

# sludge2energy

## Sewage Sludge Utilisation



Innovative concept of decentralised sludge utilisation by generation and use of thermal and electrical energy

## ►► Decentralised solution

The HUBER concept

“Decentralised Sewage Sludge Utilisation”

is a combination of thermal sewage sludge drying and subsequent combustion and efficiently utilises the energy potential of sewage sludge.

The plants are dimensioned to handle the sewage sludge generated on site or in the immediate vicinity of the wastewater treatment plant. This minimises transport distances or even eliminates the need for sludge transport.

The thermal energy recovered from sewage sludge combustion is used for sludge drying and generation of electrical energy.

Sewage sludge combustion significantly reduces sludge volumes. The combustion residue, sewage sludge ash, is a future resource of great interest for phosphorus recovery.

### ① Sludge handling:

The dewatered sludge is fed via a live bottom system and eccentric screw pump. The size of the intermediate storage tank depends on the plant-specific requirements.

### ② HUBER Belt Dryer BT<sup>plus</sup>:

Drying takes place at a temperature of approx. 100 °C in an energetically optimised belt dryer with heat recovery.

The belt dryer uses the exhaust air from combustion of sludge ③ and electricity generation ⑤ and therefore eliminates the need for external heat supply.

The complete dryer technology is designed for the production of a dry granulate that is optimal for combustion.

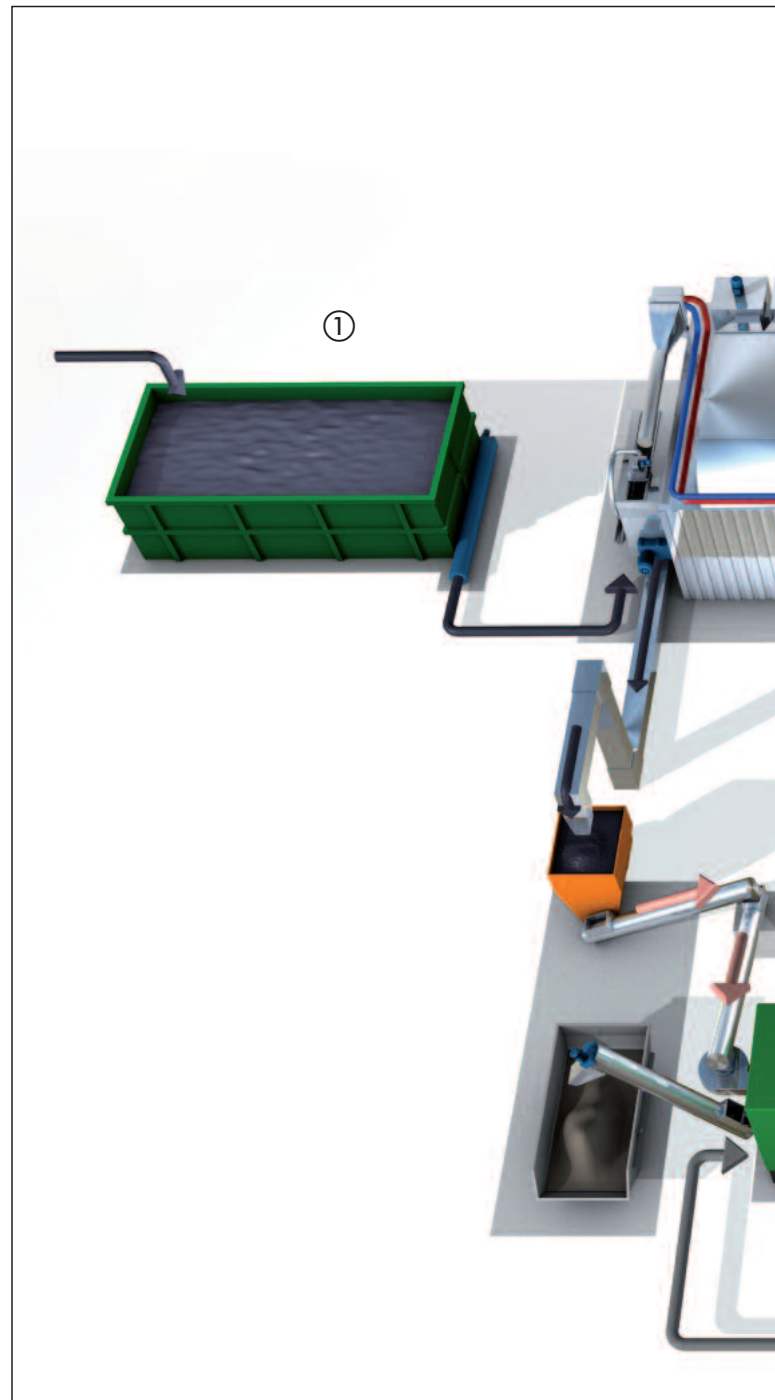
### ③ Grate furnace:

The thermal utilisation of the dried sludge takes place in an oven with grate furnace that provides a high flexibility for the fuels used and the benefit of easy and reliable operation. For optimised combustion the grate zones are equipped with individual controls and air supply. Grate de-ashing is performed automatically. Flue gas recirculation represents the first stage of exhaust gas treatment.

