
Happy 25th anniversary, EFTCO!

AAQUA

by AQUAPROX

Water reuse in the tank cleaning sector: past, present and future

May 30th 2024, Brussels

EFTCO 25th anniversary

Rob Van den Broeck – AAQUA


Nederland
Den Haag
Utrecht
Arnhem
Münst
Rotterdam
E31
E311
E25
43
1
3
57
Dortmund
Eindhoven
Essen
52
Düsseldorf
46
3
Brugge
Antwerpen
Aaqua
E40
Gent
Calais
A16
Duinkerke
E313
E25
61
Keulen
E403
Brussel
E314
44
4
A16
A26
A25
E40
Aken
Bonn
Rijsel
Luik
E42
E42
E19
België
A16
Charleroi
Kobl
Arras
E42
E25
A1
A2

What does AAQUA do?

- Waste water treatment plants
- Design & construction
- Automation
- Follow-up & support
- Only for industry
- On demand & tailor-made

AAQUA NV – history

- 1999: foundation of AAQUA - waste water treatment technology
- 2015: first water reuse in cattle slaughterhouse (drinking water quality)
- 2016: move to Sint-Katelijne-Waver
- 2016: member of the Aquaprox group
- 2017: acquisition of Interindus (process water treatment)
- 2019: first water reuse in tank cleaning drinking water quality
- 2020 – 2024: strong growth
- 2024: 100th reference in tank cleaning

AAQUA & tank cleaning

- 25 years of experience in tank cleaning
- No-nonsense approach: *we make our designs as simple as possible and only as complicated as needed*
- >100 references in tank cleaning worldwide
- >10 installations in tank cleaning reuse

Overview of the presentation

- Looking back 5 years ago
- Current state of water reuse
- Future trends and innovations
- Key takeaways

