

### Decentralized small-sized plants for thermal utilization of waste

Waste is often transported by truck over long distances to be disposed of at large, central waste incineration plants, leading to negative impacts on traffic and environment as well as high additional costs.

Decentralized small-sized plants for thermal utilization of waste may be a solution to this problem, yet are often not economically viable.

WEHRLE has developed a concept to ensure the economic efficiency of decentralized thermal utilization of waste.

WEHRLE plants distinguish themselves by their compactness and high fuel flexibility. Depending on the quantity of waste and local regulations, a simplified authorization process may be possible, reducing planning time and costs.



Example of decentralized thermal utilization: Disposal of screen overflows from a biogas plant

### WEHRLE's fluidized bed technology

**K<sup>3</sup>**  
waste  
—  
small  
compact  
complete

**High economic efficiency** due to WEHRLE's regional concept with sophisticated plant design and user-friendly operation

**Quick implementation** due to simplified public authorization process, depending on local regulations

**High fuel flexibility** ensuring process stability and the disposal of problematic waste and waste components

**Optional source of revenue** by selling district heating, steam and electric power

Model of a **K<sup>3</sup>** fluidized bed plant for decentralized thermal utilization of waste for 1 MW<sub>th</sub> or more

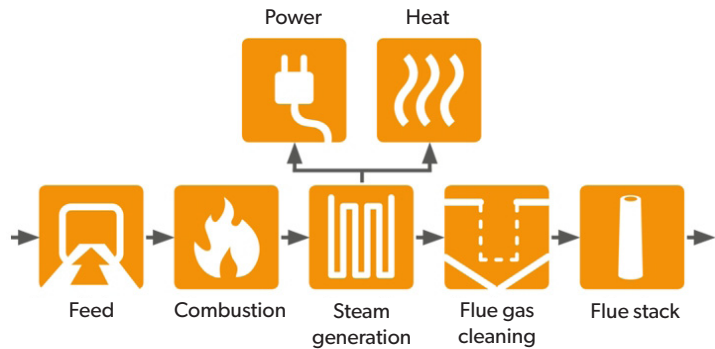


## Fluidized bed technology K<sup>3</sup>-Waste

### Small, compact, complete – Fluidized bed technology for small-sized plants

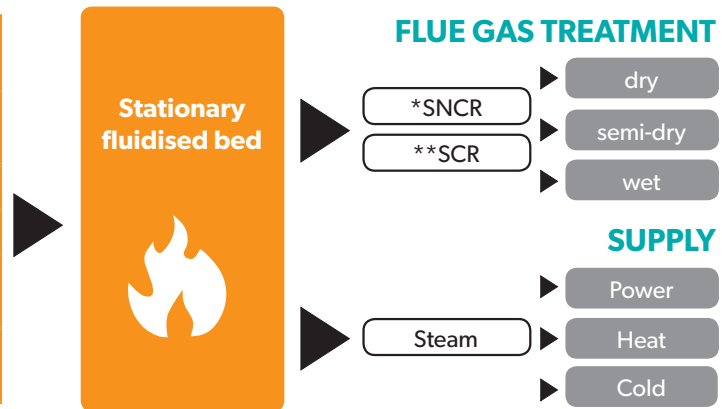
Turnkey and tailor-made solutions from fuel feed to flue stack – with customized energy applications for the generation of power, heat, process steam or coldness combined with individual services from one source.

The compact plants have a small footprint (depending on the plant size from 130 m<sup>2</sup> upwards) and are usually easy to integrate into the existing site.