### ④ Exhaust heat exchanger:

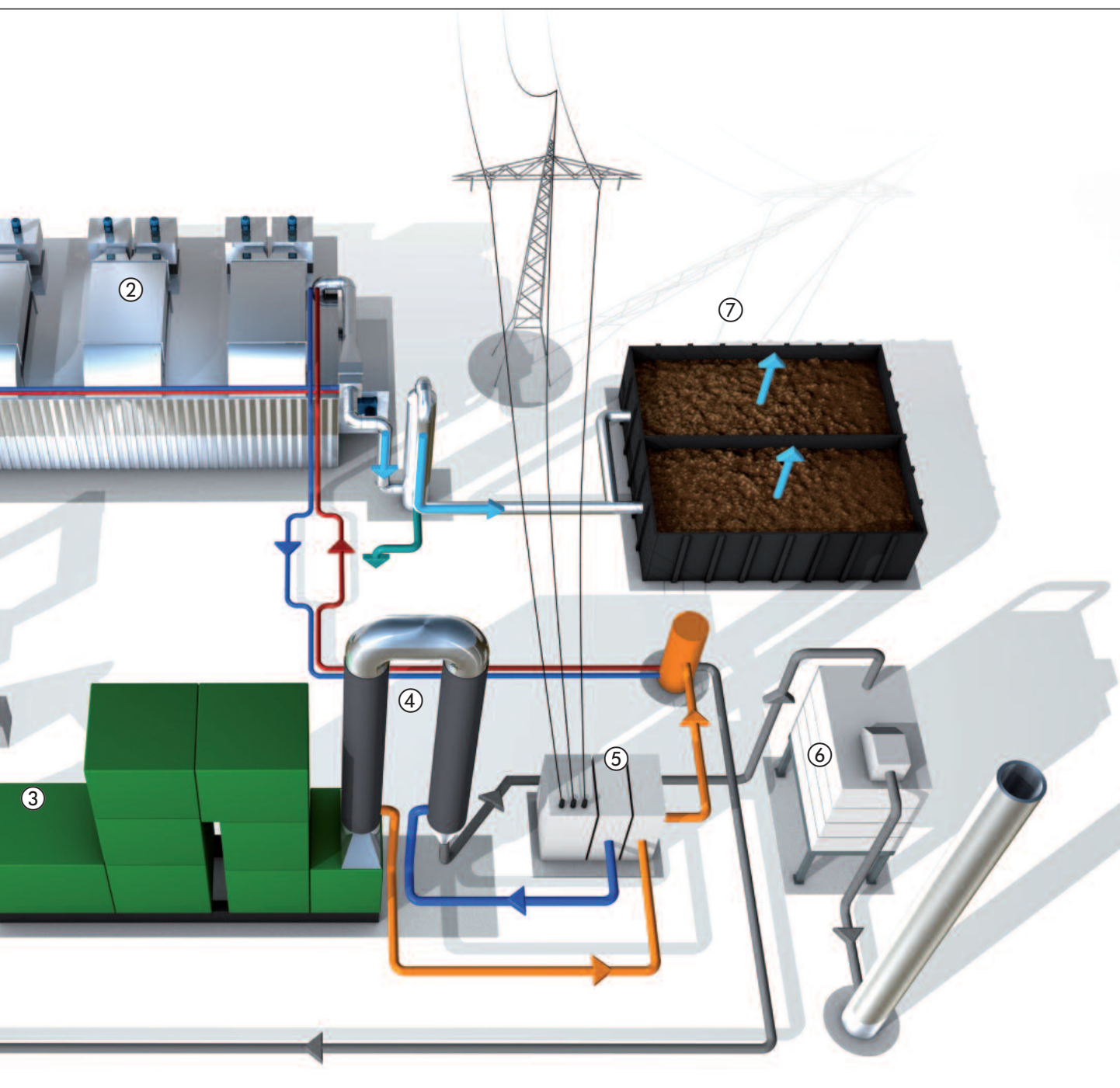
The hot flue gases from sludge combustion stream into a high-performance heat exchanger that transfers the heat energy to the compressed process air of the micro gas turbine.

The cooled flue gases are fed into the exhaust air treatment plant.



### ⑤ Micro gas turbine:

Power generation is achieved by means of a simple design micro gas turbine with a one-stage compressor and one-stage turbine. The compressor, turbine and generator are mounted on a shaft. A recuperator (heat exchanger) pre-heats the sucked air prior to the combustion chamber with the streaming out exhaust gas so that the air that enters the combustion chamber has already a higher temperature and requires less heating.



**⑥ Utilisation exhaust air cleaning:**

The reduction of nitric oxides is accomplished by means of well-proven firing measures, such as staged combustion and flue gas recirculation, and selective non-catalytic reduction (SNCR). Acid noxious gases contained within the exhaust gas, such as SO<sub>2</sub> and HCl, are removed in a dry-sorptive process.

