Quantification and reporting of greenhouse gases emissions at the organizational level in accordance with ISO 14064-1:2019

Reporting Year: 2023

Commissioned by Valland SpA to Eartha Srl

Working Group
Dr. Luca Nonini – Sustainability Analyst, Eartha Srl; luca.nonini@eartha.it
Dr. Ing. Alex Giorgini – R&D Manager, Valland SpA; alex.giorgini@valland.it

GHG Inventory Report

Piantedo (SO), December 2024

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1. General description of the Organization goals and Inventory objectives

1.1 Statement of the GHG Inventory Report

The Report has been prepared according to the International Standard 14064-1 (Greenhouse gases – Part 1: Specification with guidance at the Organization level for quantification and reporting of greenhouse gas emissions and removals), prepared by Technical Committee ISO[1]/TC 207 "Environmental management" in collaboration with Technical Committee CEN/SS S26 "Environmental management", and published in August 2019 (EN ISO 14064-1: 2019)[2].

1.2 Report structure and format

The report has been prepared following the principles outlined in the ISO 14064-1 (i.e., relevance, completeness, consistency, accuracy and transparency). The structure and format are those outlined in Chapter 9 (GHG reporting) and Annex F (GHG Inventory structure and organization) of the Standard.

1.3 Description of the reporting Company

Valland SpA has been established in 2006 in Piantedo (Province of Sondrio, Italy), at Via Roccoli No. 252, and is a privately held, unlisted Company consisting of a single legal entity. The Company is a manufacturer specializing in high-quality, custom-made ball, gate, and check valves, delivered all over the world. The Company focuses on the Oil&Gas exploration and production sectors, including subsea and transmission, as well as other specialized services for industrial applications. Nowadays, Valland is renowned for its client-centric approach, achieving outstanding performance through continuous improvement and technical expertise. The primary goal is to provide customers with the best products, incorporating cutting-edge solutions and ensuring timely delivery.

Further to that, since 2016, Valland has been experimenting with Additive Manufacturing (AM) technologies, both metallic (e.g., Binder Jetting, Powder Bed Fusion, WAAM) and polymeric (FDM of pure and composite materials, hot-chamber FDM 3D printers for high-performance techno polymers, and photopolymerization of resins). The activities, started with the support of external partners, have opened new opportunities in synergy with the core business to produce components for both Oil&Gas valves, as well as new applications in the broader Energy and Design context.

The Company integrates field proven experience with up-to-date computer aided design programs to perform Finite Element Analysis (FEA). Safety Integrity Level (SIL) and Safety Analysis Report (SAR) are also performed. For further information, visit: http://www.valland.it/

1 International Standard Organization.
2 https://www.iso.org/standard/66453.html

1.4 Company's policies and strategies for environmental sustainability

The policies and strategies of the Company for environmental sustainability focuses on managing economic, environmental, and social impacts, including human rights, in the short, medium, and long-term through the following key elements:

- Technology-led innovation: investing in advanced competitive technologies that drive sustainability, prioritizing R&D to promote energy transition and manufacturing processes, material innovation and use efficiency.
- Rationalization of natural resources exploitation: optimization of resources use to limit environmental impact, promote energy efficiency, and use renewable energy sources across all the operations.
- Circular economy practices: reduction of waste and increase material recycling and reuse through sustainable product eco-design and lifecycle management approaches.
- People-centric approach: placing people at the centre of the innovation processes, integrating technology with expertise, knowledge, and skills, and promoting of continuous learning and development among the employees.
- Partnerships and collaboration: strong partnerships with customers, suppliers, and industry Stakeholders, collaborating on initiatives that drive sustainability and innovation; participation in industry forums and contribution to sustainable practices development.

The policies and sustainability strategy of the Company is aligned with the United Nations' Sustainable Development Goals (SDGs) and the EU Green Deal Plan. The Company can positively contribute to the following SDGs:

- Goal 3: Ensure healthy lives and promote well-being for all at all ages.
- Goal 7: Ensure access to affordable, reliable, sustainable and modern energy.
- Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation.
- Goal 12: Ensure sustainable consumption and production patterns.
- Goal 13: Take urgent action to mitigate climate change and impacts on the ecosystems.

1.5 Purpose of the Report in the context of the Company's policies and strategies

Since 2022, Valland SpA has been publishing its annual Sustainability Report. At the end of 2024, the Company has released its third Report, covering the period from January 1st, 2023, to December 31st, 2023. The content of this GHG Inventory Report is therefore an expansion of what has already been described in the Sustainability Report. The main purposes of the GHG Inventory Report are:

- Support decision-making: provide actionable insights to measure, monitor and manage emissions.
- Identify hotspots: highlight critical areas or processes contributing significantly to emissions for targeted improvements.
- Internal reporting and planning: aid internal stakeholders in preparing environmental reports, setting science-based targets, and integrating sustainability into business strategies.

In a broader way, the Report could also be used as a basis to define strategic environmental actions regarding long-term sustainability goals and commitments.

1.6 Responsibility and reference contacts

The responsibility of producing the GHG Inventory and the corresponding GHG Inventory Report is of the Sustainability team, and the reference contacts are the following:

- Dr. Luca Nonini – Sustainability Analyst, Eartha Srl; luca.nonini@eartha.it
- Dr. Ing. Alex Giorgini – R&D Manager, Valland SpA; alex.giorgini@valland.it

1.7 Intended use and intended users

This Report has been produced primarily for internal use, with the goal of supporting Valland SpA in understanding and managing its GHGs emissions, facilitating decision-making, and driving internal sustainability initiatives for emissions reductions. The intended users are mainly top management, Sustainability and R&D Teams.

1.8 Dissemination policy

Following the previous paragraph, the Report may be used externally only if Valland will decide to undertake a third-party verification process to achieve the certification in accordance with the ISO 14064-3 (Greenhouse gases – Part 3: Specification with guidance for the verification and validation of greenhouse gas statement)[3].

1.9 Historical base year and historical base year GHG Inventory

This GHG Inventory Report is the first Report prepared by the Company, therefore there is no historical base year and historical base-year GHG Inventory.

1.10 Reporting period and frequency of reporting

The reporting period is January 1st, 2023 – December 31st, 2023. The reporting frequency is annual.

1.11 Base year and review of the base year

Because of the above, the base year for comparative purposes is 2023. Any future changes in the definition of the base year may be introduced in the future due to structural change in reporting or organizational boundaries (e.g., merger, acquisition or divestiture), shifts in the economic and technological context, change in calculation methodologies or emission factors values, errors which

[3] https://www.iso.org/standard/66455.html

could substantially influence the results, or obsolescence of the information related to the currently established base year.

1.12 Greenhouse gases included in the Report

GHGs emissions have been computed for (https://www.ipcc-nggip.iges.or.jp/public/2006gl/):

- Carbon dioxide (CO_2).
- Methane (CH_4).
- Nitrous oxide (N_2O).

1.13 Statement on verification and validation

The Company has decided not to verify and validate the GHG Inventory for the year 2023 by an accredited third part.

2. Organizational boundaries

Valland SpA owns 100% of the property, operational and financial control over all the facilities of the operational headquarters (i.e., factories, offices, warehouses). Therefore, the organizational boundaries coincide with the physical boundaries of the operational headquarters.

In case of future structural changes of the Company, (e.g., merger, acquisition, or divestiture), the organizational boundaries will be reassessed and adjusted accordingly.

3. Reporting boundaries

3.1 Comparison between ISO 14064-1 and GHG Protocol emissions categories

Table 1 reports the correspondence between the emissions categories defines in the ISO 14064-1 and those defined in the "Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard – Revised Edition" (World Business Council For Sustainable Development, WBCSD, e World Resource Institute, WRI, 2004)[4].

[4] https://ghgprotocol.org/standards-guidance.

Table 1: Correspondence between emissions categories of ISO 14064-1 and GHG Protocol.

