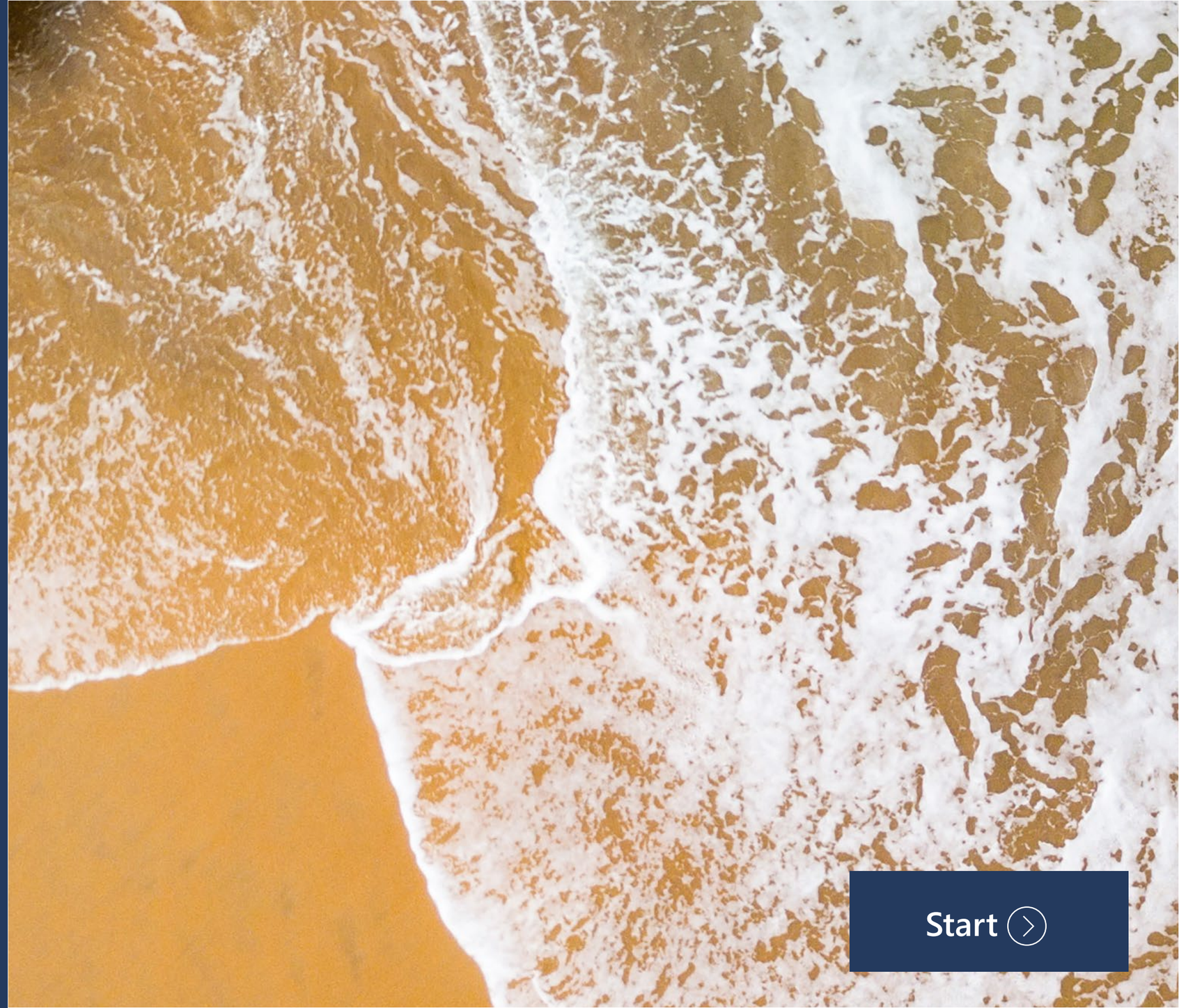
Microsoft

# Module 3

## Scope 3 Emissions Accounting Appendix



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# Module 3 Appendix

**This Appendix covers the more granular Scope 3 calculation methods that were not covered in the body of the Scope 3 module. These are provided for each of the 15 different Scope 3 categories.**

# More granular calculation methods by Scope 3 category

## Category 1: Purchased goods & services

**Category Description:** Upstream emissions from the extraction, production and transportation of goods and services acquired by your company. Excludes energy purchases that are included in Scope 2 and Scope 3 categories 2 to 8.

