PERDELLE CARBON FOOTPRINT ASSESSMENT®

PERDELLE

CONCEPTEUR DE SIMPLICITÉ

Year 2025

Based on 2024–2025 data

Service provider :

LITA
EXPERTISE COMPTABLE
par nature

Table of Contents

1. Introduction and Company Overview

1.1 Presentation of PERDELLE

PERDELLE is a company based in Besançon (4 chemin de Palente, 25000 Besançon).

It designs and manufactures ergonomic devices intended for workstation optimisation, including the "Perdelle Néo" and "Perdelle Swan" models, which provide arm and shoulder support to help prevent musculoskeletal disorders (MSDs) among workers, whether seated or standing.

The company operates across various sectors: manufacturing industry, leather goods, assembly, inspection stations, and more.

From a legal standpoint, PERDELLE is a single-member simplified joint-stock company (SASU) registered with the Besançon Trade and Companies Register under number 953 865 581.

1.2 Objectives of the Carbon Footprint Assessment®

The purpose of this Carbon Footprint assessment® is to:

- measure the **overall** carbon footprint of PERDELLE's activity for the reference year (in this case, the 07/2024–06/2025 period);

- identify the **main emission sources** (energy, fixed assets, material purchases, service purchases, transport, end-of-life);

- establish a baseline within the company's CSR strategy, in order to prioritise **actions aimed at reducing** greenhouse gas (GHG) emissions;

- serve as a **reference** point for monitoring future reductions and, where relevant, for communication with stakeholders (clients, suppliers, potential labels or reporting requirements).

1.3 Methodology and Sources Used

To carry out this assessment, we rely on the Bilan Carbone® method (ADEME and ABC) and on best practices from the GHG Protocol (Scopes 1–2–3).
 The sources for emission factors and activity data are:

- the ADEME *Base Carbone®* (French national reference database for emission factors),
- additional sector-specific references (e.g., studies by Carbone 4),
- PERDELLE's internal activity data (quantities, expenses, material weights, etc.).

The emission items are broken down according to the organisational and operational boundaries (Scopes 1 to 3). The assessment also includes qualitative and quantitative uncertainty analysis per emission source, in accordance with methodological recommendations.
A methodological appendix details the emission factors used.

This Carbon Footprint® assessment was carried out by the accounting firm LITA, under the supervision of Jean-Louis Lacoste, chartered accountant certified in the Bilan Carbone® method.

Within PERDELLE, the project follow-up was ensured by the president, Mr. Fabrice Frérot.

2. Scope of the Study

2.1 Organisational Boundary

This Carbon Footprint assessment® covers all activities of the company PERDELLE, whose head office and production site are located at:
 4 chemin de Palente, 25000 Besançon (France).

PERDELLE designs, assembles, and markets ergonomic solutions intended to reduce musculoskeletal disorders in work environments. All management and administrative operations are centralised at this single location. Assembly and cutting operations are carried out by external service providers.

No additional legal entity, secondary site, or external production facility has been directly included in the organisational boundary; however, subcontractors and external providers working on behalf of PERDELLE are considered under Scope 3, as part of purchased goods and services.

2.2 Time Boundary

The assessment covers the reference period from 1 July 2024 to 30 June 2025.
 This choice makes it possible to encompass a full activity cycle, representative of the annual production level, while aligning with the accounting period and the most recent available data (invoices, consumption, travel, subcontracting).

Data from this period were prioritised to ensure temporal consistency between physical flows (energy, materials) and financial flows (service purchases).

2.3 Operational Boundary

The operational boundary is defined in accordance with the Carbon Footprint assessment®® methodology, using three levels:

Scope	Type of Emissions	Examples Included in PERDELLE's Boundary
Scope 1	**Direct** GHG emissions from fixed or mobile sources controlled by PERDELLE	Combustion of fossil fuels (e.g., heating, small equipment), fuel used for company vehicles (in this case, fuel consumption for rented vehicles)
Scope 2	Indirect emissions from purchased and consumed **energy**	Electricity consumption (average French grid mix) used for machinery, lighting, and offices

Scope 3	Other indirect emissions not included in Scopes 1 and 2	Purchases of raw materials and components (steel, plastic, wood, aluminium, etc.), purchase of services (subcontracting, maintenance, transport, consulting…), inbound/outbound freight, business travel and commuting, end-of-life of products, waste

All these emission sources were assessed using the *Base Empreinte®*, giving priority to actual activity data from internal systems (material weights, consumption levels, expenditure amounts, distances travelled). Scope 3 emissions, which are highly representative of PERDELLE's business model (significant subcontracting and externalisation), therefore make up the majority of the total footprint.