Reference	
ISO 14064-1	**GHG Protocol**
Category 1: Direct GHG emissions	Scope 1: Direct GHG emissions
SC 1.1[a]: Stationary combustion	C 1[b]: Stationary combustion
SC 1.2: Mobile combustion	C 2: Mobile combustion
SC 1.3: Processes	C 3: Processes
SC 1.4: Fugitive	C 4: Fugitive
SC 1.5: Land use, land use change and forestry	
Category 2: Indirect GHG emissions from imported energy	Scope 2: Indirect GHG emissions from imported energy
SC 2.1: Imported electricity SC 2.2: imported energy excluding electricity	C 1: Imported energy (electricity and other carriers)
Category 3: Indirect GHG emissions from transportation	Scope 3: Other GHG emissions
SC 3.1: Upstream transportation and distribution	C 4: Upstream transportation and distribution
SC 3.2: Downstream transportation and distribution	C 9: Downstream transportation and distribution
SC 3.3: Employee commuting	C 7: Employee commuting
SC 3.4: Client and visitor transport	*Not available*
SC 3.5: Business travels	C 6: Business travels
Category 4: Indirect GHG emissions from used products	Scope 3: Other GHG emissions
SC 4.1: Purchased simple goods	C 1: Purchased good and services; C 3: Upstream fuel and energy related activities
SC 4.2: Purchased capital goods	C 2: Purchased capital goods
SC 4.3: Purchased services	C 1: Purchased good and services
SC 4.4: Disposal of solid and liquid waste	C 5: Waste generated in operations
SC 4.5: Leased assets	C 8: Upstream leased assets
SC 4.6: Purchased services not previously included	C 1: Purchased good and services
Category 5: Indirect GHG emissions associated with the use of products from the Organization	Scope 3: Other GHG emissions
SC 5.1: Use stage of the product	C 11: Use of sold products
	C 10: Processing of sold products
SC 5.2: Downstream leased assets	C 13: Downstream leased assets
SC 5.3: End of life stage of products	C 12: End of life treatment of sold products
SC 5.4: Investments	C 15: Investments
Category 6: Indirect GHG emissions from other sources	Scope 3: Other GHG emissions
Not specified	C 14: Franchising

[a]SC: subcategory; [b]C: Category.

3.2 Emissions categories and selection criteria

This chapter includes the description of emissions categories that are considered. When considering whether to include or exclude emission sources, the following criteria have been considered:

- Activities/processes that are assumed to be quantitatively substantial.
- Ability of the Company to monitor and manage emissions.
- Contribution to the Company's exposure to climate-related and reputational risks, and reduction opportunities.
- Availability of data and access to information.
- Availability, traceability, and validation of documents supporting the origin of the data.

Based on internal evaluations, the above criteria have not been used to exclude representative categories or subcategories. The categories which have been included are (**Table 2**):

1. Category 1: direct GHG emissions: they occur from GHG sources inside organizational boundaries that are fully owned or controlled by the Organization. The following direct emissions have been considered:
    - From stationary combustion: they are the consequence of the direct combustion of any type of fuel (fossil or renewable) burnt in stationary (fixed) equipment, e.g., ovens, boilers, and electricity generators, to generate heat, mechanical work or electricity.
    - From mobile combustion: they are the consequence of the direct combustion of any time of fuel (fossil or renewable) burnt in transport equipment, e.g., cars, motorcycles, freight transport vehicles (e.g., trucks, articulated lorries), used for activities/processes directly related to the Company business.

    All upstream (i.e., from cradle to the Company gate) emissions associated with fuels, emissions due to the construction of power plants/vehicles, as well as emissions allocated to fuels transport and any distribution losses are excluded.
2. Category 2: indirect GHG emissions from imported energy: (i.e., electricity, heat, steam, cooling energy and compressed air) it refers to energy purchased and consumed by the Company; all upstream (from cradle to the power plant gate) emissions associated with fuels, emissions due to the construction of power plants, as well as emissions allocated to energy transport and any distribution losses are excluded.
3. Category 3: indirect GHG emissions from transportation: they occur from sources located outside the organizational boundaries and are related to activities/processes not owned and not under the control of the Company. Emissions occurs due to fuel burnt in transport equipment (via land, air, sea, either paid or not paid by the Company and delivered to the first purchasers or other purchasers throughout the supply chain) for the transportation of: (i) simple/capital goods purchased/sold by the Company, and (ii) people (employee commuting between their home and the workplace, and business travel).

    Emissions associated with: (i) refrigeration gas leaks (e.g., chilled transport, air conditioner), (ii) fuel generation and transportation/distribution and (iii) construction of the transport equipment (vehicle and infrastructure) have not been considered due to the lack of emission factors.

    To avoid double counting with Category 4: Indirect GHG emissions from used products, only emissions that occur through the latest transport activity from the supplier to the Company gate have been included, whereas all the other emissions throughout the supply chain (i.e., among upstream suppliers) have been excluded.
4. Category 4: Indirect GHG emissions from used products: they occur from sources located outside the organizational boundaries and associated with simple goods and services, as well as capital goods[5] purchased by the Company. Simple goods can be both intermediate products used to produce other goods, or finished products used as they are, without any other transformation process.

    The emissions are associated to the upstream phases ("cradle to supplier output gate" approach): (i) extraction of raw materials, (ii) agricultural and forestry activities, (iii) materials manufacturing, production, and processing, (iv) generation of energy carriers consumed through the upstream activities, (v) disposal/treatment of waste generated through the

[5] Goods with extended lifetime (i.e., years, decades) and that are neither transformed nor sold to another organization or consumers (e.g., equipment, machinery, buildings, facilities and vehicles).

upstream activities, (vi) land use and land-use change activities, (vii) transportation of materials and products between suppliers and (viii) any other activities prior to acquisition by the reporting Company.

This category includes also emissions from:

- Disposal of solid and liquid waste produced by the Company (services paid by the Organization to third parties).
- Upstream activities related to fuel and electricity (extraction, production, and transportation of fuels used by the Company; extraction, production, and transportation of fuels used to generate electricity, steam, heat and cooling subsequently purchased by the Company; electricity losses due to transmission and distribution processes).

As well as for the organizational boundaries, in case of future structural changes of the Company, the mentioned above selection criteria will be reviewed.

Table 2: List of categories and subcategories of ISO 14064-1 included/excluded and reason for exclusion.

Reference **ISO 14064-1**	Inclusion/exclusion (yes; no)	Reason in case of exclusion
Category 1: Direct GHG emissions		
SC 1.1: Stationary combustion	Yes	
SC 1.2: Mobile combustion	Yes	
SC 1.3: Processes	No	No activities causing emissions are carried out.
SC 1.4: Fugitive	No	No emissions associated to this activity.
SC 1.5: Land use, land use change and forestry	No	No activities causing emissions are carried out.
Category 2: Indirect GHG emissions from imported energy		
SC 2.1: Imported electricity	Yes	
SC 2.2: imported energy excluding electricity	No	No activities causing emissions are carried out.
Category 3: Indirect GHG emissions from transportation		
SC 3.1: Upstream transportation and distribution	Yes	
SC 3.2: Downstream transportation and distribution	No	Complexity in obtaining the data and accuracy[a].
SC 3.3: Employee commuting	Yes	
SC 3.4: Client and visitor transport	No	Complexity in obtaining the data and accuracy.
SC 3.5: Business travels	Yes	
Category 4: Indirect GHG emissions from used products		
SC 4.1: Purchased simple goods	Yes	
SC 4.2: Purchased capital goods	Yes	
SC 4.3: Purchased services	Yes	
SC 4.4: Disposal of solid and liquid waste	Yes	
SC 4.5: Leased assets	No	No activities causing emissions are carried out.
SC4.6: Purchased services not previously included	No	All emissions are already included in SC 4.3.
Category 5: Indirect GHG emissions associated with the use of products from the Organization		
SC 5.1: Use stage of the product	No	Complexity in obtaining the data and accuracy.
SC 5.2: Downstream leased assets	No	No activities causing emissions are carried out.
SC 5.3: End of life stage of products	No	Complexity in obtaining the data and accuracy.
SC 5.4: Investments	No	No activities causing emissions are carried out.
Category 6: Indirect GHG emissions from other sources		
Not specified	No	No activities causing emissions are carried out.

[a]To improve the completeness, accuracy, and transparency of the GHG emissions Inventory, efforts will be made to consider also the categories currently excluded due to both complexity in obtaining the data and level of accuracy.

4. Quantification of emissions: methodological approaches and parameters

4.1 General introduction

The emissions have been calculated using a model recently developed by Eartha Srl. The model has been developed in the MS Office Excel 365 environment (file format .xlsm) and is based on methodologies aligned with those defined in the "Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard – Revised Edition" (WBCSD and WRI, 2004) and in the "Technical Guidance for Calculating Scope 3 Emissions (Version 1.0)" (WBCSD and WRI, 2013), which are a supplement to the "Corporate Value Chain (Scope 3) Accounting & Reporting Standard" (WBCSD and WRI, 2011).

