

carboncalcpcf.com

Product Carbon Footprint Analysis Report

For yrdejkyywq

Accounting Standard: GHG Protocol

Company Name: reufznrtxd

Senior Sustainability Consultant:
ttmmyenfws

Disclaimer: This report is generated based on available data and industry standards. While every effort has been made to ensure accuracy, the actual impact may vary depending on real-world conditions and further granular data.

Product Carbon Footprint Analysis Report for yrdejkywq

Generated Date: June 3, 2026

Executive Summary

This report presents a high-detail Product Carbon Footprint (PCF) analysis for the product **yrdejkywq**, manufactured by **reufznrtxd**. As **ttmmyenfws**, a Senior Sustainability Consultant specializing in GHG Protocol, this analysis adheres to the GHG Protocol accounting standard, incorporating the latest 2026 Land Sector and Removals (LSR) Standard updates and targeting at least 95% Scope 3 coverage. The primary goal is to quantify the greenhouse gas (GHG) emissions associated with the product's entire lifecycle, from raw material acquisition to end-of-life treatment, providing insights into emission hotspots and opportunities for reduction.

1. Introduction

Understanding the environmental impact of products is crucial for sustainable business practices. This report details the Product Carbon Footprint (PCF) of **yrdejkywq**, following a rigorous methodology consistent with global best practices. The analysis identifies key emission sources across the product's lifecycle, providing **reufznrtxd** with actionable data to inform sustainability strategies and enhance transparency.

This analysis has been conducted by **ttmmyenfws**, Senior Sustainability Consultant.

Accounting Standard: The analysis strictly adheres to the Greenhouse Gas (GHG) Protocol Product Standard, which provides a comprehensive framework for measuring and managing GHG emissions from products.

2. Methodology

The Product Carbon Footprint (PCF) analysis was conducted following a five-step methodology, fully aligned with the GHG Protocol.

1. Define Scope

This initial step established the functional unit, system boundaries, geographic scope, and allocation rules for the PCF study.

2. Map Lifecycle (LCI Inventory Stages)

The complete lifecycle of **yrdejkywq** was mapped, identifying all stages from raw material extraction to end-of-life.

3. Collect Data

Primary and secondary data points relevant to each lifecycle stage were collected.

4. Calculate Emissions

Emissions were calculated by multiplying activity data (e.g., material quantity, energy consumption) by appropriate emission factors ($\text{Activity} \times \text{Emission Factor} = \text{CO}_2\text{e}$).

5. Review & Report

The calculated PCF was reviewed for accuracy and reliability, identifying emission hotspots and presenting the findings in a comprehensive report.

GHG Protocol Adherence and Updates:

- **Emission Categorization:** Emissions are categorized into Scope 1 (direct emissions from owned or controlled sources), Scope 2 (indirect emissions from the generation of purchased energy), and Scope 3 (all other indirect emissions that occur in a company's value chain).
 - **2026 LSR Update:** The Land Sector and Removals (LSR) Standard, released on January 30, 2026, and effective January 1, 2027, is considered. While the guidance document for its operationalization is expected in Q2 2026, its principles are acknowledged for land-use related emissions and carbon removals. For **yrdejkywq**, direct land use impacts are minimal, but potential biogenic carbon within materials would be accounted for if significant.
 - **Scope 3 Compliance:** This analysis aims for at least 95% coverage for Scope 3 reporting, in line with 2026 requirements, by including all significant upstream and downstream value chain activities.
-

3. Scope Definition

The foundational elements of this PCF study are defined as follows:

- **Functional Unit:** 1.0 unit of **yrdejkywq**. This unit serves as the reference basis for all quantified environmental impacts.
- **System Boundary:** Initially set at **factory_gate** for the production phase, this report extends the boundary to a comprehensive "Cradle-to-Grave" approach, encompassing raw material acquisition, manufacturing, all transportation, product use, and end-of-life treatment, as requested for a full PCF analysis. Emissions are allocated to relevant GHG Protocol scopes.
- **Geographic Scope:**
 - **Final Production Country:** China
 - **Supply Chain Focus:** Europe Focused (implying material sourcing and/or distribution channels may have European origins/destinations).

- **Allocation:** Emissions are allocated based on direct physical attribution where possible (e.g., material mass, energy consumed per unit). For shared processes, allocation methods such as mass or economic value are applied consistently.

4. Lifecycle Mapping & Data Collection (LCI Inventory)

This section details the inputs and processes identified across the lifecycle of **yrdejkywq**, along with the data collected for emission calculations.

4.1. Detailed Bill of Materials (BOM)

The following Bill of Materials (BOM) for **yrdejkywq** was provided and used for high-accuracy material impact calculation. Emission factors are representative of industry standards (e.g., Ecoinvent/ DEFRA equivalents).

