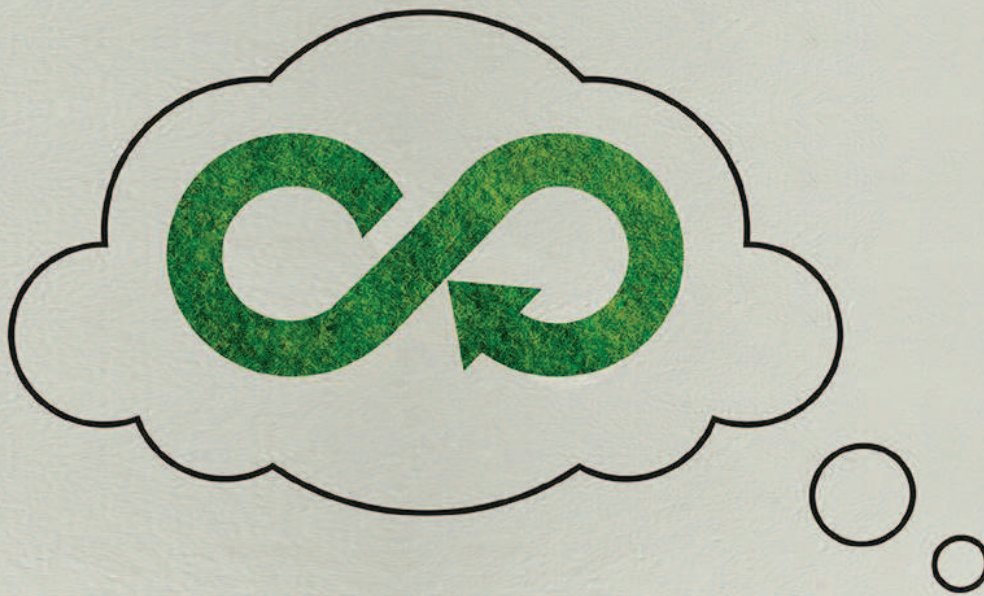


THE CLEAN WAY TO CIRCULARITY

The circular economy is a functioning business case and a win-win solution for the economy, the environment and society. It puts sustainable business at the center and creates clarity as to which plastics are sustainable at all.





Daniel Lützelschwab – Partner, Folienwerk Wolfen

In the linear economy, raw materials are mined, products are manufactured, sold, consumed and thrown away. This leads to a shortage of raw materials, waste and environmental pollution. A more sustainable perspective for the future is offered by the circular economy, which pursues the goal of not throwing resources away but keeping them in use for as long as possible and with the highest possible value, also thanks to recycling and upcycling.

Life Cycle Assessment Determines Actual Environmental Impact

Analyzing the life cycle of products strengthens the understanding of a product's actual environmental impact as well as product benefits and enables informed decisions, especially regarding the circular economy. In contrast to the more common CO₂ footprint measurement tool, life cycle assessment (LCA) examines the environmental impacts of products holistically throughout their entire life cycle (from cradle to grave) and is therefore much more meaningful. The CO₂ footprint only measures the climate-impacting gases that contribute to the greenhouse effect and thus only includes the emissions for the air. What about the effects on soil and water, humans, animals and plants?

Creating LCAs is elaborate but fundamental work to determine the real environmental impact of products. To achieve comparability, LCAs must follow globally valid ISO standards. Selective, abbreviated or simplified comparisons are wrong. They may give a product or company a green image at first glance, but this begins to crumble on closer analysis (greenwashing).

LCAs determine all environmental impacts during the production, use phase and disposal of the product, as well as the associated upstream and downstream processes (e.g., production of raw materials, consumables and supplies). The environmental impacts include all environmentally relevant extractions from the environment (e.g., ores, crude oil) as well as emissions into the environment (e.g., waste, CO₂, toxic substances).