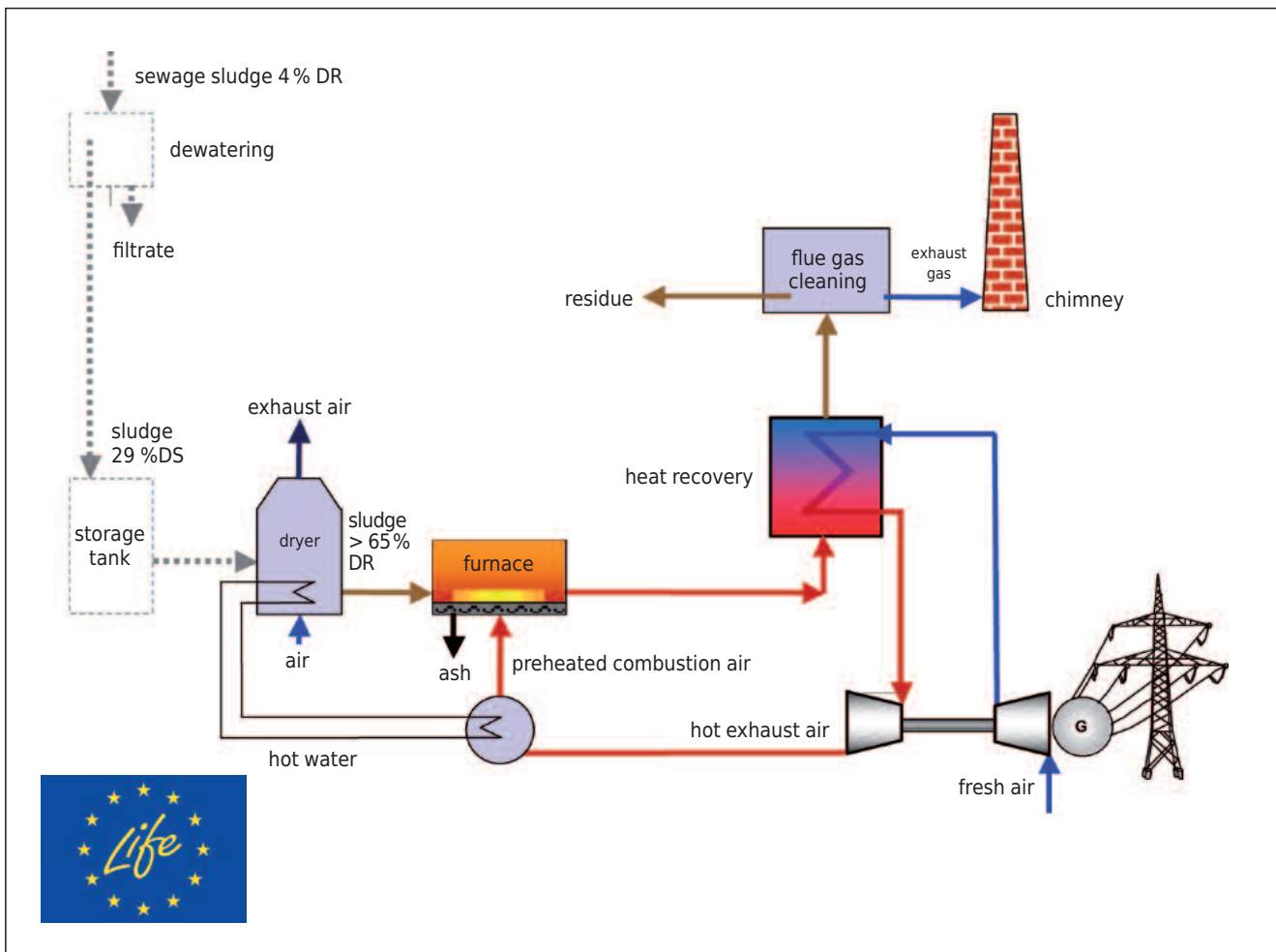
**⑦ Belt dryer exhaust air treatment:**

Exhaust air cleaning is normally performed with a two-stage system. A vertical washer 'washes' dust particles and chemical compounds out of the exhaust air. Organic compounds that might cause odour nuisance are adsorbed and biologically degraded in the subsequent biofilter.

## ➤ sludge2energy – a project supported under the EU's environmental program LIFE

In cooperation with atz (development and research centre) HUBER SE developed an innovative concept for thermal utilisation of sewage sludge, which produces electric and thermal energy both at the same time. The concept further allows for combined treatment of sewage sludge and other municipal waste, such as horticultural waste, screenings, etc. In response to the increasing challenges of sustainable waste management this innovative system is supported under the EU's environmental program LIFE06 and being implemented on WWTP Straubing, Bavaria. The plant is designed for an annual sludge volume of up to 3,000 t dry substance.

The energy-autarkic system achieves a sludge volume reduction to only 1/8 of the initial volume of the sludge to be disposed of. The residue is an ideal source for phosphorus recovery.



**HUBER SE**

Industriepark Erasbach A1 · D-92334 Berching  
 Phone: + 49 - 84 62 - 201 - 0 · Fax: + 49 - 84 62 - 201 - 810  
 info@huber.de · Internet: www.huber.de

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