



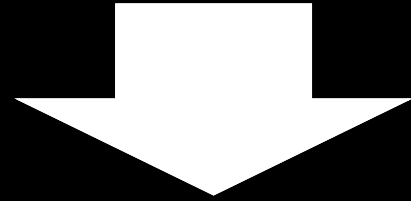
**2022-2023 Spring Term**  
**Green transition from international and European  
perspective**

# **Decarbonisation & Business**

**Lecture 2 | 30 March 2023**  
**Marina Olshanskaya & Aleksandra Noviko**



PARIS ACCORD: NET ZERO CARBON EMISSIONS BY 2050 GLOBALLY



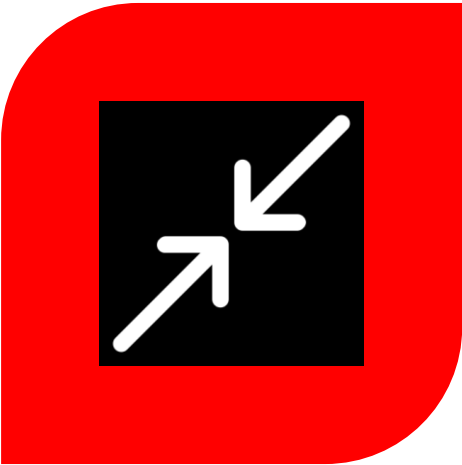
**EVERY BUSINESS** will have to learn how  
to manage its  
carbon footprint and create value from  
climate actions

# CARBON EMISSION MANAGEMENT

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**MEASURE**



**REDUCE**



**COMPENSATE**



**CARBON FOOTPRINT**

# What is carbon footprint

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The total amount of greenhouse gases (GHG) that are emitted into the atmosphere by an organization or company, either **directly or indirectly**.

Greenhouse gases (GHG) include:

- **Carbon dioxide (CO<sub>2</sub>)**
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF<sub>6</sub>)
- Some other “rare” gases

# Standards and methodological guidelines

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## GHG Protocol

The GHG Protocol recognized as the most widely used international accounting tool for business sector.



GREENHOUSE  
GAS PROTOCOL

## IPCC Guidelines

Intergovernmental Panel on Climate Change (IPCC) Guidelines (2006 and 2019 refinement) for national GHG inventories