**Minimum boundaries within the category:** All upstream emissions of purchased goods and services.

# More granular calculation methods by Scope 3 category

## Category 1: Purchased goods & services

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Supplier-specific**<br>**Sum across goods purchased:** ∑ (quantities of good purchased (e.g., kg) × supplier-specific product EF (e.g., $kgCO_2e/kg$)) | ▪ Quantities or units of goods and services (e.g., kg, hours, units) | ▪ Supplier-specific EF for each purchased good or service, if the supplier has conducted a reliable (i.e. leverages third-party databases and is ideally certified by a third-party) cradle-to-gate GHG inventory, product footprint, internal life cycle report |
| **Hybrid**<br>**Sum across goods purchased:** ∑ Tier 1 supplier Scopes 1 and 2 relating to good ($kgCO_2e$) + ∑ (mass of waste from tier 1 supplier relating to the good (kg) × waste activity EF (kg $CO_2$ e/kg)) + ∑ (mass or quantity of units of the good (e.g., kg) × EF of good excluding Scopes 1 and 2 and waste generated by producer ($kgCO_2e$/kg or unit or $)) | ▪ Supplier Scope 1 and 2 related to purchased good<br>▪ Quantities of waste output by supplier to produce goods and services | ▪ Combination of supplier-specific, average-data and/ or spend-based |
| **Average-data**<br>**Sum across capital goods purchased:** ∑ (mass or unit of good (kg or piece) × EF of good per mass unit or piece ($kgCO_2e$/kg or piece)) | ▪ Mass or number of units of purchased capital goods (e.g., kg, pieces, hours, units) | ▪ EF databases: Use cradle-to-gate EFs of the purchased goods or services per unit of mass or unit of product (e.g., $kgCO_2e/kg$) |
| **Spend-based**<br>**Sum across goods purchased:** ∑ (value of capital good (e.g., $) × EF of good per unit of economic value (e.g., $kgCO_2e$/$)) | ▪ Amount spent on purchased capital goods, by product type, using market values (e.g., $, €) | ▪ Amount spent on purchased capital goods, by product type, using market values (e.g., $, €)<br>▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the **GHG Protocol Technical Guidance for Calculating Scope 3**. Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 2: Capital goods

**Category Description:** Upstream emissions from the extraction, production and transportation of capital goods acquired by your company e.g., fixed assets, plants, equipment, vehicles, facilities. Excludes emissions from use of capital goods (accounted for in Scope 1 or Scope 2).

**Minimum boundaries within the category:** All upstream emissions of purchased goods and services.

# More granular calculation methods by Scope 3 category

## Category 2: Capital goods

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Supplier-specific**<br>**Sum across goods purchased:** ∑ (quantities of good purchased (e.g., kg) × supplier-specific product EF (e.g., $kgCO_2e/kg$)) | ▪ Quantities or units of capital goods (e.g., kg, hours, units) | ▪ Supplier-specific EF for each purchased good or service, if the supplier has conducted a reliable i.e. leverages third-party databases and is ideally certified by a third-party) cradle-to-gate GHG inventory, product footprint, internal life cycle report |
| **Hybrid**<br>**Sum across goods purchased:** ∑ Tier 1 supplier Scopes 1 and 2 relating to good ($kgCO_2e$) + ∑ (mass of waste from tier 1 supplier relating to the good (kg) × waste activity EF (kg $CO_2$ e/kg)) + ∑ (mass or quantity of units of the good (e.g., kg) × EF of good excluding Scopes 1 and 2 and waste generated by producer ($kgCO_2e/kg$ or unit or $)) | ▪ Supplier total Scope 1+2 (at minimum, +3 when available)<br>▪ Quantities of waste output by supplier to produce capital goods | ▪ Combination of supplier-specific, average-data and/or spend-based |
| **Average-data**<br>**Sum across capital goods purchased:** ∑ (mass or unit of good (kg or piece) × EF of good per mass unit or piece ($kgCO_2e/kg$ or piece)) | ▪ Mass or number of units of purchased capital goods (e.g., kg, pieces, hours, units) | ▪ EF databases: Use cradle-to-gate EFs of the purchased goods or services per unit of mass or unit of product (e.g., $kgCO_2e/kg$) |
| **Spend-based**<br>**Sum across goods purchased:** ∑ (value of capital good (e.g., $) × EF of good per unit of economic value (e.g., $kgCO_2e/\$$)) | ▪ Amount spent on purchased capital goods, by product type, using market values (e.g., $, €) | ▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

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

**Category Description:** Emissions related to the extraction, production, and transportation of fuels and energy purchased or acquired by your company, not already accounted for in Scope 1 or Scope 2.

**Minimum boundaries within the category:** For fuels and electricity, all upstream (cradle-to-gate) emissions, excluding combustion. For transmission and distribution (T&D) emissions, all upstream emissions including combustion. For generation of purchased electricity that is sold to end users, emissions from the generation of purchased energy.

**Note:** In case of ambiguity over whether a particular purchased product is a capital good (to be reported in category 2) or a purchased good (to be reported in category 1), follow your company's financial accounting procedure to determine which categories.

