

carboncalcpcf.com

Product Carbon Footprint Analysis Report

Product Name: epduonfkye

Company Name: krsqkgsspf

Accounting Standard: GHG Protocol

Senior Sustainability Consultant:
qeemhoylgi

This report is generated based on available data and industry standards. It represents a detailed analysis of the product's carbon footprint, with illustrative data used for placeholders.

Product Carbon Footprint Analysis for epduonfkye

Generated Date: May 26, 2026

1. Executive Summary

This report presents a high-detail Product Carbon Footprint (PCF) analysis for the product "epduonfkye" manufactured by "krsqkgsspf". The analysis was conducted by "qeemhoylgi", a Senior Sustainability Consultant, adhering strictly to the GHG Protocol. The objective is to quantify the greenhouse gas emissions associated with the product's entire lifecycle from raw material extraction to end-of-life (cradle-to-grave perspective, with a system boundary of factory gate for primary data collection and extended to use and end-of-life with secondary data). This report aims to identify emission hotspots, assess environmental impacts, and provide a baseline for future sustainability improvements. Special attention has been paid to the 2026 Land Sector and Removals (LSR) Standard update and ensuring at least 95% coverage for Scope 3 emissions, as per 2026 requirements. Illustrative data has been used for various parameters where specific inputs were provided as placeholders.

2. Methodology

The Product Carbon Footprint (PCF) for "epduonfkye" was calculated following the five-step methodology

prescribed, with strict adherence to the GHG Protocol Product Standard. This includes:

1. Defining the scope of the assessment.
2. Mapping the product's lifecycle and relevant inventory stages.
3. Collecting primary and secondary data points.
4. Calculating emissions based on activity data and emission factors.
5. Reviewing and reporting findings, including hotspots and reliability assessments.

Emissions are categorized into Scope 1 (direct emissions), Scope 2 (indirect emissions from purchased energy), and Scope 3 (all other indirect emissions in the value chain). The 2026 Land Sector and Removals (LSR) Standard is acknowledged, and efforts are made to include relevant land use and carbon removal impacts where data permits. A comprehensive approach ensures robust Scope 3 reporting coverage.

3. Scope Definition

3.1. Functional Unit

The functional unit for this PCF analysis is defined as **1.0 unit of epduonfkye**, providing its intended function over its entire lifespan.

3.2. System Boundary

The system boundary for this analysis is a "factory_gate" scope for primary data collection from krsqkgsspf's direct operations, extended to include a "cradle-to-grave" perspective using secondary data for upstream (materials, transport) and downstream (use

phase, end-of-life) impacts. This includes all stages from raw material acquisition, manufacturing, transport, use, and end-of-life treatment.

3.3. Geographic Scope

- **Final Production Country:** China
- **Supply Chain Focus:** Europe Focused (implying significant material sourcing and/or distribution within Europe)

3.4. Accounting Standard

This Product Carbon Footprint analysis strictly adheres to the **GHG Protocol Product Life Cycle Accounting and Reporting Standard**. All emissions are categorized according to GHG Protocol Scope 1, 2, and 3 definitions. The report also considers the requirements of the 2026 Land Sector and Removals (LSR) Standard for land use and carbon removals and aims for at least 95% coverage for Scope 3 reporting.

3.5. Allocation

Allocation of emissions for multi-output processes or recycled content follows the GHG Protocol's recommendations, primarily using mass-based allocation where direct attribution is not possible. For recycled content, the "cut-off" approach is generally applied, meaning the burden of primary production is assigned to the primary user of the material, and the burden of recycling is assigned to the product using the recycled content. Avoided emissions credits are applied at the end-of-life stage for materials that are recycled.

4. Lifecycle Mapping & Data Collection

The product lifecycle for epduonfkye is mapped into the following stages, with associated data collection points:

4.1. Bill of Materials (BOM) & Raw Material Acquisition (Scope 3, Category 1)

The following detailed Bill of Materials (BOM) was provided for "epduonfkye". The 'Total Carbon' for each item is directly used in the material impact calculation. Emission factors for these materials are assumed to incorporate cradle-to-gate impacts.

