

carboncalcpcf.com

Product Carbon Footprint Analysis Report

For: yimqrrmqmkggy

Company: yoeurmyxok

Senior Sustainability
Consultant:
gkryewyygt

Protocol Data (Accounting
Standard): GHG Protocol

Disclaimer: This report is generated based on available data and industry standards, incorporating illustrative values for placeholder parameters. While every effort has been made to ensure accuracy within these constraints, actual emissions may vary depending on specific operational details and real-world data.

1. Executive Summary

This report presents a high-detail Product Carbon Footprint (PCF) analysis for the product **yimqrmkgy**, manufactured by **yoeurmyxok**. Conducted by **gkryewyygt**, Senior Sustainability Consultant, this analysis adheres strictly to the Greenhouse Gas (GHG) Protocol, incorporating anticipated 2026 updates for Scope 3 emissions and the Land Sector and Removals (LSR) Standard. The objective is to quantify the greenhouse gas emissions associated with the product's lifecycle from a factory-gate perspective, identify emission hotspots, and provide a foundation for targeted decarbonization efforts. Due to the placeholder nature of some input parameters, illustrative values have been applied to demonstrate the methodology and calculation process comprehensively. Key findings indicate that the manufacturing phase, particularly material acquisition and energy consumption, along with the product's use phase, represent significant emission contributors.

2. Methodology: GHG Protocol Approach

The Product Carbon Footprint (PCF) analysis for yimqrmkgy follows the five-step methodology prescribed by the GHG Protocol, ensuring a consistent, transparent, and comprehensive

assessment of greenhouse gas (GHG) emissions across the product's lifecycle. This methodology is critical for identifying emission hotspots and informing sustainability strategies.

2.1. Step 1: Define Scope

The initial phase establishes the boundaries and parameters of the PCF study:

- **Functional Unit:** 1.0 unit of yimqrmkgy. This unit serves as the basis for all emission calculations, allowing for comparable results.
- **System Boundary:** factory_gate (cradle-to-gate). This boundary includes all emissions from raw material extraction, processing, and manufacturing up to the point where the finished product leaves the factory gate. While the core system boundary is factory-gate, downstream phases (Use Phase and End-of-Life) are included as per the user's request for a comprehensive PCF, falling under Scope 3 categories.
- **Geographic Scope:** Final production occurs in China, with a Supply Chain Focus on Europe for raw material sourcing and initial transport to manufacturing.
- **Accounting Standard:** GHG Protocol (Corporate Value Chain (Scope 3) Accounting and Reporting Standard). This report explicitly categorizes emissions 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 the value chain of the reporting company, both upstream and downstream).

- **Allocation:** All emissions are directly allocated to the functional unit (1.0 unit of yimqrmkg). Co-product and recycling allocations would be considered if specific data were available, following GHG Protocol guidance on allocation for multi-product systems.
 - **GHG Protocol 2026 Updates:** This analysis conceptually incorporates the anticipated revisions from the GHG Protocol's 2026 updates. This includes a commitment to achieving at least 95% coverage for all required Scope 3 emissions, ensuring a more complete and accurate inventory. Furthermore, the Land Sector and Removals (LSR) Standard, effective January 1, 2027, is considered for relevant land-based emissions and carbon removals. As specific land-use data for yimqrmkg is not provided, this is acknowledged as a critical area for future primary data collection, especially for agricultural or forestry-related product components. The LSR Standard provides accounting requirements and guidance for entities with significant land sector activities and entities choosing to report CO₂ removals or CO₂ capture with geologic storage.
-

2.2. Step 2: Map Lifecycle (Life Cycle Inventory - LCI Stages)

The lifecycle of yimqrmkg is mapped into distinct stages to systematically identify all emission

sources. This section provides a detailed breakdown of materials and energy inputs, utilizing illustrative data where specific parameters were provided as placeholders.

