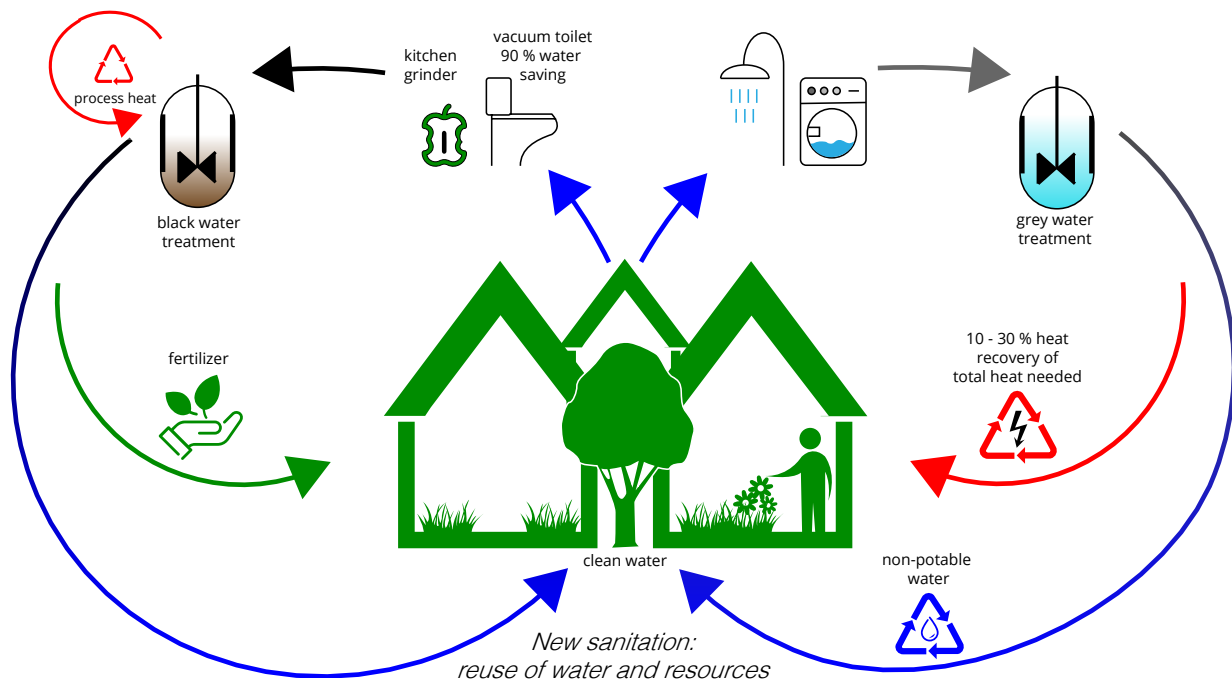


Climate resilient decentralized sustainable wastewater treatment



Clean water for healthy and future-proof living

A healthy living environment and a future-proof place to live require an efficient and integrated approach at the neighborhood level, with a focus on sustainability and circularity. Water can no longer be taken for granted in the near future. Due to climate change and the growing demand for new housing, the availability of high quality potable water will decrease. A selection of recent articles on this topic can be seen below. The mounting pressure, calls for a water transition and drinking water companies are calling on the government to amend the building code and the Drinking Water Act to allow domestic water to be supplied to homes. DeSah's sanitation concept (Decentralized Sanitation and Reuse) prepares neighborhoods for the future.



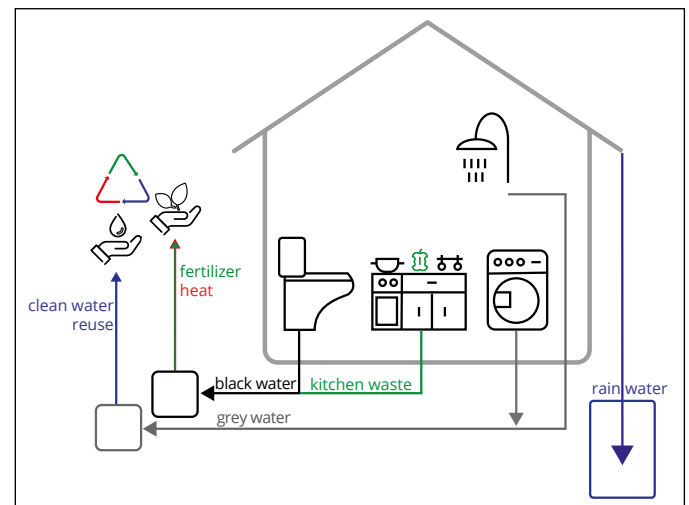
This Desah concept has several advantages compared to conventional, centralized wastewater and green waste treatment systems. Such as, lower water consumption due to water saving toilets/vacuum toilets (1-liter flush), lower energy consumption due to heat recovery from the wastewater treatment process, the possibility to recycle water on a neighborhood level, the recovery of valuable fertilizer, and an overall decrease in dependency of central power and water grids. This approach to wastewater treatment at the district level is also known as “New Sanitation”.