# More granular calculation methods by Scope 3 category

## Category 3: Fuel- and energy-related activities not included in Scope 1 or Scope 2

Upstream fuel EF

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **For purchased fuels and electricity:**<br>**Supplier-specific or average-data**<br>**Sum across fuel types, suppliers, regions, or countries:** ∑ (fuel consumed (e.g., kWh) × ***upstream fuel EF*** ($kgCO_2e$)/kWh) | ▪ Quantities or types of fuel consumed<br>▪ Quantities of electricity, steam, heating or cooling purchased and consumed per unit of consumption (e.g., MWh) | ▪ For supplier-specific method: no tool needed since EFs are provided by fuel- and utility-providers<br>▪ For average-data method: Scope 3 estimation tools or EF databases<br>▪ For hybrid method: Combination of supplier-specific and average-data |
| **For T&D losses:**<br>**Supplier-specific, hybrid or average-data**<br>**Sum across suppliers, regions, or countries:** ∑ (electricity/fuel consumed (e.g., kWh) × life cycle EF ($kgCO_2e$)/kWh x T&D loss rate (%)) | ▪ Electricity, steam, heating or cooling per unit of consumption (e.g., MWh)<br>▪ And/or Scope 2 emissions data | |
| **For generation of purchased electricity that is sold to end users:**<br>**Supplier-specific or average-data**<br>**Sum across suppliers, regions or countries:** ∑ (electricity/fuel purchased for resale (kWh) × life cycle EF ($kgCO_2e$/kWh) | ▪ Quantities and specific source (e.g., generation unit) of electricity purchased and re-sold | |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 4: Upstream transportation and distribution

**Category Description:** Emissions from the transportation and distribution of products purchased by your company between tier 1 suppliers and your company's own operations (in vehicles/facilities not owned or controlled by your company); services purchased by your company, including inbound and outbound logistics; transportation and distribution between your company's facilities (in vehicles/facilities not owned or controlled by your company).

**Minimum boundaries within the category:** Scope 1 and 2 emissions of transportation and distribution providers that occur during use of vehicles and facilities (e.g., from energy use). Optional: LCA emissions associated with manufacturing vehicles, facilities, or infrastructure.

# More granular calculation methods by Scope 3 category

## Category 4: Upstream transportation and distribution

### Estimating emissions from transportation

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Fuel-based (Average-data)**<br>**Sum across fuel types:** ∑ (fuel consumed (liters) × fuel EF ($kgCO_2e$/liters)<br>▪ **sum across grid regions:** ∑ (quantity of electricity consumed (kWh) × electricity grid EF (kg $CO_2e$/kWh)<br>▪ **sum across refrigerant and air-conditioning types:** ∑ (quantity of refrigerant leakage × refrigerant GWP ($kgCO_2e$)) | ▪ Quantities of fuel (e.g., diesel, gasoline, jet fuel, biofuels) consumed<br>▪ Amount spent on fuel, average cost of fuel<br>▪ Amount of refrigerant leaks<br>▪ If applicable: Distance traveled; Average fuel efficiency of the vehicle; Mass of purchased goods in the vehicle (ton); Information on whether the products are refrigerated during transport | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others (e.g., industry associations, academic publications) |
| **Distance-based (Average-data)**<br>**sum across transport modes and/or vehicle types:** ∑ (mass of goods purchased (tons or volume) × distance traveled (km) × transport mode or vehicle type EF ($kgCO_2e$/ton or volume/km) | ▪ Mass or volume of the products sold<br>▪ Distances provided by transportation suppliers<br>▪ Online maps or calculators<br>▪ Published port-to-port travel distance | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others e.g., industry associations, academic publications (ECOTransIT, NTM, EPA Smart Way, HBEFA, etc.) |
| **Spend-based**<br>**sum across transport modes and/or vehicle types:** ∑ (amount spent on transportation by type ($) × EF per economic unit ($kgCO_2e$/$)) | ▪ Amount spent on transportation by type (e.g., road, rail, air, barge), using market values (e.g., $) | ▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 4: Upstream transportation and distribution

### Estimating emissions from distribution

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Site-Specific**<br>1. **For each storage facility:** ∑ (fuel/electricity consumed (kWh) x relevant EF ($kgCO_2e/kWh$) + (quantity of refrigerant leakage × refrigerant GWP ($kgCO_2e$)<br>2. **Allocate emissions based on volume that company's products take within storage facility:** Allocated emissions of storage facility ($kgCO_2e$) = volume of purchased goods (m3) % total volume of goods in storage facility (m3)<br>3. **Sum across all storage facilities:** ∑ allocated emissions of storage facility | ▪ Site-specific fuel, electricity use<br>▪ Site-specific refrigerant leakage<br>▪ Average occupancy rate of the storage facility (i.e., average total volume of goods stored) | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others e.g., industry associations, academic publications |
| **Average-data**<br>**Sum across storage facilities:** ∑ (volume of stored goods (m3 or pallet or TEU*) × average number of days stored (days) × storage facility EF ($kgCO_2$ e/m3 or pallet or TEU/day)) | ▪ Volume of purchased goods that are stored (e.g., m2 , m3 , pallet, TEU*) or number of pallets needed to store purchased goods<br>▪ Average number of days that goods are stored | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others e.g., industry associations, academic publications |

**20-foot equivalent unit*

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 5: Waste generated in operations

**Category Description:** Emissions from third-party disposal and treatment of waste generated in your company's operations (in facilities not owned or controlled by your company). Waste treatment methods include disposal in landfill, waste-to-energy, recycling, incineration, composting and wastewater treatment.

