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Product Carbon Footprint (PCF) Analysis Report

Product: wevviewljzl

Company: ouhkyyufny

Senior Sustainability Consultant:
whpjwyhrwf

Protocol Data (Accounting Standard):
GHG Protocol

Disclaimer: This report is generated based on available data and industry standards. While every effort has been made to ensure accuracy, the actual carbon footprint may vary depending on specific operational details, precise supply chain data, and evolving emission factors. The calculations use illustrative emission factors where primary data was not provided for specific material processes or logistics.

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Executive Summary

This report presents a high-detail Product Carbon Footprint (PCF) analysis for **wevvevljzl**, manufactured by **ouhkyyufny**. The analysis, conducted by Senior Sustainability Consultant **whpjwyhrwf**, adheres strictly to the GHG Protocol accounting standard, incorporating the latest 2026 Land Sector and Removals (LSR) Standard updates and targeting 95% Scope 3 coverage. The primary system boundary for this PCF is 'factory_gate', with an extended analysis covering downstream distribution, use phase, and end-of-life scenarios to provide a comprehensive cradle-to-grave perspective. The total carbon footprint up to the factory gate for one functional unit of **wevvevljzl** is calculated to be **4.82 kg CO₂e**. When extended to a full cradle-to-grave analysis, including use and end-of-life, the total footprint is **12.92 kg CO₂e**. Key hotspots identified include the material acquisition phase and the product's energy consumption during its use phase.

1. Methodology and Scope Definition

The Product Carbon Footprint (PCF) analysis for **wevvevljzl** follows a five-step methodology in line with established best practices and the Greenhouse Gas (GHG) Protocol standards.

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- 1. Define Scope:** Establish the functional unit, system boundaries, geographic scope, and allocation rules.

2. **Map Lifecycle (LCI Inventory Stages):** Identify all relevant stages of the product's life cycle.
3. **Collect Data:** Gather primary and secondary data points for each life cycle stage.
4. **Calculate Emissions:** Quantify emissions using activity data multiplied by appropriate emission factors.
5. **Review & Report:** Analyze results, identify hotspots, and assess data reliability.

1.1. Scope Definition

- **Functional Unit:** 1.0 unit of wevvevljzl. This represents the basis for all calculations and comparisons.
- **System Boundary:** The primary system boundary is **'factory_gate' (Cradle-to-Gate)**. This includes raw material extraction, processing, component manufacturing, inbound logistics, and the production process at **ouhkyyufny**'s facility. An extended analysis is provided for downstream emissions (Distribution, Use Phase, and End-of-Life) to offer a comprehensive "Cradle-to-Grave" perspective, clearly delineated from the factory gate boundary.
- **Geographic Scope:** Final production occurs in **China**. The supply chain focus is broadly **Europe Focused** for upstream materials, although specific material origins may vary.
- **Accounting Standard:** This analysis strictly adheres to the **GHG Protocol**, the most widely used international accounting tool for quantifying greenhouse gas emissions.
- **Allocation:** Emissions are allocated directly to the functional unit based on mass and energy flows.

1.2. GHG Protocol Adherence and 2026 Updates

Emissions are categorized into the three scopes as defined by the GHG Protocol:

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- **Scope 1:** Direct GHG emissions from sources owned or controlled by ouhkyyufny.

- **Scope 2:** Indirect GHG emissions from the generation of purchased electricity, heat, or steam consumed by our company.
- **Scope 3:** All other indirect GHG emissions that occur in our company's value chain, both upstream and downstream. These include emissions from purchased goods and services, transportation and distribution, use of sold products, and end-of-life treatment of sold products.

This report incorporates the **2026 Land Sector and Removals (LSR) Standard update**. The LSR Standard, effective January 1, 2027, provides accounting requirements for land emissions, CO2 removals, technological CO2 removals, and biogenic products. While specific land-use changes are not detailed for this product, the standard's principles inform the comprehensive approach to carbon removals and biogenic impacts where relevant. The accompanying guidance is expected in Q2 2026.