Green Chemistry: The Basis for Sustainable Plastics

The International Union of Pure and Applied Chemistry (IUPAC) is the globally authoritative scientific institution for

questions relating to chemistry. It defines green chemistry as "design of chemical products and processes that reduce or eliminate the use or generation of substances hazardous to humans, animals, plants and environments." This definition creates the basis for plastics that can be used without hesitation. Establishing a truly sustainable circular economy will only succeed if its products and processes follow the principles of green chemistry. For the plastics industry, this means, among other things, eliminating halogens and endocrine, carcinogenic or toxic effects in the materials it uses in its raw materials and processes.

Global Initiative for a New Plastics Economy

The independent Ellen MacArthur Foundation, together with the United Nations Environment Program, has developed the very broad-based New Plastics Economy Global Commitment initiative. The initiative is closely aligned with IUPAC's Green Chemistry definition and the 17 UN Sustainable Development Goals and advocates a global circular economy. More than 500 organizations unite behind a common vision and goals to solve plastic waste and pollution at its source:

- More than 250 global companies (representing more than 20% of the plastic packaging used worldwide)
- 20 governments from all political levels on all five continents
- 27 global financial institutions (they collectively manage \$4 billion in assets)
- World Economic Forum (WEF), National Geographic, Consumer Goods Forum and numerous other nongovernmental organizations
- More than 50 academies, leading universities and other educational institutions in numerous countries

Corporate Groups Committed to Sustainable Plastics

The need for change is clear. Consumer goods groups around the world have made public their goals for the use of sustainable plastics in the Ellen MacArthur initiative. For example:

- Colgate-Palmolive: "Eliminate PVC in all packaging by end 2020."

continued on page 14

- Danone: “We will launch 100% rPET bottles in all major water markets by 2021.”
- H&M Group: “Phase out of EPS by 2023, and a strict ban against PVC.”
- L’Oréal: “Safe material use: no BPA, phthalates or heavy metals are used.”
- MARS: “Eliminate PVC in all packaging by end 2020.”
- McCormick: “Eliminate Polystyrene systemwide.”
- METRO: “Eliminate PVC and PVDC in our own brand packagings.”
- Nestlé: “PVC, PVDC, PS are materials to be removed by 2024 at the latest.”

PET Meets All Requirements

The polyester PET and its sister PETG meet all green chemistry requirements and are perfectly recyclable. Regardless of the infrastructure in different markets and countries, PET and PETG can be handled risk-free at the end of the product’s useful life (end-of-life) with all disposal scenarios and processes, unlike PVC for example. Card manufacturers usually don’t know where and how their smart cards will be disposed of, whether landfill, incinerator or recycling—with PET and PETG they are on the right side, with no emissions, no toxins. The polyesters are ideally suited for recycling:

- Mechanical: leads to a secondary raw material
- Chemical: leads back to the monomer (which allows re-synthesis of the polymer in identical quality)
- Microbiological: enzymatic decomposition into the basic chemical building blocks of PET, which in turn can be used to produce virgin PET

Chemical company Eastman Chemical Co. is building a \$250 million molecular recycling facility at its Kingsport, Tennessee, headquarters that will use methanolysis to return various polyesters to monomers. With this technology, Eastman will divert waste that would otherwise be landfilled, incinerated or end up in our waterways. And it can be done an infinite number of times.

Which plastic will we invest in in the future? On the way to sustainable smart cards, plastics with a beneficial LCA such as PET are pointing the way and are an important, clean step toward the circular economy.

About the Author: Daniel Lützelshwab is CEO of smart ecofilms and a pioneer for sustainable, safety-critical and economically viable smartcards. His mission is the worldwide distribution of films for smartcards made from recycled PETG, Ocean Plastic® and PLA instead of single-use plastic. Daniel is a partner of the renowned German Folienwerk Wolfen and works exclusively and worldwide in the distribution of films for smartcards and security documents.

Design Safer Chemicals

Less Hazardous Chemical Syntheses

Safer Solvents and Auxiliaries

Inherently Safer Chemistry for Accident Prevention

HF HALOGEN FREE

BPA FREE