



FISH WASTE FOR PROFIT

From Fish Waste to Energy and Organic Fertilizer



10th June 2022 Dr. Arne Hj. Knap, Sterner AS





From single components to complete turnkey facilities within
TECHNOLOGY FOR CLEAN WATER





WHAT IS SLUGDE FROM A FISH PLANT?

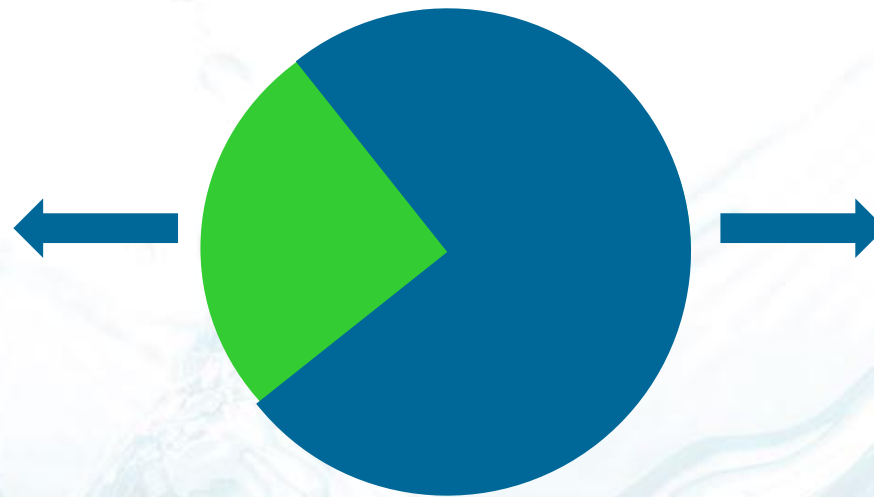
20-40% Non-organic Fertilizer

- Phosforus 1.4%
- Nitrogen 7%
- Potassium 0.7%

Fertilizer value



BIOGAS PROCES CONVERTS ORGANIC NITROGEN (PROTEIN/AMINO ACIDS) TO INORGANIC NITROGEN (AMMONIUM)



