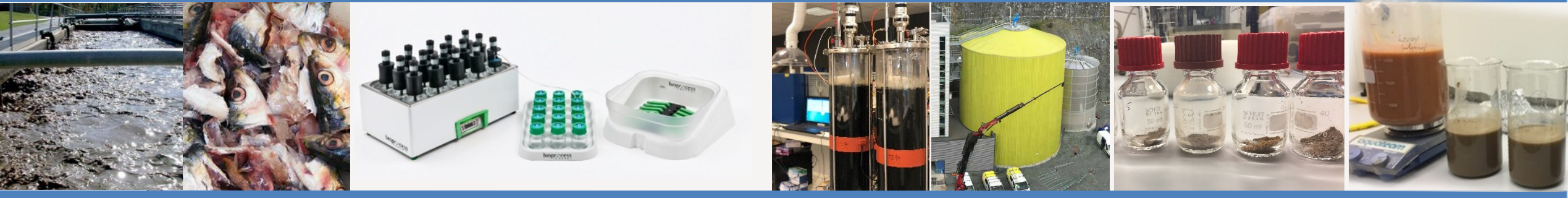


# Annual Conference of Trout Producers in Poland 11-12 October 2018



## Aquaculture – how Polish and Norwegian companies can join forces

*Beata Szatkowska*  
*Renata Tomczak-Wandzel*

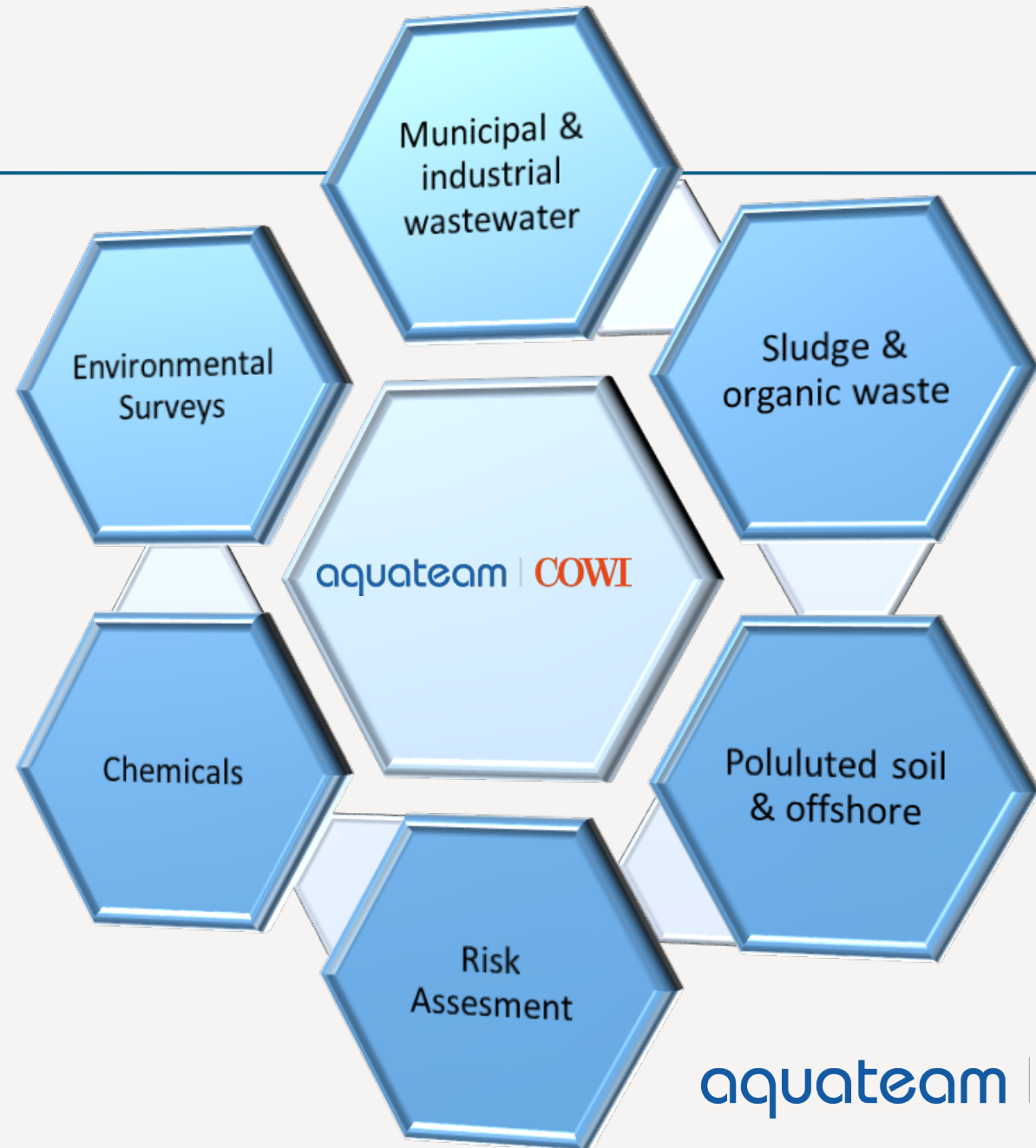
# Aquateam COWI AS

- Independent consultancy and R&D
- 34 years experience
- Expert link in technology transfer
- Operational experience worldwide
- Recognized by authorities
- Multidisciplinary expertise
- State of the art lab and field equipment