3. Results of the Carbon Footprint Assessment®

3.1 Detailed Results by Emission Source

PERDELLE's Carbon Footprint Assessment®, carried out for the period **July 2024 to June 2025**, amounts to a **total of 24.7 tonnes of CO$_2$ equivalent** (tCO$_2$e).

The emission sources are broken down as follows:

Category	Emissions (kgCO$_2$e)	Emissions (tCO$_2$e)	Share of Total	Average Uncertainty
Energy	583	0,6	2%	± 10 %
Fixed Assets	420	0,4	2%	± 67 %
Construction Materials and Inputs	8 621	8,6	35%	± 10 %
Freight and Logistics	943	0,9	4%	± 47 %
Travel (business and commuting)	357	0,36	1%	± 26 %
End-of-life and Waste	92	0,09	< 1 %	± 88 %
Purchase of Services	13 729	13,7	56%	± 30 %
TOTAL	24 745	24,7 tCO$_2$e	100%	—

PERDELLE - Répartition des émissions par catégorie
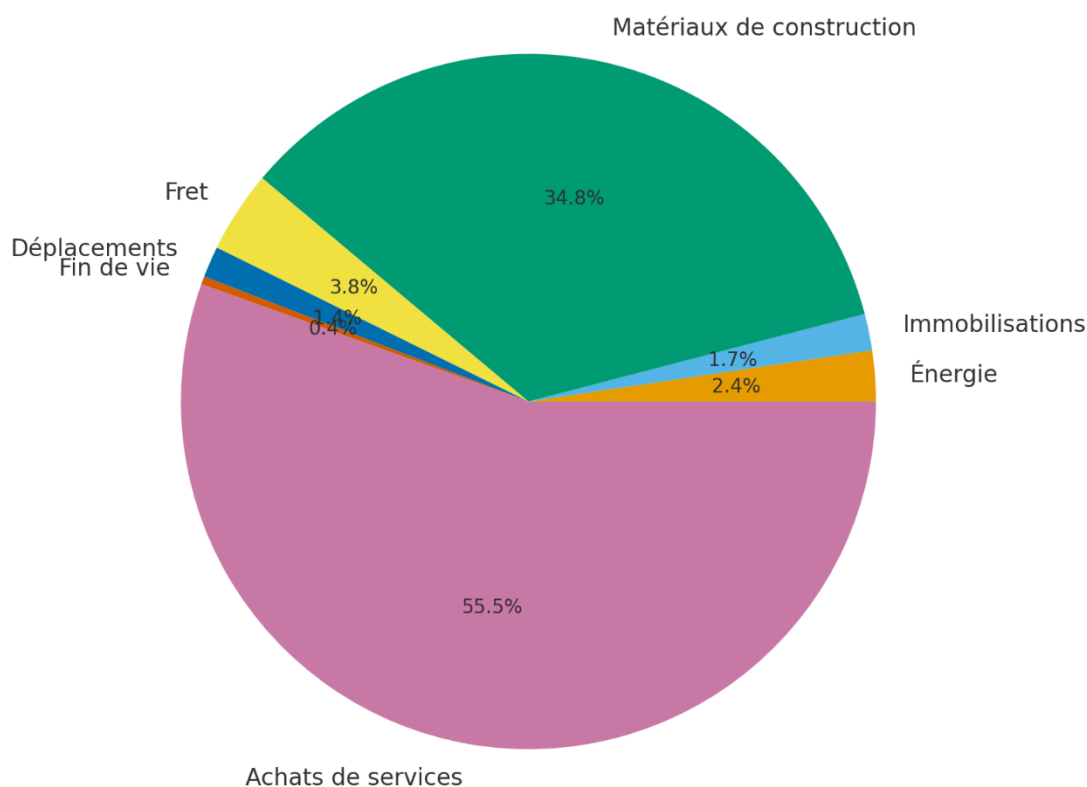
Purchases of services (subcontracting, maintenance, vehicle rental, consulting, catering, communication) represent the largest emission source, reflecting PERDELLE's reliance on external providers for cutting operations, logistics, and support activities.

