WEHRLE

Small-scale plants for decentralised thermal utilisation of sewage sludge as pretreatment for phosphorous recovery

The revised European Union nitrate directive requires smaller sewage treatment plants with less than 500,000 population equivalents to provide discharge methods for their excess sludge other than agricultural use. Also, the recovery of phosphorous from sewage sludge is required.

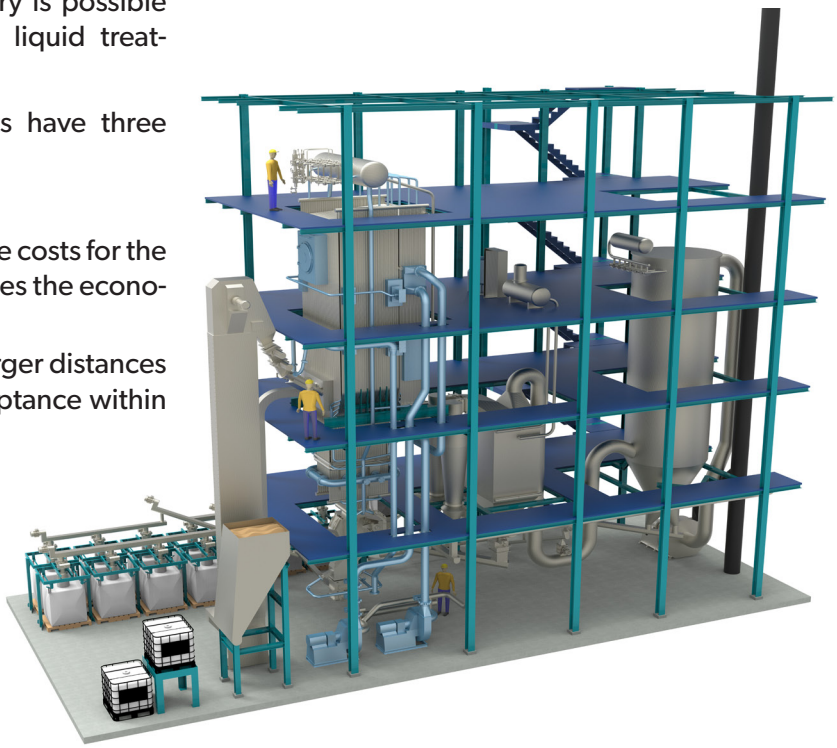
Depending on the technology used, sewage sludge incineration supports the recovery of phosphorous by concentrating it in the ashes so that a higher yield of phosphorous recovery is possible compared with technologies using liquid treatment technologies.

However, central incineration plants have three significant disadvantages:

1. Larger plants are more economic.
2. The dependency on the achievable costs for the disposal of sewage sludge increases the economic risk.
3. Delivery of sewage sludge over larger distances raises costs and reduces the acceptance within the population.

For these conditions, WEHRLE has developed a suitable regional concept for disposal:

1. From 200,000 population equivalents (approx. 2,800 tTS/a) cost effective treatment can be achieved.
2. The high fuel flexibility of the WEHRLE technology allows a simple retrofit to other fuels and therefore increases planning security in case of fluctuating costs for sewage sludge disposal.



Model of a **K³** fluidised bed plant for decentralised utilisation of sewage sludge from 200,000 inhabitant equivalents

Fluidised bed technology by WEHRLE

Quick realisation due to (typically) simplified public authorisation process

Multi-Fuel

Planning security: simple adaptation to other fuels in case of decreasing economics for sewage sludge treatment in the future

P ready

Process-integrated concentration of phosphorous in the ashes simplifies the subsequent **phosphorous recycling**

K³ sludge

small
compact
complete

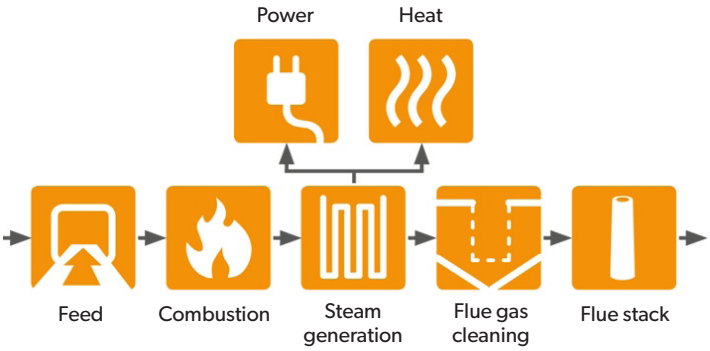
Mono-Incineration of Sewage Sludge by K³-*Sludge*