ID	Description	Category	Process	Qty	Unit	Emission Factor (kgCO2e/unit)	Total Carbon (kgCO2e)
1	Plastic Casing	Polymers	Injection Molding	0.5	kg	3.5	1.75
2	Circuit Board (populated)	Electronics	Assembly	0.1	unit	20.0	2.00
3	Metal Screws	Metals	Manufacturing	0.02	kg	5.0	0.10
4	Cardboard Packaging	Paper/ Board	Forming	0.15	kg	1.2	0.18

Total Material Carbon Footprint: 4.03 kgCO2e/unit

4.2. Manufacturing/Production (Scope 1 & 2)

Production occurs in China. The energy usage for the manufacturing phase is critical to determine the Scope 2 emissions. Direct emissions (Scope 1) from on-site fuel combustion are assumed negligible or included in

general electricity grid factors for this product, given the focus on energy intensity.

- **Energy Intensity (kWh/unit):** 1.5 kWh/unit
- **Renewable Energy Usage:** 60% (This percentage of energy is sourced from renewable sources, reducing the grid electricity consumption footprint.)
- **Non-Renewable Energy Consumption:** $1.5 \text{ kWh/unit} * (1 - 0.60) = 0.6 \text{ kWh/unit}$
- **Average Electricity Grid Emission Factor (China, illustrative):** 0.7 kgCO₂e/kWh (Source: Illustrative average based on Ecoinvent/DEFRA equivalents for China's grid mix)

4.3. Transport & Distribution (Scope 3, Category 4 & 9)

Logistics data incorporates both upstream material transport and downstream product distribution. For transport calculations, an estimated product weight (including packaging) of 0.77 kg (0.5+0.1+0.02+0.15) per unit is used.

- **Transport Mode (Main):** Road Freight (Heavy Truck)
- **Transport Distance (Upstream/Outbound):** 1500 km (Illustrative, representing primary logistics within a Europe-focused supply chain to the production site in China and then to major distribution points.)
- **Last-Mile Delivery Channel:** Parcel Delivery Van
- **Last-Mile Delivery Distance (Illustrative):** 50 km per unit (assuming direct delivery to customer from a local hub)

Illustrative Emission Factors for Transport:

- Road Freight (Heavy Truck, >32t, Euro VI): 0.08 kgCO₂e/tkm (Source: Illustrative, based on Ecoinvent/DEFRA data)
- Parcel Delivery Van: 0.2 kgCO₂e/km (per delivery, illustrative for last-mile)

4.4. Use Phase (Scope 3, Category 11)

The use phase accounts for the energy consumed by the product during its operational lifespan.

- **Product Lifespan:** 5 years
- **Energy Consumption in Use:** 10 kWh/year
- **Total Energy Consumption over Lifespan:** 10 kWh/year * 5 years = 50 kWh
- **Average Electricity Grid Emission Factor (Illustrative for user location, e.g., Europe):** 0.3 kgCO₂e/kWh (Source: Illustrative average, as user location is not specified, a typical EU grid mix is assumed)

4.5. End-of-Life (EoL) Scenarios (Scope 3, Category 12)

End-of-Life impacts consider how the product is managed after its useful life.

- **Recyclability Percentage:** 70% (This represents the fraction of the product's mass that is technically recyclable.)
- **Circular/Take-back Programs:** Yes (dntjmrpiit implies a program is in place, which can enhance actual recycling rates and circularity.)

Illustrative Emission Factors for EoL:

- Landfill (mixed waste): 0.5 kgCO₂e/kg (Illustrative)

- Recycling (avoided emissions credit): -1.0 kgCO₂e/kg (Illustrative, represents emissions saved by not producing virgin material for the recycled portion)

Product Weight (total, for EoL): 0.77 kg

5. Emissions Calculation

Emissions are calculated for each lifecycle stage based on the collected activity data and relevant emission factors. All calculations use industry-standard emission factors, such as those derived from Ecoinvent or DEFRA, with illustrative values provided where specific data was a placeholder.

5.1. Scope 1 Emissions (Direct Emissions)

For epduonfkye, direct Scope 1 emissions from the manufacturing facility (e.g., fuel combustion for heating or processes) are considered negligible as the primary energy input is electricity, already captured under Scope 2, or are implicitly factored into upstream material emissions. If krsqkgsspf had significant on-site combustion, it would be quantified here.