Material inputs (notably steel and plastic) form the second major contributor, linked to the manufacturing of Perdelle devices.

3.2 Analytical Results

This analysis aims to estimate the unit carbon footprint of the main Perdelle device models.
 The goal is to understand the emission structure associated with each product, identify the most impactful materials, and highlight the priority reduction levers for future product ranges.

Calculations were performed per unit of product, based on material weights and emission factors from the *Base Carbone®* (ADEME, 2023).
 The data presented exclude any sensitive information (production volumes, sales figures, costs) to focus exclusively on the intrinsic carbon intensity of the products.

Aside from "indirect carbon charges", the following analytical material data were obtained:

3.2.1 Analytical Result — Perdelle Néo Device (per unit)

Carbon Intensity

- **12.27 kgCO$_2$e per Perdelle Néo device** (excluding indirect charges)

- **37.54 kgCO$_2$e per Perdelle Néo device** (including indirect charges)

Analysis

The Perdelle Néo device is characterised by a structure with high metal density: more than 85% of its footprint comes from the steel used for the arches, fastenings, and load-bearing elements.
 Polymer materials (plastics and rubbers) account for around 9% of the impact, while single-use components (packaging, foam, labels) remain marginal.

This profile reflects a robust product whose manufacturing is energy-intensive. Its decarbonisation will therefore depend primarily on increasing the recycled content of the steel and on optimising the material usage of structural parts.

Synthetic Breakdown by Material (per unit)

Material	Emissions (kgCO$_2$e)	Share
Steel	≈ 10,54	≈ 86 %
Plastics (parts, drum, end caps, tensioners, bags, etc.)	0,54	≈ 4,4 %
Rubber (elastics)	0,54	≈ 4,4 %
Foam (ergonomic arm supports)	0,2	≈ 1,6 %
Cardboard (main packaging)	0,31	≈ 2,5 %
Steel + plastic composites (indexable handles)	0,14	≈ 1,1 %
Paper, labels, flyers	<0,01	≈ 0,1 %
Total	12,27	100%

3.2.2 Analytical Result — Perdelle Swan Device (per unit)

Carbon Intensity

- **13,75 kgCO$_2$e per Perdelle Swan device** (excluding indirect charges)

- **39.02 kgCO$_2$e per Perdelle Swan device** (including indirect charges)

Analysis

The carbon profile of the Swan device is close to that of the Néo model, but slightly higher (+1.5 kgCO$_2$e), due to a heavier metal structure and the presence of aluminium components — a particularly carbon-intensive material (≈ 7.8 kgCO$_2$e/kg). Plastics and rubber remain secondary but non-negligible contributors.

Reduction efforts may focus on:

- lowering the weight of metal sub-assemblies,
- substituting aluminium where possible,
- integrating low-carbon steel (electric or hydrogen steelmaking).

Breakdown by Material (per unit)

Material	Emissions (kgCO$_2$e)	Share
Steel	≈ 11,8	≈ 86 %
Plastics (parts, drum, end caps, tensioners, bags, etc.)	0,77	≈ 5,6 %
Rubber (elastics)	0,54	≈ 3,9 %
Foam (ergonomic arm supports)	0,19	≈ 1,4 %
Cardboard (main packaging)	0,31	≈ 2,3 %

Aluminium (jaw component)	0,35	≈ 2,5 %
Steel + plastic composites (indexable handles)	0,06	≈ 0,4 %
Paper, labels, flyers	< 0,01	≈ 0,1 %
Total	13,75	100%

Carbon Intensity

- **6.54 kgCO$_2$e per Perdelle Taya device** (excluding indirect charges)
- **31.81 kgCO$_2$e per Perdelle Taya device** (including indirect charges)

The Taya device shows a unit carbon footprint for direct inputs that is **half that of the Néo and Swan devices**.
This performance is explained by:

- a more compact structure,
- a reduction in steel mass,
- the presence of wooden components, which have a low carbon intensity.

The aluminium share (≈ 12%) remains a point requiring attention, while the other materials contribute in a more balanced manner.
The Taya device thus represents a more resource-efficient design model, demonstrating the environmental improvement potential of the PERDELLE product range.

