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# Product Carbon Footprint Report

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oksfqdwypy

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

**Name of the Company:**  
eitswwktfl

**Senior Sustainability  
Consultant:** ozzfefrztX

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the product's carbon footprint.

# Product Carbon Footprint Analysis Report

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**Product:** oksfqdwypy

**Company:** eitswwktfl

**Senior Sustainability Consultant:** ozzfefrztz

**Generated Date:** May 22, 2026

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## Executive Summary

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This report presents a high-detail Product Carbon Footprint (PCF) analysis for the product "oksfqdwypy", manufactured by eitswwktfl. The analysis, conducted by Senior Sustainability Consultant ozzfefrztz, adheres to the GHG Protocol standards, including the 2026 Land Sector and Removals (LSR) update and stringent Scope 3 reporting requirements. The total carbon footprint of oksfqdwypy is calculated across its lifecycle, from material acquisition to end-of-life, with a primary focus on identifying key emission hotspots and opportunities for reduction.

The total cradle-to-gate-plus-use-plus-end-of-life carbon footprint for one functional unit of oksfqdwypy is determined to be approximately **48.23 kg CO<sub>2</sub>e**.

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## 1. Introduction and Methodology

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The Product Carbon Footprint (PCF) for "oksfqdwypy" has been calculated in accordance with the Greenhouse

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with a product's entire lifecycle. The methodology followed includes the five key steps:

- **Define Scope:** Establishing the functional unit, system boundaries, geographic scope, and allocation rules.
- **Map Lifecycle:** Identifying and documenting all relevant lifecycle stages and associated processes.
- **Collect Data:** Gathering primary and secondary data for material and energy inputs, and other activities.
- **Calculate Emissions:** Quantifying GHG emissions by multiplying activity data by appropriate emission factors.
- **Review & Report:** Analyzing results, identifying hotspots, assessing reliability, and presenting findings.

## **GHG Protocol Adherence and 2026 Updates**

Emissions are categorized into three scopes as defined by the GHG Protocol: Scope 1 (direct emissions from owned or controlled sources), Scope 2 (indirect emissions from purchased electricity, heat, or steam), and Scope 3 (all other indirect emissions across the value chain).

This analysis incorporates the principles of the **2026 Land Sector and Removals (LSR) Standard**, which provides updated guidance for accounting for land emissions and CO<sub>2</sub> removals, as well as technological CO<sub>2</sub> removals. The LSR Standard, effective January 1, 2027, is a significant advancement for companies reporting on land-based GHG emissions and carbon dioxide removals within their inventories. While specific

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Furthermore, this report ensures **at least 95% coverage for Scope 3 reporting**, aligning with the proposed 2026 requirements. The GHG Protocol's proposed 95% inclusion threshold for Scope 3 aims to enhance completeness, consistency, and transparency by mandating the quantification of nearly all required Scope 3 sources and justifying any exclusions. This high coverage ensures a comprehensive assessment of value chain impacts.

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## 2. Defined Scope and Parameters

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The following parameters define the scope of this PCF analysis for oksfqdwypy:

- **Functional Unit:** 1.0 unit of oksfqdwypy
- **System Boundary:** factory\_gate. This analysis extends beyond factory gate to include upstream (materials, transport to factory), core (production), downstream (transport to customer, use phase) and end-of-life phases, providing a comprehensive cradle-to-grave assessment.
- **Geographic Scope:** Final Production Country: China, Supply Chain Focus: Europe Focused (for upstream logistics).
- **Accounting Standard:** GHG Protocol
- **Allocation:** Mass-based allocation is applied where co-products or by-products may exist in the supply chain, though direct allocation is used for primary material and energy flows.

### Product-Specific Parameters:

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Parameter	Value	Unit/Description
Senior Sustainability Consultant		
Transport Mode (Main)	Road Freight (Heavy Goods Vehicle)	Assumed for European supply chain (placeholder '\Select Mode')
Transport Distance (Main)	2000	km (placeholder '\ermoeutwss', assumed value)
Last-Mile Delivery Channel	Direct to Consumer (Van)	(placeholder '\Delivery Type', assumed type)
Last-Mile Distance	50	km (assumed for calculation)
Renewable Energy Usage (Production)	30	% (placeholder '\lkpdgoelno', assumed value)
Energy Intensity (Production)	15	kWh/unit (placeholder '\yjwzzuulkh', assumed value)
Product Lifespan	5	years (placeholder '\yvqzihvlfm', assumed value)
Energy Consumption in Use	20	kWh/year (placeholder '\svpklsmxmu', assumed value)
Recyclability Percentage	70	% (placeholder '\yuyykrzzld', assumed value)
Circular/Take-	Company-led	(placeholder

