carboncalcpcf.com

Product Carbon Footprint Analysis Report

Product: psipqfhles

Company: yfulvwlrzp

Accounting Standard: GHG Protocol

Prepared by:

zyuhtqnwts

Senior Sustainability Consultant

Product Carbon Footprint (PCF) Analysis Report for psipqfhles

Generated Date: June 3, 2026

Executive Summary

This report presents a high-detail Product Carbon Footprint (PCF) analysis for the product "psipqfhles," manufactured by "yfulvwlrzp." The analysis was conducted by Senior Sustainability Consultant zyuhtqnwts, adhering strictly to the GHG Protocol Corporate Standard, including the 2026 Land Sector and Removals (LSR) update. The objective is to quantify the greenhouse gas (GHG) emissions across the product\'s lifecycle, from raw material extraction to end-of-life treatment, identifying key emission hotspots and providing a basis for targeted reduction strategies. The total illustrative PCF for one unit of psipqfhles is estimated at 38.36 kg CO2e.

---

1. Defining the Scope of Analysis

1.1 Functional Unit

The functional unit for this Product Carbon Footprint analysis is defined as **1.0 unit of psipqfhles**, providing a consistent basis for quantification and comparison.

1.2 System Boundary

The system boundary adopted for this analysis is **"factory_gate,"** encompassing all upstream processes from raw material acquisition, through manufacturing, to the point where the finished product leaves the production facility. For a comprehensive PCF, and aligning

with GHG Protocol requirements, downstream emissions from product use and end-of-life are also included, effectively following a "cradle-to-grave" approach.

- **Included:** Raw material extraction and processing, manufacturing at yfulvwlrzp\'s facilities, upstream transportation of materials, factory energy consumption, transportation to the customer, product use-phase energy consumption, and end-of-life treatment.
- **Excluded:** Capital goods, employee commuting, business travel, and other indirect corporate-level emissions not directly attributable to the product\'s lifecycle.

1.3 Geographic Scope

The geographic scope of the final production country is **China**. The supply chain focus is primarily **Europe Focused**, implying that many upstream material sourcing and intermediate manufacturing steps may originate from or pass through European supply chains before final assembly in China.

1.4 Allocation

Emissions are allocated to the functional unit based on mass and energy consumption where appropriate. For shared processes (e.g., transportation of multiple goods), emissions are allocated proportionally to the weight or volume of the product psipqfhles.

1.5 Accounting Standard

This analysis strictly adheres to the **GHG Protocol Corporate Standard**, categorizing emissions into Scope 1 (direct emissions), Scope 2 (purchased energy emissions), and Scope 3 (all other indirect emissions in the value chain).

---

2. Mapping the Lifecycle & 3. Data Collection

The lifecycle of psipqfhles is mapped across several stages, for which data has been collected or estimated based on the provided parameters. The primary lifecycle stages include material acquisition and pre-processing, manufacturing, transportation, use-phase, and end-of-life.

2.1 Detailed Bill of Materials (BOM) for psipqfhles

The Detailed Bill of Materials (BOM) provides a high-accuracy basis for calculating material impacts. The "Total Carbon" values from the provided BOM are directly used for material impact calculation. These values represent the cradle-to-gate emissions associated with each material.

(Note: The BOM data below is illustrative, assuming the generic placeholder "pdyqsnhp" represents this structured data.)

ID	Description	Category	Process	Quantity	Unit	Emission Factor (kgCO2e/Unit)	Total Carbon (kgCO2e)
1	Steel Casing	Metals	Stamping	0.5	kg	2.0	1.0
2	Plastic Enclosure	Plastics	Injection Molding	0.3	kg	3.5	1.05
3	Circuit Board	Electronics	Assembly	0.1	unit	50.0	5.0
4	Copper Wire	Metals	Extrusion	0.02	kg	4.0	0.08

The total illustrative mass of the product (sum of BOM quantities) is 0.5 + 0.3 + 0.1 (assumed weight for circuit board) + 0.02 = 0.92 kg.

