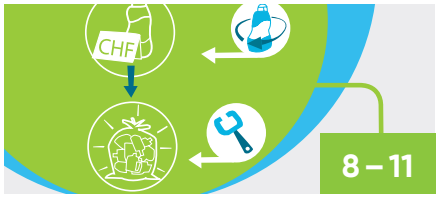
SCHWEIZER
PLASTIC
RECYCLER

PLASTIC ROADMAP

How we keep plastic in circulation

Content

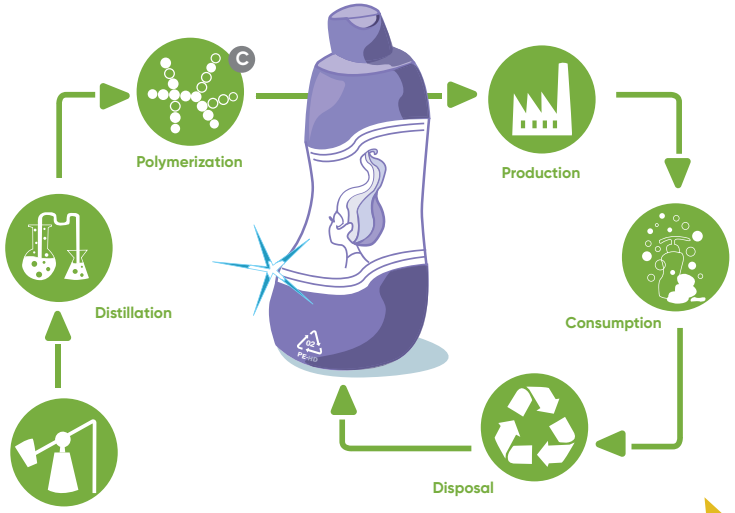


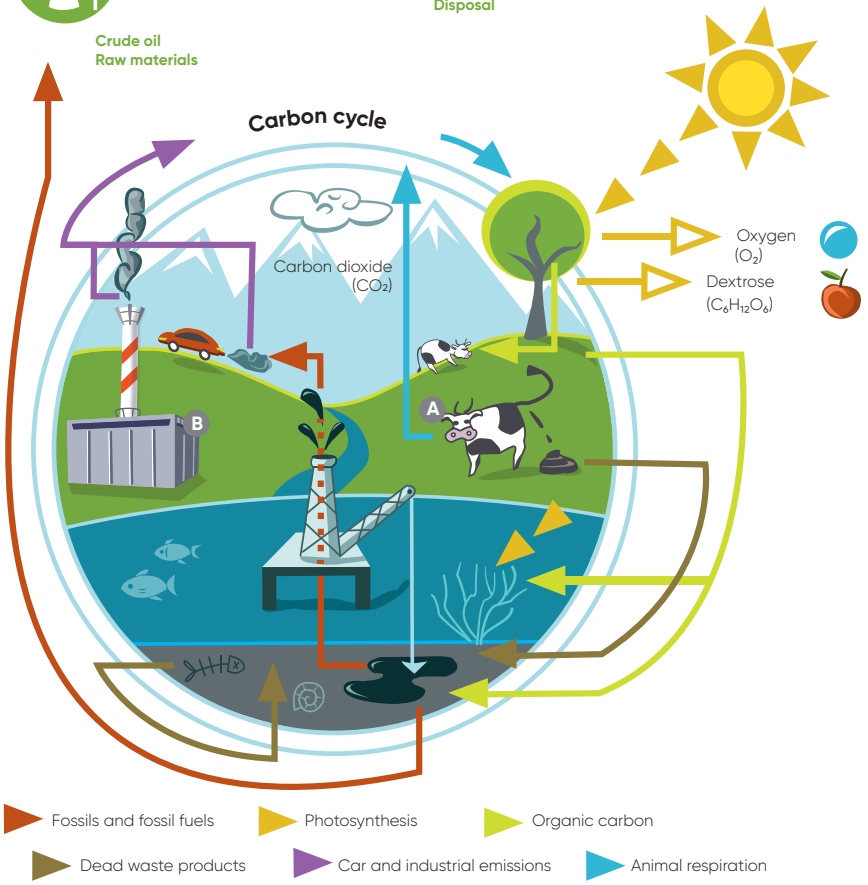
Everything you need to know about plastic and recycling

Where does plastic come from? How does plastic recycling protect the environment? Which types of packaging are suitable for recycling?