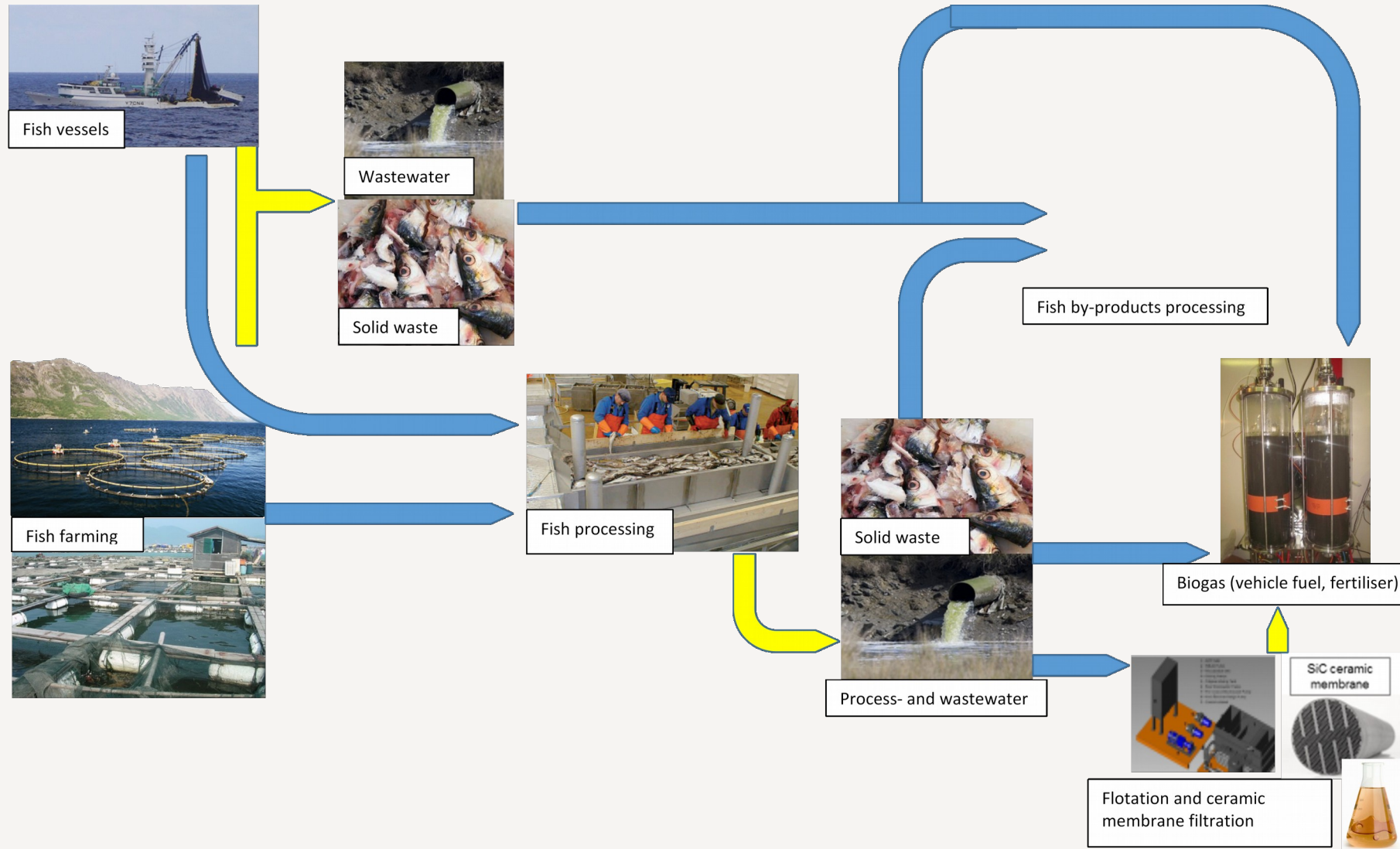


# Areas of Expertise

- > Aquaculture
- > Industrial wastewater
- > Municipal wastewater
- > Municipal drinking water
- > Algae and biofuels
- > Process microbiology
- > Contaminated soils
- > Environmental risk assessment & monitoring
- > Ecotoxicological studies
- > Chemical use in process
- > Oil & gas (PW, SW)