Following the GHG Protocol classification, the model enables the quantification of the emissions for each category of Scope 1, Scope 2, and Scope 3 over a default period of 1 year. The results can be aggregated into different categories in accordance with the ISO 14064-1.

The model has been developed with the intention of balancing as much as possible accuracy and the ease of use, with the goal of assisting the user in identifying critical points (activities/processes characterized by the highest emissions) within the value chain, and for which further data collection and more in-depth analysis may be required.

The model includes a dedicated worksheet for user input data entry, but its structure is not explained in this document as it is not essential for the purposes of the Report.

The results are presented in another specific worksheet. Emissions are reported for both fossil CO_2eq and (separately) biogenic CO_2 (use of biomass) and are provided in both absolute terms (t) and as percentages of the total emissions of the corresponding Scope.

Additionally, the percentage distribution of emissions across the three different Scopes is shown, along with the total absolute emissions (t; %).

For future Inventories, the model provides the option to save the results for all the analysed years in another separate worksheet. This allows for the tracking of an "environmental profile" over a period of "n" years, offering a detailed historical overview of the emissions trend across the value chain, which is useful to define mitigation strategies.

The following paragraph describes the methodological approach, including literature sources, calculation parameters and any assumptions/simplifications introduced. For the Report, emissions sources have been classified into the categories and subcategories defined in the ISO 14064-1. The description is done only for those included in the GHG Inventory.

4.2 Methodology

4.2.1 Subcategory 1.1: Stationary combustion

Emissions are calculated by multiplying the amount of fuel consumed (dm^3) by the specific emission factor[6] of the fuel (kg CO_2/dm^3; kg CO_2eq of CH_4/dm^3; kg CO_2eq of N_2O/dm^3) (Department for Environment, Food & Rural Affairs, DEFRA, 2023)[7].

4.2.2 Subcategory 1.2: Mobile combustion

Emissions are calculated considering the volume of fuel consumed (dm^3) (or travelled distance, km) and the corresponding emission factor defined according to the type of vehicle (kg CO_2/mile; kg CH_4/mile; kg N_2O/mile) (GHG Protocol, 2017). This method incorporates the relevant emissions from the vehicle's fuel consumption and the travelled distance, ensuring that the contribution of each transportation method is accounted for in a standardized way.

4.2.3 Subcategory 2.1: Imported electricity

Emissions are estimated by multiplying the amount of energy consumed (kWh) by an emission factor (kg CO_2eq/kWh) that varies according to the purchasing mechanism:

- Location-based: a weighted average CO_2eq emission factor is considered, defined according to the composition of the national electricity production "mix"; the emission factor reflects how the electricity is generated in a given area considering the contribution of all energy sources (fossil and renewable) (Carbon Footprint Ltd, 2023).
- Market-based: CO_2eq emission factor is assumed to be 0 kg CO_2eq/kWh, if electricity is produced by a specific supplier from certified renewable sources (tracking system based on the so-called "Guarantees of Origin", GO).
- Residual-mix: this is a specific form of the market-based mechanism, which considers certified electricity generated only through non-renewable energy sources. In other words, if a consumer has defined a supply contract with a given supplier to purchase electricity generated only from non-renewable sources, the emission factor is systematically higher than that of the location-based mechanism, because the contribution of all the renewable sources is excluded (Carbon Footprint Ltd, 2023).

4.2.4 Subcategory 3.1: Upstream transportation and distribution

Emissions are computed as the product between the expenditure (€) for the storage/warehousing service only and final delivery (i.e., from the last supplier to the Company gates, excluding all the

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6 It expresses the ratio between the mass of a GHG emitted into the atmosphere from a specific emission source, and a reference unit (e.g., mass, volume, energy, distance).

7 The DEFRA emission factors for CH_4 and N_2O are already expressed as CO_2eq through the corresponding Global Warming Potential (GWP). The GWP expresses the contribution of a gas to the greenhouse effect compared to that of CO_2, which is assumed equal to 1 and taken as reference. The GWP value of each gas is calculated for a specific period (typically 20, 100, or 500 years). In the model, all the GWP values are related to a period of 100 years and are those defined by the Fourth, Fifth, and Sixth IPCC Assessment Report.

“upstream” activities between suppliers) and the corresponding “margin of supply chain emission factor” (kg CO_2eq/€, year 2023)[8].

Information regarding storage/warehousing methods, type of vehicle used for transportation, mass of goods transported, as well as travelled distance is not necessary, as the contribution of all these elements is already accounted for into the value of the emission factor (U.S. Environmental Protection Agency, EPA, 2022).

4.2.5 Subcategory 3.3: Employee commuting

Emissions are computed by multiplying the travelled distance (km) by the corresponding emission factor (kg CO_2/km; kg CO_2eq of CH_4/km; kg CO_2eq N_2O/km), defined according to type of vehicle (DEFRA, 2023).

4.2.6 Subcategory 3.5: Business travel

Emissions are quantified based on: (i) type of transport/vehicle used, (ii) number of employees involved and (iii) total travelled distance (per single employee; round trip), applying an emission factor defined according to the type of transport/vehicle (kg CO_2/km; kg CO_2eq of CH_4/km; kg CO_2eq N_2O/km; kg CO_2/passenger · km; kg CO_2eq of CH_4/ passenger · km; kg CO_2eq N_2O/ passenger · km). Optional data such as: (i) destination Country, (ii) number of nights spent in hotels[9] and (iii) number of rooms have also been included to improve the accuracy of the results (DEFRA, 2023).

4.2.7 Subcategory 4.1, 4.2 and 4.3: Purchased simple goods, purchased capital goods and purchased services

Emissions are computed by multiplying the expenditure (€) by the specific “supply chain emission factor without margin” related to the type to which the good/service belongs (EPA, 2022). This emission factors reflects emissions which occur along the supply chain between suppliers and exclude activities involving the last supplier and the transportation and distribution of goods and services up to the Company gates.

Subcategory 4.1 also includes emission related to the upstream activities for fuels and electricity:

- Extraction, production, and transportation of fuels used by the Company for direct combustion; emissions are calculated as the product between the volume of fuel (dm^3) and the corresponding emission factor (kg CO_2eq/dm^3) which includes all the “upstream” activities (DEFRA, 2023).
- Extraction, production, and transportation of any fuel used for the generation of the electricity subsequently purchased by the Company under the location-based mechanism: emissions are quantified as the product between the amount of purchased electricity (kWh) and the corresponding emission factor (kg CO_2eq/kWh) that accounts for all the “upstream” activities (International Energy Agency, IEA, 2023).

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8 The value of these emission factors have been calculated starting from values expressed as kg CO_2eq/$ (year 2018) and considering the ratio €/$ for the year 2018, as well as the Italian inflation rate for the period 2018-2023.

9 It is assumed that the employees stay in “3-stars” hotels.

Tel.: +39 0342 682179 • Fax: +39 0342 682177
www.valland.it • info@valland.it
C.F/P.I. 00859800146
Head Office
Corso Giacomo Matteotti 8/A
23900 Lecco - Italy
Offices and Plant
Via Roccoli 252
23010 Piantedo (SO) - Italy

- Energy losses occurring during the electricity transmission and distribution processes, from the point of production to the Company gate. Emissions are calculated as the product between the amount of energy and an average emission factor related to the Italian conditions (Carbon Footprint Ltd, 2023)[10].

4.2.8 Subcategory 4.4: Disposal of solid and liquid waste

Emissions are calculated as the product between the mass of waste[11] and an emission factor (kg CO_2eq/t) defined according to the type of waste and treatment. Compared to all the possible types of treatment of the model (i.e., (i) disposal/purification, (ii) open-loop recycling, (iii) closed-loop recycling[12], (iv) incineration by direct combustion, (v) composting, (vi) landfill and (vii) anaerobic digestion), the following have been considered: (i) open-loop recycling, (ii) landfill and (iii) disposal/purification. If a specific type of waste is not present in the model, the most representative one is used.

4.3 Types of used data

Data used for the calculation are both primary (from direct measurement) and secondary (from estimations). For each subcategory, the type of used data is shown in **Table 3**.

Table 3: Types of data for each subcategory.