The VSPR and the Swiss Consumer Forum kf have produced this Plastic Roadmap to answer questions about plastic and environmental issues that have arisen through the use of plastic over the last 70 years.
While the material itself is extremely versatile, the longevity of plastic and the careless use of packaging creates long-lasting environmental problems.
This illustrated guide offers suggestions on how to handle plastic in a responsible way and how to use it as long as possible. In particular, it examines the topic of plastic recycling more closely, since new products such as pipes or packaging films can be manufactured from household packaging that has been collected, sorted, and recycled. Food packaging such as yogurt cups should also be made from recycled materials in the future.
In order to achieve this, we first need to ensure that a certain amount of plastic is collected so that processes can be improved and a Swiss sorting plant can become a reality.
So let's work together to create a future in which plastic is no longer waste but the raw material of tomorrow.

Happy reading!





The shampoo bottle – a bathroom treasure

A world without plastic? Unthinkable. Used to make countless everyday products, the material is simply too ubiquitous. But what is plastic actually made of?

Toys, the shampoo bottle in the bathroom, that jacket that magically repels the rain. Plastics come in a wide variety of compositions, shapes, and colors. According to the Heinrich Böll Foundation's "Plastic Atlas 2019," annual global plastic production has increased from two million tons in 1950 to more than 400 million tons today – and production volumes will continue to increase in the future.

What plastic is made of

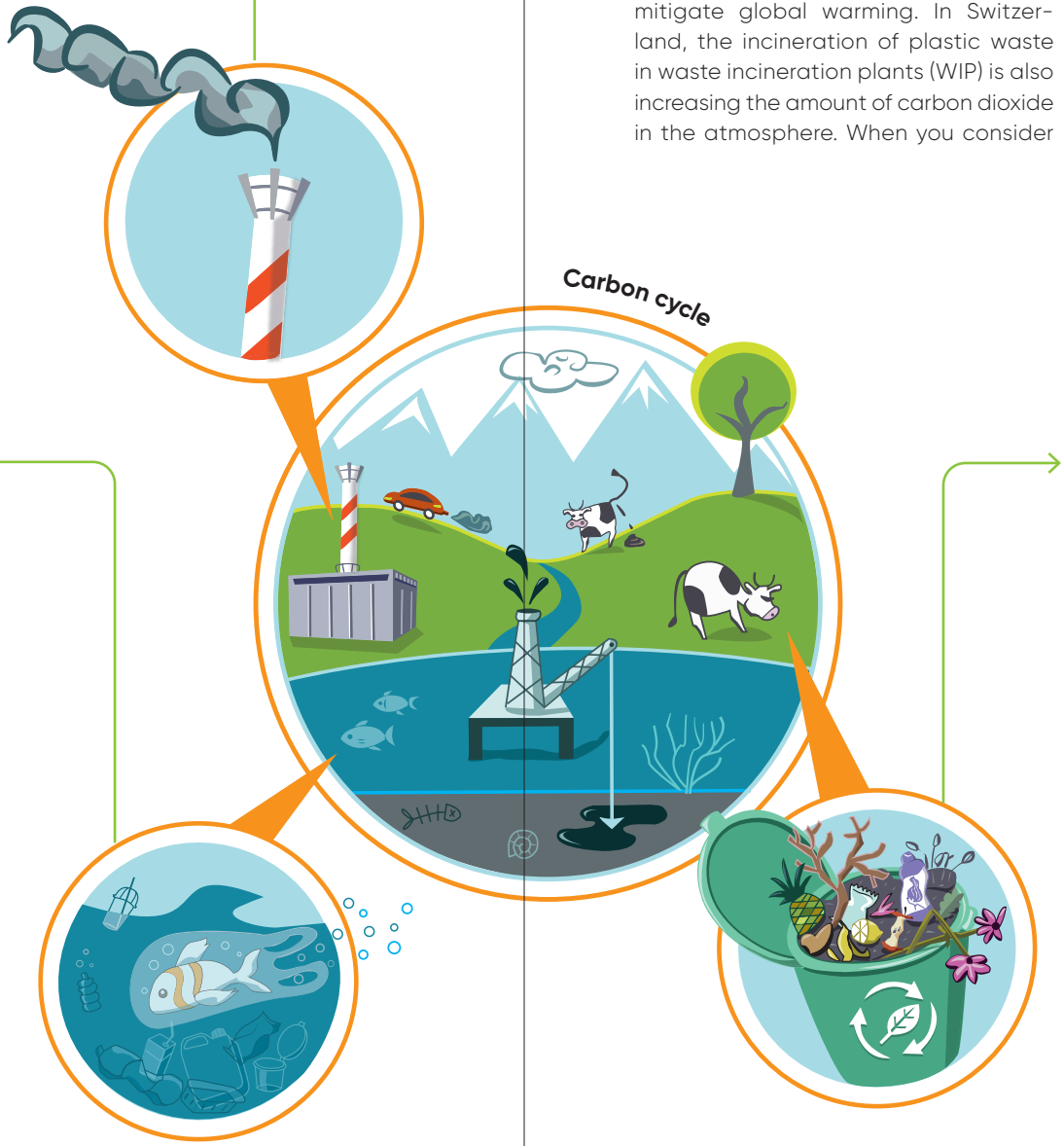
The basic ingredient of any plastic is carbon, the basis of all life on Earth. In nature, it often occurs as lime (or very rarely as diamond) and – combined with oxygen – in gaseous form as carbon dioxide. Carbon dioxide is the gas that all living beings A exhale and is also produced when fuels and combustibles – as well as plastics – are burned B. Crude oil, in turn, is a mixture of carbon compounds and consists of the remains of tiny marine animals and plants. Over millions of years, this plankton has turned into a viscous, black liquid deep in the soil beneath our oceans, and is therefore also known as "black gold." To produce plastic packaging, crude oil is distilled to obtain substances such as ethylene and then polymerized to form polyethylene, resulting in long, stable chains of carbon and hydrogen atoms C. These make the plastic not only resistant to acids, bases, and other chemicals, but also durable. Polyethylene is one of the most widely used types of plastic. It is used as packaging for food as well as for personal care products such as shampoo.

