded from this category due to nonrelevant to downstream transportation and distribution. Only the transportation of finished products from manufacturing facilities to customers or distribution centers are included. Downstream transportation and distribution by company within BJC Group are excluded from this category to avoid double counting at group level.
10	Processing of sold products	Processing of sold products is considered irrelevant to BJC's business because it sells a final product that does not undergo any additional processing before being sold to the end-user.
11	Use of sold products	GHG emissions performance of Category 11 (use of sold products) are included in Category 1 (Purchased goods and services)
12	End-of-life treatment of sold products	Retail and Logistic businesses are excluded from this category due to nonrelevant to End of life treatment of sold products.
13	Downstream leased assets	Not include downstream leased assets by company within BJC Group to avoid double counting at group level
14	Franchises	Packaging, consumer, and logistic businesses are excluded from this category due to nonrelevant to franchises.
15	Investments	The data is not available for FY 2022 because BJC has only collected the relevant information from its subsidiaries.