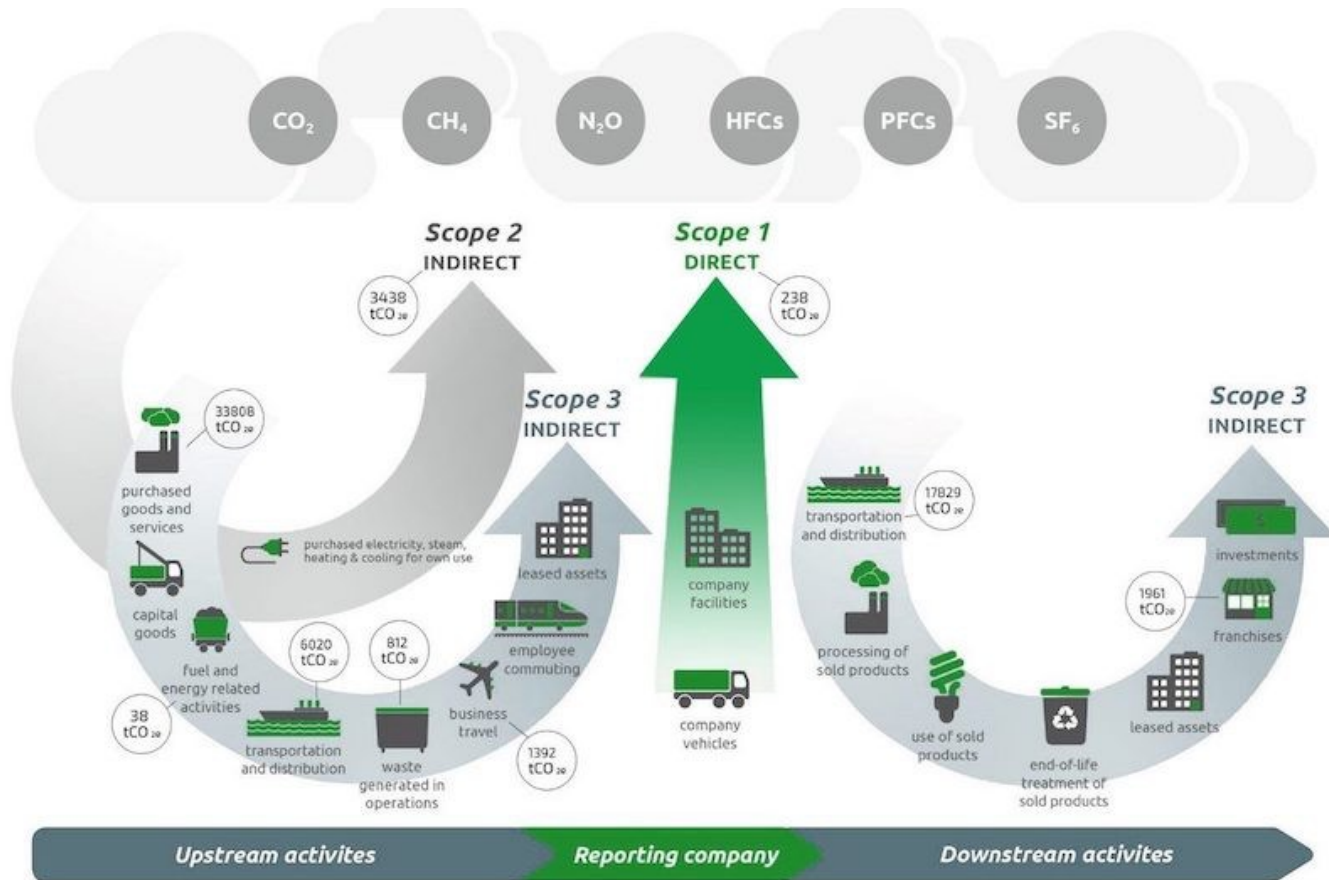


# GHG Protocol Corporate Accounting Standard

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The GHG Protocol Corporate Accounting and Reporting Standard provides requirements and guidance for companies preparing a corporate-level GHG emissions inventory. GHG Protocol categories all corporate emissions under three scopes, as follows:

- **Scope 1:** Direct emissions related to an organization's operation, activities and processes (e.g. gas and transport fuels)
- **Scope 2:** Indirect emissions derived from electricity used for a company's operation (lighting, appliances and equipment, cooling)
- **Scope 3:** Indirect emissions from company's value chain, upstream and downstream



Upstream scope 3 emissions

Category 1: Purchased goods and services

Category 2: Capital goods

Category 3: Fuel- and energy-related activities (not included in scope 1 or scope 2)

Category 4: Upstream transportation and distribution

Category 5: Waste generated in operations

Category 6: Business travel

Category 7: Employee commuting

Category 8: Upstream leased assets

Other

Downstream scope 3 emissions

Category 9: Downstream transportation and distribution

Category 10: Processing of sold products

Category 11: Use of sold products

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

Category 13: Downstream leased assets

Category 14: Franchises

Category 15: Investments<sup>2</sup>

Other

# Which emissions are material and should be covered?

| GHG Measurement and Reporting Resource   | Suggested Threshold of Significance  | Terms Used   | Commentary  |
|--|--|--|---|
| Climate Registry   | 5% of Scope 1 and 2 Emissions  | Materiality Threshold, Material Misstatement                           | Refers to "avoidable errors"  |
| UNEP Common Carbon Metric  | Not indicated  | None   | Indicates to include fugitive emissions if available, while transport emissions are excluded  |
| GHG Protocol Corporate Accounting  | Determined individually, 5% of total inventory for the part of the organization being verified       | Materiality Threshold, Material Discrepancy                            | Company may determine its own threshold in collaboration with a third party verifier, and specific emissions may be material even if they are under 5%.                       |
| GHG Protocol Life Cycle Accounting and Reporting Standard                      | Determined individually  | Quantitative Materiality, Materiality Threshold, Materially Misleading | "The assurer and reporting company should determine an appropriate threshold or benchmark of materiality during the assurance process." Can be pre-determined by the assurer. |
| GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting standard | Determined individually  | Quantitative Materiality, Materiality Threshold, Materially Misleading | "The assurer and reporting company should determine an appropriate threshold or benchmark of materiality during the assurance process." Can be pre-determined by the assurer. |
| EU Emissions Trading Scheme  | 5% of aggregate emissions for installations less than 500kt, 2% for installations greater than 500kt | Materiality Threshold  | Threshold depends on the project's size   |
| Carbon Disclosure Project (Investor Response)                                  | Not Indicated  | Not referenced   | Requests that emissions not included are mentioned in the questionnaire   |
| ISO 14046-1:2006   | Determined individually  | Material Discrepancy   | "Acceptable materiality is determined by the validator, verifier or GHG programme, based on the agreed level of assurance."   |
| PAS 2050:2008  | 1%   | Material Contribution  |   |
| UK Carbon Reductions Commitment Energy Efficiency Scheme                       | Emissions above 90% or above the % total of core emissions + ETS Emissions + CCA Emissions*          | Residual Percentage  | Determined by a calculation and must include a Residual Measurement List if regulated emissions do not meet the residual percentage   |



