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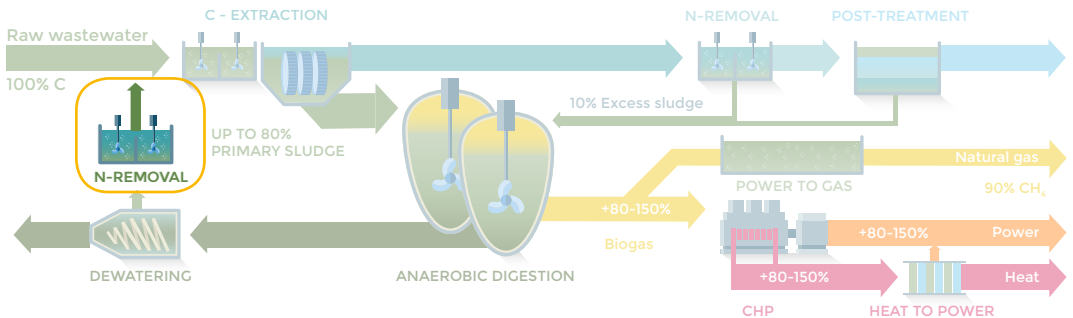
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KIRCHBICHL NITRITATION OF SLUDGE DEWATERING EFFLUENT AT A TWO-STAGE WWTP

The integration of a sludge dewatering effluent treatment can save on aeration demand, supporting the development of an energy-positive wastewater treatment plant (WWTP). At the two-stage WWTP Kirchbichl, POWERSTEP focusses on optimizing nitrogen removal by coupling nitrification in the dewatering effluent and denitrification in the first-stage activated sludge tank.

WHAT IS THE INNOVATION?



Sludge dewatering effluent (SDE) contains a high load of ammonium-nitrogen, corresponding to 15-20% of the total influent nitrogen load of the WWTP. Recycling SDE back in the activated sludge tank leads to a higher aeration demand for

wastewater treatment. At Kirchbichl, SDE is recycled after nitrification in side stream. The nitrite produced contains chemically bound oxygen, which can be used for organic carbon removal in the first stage, resulting in lower need for aeration.

○ WHAT IS THE ADDED VALUE?

Nitrification in side stream allows the plant to save on aeration demand for the nitrogen treatment, because aeration efficiency is higher in SDE than in the first-stage activated sludge tank (higher oxygen transfer efficiency). Additionally, the reduced carbon demand in the first-stage results in an enhanced biogas yield in the anaerobic digestion. Overall, the process saves on energy consumption while producing more biogas for energy-production.

○ WHAT IS THE TECHNOLOGY AT STAKE?

The focus lies on the optimal technological integration of the nitrification process in the two-stage plant configuration.

○ WHAT ARE THE EXPECTED OUTCOMES?

- ▣ Full-scale demonstration of integrated SDE management through nitrification at a two-stage WWTP in Kirchbichl.
- ▣ Development of a simulation model for process evaluation and optimization (both on technological and energy aspects) for Kirchbichl.
- ▣ Verification of the model's outcomes for single- and two-stage WWTPs and with different sewer composition.

○ PARTNERS



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