60-80% organic Energy

- Calorific value ca. 4 kWh/kg DM

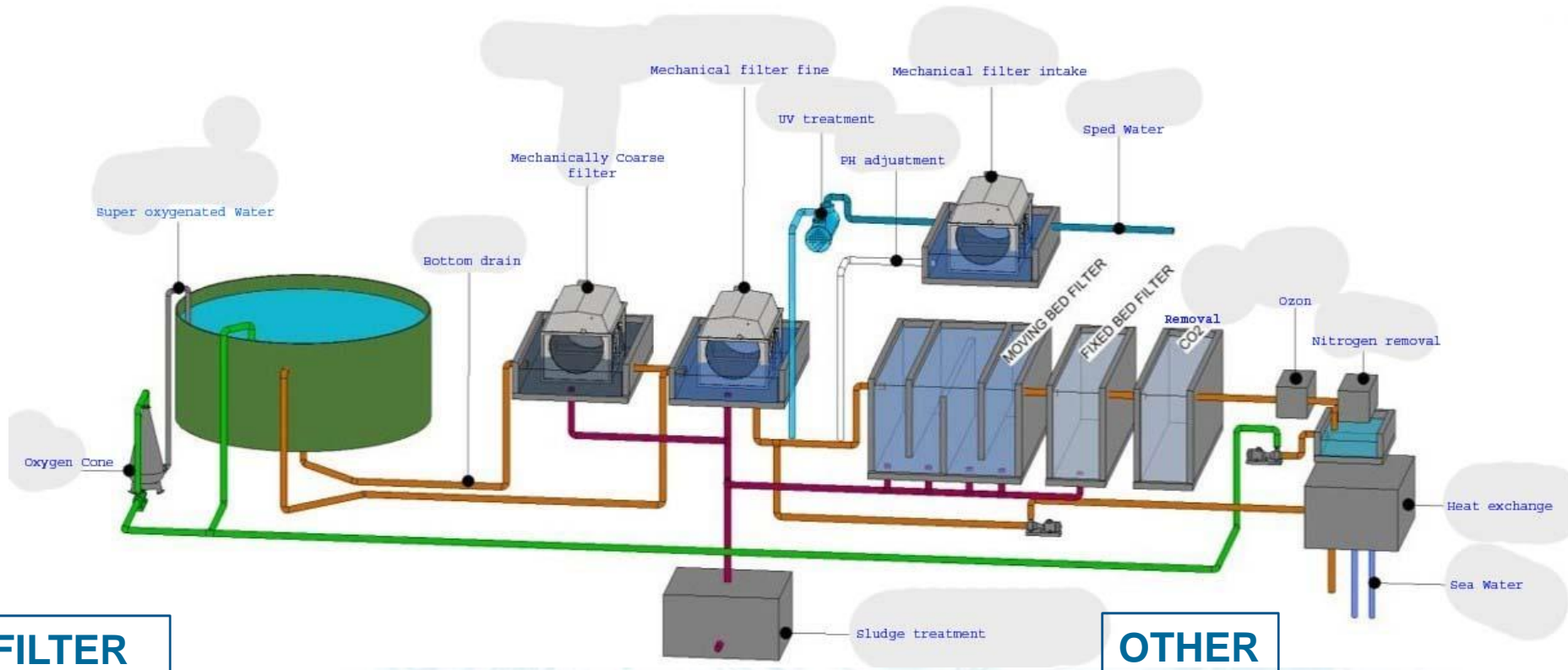
Energy value



BIOGAS PROCES «UTILIZE» 70 – 80%% OF THE ORGANIC FRACTION



WHERE IS SLUDGE GENERATED?



FILTER

Flushed sludge from filters
Only sludge source in a flow-through plant

OTHER

- Denitrification
- Phosforus removal
- Plate separator

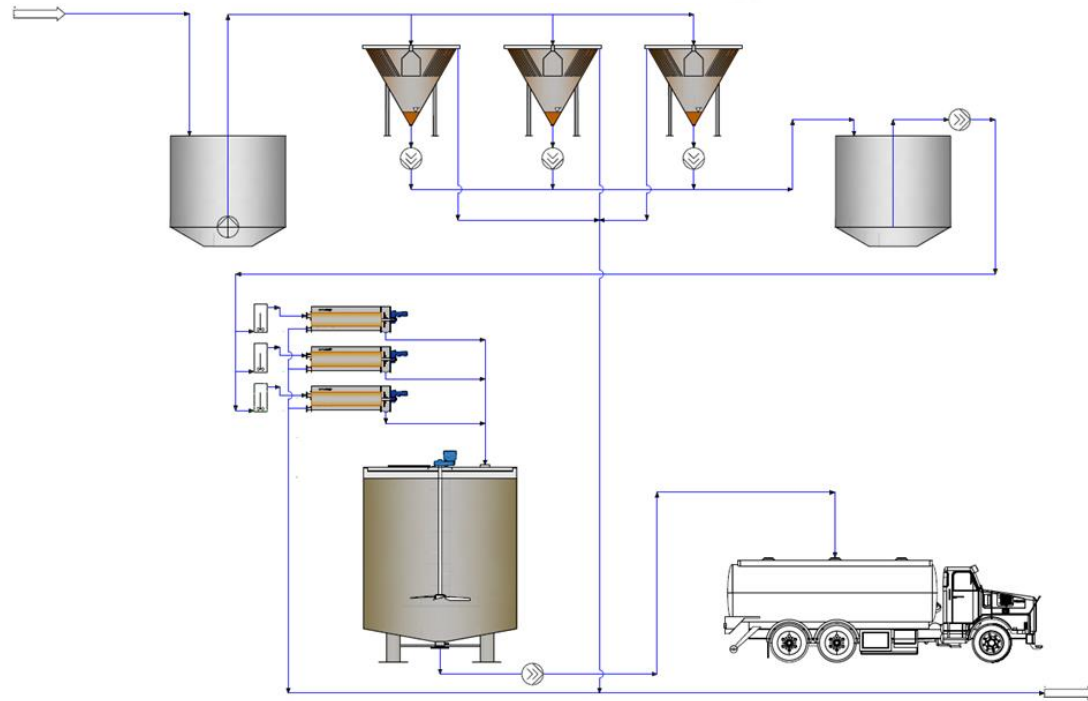
BIOSLUDGE

Biosludge comes from different processes such as MBBR, fixed bed, etc.





