

3inONE Tank

- Innovative steel tank for sludge storage

Frederikshavn Forsyning Case Study



Client

Frederikshavn Forsyning utility,
Northern Denmark Region

Results

The **3inONE Tank** has proven its worth for the client:

- Collection of biogas from the digested sludge, corresponding to 8 to 14% of the total biogas production.
- Up to 36% heat recovery from the digested sludge to the incoming sludge.
- An annual heat energy recovery of up to 1,500 MWh — equivalent to the heat supply of 100 single-family houses.

The background

Given the increased focus on resource scarcity and emission of greenhouse gas, Krüger A/S — a subsidiary of Veolia Water Technologies — has developed a solution in collaboration with Frederikshavn Forsyning, where the sludge management capacity is improved in order to optimize the use of resources.

This led to the development of a multifunctional sludge storage tank, the **3inONE Tank**.

The criteria for the development of the new tank was:

- High reliability.
- Elimination of odour nuisance.
- Sustainability, e.g. recovering residual biogas from digested sludge to be used for production of heat and electricity.

Our solution

The multifunctional design of the **3inONE Tank** is unique as it combines two individual tanks in one covered steel tank, acting as gas collector, heat exchanger and buffer. The tank capacity in Skagen is 560 m³ of incoming sludge and 725 m³ of digested sludge.

Advantages:

- Makes it possible to use all biogas.
- No loss of greenhouse gases.
- Explosive Atmosphere areas under control.
- No odour nuisance.
- No operating costs for ventilation or odour treatment.
- The energy from the digested sludge can be transferred to the incoming sludge in order to reduce heat consumption.

New standards in Denmark demand that plants control their methane emissions and act to eliminate or reduce them. The **3inONE Tank** is a solution to reduce the emissions from sludge storage facilities.

*Photo: 3inOne Tank in Skagen WWTP, Frederikshavn Forsyning
Two more 3inONE Tanks have been or are under construction in Denmark*





3inONE Tank - double sludge storage in steel tank

■ Gas collection

■ Buffer capacity

