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# Product Carbon Footprint Analysis Report

**Product Name:** dqmkzymjuy

**Company Name:** ddszsvixlq

**Protocol Data (Accounting Standard):** GHG Protocol

**Senior Sustainability Consultant:** rvlwiizpxl

This report is generated based on available data and industry standards. While efforts have been made to ensure accuracy and comprehensive coverage, specific real-world conditions may vary.

# Product Carbon Footprint Analysis Report for dqmkyzmjuy

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## Executive Summary

This report provides a high-detail Product Carbon Footprint (PCF) analysis for the product dqmkyzmjuy, manufactured by ddszsvixlq. As rvlwiizpxl, Senior Sustainability Consultant specializing in GHG Protocol, this analysis adheres to the latest GHG Protocol standards, including the 2026 updates for Scope 3 and the Land Sector and Removals (LSR) Standard. The assessment covers the entire lifecycle from raw material extraction to end-of-life, with a focus on a '\factory\_gate\' system boundary for initial Scope 1 and 2, and extending to full Scope 3 for value chain impacts. Key parameters such as detailed Bill of Materials, transport logistics, renewable energy usage, product lifespan, and end-of-life scenarios have been incorporated to provide a robust and actionable carbon footprint. The goal is to identify emission hotspots and inform strategic decarbonization efforts for ddszsvixlq.

## 1. Defining the Scope of Analysis

### 1.1 Functional Unit

The functional unit for this Product Carbon Footprint (PCF) analysis is defined as: **1.0 unit of dqmkyzmjuy**. This unit serves as the reference basis for all quantitative data and calculations in the study, ensuring comparability and consistency.

### 1.2 System Boundary

The system boundary for this PCF analysis is primarily '\factory\_gate\' for direct operational emissions, but extends to a

comprehensive "cradle-to-grave" approach for the full value chain assessment as required by GHG Protocol Scope 3. This includes:

- **Upstream (Scope 3):** Raw material acquisition and pre-processing, supplier manufacturing, and inbound transportation.
- **Core Operations (Scope 1 & 2):** Manufacturing processes at ddszsvxlq's production facility (direct emissions from owned/controlled sources and indirect emissions from purchased electricity/heat).
- **Downstream (Scope 3):** Outbound transportation, product use phase, and end-of-life treatment.

### 1.3 Geographic Scope

The geographic scope of this analysis is defined as:

- **Final Production Country:** China
- **Supply Chain Focus:** Europe Focused
- **Product Use Phase:** Assumed to be primarily within Europe.

### 1.4 Accounting Standard

This Product Carbon Footprint analysis is conducted in strict adherence to the **GHG Protocol Corporate Accounting and Reporting Standard** and the **Corporate Value Chain (Scope 3) Accounting and Reporting Standard**. This includes applying the principles of relevance, completeness, consistency, transparency, and accuracy.

Specifically, the report addresses the **2026 GHG Protocol updates**:

- **Scope 3 Coverage:** Ensuring at least 95% coverage for total relevant Scope 3 emissions.
- **Land Sector and Removals (LSR) Standard:** The LSR Standard v1.0, effective January 1, 2027, sets requirements for corporate GHG accounting covering emissions and

removals from agricultural and land-use activities. While the direct primary emissions for dmqkzymjuy are not identified as largely land-use based, the standard's principles for identifying and reporting land-based emissions and removals in the value chain are acknowledged, and any relevant upstream or downstream land use changes would be incorporated if identified. The accompanying guidance is expected in Q2 2026.

- **Data Disaggregation:** Emphasis on distinguishing between primary and secondary data sources, aligning with the 2026 requirements for enhanced data transparency.

## 1.5 Allocation

Emissions are allocated directly to the functional unit (1.0 unit of dmqkzymjuy). Where shared processes or co-products exist in the supply chain, allocation is assumed to be based on physical parameters (e.g., mass, energy content) or economic value, depending on the specific data availability and industry best practices for the given process. For this report, material impacts are directly attributed as per the Bill of Materials.

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## 2. Mapping the Lifecycle (LCI Inventory Stages)

The lifecycle of dmqkzymjuy is mapped into distinct stages to ensure comprehensive data collection and emission calculation:

- **A. Raw Material Acquisition & Pre-processing:** Extraction, processing, and refining of all raw materials listed in the Bill of Materials (BOM).
- **B. Manufacturing (Production Phase):** All processes involved in transforming raw materials into the final product at ddszsvxlq's facility, including energy consumption, water usage, and waste generation.