**Minimum boundaries within the category:** Scopes 1 and 2 of waste management suppliers that occur during disposal or treatment. Optional: Emissions from transportation of waste.

# More granular calculation methods by Scope 3 category

## Category 5: Waste generated in operations

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Supplier-specific**<br>**Sum across waste treatment providers:** ∑ allocated scope 1 and 2 emissions of waste treatment company | ▪ Allocated scopes 1 and 2 of the waste-treatment company (allocated to the waste collected from your company) | ▪ Supplier-specific EF, collected from the waste treatment provider |
| **Waste-type-specific**<br>**Sum across waste types:** ∑ (waste produced (tons or m3) × waste type and waste treatment specific EF ($kgCO_2e$/ton or m3)) | ▪ Waste produced (e.g., ton, m3) and type of different waste generated in operations<br>▪ For each waste type, waste treatment method applied | ▪ Scope 3 estimation tools<br>▪ EF databases |
| **Average-data**<br>**Sum across waste treatment methods:** ∑ (total mass of waste (ton) × proportion of total waste treated by waste treatment method × waste treatment method EF ($kgCO_2e$/ton)) | ▪ Total mass of waste generated in operations<br>▪ Proportion of this waste being treated by different methods | |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 6: Business travel

**Category Description:** Emissions from the transportation of employees for business-related activities in vehicles not owned or operated by your company. Transportation modes include air, rail, bus, automobile (rental cars or employee-owned cars).

**Minimum boundaries within the category:** Scopes 1 and 2 emissions of transportation carriers that occur during use of vehicles (e.g., from energy use). Optional: The life cycle emissions associated with manufacturing vehicles or infrastructure, and emissions from hotel stays.

# More granular calculation methods by Scope 3 category

## Category 6: Business travel

**Quantity of fuel consumed**

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Fuel-based**<br>**Sum across fuel types:** ∑ (***quantity of fuel consumed*** (liters) × fuel EF (e.g., $kgCO_2e$/liter))<br>▪ **Sum across grid regions:** ∑ (quantity of electricity consumed (kWh) × electricity grid EF ($kgCO_2e$/kWh))<br>▪ **Sum across refrigerant and air-conditioning types:** ∑ (quantity of refrigerant leakage × GWP for the refrigerant ($kgCO_2e$)) | ▪ Quantities of fuel (e.g., diesel, gasoline, jet fuel, biofuels, etc.)consumed<br>▪ Amount spent on fuel and average cost of fuel<br>▪ Fugitive emissions e.g., refrigerant leakage<br>▪ If applicable: Distance traveled; Average fuel efficiency of the vehicle | ▪ Scope 3 estimation tools<br>▪ EF databases |
| **Distance-based**<br>**Sum across vehicle types to determine total emissions:** ∑ (total distance traveled by vehicle type (vehicle-km or passenger-km) × vehicle specific EF ($kgCO_2e$/vehicle or passenger-km)) | ▪ Total distance traveled by each mode of transport by employees<br>▪ Countries of travel (since transportation EF vary by country)<br>▪ Specific types of vehicles used for travel (since transportation EFs vary by vehicle types) from transport providers | ▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 7: Employee commuting

**Category Description:** Emissions from the transportation of employees between their homes and their worksites, in vehicles not owned or operated by your company. Transportation modes include air, rail, bus, automobile, teleworking and others (e.g., subway, bicycling, walking).

**Minimum boundaries within the category:** Emissions from the transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company).

# More granular calculation methods by Scope 3 category

## Category 7: Employee commuting

**Quantity of fuel consumed**

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Fuel-based**<br>**Sum across fuel types:** ∑ (***quantity of fuel consumed*** (liters) × fuel EF (e.g., $kgCO_2e$/liter))<br>▪ **Sum across grid regions:** ∑ (quantity of electricity consumed (kWh) × electricity grid EF ($kgCO_2e$/kWh))<br>▪ **Sum across refrigerant and air-conditioning types:** ∑ (quantity of refrigerant leakage × GWP for the refrigerant ($kgCO_2e$)) | ▪ Quantities of fuel (e.g., diesel, gasoline, jet fuel, biofuels, etc.) consumed<br>▪ Amount spent on fuel and average cost of fuel<br>▪ Fugitive emissions e.g., refrigerant leakage<br>▪ If applicable: Distance traveled; Average fuel efficiency of the vehicle | ▪ Scope 3 estimation tools<br>▪ EF databases |
| **Distance-based**<br>1. **Sum across all employees to determine total distance traveled:** total distance traveled by vehicle type (vehicle-km or passenger-km) = ∑ (daily one-way distance between home and work (km) × 2 × number of commuting days per year)<br>2. **Sum across vehicle types to determine total emissions:** $kgCO_2e$ from employee commuting = ∑ (total distance traveled by vehicle type (vehicle-km or passenger-km) × vehicle specific EF ($kgCO_2e$/vehicle or passenger-km))<br>+ for each energy source used in teleworking: ∑ (quantities of energy consumed (kWh) × emissions factor for energy source ($kgCO_2$ ekWh)) | ▪ Total distance traveled by employees<br>▪ Mode of transport used for commuting | ▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 7: Employee commuting

