Eawag
Swiss Federal Institute of
Aquatic Science and Technology

Resource-oriented sanitation

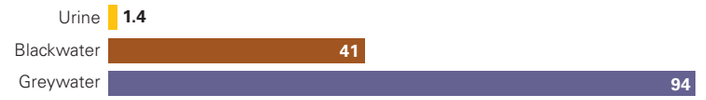
Circular economy with wastewater

eawag
aquatic research

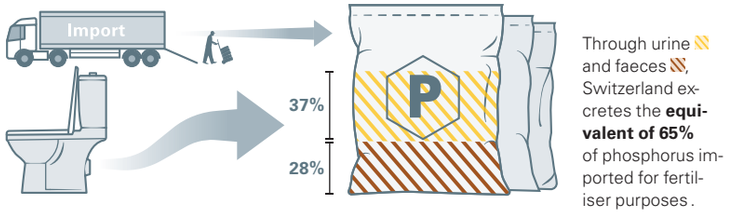
Why recover resources from wastewater?

The economical use of resources is also becoming increasingly important in Switzerland, because our society is facing major challenges: climate change, shortage of water, eutrophication, urbanisation, heat islands and loss of biodiversity.

How much wastewater one person produces per day in Switzerland
Average in litres



Why separate wastewater and treat it decentrally?



Through urine and faeces, Switzerland excretes the **equivalent of 65%** of phosphorus imported for fertiliser purposes.

The energy and heat production of **pellets from faeces** is comparable to that of wood pellets.

Reuse of greywater and rainwater can replace almost all domestic drinking water.

Resource-oriented sanitation in practice

There are a number of projects that have already implemented resource-oriented sanitation systems in their construction projects. The choice of technologies must be strongly oriented towards the local context. Two examples:

- At the individual building level: a housing cooperative in Switzerland is already successfully combining different decentralised technologies, for example, greywater treatment for flushing toilets and irrigating plants, and fertiliser recovery from urine and faeces.
- At the neighbourhood level: within a neighbourhood in Germany, greywater and blackwater are collected separately. The treated greywater is infiltrated into nature on site, and energy in the form of biogas is produced from the blackwater.

Water Hub: research and innovation platform

The NEST (Next Evolution in Sustainable Building Technology) is a living lab of Empa and Eawag in Dübendorf (Switzerland). There, researchers have been testing and investigating innovative technologies in collaboration with industry and practice since 2016.
The basement is the location of the Water Hub, which is the platform where wastewater is seen as a valuable resource. The research environment allows a broad portfolio of decentralised technologies to be tested and further developed for the recovery of resources from wastewater. In this way, different local framework conditions can be addressed in a modular and flexible way.