2.2 Energy Inputs (Production Phase)

- **Energy Intensity (kWh/unit):** smtkoxvjjm (Illustrative value used for calculation: 10 kWh/unit)

- **Renewable Energy Usage:** ixouyddzuv (Illustrative value used for calculation: 50%)

2.3 Logistics Data (Transportation)

- **Transport Mode (Upstream):** Select Mode (Illustrative value: Road freight - Heavy Goods Vehicle)
- **Transport Distance (Upstream):** ikweyshfuv (Illustrative value: 2000 km)
- **Last-Mile Delivery Channel:** Delivery Type (Illustrative value: Courier Van; assumed last-mile distance: 50 km)

2.4 Product Durability and Consumption (Use Phase)

- **Product Lifespan:** ujsdknhmll (Illustrative value: 5 years)
- **Energy Consumption in Use:** vohepwujmz (Illustrative value: 5 kWh/year)

2.5 End-of-Life (EoL) Scenarios

- **Recyclability Percentage:** vntfptoyzw (Illustrative value: 70%)
- **Circular/Take-back Programs:** jtoypnogli (Illustrative value: Yes, active take-back and refurbishment program)

---

4. Emission Calculation

Emissions are calculated based on activity data multiplied by appropriate emission factors (EFs). Illustrative numerical values are used for generic string parameters to demonstrate the calculation methodology. All emission factors are sourced from industry-standard databases or reputable studies.

Illustrative Emission Factors Used:

- Electricity, China Grid Mix: 0.6205 kg CO2e/kWh
- Road Freight (HGV, general): 0.135 kg CO2e/tkm
- Courier Van (Last Mile): 0.23099 kg CO2e/km (vehicle-based)

- Landfill (Mixed Waste): 0.3 kg CO2e/kg
- Recycling (Steel processing): 1.71 kg CO2e/kg
- Recycling (Plastic processing): 0.202 kg CO2e/kg

4.1 Scope 1 Emissions (Direct Emissions)

Given the "factory_gate" system boundary and the nature of the product, direct emissions from owned or controlled sources (e.g., on-site fuel combustion) are assumed to be negligible for the functional unit or are indirect via purchased electricity. Therefore, Scope 1 emissions are considered **0 kg CO2e** for this product.

4.2 Scope 2 Emissions (Purchased Energy)

These emissions arise from the generation of purchased electricity consumed during the manufacturing of psipqfhles.

- Energy consumed: 10 kWh/unit (from `smtkoxvjjm`)
- Renewable energy usage: 50% (from `ixouyddzuv`)
- Grid electricity proportion: 10 kWh/unit * (1 - 0.50) = 5 kWh/unit
- Emission Factor (China grid mix): 0.6205 kg CO2e/kWh
- **Calculation:** 5 kWh/unit * 0.6205 kg CO2e/kWh = **3.10 kg CO2e**

4.3 Scope 3 Emissions (Value Chain Emissions)

Scope 3 emissions represent the most significant portion of the PCF for many products and require comprehensive assessment.

4.3.1 Category 1: Purchased Goods and Services (Materials)

Emissions from the extraction, production, and pre-processing of raw materials are directly derived from the "Total Carbon" values provided in the Detailed Bill of Materials (BOM).

- Steel Casing: 1.0 kg CO2e
- Plastic Enclosure: 1.05 kg CO2e
- Circuit Board: 5.0 kg CO2e
- Copper Wire: 0.08 kg CO2e

- **Total Material Emissions: 1.0 + 1.05 + 5.0 + 0.08 = 7.13 kg CO2e**

4.3.2 Category 4: Upstream Transportation and Distribution

Emissions from the transportation of raw materials to the manufacturing facility and distribution to the end customer.

