LCIA Method Down-Selection

LCIA Method	General Information	Key features	Normalisation included	Selection Decision	References
BEES (Building for Environmental and Economic Sustainability)	A tool implementing the method. Measures the environmental performance in the building industry in line with ISO 14040 series.	Includes the consideration of costs (Economic assessment), focuses on the construction industry	Not reviewed	REJECT: construction is relevant for airports, but not transport cabins	[10]
WAVE (Water Accounting and Vulnerability Evaluation), 2014	Focuses on analysing freshwater vulnerability due to consumption by the product supply chain.	The first method to account for atmospheric evaporation of the water.	Not reviewed	REJECT: focused on Water scarcity; use broader methods that include water	[11]
Boulay et al.., 2011	Focuses on analysing freshwater scarcity on human health and the approaches to mitigate it using financial resources.	Not reviewed	Not reviewed	REJECT: focused on Water Scarcity and Human Health; use broader methods	[12]
CML, 2001	Implemented in CMLCA software.	BL = most common IC, non-BL = deeper assessment. Contains all characterisation factors mentioned in the Handbook on LCA. Non-baseline version is extended with additional factors pulled from other recognised methods, such as Eco-Indicator 99 or EPS.	Excludes weighting; includes normalization for EU, NL, West Europe, World at various temporal levels.	ACCEPT: a detailed method for Europe region	[13], [14]
Crustal Scarcity Indicator, 2020	Midpoint mineral resource impact assessment method based on long-term global elemental scarcity proxies: reserves, reserve base, reserves + cumulative production, ore deposits.	Uses kg silicon equivalents per kg of subject element.	Not reviewed	REJECT: focused on mineral resources that are not prevalent in cabins (except Al)	[15]
Cumulative Energy Demand, 1997	A method for determining and comparing the energy intensity of processes by calculating the total primary energy input into product creation.	Used for product environmental performance screening based on quantifying its use of primary energy; does not address phasing out.	None	REJECT: focused on non-renewable energy sources; omits waste - a key cabin EOL impact	[16], [17]
Eco-indicator, 1999	A method for calculating the bespoke "eco-indicator" values of materials and processes used across the product life cycle.	Performs relative comparison to produce a single-score result. Covers production, transportation, operations, and disposal.	EUR; 0.1 for Etox cat.; 1.0 for HH & Res.	REJECT: succeeded by the ReCiPe method	[18]
Ecological Scarcity / Eco-Points, 2013	A method for assessing the relative environmental impact of pollutant emissions & resource consumption against benchmark.	Aggregates the different impacts into a single "eco-point" unit derived from the legal & policy targets defined for a specific region.	Not reviewed	REJECT: focused on Switzerland, impact calculation for other regions is challenging.	[19], [20]
Ecosystem Damage Potential	Focuses on land transformation & occupation	Not reviewed	Not reviewed	REJECT: low relevance to transport cabins (production facilities only); use broader methods instead	[21], [22]
EDIP (Environmental Design of Industrial Products), 1997	Focuses on the Danish industry	Not reviewed	Not reviewed	REJECT: narrow focus on the Danish industry, irrelevant for cabins	[23]
EF Method, 2011	A method to measure the environmental impact of goods, services and organisations from across the supply chain (extraction of raw materials, production, use, final waste management).	Includes Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF), produces a single score.	None	ACCEPT: popular, continuously developed method for Europe region	[24], [25], [26]
EN15804 Method	Provides the rules for construction products, services, and processes regardless of technical and functional performance.	Not reviewed	Not reviewed	REJECT: construction is relevant for airports, but not transport cabins	[27]
Environmental Prices, 2017	A midpoint method for calculating the monetary costs due to pollution	Produces a single-score indicator (EUR/kg)	Normalisation per region	ACCEPT: provides a monetary point of view	[28], [29], [30]
EPD (Environmental Product Declarations), 2018	Provides a transparent and objective quantitative basis for the comparison of products and services	The output is provided by the OEM and must be verified by an independent expert to be valid for 5 years.	None	REJECT: used for declaration reports in line with Product Category Rule, not relevant for cabin assessment task	[31]
EPS (Environmental Priority Strategies), 2015	Measures the criticality of environmental impact in monetary terms based on the willingness to pay for the restoration of changes.	Produces a single-score ELU (Environmental Load Unit) output	ELU includes characterization, normalization, and weighting	ACCEPT: provides a monetary point of view; use the "2015d" version for full inclusion	[32]
Water Scarcity Indicator (Hoekstra), 2012	Calculates the fraction between the water consumed and available.	Includes runoff water	Includes regional factors as weighted averages	REJECT: focused on Water scarcity; use broader methods that include water	[33]
ILCD (International Reference Life Cycle Data System), 2011	A consensus from analysing several Midpoint & Endpoint methods by the European Commission.	Optimises impact characterisation by using the best sources for each IC; recommended for application in the European context	Regional, Global	ACCEPT: a popular, continuously developed method for Europe region	[34]
IMPACT (IMPact Assessment of Chemical Toxics), 2002+	Focuses on human, aquatic, and terrestrial ecotoxicity; combines bespoke factors with other impacts form existing methods.	Divides the impact / unit emission by total impact of substances in categories where characterization factors are available, per person per year; 4 damage categories	None	ACCEPT: a popular, continuously developed method for Europe region	[35], [36]
IPCC GWP, 2013/2021	Focuses on Climate Change impacts through direct global warming potential of air emissions	Produces a single-score result in kg CO2 equivalent/kg	None	ACCEPT: provides Global Warming point of view: narrow, but important	[37]
LIME (Life-cycle Impact assessment Method based on Endpoint modelling), 2003	Not reviewed	Not reviewed	Not reviewed	REJECT: focus constrained to Japan only	[38]
LUCAS (LCIA method Used for a CAnadian-Specific context), 2006	Not reviewed	Not reviewed	Not reviewed	REJECT: focus constrained to Canada only	[39]
MEEuP (Methodology study for Ecodesign of Energy-using Products), 2005	Focused on energy-using products	Not reviewed	Not reviewed	REJECT: does not apply to all cabin products	[40]
Motoshita et al 2010	An endpoint indicator addressing human health-related categories	Not reviewed	Not reviewed	REJECT: focuses on Human Health; use broader methods that include HH	[41]
ReCiPe, 2016	Combines Eco-Indicator 99 + CML factors at Midpoint, Endpoint, Intermediate levels.	Includes individualist (I), hierarchist (H), and egalitarian perspectives; 3 damage categories	Representative at the global scale	ACCEPT: supersedes Eco-Indicator method, globally used	[42]
Selected LCI Results	Assesses the impact of emissions from life cycle processes	Not reviewed		REJECT: covers the processes only - only useful where the core methods do not reflect process emissions	[21], [22]
TRACI (Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts) 2.1, 2008	A midpoint method for calculating the monetary costs due to pollution	Covers the North-American region	US only, and US + Canada combined	ACCEPT: focuses on US and Canada region, offers a comparison baseline for Europe	[43]
USEtox (UNEP-SETAC Ecotoxicity), 2010	Calculates environmental impact to identify and obtain human- & eco-toxicological impacts of chemicals	based on scientific consensus	Not reviewed	REJECT: uses interim characterisation factors, therefore high uncertainty	[44]