Vital cycles

Through the extraction of oil, humans interfere with the carbon cycle, which is one of the three vital cycles on our planet along with the water and nitrogen cycles. Hydrogen, oxygen, carbon, and nitrogen are the basic building blocks of life. Incinerating large quantities of plastic waste increases the amount of CO_2 in the atmosphere. Plastic recycling, along with other measures, is therefore an effective tool for reducing CO_2. By recycling plastic, we do justice to its value as a raw material. After all, would you really throw away your old gold jewelry just because you no longer wear it?

Plastic residue

Whether in the air, in the soil or in the water: plastic, or at least traces of it, can be found in many places on our planet. Careless handling of plastic and incorrect disposal of plastic waste are putting a strain on the Earth's natural carbon cycle.



In the water

The pollution of the world's oceans with plastic waste is a major problem that remains unsolved. Most of this plastic waste comes from disorderly landfills in emerging economies, where increased recycling would reduce landfilling. By contrast, Switzerland has had a functioning waste management system without uncontrolled landfills for decades. Plastic waste is either recycled or thermally recovered in this country. Nevertheless, plastics are also released into the environment through littering (macroplastics) or, for example, tire wear or the washing of textiles made of plastics (microplastics). There is no question that we in Switzerland also need to reduce these plastic inputs into the environment through suitable measures.

In the air

It takes your breath away: There is a general consensus that man-made CO_2 emissions must be reduced in order to mitigate global warming. In Switzerland, the incineration of plastic waste in waste incineration plants (WIP) is also increasing the amount of carbon dioxide in the atmosphere. When you consider that 635,000 tons of plastic are burned each year, producing nearly three times the amount of CO_2, this is anything but a trivial matter (1 kg of plastic produces 2.8 kg of CO_2 = 1.78 million tons of CO_2 per year).
With newer, energy-efficient WIPs, the waste heat can be used for long-distance heating in homes or as steam in industry, which in turn reduces CO_2 emissions somewhat.

In the soil

Field, forest, meadow – and plastic: If you let your gaze wander while walking, cycling or driving, you will quickly notice how our roadsides are lined with carelessly discarded plastic packaging and other waste. Here and there, farmers use friendly signs to try to remind others that cows prefer to eat fresh grass and herbs instead of tough-to-chew plastic.
However, plastic also reaches fields and meadows via other routes. Disposed of as a foreign substance in green waste (compost) and processed into fertilizer, it ultimately makes its way into the environment. Biomasse Suisse figures show that up to 50 tons of plastic end up in Swiss soil every year.