2.2.1. Materials Acquisition & Pre-processing (Upstream - Scope 3, Category 1)

This stage covers the extraction of raw materials, their initial processing, and the manufacturing of components used in yimqrmkgy. The detailed Bill of Materials (BOM) for "zrnmoprw" is interpreted here with illustrative data, following the specified format:

Illustrative Detailed Bill of Materials (BOM) for yimqrmkgy:

ID	Description	Category	Process	Qty	Unit	Illustrative Emission Factor (kgCO2e/unit or / kg)
M001	Aluminum Casing	Metals	Extrusion, Machining	0.5	kg	8.0
M002	Plastic Enclosure (ABS)	Plastics	Injection Molding	0.3	kg	3.5
M003	Electronic Circuit Board (PCB)	Electronics	Assembly, Soldering	0.1	unit	15.0
M004	Copper Wiring	Metals	Drawing, Insulation	0.05	kg	4.0
M005	Packaging (Cardboard)	Paper/ Wood	Pulping, Forming	0.2	kg	1.0

ID	Description	Category	Process	Qty	Unit	Illustrative Emission Factor (kgCO2e/unit or / kg)
M006	Battery (Lithium-ion)	Electronics	Cell Manufacturing, Assembly	0.08	kg	25.0

2.2.2. Manufacturing (Core Emissions - Scope 1, 2, and relevant Scope 3)

This stage covers the energy consumption and direct emissions from the assembly and finishing processes at the production facility in China.

- **Energy Inputs:** Electricity (purchased from the grid, with a portion from renewable sources), minor direct fuel consumption for on-site machinery.
- **Material Inputs:** Components from the BOM.

2.2.3. Transportation (Upstream & Downstream - Scope 3, Categories 4 & 9)

This covers the logistics of bringing raw materials/ components to the factory and distributing the finished product.

- **Inbound Logistics:** Raw materials from Europe to China (Sea Freight).
- **Outbound Logistics:** Finished products from the factory in China to the consumer in

Europe (Sea Freight, then Last-Mile Delivery).

2.2.4. Use Phase (Downstream - Scope 3, Category 11)

This stage accounts for the emissions generated during the product's lifespan when actively used by the consumer.

- **Energy Consumption in Use:** Electricity consumed by yimqrmkg during its operational life.
- **Product Lifespan:** Expected duration of active use.

2.2.5. End-of-Life (Downstream - Scope 3, Category 12)

This stage addresses the emissions associated with the disposal or recycling of the product at the end of its life.

- **Disposal Methods:** Landfilling, recycling, or other treatment processes.
 - **Recyclability Percentage:** Portion of the product that is recycled.
 - **Circular/Take-back Programs:** Impact of programs to extend product life or facilitate recycling.
-

2.3. Step 3: Collect Data (Primary/Secondary Data Points)

Data collection is a crucial step, leveraging both primary and secondary sources. For this report, where specific parameters were provided as placeholders, illustrative data has been used to demonstrate the calculation methodology.

2.3.1. Material Data

The "Detailed Bill of Materials (BOM): zrnmoprw" was used as a template for material types. Illustrative quantities and representative emission factors were assigned. Ideally, primary data from suppliers would be collected, but for this analysis, industry-average emission factors are utilized where specific values were not provided with "zrnmoprw".

Data Point	Value Used (Illustrative/ Placeholder)	Source/ Comment
Total Product Weight	1.5 kg (estimated sum of BOM items)	Derived from illustrative BOM

2.3.2. Production Energy Data

Energy consumption during the manufacturing phase is a significant contributor to the PCF.

Data Point	Value Used (Illustrative/ Placeholder)	Source/Comment
	50%	

Data Point	Value Used (Illustrative/ Placeholder)	Source/Comment
Renewable Energy Usage (vquzxvnrpw)		Assumed for illustrative purposes. Represents the percentage of electricity purchased from renewable sources.
Energy Intensity (kWh/unit) (nttuipztl)	5 kWh/unit	Assumed for illustrative purposes. Represents the total electricity consumed per unit of yimqrmkgy produced.
China Grid Emission Factor (2023 National Average)	0.6205 kgCO2e/kWh	Representative national average. Actual provincial factors can vary significantly.

2.3.3. Transportation Data

Logistics data significantly impacts Scope 3 emissions. Illustrative data is used for the placeholder parameters.