Looking back 5 years ago

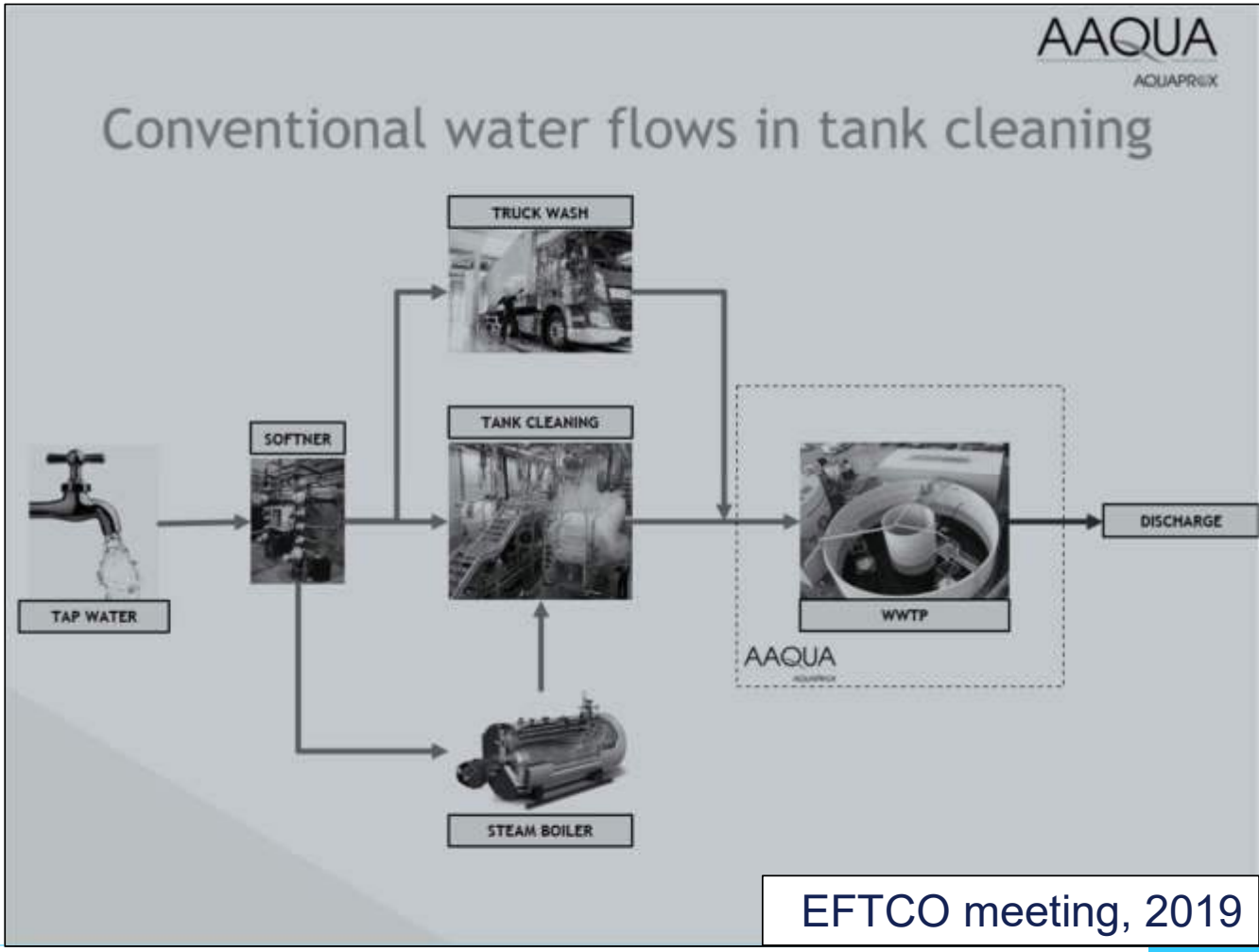
Looking back 5 years ago

Importance of water for the tank cleaning sector

- Most important resource in tank cleaning
- Large quantities: 1 – 4 m^3 /truck
- High quality
  - Soft water (tank cleaning, truck wash)
  - Drinking water quality (tank cleaning (food))
  - Low salt concentration (tank cleaning, steam boilers)
- Temperature
  - Cold (20-30%)
  - Warm (70-80%)

Looking back 5 years ago

- Water source: tap water / well water / surface water
- Process water treatment: softening
- WWTP: treatment for discharge
- Single – linear use