How to handle plastic properly

Demand for plastic is unlikely to decrease in the foreseeable future, which makes responsible handling of the material all the more important. "Avoid, reduce, recycle," must be our motto.

Many plastic products are too valuable to be incinerated after use. For the sake of the environment and future generations, we need approaches that promote the careful use of plastics and conserve valuable resources.

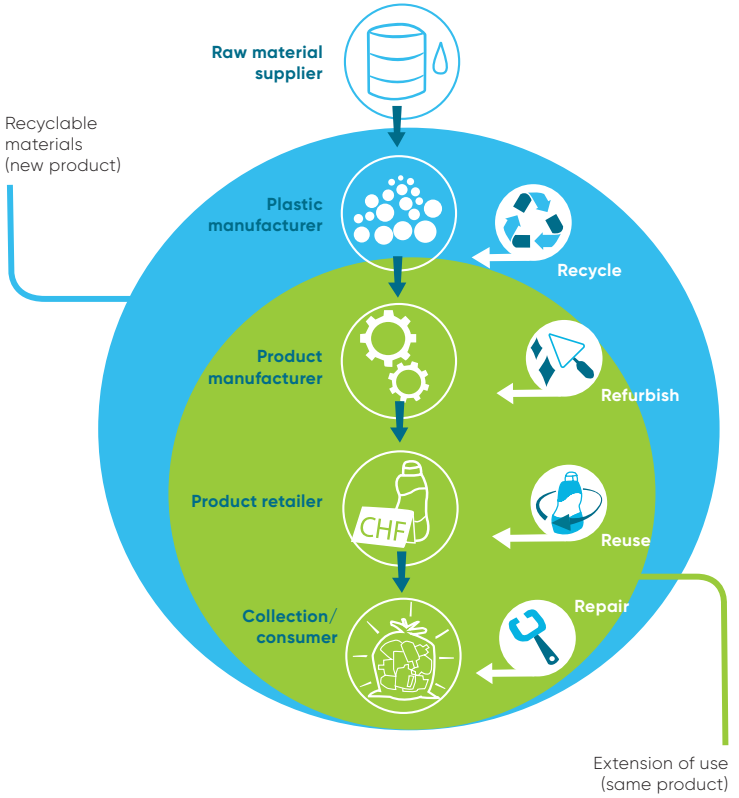
> According to a study by Swedish consulting firm "Material Economics," CO_2 emissions from Europe-wide plastic production will almost double from 132 million in 2018 to 233 million tons per year by 2050, making it even more difficult to achieve climate targets.

Plastic consumption must be reduced significantly, not least to protect our climate.
We can succeed if we transform society through the recycling economy. What about doing away with plastic altogether? Or can it be replaced by other materials such as cardboard or packaging made from renewable raw materials, for example corn-based products? There is no simple answer to either question. What is certain is that plastic packaging fulfills an important hygiene and protective function, and replacing it with cardboard or renewable raw materials usually consumes more energy than the plastic production.
Consumers are in control of which products they buy and in what kind of packaging. Do I prefer lightly packaged (or unpackaged) fresh produce, or do I opt for elaborately packaged, non-recyclable convenience products? Do I shop at the market or at the big-box retailer? Do I choose disposable or reusable packaging? The types of packaging we opt for ultimately remain a question of consumer choice.

Staying in circulation in the long term

In addition to changes in consumer behavior, industry stakeholders also need to contribute technical solutions to avoid, reduce, and recycle plastic waste. We all need to work together. Following nature's example, the Ellen MacArthur Foundation, a non-profit foundation dedicated to promoting the recycling economy, proposes closing cycles in order to conserve resources and reduce waste. It calls the "technical cycles":

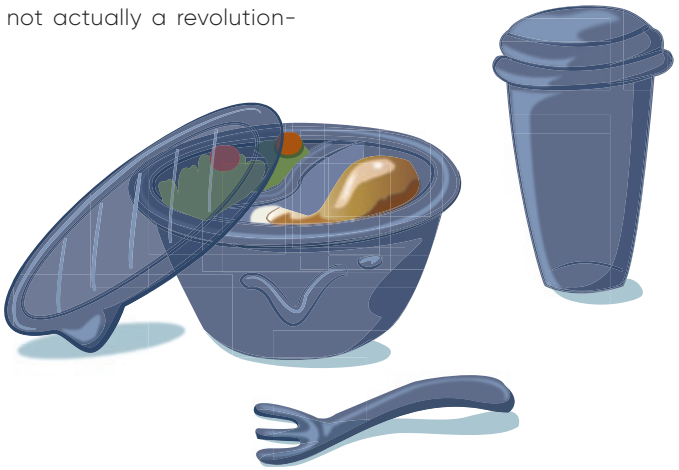
repair, reuse, refurbish, and recycle.