Data Point	Value Used (Illustrative/ Placeholder)	Source/Comment
Primary Transport Mode (Select Mode)	Sea Freight (from Europe to China for materials, China to Europe for finished product)	Common mode for intercontinental transport.
Primary Transport		

Data Point	Value Used (Illustrative/ Placeholder)	Source/Comment
Distance (wvsmhrljqg)	10,000 km (intercontinental sea freight)	Representative long-haul distance.
Sea Freight Emission Factor	0.016 kgCO ₂ e/tonne-km	Representative average for container ships (DEFRA/BEIS).
Last-Mile Delivery Channel (Delivery Type)	Road Freight (Heavy Goods Vehicle - HGV)	Common for regional and last-mile delivery within Europe.
Last-Mile Delivery Distance	500 km (e.g., within Europe)	Representative distance for regional distribution.
Road Freight Emission Factor (HGV)	0.092 kgCO ₂ e/tonne-km	Representative average for articulated HGV (>20t), well-to-wheel (GLEC/BEIS). Other sources provide ranges, e.g., 0.062-0.243 kgCO ₂ e/tonne-km.

2.3.4. Use Phase Data

Consumer usage patterns are modeled with the provided placeholder data.

Data Point	Value Used (Illustrative/ Placeholder)	Source/Comment
	5 years	Assumed for illustrative purposes. Product lifespans vary

Data Point	Value Used (Illustrative/ Placeholder)	Source/Comment
Product Lifespan (oqmvwtugtq)		by category (e.g., TVs 6.5 years, smartphones 4.8 years, large appliances 11-12 years).
Energy Consumption in Use (kWh/unit/ year) (eregfnrnh)	10 kWh/year	Assumed for illustrative purposes. Typical appliance consumption can range from small electronics (e.g., router 10 kWh/year) to refrigerators (up to 700 kWh/year).
European Grid Emission Factor (Average)	0.25 kgCO ₂ e/ kWh	Representative European average for illustrative purposes. Actual values vary by country.

2.3.5. End-of-Life (EoL) Data

The final stage of the product lifecycle considers disposal and recovery.

Data Point	Value Used (Illustrative/ Placeholder)	Source/Comment
Recyclability Percentage (xdwuryvvin)	70%	Assumed for illustrative purposes. Represents the percentage of the product material that is collected and processed for recycling.

Data Point	Value Used (Illustrative/ Placeholder)	Source/Comment
Circular/Take-back Programs (nkrnqugkyy)	Described qualitatively	Presence of such programs can significantly enhance recycling rates and resource efficiency.
Landfill Emission Factor (Mixed Waste)	0.5 kgCO ₂ e/kg of waste	Illustrative factor for waste sent to landfill (includes methane emissions from decomposition).
Avoided Emissions Factor (Recycling)	(Not explicitly calculated as a credit in this simplified model, but recognized as a benefit)	Recycling avoids virgin material production emissions. Factors exist for specific materials.

2.4. Step 4: Calculate Emissions (Activity * Emission Factor = CO₂e)

Emissions are calculated for each lifecycle stage and categorized according to the GHG Protocol Scopes. All calculations use the illustrative data and emission factors outlined in Step 3. An emission factor is a representative value that relates the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

2.4.1. Scope 1 Emissions (Direct Emissions)

For a "factory_gate" boundary, direct emissions typically arise from owned or controlled combustion sources (e.g., boilers, company vehicles on-site). Assuming the primary manufacturing process itself does not involve significant direct fuel combustion within the defined boundary for yimqrmkgy, Scope 1 emissions are considered minimal for the product unit:

- **Illustrative Scope 1 (Direct Manufacturing Operations):** 0.01 kgCO₂e/unit
- **Total Scope 1: 0.01 kgCO₂e**

2.4.2. Scope 2 Emissions (Energy Indirect Emissions - Purchased Electricity)

These emissions result from the generation of purchased electricity consumed during manufacturing.

- Energy Intensity: 5 kWh/unit (nttuipztl)
- Renewable Energy Usage: 50% (vquzxvnrpw)
- Non-Renewable Electricity Consumed: 5 kWh/unit * (1 - 0.50) = 2.5 kWh/unit
- China Grid Emission Factor: 0.6205 kgCO₂e/kWh
- **Calculation:** 2.5 kWh/unit * 0.6205 kgCO₂e/kWh = 1.55125 kgCO₂e/unit
- **Total Scope 2: 1.55 kgCO₂e**

2.4.3. Scope 3 Emissions (Value Chain Emissions)

Scope 3 emissions encompass all other indirect emissions in the value chain. This analysis ensures at least 95% coverage for required Scope 3 emissions as per 2026 requirements, acknowledging that specific primary data for full compliance is beyond this illustrative report.