Looking back 5 years ago

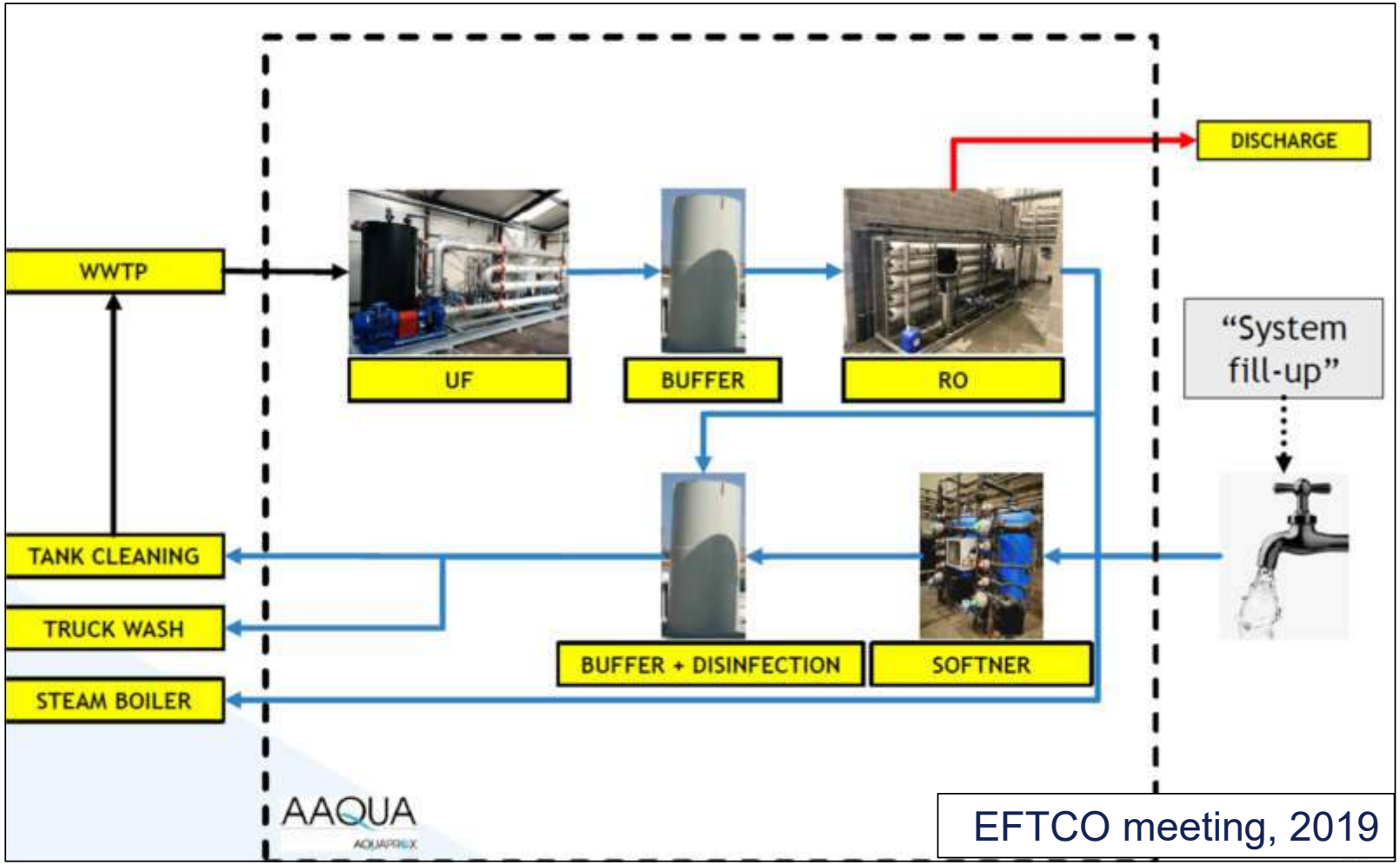
The future 5 years ago

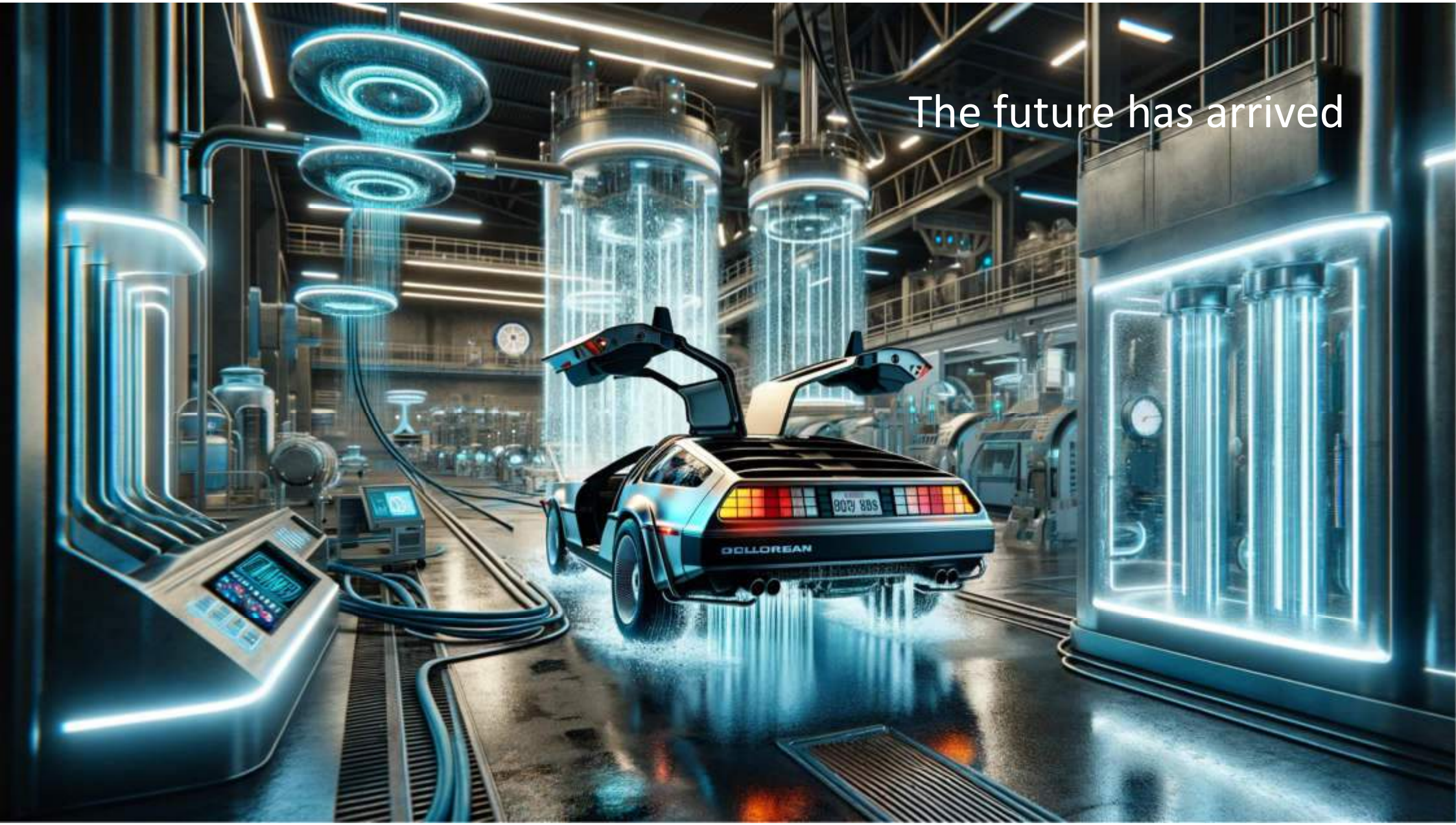
- Water source: tap water / well water / surface water / wastewater
- Process water treatment: softening -> limited softening

