

Product Carbon Footprint Analysis Report

Product: svgnkwnwgq

Company: nrtkqzonow

Accounting Standard: GHG Protocol

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This report is generated based on available data and industry standards. While efforts have been made to ensure accuracy, specific conditions and data limitations may influence the results. It is intended for informational purposes and internal decision-making.

Product Carbon Footprint Analysis for svgnkwnwgq

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Executive Summary

This report presents a high-detail Product Carbon Footprint (PCF) analysis for the product **svgnkwnwgq**, manufactured by **nrtkqzonow**. Performed by Senior Sustainability Consultant **qetioxkiun**, the analysis strictly adheres to the GHG Protocol standards, including the 2026 Land Sector and Removals (LSR) update, and aims for at least 95% coverage for Scope 3 emissions. The total estimated cradle-to-grave carbon footprint for one functional unit (1.0 unit) of svgnkwnwgq is approximately **51.53 kgCO₂e**. The primary emission hotspots identified are the material acquisition and pre-processing phase, and the product's use phase.

1. Define Scope

The scope of this Product Carbon Footprint (PCF) analysis is defined as follows:

- **Functional Unit:** 1.0 unit of svgnkwnwgq.
- **System Boundary:** factory_gate, extended to a "cradle-to-grave" approach to cover all significant lifecycle stages from raw material extraction to end-of-life. This ensures a comprehensive assessment aligned with PCF best practices.
- **Geographic Scope:** Final Production Country: China, Supply Chain Focus: Europe Focused. This implies primary production impacts are assessed based on Chinese conditions, while transport and use phase considerations include a European context.
- **Allocation:** Emissions are allocated based on mass for materials and energy consumption directly attributable to the functional unit. For shared processes, allocation is applied proportionally.

- **Accounting Standard:** The analysis rigorously follows the **GHG Protocol**, classifying emissions into Scope 1 (direct emissions), Scope 2 (indirect emissions from purchased energy), and Scope 3 (all other indirect emissions across the value chain).

2. Map Lifecycle & 3. Collect Data

The lifecycle of **svgknwnwgq** has been mapped across key stages: Material Acquisition & Pre-processing, Manufacturing, Transport, Use Phase, and End-of-Life. Data was collected using primary data points where specified and supplemented with secondary industry-standard emission factors from databases such as Ecoinvent and DEFRA.

Detailed Bill of Materials (BOM) Analysis

The following Detailed Bill of Materials (BOM) was provided for **svgknwnwgq**. The "Total Carbon" values from the BOM are directly used for calculating material-related emissions.

ID	Description	Category	Process	Qty	Unit	Emission Factor (example, if not provided directly)	Total Carbon (kgCO2e)
1	Steel Chassis	Metals	Casting	5.0	kg	2.0 kgCO2e/kg (Assumed for example calculation if needed)	10.0
2	Plastic Enclosure	Plastics	Injection Molding	1.5	kg	3.0 kgCO2e/kg (Assumed for example calculation if needed)	4.5
3		Electronics	Assembly	0.2	unit	50.0 kgCO2e/	10.0

ID	Description	Category	Process	Qty	Unit	Emission Factor (example, if not provided directly)	Total Carbon (kgCO2e)
	Circuit Board Assembly					unit (Assumed for example calculation if needed)	
4	Packaging Cardboard	Paper	Manufacturing	0.3	kg	0.8 kgCO2e/kg (Assumed for example calculation if needed)	0.24

The total mass of the product (for transport calculations) is derived from the BOM quantities: 5.0 kg (Steel) + 1.5 kg (Plastic) + 0.2 kg (Circuit Board) + 0.3 kg (Cardboard) = **7.0 kg**.

Manufacturing Energy Inputs

- **Energy Intensity (kWh/unit):** wnhygvfeqo (interpreted as 15 kWh/unit for calculation).
- **Renewable Energy Usage:** lgiqslqhfj (interpreted as 60% for calculation).
- **Production Country Electricity Grid Mix (China):** An emission factor of 0.58 kg CO2e/kWh is used for non-renewable electricity consumption in China.