- **C. Transportation:** Inbound logistics of raw materials to the manufacturing facility, and outbound logistics of the finished product to the customer, including last-mile delivery.
  - **D. Use Phase:** Energy consumption and other impacts associated with the product's operation over its defined lifespan.
  - **E. End-of-Life (EoL):** Disposal, recycling, or recovery processes for the product and its packaging at the end of its useful life.
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## **3. Data Collection (Primary/Secondary Data Points)**

Data for this PCF analysis is gathered from a combination of primary (specific to ddszsvxlq and dqmkyzmjuy) and secondary (industry average) sources. In line with 2026 GHG Protocol updates, efforts are made to use primary data where available and disaggregate data by source type.

### **3.1 Detailed Bill of Materials (BOM) - flyzyvqz**

The following detailed Bill of Materials (BOM) provides the basis for calculating the material-related emissions for dqmkyzmjuy. Note: As the actual content of 'flyzyvqz' was a placeholder, illustrative data following the specified format has been used to demonstrate the calculation methodology.

ID	Description	Category	Process	Qty	Unit	Emission Factor (kgCO2e/unit)	Total Carbon (kgCO2e)
M01	Aluminum casing	Metal	Extrusion	0.8	kg	7.5	6.00
M02	Plastic components	Plastic	Injection Molding	0.5	kg	3.0	1.50
M03	Electronic board	Electronics	Assembly	0.15	kg	15.0	2.25
M04	Copper wiring	Metal	Drawing	0.05	kg	2.0	0.10
M05	Packaging (cardboard)	Paper	Converting	0.2	kg	1.2	0.24
M06	Screws & Fasteners	Metal	Machining	0.02	kg	4.0	0.08
<b>Total Material Impact:</b>							<b>10.17 kg CO2e</b>
<b>Total Product Weight (excl. packaging):</b>							<b>1.52 kg</b>
<b>Total Product Weight (incl. packaging):</b>							<b>1.72 kg</b>

### 3.2 Energy Inputs (Production Phase)

- **Energy Intensity (kWh/unit):** iuzymwdemo (Assumed: 15.5 kWh/unit)
- **Renewable Energy Usage:** duzmwepemi (Assumed: 75% of total energy)
- **Non-Renewable Energy Usage:** (1 - duzmwepemi) = 25% of total energy.
- **Electricity Grid Emission Factor (China):** 0.65 kg CO2e/kWh (Illustrative, based on Ecoinvent/IEA data for China's electricity mix as of 2021).

- **Renewable Energy Emission Factor:** 0.0 kg CO<sub>2</sub>e/kWh (Assumed for certified renewable energy sources).

### 3.3 Transport Logistics Data

- **Primary Transport Mode (Inbound/Outbound):** Select Mode (Assumed: Road freight, HGV >16t, Euro V/VI standard, typical for Europe).
- **Transport Distance:** tuoxyzdeuy (Assumed: 1500 km)
- **Last-Mile Delivery Channel:** Delivery Type (Assumed: Road freight, van <3.5t, typical for urban delivery).
- **Emission Factor - Road freight (HGV, >16t):** 0.08 kg CO<sub>2</sub>e/tkm (Illustrative, based on Ecoinvent for European focus).
- **Emission Factor - Road freight (van, <3.5t):** 0.25 kg CO<sub>2</sub>e/tkm (Illustrative, based on general transport databases).

### 3.4 Use Phase Data

- **Product Lifespan:** xoihgkueqq (Assumed: 5 years)
- **Energy Consumption in Use (Annual):** prepnjopvw (Assumed: 20 kWh/year)
- **Electricity Grid Emission Factor (Europe, for user):** 0.25 kg CO<sub>2</sub>e/kWh (Illustrative, based on average European electricity mix).

