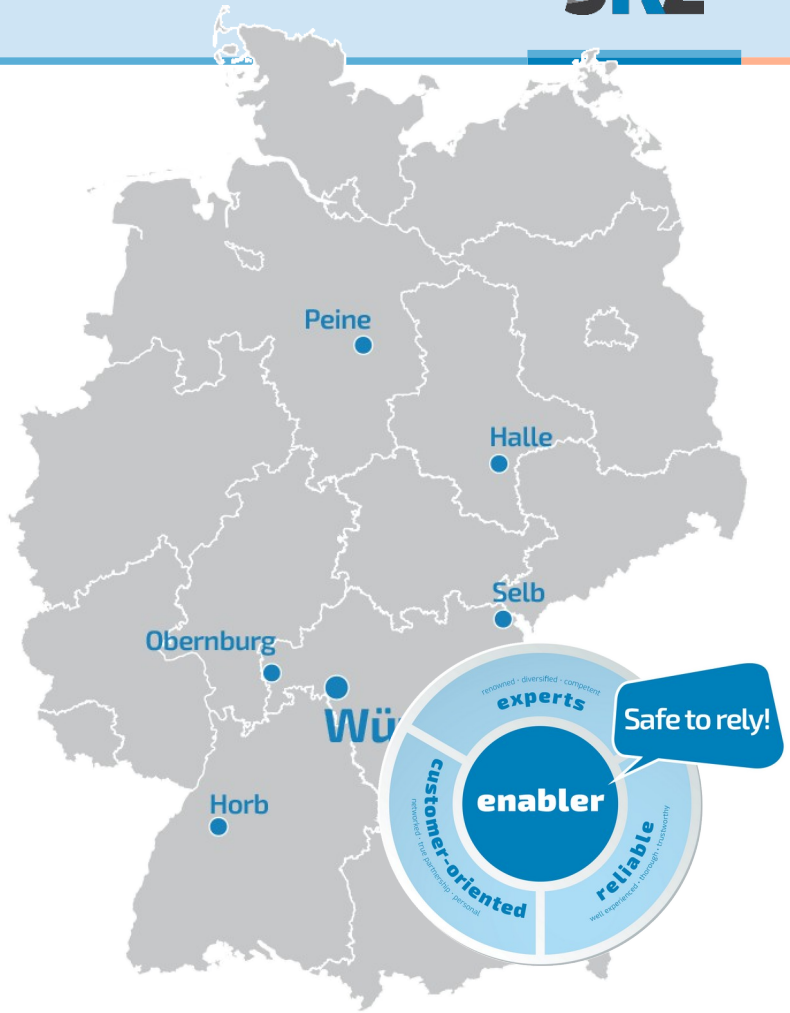
Naturally sustainable! A journey through the life cycle analysis of bio-based plastics

Antonia Ivanda

09.09.2025



ZUSE-GEMEINSCHAFT

Forschungsnetzwerk Mittelstand

KLIMASCHUTZ UNTERNEHMEN

TOP 100

Deutschland Land der Ideen

The enabler –
for the plastics industry

60 YEARS SKZ 1961 2021

Founded 1961 in Würzburg

More than 430 employees

More than 400 members in the network

Member of the AiF and the Zuse Association

Accredited for testing, monitoring and certification

International Organization for Standardization ISO 50001

Forschungsnetzwerk Mittelstand

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DAkkS Deutsche Akkreditierungsstelle D-PL-19033-01-00 D-IS-19033-01-00 D-ZE-19033-01-00

DAkkS Deutsche Akkreditierungsstelle D-ZM-17265-01-00

Overview
of the business fields

More than 400 members in the FSKZ network | Events with more than 10.000 participants annually

NETWORKING

TESTING
- Product monitoring
- Product certification
- Product testing
- Expert opinions
- Damage analysis

SKZ service climate-neutral

DAkkS Deutsche Akkreditierungsstelle D-PL-19033-01-00 D-IS-19033-01-00 D-ZE-19033-01-00

ANALYTIK SERVICE OBERNBURG
- Product analysis
- Process measuring technology
- Damage analysis
- Polymer characterisation

ASO service climate-neutral

DAkkS Deutsche Akkreditierungsstelle D-PL-20885-01-00

TRAINING
- Practical training
- Workshops
- Courses
- In-house training
- Training for masters and technicians
- Studies
- Online-courses

ISO 9001:2015

AZAV zugelassen

RESEARCH
- Materials
- Processing
- Inspection and test methods
- Sustainability
- Circular Economy
- Lightweight construction
- Digitization

