

ELIQUO | WATER
GROUP

LYSOTHERM®

Working principle & performance

24.06.2019



KEY BENEFITS

Reduce biosolids disposal cost

- ↑ Volatiles Solids Reduction on WAS: **+100%**
- +
- ↑ Dewaterability of digested biosolids **by up to 5%**
- =
- ↓ Biosolids quantity & hauling costs **by up to 35%**



Increase biogas yield

- ↑ Improve the biogas yield from WAS: **+100%**



Improve quality of biosolids

Elimination of pathogens and **Class A quality** can be achieved for beneficial reuse & biosolids stability



Increase digester capacity **by up to 60%**

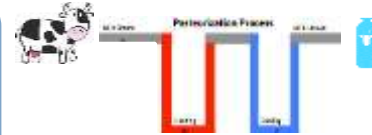


- ↓ Required HRT
- ↓ Viscosity of the digested biosolids (Higher DS load is possible)

LYSOTHERM[®] OVERVIEW

1. Key Benefits

Thermal sludge hydrolysis without steam
No odor emissions



2. Operating Principle

Continuous operation based on tube-in-tube
heat exchangers & thermal oil



3. Special Features

Integrated Cleaning In Place
Internal heat recovery

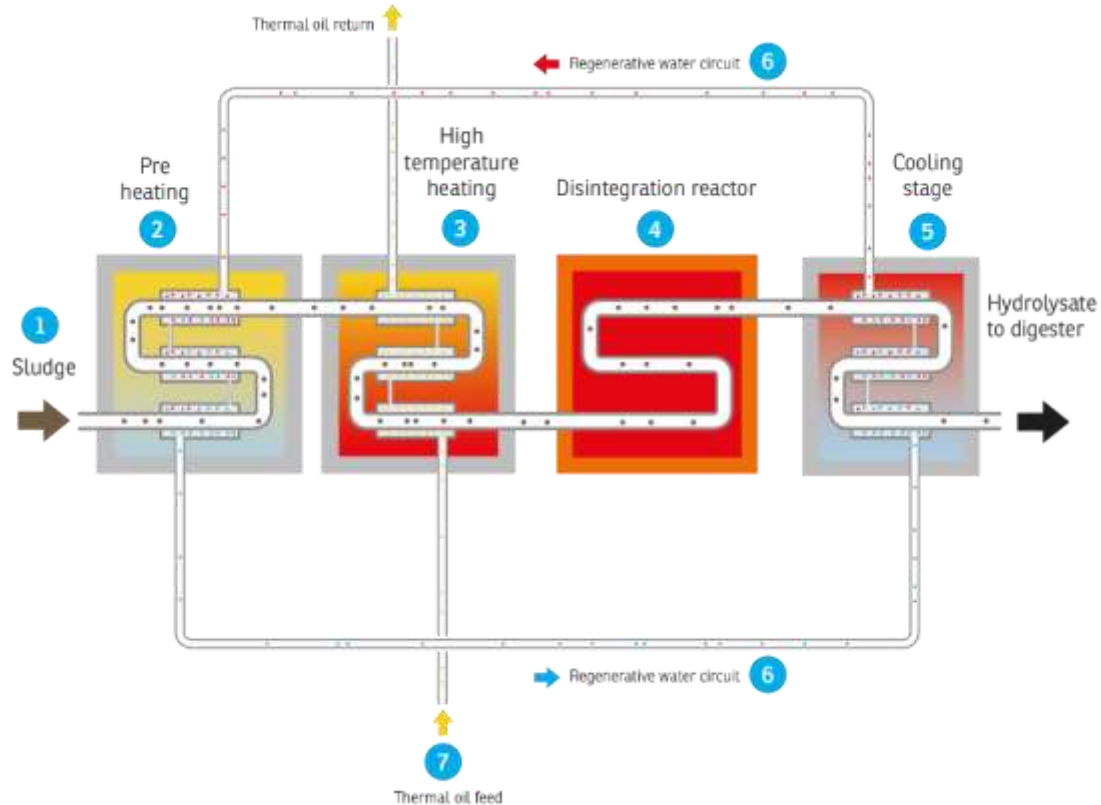


4. Manufacturing

In-house Modular
Plug & Play

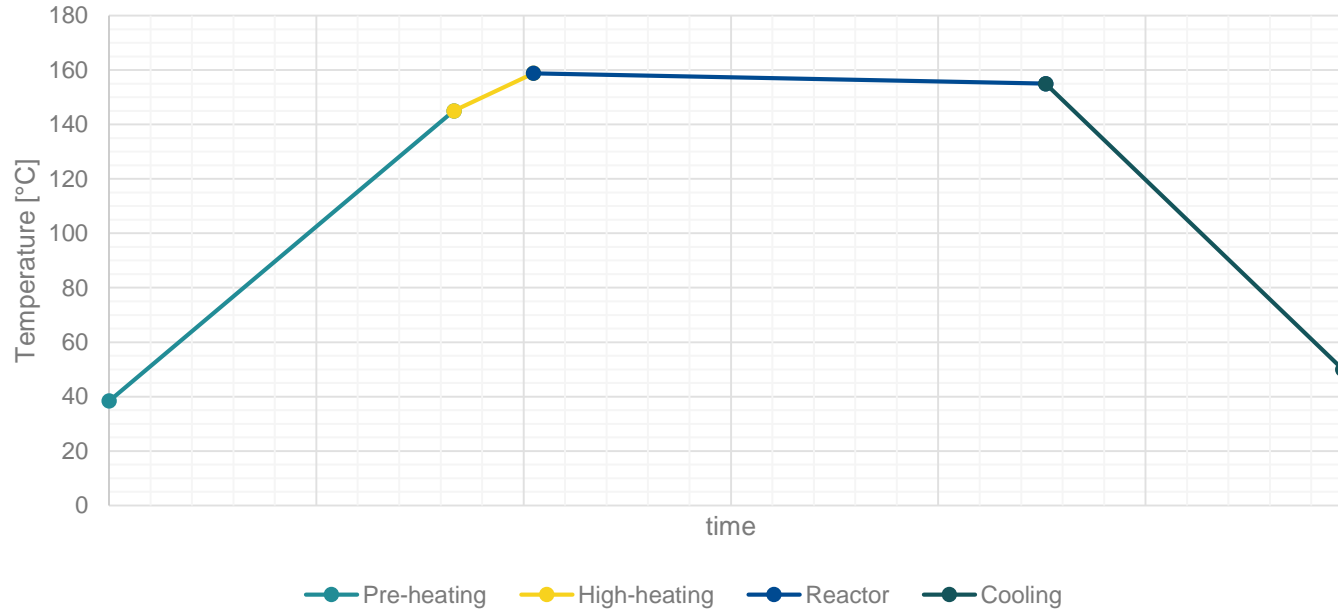


OPERATING PRINCIPLE

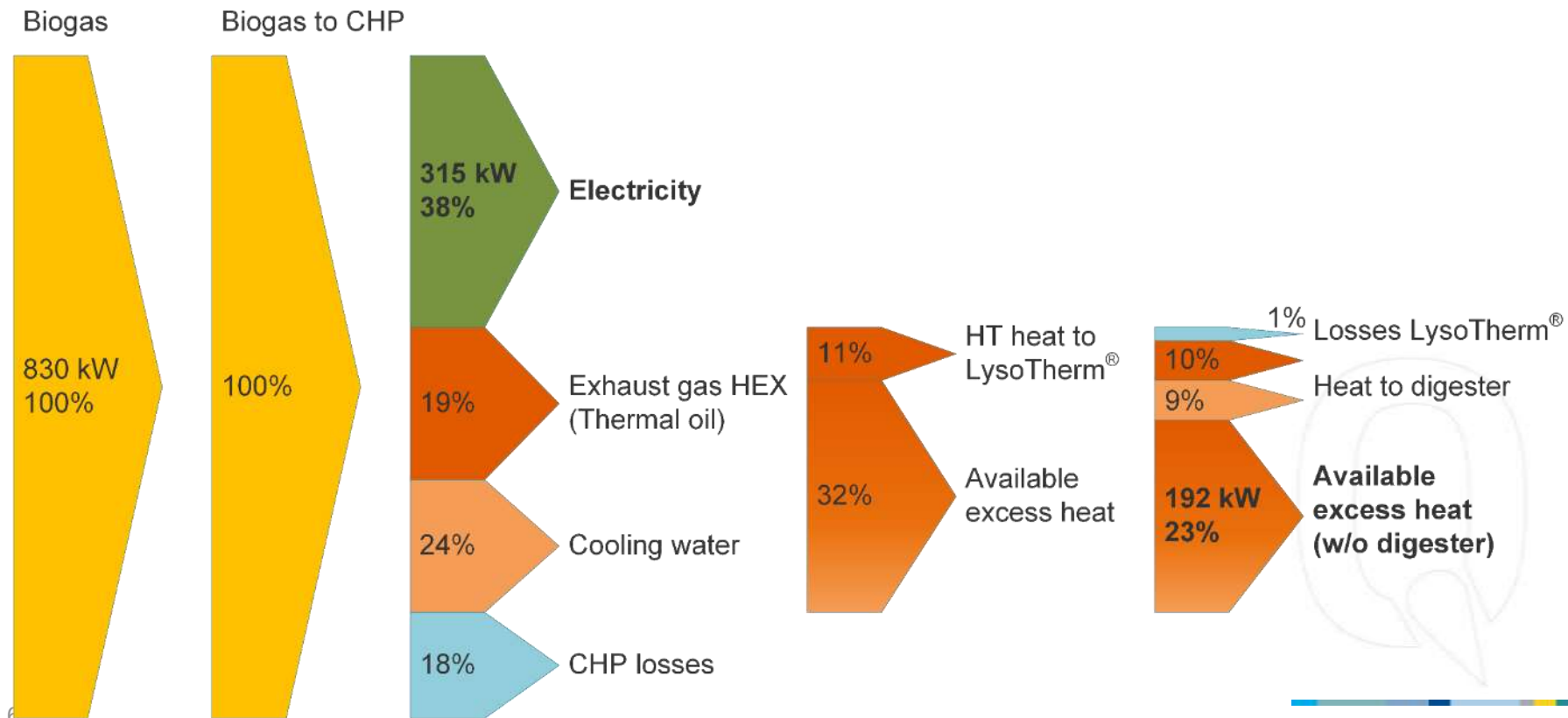


OPERATING PRINCIPLE

LysoTherm®: Temperature as a function of time



SANKEY DIAGRAM LYSO THERM[®]