Category 1: Purchased Goods and Services (Materials)

Calculations based on the illustrative BOM:

ID	Description	Qty (kg or unit)	Illustrative Emission Factor (kgCO2e/unit or /kg)	Total Carbon (kgCO2e)
M001	Aluminum Casing	0.5 kg	8.0 kgCO2e/kg	4.00
M002	Plastic Enclosure (ABS)	0.3 kg	3.5 kgCO2e/kg	1.05
M003	Electronic Circuit Board (PCB)	0.1 unit	15.0 kgCO2e/unit	1.50
M004	Copper Wiring	0.05 kg	4.0 kgCO2e/kg	0.20
M005	Packaging (Cardboard)	0.2 kg	1.0 kgCO2e/kg	0.20
M006	Battery (Lithium-ion)	0.08 kg	25.0 kgCO2e/kg	2.00
Total Scope 3, Category 1 Emissions:				8.95 kgCO2e

Category 4: Upstream Transportation and Distribution (Raw Materials)

Transport of raw materials from Europe to the factory in China.

- Product Weight: 1.5 kg (total for finished product, assuming raw materials weight similar)
- Transport Mode: Sea Freight
- Distance: 10,000 km (wvsmhrliqqg)
- Emission Factor: 0.016 kgCO₂e/tonne-km
- **Calculation:** $(1.5 \text{ kg} / 1000 \text{ kg/tonne}) * 10,000 \text{ km} * 0.016 \text{ kgCO}_2\text{e/tonne-km} = 0.24 \text{ kgCO}_2\text{e}$
- **Total Scope 3, Category 4: 0.24 kgCO₂e**

Category 9: Downstream Transportation and Distribution (Finished Product)

Transport of finished product from the factory in China to Europe, then last-mile delivery.

- Product Weight: 1.5 kg
- **Intercontinental Transport (China to Europe):**
 - Mode: Sea Freight
 - Distance: 10,000 km (illustrative)
 - Emission Factor: 0.016 kgCO₂e/tonne-km
 - Calculation: $(1.5 \text{ kg} / 1000 \text{ kg/tonne}) * 10,000 \text{ km} * 0.016 \text{ kgCO}_2\text{e/tonne-km} = 0.24 \text{ kgCO}_2\text{e}$
- **Last-Mile Delivery (within Europe):**
 - Mode: Road Freight (HGV)

- Distance: 500 km (illustrative)
- Emission Factor: 0.092 kgCO₂e/tonne-km
- Calculation: $(1.5 \text{ kg} / 1000 \text{ kg/tonne}) * 500 \text{ km} * 0.092 \text{ kgCO}_2\text{e/tonne-km} = 0.069 \text{ kgCO}_2\text{e}$
- **Total Scope 3, Category 9: 0.24 kgCO₂e + 0.069 kgCO₂e = 0.309 kgCO₂e**

Category 11: Use of Sold Products

Emissions from energy consumption during the product's lifespan.

- Product Lifespan: 5 years (oqmvwtugtq)
- Energy Consumption in Use: 10 kWh/year (eregfnrnhy)
- European Grid Emission Factor: 0.25 kgCO₂e/kWh (illustrative average)
- **Calculation:** $10 \text{ kWh/year} * 5 \text{ years} * 0.25 \text{ kgCO}_2\text{e/kWh} = 12.5 \text{ kgCO}_2\text{e}$
- **Total Scope 3, Category 11: 12.5 kgCO₂e**

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

Emissions from disposal of non-recycled components.

- Total Product Weight: 1.5 kg
- Recyclability Percentage: 70% (xdwuryvvin)
- Waste to Landfill: $1.5 \text{ kg} * (1 - 0.70) = 0.45 \text{ kg}$

- Landfill Emission Factor: 0.5 kgCO₂e/kg of waste (illustrative)
- **Calculation:** 0.45 kg * 0.5 kgCO₂e/kg = 0.225 kgCO₂e
- **Circular/Take-back Programs (nkrnqugkyy):** The existence of circular and take-back programs would ideally lead to higher recycling rates and potentially lower landfill emissions, or even avoided emissions credits if materials re-enter production cycles. For this report, the 70% recyclability assumes some level of effective take-back.
- **Total Scope 3, Category 12: 0.225 kgCO₂e**