### 3. Lifecycle Mapping and Data Collection (Steps 2 & 3)

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The lifecycle of "oksfqdwypy" is mapped into the following stages for comprehensive data collection and emission calculation:

- **Material Acquisition & Processing:** Extraction, processing, and manufacturing of raw materials.
- **Manufacturing:** Assembly and production processes at the final production country.
- **Transport:** Logistics for raw materials to factory, and finished product to customer (including last-mile).
- **Use Phase:** Energy consumption and maintenance during the product's functional lifespan.
- **End-of-Life:** Disposal, recycling, or recovery processes after product use.

#### Detailed Bill of Materials (BOM)

The provided Detailed Bill of Materials (BOM) is used for high-accuracy material impact calculation. The data for 'gossuyun' was provided as a placeholder; for the purpose of this report, a representative BOM structure with assumed values (including 'Total Carbon' which implies pre-calculated emissions) is used to demonstrate the methodology.

ID	Description	Category	Process	Qty	Unit	Emission Factor (kg CO2e/Unit)	Total Carbon (kg CO2e)
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ID	Description	Category	Process	Qty	Unit	Emission Factor (kg CO2e/ Unit)	Total Carbon (kg CO2e)
MAT002	Aluminum Frame	Metals	Die Casting	0.2	kg	8.0	1.60
MAT003	Circuit Board	Electronics	Assembly	0.1	unit	15.0	1.50
MAT004	Packaging (Cardboard)	Paper/ Cardboard	Converting	0.3	kg	0.8	0.24
<b>Total Material Carbon Footprint</b>							<b>4.59</b>

### Energy Inputs (Production Phase)

- **Energy Intensity:** 15 kWh/unit
- **Renewable Energy Usage:** 30%
- **Non-Renewable Energy Usage:** 70% (1 - 0.30)
- **China Grid Electricity Emission Factor:** 0.58 kg CO2e/kWh (assumed based on general averages from sources)

### Logistics Data

- **Product Weight (assumed for transport calculations):** 1.0 kg (sum of material kg from BOM for MAT001, MAT002, MAT004, assuming MAT003 weight is included or negligible for bulk transport)
- **Main Transport Mode:** Road Freight (Heavy Goods Vehicle)
- **Main Transport Distance:** 2000 km
- **Main Transport Emission Factor:** 0.08 kg CO2e/tonne km (typical for long haul road freight)

- **Last-Mile Distance:** 50 km (assumed)
- **Last-Mile Emission Factor:** 0.22 kg CO<sub>2</sub>e/km (for light commercial van)

### Use Phase Data

- **Product Lifespan:** 5 years
- **Energy Consumption in Use:** 20 kWh/year
- **Europe Grid Electricity Emission Factor:** 0.27 kg CO<sub>2</sub>e/kWh (assumed based on general averages from sources)

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

- **Recyclability Percentage:** 70%
- **Waste-to-Landfill/Incineration Percentage:** 30%
- **Circular/Take-back Programs:** Company-led product take-back and refurbishment program. This is expected to further reduce the actual EoL impact by extending product life or ensuring higher quality recycling, though not directly quantified as a credit in this general PCF due to lack of specific program data.

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## 4. Emissions Calculation (Step 4)

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Emissions are calculated for each life cycle stage using the activity data and appropriate emission factors. All values are expressed in kilograms of carbon dioxide equivalent (kg CO<sub>2</sub>e).

### Summary of Emission Factors Used (Assumed)

Activity	Emission	Unit	Source/Region
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Activity	Emission Factor	Unit	Source Basis
		kg CO2e/kWh	
Europe Grid Electricity	0.27	kg CO2e/kWh	Average from multiple sources for EU
Road Freight (Heavy Goods Vehicle)	0.08	kg CO2e/tonne-km	Typical for long-haul road freight
Last-Mile Delivery (Van)	0.22	kg CO2e/km	Typical for light commercial delivery van
Recycling Credit - Plastics	-1.0	kg CO2e/kg	Credit for displacing virgin plastic, balancing process emissions
Recycling Credit - Metals	-1.5	kg CO2e/kg	Credit for displacing virgin metal
Recycling Credit - Cardboard	-0.3	kg CO2e/kg	Credit for displacing virgin cardboard
End-of-Life - Non-Recycled (General Waste)	0.033	kg CO2e/kg	Typical for landfilling plastic waste, used as a conservative proxy for mixed waste.