# Material emissions for Scope 3:

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The reporting organization can identify other indirect (Scope 3) GHG emissions by assessing which of its activities' emissions:

- contribute significantly to the organization's total anticipated other indirect (Scope 3) GHG emissions;
- offer potential for reductions the organization can undertake or influence;
- contribute to climate change-related risks, such as financial, regulatory, supply chain, product and customer, litigation, and reputational risks;
- are deemed material by stakeholders, such as customers, suppliers, investors, or civil society;
- result from outsourced activities previously performed in-house, or that are typically performed in-house by other organizations in the same sector;
- have been identified as significant for the organization's sector;
- meet any additional criteria for determining relevance, developed by the organization or by organizations in its sector.

# One formula



## ...But many tiers

| Tier   | Activity Data   | Emission factors   |
|--------|---|--|
| Tier 1 | <ul style="list-style-type: none"><li>• Least precise</li><li>• Used only in cases where more accurate data is unavailable and where the source is secondary such as with some scope 3 emissions</li><li>• E.g.: national average energy use per customer/per m2</li></ul>          | <ul style="list-style-type: none"><li>• available national or international factors such as those provided by the IPCC, UK Gov-nt, Eurostat</li></ul>                                  |
| Tier 2 | <ul style="list-style-type: none"><li>• Medium precision</li><li>• based on estimates or models</li><li>• E.g: engineering estimates of energy use based on system use and design</li><li>• E.g.: quantity of fuel used based on known price paid times average fuel cost</li></ul> | <ul style="list-style-type: none"><li>• intermediate level of complexity and locally specific data</li><li>• a country-specific emission factor for each gas.</li></ul>                |
| Tier 3 | <ul style="list-style-type: none"><li>• Most precise (in case regulatory required)</li><li>• metered energy use</li><li>• quantity of solid waste as weighed at a transfer station</li></ul>  | <ul style="list-style-type: none"><li>• most complex and require the most specific data</li><li>• Technology-specific emission factor</li><li>• For Scope 3: suppliers' data</li></ul> |

# Activity data

| Emission scope | Sources  | Units                | Data Resolution   |
|----------------|--|----------------------|---|
| Scope 1        | Stationary fuel combustion in company's owned or operated generators | l                    | Fuel consumption/year   |
|                | Mobile fuel combustion in company's owned or operated vehicles       | l                    | Fuel consumption/year/per vehicle                             |
|                | Fugitive emissions   | kg                   | Leakage of HFCs from owned and operated chillers and AC units |
| Scope 2        | Purchased secondary energy   | kWh/GCal             | Electricity consumption/year/per facility                     |
| Scope 3        | Company's inputs and outputs   | Tonnes/liters or USD | Quantity (physical or monetary)                               |