Breakdown by Material (per unit)

Material	Emissions (kgCO$_2$e)	Share
Steel	≈ 4,9	≈ 75 %
Plastics (parts, drum, end caps, tensioners, bags, etc.)	0,65	≈ 10 %
Wood / beech (structural elements)	0,23	≈ 3,5 %
Rubber (elastics)	0,54	≈ 8 %
Foam (ergonomic arm supports)	0,19	≈ 3 %
Cardboard (main packaging)	0,03	≈ 0,5 %
Aluminium (jaw component)	0,78	≈ 12 %
Steel + plastic composites (indexable handles)	0,14	≈ 2 %
Total	6,54	100%

Interpretation

Each Perdelle device sold in 2024–2025 has a carbon footprint ranging from **31.81 to 39.02 kgCO$_2$e**, consisting of:

- **2/3 indirect emissions** (services and site operations),
- **1/3 direct emissions** (materials and components).

This proportion is typical of a production model based on external manufacturing and a high reliance on service inputs (suppliers, maintenance, transport, etc.).
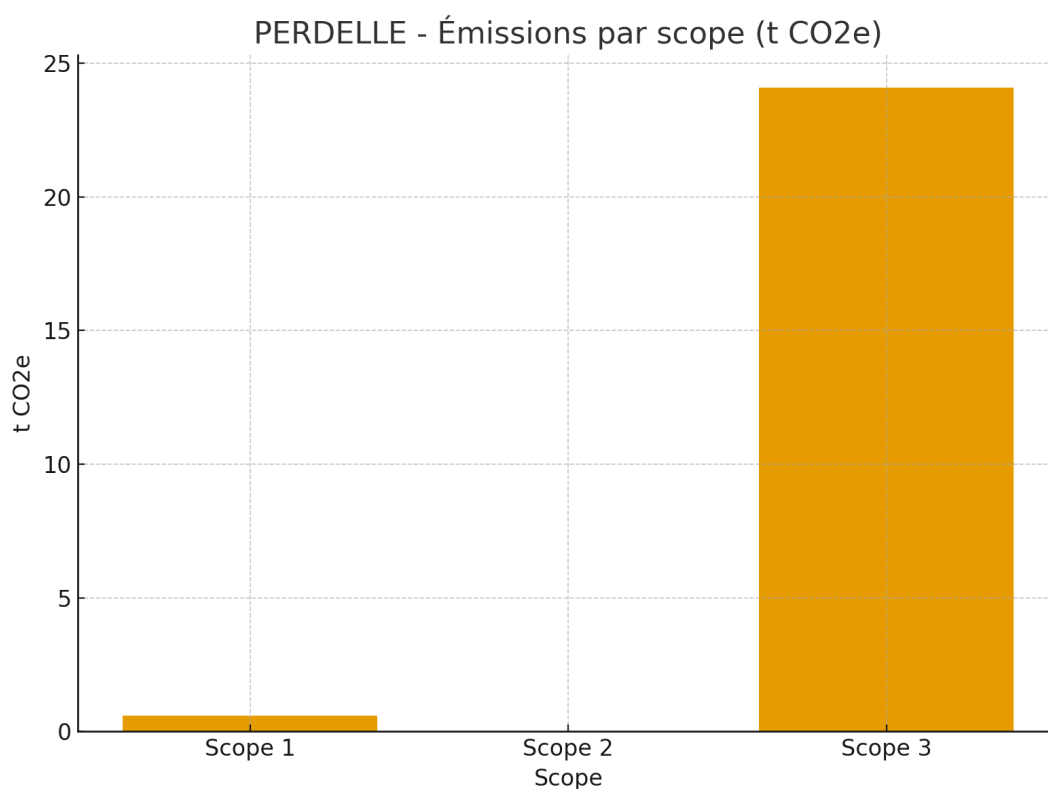
3.3 Consolidated Total

Consolidated emissions amount to **24.7 tCO$_2$e**, all categories combined.
This value is representative of a **light industrial activity** with a high degree of externalisation.

PERDELLE's carbon structure is distributed as follows:

- **Scope 3: 97%** of total emissions,
- **Scope 1: 2%,**
- **Scope 2: < 1%**.

