

EOS M4 ONYX

This document summarizes the life cycle assessment data of the LCA study "Life cycle assessment of the manufacturing of a M4 ONYX system", which was commissioned by EOS and conducted by Fraunhofer EMI in 2025.

Framework of the LCA

Goal

Investigation of the environmental impact of the manufacturing of one EOS M4 ONYX system.

System boundary

Cradle-to-gate.

Declared unit

The manufacturing of one EOS M4 ONYX system (incl. RFS Pro), ready for delivery, including the manufacturing and disposal of the transport packaging. A szenario (Climate Change - total only) includes the Volkman Powder Handling System (PowTrex, vHub, vLoader) and the Grenzebach Dual Setup Station (M4 ONYX version).

Methodology

The LCA follows the principles of the ISO standards 14040/44 and was performed according to the VDMA 34178 guideline. The EF 3.1 method were used for the characterization.

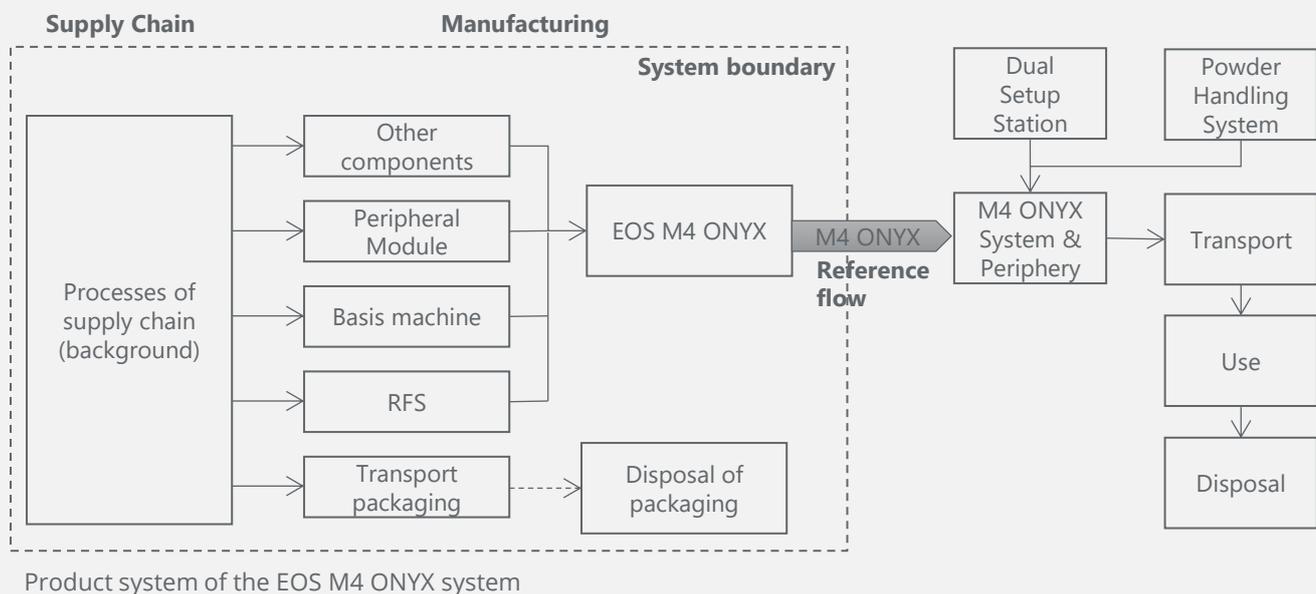
Data sources

The foreground data was provided by EOS (*data from 2025*). The background data was derived from component suppliers and taken from the ecoinvent 3.11 database. Data on the Carbon Footprint and/or components of the peripheral devices was provided by the suppliers.

Cut-off rules

Inputs and outputs contributing <1% of the total mass (based on the BOM) and <1% of the total cumulative energy demand of the reference flow may be excluded, provided that the total excluded flows do not exceed 5 % of the mass, energy, or environmental relevance for any impact category.

System boundaries



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Results of impact assessment

Category	Value	Unit
Climate Change – total	3.74 x 10 ⁴	kg CO ₂ eq.
Climate Change – biogenic	355	kg CO ₂ eq.
Climate Change – fossil	3.67 x 10 ⁴	kg CO ₂ eq.
Climate Change – land use and land use change	65	kg CO ₂ eq.
Acidification	299	mol H ⁺ eq.
Eutrophication, freshwater	28	kg P eq.
Eutrophication, marine	46	kg N eq.
Eutrophication, terrestrial	473	mol N eq.
Ozone depletion	0.008	kg CFC11 eq.
Photochemical oxidant formation	148	kg NMVOC eq.
Land use	2.57 x 10 ⁵	Pt
Water use	1.58 x 10 ⁴	m ³ world eq.
Resource use, fossils	4.36 x 10 ⁵	MJ
Resource use, minerals and metals	3.8	kg Sb eq.

Scenario: M4 ONYX incl. Periphery (Climate Change – total [kg CO₂ eq.])

M4 ONYX	Volkmann Powder Conveying System	Grenzebach Dual Setup Station	Total
3.74 x 10 ⁴	0.53 x 10 ⁴	1.09 x 10 ⁴	5.36 x 10 ⁴

Framework of the LCA

Life cycle software
openLCA 2.0.5

LCA practitioner
Fraunhofer EMI

Report
Report EMI_2025_138-I

Critical review
Critically reviewed by TÜV Süd,
07.11.2025