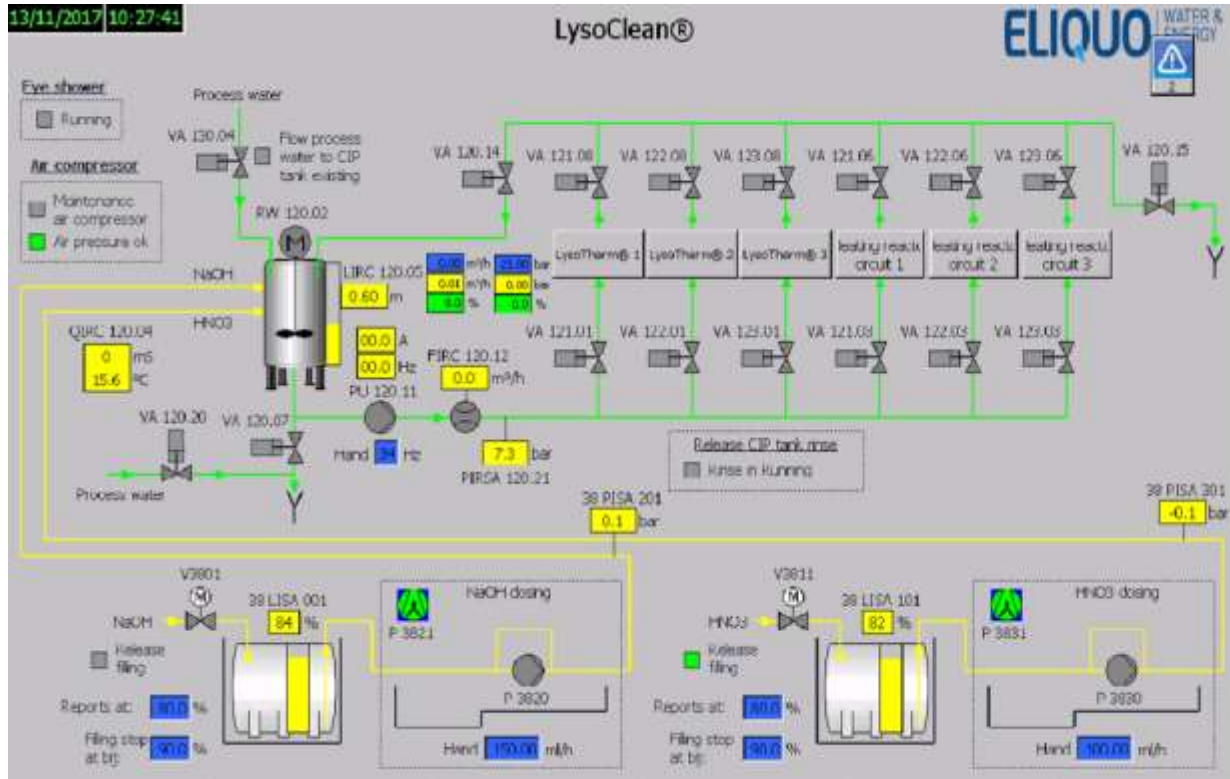
SPECIAL FEATURES



Optimal operating conditions, such as **low temperature delta** between sludge and heating medium, prevent baking



SPECIAL FEATURES

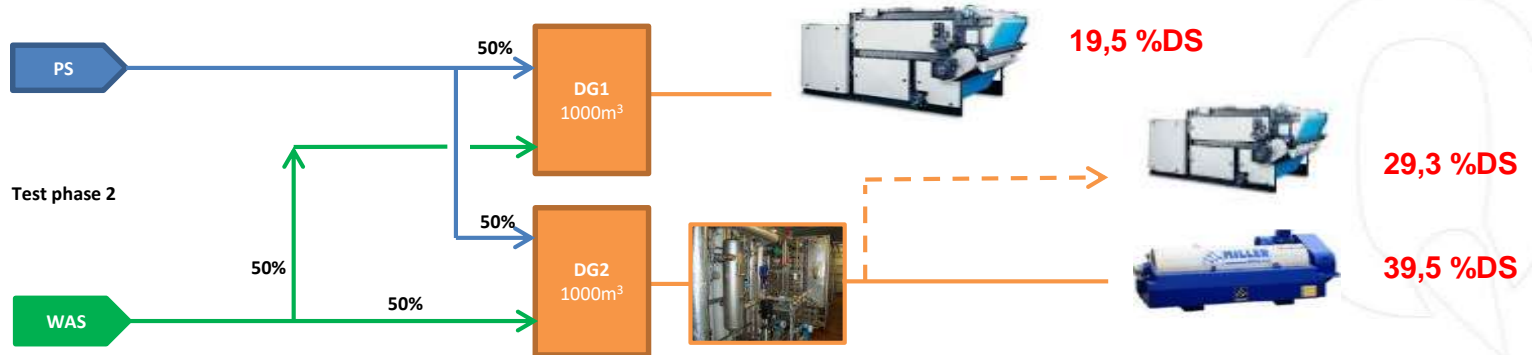
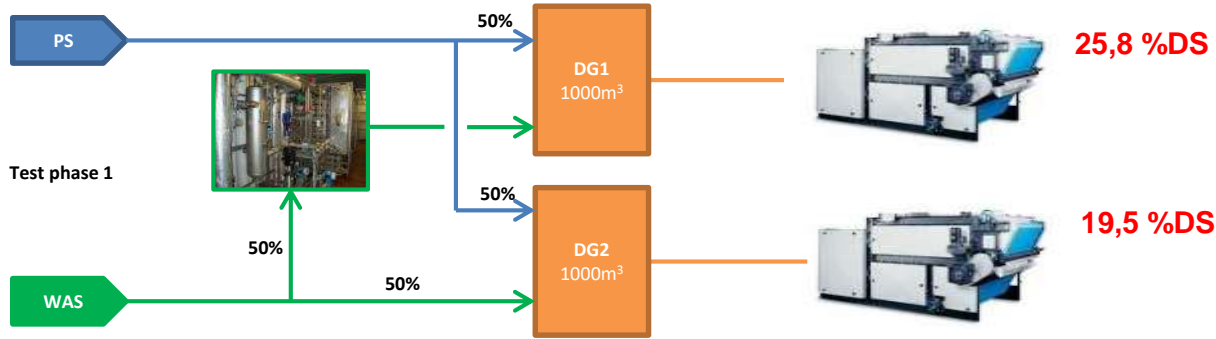