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Average-data**<br>**Sum across each transport mode:** ∑ (total number of employees × % of employees using mode of transport × one way commuting distance (vehicle-km or passenger-km) × 2 × working days per year × transport mode EF ($kgCO_2e$/vehicle-km or passenger-km)) | ▪ Number of employees<br>▪ Average distance traveled by an average employees per day<br>▪ Average breakdown of transport modes used by employees<br>▪ Average number working days per year | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others (e.g., industry associations, academic publications) |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 8: Upstream leased assets

**Category Description:** Emissions from operation of assets leased by your company (lessee) and not included in the lessee's Scope 1 and 2 emissions.

**Minimum boundaries within the category:** Scope 1 and 2 emissions of lessors that occur during operation of leased assets (e.g., from energy use). Optional: The life cycle emissions associated with manufacturing/ construction of assets.

# More granular calculation methods by Scope 3 category

## Category 8: Upstream leased assets

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Asset-specific**<br>1. **Calculate the scope 1 and scope 2 emissions associated with each leased asset**<br>2. **Sum across leased assets:** ∑ Scopes 1 and 2 of each leased asset<br>**For leased building spaces not sub-metered by the tenant, allocate emissions:** energy use from leased space (kWh) = your company's area (m2) % building total area (m2) × occupancy rate (%) × building's total energy use (kWh) | ▪ Asset-specific fuel use; electricity, steam, heating and cooling use; process emissions; and fugitive emissions (e.g., refrigerant leakage)<br>▪ Asset-specific Scopes 1 and 2 | ▪ Specific EFs calculated based on the leased asset Scope 1 and 2 emissions (collected from the lessee) |
| **Lessor-specific**<br>1. **Calculate the scope 1 and scope 2 emissions associated with each lessor**<br>2. **Allocate emissions from each lessor and sum across lessor:** ∑ Scopes 1 and 2 of lessor (kg $CO_2e$) x (leased asset area/volume/quantity) % (total lessor asset area/volume/quantity) | ▪ Lessor's fuel use, electricity use, process emissions and fugitive emissions (refrigerant leakage)<br>▪ or Lessor's scopes 1 and 2<br>▪ Physical or financial data for allocation (e.g., total area/volume/quantity of lessor's assets and leased assets) | ▪ Specific EFs calculated based on the leased asset Scope 1 and 2 emissions (collected from the lessee) |
| **Average-data**<br>1. **Sum across building types:** ∑ (total floor space of building type (m2) × average building type EF (kg$CO_2e$/m2/year))<br>2. **Sum across asset types:** ∑ (number assets x average emissions per type (kg$CO_2e$/asset type)) | ▪ Floor space of each leased asset<br>▪ Number of leased assets, by building type<br>▪ Number of leased assets that give rise to Scope 2 emissions (e.g., company cars, trucks, etc.) | ▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 9: Downstream transportation and distribution

**Category Description:** Emissions from the transportation and distribution of products sold by your company, your company's own operations and end consumer (if not paid for by your company), including retail and storage in vehicles and facilities not owned or controlled by your company.

**Minimum boundaries within the category:** Scope 1 and 2 emissions of transportation, distribution providers and retailers that occur during use of vehicles and facilities (e.g., from energy use). Optional: Lifecycle emissions associated with manufacturing vehicles, facilities, or infrastructure.