- WWTP: treatment for discharge -> treatment for reuse

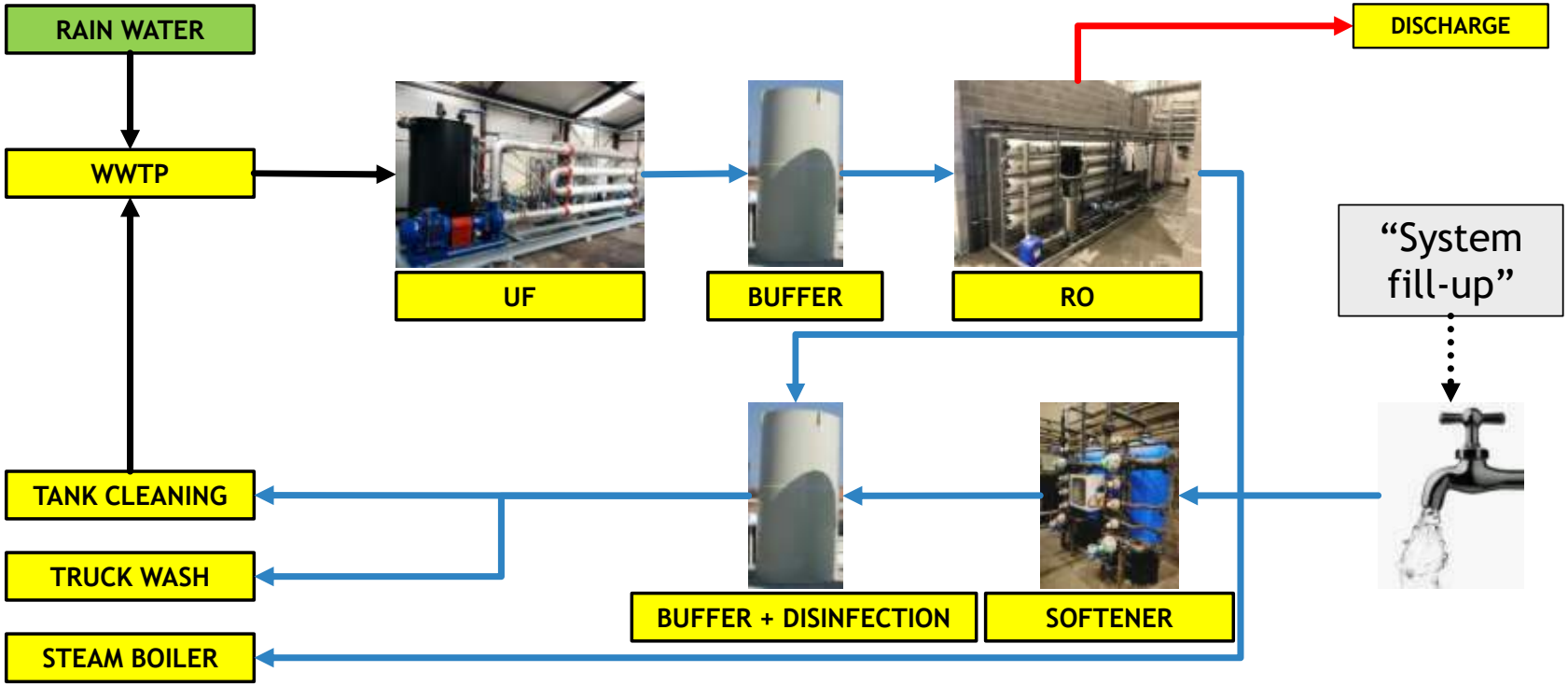
- Single – linear use -> circular use

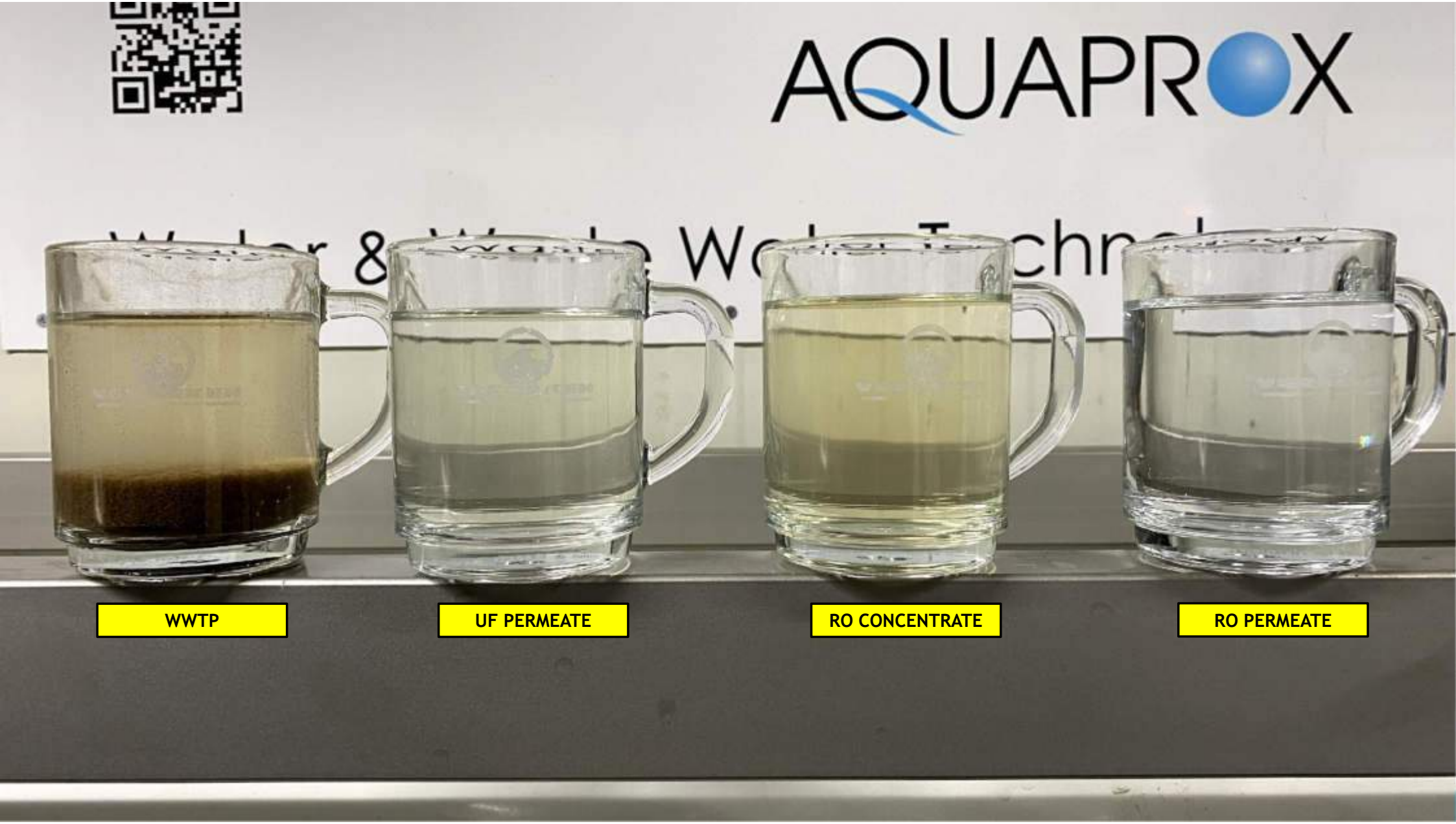
The future 5 years ago…