ISO 9001:2015

CERTIFICATION
- ISO 9001
- ISO 14001
- ISO 45001
- ISO 50001
- IATF 16949
- ISO 22000
- ISO 13485
- SpaEfV
- FW 605

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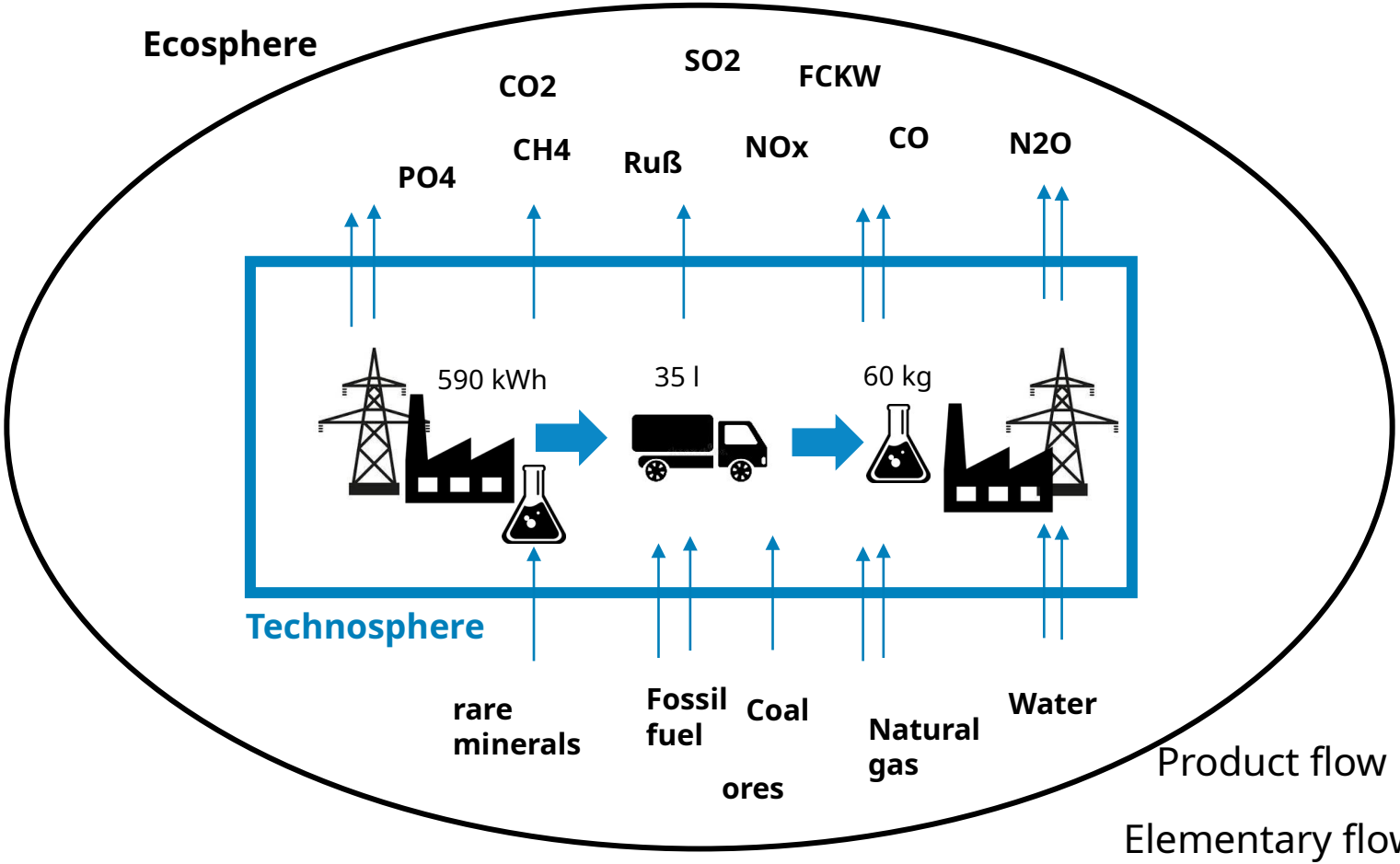
What is a life cycle assessment?

A life cycle assessment is the “environmental report” of a product, process, service, or entire company.