# More granular calculation methods by Scope 3 category

## Category 9: Downstream transportation and distribution

**Quantity of fuel consumed**

### Estimating emissions from transportation

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Fuel-based**<br>**Sum across fuel types:** ∑ (***quantity of fuel consumed*** (liters) × fuel EF ($kgCO_2e$/liters)<br>▪ **sum across grid regions:** ∑ (quantity of electricity consumed (kWh) × electricity grid EF (kg $CO_2e$/kWh)<br>▪ **sum across refrigerant and air-conditioning types:** ∑ (quantity of refrigerant leakage × refrigerant GWP ($kgCO_2e$)) | ▪ Quantities of fuel (e.g., diesel, gasoline, jet fuel, biofuels) consumed<br>▪ Amount spent on fuel, average cost of fuel<br>▪ Amount of refrigerant leaks<br>▪ If applicable: Distance traveled; Average fuel efficiency of the vehicle; Mass of purchased goods in the vehicle (ton); Information on whether the products are refrigerated during transport | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others e.g., industry associations, academic publications |
| **Distance-based**<br>**sum across transport modes and/or vehicle types:** ∑ (mass of goods purchased (tons or volume) × distance traveled (km) × transport mode or vehicle type EF ($kgCO_2e$/ton or volume/km) | ▪ Mass or volume of the products sold<br>▪ Distances provided by transportation suppliers<br>▪ Online maps or calculators<br>▪ Published port-to-port travel distance | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others e.g., industry associations, academic publications |
| **Spend-based**<br>**sum across transport modes and/or vehicle types:** ∑ (amount spent on transportation by type ($) × EF per economic unit ($kgCO_2e$/$)) | ▪ Amount spent on transportation by type (e.g., road, rail, air, barge), using market values (e.g., $) | ▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 9: Downstream transportation and distribution

### Estimating emissions from distribution

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Site-Specific**<br>1. **For each storage facility:** ∑ (fuel/electricity consumed (kWh) x relevant EF ($kgCO_2e/kWh$) + (quantity of refrigerant leakage × refrigerant GWP ($kgCO_2e$)<br>2. **Allocate emissions based on volume that company's products take within storage facility:** Allocated emissions of storage facility ($kgCO_2e$) = volume of purchased goods (m3) % total volume of goods in storage facility (m3)<br>3. **Sum across all storage facilities:** ∑ allocated emissions of storage facility | ▪ Site-specific fuel, electricity use<br>▪ Site-specific refrigerant leakage<br>▪ Average occupancy rate of the storage facility (i.e., average total volume of goods stored) | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others e.g., industry associations, academic publications |
| **Average-data**<br>**Sum across storage facilities:** ∑ (volume of stored goods (m3 or pallet or TEU*) × average number of days stored (days) × storage facility EF (kg $CO_2$ e/m3 or pallet or TEU/day)) | ▪ Volume of purchased goods that are stored (e.g., m2 , m3 , pallet, TEU*) or number of pallets needed to store purchased goods<br>▪ Average number of days that goods are stored | ▪ Scope 3 estimation tools<br>▪ EF databases |

**Twenty-foot equivalent unit*

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 10: Processing of sold products

**Category Description:** Emissions from the processing of intermediate products sold by downstream companies (e.g., manufacturers) subsequent to sale by your company.

**Minimum boundaries within the category:** Scopes 1 and 2 emissions of downstream companies that occur during processing (e.g., from energy use).

# More granular calculation methods by Scope 3 category

## Category 10: Processing of sold products

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Site-Specific**<br>**Sum across fuel consumed in the processing of sold intermediate products:** ∑ (quantity of fuel consumed (e.g., liter) × life cycle EF for fuel source (e.g., $kgCO_2$ e/liter))<br>▪ **Sum across electricity consumed in the processing of sold intermediate products:** ∑ (quantity of electricity consumed (kWh) × life cycle EF for electricity (kg $CO_2$ e/kWh))<br>▪ **Sum across refrigerants used in the processing of sold intermediate products:** ∑ (quantity of refrigerant leakage (kg) × refrigerant GWP ($kgCO_2e$/kg))<br>▪ **Sum across process emissions released** in the processing of sold intermediate products<br>▪ **To the extent possible, sum across waste generated in the processing of sold intermediate products:** ∑ (mass of waste output (kg) × EF for waste activity ($kgCO_2e$/kg)) | ▪ Types and quantities of intermediate goods sold<br>▪ Site-specific GHG emissions data provided by downstream value chain partners, or site-specific activity data from downstream processes, including:<br>  ▪ Quantities of energy consumed in process(es)<br>  ▪ To the extent possible, mass of waste generated in process(es)<br>▪ If applicable, activity data related to non-combustion emissions (i.e., industrial process or fugitive emissions) | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others e.g., industry associations, academic publications |
| **Average-data**<br>**Sum across intermediate products:** ∑ (mass of sold intermediate product (kg) × EF of processing of sold product (kgCO2e/kg final product)) | ▪ For each type of sold intermediate product: process(es) involved in processing sold intermediate products into final product<br>▪ Information needed for allocation (e.g., mass, economic value) | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others e.g., industry associations, academic publications |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 11: Use of sold products

**Category Description:** Emissions from the end use of goods and services sold by your company.

**Minimum boundaries within the category:** Direct use-phase emissions of sold products over their expected lifetime (i.e., Scopes 1 and 2 of end users that occur from the use of products). Optional: Indirect use-phase emissions of sold products over their expected lifetime (i.e., emissions from the use of products that indirectly consume fuels or electricity during use).