Subcategory (SC)	Type of data
SC 1.1 – Stationary combustion	Primary
SC 1.2 – Mobile combustion	Primary
SC 2.1 – Imported electricity	Primary
SC 3.1 – Upstream transportation and distribution	Primary
SC 3.3 – Employee commuting	Secondary
SC 3.5 – Business travels	Secondary
SC 4.1 – Purchased simple goods	Primary
SC 4.2 – Purchased capital goods	Primary
SC 4.3 – Purchased services	Primary
SC 4.4 – Disposal of solid and liquid waste	Primary

[10] The emission factors available in literature are related to the location-based mechanism; therefore, it is assumed that – given the same Country of origin – the emission factors are also applicable to the market-based (including residual-mix mechanisms).
[11] In the model, the waste can be classified as: (i) construction materials, (ii) electrical/electronic devices, (iii) metals, (iv) plastic materials, (v) paper, and (vi) other.
[12] In the open-loop recycling, the recycled material is used to produce another type of good, and the material loses its original characteristics. On the contrary, in the closed-loop recycling, the recycled material is used to produce the same type of good and it maintains its original properties.

4.4 Model characteristics

- Reproducibility of the results: the model has been developed in MS Office Excel, a universally accessible program, and uses standard inputs (e.g., mass of fuel, amount of energy, expenditure) with documented assumptions and emission factors. This enhances reproducibility, as other users can replicate results by applying the same inputs and parameters.
- Acceptability: the model aligns with well-established global standards (GHG Protocol, ISO 14064-1) and uses recognized datasets (e.g., DEFRA, EPA, IEA), enhancing its acceptability within corporate and regulatory frameworks, and credibility within the sustainability and emissions accounting community. Moreover, its modular design, ease of use, and ability to integrate optional data further support its adoption by a wide range of users.
- Consistency with the intended use, balancing both accuracy and ease of use in identifying emission hotspots. Through its modular structure, the model allows for detailed analysis when more specific data is available, while providing broader overviews if input data are limited. This makes the model particularly well-suited for annual reporting, trend analysis, and strategy formulation. This flexible approach can accommodate a range of data availability, making the model a valuable tool for emissions management.
- Economic proxy approach: for some subcategories, such as the purchase of goods and services, the model uses economic proxies (e.g., emissions per value of monetary expenditure) rather than direct physical metrics like the mass of purchased good and the travelled distance. While this approach simplifies data collection, it introduces a higher degree of uncertainty, as there is no guarantee that the monetary expenditure is directly correlated with the emissions intensity of a particular good or service. This can be a problem if the upstream activities of the supply chain are not well-understood.
- Lack of validation: the model does not incorporate mechanisms to validate its outputs against real-world measurements or site-specific data. Without such validation, the model's predictive accuracy remains uncertain, particularly for certain emissions sources where on-the-ground data may vary considerably. In the absence of validation, the results should be interpreted with caution, particularly if used to support decision-making or external reporting.

4.5 Emission factors

Table 4 reports values and reference of the emissions factors used for the calculations.

Table 4: Emission factors used for the calculations.

Category (C)	Subcategory (SC)	Emission factor		
		Value	Unit of measure	Reference link
C 1: Direct GHG emissions	SC 1.1: Stationary combustion	1. Liquid petroleum gas (LPG) - CO_2: 1.555 - CH_4: 0.001 - N_2O: 0.001	kg CO_2/dm^3 kg CO_2eq of CH_4/dm^3 kg CO_2eq of N_2O/dm^3	https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023
	SC 1.2: Mobile combustion	1. Car – gasoline: - CO_2: 0.4 - CH_4: $1.5 \cdot 10^{-5}$ - N_2O: $7.9 \cdot 10^{-6}$	kg CO_2/mile kg CO_2/mile kg N_2O/mile	https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fghgprotocol.org%2Fsites%2

		2. Car – diesel: - CO_2: 0.5 - CH_4: $5.0 \cdot 10^{-7}$ - N_2O: $1.0 \cdot 10^{-6}$ 3. Light vehicle – diesel: - CO_2: 0.6 - CH_4: $1.0 \cdot 10^{-6}$ - N_2O: $1.5 \cdot 10^{-6}$	kg CO_2/mile kg CO_2/mile kg N_2O/mile kg CO_2/mile kg CO_2/mile kg N_2O/mile	Fdefault%2Ffiles%2F2023-05%2FEmission_Factors_from_Cross_Sector_Tools_March_2017%2520%25281%2529.xlsx&wdOrigin=BROWSELINK
C 2: Indirect GHG emissions	SC 2.1: Imported electricity	- CO_2eq: 0.0	kg CO_2eq/kWh	Assumption based on the concept of "market-based mechanism".
C 3: Indirect GHG emissions from transportation	SC 3.1: Upstream transportation and distribution	1. Machinery, excluding computers: - CO_2eq: 0.0132 2. Plastic and rubber products: - CO_2eq: 0.0122 3. Computers and related parts, conductors, measurement, and communication devices - CO_2eq: 0.0102 4. Electricity, natural gas, drinking water, and wastewater treatment - CO_2eq: 0.0000 5. Clothing and leather goods - CO_2eq: 0.0264 6. Medical supplies: - CO_2eq: 0.0275 7. Various fabricated metal products - CO_2eq: 0.0448 8. Paper products and paper production plants - CO_2eq: 0.0244 9. Furniture and shelves - CO_2eq: 0.0448 10. Valves and fittings - CO_2eq: 0.0356	kg CO_2eq/€	https://catalog.data.gov/dataset/supply-chain-ghg-emission-factors-for-us-commodities-and-industries-v1-1-1
	SC 3.3: Employee commuting	1. Car – Dimensions not available (fuel: not available - CO_2: 0.1655 - CH_4: 0.0002 - N_2O: 0.0010	kg CO_2/km kg CO_2eq of CH_4/km kg CO_2eq of N_2O/km	https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023
	SC 3.5: Business travels	1. Short-haul international flight (class: not available) - CO_2: 0.1088 - CH_4: $1.1 \cdot 10^{-5}$ - N_2O: $9.2 \cdot 10^{-4}$ 2. Long-haul international flight (class: not available) - CO_2: 0.1529 - CH_4: $1.1 \cdot 10^{-5}$ - N_2O: $1.3 \cdot 10^{-3}$ 3. Car – average dimensions (fuel: not available) - CO_2: 0.1713 - CH_4: 0.0002 - N_2O: 0.0010 4. Taxi - CO_2: 0.2064 - CH_4: $4.6 \cdot 10^{-6}$	kg CO_2/passenger·km kg CO_2eq of CH_4/passenger·km kg CO_2eq of N_2O/passenger·km kg CO_2/passenger·km kg CO_2eq of CH_4/passenger·km kg CO_2eq of N_2O/passenger·km kg CO_2/km kg CO_2eq of CH_4/km kg CO_2eq of N_2O/ km kg CO_2/km kg CO_2eq of CH_4/km	https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

		- N_2O: $1.7 \cdot 10^{-3}$	kg CO_2eq of N_2O/ km	
C 4: Indirect GHG emissions from used products	SC 4.1: Purchased simple goods	1. Clothing and leather goods - CO_2eq: 0.0529 2. Office supplies - CO_2eq: 0.2238 3. Media, literature, and software - CO_2eq: 0.0427 4. Metallic minerals, dimensional stones, non-metallic minerals - CO_2eq: 1.0427 5. Agricultural, pharmaceutical, industrial, and commercial chemical products - CO_2eq: 0.4201 6. Paper products and paper production plants - CO_2eq: 0.4578 7. Primary iron, steel, and ferroalloy products - CO_2eq: 1.0589 8. Various fabricated metal products - CO_2eq: 0.3184 9. Plastic and rubber products - CO_2eq: 0.2940 10. Wood products - CO_2eq: 0.2187 11. Radio, TV, telecommunications - CO_2eq: 0.0804 12. Plumbing fixtures, faucets, valves, and other metal fittings - CO_2eq: 0.1516 13. Manufactured pipes and fittings - CO_2eq: 0.3520	kg CO_2eq/€	https://catalog.data.gov/dataset/supply-chain-ghg-emission-factors-for-us-commodities-and-industries-v1-1-1
		14 LPG - CO_2eq: 0.186	kg CO_2eq/dm^3	https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023
		15 Electricity Upstream activity - CO_2eq: 0.00	kg CO_2eq/kWh	Assumption based on the concept of "market-based mechanism".
		Transport and distribution losses - CO_2eq: 0.05	kg CO_2eq/kWh	https://www.carbonfootprint.com/international_electricity_factors.html
	SC 4.2: Purchase capital goods	1. Devices and equipment for cutting tools and machine tool and rolling mills - CO_2eq: 0.2452 2. Material handling equipment - CO_2eq: 0.2706 3. Computers and related parts, conductors, measurement, and communication devices - CO_2eq: 0.0397 4. Capacitors, resistors, coils, transformers, connectors, and other	kg CO_2eq/€	https://catalog.data.gov/dataset/supply-chain-ghg-emission-factors-for-us-commodities-and-industries-v1-1-1