# Emission factors

| Fuel                           | Unit         | kg CO <sub>2</sub> e | kg CO <sub>2</sub> | kg CH <sub>4</sub> | kg N <sub>2</sub> O |
|--------------------------------|--------------|----------------------|--------------------|--------------------|---------------------|
| Gas oil                        | tonnes       | <b>3 230,28</b>      | 3 190,00           | 3,29               | 36,99               |
|                                | litres       | <b>2,75857</b>       | 2,72417            | 0,00281            | 0,03159             |
|                                | kWh (Net CV) | <b>0,27318</b>       | 0,26978            | 0,00028            | 0,00313             |
| Petrol (average biofuel blend) | tonnes       | <b>2 947,62</b>      | 2 929,08           | 9,68               | 8,87                |
|                                | litres       | <b>2,19352</b>       | 2,17972            | 0,00720            | 0,00660             |
|                                | kWh (Net CV) | <b>0,24227</b>       | 0,24075            | 0,00080            | 0,00073             |
| Petrol (100% mineral petrol)   | tonnes       | <b>3 153,90</b>      | 3 135,00           | 9,86               | 9,04                |
|                                | litres       | <b>2,33969</b>       | 2,32567            | 0,00732            | 0,00671             |
|                                | kWh (Net CV) | <b>0,25430</b>       | 0,25277            | 0,00080            | 0,00073             |

# Scope 1: Mobile fuel combustion

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- Scope:** Mobile fuel combustion happens in Company's owned or operated vehicles
- Activity data:** Data on the total annual fuel consumption in liters (l)
- Emission factor:** Emission factor (kgCO<sub>2</sub>e/l) for fuel oil has been used from the [UK Government database](#) of GHG reporting conversion factors

## Emissions:

| Vehicle type | Fuel type | Operational control | Fuel consumption, l | Emission factor, kg CO <sub>2</sub> e/l | Emissions, kg of CO <sub>2</sub> -eq. |
|--------------|-----------|---------------------|---------------------|---|---------------------------------------|
| Peugeot 308  | Unleaded  | Yes                 | 790                 | 2,33                                    | <b>1,841</b>                          |

# Scope 2: Purchased electricity

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- Scope:** Emissions from purchased electricity falls under Scope 2 (Indirect emissions). This covers electricity consumption in company's owned and operated facilities , which is used for HVAC, lighting, IT equipment, machinery, among others.
- Activity Data:** Annual data on electricity consumption in individual buildings (electricity bills or meters)
- Emission factor:** National grid emission factor in kgCO<sub>2</sub>e/kWh as reported e.g., by [European Environmental Agency](#)

| Facility   | Country of operation | Electricity consumption, kWh | Emission factor, kg CO <sub>2</sub> e/kWh | Emissions, kg of CO <sub>2</sub> -eq. |
|------------|----------------------|------------------------------|---|---------------------------------------|
| Facility 1 | Germany              | 1,000                        | 0,4                                       | <b>400</b>                            |
| Facility 2 | Kazakhstan           | 1,000                        | 1,1                                       | <b>1,100</b>                          |

# Scope 3: Purchased Goods and Services

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**Scope:** Category 1 Scope 3 entails emissions tied to acquisition of goods and services from external suppliers.

**Activity data:** Data on breakdown of major expenses on goods (such as office equipment, stationery/paper products, computer software, raw materials) and services have to be collected in local currency.

**Emission factor:** Emission factors (kgCO<sub>2</sub>e/EUR) as carbon intensity of spendings has been used from the UK Government latest (2021) database of GHG reporting conversion factors

| Type of purchased goods and services     | Annual expenditures, EUR | Emission factor, kg CO <sub>2</sub> e/EUR | Emissions, kg of CO <sub>2</sub> -eq. |
|--|--------------------------|---|---------------------------------------|
| Paper and paper products                 | 1,000                    | 0,459                                     | <b>459</b>                            |
| Iron and steel                           | 10,000                   | 1,250                                     | <b>11,250</b>                         |
| Building and building construction works | 100,000                  | 0,172                                     | <b>17,000</b>                         |



# Scope 3: Waste generation

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**Scope:** Category 5 Scope 3 entails emissions associated with disposal of company's waste

**Activity data:** Data on the amount, type of waste and its type of disposal

**Emission factor:** Emission factors (kgCO<sub>2</sub>e/tonnes of waste disposed) as carbon intensity of waste disposal has been used from the UK Government latest (2021) database of GHG reporting conversion factors.

| Type of waste | Amount, kg | Type of disposal | Emission factor, kgCO <sub>2</sub> e/t waste | Emissions, kg of CO <sub>2</sub> -eq. |
|---------------|------------|------------------|--|---------------------------------------|
| Paper         | 1,000      | Landfill         | 8,902  | <b>89,020</b>                         |
| Scrap metal   | 1,000      | Re-cycle         | 21,294                                       | <b>212,940</b>                        |
| Scrap metal   | 2,000      | Landfill         | 8,902  | <b>17,804</b>                         |