# More granular calculation methods by Scope 3 category

## Category 11: Use of sold products

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Products that directly consume energy (fuels or electricity) during use**<br>**sum across fuels consumed from use of products:** ∑ (total lifetime expected uses of product × number sold × fuel consumed per use (kWh) × fuel EF ($kgCO_2e$/kWh))<br>▪ **sum across electricity consumed from use of products:** ∑ (total lifetime expected uses of product × number sold × electricity consumed per use (kWh) × electricity EF (kg $CO_2$ e/kWh))<br>▪ **sum across refrigerant leakage from use of products:** ∑ (total lifetime expected uses of product × number sold × refrigerant leakage per use (kg) × GWP (kg $CO_2$ e/kg)) | ▪ Total lifetime expected uses of product(s)<br>▪ Quantities of products sold<br>▪ Fuel used per use of product<br>▪ Electricity consumption per use of product<br>▪ Refrigerant leakage per use of product | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others (e.g., industry associations, academic publications) |
| **Fuels and Feed-stocks**<br>**Sum across fuels/feedstocks:** ∑ (total quantity of fuel/feedstock sold (e.g., kWh) × fuel/feedstock combustion EF (e.g., kgCO2e/kWh) | ▪ Total quantities of fuels/feedstocks sold | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others (e.g., industry associations, academic publications) |
| **GHG and products that contain or form GHGs that are emitted during use**<br>1. **Sum across GHGs released in a product or product group:** ∑ (GHG contained per product × Total number of products sold × % of GHG released during lifetime use of product × GWP of the GHG)<br>2. **Sum across products or product groups:** ∑ (use phase emissions from product or product group 1,2,3…). Note: if the % released is unknown 100% should be assumed. | ▪ Total quantities of products sold<br>▪ Quantities of GHGs contained per product<br>▪ % of GHGs released throughout the lifetime of the product | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others e.g., industry associations, academic publications |

# More granular calculation methods by Scope 3 category

Packaging

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

**Category Description:** Emissions from the waste disposal and treatment of products sold by your company at the end of their life.

**Minimum boundaries within the category:** Scope 1 and 2 of waste management companies that occur during disposal or treatment of sold products.

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Waste-type specific method**<br>**Sum across waste treatment methods for sold products and packaging:** ∑ (total mass of sold products and packaging from point of sale to end of life after consumer use (kg) × percentage of total waste being treated by waste treatment method (%) × EF of waste treatment method ($kgCO_2e/kg$)) | ▪ Total mass of sold products and packaging from the point of sale by the reporting company to the end-of-life after consumer use<br>▪ Proportion of this waste being treated by different methods (e.g., % landfilled, incinerated, recycled, etc.) | ▪ Scope 3 estimation tools<br>▪ EF databases<br>▪ Others (e.g., industry associations, academic publications) |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 13: Downstream leased assets

**Category Description:** Emissions from operation of assets owned by your company (lessor) and leased to other entities, not included in your company's Scopes 1 and 2.

**Minimum boundaries within the category:** Scope 1 and 2 emissions of lessees that occur during operation of leased assets (e.g., from energy use). Optional: The life cycle emissions associated with manufacturing/ construction of assets.

# More granular calculation methods by Scope 3 category

## Category 13: Downstream leased assets

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Asset-specific**<br>1. **Calculate the scope 1 and scope 2 emissions associated with each leased asset**<br>2. **Sum across leased assets:** ∑ Scopes 1 and 2 of each leased asset<br>**For leased building spaces not sub-metered by the tenant, allocate emissions:** energy use from leased space (kWh) = your company's area (m2) % building total area (m2) × occupancy rate (%) × building's total energy use (kWh) | ▪ Asset-specific fuel use; electricity, steam, heating and cooling use; process emissions; and fugitive emissions (e.g., refrigerant leakage)<br>▪ Asset-specific Scopes 1 and 2 | ▪ Specific EFs calculated based on the leased asset Scope 1 and 2 emissions (collected from the lessor) |
| **Lessee-specific**<br>1. **Calculate the scope 1 and scope 2 emissions associated with each lessee**<br>2. **Allocate emissions from each lessee and sum across lessees:** ∑ Scopes 1 and 2 of lessee (kg CO2e) x (leased asset area/volume/quantity) % (total lessee asset area/volume/quantity) | ▪ Lessee's fuel use, electricity use, process emissions and fugitive emissions (refrigerant leakage)<br>▪ or Lessee's scopes 1 and 2<br>▪ Physical or financial data for allocation (e.g., total area/volume/quantity of lessee's assets and leased assets) | ▪ Specific EFs calculated based on the leased asset Scope 1 and 2 emissions (collected from the lessor) |
| **Average-data**<br>1. **Sum across building types:** ∑ (total floor space of building type (m2) × average building type EF ($kgCO_2e$/m2/year))<br>2. **Sum across asset types:** ∑ (number assets x average emissions per type ($kgCO_2e$/asset type)) | ▪ Floor space of each leased asset<br>▪ Number of leased assets, by building type; and/or<br>▪ Number of leased assets that give rise to Scope 2 emissions (e.g., company cars, trucks, etc) | ▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 14: Franchises

**Category Description:** Emissions from the operation of franchises, not included in Scopes 1 and 2 reported by franchisor (i.e., companies that grant licenses to other entities to sell or distribute its goods or services in return for payments, such as royalties for the use of trademarks and other services).

