AB 1 FACT-CHECK

Against a backdrop of increasing resource scarcity, environmental pollution and global climate change, sustainable production technologies and consumption changes are gaining importance in all economic, social and political sectors. Life Cycle Assessment (LCA) is a methodological framework for analyzing products, materials and services and determining their health, environmental and resource consumption impacts.

The three influencing variables mentioned represent the endpoints of the LCA. They result from eleven impact categories, which consider the relevant environmental compartments (living organisms, soil, water, air) with the pollutant inputs (substances, radiation, noise) as well as their migration. Mineral and fossil resources as well as land and water requirements are taken into account, as is the emission load of all subsystems examined.

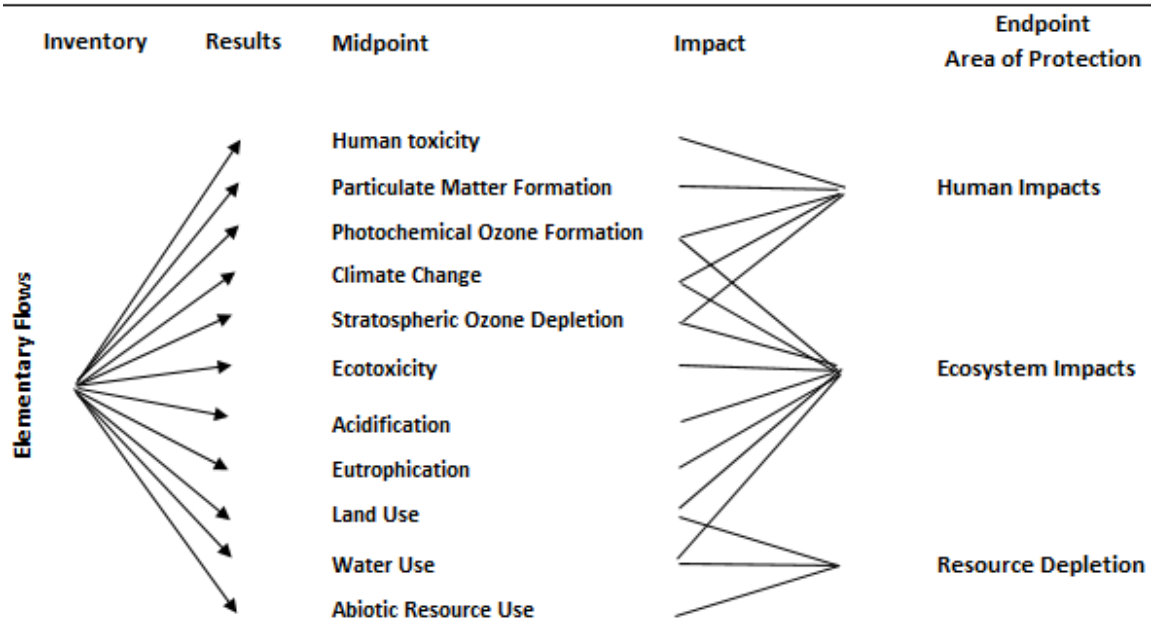
Midpoint categories with their impact on the LCA endpoints under consideration.

Human Impacts	Ecosystem Impacts	Resource Depletion
Carcinogens	Toxicity	Freshwater
Toxicity	Solid Waste	Soil
Particulate Matter	Climate Change	Forest
Ozone Depletion	Acid Rain	Grasland
Smog	Eutrophication	Minerals
	Land Use Change	Fossil Fuel

Table 1 shows the 11 impact categories and their relevance to the three endpoints.

The 11 impact categories are calculated in the LCA with the help of the material data, the applied processing steps, the energy inputs and the disposal route. The can be quantified in material flow analyses. The overview graphic illustrates the interrelationships.

Relationship between LCA analysis and midpoint categories with their impact on the considered endpoints



WS 2 Pollutants and influencing parameters

The table lists on the one hand the elements, substances and radiation responsible for a pollutant effect, and on the other hand further influencing factors concerning the consumption of raw materials and land areas. In some cases, pollutant classes affect more than one endpoint. For example, the climate-relevant gases carbon dioxide, methane and nitrous oxide affect both human health and the environment. Heavy metals are toxic to all living organisms.

Setting Inpact Categories	Classification & Characterization	Normalization	Grouping	Endpoint Area of Protection
Pollutant	act on	flows into damage category	Impact	Endpoint
Lead, Cadmium, Nickel, Cobalt VOC (volatile organic compounds) Arsenic, Antimony, Quicksilver	Human toxicity potential	Carcinogens Resp. Organics Resp. Inorganic	Human Impacts	
CO_2, CH_4, N_2O	Global Warming Potential	Climate Change		
UV, radiation, noise		Radiation		
VOC (volatile organic compounds)	Formation potential of tropospheric ozone photochemical oxidants	Ozone Layer		
FCKW, C_2H_4, CH_3COCH_3, H_2CO	Depletion potential of the stratospheric ozone layer			
dust, soot, particles	Smog / Fog / Particulate Matter Formation			
Heavy metals, toxic micro pollutants	Freshwater aquatic ecotoxicity potential Marine aquatic ecotoxicity potential Terrestrial ecotoxicity potential Abiotic depletion potential for non-fossil resources	Ecotoxicity	Ecosystem Impacts	
HNO_2, HNO_3, H_2SO_4, H_2SO_3, acid rain	Acidification potential of land and water	Acidification		
PO_4, NO_3 from manure & fertilizers	Eutrophication potential	Eutrophication		
land area	Land consumption	Land Use		
minerals	Resource consumption	Minerals	Resource Depletion	
mineral oil, petroleum	Resource consumption	Fossile Fuels		

WS 3 Interpretation of the results using the example of aluminum - from bauxite or better recycled?