ID	Description	Category	Process	Qty	Unit	Emission Factor (kgCO2e/ Unit)	Total Carbon (kgCO2e)
ID-P1	Plastic Body	Plastics	Injection Molding	0.15	kg	3.0	0.45
ID-C1	Copper Wiring	Metals	Extrusion	0.03	kg	7.5	0.225
ID-PCB1	Printed Circuit Board	Electronics	Assembly	1	unit	10.0	10.0
ID-P2	Packaging (Cardboard)	Paper/ Cardboard	Manufacturing	0.05	kg	0.7	0.035

Total Raw Material Emissions (Scope 3, Category 1): 10.71 kg CO2e

Total Product Mass (for transport calculation, approximate):
0.15 kg + 0.03 kg + 0.1 kg (assumed PCB mass) + 0.05 kg = 0.33 kg.

4.2. Energy Inputs (Production Phase)

- **Renewable Energy Usage:** royqhtxowr (e.g., 40% renewable electricity is used in production).
- **Energy Intensity (kWh/unit):** srszlnfkqw (e.g., 8 kWh/unit).
- ****Assumed China Grid Emission Factor:**** 0.6 kg CO2e/kWh (for non-renewable electricity).

4.3. Logistics Data (Transportation)

- ****Upstream Transport Mode:**** Select Mode (e.g., Ocean Freight for bulk materials to China factory).
- ****Upstream Transport Distance:**** hgtusrptnr (e.g., 15000 km).
- ****Assumed Ocean Freight Emission Factor:**** 0.01 kg CO2e/tkm.
- ****Last-Mile Delivery Channel:**** Delivery Type (e.g., Road (Light Commercial Vehicle)).
- ****Assumed Last-Mile Distance:**** 100 km (illustrative, as specific distance for 'Delivery Type' was not provided).
- ****Assumed Last-Mile Emission Factor:**** 0.2 kg CO2e/parcel for 100km (simplified for a single unit).

4.4. Use Phase Data

- **Product Lifespan:** xnwydihyqu (e.g., 4 years).
- **Energy Consumption in Use:** kvxnzyihyd (e.g., 3 kWh/year).
- ****Assumed Use Phase Electricity Grid Emission Factor:**** 0.5 kg CO2e/kWh (global average for product use).

4.5. End-of-Life (EoL) Scenarios

- **Recyclability Percentage:** linzjrssej (e.g., 60% of material is recyclable).
- **Circular/Take-back Programs:** vhemxzpsol (e.g., 5% take-back for remanufacturing, yielding a 0.05 kg CO2e/unit benefit for returned units).
- ****Assumed EoL Landfill Emission Factor:**** 1.5 kg CO2e/kg (for non-recycled/remanufactured waste).

- ****Assumed EoL Recycling Benefit Factor:**** -0.7 kg CO2e/kg (for avoided virgin material production).
-

5. Emissions Calculation (Activity & Emission Factor = CO2e)

Emissions are calculated for each stage of the product's lifecycle and categorized according to the GHG Protocol.

5.1. Scope 1: Direct Emissions

For a Product Carbon Footprint with a 'factory_gate' boundary, direct Scope 1 emissions (e.g., from on-site fuel combustion for manufacturing processes directly attributable to the product) are generally integrated into the material and energy factors if outsourced, or would require specific operational data. For this analysis, it is assumed that significant direct emissions specific to the product manufacturing are covered within the energy intensity and material production emissions.

Estimated Scope 1 Emissions: 0.00 kg CO2e/unit (Assuming negligible direct emissions within the defined 'factory_gate' boundary for this product type, or embedded within upstream factors).

5.2. Scope 2: Purchased Energy Emissions (Production)

These emissions result from the electricity purchased for the manufacturing of **yrdejkywq** in China.

- Energy Intensity: 8 kWh/unit
- Renewable Energy Usage: 40%
- Non-renewable electricity: $8 \text{ kWh/unit} * (1 - 0.40) = 4.8 \text{ kWh/unit}$
- China Grid Emission Factor: 0.6 kg CO2e/kWh

Calculated Scope 2 Emissions: $4.8 \text{ kWh/unit} * 0.6 \text{ kg CO2e/kWh} = 2.88 \text{ kg CO2e/unit}$

5.3. Scope 3: Value Chain Emissions

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

Emissions from the extraction, production, and transportation of raw materials and components for **yrdejkywq**.

- Total Carbon from BOM (as provided in section 4.1): 10.71 kg CO₂e/unit

Calculated Scope 3, Category 1 Emissions: 10.71 kg CO₂e/unit

5.3.2. Category 4: Upstream Transportation and Distribution

Emissions associated with transporting raw materials and components to the manufacturing facility in China.

- Transport Mode: Ocean Freight
- Transport Distance: 15000 km
- Total Product Mass (approx.): 0.33 kg
- Emission Factor (Ocean Freight): 0.01 kg CO₂e/tkm

Calculated Scope 3, Category 4 Emissions: $(0.33 \text{ kg} / 1000) * 15000 \text{ km} * 0.01 \text{ kg CO}_2\text{e/tkm} = \mathbf{0.0495 \text{ kg CO}_2\text{e/unit}}$

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

Emissions from the final delivery of the finished product to the customer.

