

# ULTIMATE

A circular icon representing a water cycle, with three arrows forming a loop. The top arrow is blue, the bottom-left is yellow, and the bottom-right is green.

WATER SMART INDUSTRIAL SYMBIOSIS

## CS7 – Tain (Glenmorangie distillery)



Meeting: December, 17<sup>th</sup> 2020



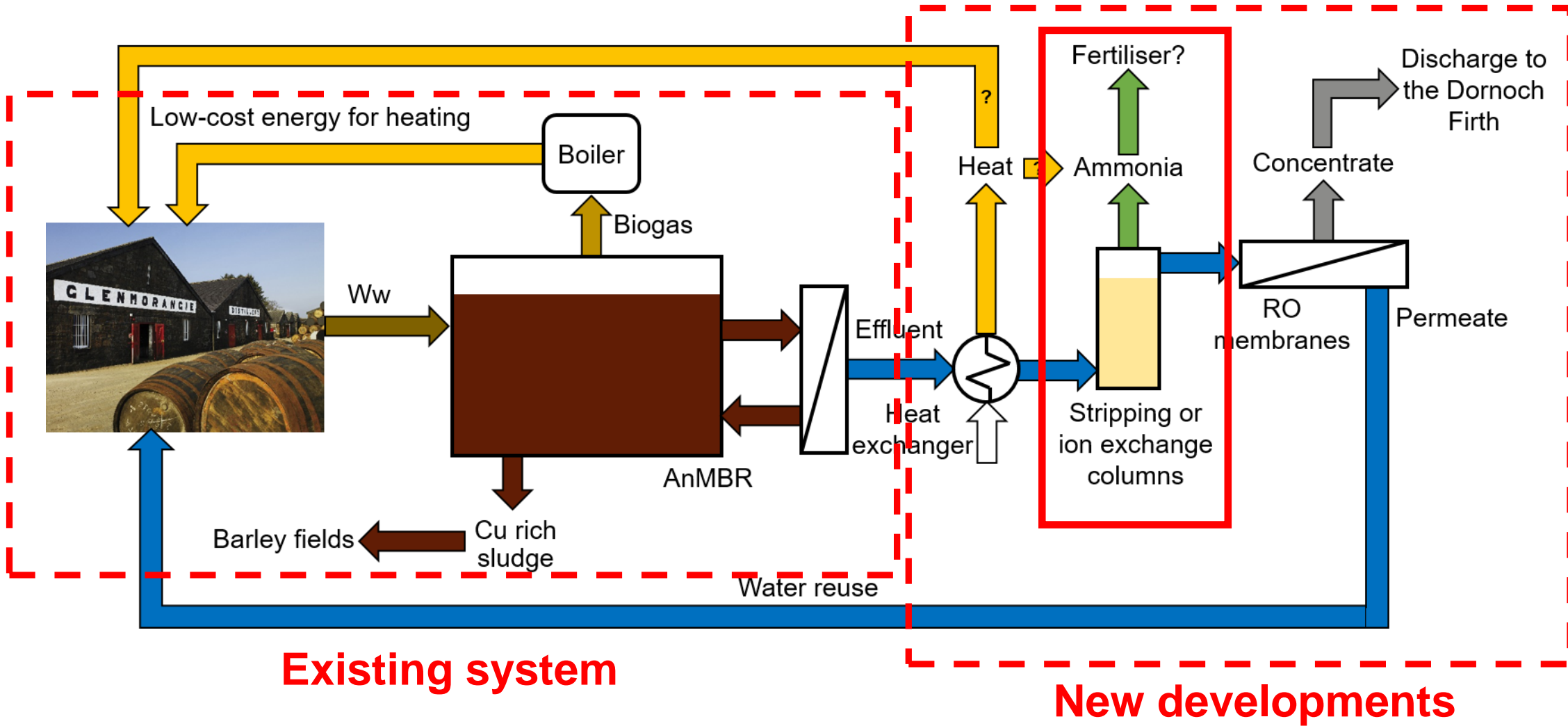


# CS7





# Treatment systems



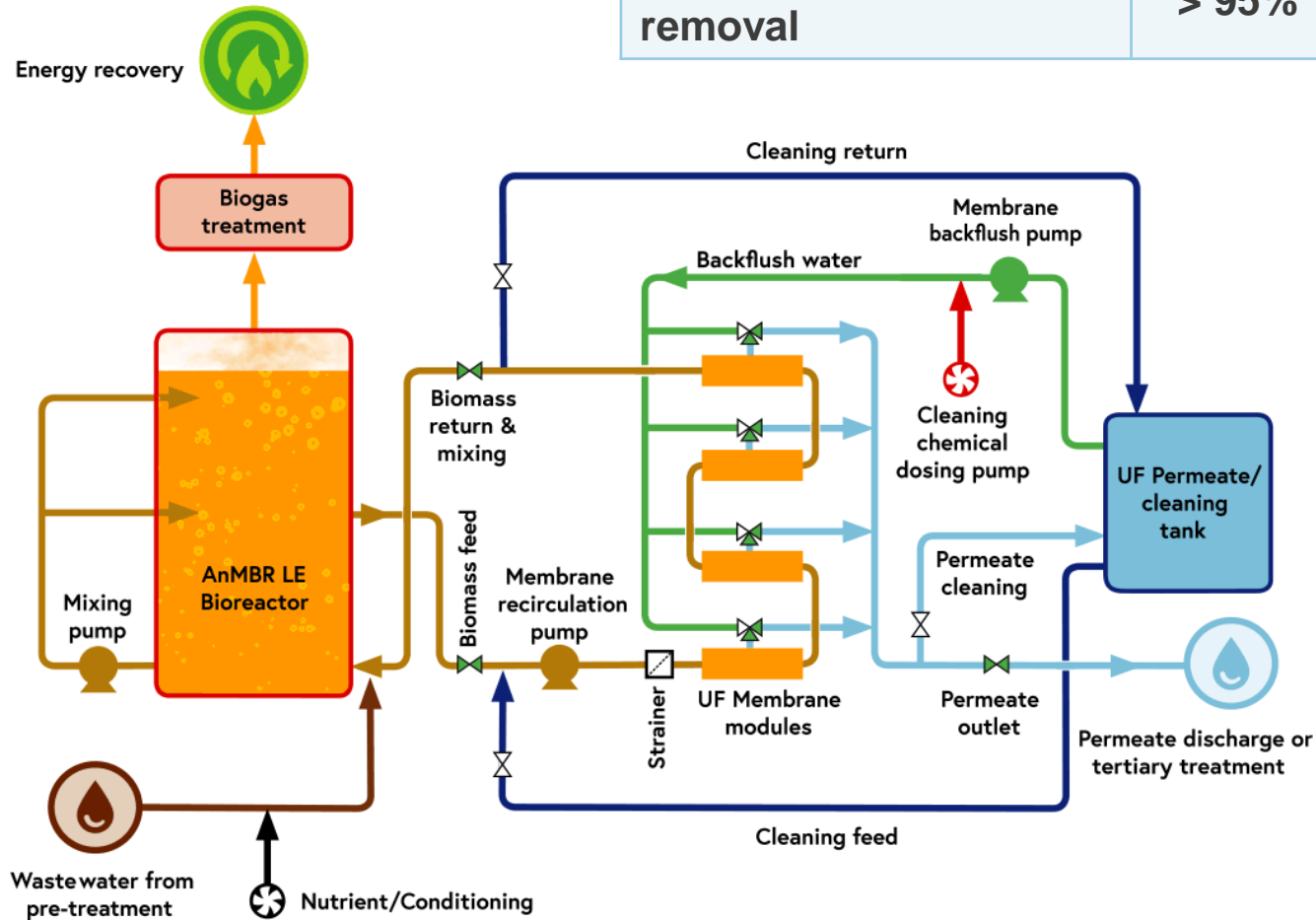




# AnMBR LE™



Peak/average AnMBR Feed flow rate (m <sup>3</sup> /d)	467/377
Design COD load (kg/d)	14,527
Average total COD removal	> 95%