- **Upstream Transport (Raw materials to factory):**
    - Product weight: 0.92 kg/unit (sum of BOM quantities)
    - Distance: 2000 km (from `ikweyshfuv`)
    - Transport Mode: Road freight (Heavy Goods Vehicle)
    - Emission Factor: 0.135 kg CO2e/tkm (or 0.000135 kg CO2e/kg.km)
    - **Calculation:** 0.92 kg * 2000 km * 0.000135 kg CO2e/kg.km = **0.25 kg CO2e**
- **Last-Mile Delivery (Factory to Customer):**
    - Delivery Channel: Courier Van (from `Delivery Type`)
    - Assumed Last-Mile Distance: 50 km (illustrative for a single unit delivery via courier)
    - Emission Factor (Courier Van): 0.23099 kg CO2e/km (vehicle-based). This is applied per unit delivery, assuming the unit constitutes the primary load for this specific delivery leg.
    - **Calculation:** 50 km * 0.23099 kg CO2e/km = **11.55 kg CO2e**
- **Total Transportation Emissions: 0.25 + 11.55 = 11.80 kg CO2e**

4.3.3 Category 11: Use of Sold Products

Emissions generated during the consumer use phase of the product, primarily from energy consumption.

- Energy Consumption in Use: 5 kWh/year (from `vohepwujmz`)
- Product Lifespan: 5 years (from `ujsdknhmll`)
- Total Energy in Use: 5 kWh/year * 5 years = 25 kWh
- Emission Factor (China grid mix): 0.6205 kg CO2e/kWh

- **Calculation:** 25 kWh * 0.6205 kg CO2e/kWh = **15.51 kg CO2e**

4.3.4 Category 12: End-of-Life Treatment of Sold Products

Emissions associated with the disposal and recycling of the product at the end of its lifespan.

- Total Product Weight: 0.92 kg
- Recyclability Percentage: 70% (from `vntfptoyzw`)
- Mass to Recycling: 0.92 kg * 0.70 = 0.644 kg
- Mass to Landfill: 0.92 kg * (1 - 0.70) = 0.276 kg

Allocation for Recycled Materials: Based on the BOM, the main recyclable materials are Steel (0.5 kg) and Plastic (0.3 kg), totaling 0.8 kg. The 0.644 kg recycled mass is proportionally split:

- Recycled Steel: (0.5 kg Steel / 0.8 kg Total Recyclable) * 0.644 kg = 0.4025 kg
- Recycled Plastic: (0.3 kg Plastic / 0.8 kg Total Recyclable) * 0.644 kg = 0.2415 kg

Emissions from Recycling:

- Steel Recycling EF: 1.71 kg CO2e/kg
- Plastic Recycling EF: 0.202 kg CO2e/kg
- **Calculation (Steel):** 0.4025 kg * 1.71 kg CO2e/kg = 0.69 kg CO2e
- **Calculation (Plastic):** 0.2415 kg * 0.202 kg CO2e/kg = 0.05 kg CO2e
- **Total Recycling Emissions: 0.69 + 0.05 = 0.74 kg CO2e**

Emissions from Landfilling:

- Landfill EF (Mixed Waste): 0.3 kg CO2e/kg
- **Calculation:** 0.276 kg * 0.3 kg CO2e/kg = 0.08 kg CO2e

Total End-of-Life Emissions: 0.74 + 0.08 = 0.82 kg CO2e

Circular/Take-back Programs: The company yfulvwlrzp has "jtoypnogli" (active take-back and refurbishment programs). These programs are crucial for extending product lifespan and increasing

material circularity, thereby avoiding upstream emissions from new production. While not directly quantified in the EoL calculation (which focuses on the fate of the initial product), these initiatives significantly reduce the overall lifecycle impact across multiple product cycles.

4.4 2026 LSR Update: Land Sector and Removals (LSR) Standard

The GHG Protocol\'s 2026 LSR Standard requires accounting for greenhouse gas emissions and removals associated with land use. For "psipqfhles," direct land-use change emissions or removals would be applicable if biogenic carbon materials (e.g., wood, bio-plastics from specific feedstocks) were present in the BOM or if raw material sourcing directly caused land-use change. Given the illustrative BOM (steel, plastic, circuit board, copper), which are predominantly fossil or mineral-based, direct LSR impacts for *this specific product\'s materials* are likely embedded within the "Total Carbon" values of the purchased goods. However, if any material involved deforestation or significant land-use conversion in its supply chain, those emissions would be quantified under LSR. yfulvwlrzp should implement robust traceability to identify and quantify such impacts for future, more granular LSR reporting.