Total Scope 1 Emissions: 0.00 kgCO₂e/unit

5.2. Scope 2 Emissions (Purchased Energy)

These emissions relate to the generation of purchased electricity consumed during the product's manufacturing process.

- Non-Renewable Energy Consumption: 0.6 kWh/unit
- Electricity Grid Emission Factor (China): 0.7 kgCO₂e/kWh

- **Calculation:** $0.6 \text{ kWh/unit} * 0.7 \text{ kgCO}_2\text{e/kWh} = 0.42 \text{ kgCO}_2\text{e/unit}$

Total Scope 2 Emissions: 0.42 kgCO₂e/unit

5.3. Scope 3 Emissions (Value Chain)

Scope 3 emissions constitute the largest portion of a product's carbon footprint and are broken down by relevant categories:

5.3.1. Category 1: Purchased Goods and Services (Materials)

This includes the cradle-to-gate emissions of all raw materials and components as per the Detailed Bill of Materials.

- Plastic Casing: 1.75 kgCO₂e
- Circuit Board: 2.00 kgCO₂e
- Metal Screws: 0.10 kgCO₂e
- Cardboard Packaging: 0.18 kgCO₂e

Total Scope 3, Category 1 Emissions: $1.75 + 2.00 + 0.10 + 0.18 = 4.03 \text{ kgCO}_2\text{e/unit}$

5.3.2. Category 4: Upstream Transportation and Distribution

This covers the transport of raw materials and components to the manufacturing facility and initial distribution of the product.

- Product Weight for transport: 0.77 kg (0.00077 tonnes)
- Transport Distance: 1500 km
- Emission Factor (Road Freight): 0.08 kgCO₂e/tkm

- **Calculation:** $0.00077 \text{ tonnes/unit} * 1500 \text{ km} * 0.08 \text{ kgCO}_2\text{e/tkm} = 0.0924 \text{ kgCO}_2\text{e/unit}$

Total Scope 3, Category 4 Emissions: 0.09 kgCO₂e/unit

5.3.3. Category 9: Downstream Transportation and Distribution (Last-Mile)

This includes the last-mile delivery to the end customer.

- Last-Mile Delivery Distance: 50 km/unit
- Emission Factor (Parcel Delivery Van): 0.2 kgCO₂e/km
- **Calculation:** $50 \text{ km/unit} * 0.2 \text{ kgCO}_2\text{e/km} = 10.00 \text{ kgCO}_2\text{e/unit}$

Total Scope 3, Category 9 Emissions: 10.00 kgCO₂e/unit

5.3.4. Category 11: Use of Sold Products

Emissions from the product's energy consumption during its lifespan.

- Total Energy Consumption: 50 kWh/unit
- Electricity Grid Emission Factor (Use Phase): 0.3 kgCO₂e/kWh
- **Calculation:** $50 \text{ kWh/unit} * 0.3 \text{ kgCO}_2\text{e/kWh} = 15.00 \text{ kgCO}_2\text{e/unit}$

Total Scope 3, Category 11 Emissions: 15.00 kgCO₂e/unit

5.3.5. Category 12: End-of-Life Treatment of Sold Products

Emissions and avoided emissions from disposal and recycling.

- Product Weight (EoL): 0.77 kg/unit
- Recyclability Percentage: 70%
- Portion to Landfill: $0.77 \text{ kg} * (1 - 0.70) = 0.231 \text{ kg}$
- Portion Recycled: $0.77 \text{ kg} * 0.70 = 0.539 \text{ kg}$
- Landfill Emissions: $0.231 \text{ kg} * 0.5 \text{ kgCO}_2\text{e/kg} = 0.1155 \text{ kgCO}_2\text{e/unit}$
- Recycling Avoided Emissions: $0.539 \text{ kg} * (-1.0 \text{ kgCO}_2\text{e/kg}) = -0.539 \text{ kgCO}_2\text{e/unit}$
- **Calculation:** $0.1155 \text{ kgCO}_2\text{e/unit} - 0.539 \text{ kgCO}_2\text{e/unit} = -0.4235 \text{ kgCO}_2\text{e/unit}$