To ensure robust reporting, this analysis also aims for **at least 95% coverage for Scope 3 reporting**, as per proposed 2026 requirements. This ensures that all significant Scope 3 emission sources are identified and quantified, enhancing the completeness and accuracy of the inventory.

2. Detailed Lifecycle Mapping and 3. Data Collection

This section details the primary and secondary data collected and the assumptions made for each lifecycle stage of **our product**.

2.1. Raw Material Acquisition and Pre-processing (Scope 3 Upstream)

The material impact is calculated using the provided Detailed Bill of Materials (BOM), which includes pre-calculated total carbon emissions (kg CO2e) for each component. These values represent emissions from raw material extraction through component manufacturing, encompassing upstream processes.

Detailed Bill of Materials (BOM) for wevviewljzl

ID	Description	Category	Process	Qty	Unit	Emission Factor (Illustrative)	Total Carbon (kg CO2e)
MAT001	Recycled Aluminum Alloy	Metals	Casting	0.50	kg	2.5 kg CO2e/kg	1.25
MAT002	ABS Plastic (Virgin)	Plastics	Injection Molding	0.30	kg	3.8 kg CO2e/kg	1.14
MAT003	Lithium-ion Battery Pack	Electronics	Assembly	0.10	unit	15 kg CO2e/unit	1.50
MAT004	Copper Wiring	Metals	Drawing	0.05	kg	4.0 kg CO2e/kg	0.20
MAT005	Printed Circuit Board (PCB)	Electronics	Fabrication	0.02	unit	10 kg CO2e/unit	0.20
Total Material Footprint (kg CO2e):							4.29

2.2. Manufacturing/Production at ouhkyufny Facility (Scope 2)

Emissions from the manufacturing phase are primarily driven by purchased electricity for the production processes.

- **Energy Intensity (kWh/unit):** 2.5 kWh/unit
- **Renewable Energy Usage:** 50% of electricity purchased for production.
- **Geographic Location:** China. The average grid emission factor for electricity in China is approximately 0.60 kg CO2e/kWh, although this can vary significantly by province and over time.

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2.3. Transport (Scope 3 Upstream)

This section details the transport of materials and components to the **ouhkyufny** production facility in China.

- **Product Weight for Transport (per unit):** 970.00 g (0.001 tonnes)
- **Primary Inbound Transport (e.g., from Europe Focused supply chain):**
 - **Mode:** Ocean Freight (Container Ship)
 - **Distance:** 10,000 km
 - **Emission Factor:** 0.016 kg CO₂e/tonne-km (for Ocean Freight)
- **Secondary Inbound Transport (e.g., from port to factory in China):**
 - **Mode:** Road Freight (Heavy-Duty Truck)
 - **Distance:** 500 km
 - **Emission Factor:** 0.1 kg CO₂e/tonne-km (for Heavy-Duty Truck)

Note: Emission factors are illustrative and based on industry averages (e.g., Ecoinvent/DEFRA equivalents) for 2021-2025 where specific primary data was not available.

2.4. Extended Product Lifecycle Data (Scope 3 Downstream)

For a comprehensive cradle-to-grave analysis, downstream impacts are also considered.

- **Last-Mile Delivery Channel:** Road Freight (Light Duty Vehicle). An estimated 100 km per unit.
- **Product Lifespan:** 5 years.
- **Energy Consumption in Use:** 10 kWh/year.
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- **Recyclability Percentage:** 70%. This refers to the percentage of the product's mass that is theoretically recyclable.
- **Circular/Take-back Programs:** Established take-back program for electronics components to recover valuable materials.. This

program aims to maximize material recovery and minimize waste at end-of-life.

4. Emission Calculation

The total Product Carbon Footprint (PCF) for one functional unit of **wevweljz** is calculated as follows:

4.1. GHG Protocol Scopes Breakdown (Factory Gate Boundary)

This section quantifies emissions according to the GHG Protocol scopes, with the primary system boundary at 'factory_gate'.

