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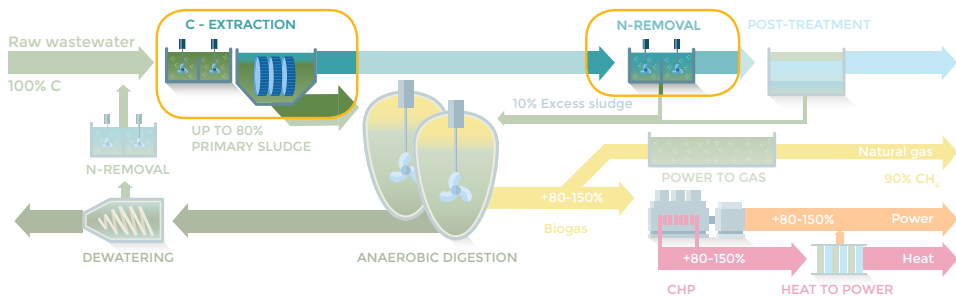
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## ALTENRHEIN LESS ENERGY CONSUMPTION, FEWER N<sub>2</sub>O-EMISSIONS AND PRODUCTION OF FERTILISER BY MEMBRANE STRIPPING

At Altenrhein (CH) WWTP, the highly polluted sludge water will be cleaned in a separate stage by membrane stripping instead of treating it in the main stage of the WWTP, thus producing a valuable fertiliser while reducing energy demand and N<sub>2</sub>O-emissions.

### ○ WHAT IS THE INNOVATION?



The membrane stripping process applied at Altenrhein WWTP is a compact, physico-chemical treatment method for ammonia-rich sludge water. Instead of oxidising the ammonia in a biological stage or stripping it through an energy intensive air exchange,

the concentration gradient across an ammonia-permeable membrane is used to separate the ammonia from the sludge water, subsequently absorbing it into sulphuric acid to produce a commercially viable fertiliser.

## ○ WHAT IS THE ADDED VALUE?

The membrane-stripping process has a lower overall energy demand than oxidising bio-processes like nitrification-denitrification or deammonification and physical processes like air- or steam-stripping. The end-product of the process is an ammonia sulphate solution that is virtually free of heavy metals or micro pollutants often found in sludge water. Therefore, this fertiliser is highly suitable to close nutrient loops in agriculture. The two main side effects from the reduced ammonia load to the main stage are lower  $N_2O$ -emissions and freed up capacity of the main stage. The free capacity can be used to treat additional loads, thus delaying or avoiding a plant expansion.

## ○ WHAT ARE THE TECHNOLOGIES AT STAKE?

The technologies to be researched are the membranes themselves (like temperature stability and life expectancy). Since the membranes are made available by their manufacturer, these parameters can be just observed, but not changed. The equally important pre-treatment processes and process parameters such as flow-rate, number and sequence of stages, points of base addition, temperature or pH-value can and will be varied and optimised in the course of the demonstration project.

## ○ WHAT ARE THE EXPECTED OUTCOMES?

- ▣ Full-scale demonstration of the recovery of nitrogen from wastewater by membrane ammonia stripping.
- ▣ Production of a marketable nitrogen fertiliser product.
- ▣ Collection of long-term experience during the scientifically supervised operation of the stage.

## ○ PARTNERS



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