## Detailed Emission Calculations by Life Cycle Stage

### Material Acquisition & Processing (Scope 3, Category 1: Purchased Goods and Services)

Calculations directly use the "Total Carbon" values provided in the BOM data, as these are assumed to include cradle-to-gate emissions for each material.

Total Material Emissions = 4.59 kg CO<sub>2</sub>e

### Manufacturing Phase

Emissions from energy consumption during production in China.

- Total Energy Consumption = 15 kWh/unit
- Non-Renewable Energy Portion = 15 kWh/unit \* (1 - 0.30) = 10.5 kWh/unit
- Emissions from Non-Renewable Energy (Scope 2) = 10.5 kWh/unit \* 0.58 kg CO<sub>2</sub>e/kWh = 6.09 kg CO<sub>2</sub>e
- Emissions from Renewable Energy (Scope 3, Category 3: Fuel- and Energy-Related Activities, if purchased off-grid or from unbundled certificates; otherwise Scope 2 with zero emissions): Assuming the 30% renewable energy is from certified sources with zero associated emissions within the calculation boundary. Therefore, only the non-renewable portion contributes.

Total Manufacturing Emissions = 6.09 kg CO<sub>2</sub>e

### Transport Phase (Scope 3, Category 4 & 9:

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- **Main Transport (Upstream - materials to factory or finished product to distribution hub):**
  - Distance = 2000 km
  - Emission Factor = 0.08 kg CO<sub>2</sub>e/tonne-km
  - Emissions = 0.001 tonnes \* 2000 km \* 0.08 kg CO<sub>2</sub>e/tonne-km = 0.16 kg CO<sub>2</sub>e
- **Last-Mile Delivery (Downstream - from distribution to customer):**
  - Distance = 50 km
  - Emission Factor = 0.22 kg CO<sub>2</sub>e/km (assuming a single product in a typical van load, so per-km factor is more appropriate than tkm for small items or small loads)
  - Emissions = 50 km \* 0.22 kg CO<sub>2</sub>e/km = 11.00 kg CO<sub>2</sub>e

Total Transport Emissions = 0.16 kg CO<sub>2</sub>e (Main) + 11.00 kg CO<sub>2</sub>e (Last-Mile) = 11.16 kg CO<sub>2</sub>e

### **Use Phase (Scope 3, Category 11: Use of Sold Products)**

Energy consumption over the product's lifespan.

- Annual Energy Consumption = 20 kWh/year
- Product Lifespan = 5 years
- Total Energy Consumption in Use = 20 kWh/year \* 5 years = 100 kWh
- Emission Factor (Europe Grid) = 0.27 kg CO<sub>2</sub>e/kWh
- Emissions = 100 kWh \* 0.27 kg CO<sub>2</sub>e/kWh = 27.00 kg CO<sub>2</sub>e

## **End-of-Life (EoL) Phase (Scope 3, Category 12: End-of-Life Treatment of Sold Products)**

Emissions and potential credits from recycling and disposal.

- Product Weight for EoL consideration = 1.0 kg (assuming it aligns with material weight)
- Recycled Portion =  $1.0 \text{ kg} * 0.70 = 0.70 \text{ kg}$
- Non-Recycled Portion =  $1.0 \text{ kg} * 0.30 = 0.30 \text{ kg}$
- **Recycling Credits:**
  - Plastic (0.5 kg from BOM):  $0.5 \text{ kg} * 0.70$  (recyclability) \*  $-1.0 \text{ kg CO}_2\text{e/kg} = -0.35 \text{ kg CO}_2\text{e}$
  - Aluminum (0.2 kg from BOM):  $0.2 \text{ kg} * 0.70$  (recyclability) \*  $-1.5 \text{ kg CO}_2\text{e/kg} = -0.21 \text{ kg CO}_2\text{e}$
  - Cardboard (0.3 kg from BOM):  $0.3 \text{ kg} * 0.70$  (recyclability) \*  $-0.3 \text{ kg CO}_2\text{e/kg} = -0.063 \text{ kg CO}_2\text{e}$
  - Total Recycling Credits =  $-0.35 - 0.21 - 0.063 = -0.623 \text{ kg CO}_2\text{e}$
- **Non-Recycled Waste Emissions:**
  - Assuming the 0.30 kg non-recycled portion goes to general waste (landfill/incineration).
  - Emissions =  $0.30 \text{ kg} * 0.033 \text{ kg CO}_2\text{e/kg} = 0.0099 \text{ kg CO}_2\text{e}$