		- CO_2eq: 0.1465 5. Lights and chandeliers, electrical panels, transformers, and household appliances - CO_2eq: 0.1770 6. Machinery, excluding computers - CO_2eq: 0.1831 7. Structural metal products - CO_2eq: 0.3550		
	SC 4.3: Purchase services	1. Supporting services for industrial activities - CO_2eq: 0.2736 2. Electricity, natural gas, drinking water, and wastewater treatment - CO_2eq: 2.8472 3. Legal services - CO_2eq: 0.0559 4. Professional and technical-scientific services - CO_2eq: 0.1363	kg CO_2eq/€	https://catalog.data.gov/dataset/supply-chain-ghg-emission-factors-for-us-commodities-and-industries-v1-1-1
	SC 4.4: Disposal of solid and liquid waste	1. Washing waters/solutions Disposal/purification: - CO_2eq: 0.20 Open-loop recycling: - CO_2eq: 0.00 3. Medium-sized electrical and electronic equipment (open-loop recycling) - CO_2eq: 21.28 4. Batteries (open-loop recycling) - CO_2eq: 21.28 5. Insulating material (landfill) - CO_2eq: 1.23 6. Wood products (open-loop recycling) - CO_2eq: 0.00 7. Metal waste (open-loop recycling) - CO_2eq: 21.28 8. Plastic (open-loop recycling) - CO_2eq: 21.28 9. Waste from commercial and industrial activities Open-loop recycling: - CO_2eq: 0.00 Landfill: - CO_2eq: 520.34 10. Small-sized electrical and electronic equipment (open-loop recycling) - CO_2eq: 21.28	kg CO_2eq/t	https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

5. Results and discussion

5.1 GHG emissions

The fossil CO_2eq emissions for each category are shown in **Table 5**. Results are reported in both absolute and relative terms (t and %, respectively).

Table 5: GHG emissions (t; %) for each category.

Category (C)	Emissions	
	t	%
C 1 – Direct GHG emissions	469.4	16.2%
C 2 – Indirect GHG emissions from imported energy	0.0	0.0%
C 3 – Indirect GHG emissions from transportation	130.1	4.5%
C 4 – Indirect GHG emissions from used products	2298.7	79.3%
Total	**2898.1**	**100.0%**

Table 6 shows the emissions for each subcategory. Results are reported in both absolute and relative terms (t, % of the total of the category and % of the total of the Inventory).

Table 6: GHG emissions (t; %) for each subcategory.

Subcategory (SC)	Category (C)	Emissions		
		t	%	
			Of the category	Of the total
SC 1.1 – Stationary combustion	C 1	455.8	97.1%	15.7%
SC 1.2 – Mobile combustion		13.6	2.9%	0.5%
SC 2.1 – Imported electricity	C 2	0.0	0.0%	0.0%
SC 3.1 – Upstream transportation and distribution	C 3	4.6	3.5%	0.2%
SC 3.3 – Employee commuting		70.6	54.3%	2.4%
SC 3.5 – Business travels		54.9	42.2%	1.9%
SC 4.1 – Purchased simple goods	C4	1220.9	53.1%	42.1%
SC 4.2 – Purchased capital goods		543.4	23.6%	18.8%
SC 4.3 – Purchased services		533.6	23.2%	18.4%
SC 4.4 – Disposal of solid and liquid waste		0.7	0.0%	0.0%
Total	-	**2898.1**	-	**100.0%**

Table 7 show, for each subcategory, the emissions subdivided – where possible – as CO_2, CH_4 and N_2O.

Tel.: +39 0342 682179 • Fax: +39 0342 682177
www.valland.it • info@valland.it
C.F/P.I. 00859800146

Head Office
Corso Giacomo Matteotti 8/A
23900 Lecco - Italy

Offices and Plant
Via Roccoli 252
23010 Piantedo (SO) - Italy

Table 7: Emissions of CO_2, CH_4 and N_2O.

Subcategory (SC)	Category (C)	Emissions			
		CO_2 (kg)	CH_4 (kg)	N_2O (kg)	Total (t)
SC 1.1 – Stationary combustion	C 1	455122	396.7	252.5	455771.3
SC 1.2 – Mobile combustion		13543.4	0.1	0.1	13.6
SC 2.1 – Imported electricity	C 2	0.0	0.0	0.0	0.0
SC 3.1 – Upstream transportation and distribution	C 3	-	-	-	4.6
SC 3.3 – Employee commuting		70112.9	80.7	414.5	70.6
SC 3.5 – Business travels		48271.0	4.3	405.2	54.9
SC 4.1 – Purchased simple goods	C 4	-	-	-	1220.9
SC 4.2 – Purchased capital goods		-	-	-	543.4
SC 4.3 – Purchased services		-	-	-	533.6
SC 4.4 – Disposal of solid and liquid waste		-	-	-	0.7
Total					**2898.1**

The total GHG emissions amount to 2898.1 t CO_2eq. The category that most contributes is C4 - Indirect GHG emissions from used products (79.3%), followed by C1 – direct GHG emissions. As previously mentioned, emissions associated with C2 – Indirect GHG emissions from imported energy are 0 t CO_2eq, as the electricity is fully purchased through the "market-based" mechanism using only renewable energy sources.

This different contribution is also reflected at the subcategory level; the highest emissions are associated with subcategory 4.1, with 1220.9 t (53.1% of the emissions of category 4 and 42.1% of the overall emissions). The other two subcategories that most contribute to the emissions are 4.3 and 4.2, with 533.6 t and 543.4 t CO_2eq, respectively (accounting together for more than 37% of the total emissions).

Emissions associated with upstream transportation and distribution are negligible compared to those from employee commuting and business travel. This is due, on one hand, to the fact that several business trips around the world have been performed and the daily commuting by employees have been estimated by assuming that each employee travels to the Company with the own car for all working days of the year (i.e., 220); on the other hand emissions from upstream transportation and distribution are quantified using a "spend-based emission factor", without explicitly considering information on travelled distances, mass of transported goods and the types/characteristics of the transportation vehicle. As mentioned above, while this approach allows for a swift estimation of emissions even in the absence of specific transportation data, it is associated with a high level of uncertainty.

The "spend-based emission factors" approach assumes a proportional relationship between the amount spent on a product or service and the associated emissions. While this may be true for some kinds of goods/services, it may not always reflect the real conditions, with the results that the emissions can be over or under-estimated. For instance, long-distance transport by air or sea may have significantly higher emissions than short-distance transport by rail or truck, but this nuance is not captured through the economic approach, so the results should be considered with caution.

With significant emissions arising from employee commuting, promoting remote work and telecommuting where feasible could be a valuable strategy to reduce the emissions. Flexible work arrangements, such as staggered shifts or compressed workweeks, can also reduce daily travelling.

Emissions from business travels could be reduced encouraging, whenever possible, virtual meetings. For necessary trips, prioritizing train travel (which generally has lower emissions than air travel) and setting internal limits on business travel or adopting a policy to prioritize low-carbon travel options could also be a valuable solution to reduce emissions.

Regarding goods and services, assuming that reducing the purchased quantity is not a feasible option, emissions could be limited by: (i) optimizing consumption through assessing actual needs and avoiding waste, (ii) evaluating the purchase of goods characterized by low emissions during production and transportation, and, where possible, (iii) using goods made from recycled materials or renewable resources (e.g., certified wood, recycled plastic).

In the future, emissions associated to the use of Company's vehicles could be reduced purchasing low-emission vehicles (or even electric vehicles), as well as optimizing, where possible, the travelled distances and the load capacity of individual vehicles to limit the number of trips.

Table 8, **Table 9** and **Table 10** show the fraction (%) of expenditures and GHG emissions related to each type of purchased simple good, purchased services and purchased capital good, respectively.

Analysing the relationship between the fraction of expenditure and the fraction of emissions for different types of goods and services is useful, as certain goods or services might represent a small share of expenditures but contribute significantly to emissions, and vice-versa. Identifying such relations can help the Company to focus on those with the highest emission-to-expenditure ratio, allowing targeted reductions in areas where the environmental impact outweighs the financial input.

For this specific case of this Report, the fraction of emissions reflects the fraction of expenditure, except for few cases where the fraction of emission is considerably higher (i.e., metallic minerals, dimensional stones, non-metallic minerals; primary iron, steel, and ferroalloy products; various fabricated metal products) or lower (i.e., plumbing fixtures, faucets, valves, and other metal fittings; professional and technical-scientific services).