4.5 Scope 3 Compliance (95% Coverage)

This analysis addresses the major categories of Scope 3 emissions relevant to "psipqfhles": Purchased Goods and Services (Category 1), Upstream Transportation and Distribution (Category 4), Use of Sold Products (Category 11), and End-of-Life Treatment of Sold Products (Category 12). These categories typically represent the dominant share of a manufactured product\'s value chain emissions. By calculating these significant categories with detailed data, this report aims to achieve well over the 95% coverage requirement for Scope 3 reporting as per 2026 guidelines. Remaining categories, such as capital goods or waste generated in operations (beyond EoL product waste), are assumed to be minor contributors on a per-unit product basis and are often handled at the corporate level.

---

5. Review & Report: Total Product Carbon Footprint

The illustrative Product Carbon Footprint for one unit of psipqfhles is summarized below:

Emission Scope & Category	Illustrative Emissions (kg CO2e)
Scope 1: Direct Emissions	0.00
Scope 2: Purchased Electricity (Manufacturing)	3.10
Scope 3: Value Chain Emissions	
Category 1: Purchased Goods and Services (Materials)	7.13
Category 4: Upstream Transportation and Distribution	11.80
Category 11: Use of Sold Products	15.51
Category 12: End-of-Life Treatment of Sold Products	0.82
Total Product Carbon Footprint	**38.36**

Note: Totals may slightly vary due to rounding.

5.1 Hotspots and Reliability

The primary emission hotspots for psipqfhles, based on this illustrative analysis, are:

- **Use Phase (40.4%):** Energy consumption during the product\'s lifespan is the largest contributor, highlighting the importance of energy efficiency in product design and consumer behavior.
- **Last-Mile Transportation (30.1% of Scope 3, 11.55 kg CO2e):** The illustrative last-mile delivery scenario shows a significant impact, suggesting optimization of delivery logistics and vehicle types could yield substantial reductions.

- **Material Production (18.6%):** The manufacturing of key components, particularly the Circuit Board (5.0 kg CO2e) and Plastic Enclosure (1.05 kg CO2e), contributes significantly, emphasizing the need for sustainable material sourcing and design for dematerialization.
- **Manufacturing Energy (8.1%):** While a portion of renewable energy is used, further decarbonization of the factory\'s energy mix will directly reduce Scope 2 emissions.

The reliability of this report is dependent on the accuracy of the provided parameters and the chosen emission factors. While industry-standard factors were used, primary data collection for all supply chain stages would further enhance accuracy. The illustrative nature of the numerical inputs (derived from generic string placeholders) means these figures are indicative and would require precise operational data for definitive quantification.

Recommendations for yfulvwlrzp:

- **Enhance Energy Efficiency:** Focus on reducing energy consumption during the product\'s use phase through design improvements.
- **Decarbonize Manufacturing:** Increase renewable energy usage at production facilities in China beyond the current 50% to reduce Scope 2 emissions.
- **Optimize Logistics:** Investigate lower-carbon transportation modes and optimize last-mile delivery networks, potentially exploring electric vehicles or consolidated shipments.
- **Sustainable Material Sourcing:** Explore materials with lower embodied carbon, increase recycled content, and demand greater transparency from suppliers regarding their carbon footprint.
- **Strengthen Circularity:** Leverage the existing "jtoypnogli" (take-back/refurbishment) programs to maximize product and material longevity, reducing the need for virgin material input.
- **Improve Data Collection:** Implement systems for collecting primary data for all key parameters (transport distances,

actual energy consumption, specific material EFs) to refine future PCF analyses.