The NEST building in Dübendorf

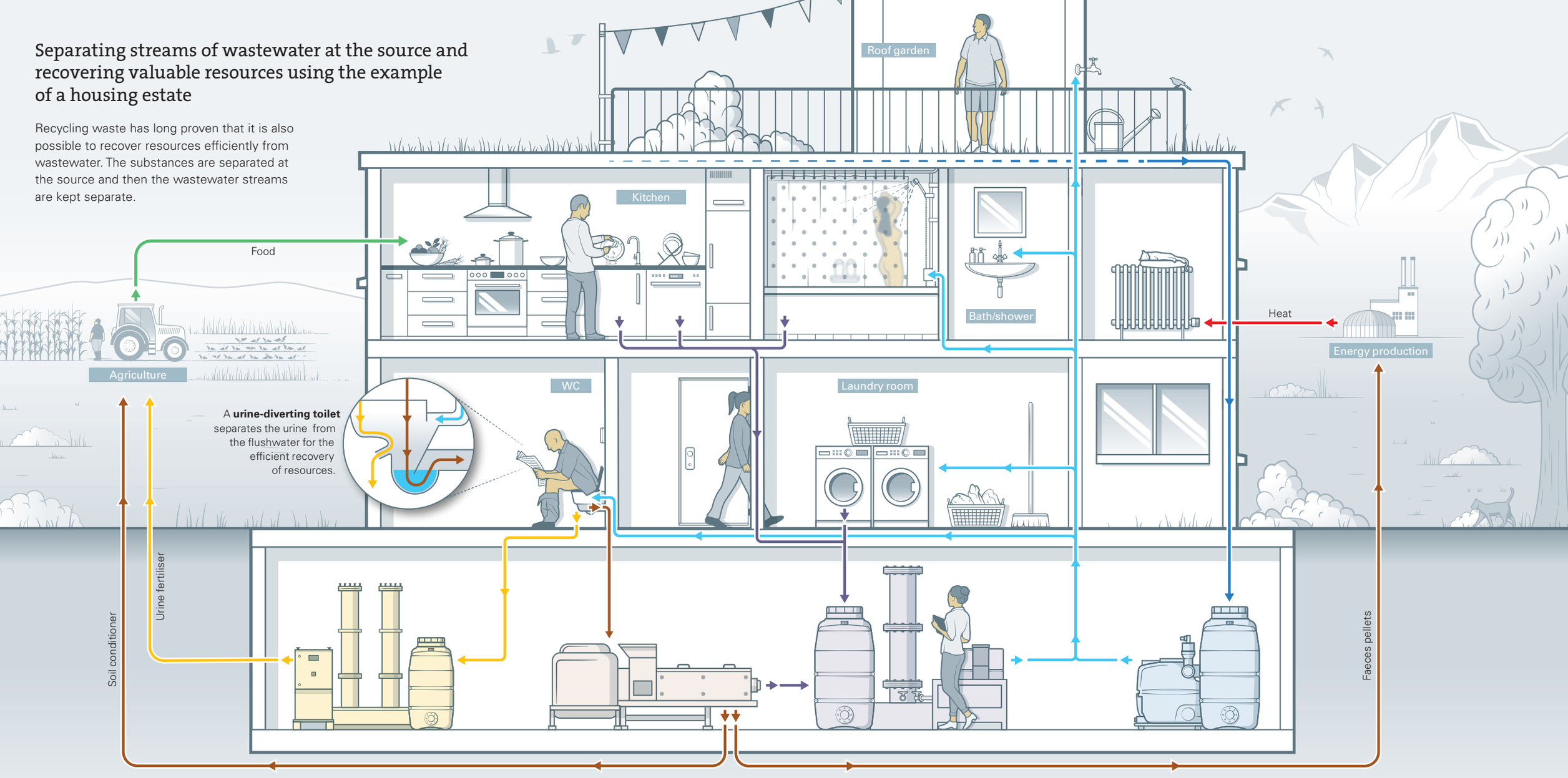
Eawag is one of the world's leading aquatic research institutes. With its professional diversity, close relationships with partners in the field and an international network, Eawag offers an excellent environment for comprehensively understanding the habitat and resource of water, identifying problems at an early stage and developing widely accepted solutions.

Eawag, Communications, info@eawag.ch, Überlandstrasse 133, 8600 Dübendorf

www.eawag.ch/resourcecycle

Separating streams of wastewater at the source and recovering valuable resources using the example of a housing estate

Recycling waste has long proven that it is also possible to recover resources efficiently from wastewater. The substances are separated at the source and then the wastewater streams are kept separate.



Water and energy streams

- Urine/fertiliser
- Blackwater/ pellets
- Greywater
- Rainwater
- Service water
- Food
- Heat

Urine treatment

Urine contains most of the nutrients that people excrete – nitrogen, phosphorous and potassium – that are ideal for making fertiliser.

Blackwater treatment

Blackwater is the mixture of flushwater, faeces, toilet paper and, depending on the toilet system, urine. Feaces consists mainly of organic material containing energy and nutrients that can be re-used.

Greywater treatment

Greywater refers to domestic wastewater generated in the kitchen, bathroom and laundry room, which can be treated and then used again in and around a household. Different grades of quality must be guaranteed for the respective further use of the treated water.

Rainwater treatment

As rainwater contains very low levels of contamination, it can be treated and stored relatively easily. In addition to being used in households, like greywater, it can also be used for the irrigation of plants, which contributes to local cooling.