Table 8: Fraction (%) of expenditures and emissions for purchased simple goods[a].

Type of purchased simple good	Fraction (%)	
	Expenditures	Emissions
Clothing and leather goods	0.2%	0.0%
Office supplies	0.2%	0.2%
Media, literature, and software	0.2%	0.0%
Metallic minerals, dimensional stones, non-metallic minerals	0.6%	2.2%
Agricultural, pharmaceutical, industrial, and commercial chemical products	0.7%	1.1%
Paper products and paper production plants	0.1%	0.1%
Primary iron, steel, and ferroalloy products	0.5%	1.9%
Various fabricated metal products	58.9%	70.4%
Plastic and rubber products	2.4%	2.6%
Wood products	2.9%	2.4%
Radio, TV, telecommunications	0.0%	0.0%
Plumbing fixtures, faucets, valves, and other metal fittings	33.3%	19.0%
Manufactured pipes and fittings	0.1%	0.1%

[a]In this table, upstream activities related to fuels and energy are excluded.

Table 9: Fraction (%) of expenditures and emissions for purchased services.

Type of purchased service	Fraction (%)	
	Expenditures	Emissions
Supporting services for industrial activities	92.1%	95.8%
Electricity, natural gas, drinking water, and wastewater treatment	0.0%	0.1%
Legal services	0.1%	0.0%
Professional and technical-scientific services	7.9%	4.1%

Table 10: Fraction (%) of expenditures and emissions for purchased capital goods.

Type of purchased capital good	Fraction (%)	
	Expenditures	Emissions
Devices and equipment for cutting tools and machine tool and rolling mills	0.2%	0.3%
Material handling equipment	0.3%	0.5%
Computers and related parts, conductors, measurement, and communication devices	0.7%	0.2%
Capacitors, resistors, coils, transformers, connectors, and other	25.5%	21.6%
Lights and chandeliers, electrical panels, transformers, and household appliances	0.1%	0.1%
Machinery, excluding computers	73.2%	77.4%
Structural metal products	0.0%	0.0%

Figure 1 and **Figure 2** show the emissions in accordance with the GHG Protocol. In **Figure 1**, the emissions are aggregated at the Scope level, whereas in **Figure 2**, the emissions are subdivided into the Scope 3 categories (**Table 1** for reference).

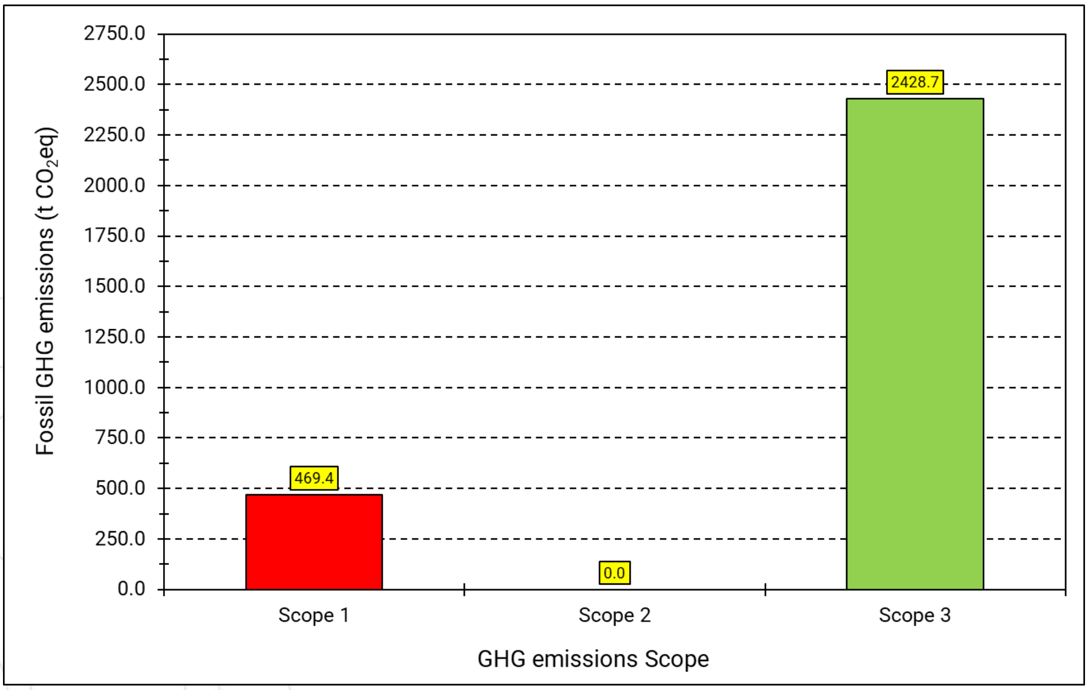

Figure 1: GHG emissions for each Scope.

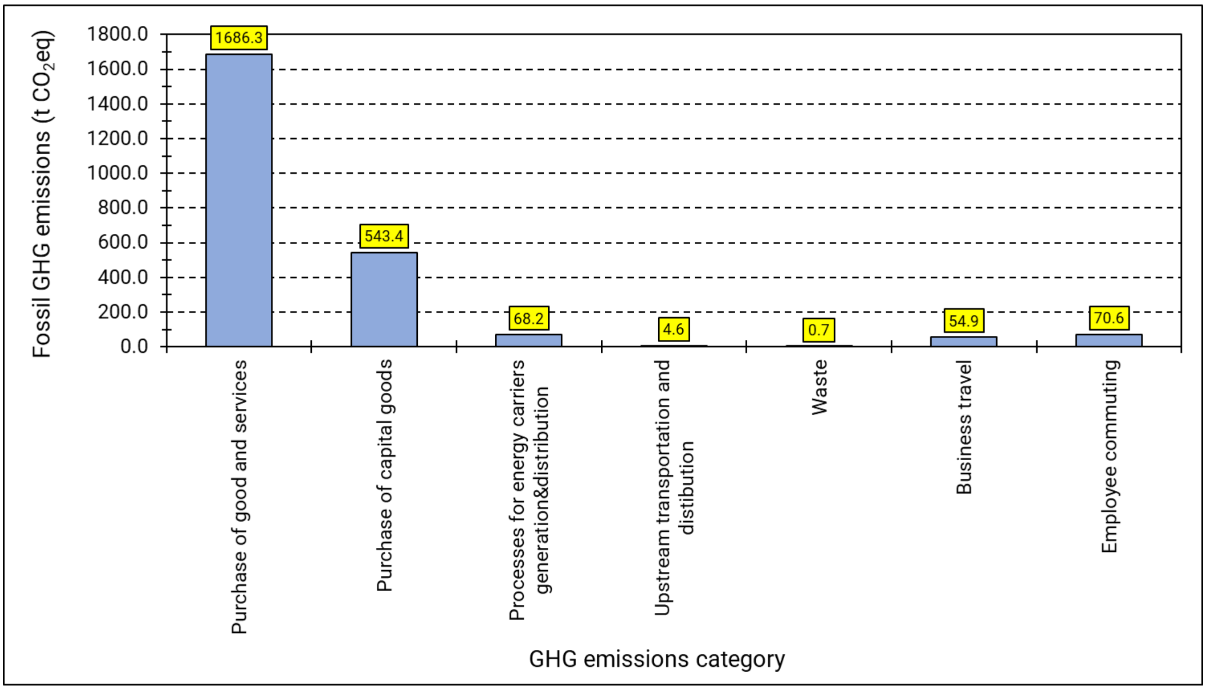

Figure 2: GHG emissions for each Scope 3 category.

Direct (Scope 1) and indirect (Scope 3) GHG emissions amount for 16.2% and 83.8% of the total, respectively.

5.2 Energy intensity and emissions intensity

The total energy consumption within the Company is 8205595 MJ (2279332 kWh) given by the sum of: (i) purchased electricity (1002845 MJ; 278568 kWh), (ii) LPG for warehouse heating (7017775.2 MJ; 292700 dm^3), (iii) gasoline (27588 MJ; 930 dm^3) and (iv) diesel fuel (157387 MJ; 4245 dm^3)[13] for the Company vehicles.

The energy efficiency has been measured through the energy intensity value (toe[14]/€), expressed as the ratio between the total consumed energy and the total expenditure for purchasing goods and services and capital goods (upstream fuel and energy activities excluded), which is the most important category in terms of GHG emissions. For 2023, the energy intensity value is $2.1 \cdot 10^{-5}$ toe/€.