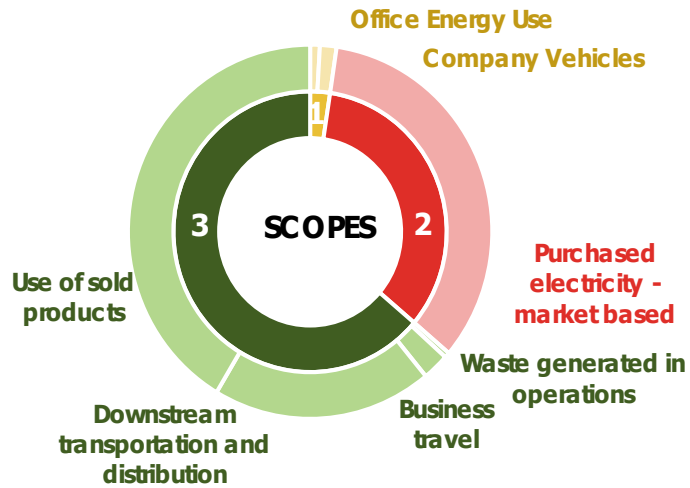
# GHG Emissions Summary



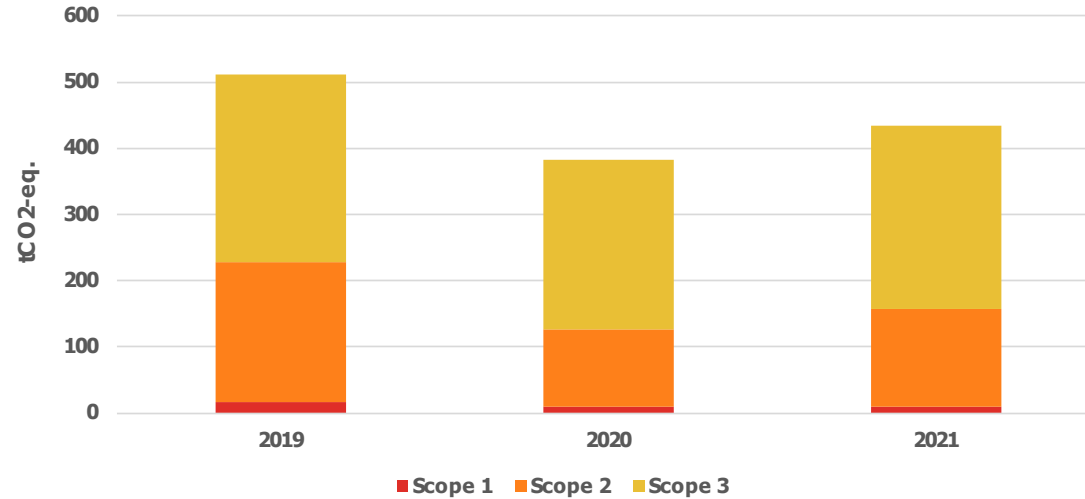
| Scope        | Activity Type                              | 2019                   | 2020          | 2021          |
|--------------|--|------------------------|---------------|---------------|
| Scope 1      | Office Energy Use                          | 3.74                   | 3.69          | 3.72          |
|              | Company Vehicles                           | 13.14                  | 6.69          | 6.45          |
|              | <b>Scope 1 - Total</b>                     | <b>16.88</b>           | <b>10.38</b>  | <b>10.17</b>  |
| Scope 2      | Purchased electricity - market based       | 210.07                 | 116.34        | 147.34        |
|              | Purchased heat and steam                   | 0.00                   | 0.00          | 0.00          |
|              | <b>Scope 2 - Total</b>                     | <b>210.07</b>          | <b>116.34</b> | <b>147.34</b> |
| Scope 3      | Purchased goods and services               |                        |               |               |
|              | Capital goods                              |                        |               |               |
|              | Upstream transportation and distribution   | 0.00                   | 0.00          | 0.00          |
|              | Waste generated in operations              | 5.00                   | 3.00          | 2.00          |
|              | Business travel                            | 8.52                   | 12.78         | 10.23         |
|              | Employee commuting                         | 0.00                   | 0.00          | 0.00          |
|              | Upstream leased assets                     |                        |               |               |
|              | Downstream transportation and distribution | 120.00                 | 80.00         | 85.00         |
|              | Processing of sold products                |                        |               |               |
|              | Use of sold products                       | 150.00                 | 160.00        | 180.00        |
|              | End-of-life treatment of sold products     |                        |               |               |
|              | Downstream leased assets                   |                        |               |               |
|              | Franchises                                 |                        |               |               |
|              | Investments                                |                        |               |               |
|              |  | <b>Scope 3 - Total</b> | <b>283.52</b> | <b>255.78</b> |
| <b>TOTAL</b> |  | <b>510.47</b>          | <b>382.50</b> | <b>434.73</b> |