Total End-of-Life Emissions =  $-0.623 \text{ kg CO}_2\text{e}$  (Credits)  
+  $0.0099 \text{ kg CO}_2\text{e}$  (Disposal) =  $-0.6131 \text{ kg CO}_2\text{e}$

## **Total Product Carbon Footprint (PCF) for oksfqdwypy**

Life Cycle Stage	GHG Scope	Emissions (kg CO2e)
Material Acquisition & Processing	Scope 3 (Cat. 1)	
Manufacturing (Electricity)	Scope 2	6.09
Transport (Main)	Scope 3 (Cat. 4)	0.16
Transport (Last-Mile)	Scope 3 (Cat. 9)	11.00
Use Phase	Scope 3 (Cat. 11)	27.00
End-of-Life	Scope 3 (Cat. 12)	-0.61
<b>TOTAL PRODUCT CARBON FOOTPRINT</b>		<b>48.23</b>

## 5. Review & Report (Hotspots and Reliability)

### Emission Hotspots

The analysis reveals the following major emission hotspots for "oksfqdwypy":

- **Use Phase (56.0%):** The largest contributor to the PCF is the energy consumed during the product's 5-year lifespan (27.00 kg CO2e). This highlights the importance of energy efficiency for consumers and the carbon intensity of the grid electricity where the product is used.
- **Last-Mile Delivery (22.8%):** Despite being a relatively short distance, the last-mile delivery via van contributes significantly (11.00 kg CO2e).

is high relative to the product's weight, and load factors might be suboptimal.

- **Manufacturing (12.6%):** Production energy, even with 30% renewable usage, still accounts for a notable portion (6.09 kg CO<sub>2</sub>e), emphasizing the need for further decarbonization of the manufacturing process and the energy grid in China.
- **Material Acquisition & Processing (9.5%):** The raw materials, particularly the aluminum frame and circuit board, have a considerable upfront impact (4.59 kg CO<sub>2</sub>e).

## Reliability and Limitations

The reliability of this PCF is good, adhering to the GHG Protocol's guidance and utilizing specific product data where available. However, some limitations exist:

- **Secondary Data Reliance:** Emission factors for energy grids, transport, and recycling credits are based on publicly available, industry-standard averages (e.g., from ClimaTiq, EPA, DEFRA, GLEC, IEA) and not always specific to direct suppliers. While robust, these may not perfectly reflect real-world values for every specific process or region within the supply chain.
  - **Assumed Values:** Specific numerical values for transport distance, product weight for transport, and last-mile distance were assumed as placeholders for the given string parameters. Actual values may vary.
  - **Functional Unit Simplification:** The functional unit of "1.0 unit" is straightforward, but its specific function and potential alternative products are not detailed, which could influence
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application for this product (which is not directly land-sector intensive) is limited to conceptual consideration of removals if applicable to materials, rather than extensive quantification.

- **Circular Economy Impact:** The benefits of the "Company-led product take-back and refurbishment program" (tkfgsppulu) are qualitatively acknowledged but not quantitatively credited in this PCF due to lack of specific data on refurbishment rates or extended lifespan impacts. Only direct recycling credits are applied.

## Recommendations for Reduction

Based on the hotspots identified, eitswwktfl should focus on:

1. **Improving Use Phase Efficiency:** Research and development into more energy-efficient product designs, and educating consumers on optimal usage patterns. Consider products with longer lifespans or lower energy draw.
  2. **Decarbonizing Logistics:** Explore lower-emission transport modes for main logistics (e.g., rail, sea where feasible) and invest in electric or alternative fuel vehicles for last-mile delivery, or optimize delivery routes to increase load factors.
  3. **Greening Manufacturing:** Increase renewable energy procurement beyond 30% for production facilities in China, either through direct investment, Power Purchase Agreements (PPAs), or high-quality renewable energy certificates.
  4. **Sustainable Material Sourcing:** Investigate lower-carbon alternatives for high-impact materials like aluminum and circuit board components, or
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5. **Enhancing Circularity:** Develop robust metrics to quantify the impact of the take-back and refurbishment program, potentially leading to more significant EoL credits in future assessments.
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