Like for energy, the emissions intensity has been computed as the ratio between the total (Scope 1 + Scope 2 + Scope 3) emissions and the total expenditure (€) for the purchase of goods and services and capital goods (upstream fuel and energy activities excluded), and it is $3.1 \cdot 10^{-4}$ tCO_2eq/€.

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13 For the fuels, the energy (MJ) has been computed starting from the volume expressed as dm^3 and applying the lower heating value (literature). The volume of fuel, if not already available from the Company's data management system, has been computed as the ratio between the travelled distance (km) and the average distance travelled per unit of fuel volume (km/dm^3; GHG Protocol, 2027).

14 Tons of oil equivalent (1 toe = 41.87 GJ = 11.63 MWh).

6. Inventory quality management

6.1 GHG information management procedure

All information necessary for the preparation of the GHG Report is managed in accordance with the general principles established by the ISO 14064-1 (i.e., relevance, completeness, consistency, accuracy, and transparency) and considering the criteria defined by the Company to establish whether to include or exclude specific categories/subcategories (§ 3.2 Emissions categories and selection criteria).

These procedures support the primary goal of the Inventory. To ensure data quality and consistency, errors and omissions are identified and corrected.

For the following GHG Inventories, all the information management procedures will be further improved with the aim of developing and maintaining a robust data-collection system.

6.2 Document retention and record keeping

The Company adopts a structured approach to ensure the collection and storage of all the required data for the GHG Inventory. Software and other specific computer programs are used, enabling efficient, secure, and centralized information management. All collected information is managed in full compliance with the Company's procedures for GHG information management related to document retention and record keeping, ensuring traceability, integrity, and accessibility of the data necessary for the verification and maintenance of the Inventory.

6.3 Uncertainty analysis

The uncertainty has been evaluated using the "GHG Protocol Uncertainty Tool"[15], which calculates the statistical uncertainty (i.e., a specific type of parameter uncertainty due to random variability of sample data) using the first-order error propagation method[16].

The uncertainty is calculated for both direct and indirect measured emissions. Then the tool provides an aggregated uncertainty value for the total of all direct and indirect measured emissions, ranking it according to a scale based on quantitative confidence intervals, defined as a percentage of the estimated or measured value in which the true value is likely to exist. The final result consists of an assessment of the level of accuracy of the results (emissions), as follows (**Table 11**):

15 https://ghgprotocol.org/sites/default/files/tools/ghg-uncertainty.xlsx

16 This method is based on the following assumptions: (i) errors in each parameter are normally distributed (i.e., Gaussian distribution), (ii) there are no biases in the estimator function (i.e. the estimated value is the mean value), (iii) the estimated parameters are not correlated (i.e., all parameters are fully independent) and (iv) individual uncertainties in each parameter is lower that 60% of the mean.

Table 11: Level of accuracy of the results.

Level of accuracy	Confidence interval (CI)
High	-5% ≤ CI ≤ +5%
Good	±5% < CI ≤ ±15%
Fair	±15% < CI ≤ ±30%
Poor	CI > 30%

For the current Inventory, all the emissions have been estimated (i.e., indirect measurement). The uncertainty has been computed according to: (i) activity data (e.g., quantity of used fuel), (ii) uncertainty of the activity data (confidence interval expressed as percentage), (iii) emission factors and (iv) uncertainty of the emissions factors (confidence interval expressed as percentage). Overall, the uncertainty value is equal to ± 3.9% (level of accuracy: high). Further information can be found in **Annex A1**.

7. Mitigation activities

No mitigation activities have been undertaken during the reporting period. Possible activities for GHG emissions reduction/mitigation will be considered for future GHG Inventories.

8. Variations in the methodological approach

Any integrations or improvements to the current version of the model may be introduced for the Inventory related to the following years, also according to any change in the organizational and/or reporting boundaries (§ 2. Organizational boundaries and § 3. Reporting boundaries).

9. Additional information

There is no additional information to report.

10. Annexes

10.1 A1: Uncertainty analysis

Table A1.1 shows the data used to estimate the uncertainty for the indirect measured emissions.

Table A1.1: Uncertainty estimation for indirect measured emissions.