STERNER SLUDGE TREATMENT – MD



MECHANICAL DEWATERING

- Sludge from drum filter
- Thickening in Sterner conical lamella thickener
- Dewatering to 25-30% TS
- Special storage tank

STERNER SLUDGE TREATMENT – MDD



MECHANICAL DEWATERING/DRYING

- MD + Drying and bagging
- Dryer energy effective, uses heat pump principle
- Drying to 90-95% TS
- Used as Organic Fertilizer component



STERNER SLUDGE TREATMENT – ABR



BIOGAS, ENERGY & FERTILIZER

- Anaerobic process operates on 100% fish waste
- All energy used supplied + plenty excess energy «for sale»
- Liquid and solid digestate used for organic fertilizer production
- Used as Organic Fertilizer component

STERNER SLUDGE TREATMENT – ABR PILOT



R&D PROJECT 2014-2017

- Anaerobic process intended operates on 100% fish waste
- 2-stage «New» bioreactor technology
- Tested on site fish plant at Smøla, Norway
- Successful development

STERNER SLUDGE TREATMENT – ABR FULL SCALE

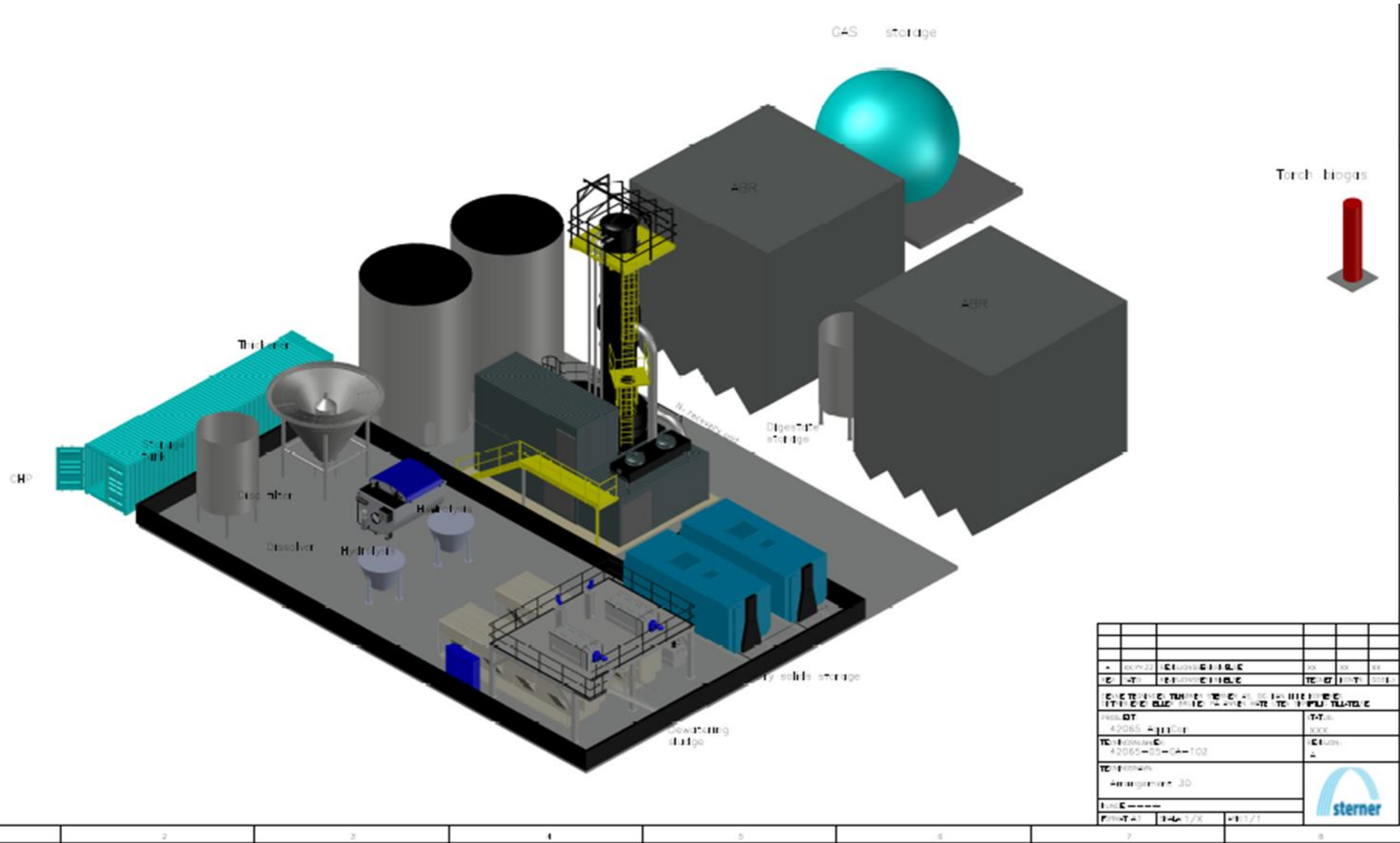


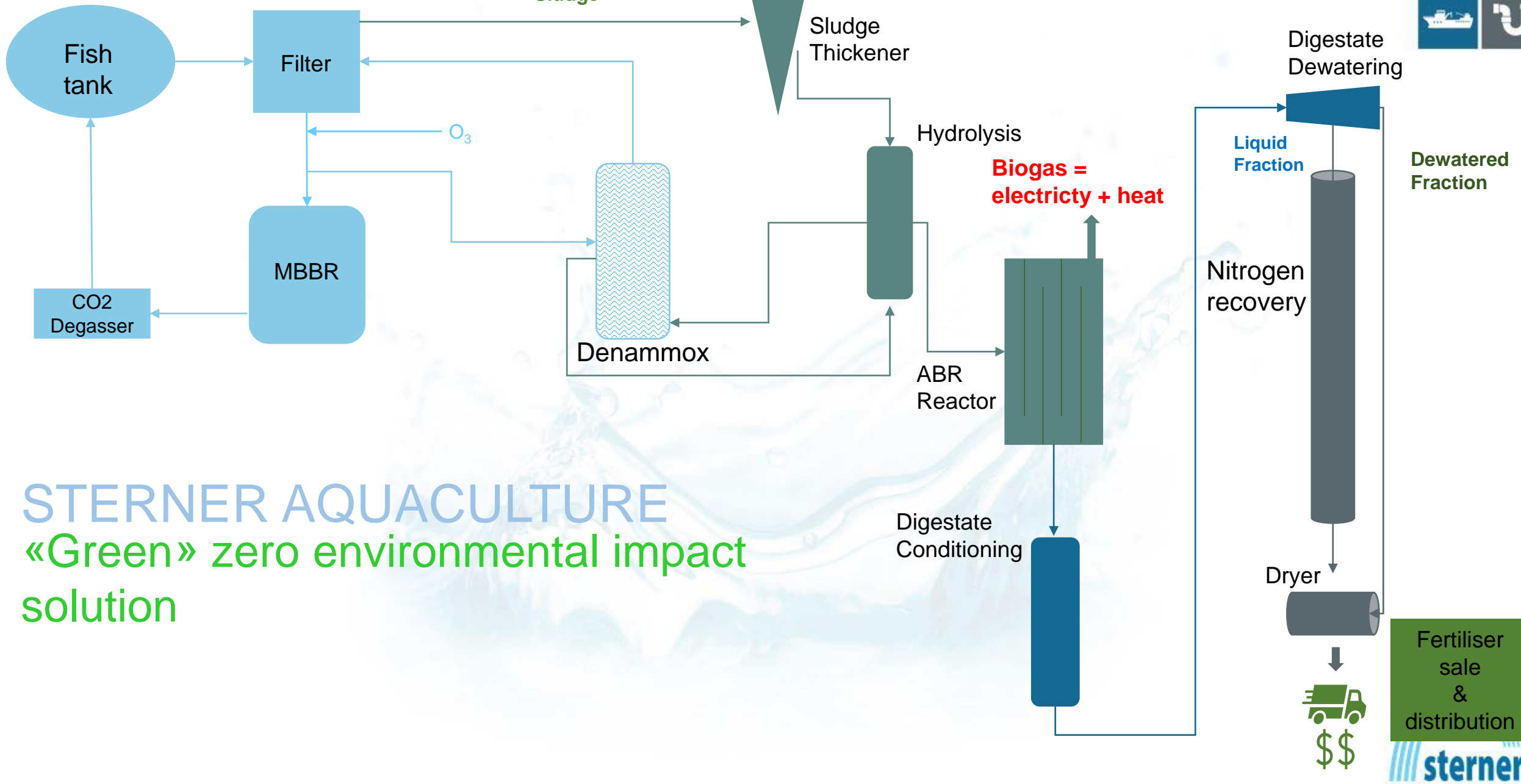
ABR CERMAQ FORSAN 2018

- 1700 tonne/yr smolt plant
- Further development of bioreactor
- Microbiological development in co-operation with IMET, The University of Maryland
- Biogas, energy use for heating, dry digestate product (fertilizer use)
- 3 year successful process optimization and operation



ABR NEXT GENERATION – 20 000 t/yr PLANT





STERNER AQUACULTURE
 «Green» zero environmental impact
 solution



Thank you! 😊

Sterner – Technology for clean water!