Daily Water Rinse

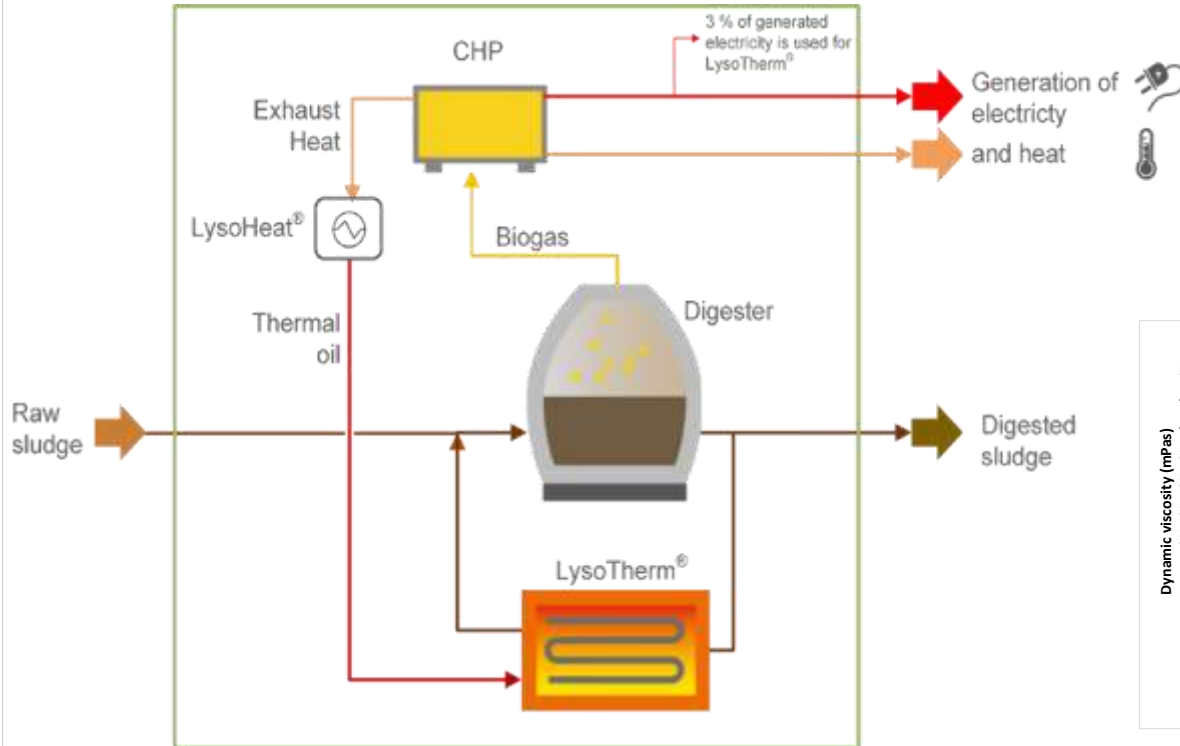
Monthly Chemical Cleaning

CONFIGURATIONS

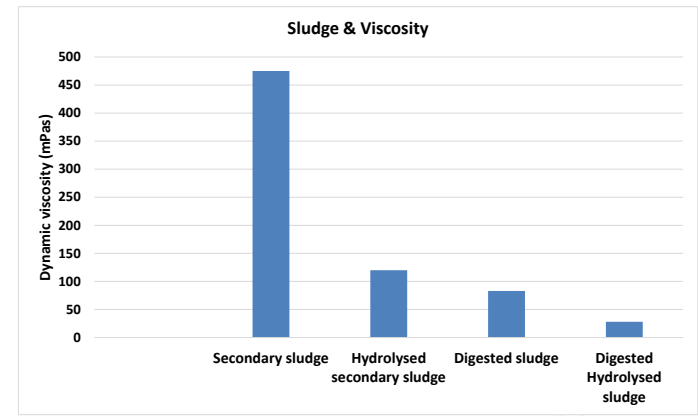
wwtp Stockach (DE)