### 3.5 End-of-Life (EoL) Scenarios

- **Recyclability Percentage:** zkzxspdjq (Assumed: 60% of total product weight)
- **Non-Recycled Percentage:** (1 - zkzxspdjq) = 40% of total product weight, assumed to go to landfill.
- **Circular/Take-back Programs:** edyhekuuet (Assumed: "Yes, internal collection and refurbishment program.")
- **Emission Factor - Landfill (Mixed Waste):** 0.1 kg CO<sub>2</sub>e/kg (Illustrative, based on DEFRA data for mixed waste landfill, including transport and fugitive CH<sub>4</sub>).

- **Recycling Credit (Avoided Emissions):** -0.05 kg CO<sub>2</sub>e/kg (Illustrative, assuming displacement of virgin material production. Note: DEFRA attributes processing emissions to the user of recycled material, but for PCF, avoided emissions are often considered).
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## 4. Calculating Emissions (Activity \* Emission Factor = CO<sub>2</sub>e)

This section details the calculation of CO<sub>2</sub>e emissions for each lifecycle stage, categorized according to the GHG Protocol's Scope 1, 2, and 3.

### 4.1 Assumptions for Calculation

- All emission factors are illustrative, referencing industry-standard databases like Ecoinvent and DEFRA.
- Total product weight (including packaging) for transport calculations: 1.72 kg (from BOM summation).
- All results are expressed in kilograms of carbon dioxide equivalent (kg CO<sub>2</sub>e).

### 4.2 Scope 1 Emissions (Direct Emissions)

For a 'factory\_gate' system boundary, Scope 1 emissions typically include direct emissions from owned or controlled sources, such as fuel combustion in boilers, furnaces, vehicles, or fugitive emissions. As no specific direct fuel consumption or fugitive emission data for ddszsvixlq's manufacturing operations were provided, we assume these are negligible or not applicable for this product-level PCF within the defined 'factory\_gate' operational boundary. If present, they would be calculated as:

Fuel Consumption (units) \* Fuel Emission Factor (kgCO<sub>2</sub>e/unit)

**Total Scope 1 Emissions: 0.00 kg CO2e** (Assumed negligible/not reported for this specific product PCF)

### 4.3 Scope 2 Emissions (Indirect Emissions from Purchased Energy)

Scope 2 emissions account for the greenhouse gases released from the generation of purchased electricity, heat, steam, or cooling consumed by ddszsvixlq\'s manufacturing facility in China.

- Total Energy Intensity: 15.5 kWh/unit
- Renewable Energy Usage: 75%
- Non-Renewable Energy Usage: 25%
- Grid Emission Factor (China): 0.65 kg CO2e/kWh

Calculations:

Non-renewable electricity = Energy Intensity \* (1 - Renewable Energy Usage)

Non-renewable electricity = 15.5 kWh/unit \* (1 - 0.75) = 3.875 kWh/unit

Emissions from non-renewable electricity = Non-renewable electricity \* Grid Emission Factor (China)

Emissions from non-renewable electricity = 3.875 kWh/unit \* 0.65 kg CO2e/kWh = 2.51875 kg CO2e/unit

Emissions from renewable electricity = Energy Intensity \* Renewable Energy Usage \* Renewable Emission Factor

Emissions from renewable electricity = 15.5 kWh/unit \* 0.75 \* 0.0 kg CO2e/kWh = 0.00 kg CO2e/unit

**Total Scope 2 Emissions: 2.52 kg CO2e**

### 4.4 Scope 3 Emissions (Value Chain Emissions)

Scope 3 emissions are all indirect emissions not included in Scope 2 that occur in the value chain of the reporting company, both upstream and downstream.

#### **4.4.1 Category 1: Purchased Goods and Services (Materials)**

Based on the provided Detailed Bill of Materials (BOM).

**Total Material Impact (from BOM): 10.17 kg CO<sub>2</sub>e**

#### **4.4.2 Category 4: Upstream Transportation and Distribution**

This includes transportation of raw materials to the manufacturing facility.

- Product Weight: 1.72 kg
- Transport Distance: 1500 km
- Transport Mode: Road freight, HGV (>16t)
- Emission Factor (HGV): 0.08 kg CO<sub>2</sub>e/tkm (or 0.00008 kg CO<sub>2</sub>e/kg/km)

Calculations:

Emissions = Product Weight (kg) \* Transport Distance (km)  
\* Emission Factor (kgCO<sub>2</sub>e/kg/km)  
Emissions = 1.72 kg \* 1500 km \* 0.00008 kg CO<sub>2</sub>e/kg/km =  
0.2064 kg CO<sub>2</sub>e

**Total Upstream Transport Emissions: 0.21 kg CO<sub>2</sub>e**

#### **4.4.3 Category 9: Downstream Transportation and Distribution (Outbound & Last-Mile)**

This includes transportation of the finished product to the customer.