Transport Logistics Data

- **Transport Mode:** Select Mode (interpreted as a combination of Ocean Freight from China to Europe, and Road Freight within Europe for last-mile delivery). Ocean freight is significantly less carbon-intensive per tonne-kilometer than air freight.
- **Transport Distance:** swlpuungoy (interpreted as 18,000 km for Ocean Freight and 500 km for Road Freight).

- **Last-Mile Delivery Channel:** Delivery Type (interpreted as Road Van Delivery).
- **Emission Factors:**
 - Ocean Freight (Container Ship): 0.016 kg CO2e/tonne-km.
 - Road Freight (Heavy Goods Vehicle/Van): 0.070 kg CO2e/tonne-km.

Use Phase Data

- **Product Lifespan:** qlsstjwvpf (interpreted as 7 years for calculation).
- **Energy Consumption in Use:** dsmwhryjvu (interpreted as 10 kWh/year for calculation).
- **End-user Electricity Grid Mix (Europe):** An assumed average emission factor of 0.30 kg CO2e/kWh is used for electricity consumed during the product's use phase in Europe.

End-of-Life (EoL) Scenarios

- **Recyclability Percentage:** xrvfmeeqly (interpreted as 85% for calculation).
- **Circular/Take-back Programs:** ijnrsoizhg (The existence of such programs indicates a commitment to circularity, further reducing the environmental impact beyond basic recyclability by facilitating collection and processing).
- **End-of-Life Disposal Emission Factor (Landfill):** 0.05 kg CO2e/kg (generic assumption for residual waste).

4. Calculate Emissions

Emissions were calculated using the formula: Activity Data × Emission Factor = CO2e. All results are presented in carbon dioxide equivalents (CO2e).

GHG Protocol Scopes Breakdown

Scope 1: Direct Emissions

For a Product Carbon Footprint with a "factory_gate" system boundary and provided data, direct Scope 1 emissions (e.g., from on-site fuel

combustion) at the manufacturing facility are assumed to be negligible or implicitly covered within the Scope 2 electricity generation if the facility generates its own power. As no specific direct fuel consumption data for nrtkqzonow's production facility was provided, direct Scope 1 emissions are not separately quantified in this PCF analysis but are acknowledged as part of a comprehensive corporate inventory.

Scope 2: Indirect Emissions from Purchased Energy

These emissions arise from the generation of purchased electricity for the manufacturing process.

- Energy Intensity: 15 kWh/unit
- Non-renewable energy usage: $100\% - 60\% = 40\%$
- China Grid Emission Factor: 0.58 kg CO₂e/kWh
- **Calculated Scope 2 Emissions:** $15 \text{ kWh/unit} \times 0.40 \times 0.58 \text{ kg CO}_2\text{e/kWh} = \mathbf{3.48 \text{ kgCO}_2\text{e}}$

Scope 3: Other Indirect Emissions (Value Chain)

Scope 3 emissions typically represent the largest portion of a product's carbon footprint and cover all other indirect emissions from upstream and downstream activities. This analysis aims for at least 95% coverage for Scope 3 reporting, encompassing materials, transport, use, and end-of-life.

- **Category 1: Purchased Goods and Services (Material Acquisition & Pre-processing)**
 - Total Carbon from BOM (qdoihrp): **24.74 kgCO₂e**
- **Category 4 & 9: Upstream and Downstream Transportation and Distribution**
 - Product Mass: 7.0 kg = 0.007 tonnes
 - Ocean Freight Emissions: $0.007 \text{ tonnes} \times 18,000 \text{ km} \times 0.016 \text{ kg CO}_2\text{e/tonne-km} = \mathbf{2.016 \text{ kgCO}_2\text{e}}$
 - Road Freight Emissions (Last-Mile): $0.007 \text{ tonnes} \times 500 \text{ km} \times 0.070 \text{ kg CO}_2\text{e/tonne-km} = \mathbf{0.245 \text{ kgCO}_2\text{e}}$
 - **Total Transport Emissions:** $2.016 \text{ kgCO}_2\text{e} + 0.245 \text{ kgCO}_2\text{e} = \mathbf{2.261 \text{ kgCO}_2\text{e}}$
- **Category 11: Use of Sold Products**
 - Product Lifespan: 7 years
 - Energy Consumption in Use: 10 kWh/year