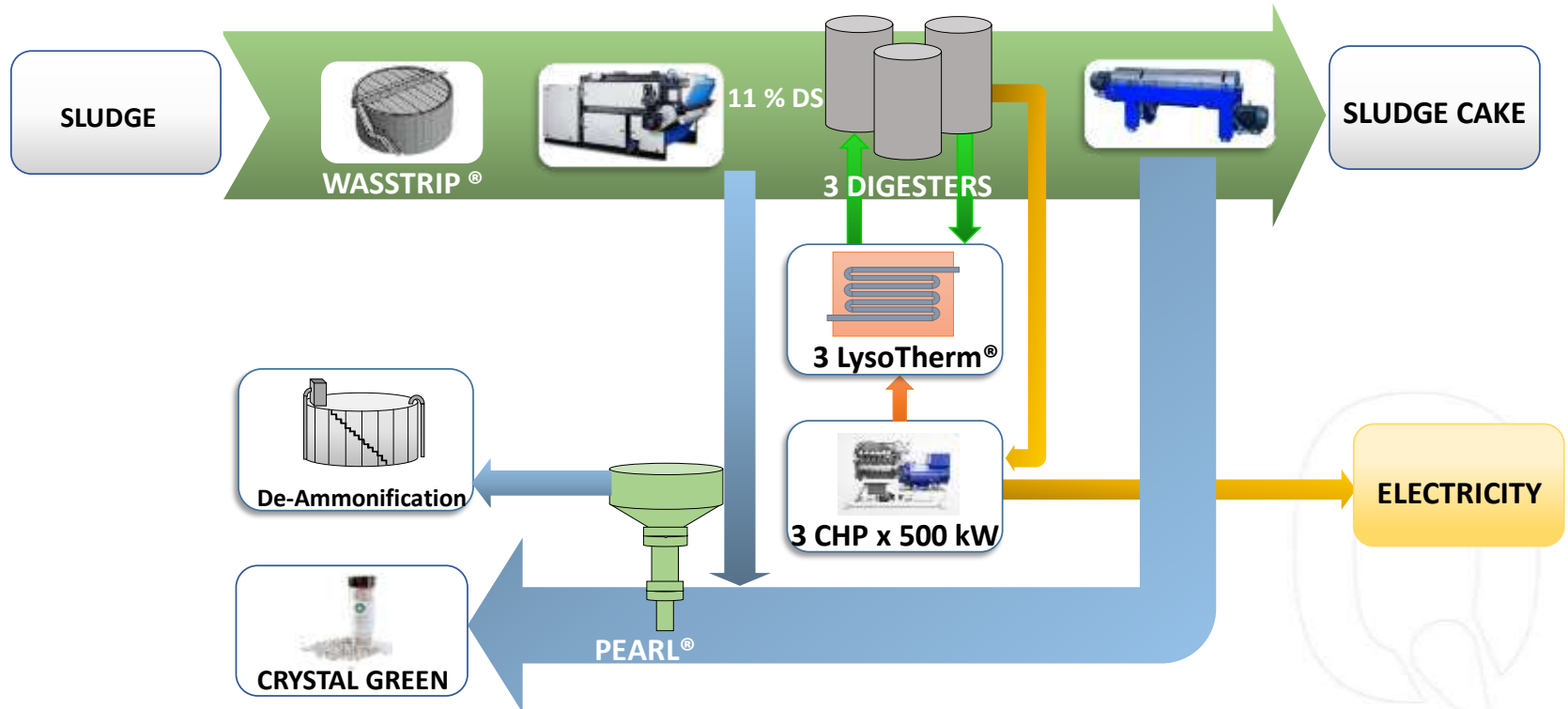
LOOP CONFIGURATION



- Operational stability and system reliability
- Doubling of treatment capacity



LOOP CONFIGURATION AMERSFOORT WWTP

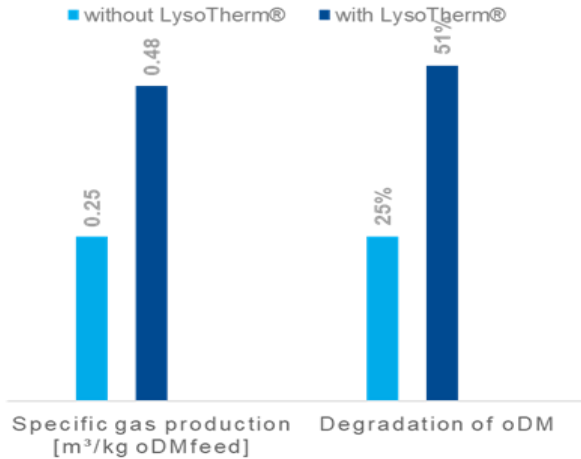


OFF SITE MANUFACTURING ON SITE INSTALLATION



LysoTherm®

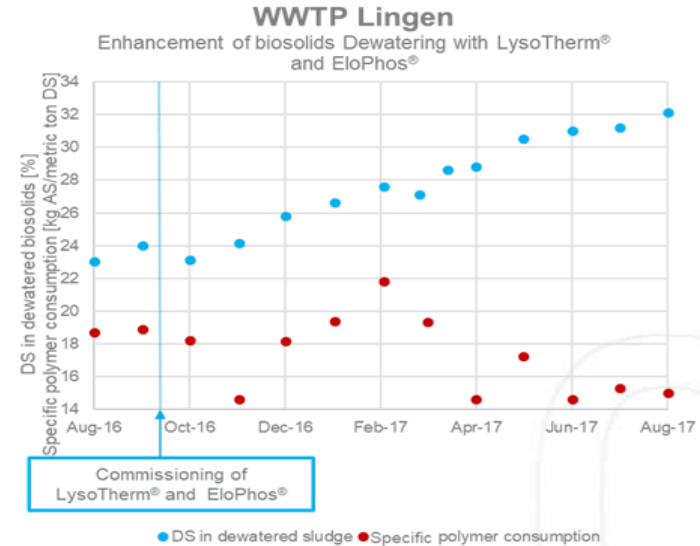
WWTP Lingen
Thermal hydrolysis of waste activated sludge