With SimaPro5-Tool a Life Cycle Inventory (the LCI) is collected. With it a calculation /determination of the damage load of a concrete quantity of a substance can take place.

Taking the metal aluminum as an example, the environmental impact is to be determined for the quantity of 0.1 kg if (1) the metal is extracted from the raw material bauxite or (2) 100% recycled scrap aluminum is reprocessed.

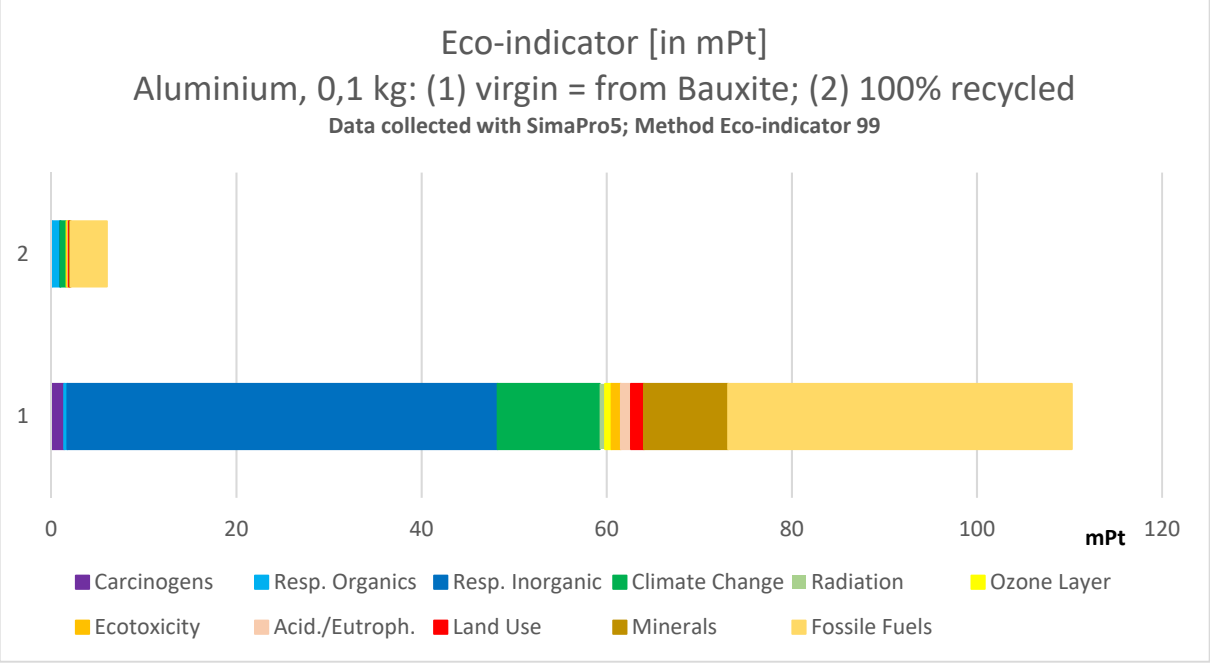
Impact Categories	Aluminum	
	virgin (1)	100% recycled (2)
	mPt	mPt
Carcinogens	1.4	0.05
Resp. Organics	0.33	0.9
Resp. Inorganic	46.5	0.05
Climate Change	11	0.6
Radiation	0.6	0.05
Ozone Layer	0.7	0.1
Ecotoxicity	1	0.1
Acid./Eutroph.	1.1	0.05
Land Use	1.4	0.1
Minerals	9.1	0.1
Fossile Fuels	37.1	3.9
Sum [mPt]	110	6

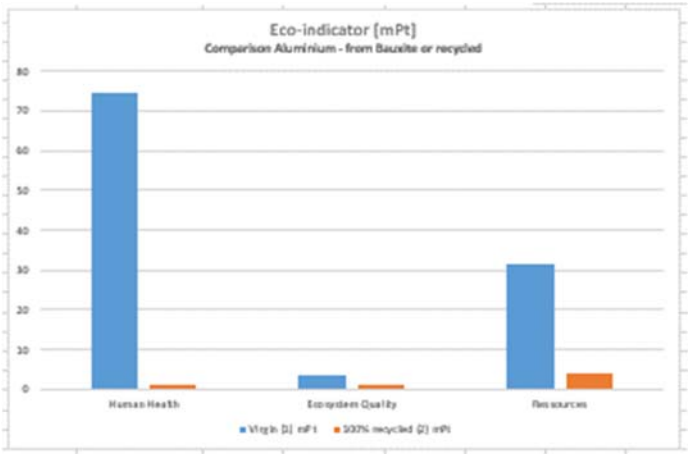
The damage categories are color-coded. They are reflected in the two staggered bars of the diagram.

The data collected were created using the Eco-indicator 99 method.

The unit is expressed in Eco-Point Pt.

1 Pt is 1/1000th of the annual environmental impact of an average European.





The mineral and energy resource consumption and the negative health effects during raw material extraction, transport and processing of the rock of the aluminum extracted from the bauxite are well recognizable. The comparison with recycled aluminum is considerable.

CONCLUSION: Collecting used aluminum cans, tea light sleeves and foils is worthwhile!