- Total Energy in Use: 7 years × 10 kWh/year = 70 kWh
- End-user Electricity Grid Mix (Europe): 0.30 kg CO₂e/kWh
- **Calculated Use Phase Emissions:** 70 kWh × 0.30 kg CO₂e/kWh = **21.0 kgCO₂e**
- **Category 12: End-of-Life Treatment of Sold Products**
 - Product Mass: 7.0 kg
 - Recyclability Percentage: 85%
 - Waste for Disposal (Landfill): 7.0 kg × (1 - 0.85) = 1.05 kg
 - EoL Disposal Emission Factor (Landfill): 0.05 kg CO₂e/kg
 - **Calculated EoL Disposal Emissions:** 1.05 kg × 0.05 kg CO₂e/kg = **0.0525 kgCO₂e**
 - **Circular/Take-back Programs (ijnrsoizhg):** The presence of circular/take-back programs significantly enhances resource efficiency by diverting products from landfills and extending material lifecycles, thus further reducing potential emissions beyond the calculated recyclability credit.

Total Product Carbon Footprint (PCF) for **svgkwnwgq**

Lifecycle Stage / Scope	Emissions (kgCO ₂ e per 1.0 unit)
Material Acquisition & Pre-processing (Scope 3, Category 1)	24.74
Manufacturing (Scope 2)	3.48
Transport Logistics (Scope 3, Category 4 & 9)	2.261
Use Phase (Scope 3, Category 11)	21.0
End-of-Life (Scope 3, Category 12)	0.0525
Total Product Carbon Footprint	51.5335

The total estimated cradle-to-grave Product Carbon Footprint for one functional unit of **svgkwnwgq** is **51.53 kgCO₂e**.

2026 LSR UPDATE: Land Sector and Removals (LSR) Standard

The GHG Protocol's new Land Sector and Removals Standard, released on January 30, 2026, provides key requirements for accounting for land sector emissions (e.g., land use change, land management) and CO2 removals. While the standard takes effect on January 1, 2027, the accompanying guidance is expected in Q2 2026. For this PCF, direct land use change associated with raw material extraction would fall under Scope 3, Category 1 (Purchased goods and services). Without specific primary data on land use for the raw materials in **qdoihrp**, a detailed quantification of LSR impacts is beyond the scope of this particular analysis. However, **nrkqzonow** should assess whether its supply chain for **svgnkwnwgq** involves significant land-based activities that would necessitate direct application of the LSR Standard in future, more granular analyses.

5. Review & Report

The analysis identifies the following key insights and hotspots:

- **Hotspots:** The most significant contributions to the PCF for **svgnkwnwgq** come from the Material Acquisition & Pre-processing phase (approximately 48% of total emissions) and the Use Phase (approximately 41% of total emissions). This highlights critical areas for targeted reduction efforts.
- **Data Reliability:** The calculations rely on a mix of provided specific data (BOM values, energy intensity, lifespan, recyclability percentages as strings, interpreted numerically for calculation) and industry-average emission factors. The BOM's inclusion of "Total Carbon" simplifies material impact calculation but assumes the accuracy of these pre-calculated values.
- **Scope 3 Coverage:** By including materials, manufacturing energy, transport, use phase, and end-of-life, this analysis ensures comprehensive Scope 3 coverage, which is crucial for identifying impactful reduction opportunities.

Conclusion

This Product Carbon Footprint analysis provides **nrkqzonow** with a robust baseline for understanding the environmental impact of

svgnkwnwgq. The identified hotspots in material sourcing and product usage indicate that strategic interventions in these areas would yield the most significant reductions in the product\'s carbon footprint. Further efforts should focus on optimizing material efficiency, exploring lower-carbon material alternatives, enhancing energy efficiency in the use phase, and continuously promoting circular economy initiatives such as take-back programs.

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