**Minimum boundaries within the category:** Scope 1 and 2 emissions of franchisees that occur during operation of franchises (e.g., from energy use). Optional: Life cycle emissions associated with manufacturing or constructing franchise.

# More granular calculation methods by Scope 3 category

## Category 14: Franchises

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Franchise-specific method**<br>**Sum across franchises:** ∑ (scope 1 + 2 of each franchise ($kgCO_2e$))<br>If franchise buildings are not submetered: energy use from franchise (kWh) = (franchise's area (m2)) % (building's total area (m2) × building's occupancy rate) × building's total energy use (kWh) | ▪ Franchisees Scope 1 and 2<br>▪ Or Site-specific fuel use, electricity use, and other process and fugitive emissions activity data | ▪ Emissions data based on the franchised asset Scope 1 and 2 emissions |
| **Average-data method**<br>**For leased buildings (if floor space data is available), sum across building types:** ∑ (total floor space of building type (m2) × average EF for building type ($kgCO_2e$/m2/year))<br>**For other asset types or for leased buildings where floor space data is not available, sum across building/asset types:** ∑ (number of buildings/assets × average emissions per building/asset type ($kgCO_2e$/building or asset type) | ▪ Floor space of each franchise, by floor space<br>▪ Number of franchises, by building type<br>▪ Number of franchise assets that give rise to Scope 2 emissions (e.g., company cars, trucks, etc). | ▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 15: Investments

**Category Description:** Emissions associated with the operation of your company's investments not already included in Scopes 1 or 2.

Four types of investments: equity investments (subsidiaries, joint ventures); debt investments (bonds, loans); project finance (long-term financing of projects as an equity or debt investor); managed investments and client services (e.g., investment and asset management, pension funds, credit insurance).

**Minimum boundaries within the category:** Refer to GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, table 5.9.

# More granular calculation methods by Scope 3 category

## Category 15: Investments

**Revenue of investee company**

### Estimating emissions from Equity Investments

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Investment-specific method**<br>**Sum across equity investments:** ∑ (scopes 1 and 2 of equity investment × share of equity (%)) | ▪ Investee Scopes 1 and 2 (and 3 if significant)<br>▪ Investor's proportional share of equity in the investee | ▪ Emissions data: the equity investment Scope 1 and 2 emissions (collected from the investor) |
| **Average-data method**<br>**Sum across equity investments:** ∑ ((investee company total revenue ($) × EF for investee's sector ($kgCO_2e$/$ revenue)) × share of equity (%) | ▪ Sector(s) the investee company operates in<br>▪ ***Revenue of investee company***<br>▪ Investor's proportional share of equity in the investee | ▪ Scope 3 estimation tools<br>▪ EF databases |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

# More granular calculation methods by Scope 3 category

## Category 15: Investments

**Depends on the type of project**

### Estimating emissions from Project Finance and Debt investments with and without known use of proceeds

From most to least specific and accurate methods

| A. Select Estimation Method | B. Collect Activity Data | C. Estimate Scope 3 Emissions |
|---|---|---|
| **Project-specific method (with known use of proceeds)**<br>**Sum across projects:** ∑ (scopes 1 and 2 of project × share of total project costs (%)) | ▪ Projects Scope 1 and 2<br>▪ The investor's proportional share of total project costs (total equity plus debt) | ▪ Emissions data: the project Scope 1 and 2 emissions (collected from the investor) |
| **Average-data method (with known use of proceeds)**<br>**sum across projects during construction:** ∑ ((project construction cost ($) x EF of construction sector (kgCO2e/$ revenue)) x share of total project costs (%))<br>**sum across projects during operations:** ∑ ((project revenue ($) x EF of relevant operating sector (kgCO2e/$ revenue)) x share of total project costs (%)) | ▪ Projects during construction phase: projects costs<br>▪ Projects during operational phase: project revenue; investor's proportional share of total project costs (total equity plus debt) | ▪ Scope 3 estimation tools<br>▪ EF databases |
| **Project-specific method (without known use of proceeds)**<br>∑ ((projected annual emissions of project x projected lifetime of project) x share of total project costs (%)) | ▪ Expected average annual emissions of project (estimation depends on type of project)<br>▪ Expected lifetime of project | ▪ Emissions data: the project estimated Scope 1 and 2 emissions (collected from the investor) |

*For more details, please refer to the* **GHG Protocol Technical Guidance for Calculating Scope 3**. *Within this Appendix EF = Emissions Factor*

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