- Product Weight: 1.72 kg
- Main Transport Distance: 1500 km (Assumed for outbound to distribution hub)
- Main Transport Mode: Road freight, HGV (>16t)
- Last-Mile Distance: Assumed 100 km (Illustrative for last-mile delivery)
- Last-Mile Transport Mode: Road freight, van (<3.5t)

- Emission Factor (HGV): 0.08 kg CO<sub>2</sub>e/tkm (or 0.00008 kg CO<sub>2</sub>e/kg/km)
- Emission Factor (Van): 0.25 kg CO<sub>2</sub>e/tkm (or 0.00025 kg CO<sub>2</sub>e/kg/km)

Calculations:

Main Transport Emissions = 1.72 kg \* 1500 km \* 0.00008 kg CO<sub>2</sub>e/kg/km = 0.2064 kg CO<sub>2</sub>e

Last-Mile Emissions = 1.72 kg \* 100 km \* 0.00025 kg CO<sub>2</sub>e/kg/km = 0.043 kg CO<sub>2</sub>e

**Total Downstream Transport Emissions: 0.21 kg CO<sub>2</sub>e + 0.04 kg CO<sub>2</sub>e = 0.25 kg CO<sub>2</sub>e**

#### **4.4.4 Category 11: Use of Sold Products**

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

- Product Lifespan: 5 years
- Annual Energy Consumption: 20 kWh/year
- Electricity Grid Emission Factor (Europe): 0.25 kg CO<sub>2</sub>e/kWh

Calculations:

Total Energy Consumption in Use = Product Lifespan \* Annual Energy Consumption

Total Energy Consumption in Use = 5 years \* 20 kWh/year = 100 kWh

Emissions from Use Phase = Total Energy Consumption in Use \* Grid Emission Factor (Europe)

Emissions from Use Phase = 100 kWh \* 0.25 kg CO<sub>2</sub>e/kWh = 25.00 kg CO<sub>2</sub>e

**Total Use Phase Emissions: 25.00 kg CO<sub>2</sub>e**

#### 4.4.5 Category 12: End-of-Life Treatment of Sold Products

Emissions and avoided emissions from disposal and recycling.

- Total Product Weight: 1.72 kg
- Recyclability Percentage: 60%
- Landfilled Percentage: 40%
- Emission Factor (Landfill): 0.1 kg CO<sub>2</sub>e/kg
- Recycling Credit: -0.05 kg CO<sub>2</sub>e/kg (Avoided emissions, simplified)

Calculations:

Weight to Landfill = Total Product Weight \* Landfilled Percentage = 1.72 kg \* 0.40 = 0.688 kg  
Emissions from Landfill = Weight to Landfill \* Emission Factor (Landfill) = 0.688 kg \* 0.1 kg CO<sub>2</sub>e/kg = 0.0688 kg CO<sub>2</sub>e

Weight Recycled = Total Product Weight \* Recyclability Percentage = 1.72 kg \* 0.60 = 1.032 kg  
Emissions/Credits from Recycling = Weight Recycled \* Recycling Credit = 1.032 kg \* -0.05 kg CO<sub>2</sub>e/kg = -0.0516 kg CO<sub>2</sub>e

The company has "Yes, internal collection and refurbishment program." (edyhekuuet), which would further enhance circularity and potentially reduce EoL impacts beyond simple recycling credits, but these are difficult to quantify without further operational data. The above calculation reflects basic recycling and landfill scenarios.

**Total End-of-Life Emissions: 0.07 kg CO<sub>2</sub>e + (-0.05 kg CO<sub>2</sub>e) = 0.02 kg CO<sub>2</sub>e**

#### 4.4.6 Other Scope 3 Categories

Other Scope 3 categories (e.g., business travel, employee commuting, capital goods, investments) are not directly included in a product-level PCF unless their impacts are specifically attributable to the product. For a comprehensive corporate inventory, these

would be essential. The new Category 16 (other value chain activities/facilitated emissions) is noted, but not directly applicable to this product PCF without further context.

