

Industrial IoT Edge Gateway (Model NX-1000)

Origin: Eindhoven,
Netherlands

Boundary: Cradle-to-Factory-
Gate

CRADLE-TO-GATE GROSS
IMPACT
24.87 kg CO₂e

2026 LSR BIOGENIC
STORAGE
-0.21 kg CO₂e

Basis: 1.0 Unit (1.42 kg net / 1.84 kg
gross)

Standard: GHG Protocol • 2026
LSR

TOTAL CARBON FOOTPRINT

Verified AR6

24.87 kg CO₂e

17.51 kg CO₂e / kg net product weight

SUPPLY CHAIN INTENSITY

Scope 3 Dominant

97.1%

24.14 kg CO₂e embedded in upstream tiers

PRIMARY CARBON HOTSPOT

46.0% Total

11.43 kg CO₂e

Active Silicon (Microprocessor & Memory)

ASSEMBLY OPERATIONAL EMISSIONS

GoO Wind Backed

0.73 kg CO₂e

Scope 1 (0.31 kg) + Scope 2 Mkt (0.42 kg)



GHG Protocol Scope Allocation

97.8% Scope 3 Inventory Coverage

Scope 1 (1.25%)

Scope 2 (1.69%)

Scope 3 Upstream (97.06%)

● Scope 1 (Direct)

0.31 kg CO₂e

Gas heating & backup

● Scope 2 (Market)

0.42 kg CO₂e

GoO Wind (Loc: 1.18 kg)

● Scope 3 (Upstream)

24.14 kg CO₂e

Materials & logistics



Mass vs. Carbon Footprint Divergence

Material Intensity Contrast

Compares each physical subsystem's fraction of overall unit mass against its respective greenhouse contribution.

Active Silicon (Microprocessor & Memory)

46.0% GHG vs 6.0% Mass

Cast Aluminum Chassis (EN AC-44300, 42% Recycled)

20.5% GHG vs 45.8% Mass

8-Layer PCB Substrate & Passive SMDs

13.5% GHG vs 16.5% Mass

PC/ABS Polymers, Wiring & Fasteners

6.8% GHG vs 31.7% Mass

■ Carbon Share (% CO₂e) ■ Subsystem Mass Share (% kg)



2026 LSR Standard Biogenic Carbon Accounting

A net removal balance of **-0.21 kg CO₂e** is stored in FSC-certified unbleached packaging fibers (0.42 kg). Maintained in an isolated ledger from fossil emissions to prevent offset mixing per 2026 GHG Protocol guidance.



Ranked Lifecycle Hotspots

Top Contributors

1. Semiconductors (ICs)	11.43 kg (46.0%)
2. Aluminum Chassis	5.10 kg (20.5%)
3. PCB & Passive SMDs	3.35 kg (13.5%)
4. Polymers & Cables	1.70 kg (6.8%)
5. Assembly (Scope 1 & 2)	0.73 kg (2.9%)
6. Inbound Logistics	0.24 kg (1.0%)



Strategic Assessment Insights

Audit Findings

Semiconductor Manufacturing Concentration

Sub-micron wafer fabrication (12nm FinFET) represents 46.0% of all cradle-to-gate impact despite comprising only 6.0% of unit mass, highlighting that Tier 2 foundry electricity contracts are the dominant lifecycle factor.

Secondary Alloy Decarbonization Effect

The 42% recycled European secondary aluminum enclosure avoided an estimated 4.2 kg CO₂e compared to virgin primary aluminum smelter baselines, locking in initial circularity gains.

Grid Residual vs. Location Sensitivity

Contracted Dutch Guarantee of Origin (GoO) wind power mitigates 0.76 kg CO₂e relative to the Netherlands standard location grid factor (0.42 kg market vs. 1.18 kg location-based Scope 2).

Targeted Decarbonization Plan (2026-2028)

-17.5% Target

1 Tier 2 Foundry RE100 Procurement

Mandate verified renewable PPA coverage for microprocessor cleanroom fab facilities.

-2.29 kg CO₂e

2 High-Recycled Chassis (80% Billet)

Transition die-cast enclosure from 42% to 80% ASI-certified secondary low-carbon alloy.

-1.82 kg CO₂e

3 Facility Heat Pump Electrification

Decommission Eindhoven natural gas peak heating; zero-out direct facility Scope 1 emissions.

-0.25 kg CO₂e

carboncalcpcf.com • Assessment Ref: PCF-NL-2026-NX1000-V1

GHG Protocol Product Standard

IPCC AR6 GWP100

2026 LSR Guidance Compliant

DQR Matrix: 1.3 (Very Good)