Switzerland consumes 87 million tons of material each year

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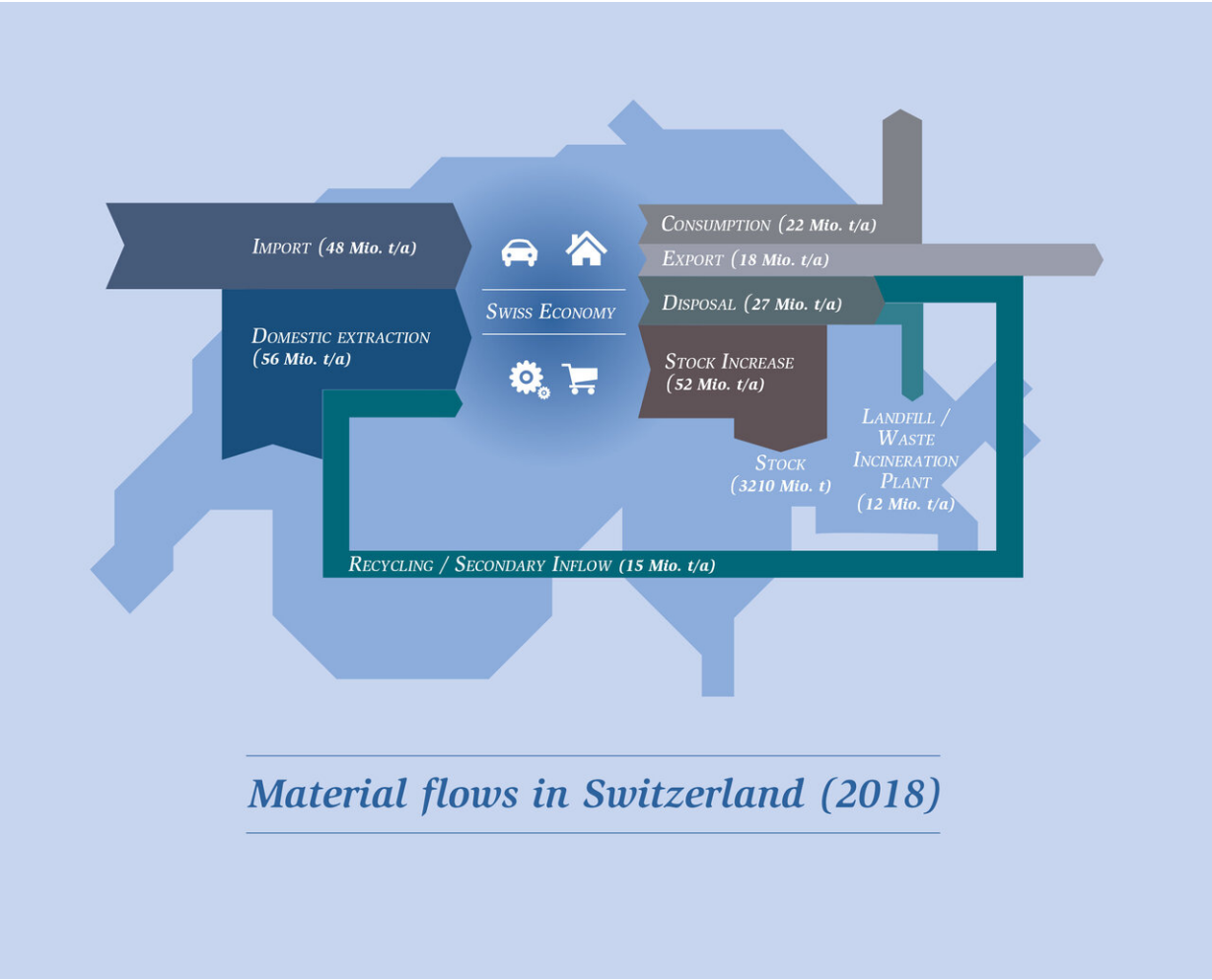

Material flows in Switzerland 2018: The masses from import to consumption and recycling to landfill. Credit: Empa

Buildings, industrial plants, roads, cars, gasoline, electricity and all other consumption: What does Switzerland consume each year? How much of it is exported or disposed of? How much flows back into the economy? And what are the consequences for the environment? For a research team at Empa's Technology and Society lab, finding precise answers to these questions was a complex task.

The MatCH project (Material and Energy Resources and Associated Environmental Impacts in Switzerland), commissioned by the Federal Office for the Environment (FOEN), began in 2013 and was carried out in several stages. The first part covered all material and energy flows in the construction sector; the second covered mobility. And Part 3 was devoted to the production and consumption of other goods that are imported, produced domestically and exported.

Operating masses for an entire country

This data mosaic is now summarized in the fourth part: a synthesis report as a snapshot of the mass and energy flows for the year 2018. Some key figures thereof: The domestic material consumption amounts to 87 million tons net per year: the necessary mass to keep the Swiss economy running. Examples of outflowing masses: 12 million tons ended up in final disposal; exports amounted to 18 million tons.

A large part of the inflowing material remains in the system—and allows Switzerland's material stock to grow. Overall, it increases by 1.6 percent per year—as of 2018—or by 52 million tons. The total weight of Switzerland's material stock: around 3.2 billion tons.

Data from many sources

To determine such data, the Empa team evaluated numerous sources. In

the "Mobility" category, the Federal Statistical Office, among others, provided useful information; for "Consumption and Production," data from the Federal Customs Administration was helpful. And for the built inventory, including buildings and traffic routes, the experts drew on earlier studies. On balance, according to the Empa researchers, these data ensured a good approximation to reality, even if they do not replace the official statistical data from federal authorities.

In the construction sector, the current consumption figures are also interesting: Almost half of the used material is concrete—just under 40 million tons annually. The entire construction sector amounts to 62 million tons, while the production and consumption sector consumes just under 18 million tons: one fifth of the total mass consumed.

In terms of environmental impact, the study focuses in particular on greenhouse gas emissions. The most prominent source of greenhouse gases is fuel consumption, with just under 25 million tons, a share of around a quarter of annual emissions. It is followed by fuels (just under 20 percent), food (more than 18 percent), electricity (just under 6 percent) and steel (just under 5 percent). However, textiles and leather, as well as basic chemicals, also make a notable contribution at 4.5 percent each.

The influence of personal lifestyle

A special feature of the study is the differentiated consideration of the influence of the Swiss population. In addition to per capita consumption data, the researchers analyzed the impact of personal scope for action on climate protection: If all Swiss behaved like the fifth of the population with the most exemplary lifestyle, Switzerland's total greenhouse gas emissions could be reduced by 16 percent. If, on the other hand, everyone behaved like the fifth with the least ecological lifestyle, emissions would increase by 17 percent.

A synthesis of three extensive studies

The report "Material and Energy Flows of the Swiss Economy" covers the entire Swiss economy and synthesizes the reports of the MatCH trilogy, Construction (2016), Mobility (2017) and Production & Consumption (2018).

28 consumption areas were differentiated and 18 material categories defined, including solid materials such as mineral raw materials, metals, plastics, but also food as well as fuels, motor fuels and electricity. The natural resource water was not included.

The cross-border and Switzerland-internal mass flows were expressed as "domestic material consumption." Environmental impacts were calculated using a simplified life cycle assessment approach, which is explained in the final report.

More information: Cecilia Matasci et al. The Influence of Consumer Behavior on Climate Change: The Case of Switzerland, *Sustainability* (2021). DOI: 10.3390/su13052966

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