Reuse: reusable packaging and refillable bottles

The reuse cycle opens up new opportunities to use plastic packaging responsibly and prevent waste.

For example, the disposable tableware used at take-out counters in stores and restaurants can be replaced with an environmentally friendly, reusable version made from durable plastic. This can be used several times and returned after use, but must be used up to 15 times to be more environmentally friendly than disposable tableware. However, multi-cycle systems are not actually a revolutionary concept. Take traditional Tupperware containers or refillable shampoo bottles, for example, which are increasingly finding their way back to store shelves for environmental reasons. Zero-packaging stores are also applying the reuse concept in order to be able to sell their products with as little plastic waste as possible.



Repair, refurbish, recycle: old things get older – or become something completely new

Products in the recycling economy should be kept in circulation for as long as possible.

The simplest way of extending the life of a product is to repair defective parts (see bottom level of the "Repair" graphic on p. 9). The product does not change. Consumers can go to a point of sale for repair and then reuse the item (second level). The third level in the graphic is labeled "Refurbish." Devices such as printers or smartphones and individual parts from the automotive industry can be cleaned and refurbished, for example, thus preventing premature disposal.
Finally, the fourth level in the blue circle is recycling – a process that creates entirely new products. Most short-lived packaging is collected and sorted, cleaned and recycled into granules, which are then used to manufacture a completely new product – albeit from old material. Today's unavoidable waste thus becomes tomorrow's raw material.

Plastic recycling protects the environment

Plastic recycling helps to reduce CO_2 emissions and save energy. Our climate thanks us when valuable raw materials can be kept in the material cycle for longer.

White socks and yellow balls, a dense network of buses and trains, and the issue of recycling. What do these things have in common? They are all areas in which we Swiss excel on a global scale. While it is the Grand Slam in tennis and the timetable in public transport that make the difference between top and flop, in recycling it is the collection rates that count. According to the Swiss Federal Office for the Environment, the 2016 collection rates in Switzerland were 96 percent for glass, 90 percent for aluminum, and 82 percent for PET.

At more than 700 kilograms of waste per person per year, our country has one of the highest municipal waste volumes in Europe. To date, just under 53 percent of this waste is recycled. Experts' forecasts paint a clear picture: population growth and rising demand for goods and services mean that Switzerland's consumption of raw materials will continue to increase – and as a result, the plastic boom will not level off.

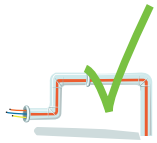
How does plastic recycling protect the environment

In Switzerland, only 11 percent of all plastic waste from trade, industry, and households is recycled. Every year, 1 million tons of plastic products are thrown away. Of this, 650,000 tons are incinerated and only 90,000 tons are recycled. It is clear, then, that there is much room for improvement. Household plastic collections, which are growing in popularity and generating environmental benefits, are a real step in the right direction.

Plastic recycling reduces CO_2 emissions as follows:

Plastic is not incinerated
CO_2 emissions are avoided by not burning plastic waste.

New raw materials
Producing plastics from crude oil requires twice the energy of producing plastics from recycled materials (secondary raw materials).



Products made from recycled materials
Making high-quality plastic products from secondary raw materials is an example of recycling at its best, ensuring that the material remains in the materials cycle for longer.

What is the general population collecting?

In order to obtain high quality secondary raw material (regranulate) and ensure the quantities available are as high as possible, consumers need to know what and how to collect. Recycling codes, which are indicated on the packaging (see appendix for a list) help with this.

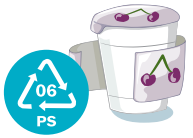
Types of plastic and packaging that can be added to the collection bag for recycling:

Polyethylene

Bottles and tubes

Films

Polystyrene



Yogurt cups

Polypropylene

Cups, trays

PET

PET trays

Note: The packaging shown can also be made of other types of plastic. For example, some cosmetic bottles are made of PET and some yogurt cups can be made of PP.