LysoTherm®



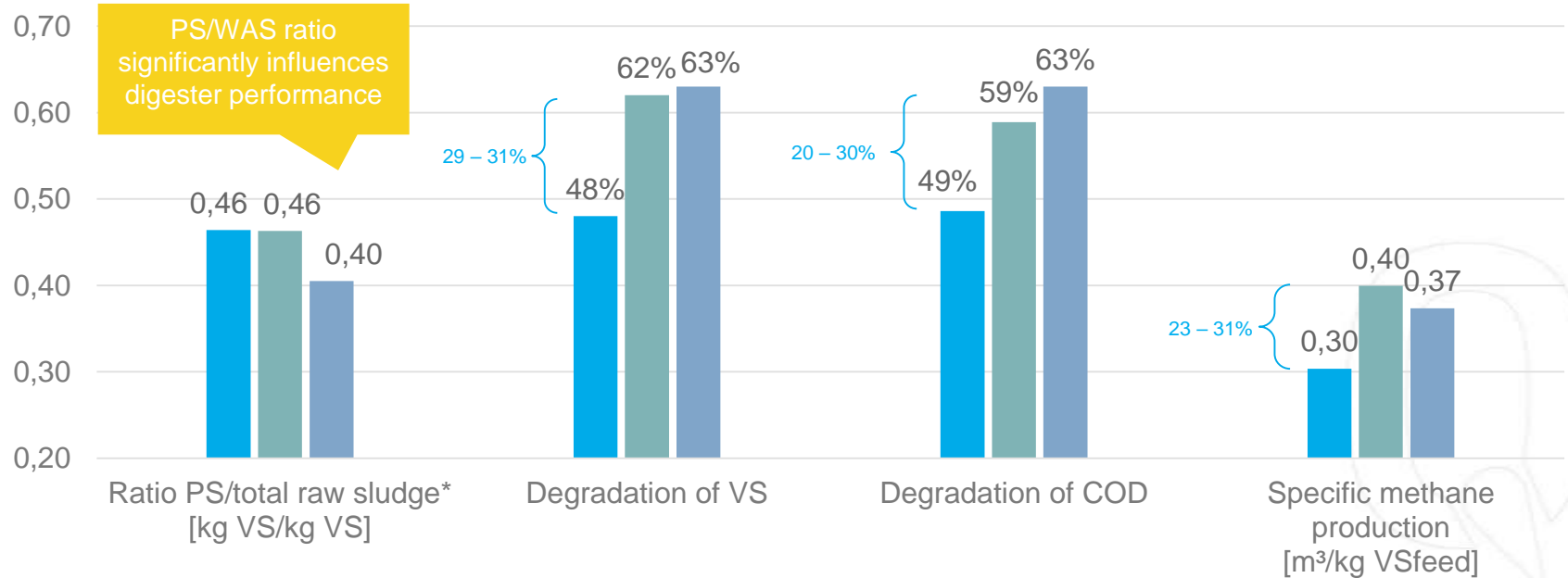
EloPhos®



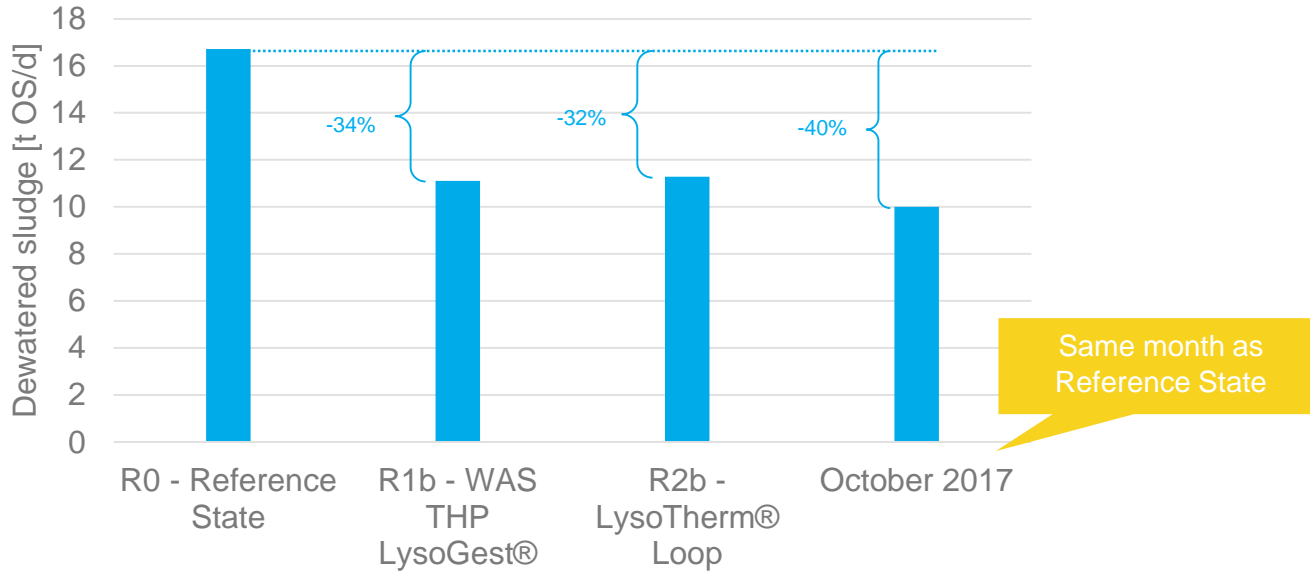
- Approx. 10%-points improvement in dewatering
- 20% savings from polymer consumption
- Doubling of VSR and Biogas yield from WAS digestion

VSR and Gas production WWTP Lingen

- R0 - Original State
- R1b - WAS THP LysoGest®
- R2b - LysoTherm® Loop



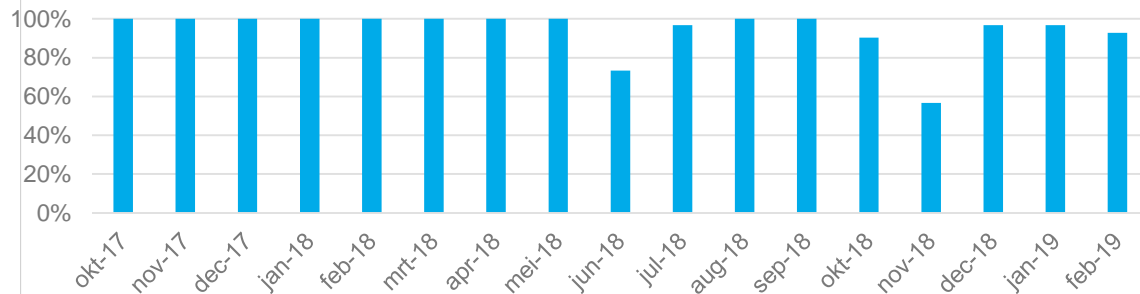
Disposal quantity based on VSR and Dewatering Results



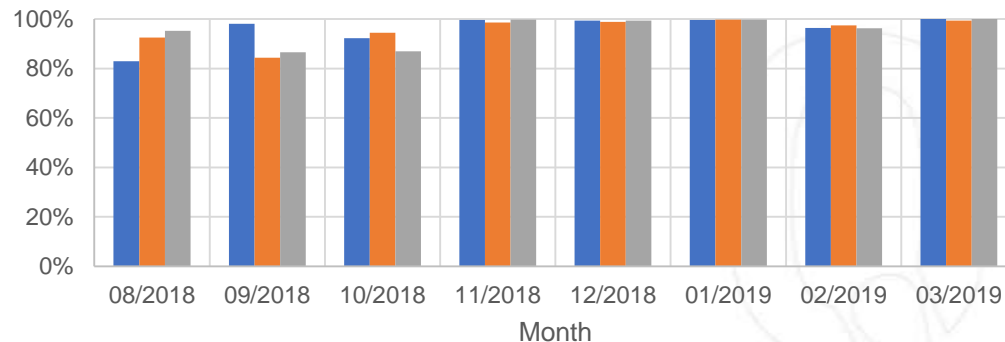
*) The specific raw sludge load changed in time. Therefore the savings were calculated based on the raw sludge load from the Reference State and VSR/Dewatering results from the corresponding measuring periods.

LYSOTHERM AVAILABILITY

Lingen



Amersfoort



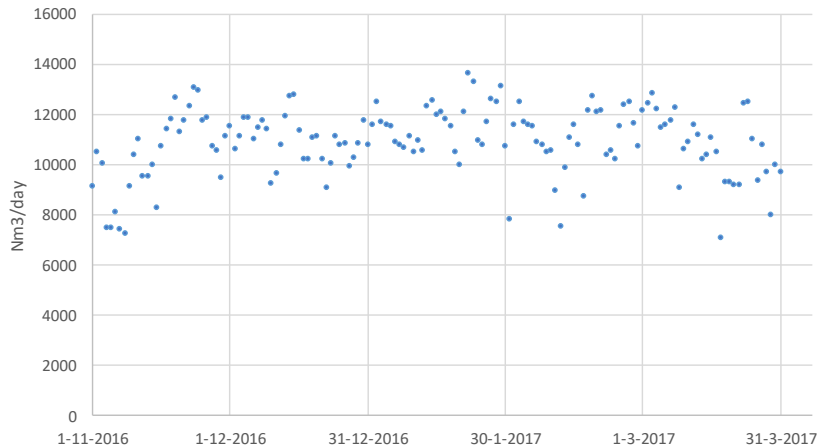
■ LysoTherm® #1 ■ LysoTherm® #2 ■ LysoTherm® #3