The future has arrived
DELLOREAN

Current state of water reuse




AQUAPROX
WWTP
UF PERMEATE
RO CONCENTRATE
RO PERMEATE

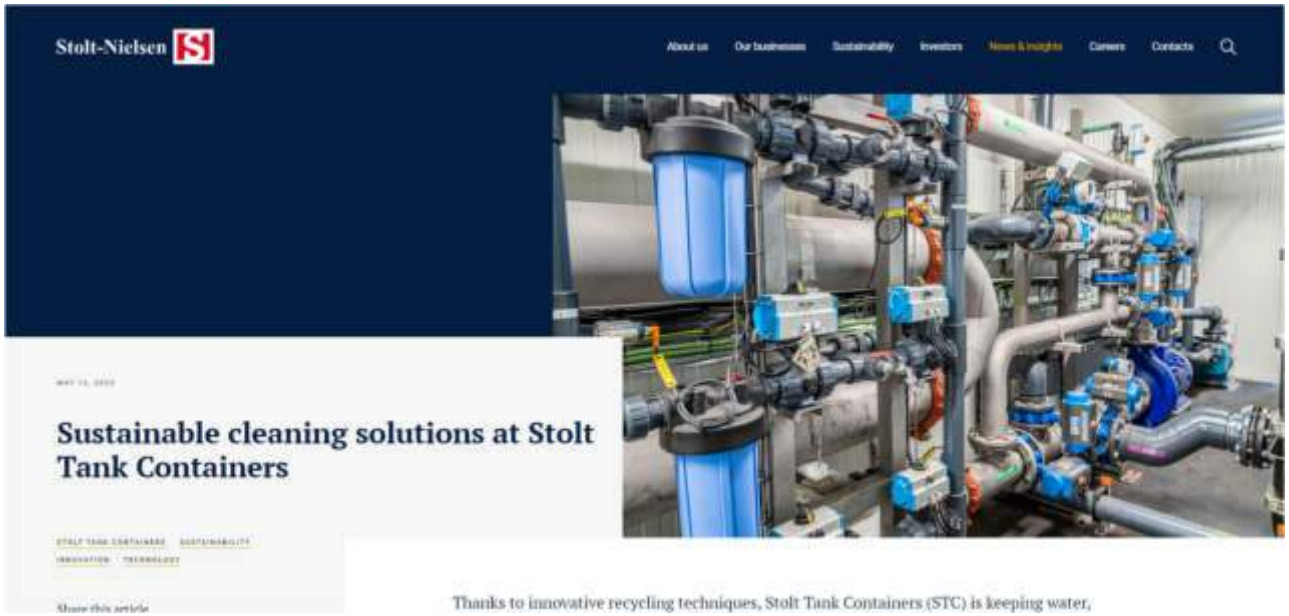
Benefits of water reuse in tank cleaning