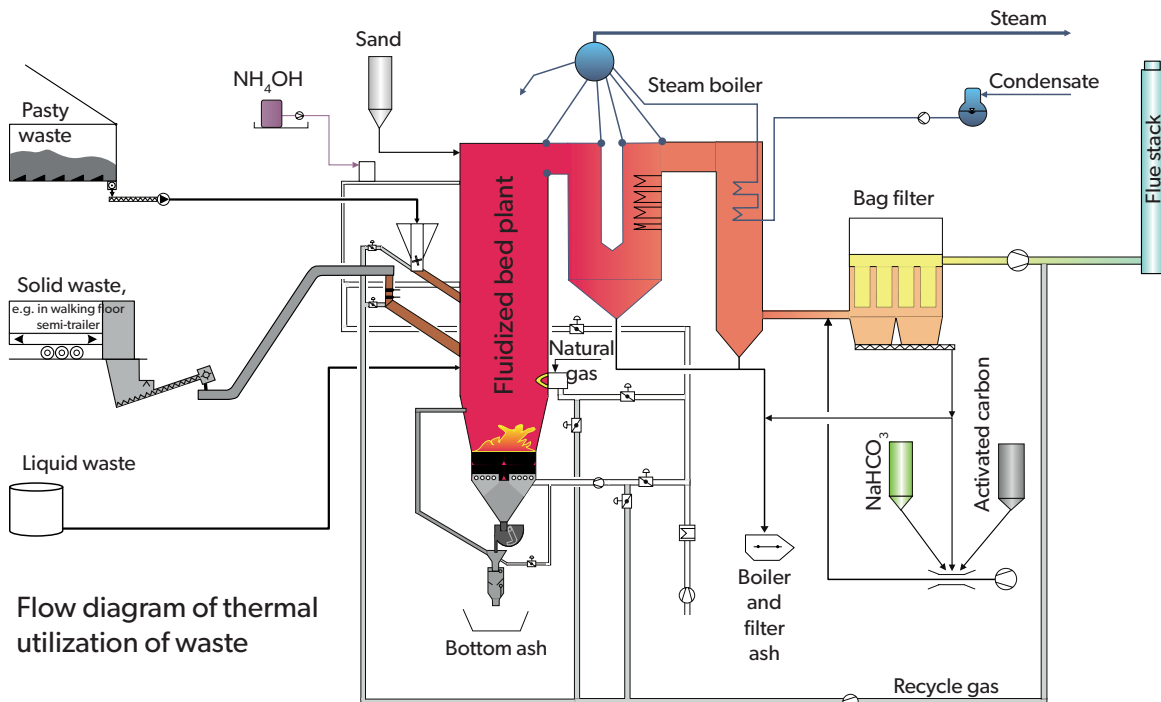


## UTILIZATION

| Fuel                                      | Calorific value [MJ/kg] |
|---|-------------------------|
| Screen overflow, digestate, liquid manure | 4.2 ... 10              |
| Contaminated waste wood                   | 11 ... 14               |
| Refuse-derived fuel (RDF)                 | 9 ... 16                |
| Industrial waste (production residues)    | 12 ... 20               |
| Hazardous waste (Cl ≤ mass fraction %)    | 12 ... 22               |



\*SNCR (Selective Non Catalytical Reaction)  
 \*\*SCR (Selective Catalytical Reaction)



Flow diagram of thermal utilization of waste

## Reference Arnoldstein (AT)

### "ABRG" Hazardous Waste Incineration Plant

Thermal disposal and utilization of treated waste (among others odorous solvents and adhesives).

The plant distinguishes itself by its high efficiency due to an availability of over 95 % as well as by environmentally-friendly emission rates which are clearly below the required limit values.

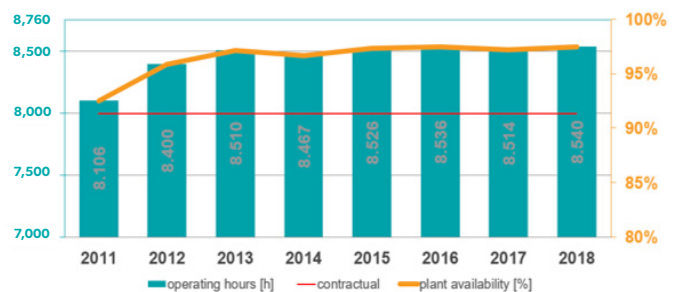
#### Fuels:

- ▶ solid, liquid, pasty waste
- ▶ hazardous and non-hazardous waste

#### Utilisation:

- ▶ Heat
- ▶ Steam
- ▶ Electricity

|                                  |              |
|----------------------------------|--------------|
| <b>Total rated thermal input</b> | 11 MW        |
| <b>Operating hours</b>           | > 8,400 h/a  |
| <b>Capacity</b>                  | > 40,000 t/a |
| <b>Commissioning</b>             | Dec. 2010    |



## Service: Partnership and support beyond take-over

### Highest availability, long plant lifetime and safe operation

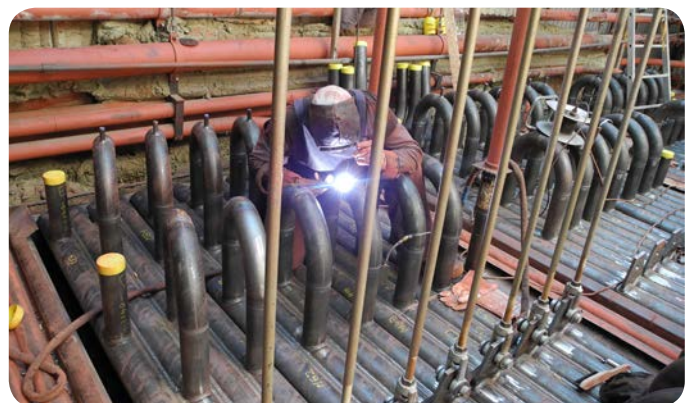
From technical consulting to installation based on your requirements, WEHRLE's service team will support you with its experience and reliability.