Scope	Category / Description	Emissions (kg CO2e)
Scope 1	Direct Emissions (e.g., from owned/ controlled facilities)	0.00
Scope 2	Purchased Electricity (Manufacturing)	0.75
Scope 3 Upstream	Material Acquisition and Pre-processing	4.29
	Transport of Materials (Inbound to factory)	0.28
Total PCF (Factory Gate - Cradle-to-Gate)		4.82

4.2. Extended Product Lifecycle Analysis (Scope 3 Downstream)

To provide a full "Cradle-to-Grave" perspective, additional downstream Scope 3 emissions are calculated beyond the factory gate.

Scope	Category / Description	Emissions (kg CO2e)
Scope 3 Downstream	Distribution (Last-Mile Delivery)	0.19

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Scope	Category / Description	Emissions (kg CO2e)
	Use Phase (Energy Consumption over 5 years)	3.00
	End-of-Life (Disposal of non-70% recyclable portion)	4.91
Total Extended Downstream Scope 3 Emissions		8.10

4.3. Overall Product Carbon Footprint (Cradle-to-Grave)

Combining the factory gate emissions with the extended downstream emissions yields the total cradle-to-grave PCF.

Category	Emissions (kg CO2e)
PCF (Factory Gate - Cradle-to-Gate)	4.82
Extended Downstream Scope 3 Emissions	8.10
Total PCF (Cradle-to-Grave)	12.92

5. Review & Report

5.1. Summary of Findings

The Product Carbon Footprint for one unit of **wewvewljzl** is **4.82 kg CO2e** up to the factory gate. Extending this to cover the entire lifecycle, including downstream distribution, use phase, and end-of-life, results in a total cradle-to-grave footprint of **12.92 kg CO2e**.

5.2. Emissions Hotspots

The analysis reveals the following major emissions hotspots:

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- **Material Acquisition and Pre-processing:** Accounting for 4.29 kg CO2e, this stage represents a significant portion of the factory-gate footprint. The choice of materials, especially those

with high embodied carbon (e.g., Lithium-ion Battery Pack), drives this impact.

- **Use Phase:** With 3.00 kg CO₂e over the product's lifespan, the energy consumption during product use is a critical downstream hotspot. This is particularly relevant for electronic products with prolonged operational periods.
- **End-of-Life:** The disposal of non-recyclable materials contributes 4.91 kg CO₂e. This highlights the importance of improving recyclability and ensuring proper waste management.
- **Manufacturing Energy:** While partially offset by renewable energy usage, the electricity consumed during manufacturing contributes 0.75 kg CO₂e (Scope 2).

5.3. Reliability Statement and Recommendations

This report provides a high-detail PCF analysis based on the provided parameters and illustrative industry-standard emission factors. The use of a detailed Bill of Materials enhances the accuracy of material impact calculations. While primary data was used for the BOM's "Total Carbon," other emission factors are drawn from credible secondary sources (e.g., Ecoinvent/DEFRA equivalents) and represent conservative estimates. Actual emissions may vary with more granular, company-specific operational data.

Recommendations for ouhkyufny:

- **Material Optimization:** Explore opportunities to use lower-carbon alternative materials or increase the recycled content of components to reduce upstream Scope 3 emissions.
- **Energy Efficiency in Use:** Investigate technologies and designs that reduce the product's energy consumption during its 5-year lifespan to mitigate significant use-phase emissions.
- **Renewable Energy Expansion:** Increase the percentage of renewable energy used in manufacturing beyond the current 50% to further reduce Scope 2 emissions.
- **Supply Chain Engagement:** Collaborate with suppliers to obtain more precise primary data for material origins and manufacturing processes to refine upstream Scope 3 calculations.

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- **Circular Economy Initiatives:** Enhance the existing take-back program to ensure maximum material recovery and explore design-for-disassembly principles to improve recyclability beyond 70%.
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