# Carbon Footprint and Emission Hotspots

Emissions by scope



Emissions by Years

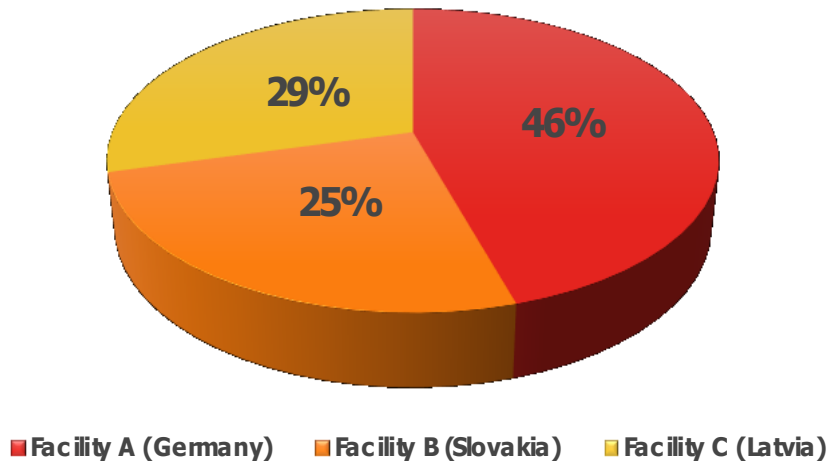


To Offset Carbon Footprint

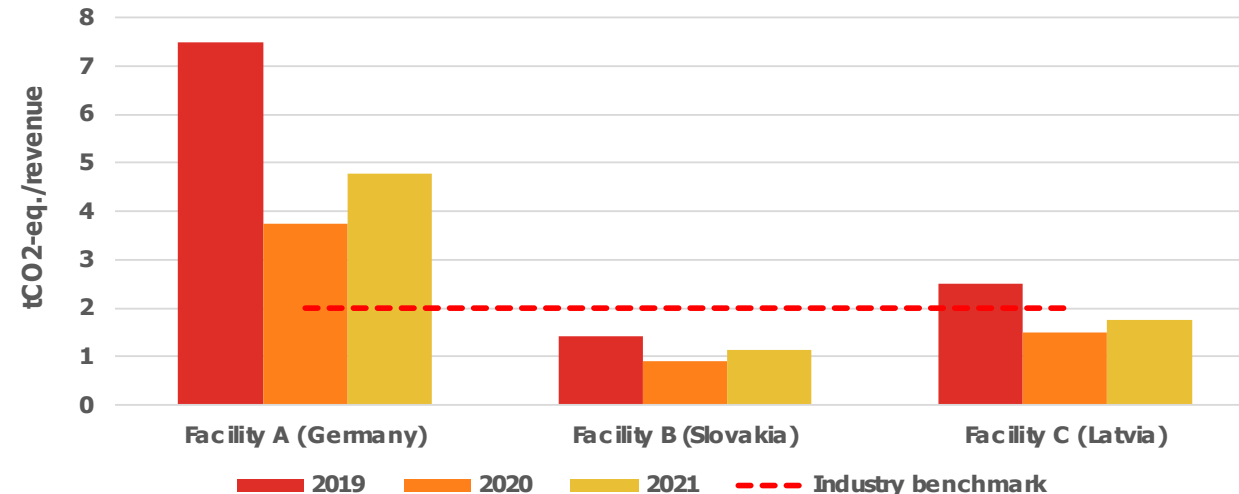
300 trees have to be grown for 10 years



Emissions by facility or country



Emissions intensity against industry benchmark



# Objective and principles of carbon accounting



Objective: to ensure that corporate GHG emission inventory represent a **faithful, true and fair** account of company's GHG emissions