PET beverage bottles do not belong in the collection bag! (These are collected separately.)

Composite packaging, such as black convenience food packaging, which consists of different materials in layers that cannot be separated, cannot be recycled.

Multi-layer packaging

Beverage cartons are the exception. They consist of cardboard, plastic, and aluminum foil. Cardboard in particular can easily be recovered in the form of pulp and used for new cardboard packaging. This is why beverage cartons are also collected, even though they are not really plastic packaging in the strictest sense.

Beverage carton

A recycling quality label

Collection organizations are scrutinized closely to ensure that plastic recycling is sustainable and offers an environmental benefit. The Verein Schweizer Plastic Recycler (VSPR) association operates an industry-wide collection system and awards an annual quality label. The quality label, which is clearly visible on the collection bag, guarantees that all plastic waste collected is recycled under strict conditions by the participating collection companies and used within Europe. The association publishes the corresponding figures every year. An independent certification body ensures compliance with the applicable criteria and performs on-site inspections of the companies and their partners, the sorters, and the processing plants.

SCHWEIZER PLASTIC RECYCLER QUALITÄT GESICHERT

Plastic recycling you can trust.

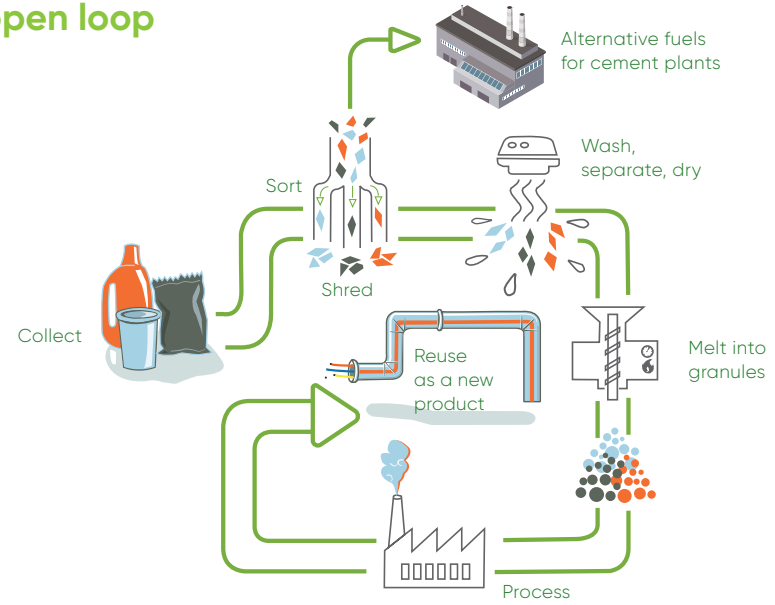
If we take a closer look, our trash is full of treasures. Thanks to recycled plastic, fossil resources remain in the cycle for longer. No new crude oil needs to be extracted for the production of secondary plastics. Defective products are given a second, third, and fourth life. Used packaging can be turned into something new.

In the cycle thanks to the collection system

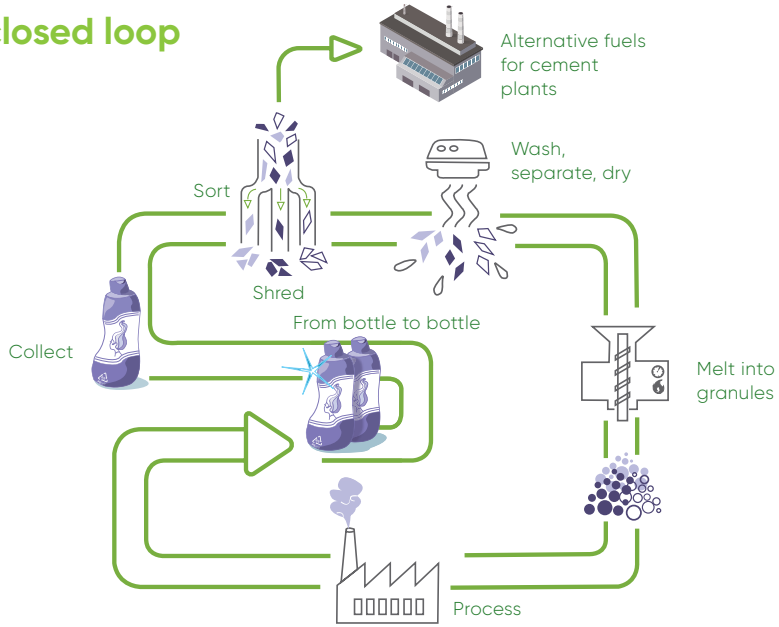
Various pilot projects have shown that consumers are willing to collect and dispose of plastic waste separately. The "Sammlung 2025" project, an initiative of the Drehscheibe Kreislaufwirtschaft of Swiss Recycling and REDILO GmbH, is currently laying the foundations for a nationwide collection system for plastic packaging and beverage cartons. More than 60 organizations are involved, representing the entire value chain – from packaging manufacturers to retailers and waste disposal companies.