New Sanitation

For the New Sanitation system of Desah, domestic/residential wastewater/sewage is separated at the source into grey and black domestic wastewater and rainwater streams. Grey and black water remain separate throughout the process and are transported to a compact decentral treatment facility in the neighborhood. After the treatment the water can be reused or released to surface water.

Rainwater and treated grey water for local irrigation

Disconnecting the rainwater and reusing the treated gray water in combination with local storage in the district makes sure that water is always available. So, in dryer seasons the stored water can be used to maintain the districts green spaces This allows for neighborhoods that are is cool, green and climate adaptive.



New sanitation: source separation of waste streams for a more effective treatment

Energy and nutrients from black water

Waste water can be treated very effectively by equipping a dwelling with water saving toilets/vacuum toilets and waste grinders for kitchen scraps. Water saving toilets/vacuum toilets trap fecal aerosols and only use up to 1 liter water per flush, in this way 25% (30 liter per person per day) of the total potable water use is saved. The black water from water saving toilets/vacuum toilets is concentrated is such way that high quality fertilizer can be recovered and micropollutants can be removed effectively. The treatment process also produces energy in the form of biogas, which can be used directly in the treatment plant. This helps to decrease the power consumption of the treatment facility and will enable a self-sufficient and fossil-free district.

Grey water for heating and domestic wastewater reuse

The warm grey water is treated separately, thus recovering clean non-potable water and heat. The water can be safely used for irrigation or can be recycled and transported to the dwellings for non-potable use or used as irrigation water. The recovered heat can be used in a district heating system, saving 10-30 % of heating associated energy consumption.

Improved living comfort and hygiene

A Desah project in Sweden has won the 2022 Global Water Award for Wastewater Project of the Year for showing the greatest innovation in compact sustainable wastewater treatment. This is the most prestigious award in the field of wastewater treatment worldwide.

Desah's approach was first demonstrated in a project in Sneek, the Netherlands (32 homes, 2006) and then on a larger scale (207 homes and apartments) in the Noorderhoek district of Sneek (2011), a ministry in The Hague (2016), Superlocal (Kerkrade), Reitdiep (Groningen), Jenfelder-au (770 homes, Hamburg, DE), DuCoop (500 apartments, Ghent, BE), Recolab (2,500 people, Helsingborg, SE).

The resident survey at in the Noorderhoek district concluded that residents are predominantly satisfied with the system: it is considered convenient and hygienic.



Wastewater treatment and energy plant in neighborhood Noorderhoek, Sneek (NL)



City district in Helsingborg, RecoLab new sanitation for 2500 persons (S)

Scale and costs

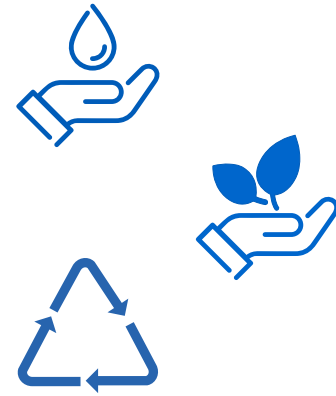
The costs for implementing new sanitation are largely determined by local conditions: connection to district heating, presence of sewerage, sewage treatment capacity and reuse possibilities for treated water. On average, a new housing development with a size of more than 500 homes is competitive with a conventional central treatment system. This applies if water treatment levy, sewerage taxes, waste charges, water savings, energy recovery and water reuse are included. This comparison becomes more favorable with higher energy and water prices. In addition, water saving toilets/vacuum toilets are the cheapest measure to save more than 25% drinking water.

Prepared for the water & energy transition with DeSah

For applications such as toilet flushing, washing machine, dishwasher or watering the garden, using high quality drinking water is a real waste of energy and resources. Water consumption at neighborhood level is directly reduced by integrating water-efficient toilets and recycling non-potable water. Moreover, costs, energy and resource savings will benefit both municipalities and residents.

The Desah system gives a district a robust and safe tool to be ready for the future.

- Total 25% drinking water savings
- Additional drinking water savings by recycling non-potable water
- Fertilizers can be recovered from wastewater
- More effective removal of micropollutants
- Local reuse for maintaining green spaces
- Delivers 10-30% of energy needed for heating homes
- Fits in the fossil-free neighborhood
- Wastewater treatment is energy neutral



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