## 4.5 Summary of Product Carbon Footprint (dqmkymjuy)

GHG Scope / Lifecycle Stage	Calculated Emissions (kg CO2e)	Percentage of Total
<b>Scope 1: Direct Emissions</b>	0.00	0.00%
<b>Scope 2: Purchased Energy</b>	2.52	6.87%
<b>Scope 3: Value Chain Emissions</b>		
Category 1: Purchased Goods & Services (Materials)	10.17	27.76%
Category 4: Upstream Transportation	0.21	0.57%
Category 9: Downstream Transportation	0.25	0.68%
Category 11: Use of Sold Products	25.00	68.27%
Category 12: End-of-Life Treatment of Sold Products	0.02	0.05%
<b>Total Product Carbon Footprint (PCF)</b>	<b>36.67</b>	<b>100.00%</b>

**Note on Scope 3 Coverage:** With the detailed BOM, transport, use, and EoL data, this analysis strives to meet the 95% coverage requirement for relevant Scope 3 emissions.

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## 5. Review & Report

### 5.1 Emission Hotspots

The analysis reveals the following major emission hotspots for dmqkzymjuy:

- **Use of Sold Products (Category 11):** This stage accounts for the vast majority of the product's footprint (68.27%), primarily due to the energy consumption over its 5-year lifespan. This highlights the critical importance of designing energy-efficient products and/or integrating renewable energy solutions for the user phase.
- **Purchased Goods and Services (Category 1):** Material production contributes significantly (27.76%) to the overall footprint. The aluminum casing and electronic board are notable contributors within the BOM.
- **Purchased Energy (Scope 2):** Manufacturing energy at the China facility accounts for 6.87% of the footprint, even with 75% renewable energy usage. Further decarbonization of the remaining 25% non-renewable energy mix, or shifting production to regions with cleaner grids, could reduce this.
- Transportation (upstream and downstream) and End-of-Life treatment contribute relatively small percentages, suggesting these are not the primary hotspots, though optimization efforts are always valuable.

### 5.2 Data Reliability and Limitations

The reliability of this PCF is contingent upon the accuracy and completeness of the input data. Key considerations include:

- **BOM Data:** The "Total Carbon" values provided in the illustrative BOM (representing 'flyzyvqz') are assumed to be accurate and comprehensive for cradle-to-gate material impacts.
- **Emission Factors:** Illustrative emission factors from recognized databases like Ecoinvent and DEFRA have been

used where specific primary data was unavailable. These factors represent averages and may not perfectly reflect the specific operational efficiencies or technologies of ddszsvixlq's suppliers.

- **Assumptions:** Various assumptions were made for parameters provided as generic strings (e.g., 'Select Mode', 'Delivery Type', '\tuoxyzdeuy', etc.) and for specific operational details (e.g., last-mile distance, energy consumption patterns). These assumptions are clearly stated but introduce a degree of uncertainty.
- **2026 GHG Protocol Updates:** The report has sought to align with the proposed 2026 GHG Protocol Scope 3 and LSR Standard updates, particularly the 95% coverage rule and data disaggregation. As the LSR guidance is still being developed, direct land-use impacts for non-agricultural products may require further specific assessment in future revisions.

### 5.3 Recommendations for ddszsvixlq

- **Product Redesign for Use Phase:** Invest in R&D to significantly improve the energy efficiency of dqmkyzmjuy during its use phase. Explore alternative power sources or lower-power components.
- **Material Optimization:** Investigate opportunities to reduce the quantity of high-impact materials (e.g., aluminum, electronics) or switch to lower-carbon alternatives, including recycled content with verified lower footprints.
- **Renewable Energy Sourcing:** Continue to increase renewable energy procurement in manufacturing operations. Explore Power Purchase Agreements (PPAs) or on-site renewable generation for the remaining 25% non-renewable electricity in China.
- **Supply Chain Engagement:** Work closely with material suppliers to collect primary emissions data and identify opportunities for their decarbonization, aligning with the 2026 GHG Protocol's emphasis on data disaggregation.

- **Circular Economy Initiatives:** Expand and promote the existing "internal collection and refurbishment program" (edyhekuuet) to maximize product longevity and material recovery, potentially mitigating EoL emissions further.
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