The VSPR is sharing its expertise and working to ensure that the quality requirements developed jointly with Empa are adopted as part of the new nationwide system. The collection and environmentally friendly disposal of packaging should be easy and as convenient as possible for consumers. So when it comes to plastic, the motto in the future will be: Make something of it!

open loop



closed loop



The future – from packaging to packaging

Trailblazing PET collection

Recycling success is measured by how much secondary raw material can be recovered from the waste collected and the applications that arise from it. Cable conduits or films are two examples of such high-value applications.

This is called an open loop. If larger quantities of household plastic waste are collected in the future, the quality of the resulting applications can be increased. This already works extremely well for PET beverage bottles. Some polyethylene bottles for cleaning agents are already made from regranulate. But what about packaging for products that come into contact with our bodies? Various pilot projects are underway in Europe and Switzerland in this regard. For example, a closed cycle or closed loop will be used to turn an old shampoo bottle into a new shampoo bottle. The hope for the future is that the strict hygiene regulations that are currently in place will be amended and that new yogurt cups can be made from used yogurt cups.

A well-rounded concept

Much has already been achieved, but there is still more to do. The decisive factor will be for industry, trade, and private individuals alike to assist with the collection of plastic packaging so that it becomes economically viable to process the packaging waste generated in this country at a sorting plant in Switzerland. New Swiss products will be created from Swiss waste, which will keep the added value in Switzerland and create new jobs. Even if we do not wait any longer, but instead rely on existing knowledge and the technological possibilities currently available, we are in a position to tackle the problem of plastic pollution at its roots. The plastic cycle thus becomes a well-rounded concept and a decisive turning point, ushering in a sustainable future.

Sources used

- Aqua Viva – Zeitschrift für Gewässerschutz, Aqua Viva and Verband Schweizer Abwasser- und Gewässerschutzfachleute VSA
  https://vsa.ch/wp-content/uploads/2020/05/Themenheft-Mikroplastik.pdf
- Circular economy Introduction, Ellen MacArthur Foundation
  https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview
- Plastic Atlas 2019, Heinrich Böll Foundation
  https://www.boell.de/en/plasticatlas
- Plastik in der Schweizer Umwelt, EBP Schweiz AG, commissioned by the Swiss Federal Office for the Environment FOEN
  https://www.bafu.admin.ch/dam/bafu/de/dokumente/abfall/externe-studien-berichte/plastik-in-der-schweizer-umwelt.pdf.download.pdf/plastik-in-der-schweizer-umwelt.pdf
- Monitoring der CO_2-Vereinbarung, Association of Swiss Waste Recyling Plant Operators
  https://vbsa.ch/wp-content/uploads/2020/01/CO2-Report/index.html
- The Circular Economy, Material Economics Sverige AB
  https://materialeconomics.com/publications/the-circular-economy-a-powerful-force-for-climate-mitigation-1
- Switzerland's greenhouse gas inventory, Swiss Federal Office for the Environment FOEN
  https://www.bafu.admin.ch/bafu/en/home/topics/climate/state/data/greenhouse-gas-inventory.html
- ReShaping Plastics, Systemiq
  https://www.systemiq.earth/reshaping-plastics/

Plastic labeling

Polyethylene terephthalate

High-density polyethylene

Polyvinyl chloride

Low-density polyethylene

Polypropylene

Polystyrene

Other plastics

List of household packaging to be collected

- **Plastic bottles (excluding PET beverage bottles)**
- **Plastic trays, cups, and tubes**
- **Flexible plastic packaging**
- **Beverage cartons**