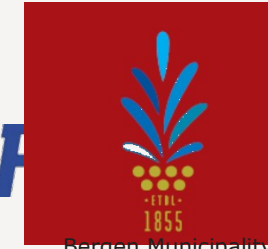


# Holistic summary of sustainable treatment of fish waste and wastewater



# Joint research projects

- > RenENER-MAR (2016-2019)

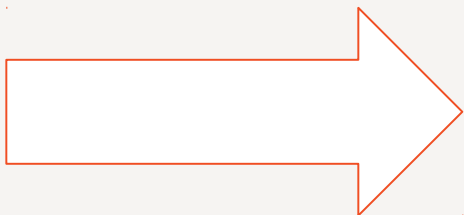


- > RESERVE1 (2017-2020)



the joint projects research on:

- > i) the possibility and effects of co-digesting waste available from the salmon aquaculture sector with regional sewage sludge.
- > ii) production of bio-resources as byproducts during the anaerobic digestion process, i.e. organic acids, plant available nutrients and clean water.



Study on co-digestion of fish sludge with regional sewage sludge

# Methods & Materials



The Automatic Methane Potential Test System (AMPTS) II © Bioprocess Control AB, SE.

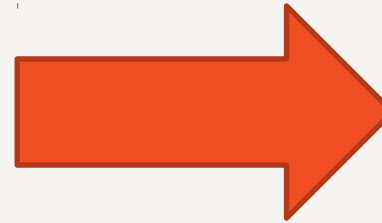
BMP trials on co-digestion mixtures with different:

- fish sludge,
- sewage sludge,
- ratio sewage/fish sludge
- temperatures

Characterisation of substrates, and digestates after BMP trials

(APHA, 1992; ICP-MS (Norwegian Standard EN ISO 17294-2) and ICP-OES (Norwegian Standard EN ISO 11885)

(Isen et al., 1954)



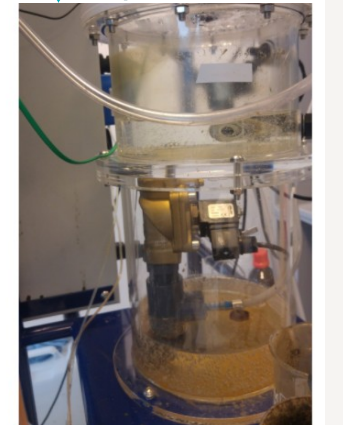
Dolly© semi-CSTR system  
(Belach Bioteknik AB, SE)

aquateam | COWI

Armfield BE4 - Anaerobic Reactor Tank



Høgskulen på Vestlandet



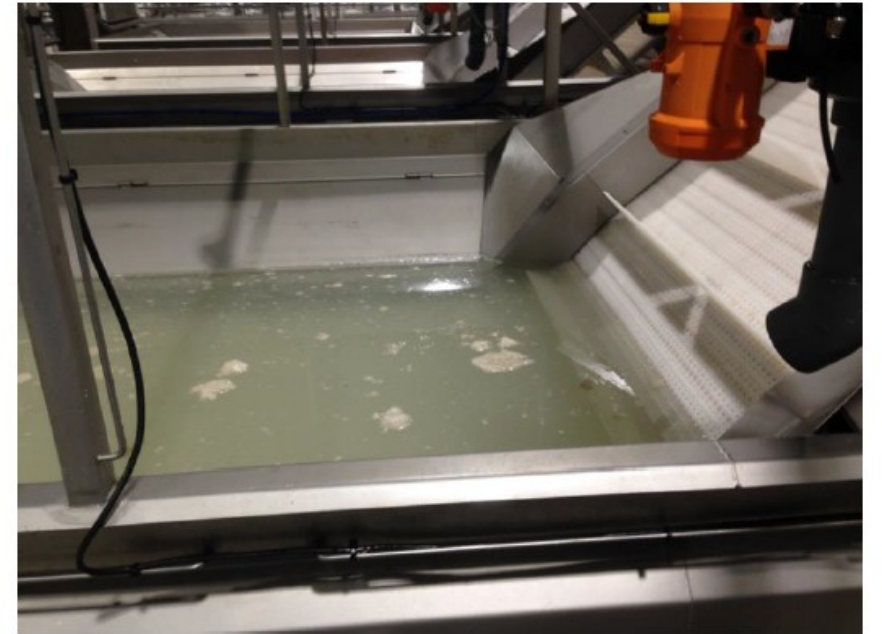
## BAT in fish processing industry

Nordic perspective

*Renata Tomczak-Wandzel, Eilen Arctander Vik  
and Tomasz Wandzel*



# BAT in fish processing industry – Nordic perspective



# WELCOME TO COOPERATION!



EILEN ARCTANDER VIK  
FORSKNINGSLEDER



RENATA TOMCZAK-WANDZEL  
SENIORFORSKER



SUBHASH SRIKANTHA  
RATHNAWEERA  
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ESTEVEZ  
SENIORFORSKER



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