COD (mg/L)	656 (316 – 1454)
SS (mg/L)	3 (0 – 18)
NH <sub>4</sub> -N (mg/L)	797 (329 – 1349)
NO <sub>3</sub> -N (mg/L)	5 (4 – 8)
PO <sub>4</sub> -P (mg/L)	252 (152 – 343)
pH	7.2 (6.4 – 8.0)

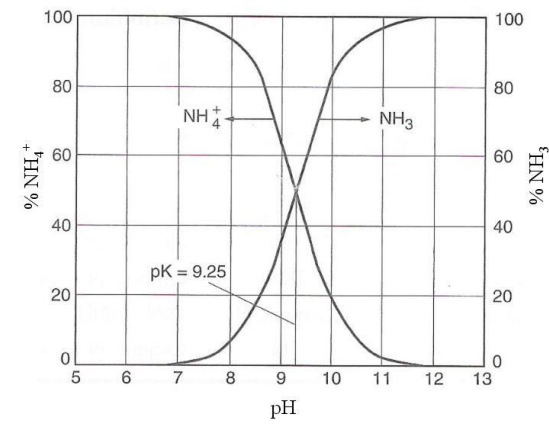
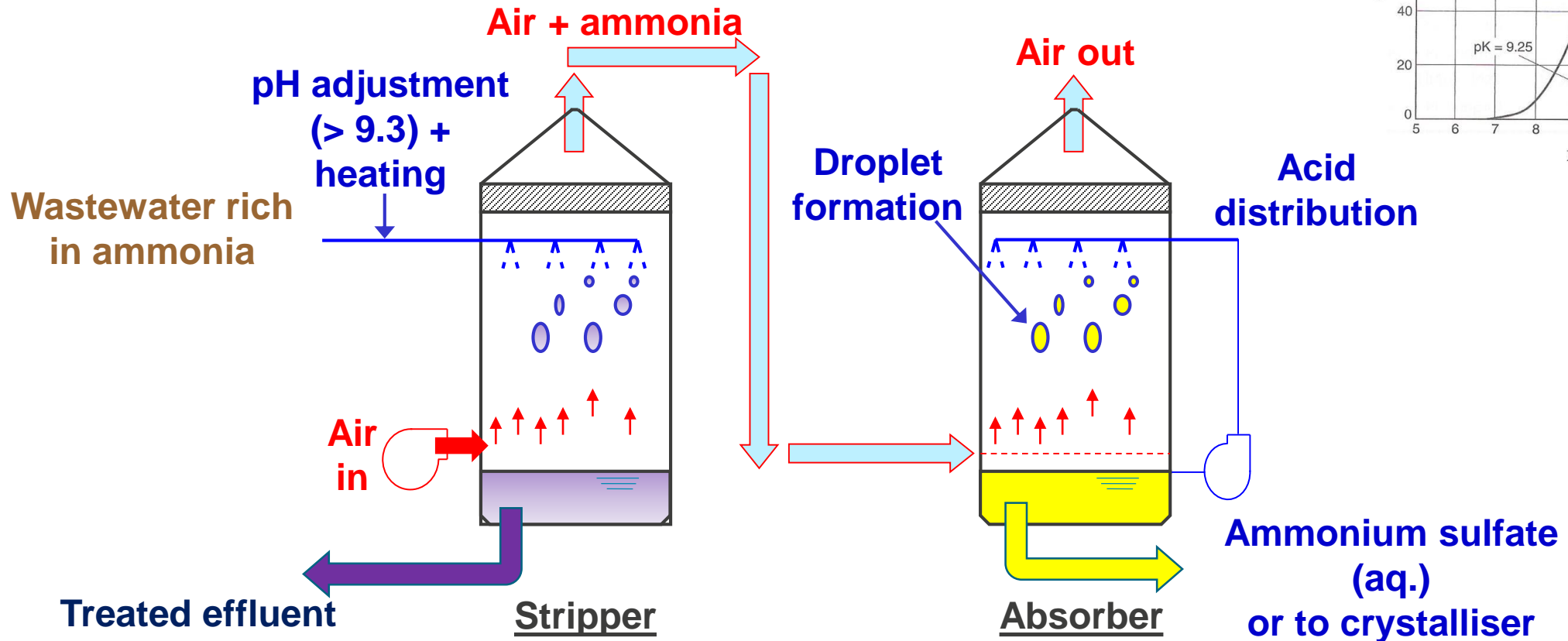
## Ammonia removal and recovery:

- Stripping
- Precipitation
- Ion exchange





# Stripping columns



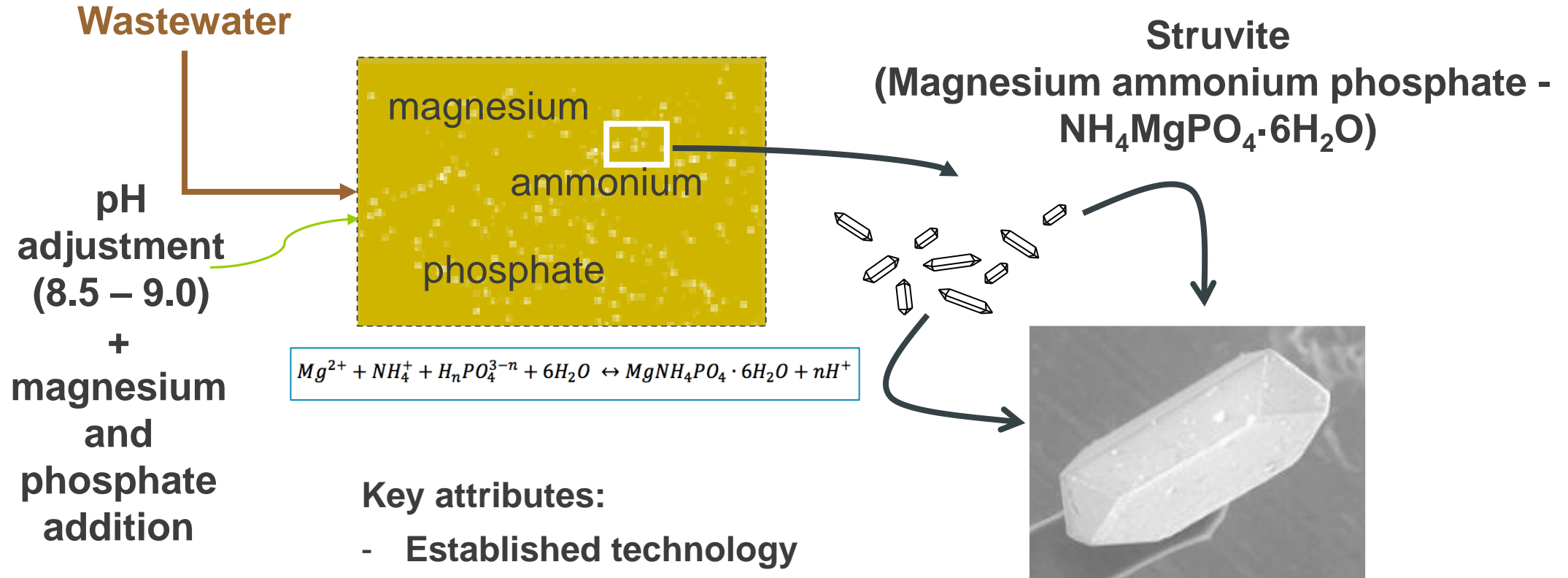
## Key attributes:

- Established technology
- Large footprint
- Energy intensive





# Precipitation - Struvite



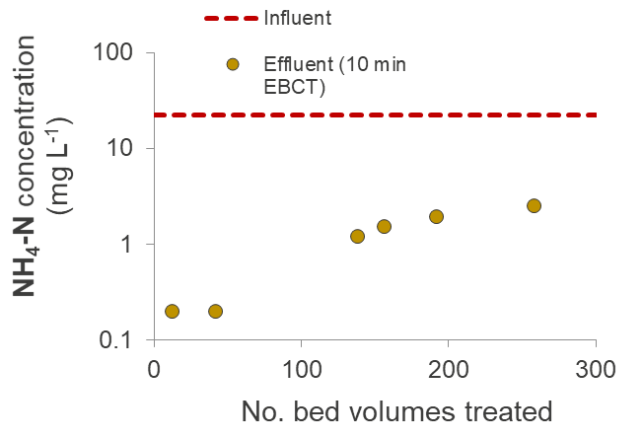
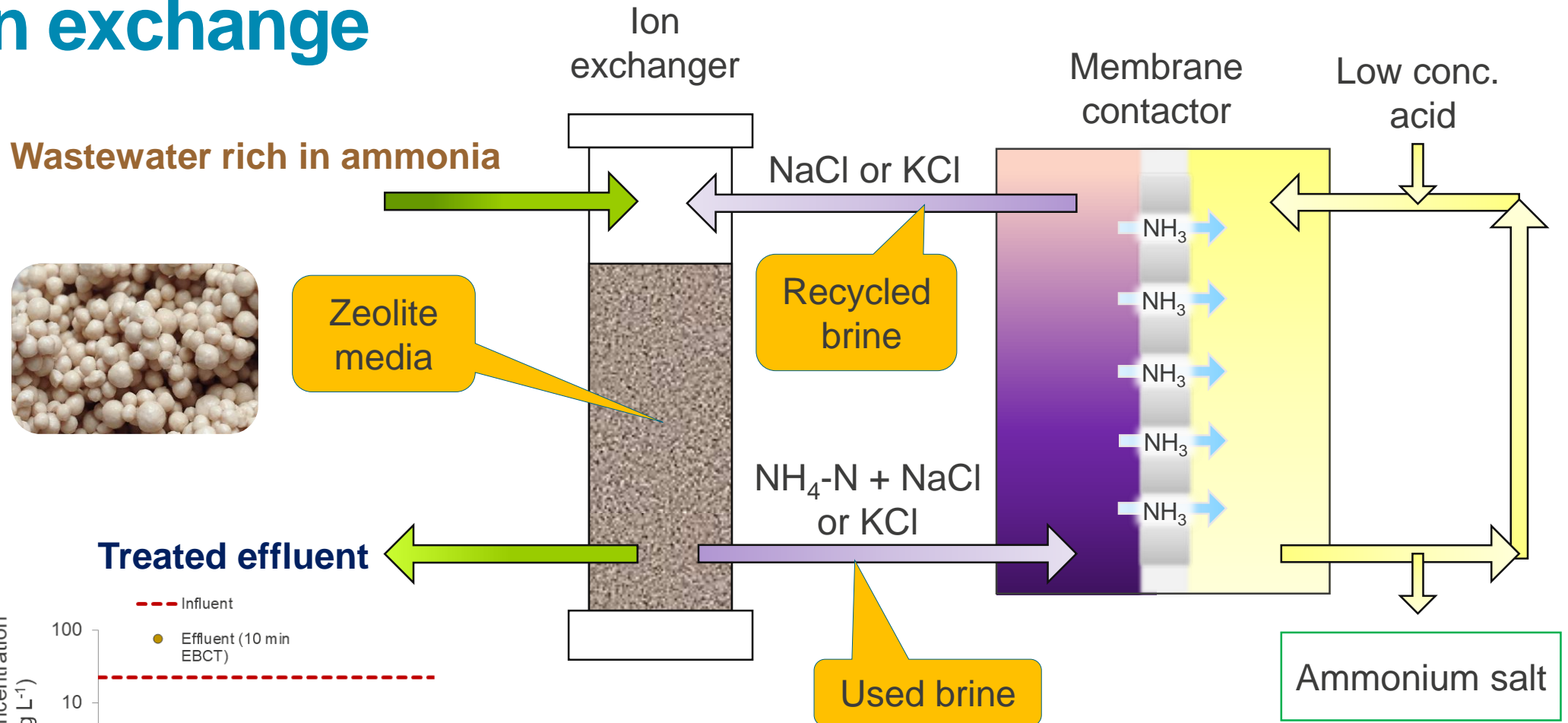
## Key attributes:

- Established technology
- Simpler configuration
- Availability of P and Mg?





# Ion exchange



## Key attributes:

- Small foot print
- Adsorption capacity at high ammonia concentrations?
- Supply chain of media







**ULTIMATE**



**WATER SMART INDUSTRIAL SYMBIOSIS**

**Thank you!**