Due to the close connection with WEHRLE's manufacturing division, the delivery periods of spare parts and consequently the downtimes are particularly short. We offer an entire range of services, from planning to project management, transport, assembly and commissioning – everything from one source carried out by WEHRLE's experts!

#### Range of services:

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

for boilers and components, fluidized bed technology and grate firing.



## Treatment of waste bunker water, leachate, liquid digestate and manure

### WEHRLE's solutions for wastewater treatment

Processes for the treatment of effluents from MBTs, waste bunkers or landfills have to be able to cope with very high concentrations of solids and must be capable of

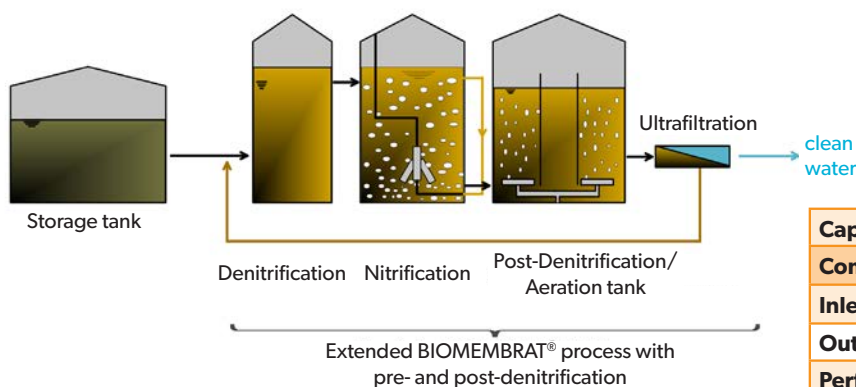
- ▶ effectively decomposing very high concentrations of organically bound nitrogen (TKN) and  $\text{NH}_4\text{-N}$ ,
- ▶ dealing with seasonal variations of water volumes or water composition,
- ▶ tolerating salt precipitations from waste (e.g. struvite).

Such requirements make highest robustness and flexibility indispensable.

Example: **UTE Montcada, Ecoparc 2, Barcelona / ES** with high-performance MBR BIOMEMBRAT® with additional downstream DN/N stage.



\*) Mechanical-biological waste treatment



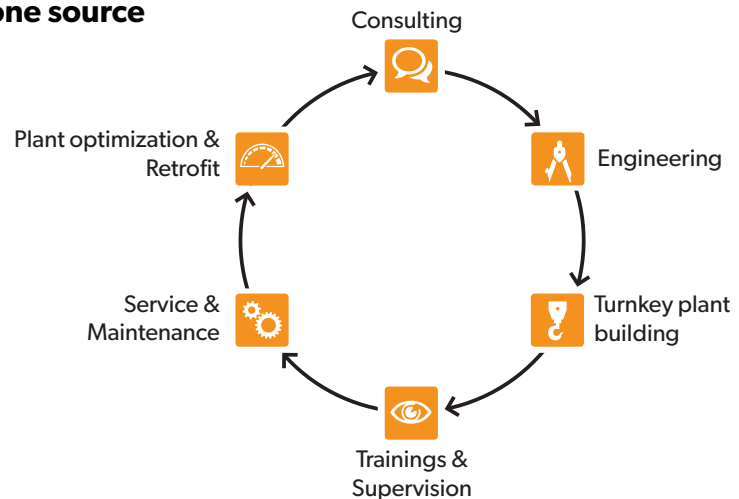
|                    |                       |                         |
|--------------------|-----------------------|-------------------------|
| <b>Capacity</b>    | 140 m <sup>3</sup> /d |                         |
| <b>Component</b>   | <b>COD</b>            | <b>NH<sub>4</sub>-N</b> |
| <b>Inlet</b>       | 30,000 mg/l           | > 5,000 mg/l            |
| <b>Outlet</b>      | 1,500 mg/l            | < 10 mg/l               |
| <b>Performance</b> | > 95 %                | > 99 %                  |

## 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. WEHRLE's high-performance boilers set benchmarks in difficult applications, e.g. for the incineration of waste or hazardous waste.

WEHRLE technology offers unique advantages especially for the waste management industry and improves the ecobalance due to decentralized waste treatment and generation of energy.



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Company video