MAINTENANCE

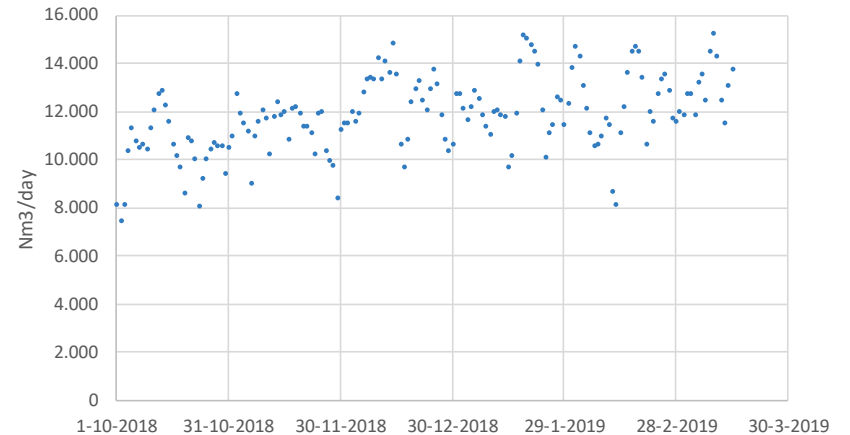
- ◉ Standard equipment
- ◉ Sludge pump on “cold side” at conventional conditions
- ◉ Automatic cleaning in place (CIP)
- ◉ Recommended spare parts in stock
 - Regular wear&tear parts (seals, rotor, stator) of rotating equipment (feed pump, CIP pump, thermal oil pump)
 - Gaskets for HEX
 - Instruments: supplier recommendations
- ◉ No maintenance requirement on a daily/weekly/monthly basis
- ◉ No planned annual planned shutdown
- ◉ Visual inspection (walk around) on daily basis
- ◉ Every 4-5 years inspection of HEX pipes



Biogas production winter 2016/2017

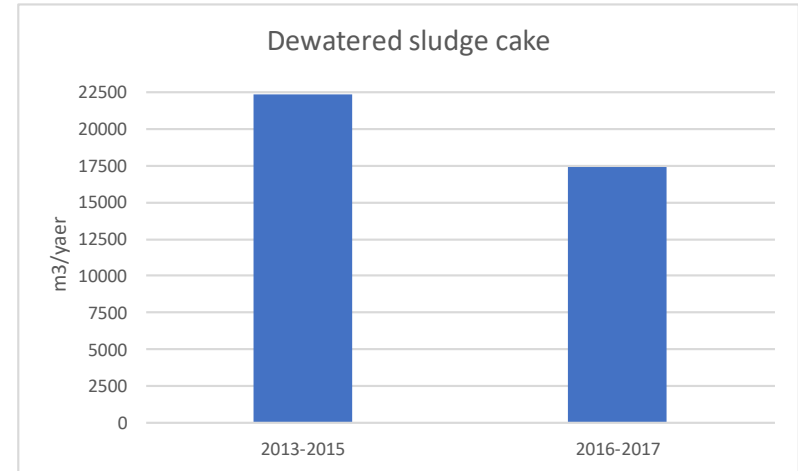
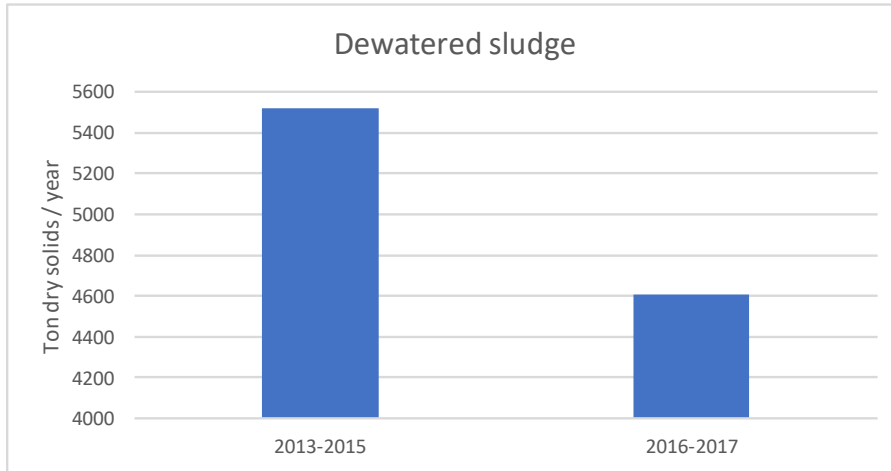


Biogas production winter 2018/2019

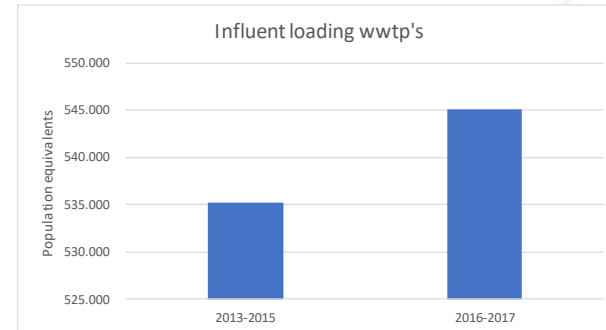


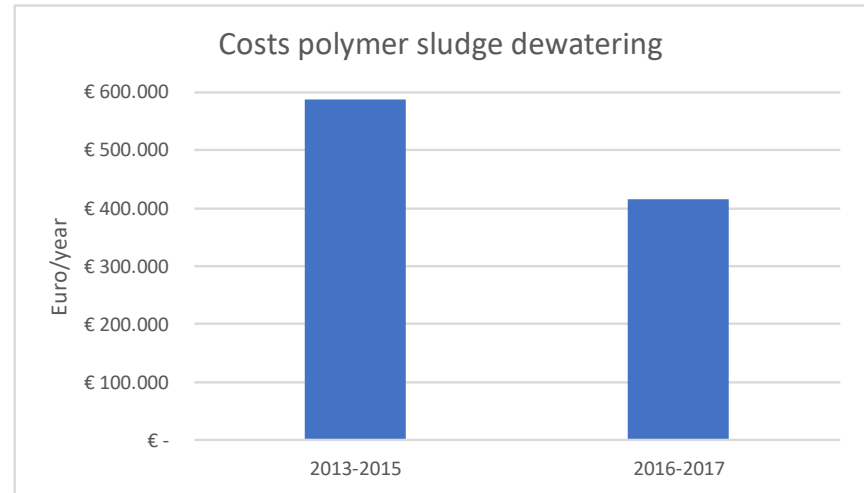
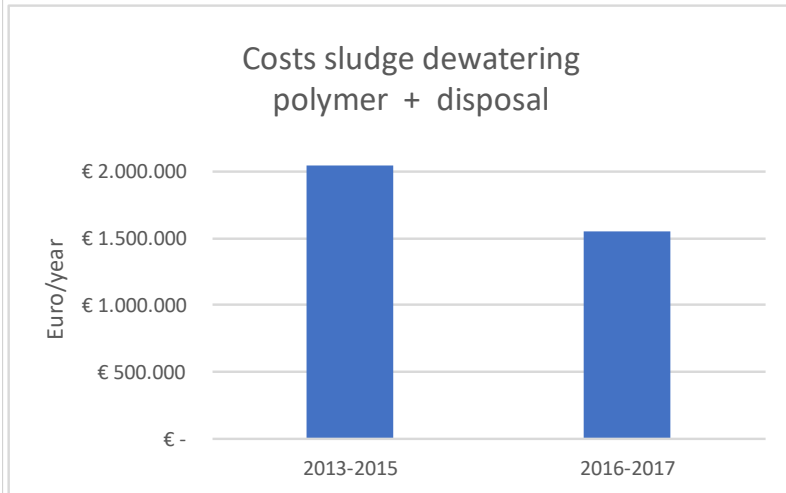
 In winter 2016/2017 & 2018/2019 digesters at design loading: average 30 ton ds/day