- ↓ Fresh water intake (50 – 80%)
- ↓ Cost for softening (50 – 80%)
- ↓ Cost for heating (typically 10-15°C -> 11-17 kWh/m^3)
- ↓ Blowdown on the steam boiler
- ↓ Discharge volume

Benefits of water reuse in tank cleaning

CASE – STOLT TANK CONTAINERS (NL)

- ↓ Fresh water intake -70%
- ↓ Cost for softening -70%
- ↓ Cost for heating (12°C) -13.9 kWh/m^3
- ↓ Discharge volume -70%
- ↓ Detergents and additives -2000 kg/y
- ↓ Carbon dioxide -37.000 kg/y



https://www.stolt-nielsen.com/news-insights/news/sustainable-cleaning-solutions-at-stolt-tank-containers/

Benefits of water reuse in tank cleaning

CASE – VERBEKEN (BE)

- ↓ Fresh water intake (-70%)
- ↓ Cost for softening (-70%)
- ↓ Cost for heating (16°C -> -18.6 kWh/m^3)
- ↓ Discharge volume (-70%)

Benefits of water reuse in tank cleaning

CASE – VERBEKEN (BE)

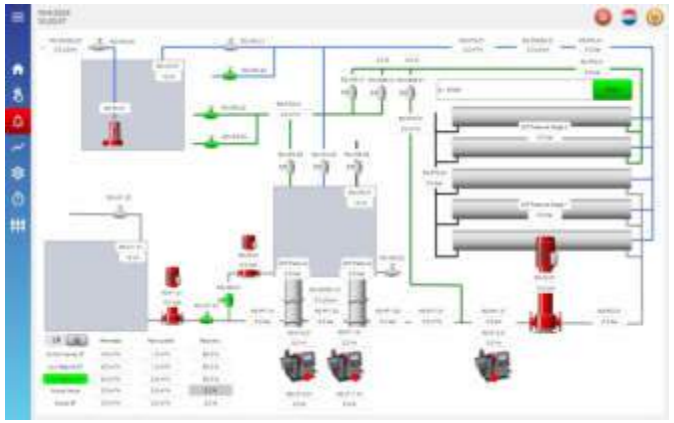
- ↓ Fresh water intake (-70%)
- ↓ Cost for softening (-70%)
- ↓ Cost for heating (16°C -> -18.6 kWh/m^3)
- ↓ Discharge volume (-70%)

- ↑ Beer +2.500 L

Challenges and barriers

Permeate quality

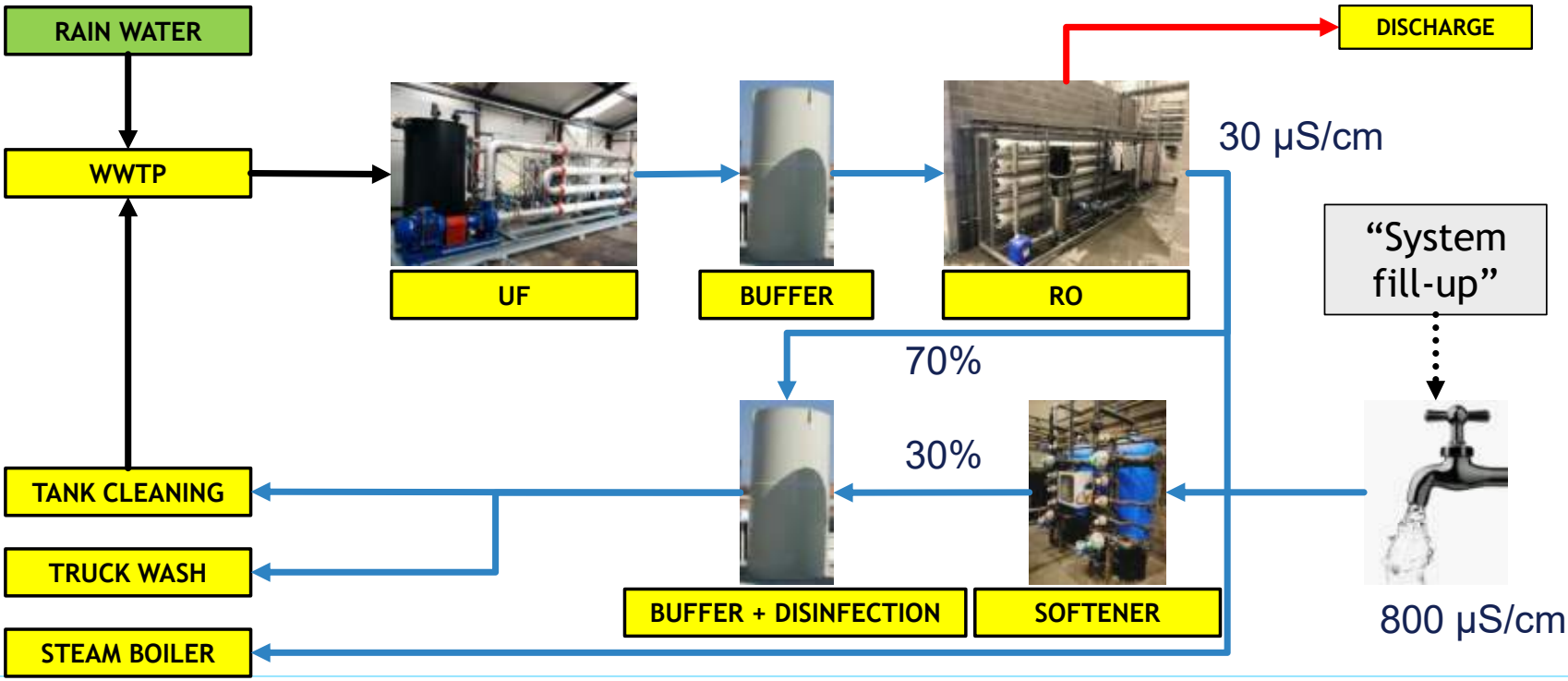
- Online monitoring (+ automation!)
- Offline monitoring
- Integration in HACCP
- Social acceptance
  - Food -> food = OK
  - Chemicals -> chemicals = OK
  - Chemicals/food -> chemicals = OK
  - Chemicals -> food = concerns, while no technological issue