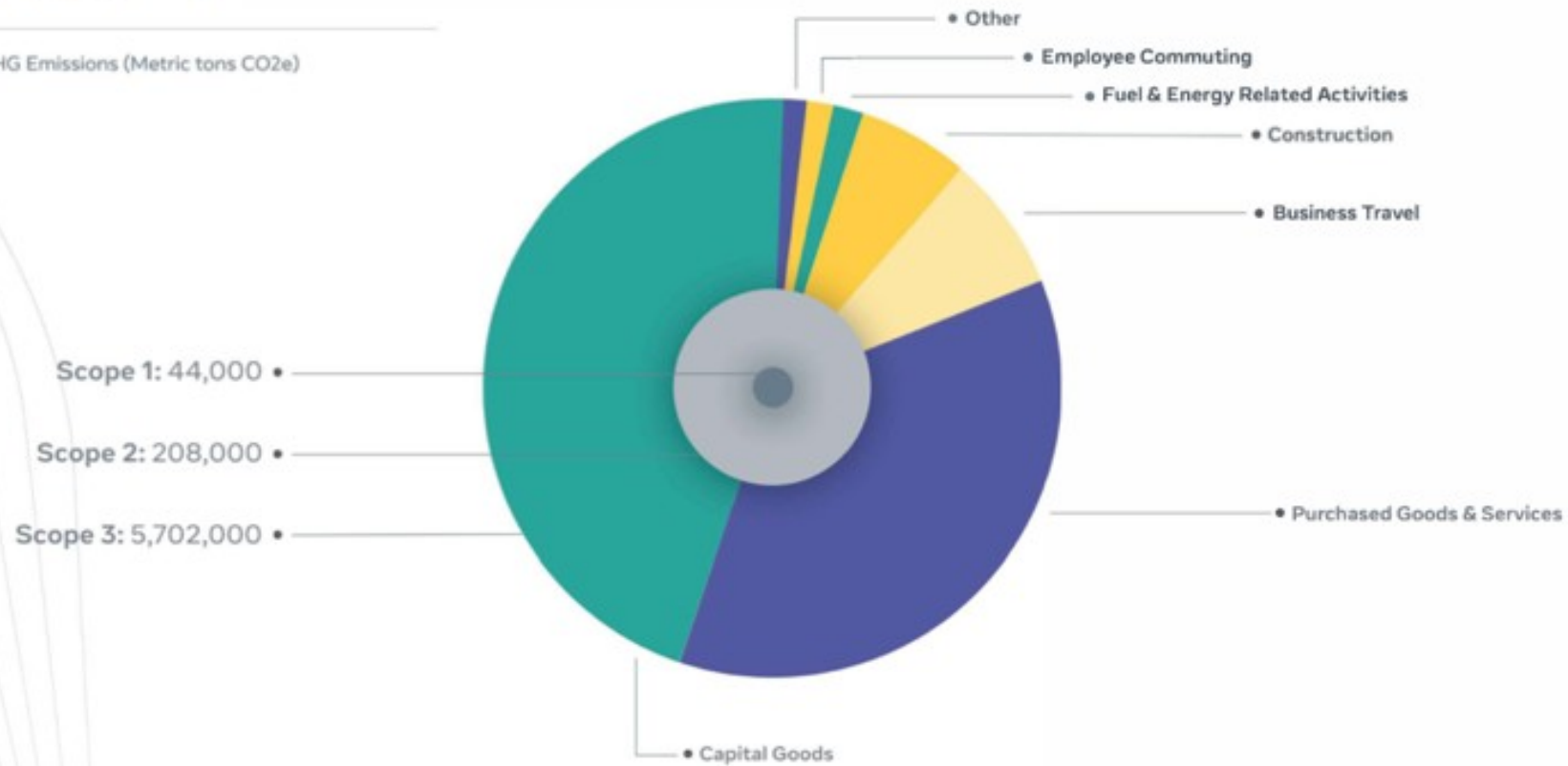
- **RELEVANCE** - Ensure that GHG inventory appropriately reflects GHG emission of the company and is relevant for decision-makers and shareholders
- **COMPLETENESS** – Account for and report on ALL GHG emissions of the company within the chosen boundary. Justify any exclusions
- **CONSISTENCY** - Use consistent methodologies to allow for meaningful comparison over the time
- **TRANSPARENCY** – Disclose any relevant assumptions and make appropriate references to calculation methodologies and data sources.
- **ACCURACY** – Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable.