PERDELLE - Émissions par scope (t CO2e)

This dominance of Scope 3 reflects the nature of the business model: very limited direct emissions (no heavy industrial processes and no internal fleet), but a significant footprint linked to purchasing, transport, and subcontracting.

PERDELLE - Achats de services (t CO2e)
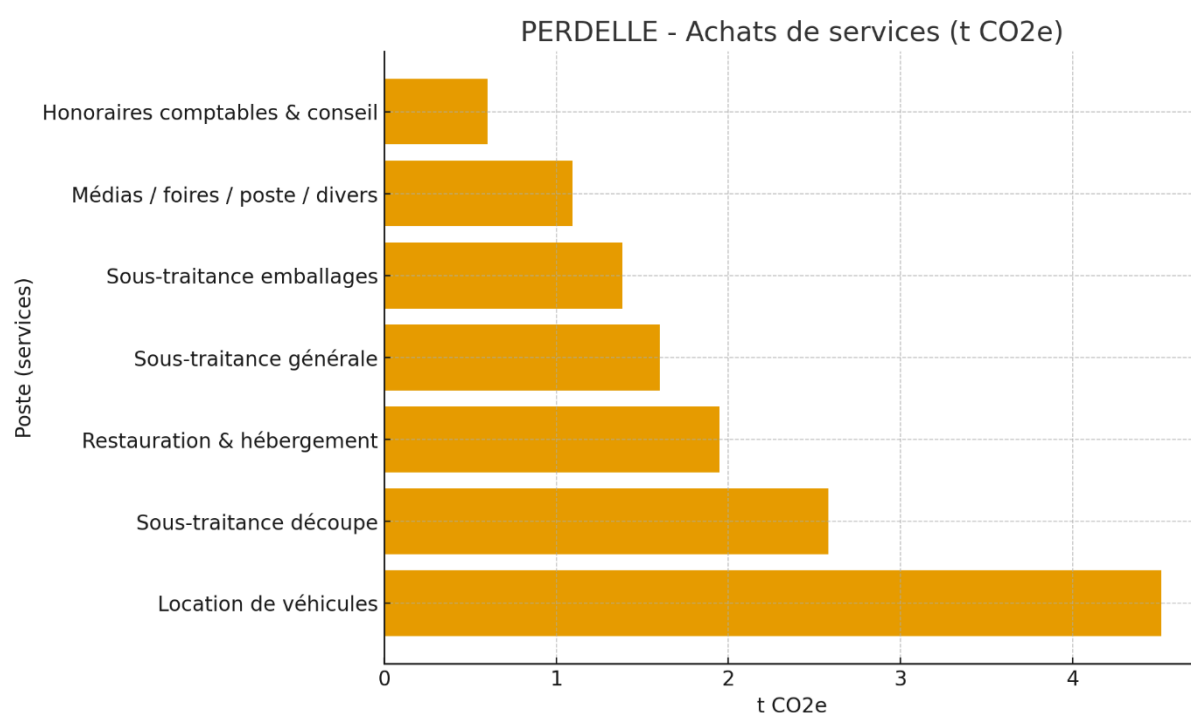
3.3 Uncertainty and Reliability Analysis

The uncertainty analysis follows the recommendations of the Bilan Carbone® methodology.

Overall, the reliability of the consolidated result is good, with a weighted average uncertainty estimated at **± 25%**, which is consistent with the standards for a first Carbon Footprint® assessment for a small company.

This uncertainty mainly arises from service-related items.

Uncertainty Level	Meaning	Affected Categories
Very low (< 10%)	Measured data and precise factors	Energy (electricity, fuels)
Low (10 – 25 %)	Known data with little variability	Plastics, cardboard, outbound freight
Medium (25 – 50 %)	Monetary or partial estimates	Service purchases, travel
High (> 50 %)	Flat-rate or uncertain data	Fixed assets, end-of-life

The greatest opportunities for improvement concern:

- carbon documentation from subcontractors and suppliers;
- traceability of waste and upstream transport.

3.4 Breakdown by Scope

Scope	Type of Emissions	Emissions (tCO$_2$e)	Share
Scope 1	Direct emissions (combustion, fuels)	0,6	2%
Scope 2	Purchased electricity	0,04	< 1 %
Scope 3	Other indirect emissions (purchases, freight, services, travel, waste)	24,1	97%
TOTAL		24,74 tCO$_2$e	100%

Scope 3 is dominant. Reduction efforts must therefore focus on the supply chain (materials and service providers) and on logistics.