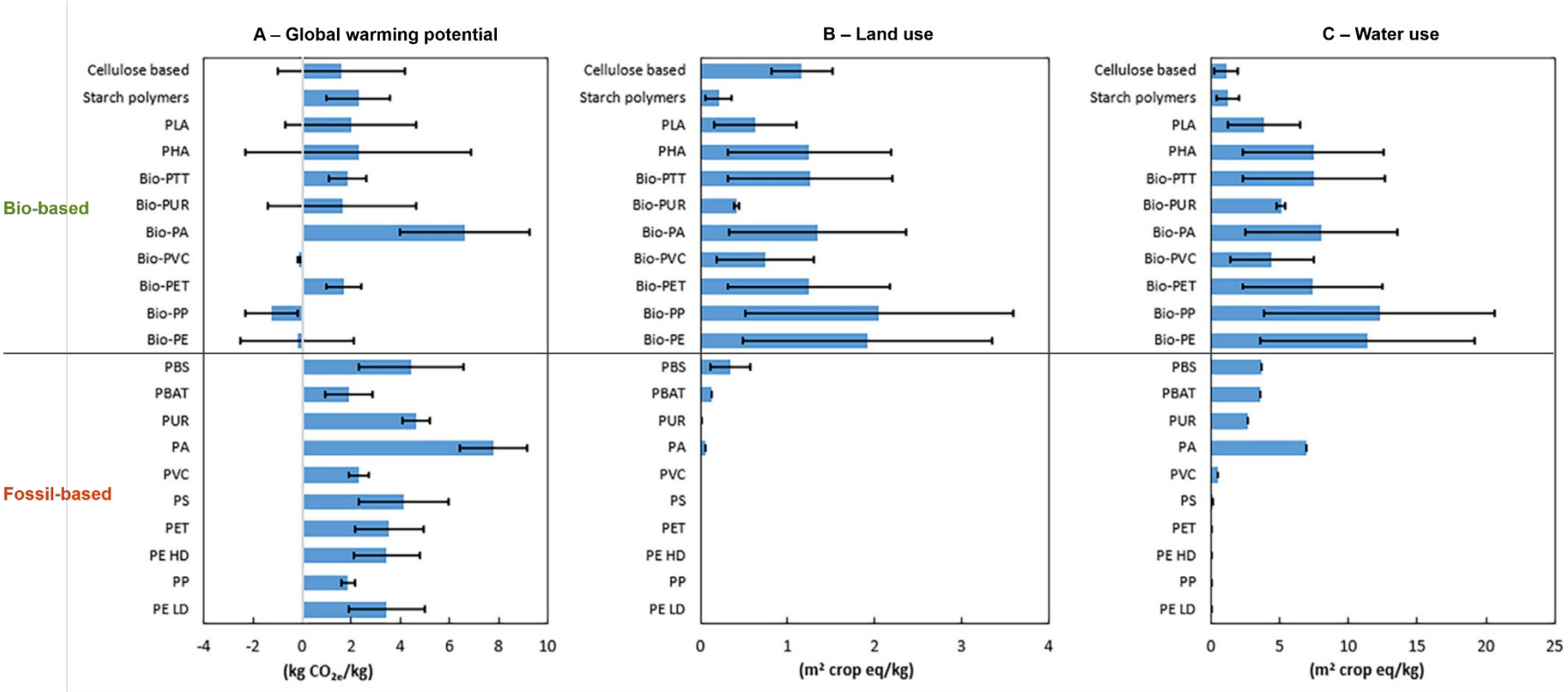
It summarizes and evaluates the impacts on the environment.

https://climatesafety.info/bookmarks/cartoons-about-climate/

What does an LCA show us?
Technosphere vs. Ecosphere



Comparison of bio-based and conventional plastics



Source: Brizga, J.; Hubacek, K.; Feng K. (2020): The Unintended Side Effects of Bioplastics: Carbon, Land, and Water Footprints. In: One Earth 3 (1), pp. 45–53. DOI: 10.1016/j.oneear.2020.06.016.

Challenges in the life cycle assessment of bioplastics

The age of the data	• The production of bioplastics is constantly being improved and optimized.

Benefits and loads of bioplastic
from a LCA perspective

Benefits

- (Partially) based on natural raw materials
- Lower dependence on petroleum
- Favorable political framework conditions (e.g., EU plastics strategy)
- Biodegradable options/disposal methods can simplify waste management and return carbon to the soil, thereby potentially reducing plastic pollution
- Simplifies the achievement of a closed carbon cycle

waste disposal

Based on: https://biopolydat.ifbb-hannover.de/lca (last checked on 1st Sep. 2025)

Adjusting LCA methods

Prospektive LCA

- Future oriented LCA
- New technologies can be considered at a point in time when this technology is already established

- Not much data available
- This method does not comply with any standards
- Currently used mainly in research activities

Thank you for your attention ☺

http://snovu.blogspot.com/2013/07/before-we-carry-oxygen-cylinders-on-our.html

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The enabler –
for the plastics industry

Our Conviction

Plastics are essential for solving the challenges of our time. That is why we empower our customers.

As a service provider for the plastics industry, we research, test and certify products and processes for companies and craft businesses and qualify and network people.