## FACEBOOK'S 2019 CARBON FOOTPRINT

# 6.0M

 metric tons of CO<sub>2</sub>e

SCOPE: GHG Emissions (Metric tons CO<sub>2</sub>e)

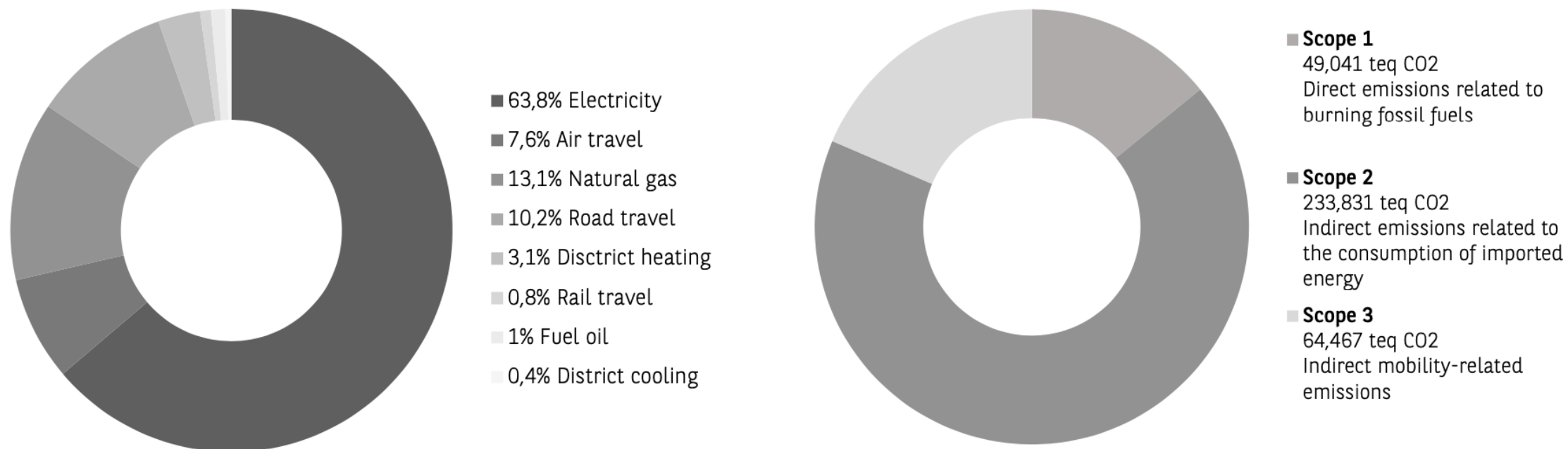


<sup>2</sup> Emissions from users that use Facebook, Instagram, WhatsApp and Messenger are not included in our Scope 3 inventory.

<sup>3</sup> We evaluate and improve our greenhouse gas inventory methodology annually.

## 4.1.4. BNP PARIBAS MEASURES ITS OPERATIONAL GHG EMISSIONS

Each year, the BNP Paribas Group measures and publishes its operational GHG emissions, by converting the energy used in its buildings and in business travel into metric tons of CO<sub>2</sub> equivalent (teqCO<sub>2</sub>, including the six GHG defined in the Kyoto Protocol). The Group's total emissions stood at 347 kteqCO<sub>2</sub> in 2020, which can be broken down as follows (Figure 23):



## Group exercise

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Please assess how the companies disclose their carbon footprint against the principles of GHG accounting:

- RELEVANCE, COMPLETENESS, CONSISTENCY , TRANSPARENCY, ACCURACY

Companies:

- Microsoft (from p. 15, Carbon negative)
- Eon (p. 13, Metrics and Targets)
- CLP (p. 21, Metrics and Targets)
- Dundee (p. 25, Metrics and Targets)
- Arcelor (p. 49, Metrics)
- Nestle (p.21, Climate & Nature)



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