4 Analysis and Interpretation

4.1 Main Emission Sources

The overall analysis shows that PERDELLE's greenhouse gas emissions for the period July 2024 – June 2025 amount to **24.7 tCO$_2$e**, distributed as follows:

- **Purchases of services:** 13.7 tCO$_2$e (56%)
- **Material inputs:** 8.6 tCO$_2$e (35%)
- **Freight and logistics:** 0.9 tCO$_2$e (4%)
- **Energy:** 0.6 tCO$_2$e (2%)
- **Fixed assets:** 0.4 tCO$_2$e (2%)
- **Other items (travel, waste):** < 1%

This structure confirms the dominant weight of outsourced services in PERDELLE's business model: maintenance, cutting, logistics, professional services, etc.
Direct emissions (linked to materials and components) represent roughly one-third of the total, while indirect emissions (purchases, freight, energy, operations) reach nearly **25 kgCO$_2$e per Perdelle device**, which is **twice the intrinsic emissions of the product itself**.

4.2 Product-by-Product Analytical Reading

The three models studied show distinct profiles:

Model	Carbon intensity (kgCO$_2$e / unit) excluding indirect charges	Dominant material	Specific features
Néo device	12,3	Steel	Full-steel structure, high density, no wood.
Swan device	13,8	Steel	Includes plastic and aluminium components.
Taya device	6,5	Steel + wood	Mixed, lighter structure using beech wood and aluminium.

The Perdelle Taya device shows a direct footprint **twice as low** as the other models, thanks to:

- a reduced metal mass,
- the use of bio-based materials (beech wood).

This performance demonstrates the relevance of eco-optimised design and the feasibility of significantly reducing unit emissions through design choices.

4.3 Identified Reduction Levers

1. **Purchases of services (56% of total)**
   - Structure a responsible purchasing plan: integrate low-carbon criteria into tenders, prioritise local providers, and assess their carbon footprint.
   - Strengthen traceability of outsourced services, which currently show high uncertainty (±50%) due to lack of direct supplier data.
   - Consider environmental clauses in subcontracting and maintenance contracts.

2. **Material inputs (35% of total)**
   - Decarbonise metal materials (steel, aluminium): use recycled sources, low-carbon steel, or certified suppliers.
   - Lighten product designs: continue the Taya approach (wood + reduced steel).
   - Explore reuse or circular economy solutions for certain components.

3. **Freight and logistics (4%)**
   - Optimise routes, consolidate shipments, and assess the relevance of low-carbon transport (biogas, electric vehicles, rail).
   - Favour transport providers with low-carbon certifications.

4. **Energy and fixed assets (4%)**
   - Monitor consumption and improve the energy efficiency of premises.
   - Integrate carbon performance into future investment decisions.

4.4 Qualitative Comments

- The predominance of indirect emissions reflects a highly outsourced industrial model, where carbon management depends largely on the data and practices of service providers.

- The analysis highlights the good performance of the Besançon site, whose energy consumption remains moderate. This is mainly due to the compact size of the premises and the fact that they are partially shared with other companies.

- Finally, the diversity of products (Swan, Néo, Taya devices) shows that low-carbon design is a genuine strategic lever: material choices, mass reduction, and assembly methods directly influence the unit footprint.

- **However, the accuracy of supplier data remains a major challenge: the monetary emission factors used for services are averaged, making them a**

source of uncertainty. A collaborative approach with subcontractors would help improve data reliability in future assessments.

5. Action Plan and Outlook

5.1 Current Situation

At this stage, no formal action plan has been established following this first Carbon Footprint Assessment®.
However, PERDELLE considers this evaluation an essential first step in understanding its climate impacts and progressively building a low-carbon strategy.

This initial exercise has made it possible to:

- quantify the company's overall carbon footprint for the first time,
- identify the main contributing sources (notably service purchases and metal materials),
- provide a baseline for any future reduction initiatives.