Small, compact, complete – Fluidised bed technology for small plants

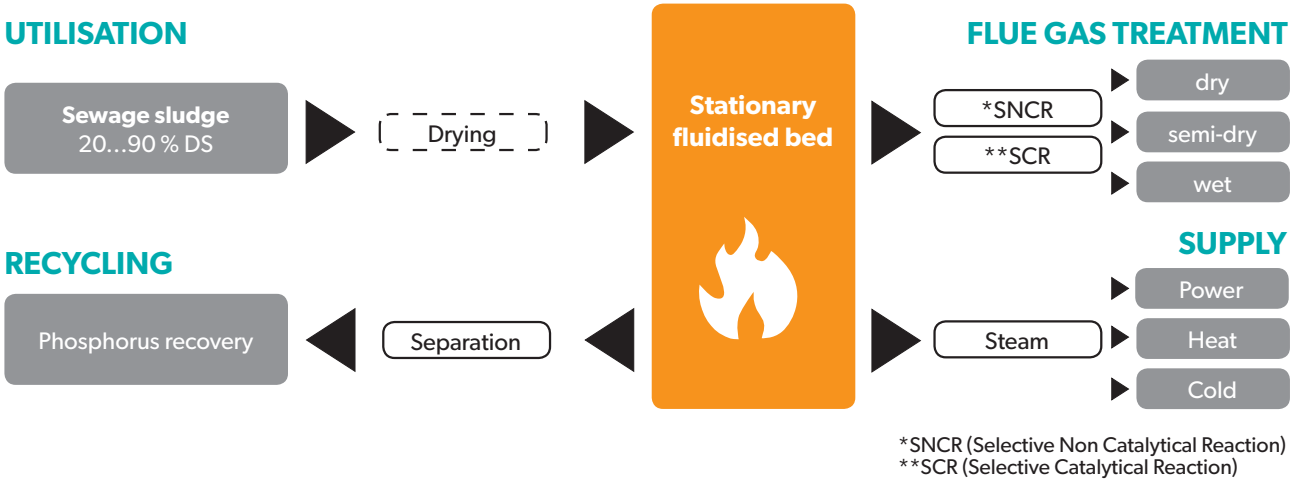
Small: Plant capacities starting from 200,000 population equivalents.

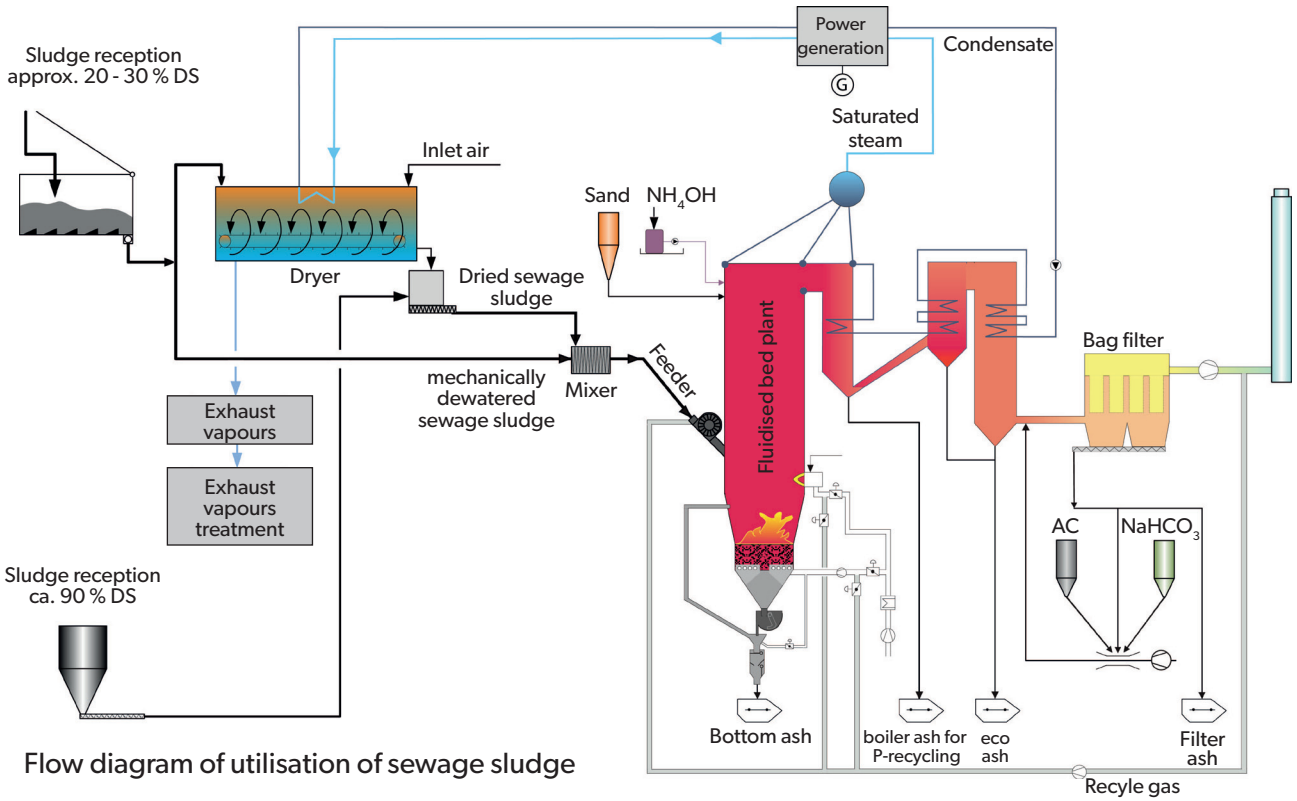
Compact: Small plant footprint (starting from 130 m², depending on the plant capacity) enabling simple integration into the existing site.