- Delivery Type: Road (Light Commercial Vehicle)
- Assumed Last-Mile Distance: 100 km
- Assumed Emission Factor: 0.2 kg CO₂e/parcel (for 100km journey of a single unit)

Calculated Scope 3, Category 9 Emissions: 0.20 kg CO₂e/unit

5.3.4. Category 11: Use of Sold Products

Emissions generated during the product's operational life by the end-user.

- Product Lifespan: 4 years
- Energy Consumption in Use: 3 kWh/year
- Total Energy Consumption: 4 years * 3 kWh/year = 12 kWh
- Use Phase Electricity Grid Emission Factor: 0.5 kg CO₂e/kWh

Calculated Scope 3, Category 11 Emissions: 12 kWh * 0.5 kg CO₂e/kWh = **6.00 kg CO₂e/unit**

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

Emissions and avoided emissions associated with the disposal, recycling, and remanufacturing of the product at the end of its life.

- Total Product Mass: 0.33 kg
- Recyclability Percentage: 60%
- Circular/Take-back Programs: 5% take-back for remanufacturing (0.05 kgCO₂e/unit benefit)
- Disposal Percentage: 100% - 60% (recycling) - 5% (take-back) = 35%
- Recycled Emissions: 0.33 kg * 0.60 * (-0.7 kg CO₂e/kg) = -0.1386 kg CO₂e
- Remanufacturing Benefit: -0.05 kg CO₂e/unit
- Disposal Emissions: 0.33 kg * 0.35 * 1.5 kg CO₂e/kg = 0.17325 kg CO₂e

Calculated Scope 3, Category 12 Emissions: -0.1386 + (-0.05) + 0.17325 = **-0.01535 kg CO₂e/unit**

5.4. Summary of Product Carbon Footprint

PCF at Factory Gate (Cradle-to-Gate)

This includes raw materials, upstream transport, and production energy.

- Scope 3, Cat 1 (Raw Materials): 10.71 kg CO₂e
- Scope 2 (Production Energy): 2.88 kg CO₂e
- Scope 3, Cat 4 (Upstream Transport): 0.0495 kg CO₂e

Total PCF (Factory Gate): 10.71 + 2.88 + 0.0495 = **13.6395 kg CO₂e/unit**

Full Cradle-to-Grave PCF

This includes all stages from raw material acquisition to end-of-life.

GHG Protocol Scope/Category	Lifecycle Stage	Emissions (kg CO ₂ e/unit)
Scope 1	Direct Emissions (Production)	0.00
Scope 2	Purchased Energy (Production)	2.88
Scope 3, Category 1	Purchased Goods and Services (Raw Materials)	10.71
Scope 3, Category 4	Upstream Transportation and Distribution	0.0495
Scope 3, Category 9	Downstream Transportation and Distribution	0.20
Scope 3, Category 11	Use of Sold Products	6.00
Scope 3, Category 12	End-of-Life Treatment of Sold Products	-0.01535

Total Product Carbon Footprint (Cradle-to-Grave): 19.82415 kg CO₂e/unit

6. Review & Reporting

6.1. Emission Hotspots

Based on the comprehensive Cradle-to-Grave analysis, the primary emission hotspots for **yrdejkywq** are:

- **Raw Materials (Scope 3, Category 1):** This stage accounts for the largest portion of the PCF (approximately 54%), largely driven by the Printed Circuit Board (PCB) component. This indicates a critical area for material optimization, design for low-carbon materials, or engaging with suppliers on decarbonization.
- **Use Phase (Scope 3, Category 11):** Energy consumption during the product's lifespan contributes significantly (approximately 30%). Strategies to reduce energy demand during use or to encourage renewable energy use by consumers would be impactful.
- **Production Energy (Scope 2):** While lower than materials and use phase, purchased electricity for manufacturing still represents a notable portion (approximately 14%). Increasing renewable energy usage beyond the current 40% in China would further reduce this impact.

6.2. Reliability Statement

The calculations presented in this report are based on the provided parameters, industry-standard emission factors, and reasonable assumptions for placeholder data. Every effort has been made to ensure the highest level of accuracy and transparency. The use of a detailed Bill of Materials significantly enhances the reliability of the material impact assessment. The 95% Scope 3 coverage target ensures a holistic view of the product's value chain emissions.

6.3. LSR Standard Applicability

The GHG Protocol's new Land Sector and Removals (LSR) Standard, effective January 1, 2027, provides crucial guidance for accounting for land-based emissions and removals. While direct land-use change for the production of **yrdejkywq**'s components is not explicitly detailed in the provided data, future analyses should thoroughly investigate the land sector impacts of raw material sourcing (e.g., biogenic

materials) to fully comply with this evolving standard. This standard will be critical for companies setting science-based targets and is likely to be incorporated in emission-related regulations.

Confidential - Internal Use Only