Specifically, this includes the following packaging from private households

Plastic bottles (excluding PET beverage bottles)
- Food: e.g., milk bottles, bottles of cooking oil
- Non-food: e.g., detergent and dish-washing liquid bottles, spray bottles

Plastic trays/blisters
- Food: e.g., fruit trays, candy packaging, meat trays
- Non-food: e.g., packaging for printer cartridges

Cups
- Food: e.g., beverage and yogurt cups
- Non-food: e.g., plastic cosmetic jars

Tubes
- Food: e.g., sauces
- Non-food: e.g., cream tubes, toothpaste tubes

Flexible plastic packaging
- Food: e.g., nut bags, bread bags
- Non-food: e.g., tote bags,
- six-pack plastic rings, detergent bags or refill bags

Bags
- Food: e.g., vegetable bags
- Non-food: e.g., tote bags

Beverage cartons

Open loop and closed loop recycling of plastic packaging

Polymer	Products	Proportion of packaging entering the market (%)	Open loop recycling	
			CH	EU
PET	Beverage bottles	16%	*e.g., polyester*	*e.g., polyester*
	Trays	5%		*e.g., polyester*
PE	Bottles	12%	*e.g., pipes, canisters, buckets, flower pots*	*e.g., pipes, canisters, buckets, flower pots*
	Food-grade films	10%	*e.g., industrial films*	*e.g., garbage bags, industrial films*
	Non-food-grade films	27%	*e.g., garbage bags, industrial films*	*e.g., garbage bags, industrial films*
PP	Cups, containers, trays	8%	*e.g., pipes, buckets, flower pots*	*e.g., pipes, buckets, flower pots*
	Films	11%	*e.g., pipes, canisters, buckets, flower pots*	*e.g., pipes, canisters, buckets, flower pots*
PS	Cups, trays	4%	*e.g., spools, thermoforming sheets, hangers*	*e.g., spools, thermoforming sheets, hangers*

Well-developed sorting and recycling capacities
Ongoing development at pilot level
Lack of development due to technical and/or economic barriers

Polymer	Products	Proportion of packaging entering the market (%)	Closed loop recycling	
			CH	EU
PET	Beverage bottles	16%		
	Trays	5%		
PE	Bottles	12%	*Bottles*	
	Food-grade films	10%		
	Non-food-grade films	27%	*Non-food-grade films*	*Non-food-grade films*
PP	Cups, containers, trays	8%	*Cups, containers, trays*	*Cups, containers, trays*
	Films	11%	*Films*	
PS	Cups, trays	4%	*Cups, bowls*	*Cups, bowls*

Well-developed sorting and recycling capacities
Ongoing development at pilot level
Lack of development due to technical and/or economic barriers

Source: market analysis by dss+ / Sofies-Emac

The publishers

SCHWEIZER PLASTIC RECYCLER

Verein Schweizer Plastic Recycler (Swiss Plastic Recycler Association)

The VSPR is committed to developing a nationwide and uniform plastic collection process in Switzerland. The basis for collection is recycling that makes environmental and economic sense and brings added value to society in terms of the environment and climate protection. The VSPR supports a consumer-friendly collection infrastructure and efficient logistics in cooperation with the federal government, cantons, municipalities, and partners from the recycling industry. The organization also promotes continuous education and training as well as the implementation of a resource and circular economy at the political level.

Schweizerisches Konsumentenforum kf (Swiss Consumer Forum)

The Swiss Consumer Forum kf has been committed to addressing the concerns of consumers since 1961 and is characterized by its unbiased attitude, independent stance, democratic structures, and broad expertise. Consumers who value their freedom of choice benefit from factual information, personal advice, and the Consumer Forum's constant exchange with the federal government, authorities, parties, organizations, and associations. The Consumer Forum stands for liberal consumer policy that is not merely unilaterally business-friendly, but takes society as a whole into account.

Imprint

Publisher
Verein Schweizer Plastic Recycler
Belchenstr. 7
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Graphics/typesetting
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grafikschmid.ch, Gipf-Oberfrick

Print
...

Information about the paper used to print this publication
Printed on Antalis Nautilus Classic, 100% recycled paper in accordance with the requirements of the "Blue Angel" environmental label for the use of waste paper, FSC certified, EU Ecolabel.

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A recycling quality label
The label launched by the Verein Schweizer Plastic Recycler (VSPR) association guarantees that the plastic waste collected is recycled in compliance with quality criteria and used within the European economic area.

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