Complete: Turn-key & tailor-made from fuel feeding to flue stack – with customised energy applications for utilisation of electricity, heating, cooling and steam.



The innovative process generates a phosphorous-enriched ash fraction which allows a more efficient phosphorous recycling in subsequent steps.





Flow diagram of utilisation of sewage sludge

Reference example: CIMO Mc Step (CH)

Sewage sludge incineration with co-firing

Direct thermal utilisation of mechanically-dewatered sewage sludge. By co-firing of waste solvents, the drying of the sludge is not required.

The reliable steam boiler concept has the advantage of high plant availability and low maintenance & repair costs.

The emission requirements are ensured using a semi-dry flue gas cleaning and a subsequent wet gas cleaning system.

Manufacturing of the boiler at WEHRLE

Firing capacity	6.74 MW
Sewage sludge mass flow	3,130 kg/h
Solvent mass flow	750 kg/h
Flue gas mass flow	16,486 Nm^3/h
Saturated steam from boiler	7.2 t/h
Saturated steam pressure	16 barg
Feed water temperature	105 °C
Flue gas temperature max.	400 °C

Service: Partnership and support beyond Take Over

Highest availability, long plant lifetime and safe operation

From technical consulting to installation based on your requirements, the service team of WEHRLE supports you with experience and reliability.

Due to the close connection with the WEHRLE manufacturing division, the delivery periods of spare parts and consequently the down-times are particularly short. We provide the whole planning, the project management, the transport, the assembly and commissio-ning – everything from one source and from the experts of WEHRLE!

Range of services:

- Plant revision and maintenance
- Restructuring
- Optimisation
- Repair / Replacement of components
- Installation and commissioning
- Plant operation

Deammonification of Sludge Water from Anaerobic Digestation & Condensate

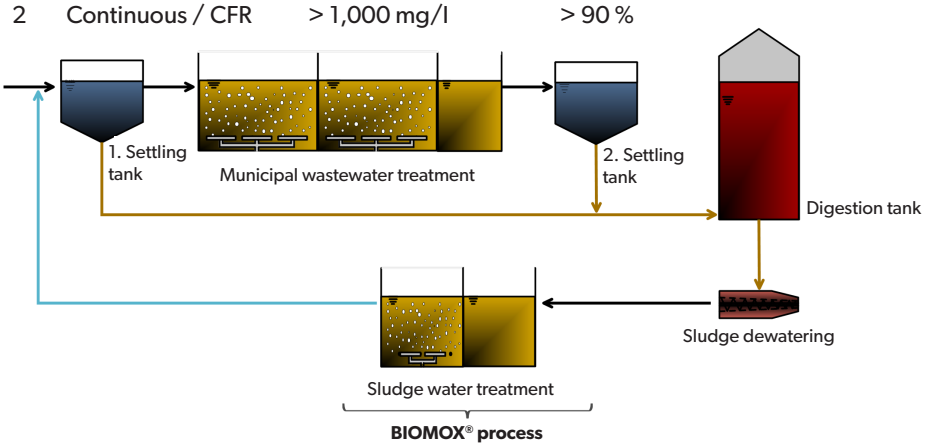
WEHRLE Solutions for the Treatment of Wastewater

The return liquor produced when dewatering anaerobic digestion sludge contains high ammonium concentrations, which increases the N load by up to 25 % when recirculating the water into the sewage treatment plant increasing the operating costs.

The sludge water can be treated directly using the BIOMOX® technology. This deammonifcation process requires 60 % less energy than conventional ammonia treatment processes. The bacteria operate without adding a C source.

Example: Sewage treatment plant **Badajoz / ES** with BIOMOX® CFR

	Process	N Concentration	N Elimination rate
1	Batch / SBR	< 1,000 mg/l	> 80 %
2	Continuous / CFR	> 1,000 mg/l	> 90 %



Flow rate	495 m^3/d
Component	**NH_4-N**
Inlet	820 mg/l
Outlet	< 80 mg/l
Performance	> 90 %

WEHRLE-WERK AG

Plant engineering and services from one source

With over 150 years of experience in the field of plant and boiler construction, WEHRLE is a synonym for quality and longevity for energy technology. The high-performance boilers from WEHRLE set benchmarks in difficult applications like incineration of waste or hazardous waste.

Particularly for sewage sludge mono-incineration the technology of WEHRLE brings unique advantages which offers economic solutions for the disposal of sewage sludge especially for operators of smaller sewage treatment plants.

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Company video

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