Challenges and barriers

Concentrate

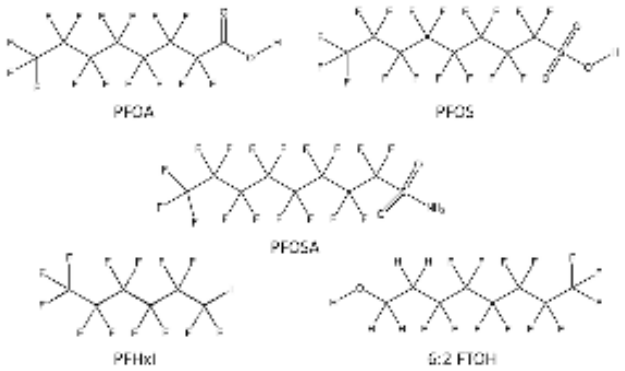
- Increased salt concentration (mg/L) in the discharge vs lower load (kg/d)



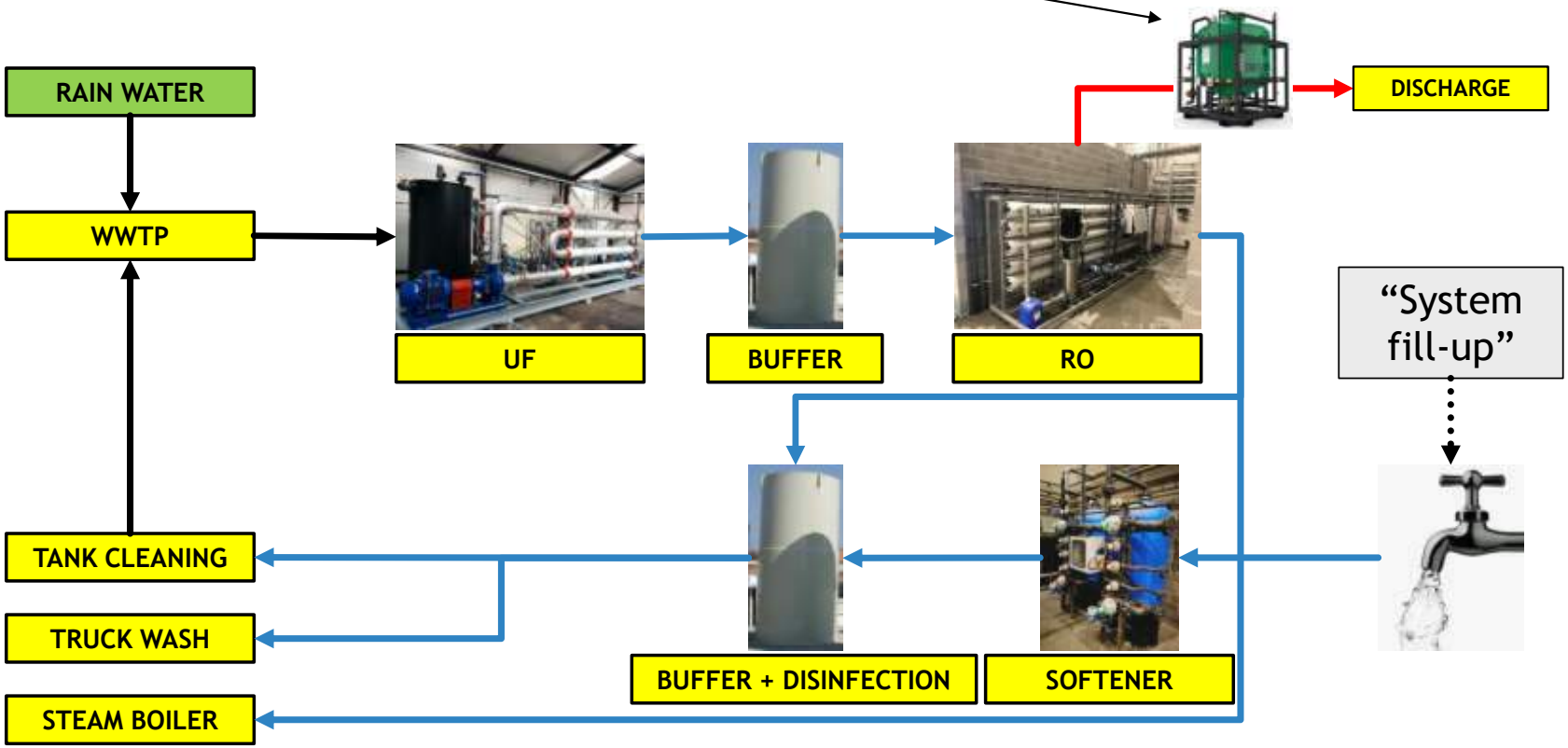
Challenges and barriers

Concentrate

- Increased salt concentration (mg/L)
- Micropollutants in the concentrate
  - Pesticides
  - Herbicides
  - PFAS
  - Pharmaceuticals



All contained in the concentrate: small flow -> easier to treat
Lower discharge load (kg/d)

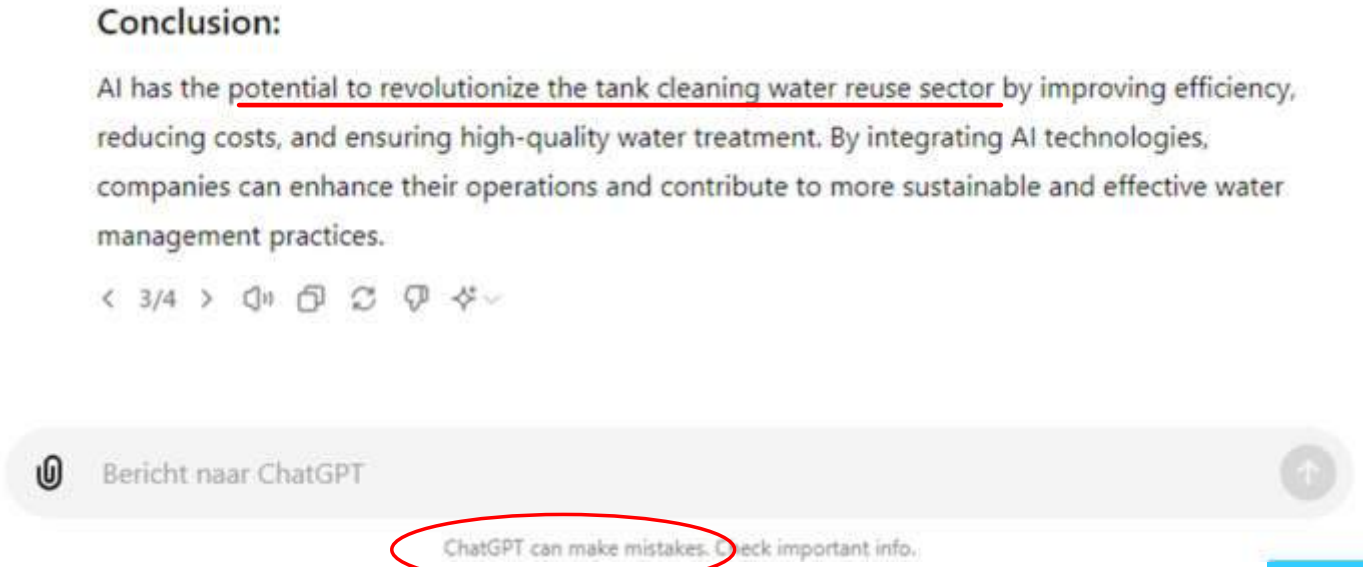


Future trends, considerations and take home message

Future trends and considerations

- More stringent discharge limits
  - Should zero be the limit?
  - What price is acceptable?
  - Who is responsible?
  - Concentration vs load

- Role of AI?
  - Predictive maintenance
  - Process optimization
  - Smart sensors
  - …



Take home message

1. The tank cleaning sector has made significant advances in wastewater treatment and water reuse, driven by technological innovations, economics and regulatory pressures.

2. Ongoing innovation and collaboration are essential to overcoming current challenges and achieving sustainable practices.

3. There are no technological barriers to produce ultrapure water from any water quality.

4. We are here to help and to share ideas – you can contact us any time.

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