2.4.4. Total Product Carbon Footprint (PCF) for yimqrmkgy

Emission Scope & Category	Total CO ₂ e (kg)
Scope 1 (Direct Manufacturing Operations)	0.01
Scope 2 (Purchased Electricity for Manufacturing)	1.55
Scope 3, Category 1 (Purchased Goods and Services - Materials)	8.95
Scope 3, Category 4 (Upstream Transportation and Distribution - Raw Materials)	0.24
Scope 3, Category 9 (Downstream Transportation and Distribution - Finished Product)	0.31
Total Product Carbon Footprint (PCF)	23.79 kgCO₂e

Emission Scope & Category	Total CO2e (kg)
Scope 3, Category 11 (Use of Sold Products)	12.50
Scope 3, Category 12 (End-of-Life Treatment of Sold Products)	0.23
Total Product Carbon Footprint (PCF)	23.79 kgCO2e

Breakdown by Scope:

- **Total Scope 1:** 0.01 kgCO2e (0.04% of total PCF)
- **Total Scope 2:** 1.55 kgCO2e (6.51% of total PCF)
- **Total Scope 3:** 22.23 kgCO2e (93.45% of total PCF)

2026 LSR Update Consideration: While this product (yimqrmkgy) is not explicitly defined as having significant land-sector activities, the LSR Standard is acknowledged. Future PCF analyses should scrutinize raw material origins to identify potential agricultural or forestry-based inputs and their associated land use change or land management emissions, which would fall under Scope 3.

Scope 3 Compliance (95% Coverage): The illustrative calculations demonstrate an approach to cover major Scope 3 categories, aiming for the 95% coverage threshold as proposed in the 2026 GHG Protocol Scope 3 revisions. This report quantifies emissions for categories 1, 4, 9, 11, and 12, which typically represent the most significant sources for manufactured goods. Exclusions, if any, would be rigorously justified and quantified to ensure

compliance with the 5% allowance for unquantified emissions.

2.5. Step 5: Review & Report

2.5.1. Hotspot Identification

Based on the illustrative calculations, the primary emission hotspots for yimqrmkgy are:

- **Use Phase (Scope 3, Category 11):** This is the largest contributor, accounting for approximately 52.5% of the total PCF. This highlights the importance of energy efficiency in product design and consumer usage patterns.
- **Materials (Scope 3, Category 1):** Constituting about 37.6% of the total PCF, the environmental impact of raw material extraction and processing, particularly for aluminum and batteries, is substantial.
- **Manufacturing Energy (Scope 2):** While smaller than the above, at about 6.5% of the total, the reliance on grid electricity in China still represents a significant portion, despite 50% renewable energy usage. Further increasing renewable energy procurement or improving energy efficiency in the factory would be beneficial.

2.5.2. Reliability Statement and Limitations

This report provides a high-level PCF analysis based on the provided parameters and illustrative data.

The reliability of the results is subject to the following limitations:

- **Illustrative Data:** Many key parameters (e.g., specific BOM details, transport distances, energy consumption, recyclability) were provided as placeholders. Therefore, representative industry-average emission factors and assumed values were used for calculation. These values may not reflect the exact operational data of yoeurmyxok or the specific characteristics of yimqrmkgy.
- **Emission Factor Sources:** Generic industry-standard emission factors (e.g., equivalents of Ecoinvent, DEFRA, GLEC, China's official factors) were applied. While these are widely accepted, specific supplier-level emission data would enhance accuracy.
- **System Boundary Specificity:** The "factory_gate" boundary for core emissions, extended to include downstream use and EoL, provides a comprehensive view. However, upstream emissions for materials are based on generalized processes.
- **LSR Standard:** While conceptually acknowledged, a full quantitative application of the 2026 LSR Standard for land use and carbon removals would require specific data on land use associated with material sourcing, which was not available for this illustrative report.
- **Data Gaps:** Certain detailed data points (e.g., specific manufacturing process energy breakdown beyond electricity, exact waste treatment infrastructure) were not provided, necessitating broader assumptions.

For a more precise and auditable PCF, it is recommended that yoeurmyxok collects primary data for all significant emission sources, particularly from its direct suppliers and manufacturing operations. This would involve specific energy bills, detailed material composition from suppliers with their own PCF data, and verified transport distances and modes.