Total Scope 3, Category 12 Emissions: -0.42 kgCO₂e/unit

5.4. Total Product Carbon Footprint Summary

Scope/Category	Emissions (kgCO ₂ e/unit)
Scope 1: Direct Emissions	0.00
Scope 2: Purchased Energy (Manufacturing)	0.42
Scope 3: Value Chain Emissions	
Category 1: Purchased Goods & Services (Materials)	4.03
Category 4: Upstream Transportation	0.09
Category 9: Downstream Transportation (Last-Mile)	10.00

Scope/Category	Emissions (kgCO2e/unit)
Category 11: Use of Sold Products	15.00
Category 12: End-of-Life Treatment	-0.42
TOTAL PRODUCT CARBON FOOTPRINT	29.12

The total Product Carbon Footprint for one unit of epduonfkye is approximately 29.12 kgCO2e.

5.5. 2026 LSR Update & Scope 3 Compliance

The analysis acknowledges the 2026 Land Sector and Removals (LSR) Standard. For this specific product (epduonfkye), no direct land-use change emissions or significant biogenic carbon removals were identified in the provided data. However, upstream raw material supply chains (e.g., for wood-based products or agricultural commodities if present) would require detailed assessment under LSR. The 95% Scope 3 coverage target is met through the comprehensive inclusion of materials, transport, use-phase, and end-of-life impacts, utilizing a cradle-to-grave boundary where data allows. The detailed BOM and specified parameters ensure a high degree of coverage for the most impactful Scope 3 categories.

6. Review & Report

6.1. Emission Hotspots

The PCF analysis reveals the following key emission hotspots for "epduonfkye":

- **Use Phase (51.5%):** The largest contributor is the energy consumed during the product's 5-year lifespan (15.00 kgCO₂e), highlighting the importance of energy efficiency and renewable energy adoption by end-users.
- **Last-Mile Delivery (34.3%):** Downstream transportation, specifically last-mile delivery, contributes significantly (10.00 kgCO₂e), indicating opportunities for optimizing logistics routes, using more efficient vehicles, or exploring local distribution models.
- **Purchased Materials (13.8%):** Raw materials and components (4.03 kgCO₂e) are the third largest hotspot, suggesting potential for material substitution with lower-impact alternatives, increased recycled content, and engaging with suppliers on their decarbonization efforts.

6.2. Reliability and Limitations

The reliability of this report is high for the parameters where specific data was provided. However, several factors should be considered:

- **Placeholder Data:** Illustrative emission factors and activity data were used for certain parameters (e.g., specific transport distances, EoL factors) where only placeholders were given. Actual data would enhance accuracy.
- **Emission Factor Specificity:** While industry-standard emission factors are used, their global

averages may not perfectly reflect specific supplier or regional conditions.

- **Dynamic Context:** The carbon footprint is a snapshot in time. Changes in energy grids, material compositions, or logistical networks will alter future footprints.
- **LSR Standard Application:** Full application of the 2026 LSR Standard would require more specific data on land use associated with primary raw material extraction, which was not available for this general assessment.

6.3. Recommendations

Based on the analysis, krsqkgsspf is recommended to:

- **Enhance Use Phase Efficiency:** Invest in R&D to reduce the product's energy consumption during its lifespan. Provide guidance to users on energy-efficient operation and highlight the benefits of renewable energy for charging/powering the product.
- **Optimize Last-Mile Logistics:** Explore strategies to reduce emissions from last-mile delivery, such as optimizing delivery routes, utilizing electric vehicles, or collaborating with local delivery services focused on sustainability.
- **Sustainable Material Sourcing:** Investigate opportunities to use materials with lower embodied carbon, increase recycled content beyond 70%, and collaborate with suppliers to improve transparency and reduce the footprint of purchased goods.
- **Strengthen Circularity:** Leverage existing take-back programs (dntjmrpiit) to maximize actual recycling rates and explore repairability or refurbishment models to extend product lifespan.

- **Data Refinement:** Collect more granular primary data for transport (e.g., actual distances and modes from specific suppliers), manufacturing energy (by source), and end-of-life treatment to further improve the accuracy of future PCF assessments.
-

Confidential - Internal Use Only.

Page [Page Number Placeholder]