

**COST-EFFECTIVE  
INTEGRATED SLUDGE  
DISPOSAL SYSTEM**



# Unique selling points



**Eliminates additional disposal costs**



**Environmentally-friendly technology**



**Green energy production**

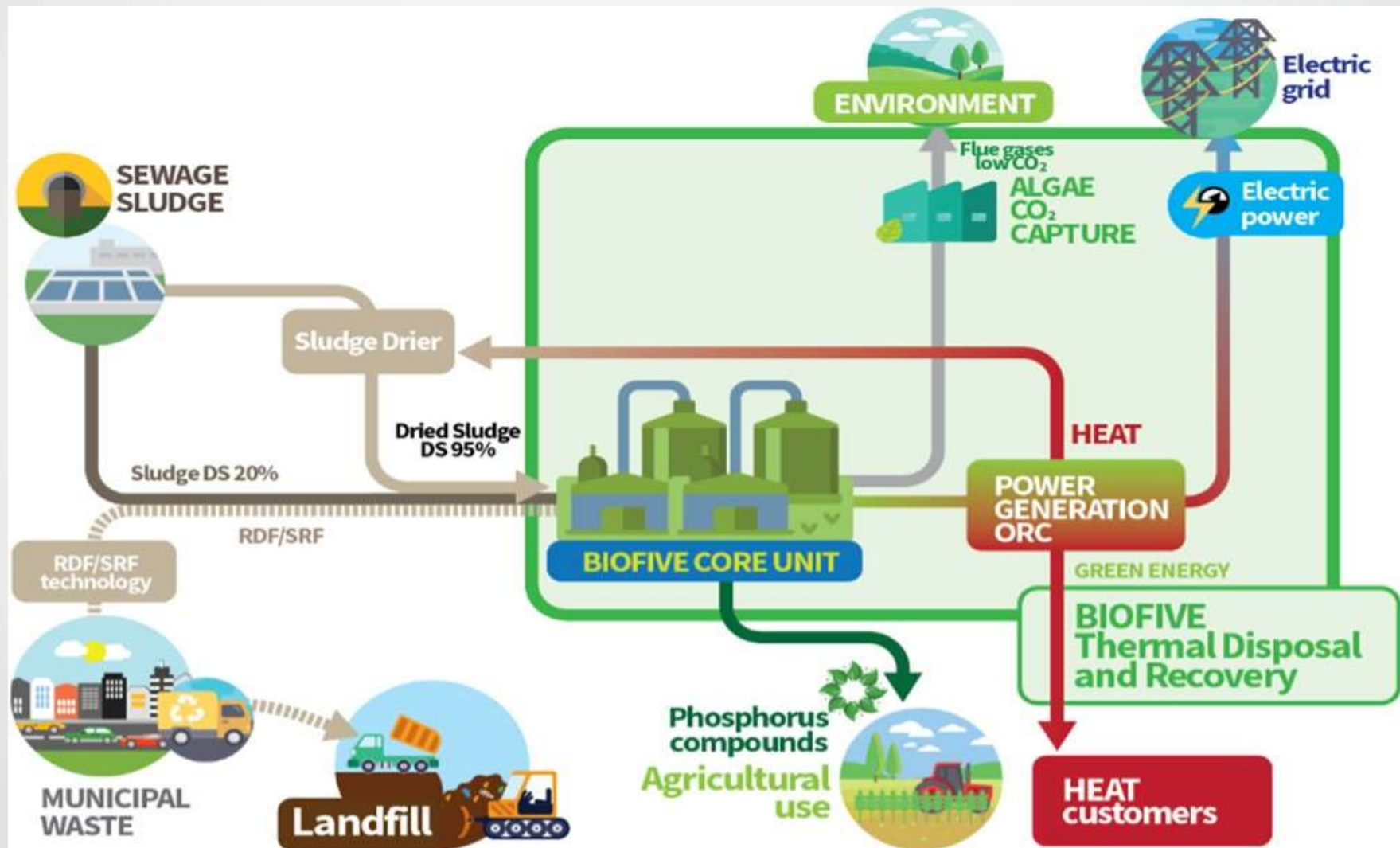


**Phosphorus recovery**



**CO<sup>2</sup> recovery and CO<sup>2</sup> quota savings**

# System overview



# Five pillars

## A system built on five pillars:

- **Eliminates transportation costs:** The system is modular and scalable, and can be installed at or near the waste/ wastewater treatment facility, thereby reducing costs.
  - **Environmentally-friendly technology:** No fossil fuels are used, so carbon footprint is reduced. The system is totally closed and the emission is under the limits. There are no unused residues, 100% of waste is utilized.
  - **Green energy production:** The heat energy is produced by using only green energy sources: sludge, RDF or biomass.
  - **Phosphorus recovery:** Phosphorus is a raw material important for plant cultivation. One of the most important sources is organic waste, mainly sewage sludge.
  - **CO2 recovery and CO2 quota savings:** As an obligatory, a flue gas cleaner is used in the system, making the CO2 usable.
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# Team