	Step 1+2						Step 3					
	A	B	C	D	E	F	G	H	I	J	K	L
	Activity Data	Unit used to measure Activity Data	Uncertainty of activity data (a) (Confidence interval expressed in ± percent)	GHG emission factor	Unit of GHG emission factor	Uncertainty of emission factor (Confidence interval expressed in ± percent)	CO2 emissions (kg)	CO_2 emissions in metric tonnes	Uncertainty of calculated emissions	Certainty Ranking	Auxiliary Variable 1	Auxiliary Variable 2
							A * D	G/1000			(H*I)	K^2
Source description												
S C 2.1: Imported electricity	278568.2	kWh	+/- 0.0%	0.0000	kg CO2eq/kWh	+/- 0.0%	0.0	0.0	+/- 0.0%	High	0.0	0.0
SC 3.1: Upstream transportation and distribution	9.5	€	+/- 0.0%	0.0132	kg CO2eq/€	+/- 10.0%	0.1	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	10.0	€	+/- 0.0%	0.0122	kg CO2eq/€	+/- 10.0%	0.1	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	5.6	€	+/- 0.0%	0.0102	kg CO2eq/€	+/- 10.0%	0.1	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	19.4	€	+/- 0.0%	0.0122	kg CO2eq/€	+/- 10.0%	0.2	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	7.0	€	+/- 0.0%	0.0122	kg CO2eq/€	+/- 10.0%	0.1	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	320.0	€	+/- 0.0%	0.0000	kg CO2eq/€	+/- 10.0%	0.0	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	36.0	€	+/- 0.0%	0.0264	kg CO2eq/€	+/- 10.0%	1.0	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	6.5	€	+/- 0.0%	0.0275	kg CO2eq/€	+/- 10.0%	0.2	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	368.8	€	+/- 0.0%	0.0122	kg CO2eq/€	+/- 10.0%	4.5	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	32381.3	€	+/- 0.0%	0.0448	kg CO2eq/€	+/- 10.0%	1450.7	1.5	+/- 10.0%	Good	0.1	0.0
SC 3.1: Upstream transportation and distribution	29.6	€	+/- 0.0%	0.0102	kg CO2eq/€	+/- 10.0%	0.3	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	70.5	€	+/- 0.0%	0.0244	kg CO2eq/€	+/- 10.0%	1.7	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	4.1	€	+/- 0.0%	0.0448	kg CO2eq/€	+/- 10.0%	0.2	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	18.0	€	+/- 0.0%	0.0122	kg CO2eq/€	+/- 10.0%	0.2	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	20.2	€	+/- 0.0%	0.0132	kg CO2eq/€	+/- 10.0%	0.3	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	1021.4	€	+/- 0.0%	0.0448	kg CO2eq/€	+/- 10.0%	45.8	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	52806.8	€	+/- 0.0%	0.0448	kg CO2eq/€	+/- 10.0%	2365.7	2.4	+/- 10.0%	Good	0.2	0.1
SC 3.1: Upstream transportation and distribution	4401.2	€	+/- 0.0%	0.0448	kg CO2eq/€	+/- 10.0%	197.2	0.2	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	11598.9	€	+/- 0.0%	0.0356	kg CO2eq/€	+/- 10.0%	412.9	0.4	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	3931.8	€	+/- 0.0%	0.0122	kg CO2eq/€	+/- 10.0%	48.0	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	38.0	€	+/- 0.0%	0.0132	kg CO2eq/€	+/- 10.0%	0.5	0.0	+/- 10.0%	Good	0.0	0.0
SC 3.1: Upstream transportation and distribution	2140.5	€	+/- 0.0%	0.0448	kg CO2eq/€	+/- 10.0%	95.9	0.1	+/- 10.0%	Good	0.0	0.0
SC 3.3: Employee commuting	423720.0	km	+/- 10.0%	0.1666	kg CO2eq/km	+/- 5.0%	70591.8	70.6	+/- 11.2%	Good	7.9	62.3
SC 3.5: Business travels	4928.0	km	+/- 10.0%	0.1725	kg CO2eq/km	+/- 5.0%	850.1	0.9	+/- 11.2%	Good	0.1	0.0
SC 3.5: Business travels	3696.0	km	+/- 10.0%	0.2081	kg CO2eq/km	+/- 5.0%	769.1	0.8	+/- 11.2%	Good	0.1	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	1793614.9	€	+/- 0.0%	0.2736	kg CO2eq/€	+/- 10.0%	490733.0	490.7	+/- 10.0%	Good	49.1	2408.2
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	6506.5	€	+/- 0.0%	0.0529	kg CO2eq/€	+/- 10.0%	344.2	0.3	+/- 10.0%	Good	0.0	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	112.2	€	+/- 0.0%	2.8472	kg CO2eq/€	+/- 10.0%	319.5	0.3	+/- 10.0%	Good	0.0	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	8643.1	€	+/- 0.0%	0.2238	kg CO2eq/€	+/- 10.0%	1934.3	1.9	+/- 10.0%	Good	0.2	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	9100.0	€	+/- 0.0%	0.0427	kg CO2eq/€	+/- 10.0%	388.6	0.4	+/- 10.0%	Good	0.0	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	24443.0	€	+/- 0.0%	1.0427	kg CO2eq/€	+/- 10.0%	25486.7	25.5	+/- 10.0%	Good	2.5	6.5
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	29554.6	€	+/- 0.0%	0.4201	kg CO2eq/€	+/- 10.0%	12415.9	12.4	+/- 10.0%	Good	1.2	1.5
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	3155.2	€	+/- 0.0%	0.4578	kg CO2eq/€	+/- 10.0%	1444.4	1.4	+/- 10.0%	Good	0.1	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	20440.0	€	+/- 0.0%	1.0589	kg CO2eq/€	+/- 10.0%	21643.9	21.6	+/- 10.0%	Good	2.2	4.7
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	2547689.5	€	+/- 0.0%	0.3184	kg CO2eq/€	+/- 10.0%	811184.3	811.2	+/- 10.0%	Good	81.1	6580.2
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	102491.1	€	+/- 0.0%	0.2940	kg CO2eq/€	+/- 10.0%	30132.4	30.1	+/- 10.0%	Good	3.0	9.1
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	127058.8	€	+/- 0.0%	0.2187	kg CO2eq/€	+/- 10.0%	27787.8	27.8	+/- 10.0%	Good	2.8	7.7
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	500.0	€	+/- 0.0%	0.0804	kg CO2eq/€	+/- 10.0%	40.2	0.0	+/- 10.0%	Good	0.0	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	1442128.0	€	+/- 0.0%	0.1516	kg CO2eq/€	+/- 10.0%	218626.6	218.6	+/- 10.0%	Good	21.9	478.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	75153.1	€	+/- 0.0%	0.2736	kg CO2eq/€	+/- 10.0%	20561.9	20.6	+/- 10.0%	Good	2.1	4.2
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	1256.6	€	+/- 0.0%	0.0559	kg CO2eq/€	+/- 10.0%	70.2	0.1	+/- 10.0%	Good	0.0	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	159964.5	€	+/- 0.0%	0.1363	kg CO2eq/€	+/- 10.0%	21803.2	21.8	+/- 10.0%	Good	2.2	4.8
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	4085.4	€	+/- 0.0%	0.3520	kg CO2eq/€	+/- 10.0%	1438.1	1.4	+/- 10.0%	Good	0.1	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	5626.3	€	+/- 0.0%	0.2452	kg CO2eq/€	+/- 10.0%	1379.6	1.4	+/- 10.0%	Good	0.1	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	9972.4	€	+/- 0.0%	0.2706	kg CO2eq/€	+/- 10.0%	2698.5	2.7	+/- 10.0%	Good	0.3	0.1
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	22146.3	€	+/- 0.0%	0.0397	kg CO2eq/€	+/- 10.0%	879.2	0.9	+/- 10.0%	Good	0.1	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	799841.7	€	+/- 0.0%	0.1465	kg CO2eq/€	+/- 10.0%	117176.8	117.2	+/- 10.0%	Good	11.7	137.3
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	2635.0	€	+/- 0.0%	0.1770	kg CO2eq/€	+/- 10.0%	466.4	0.5	+/- 10.0%	Good	0.0	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	2297603.5	€	+/- 0.0%	0.1831	kg CO2eq/€	+/- 10.0%	420691.2	420.7	+/- 10.0%	Good	42.1	1769.8
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	401.5	€	+/- 0.0%	0.3550	kg CO2eq/€	+/- 10.0%	142.5	0.1	+/- 10.0%	Good	0.0	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	278568.2	kWh	+/- 0.0%	0.0000	kg CO2eq/kWh	+/- 0.0%	0.0	0.0	+/- 0.0%	High	0.0	0.0
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	278569.2	kWh	+/- 0.0%	0.0500	kg CO2eq/kWh	+/- 5.0%	13928.5	13.9	+/- 5.0%	High	0.7	0.5
SC 4.1, 4.2 and 4.3: Purchased goods and services and capital goods	292700.0	dm^3	+/- 0.0%	0.1860	kg CO2eq/dm^3	+/- 5.0%	54442.2	54.4	+/- 5.0%	High	2.7	7.4
SC 4.4: Disposal of solid and liquid waste	1.1	t	+/- 5.0%	0.2000	kg CO2eq/t	+/- 5.0%	0.2	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.1	t	+/- 5.0%	0.0000	kg CO2eq/t	+/- 5.0%	0.0	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	23.6	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	502.8	0.5	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	4.2	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	88.6	0.1	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.9	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	20.0	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.0	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	0.1	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.8	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	16.2	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.8	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	17.9	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.0	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	0.1	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.1	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	2.6	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.4	t	+/- 5.0%	1.2300	kg CO2eq/t	+/- 5.0%	0.4	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.2	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	4.3	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.8	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	17.0	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.0	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	0.4	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.5	t	+/- 5.0%	0.0000	kg CO2eq/t	+/- 5.0%	0.0	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.1	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	2.6	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.1	t	+/- 5.0%	0.0000	kg CO2eq/t	+/- 5.0%	0.0	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	2.4	t	+/- 5.0%	0.0000	kg CO2eq/t	+/- 5.0%	0.0	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	3.5	t	+/- 5.0%	0.0000	kg CO2eq/t	+/- 5.0%	0.0	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	2.9	t	+/- 5.0%	0.0000	kg CO2eq/t	+/- 5.0%	0.0	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	7.1	t	+/- 5.0%	0.0000	kg CO2eq/t	+/- 5.0%	0.0	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	2.0	t	+/- 5.0%	0.2000	kg CO2eq/t	+/- 5.0%	0.4	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.1	t	+/- 5.0%	21.2800	kg CO2eq/t	+/- 5.0%	2.6	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.3	t	+/- 5.0%	0.2000	kg CO2eq/t	+/- 5.0%	0.1	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.0	t	+/- 5.0%	520.3400	kg CO2eq/t	+/- 5.0%	5.2	0.0	+/- 7.1%	Good	0.0	0.0
SC 4.4: Disposal of solid and liquid waste	0.1	t	+/- 5.0%	0.0000	kg CO2eq/t	+/- 5.0%	0.0	0.0	+/- 7.1%	Good	0.0	0.0
S C 1.1: Stationary combustion	292700.0	dm^3	+/- 0.0%	1.5570	kg CO2eq/dm3	+/- 5.0%	455733.9	455.7	+/- 5.0%	High	22.8	519.2
S C 1.2: Mobile combustion	8891.0	km	+/- 0.0%	0.2450	kg CO2eq/km	+/- 5.0%	2178.3	2.2	+/- 5.0%	High	0.1	0.0
S C 1.2: Mobile combustion	19917.0	km	+/- 0.0%	0.2820	kg CO2eq/km	+/- 5.0%	5616.6	5.6	+/- 5.0%	High	0.3	0.1
S C 1.2: Mobile combustion	2162.1	dm^3	+/- 0.0%	2.6990	kg CO2eq/dm3	+/- 5.0%	5835.5	5.8	+/- 5.0%	High	0.3	0.1
Note: For individual uncertainties greater than 60%, the results of the tool are not valid					Sum CO_2 emissions (M):		2845042.3	2845.0				
					Step 4: Cumulated Uncertainty:		$\pm u = \pm \frac{\sqrt{\sum_{i=1}^{n}(H_i * I_i)^2}}{M}$		+/- 3.9%	High		

Tel.: +39 0342 682179 • Fax: +39 0342 682177
www.valland.it • info@valland.it
C.F/P.I. 00859800146

Head Office
Corso Giacomo Matteotti 8/A
23900 Lecco - Italy

Offices and Plant
Via Roccoli 252
23010 Piantedo (SO) - Italy