5.2 General Outlook

Although no specific short-term actions are currently planned, the management intends to rely on the insights gained from the Carbon Footprint® assessment to guide future decisions, particularly along three lines of reflection:

- **Strengthening the production of lower-impact models**, such as the Perdelle Taya device, whose mixed steel/wood design results in a significantly lower footprint.
- **Continuing discussions with suppliers and subcontractors**, with the aim of progressively obtaining more precise carbon data and reducing the uncertainty associated with service-related emission sources.
- **Highlighting the results in the company's communication**, as evidence of an initial commitment to better controlling its environmental impact.

5.3 A Foundational First Step

This Carbon Footprint® assessment represents a foundational milestone.
 It enables PERDELLE to:

- obtain a reliable snapshot of its emissions for the 2024–2025 period,
- anchor carbon measurement practices within its governance,

- lay the groundwork for a future action plan once a broader environmental strategy is defined.

5.4 Conclusion

Even without a formalised plan, this first Carbon Footprint® marks an important turning point for PERDELLE.
 It serves as the starting point of a long-term approach aimed at:

- displaying the carbon weight of its products,
- gaining a better understanding of its impacts,
- structuring dialogue with partners,
- and preparing, in time, the definition of credible reduction objectives and actions.

This report does not conclude a climate policy — it initiates one.

Appendix: Main Emission Factors

Catégorie	Poste	Facteur d'émission	Unité	Source
Energie	Gasoil	2,66	kgCO2e/L	Base Empreinte®
Energie	Electricity (French mix)	0,06	kgCO2e/kWh	Base Empreinte®
Energie	Heating (natural gas)	24,5	kgCO2e/m3	Base Empreinte®
Fixed Assets	Building	403	kgCO2e (50 years)	Base Empreinte®
Fixed Assets	Machining equipment	4,2	kgCO2e/kg	Base Empreinte®
Material Inputs	Steel	2,21	kgCO2e/kg	Base Empreinte®
Material Inputs	Aluminium	7,8	kgCO2e/kg	Base Empreinte®
Material Inputs	Plastic (PP, PE, ABS)	2,38	kgCO2e/kg	Base Empreinte®
Material Inputs	Rubber	5,44	kgCO2e/kg	Base Empreinte®
Material Inputs	Cardboard / Paper	0,39	kgCO2e/kg	Base Empreinte®
Material Inputs	Wood (dry beech)	0,0367	kgCO2e/kg	Base Empreinte®
Material Inputs	PU / PE foam	4,87	kgCO2e/kg	Base Empreinte®
Material Inputs	Steel + plastic composites	2,3	kgCO2e/kg	Base Empreinte®
Purchase of Services	Multitechnical maintenance	215	kgCO2e/k€	Base Empreinte®
Purchase of Services	Storage and logistics	147	kgCO2e/k€	Base Empreinte®
Purchase of Services	Other personal services	157	kgCO2e/k€	Base Empreinte®
Purchase of Services	Transport / vehicle rental	319	kgCO2e/k€	Base Empreinte®
Purchase of Services	Legal and accounting services	67	kgCO2e/k€	Base Empreinte®

				Base Empreinte®
Purchase of Services	Machine repair	196	kgCO2e/k€	Base Empreinte®
Purchase of Services	Insurance / financial services	73	kgCO2e/k€	Base Empreinte®
Purchase of Services	Postal services / mail	112	kgCO2e/k€	Base Empreinte®
Purchase of Services	Telecommunications	136	kgCO2e/k€	Base Empreinte®
Purchase of Services	Catering / accommodation	250	kgCO2e/k€	Base Empreinte®
Purchase of Services	Trade fairs and exhibitions	110	kgCO2e/k€	Base Empreinte®
Purchase of Services	Advertising / market studies	113	kgCO2e/k€	Base Empreinte®
Freight / Transport	Perdelle sales (90m³ articulated truck)	0,03	kgCO2e/m³.km	Base Empreinte®
Freight / Transport	Inbound road freight	0,03	kgCO2e/m³.km	Base Empreinte®
End of Life	Rigid plastic (recycling)	41	kgCO2e/tonne	Base Empreinte®
End of Life	Aluminium (average end of life)	562	kgCO2e/tonne	Base Empreinte®
End of Life	Steel (excluding recycling)	8	kgCO2e/tonne	Base Empreinte®
End of Life	Rubber (non-hazardous waste)	23	kgCO2e/tonne	Base Empreinte®