PERFORMANCE AMERSFOORT WWTP



- 📍 17% reduction of dry solids in dewatered sludge
- 📍 VS-reduction 60% at 15 days sludge age
- 📍 At similar influent loading wwtp's

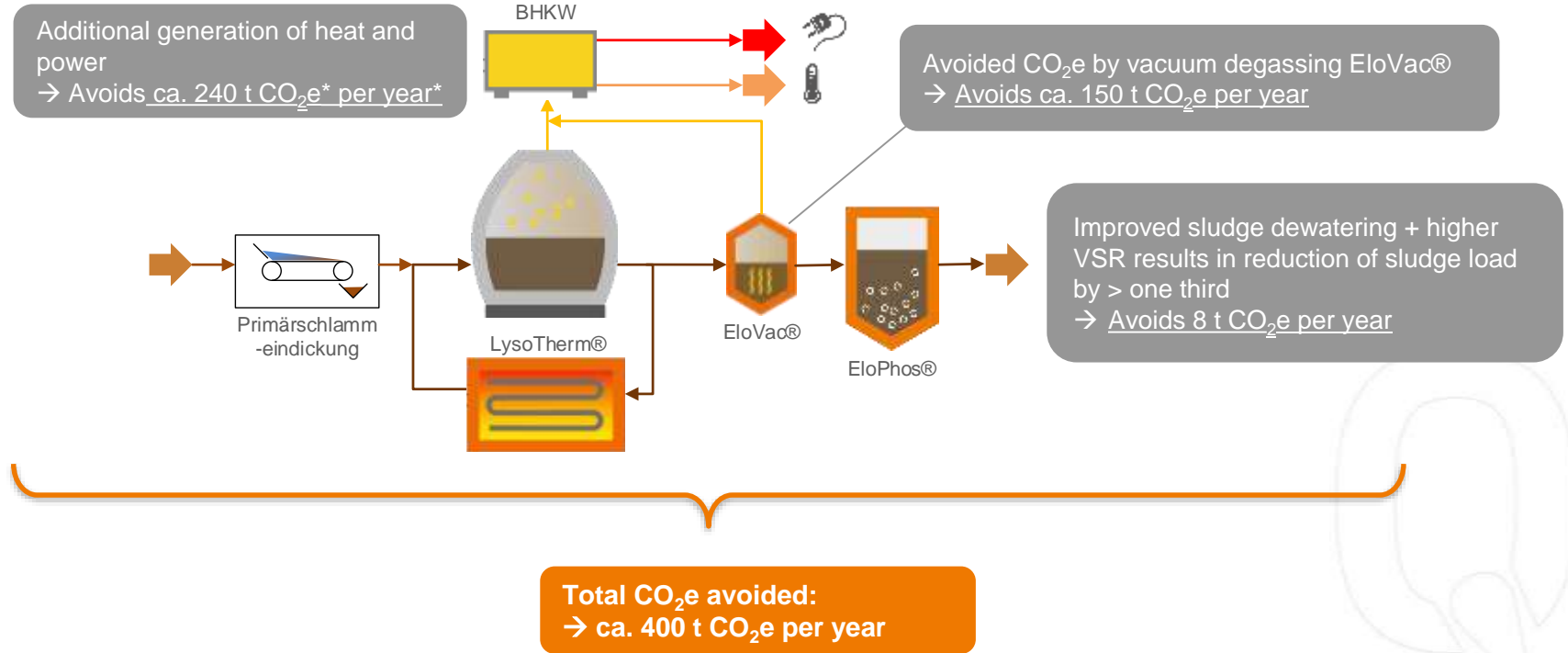




- Optimum between:
 - % Dry solids dewatered sludge
 - Polymer demand
 - Centrate quality (Pearl performance)

25% cost reduction

CARBON FOOTPRINT

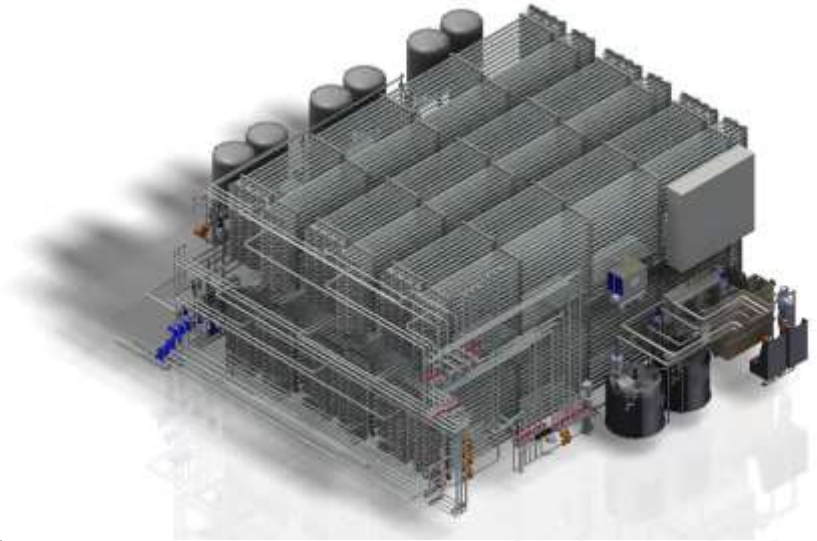


*) Incl. dosing of Co-Substrate



That corresponds to the distance in car-km from the North Cape to Gibraltar – there and back – every day.

LYSOTHERM & TORWASH



From pilot to full scale demo (?)



4. BEST SUITED TO

