carboncalcpcf.com

Product Carbon Footprint Dashboard

for **vdxltuvrwf** by **pdxxzxvpmn**

44.76 kg CO2e / unit

Total Product Footprint

44.76 kg CO2e/unit

Cradle-to-Extended-Life

Carbon Intensity

44.76 kg CO2e/unit

Based on 1.0 unit functional unit

Top Material Hotspot

Aluminum Alloy Casing

4.25 kg CO2e (43.99% of material impact)

Primary Emission Hotspot

Last-Mile Delivery

20.0 kg CO2e (44.68% of total PCF)

Lifecycle Stage Breakdown (kg CO2e)

Material Acquisition & Pre-processing	9.66 kg CO2e (21.58%)
Manufacturing/Production (Scope 1 & 2)	2.17 kg CO2e (4.85%)
Transportation (Upstream & Downstream to Hub)	0.28 kg CO2e (0.63%)
Last-Mile Delivery	20.0 kg CO2e (44.68%)
Use Phase	13.7 kg CO2e (30.61%)
End-of-Life (Net Credits)	-1.052 kg CO2e (-2.35%)

Material Carbon Impact (kg CO2e)

Aluminum Alloy Casing	4.25 kg CO2e (43.99%)
Lithium-ion Battery Pack	2.70 kg CO2e (27.95%)
Silicon Chipset	1.25 kg CO2e (12.94%)
Recycled ABS Plastic Enclosure	0.63 kg CO2e (6.52%)
Copper Wiring	0.37 kg CO2e (3.83%)
Printed Circuit Board (PCB)	0.30 kg CO2e (3.11%)
Packaging (Recycled Cardboard)	0.16 kg CO2e (1.66%)

Highlights: Key Emission Hotspots

- **Last-Mile Delivery Dominates:** The most significant contributor to the total PCF is last-mile delivery, accounting for a substantial 20.0 kg CO2e. This highlights a critical area for logistics optimization.
- **Use Phase Impact:** The product's energy consumption during its use phase is the second-largest hotspot, contributing 13.7 kg CO2e, underscoring the importance of energy-efficient design.
- **Material Footprint Matters:** Material acquisition and pre-processing are notable, contributing 9.66 kg CO2e. Specific high-impact materials like Aluminum Alloy Casing and Lithium-ion Battery Pack warrant attention for circularity efforts.

Action Plan: Strategies for Emission Reduction

- ✓ **Optimize Last-Mile Logistics:** Implement strategies like electric vehicle fleets, cargo bikes for urban delivery, and localized distribution hubs to drastically cut downstream transport emissions.
- ✓ **Enhance Use Phase Efficiency:** Design for minimal energy consumption during product lifespan, integrate smart energy management features, and explore product-as-a-service models to reduce individual unit impact.
- ✓ **Advance Material Circularity:** Prioritize increasing recycled content, design for easier disassembly and recycling, and expand take-back programs to maximize material recovery and minimize virgin resource reliance.
- ✓ **Boost Renewable Energy Integration:** Increase the percentage of renewable energy used in manufacturing facilities beyond the current (illustrative) 30% to significantly reduce Scope 2 emissions from production.
- ✓ **Strengthen Supplier Engagement:** Collaborate with upstream suppliers to acquire precise primary emissions data and jointly identify opportunities for adopting low-carbon material production processes.