The team is also reinforced by experts in environmental protection research projects, environmental projects with the Ministry of Environment, climate protection and the energy sector Baden-Württemberg, engineers, as well as city planning, urban conservation and R&D activities.

The company also receives support from a board of scientific advisors and experts.



# Utilization

- Sewage sludge, RDF/SRF fuel.
- Complete disposal at 850 ° C.
- 1 ton of waste generates 9000 MJ of heat energy.
- Utilizing 10000 tonnes of waste in a BIOFIVE system generates 4000 tonnes of CO<sup>2</sup> quota savings.





# Adaptability

- Each unit can serve a location of 50,000 to 500,000 inhabitants.
- 10000 tonnes of waste can generate 4 MW of green energy.
- Phosphorus-rich ash is an effective soil improvement tool.
- CO2 from cleaned flue gas helps grow crops in greenhouses and in algaculture.
- The waste can be utilized and disposed at the same site.



**CAN BE INTEGRATED INTO EXISTING SYSTEMS**

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## Other benefits

- **Core unit:** disposes of sewage sludge and other pre-selected organic content communal wastes.
  - **Auxilliary modules:** recovers heat & rich nutrients (phosphorous from the ash and CO<sub>2</sub> from flue gas).
  - The generated heat energy can be utilized by heat customers ( heating, water heating, cooling, drying, manufacturing etc).
  - Using the optional ORC equipment, electricity can be produced. The ash and CO<sub>2</sub> recovered can be utilized in agriculture and greenhouses.Ú
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# Consumer benefits

## **Consumer benefits by using the BIOFIVE system:**

- Environmentally-friendly and efficient solution.
  - Dynamically able to respond to electricity price variations.
  - Ultra-flexible operational profile.
  - Multiple engine units with fast start and ramp rates enabling dynamic operation at high efficiency during low heat demand.
  - High efficiency and flexible operation over a wide load range.
  - Typical plant size: 4 MW.
  - Modular and scalable.
  - Closed system: no air, soil and water pollution.
  - Multi-unit design enables optimized plant size with step by-step investment.
  - Flexible operation responds to changes in power, heat and cooling demands.
  - On-site maintenance without production downtime.
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## Additional information

- Compared to other technologies, it can be stated that BIOFIVE is a more viable technology, considering the smaller investment cost and benefits.
  - The BIOFIVE disposal and recovery system is able to generate the heat required for the disposal without the use of fossil fuels, by burning the waste itself in a closed system even at the site of the waste source.
  - The BIOFIVE system can easily be installed at or near the waste treatment facility ( wastewater treatment plant, waste sorting plant).
  - Our standard model is the core unit with a 4 MW capacity that is suitable for the disposal and utilization of 10,000 tonnes of waste annually, which is scalable based on demand.
  - Available waste management and air quality protection permits.
  - There are no fuming chimneys, no unpleasant odor, and no unverified GHG emissions.
  - The capacity can be increased to the desired size, by installing more units.
  - The system is fully automated and requires only 3 people to operate per shift.
  - Maintenance can be planned, the unit can operate 7-8000 hours per year.
  - The lifecycle of the system is 25 to 30 years, which corresponds to the industry average.
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# Sources of revenue

- Heat energy sales
- Electrical energy sales
- Waste disposal fee
- Ash (mixed with peat) sales
- Cleaned CO<sup>2</sup> industrial gas sales
- CO<sup>2</sup> quota savings sale

**RETURN ON INVESTMENT < 6-8 YEARS**



# Sustainability

- The energy balance of waste energy recovery is positive (without using any fossil fuels).
  - Environmentally-friendly solution for the disposal of sewage sludge, thereby avoiding the potential risk of contamination of soil and water resources.
  - The produced energy, ash and purified CO<sup>2</sup> can be sold.
  - Significant revenue, low capital and operational costs per output unit.
  - Up to 6-8 years return on investment.
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Providing a greener and safer environment.

**THANK YOU FOR YOUR ATTENTION!**