



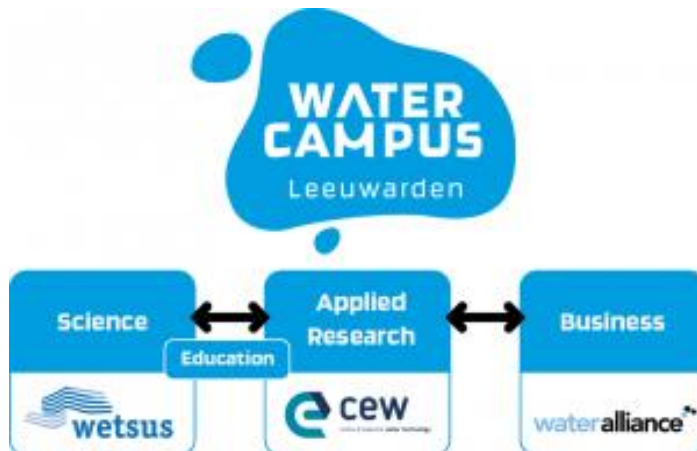
**Symposium “Water Technology Unlocking & Scaling Up the Circular Economy”
May 30th 2018 – Brussels**

Innovative Waste Water Treatment for Textiles Industry

“Economy embraces Sustainability”

Marc Feyaerts -EColoRO

- Start-up, founded in 2014
- Experienced multidisciplinary team of water professionals
- International Focus on water & material reuse in a **sustainable** way
 - **EColoRO™** concept
 - **CreaTainer™** - novel biological treatment
 - **Full brine treatment** – novel technology development
- **Office**
 - The WaterCampus Business Centre Johannes de Doper
 - Leeuwarden, Water Hub of The Netherlands



- **Mass production done in low-wage countries -> “fast fashion”**

- Bangladesh, India, China, Pakistan, Turkije...



- **Europe (Flanders): specialization, niche markets**

- Interior textiles: carpet, curtains, furnishing fabrics ...
- Clothing: underwear, sportswear, uniform clothing ...
- Technical textiles: insulation material, medical textiles, interior lining of cars
- Finishing: printing, painting, impregnation (DEET), fire-retardant ...
- Yarn production: new materials such as Polyethersulfon, Polyamide, Polypropylene ...

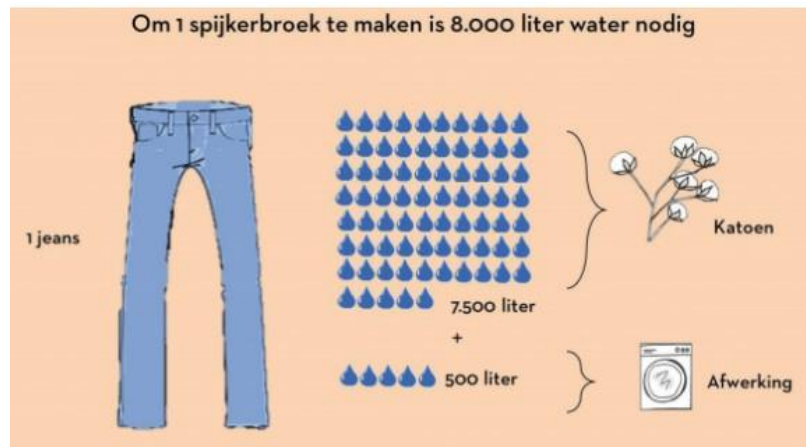


Water consumption: facts & figures >>> EColoRO

- The textile industry uses **3.2 percent** of all water that is available to people every year
- Every year more than **60 billion kilos of textile** is produced worldwide. Half of this is (chemically) dyed. An average of 150 liters of water is required to paint a kilo of textiles
- **Cotton** has a large share in the water consumption of the clothing industry, because worldwide about half of the clothing is made of cotton
- Some **8000 types of chemicals** are used worldwide to make textiles from raw materials
- Dyeing and treating textiles accounts for an estimated **17 to 20 percent** of the water polluted by industry



25 liter water



500 liter water

We close the industrial water loop with high technology

The ECWRTI project

Electro Coagulation for Water Re-Use in Textile Industries



- Horizon 2020 - EU Research and Innovation Program 2014-2020
- Start project: 1 June 2015
- Duration: 42 months
- Budget: 4.8 m € (3.7 m subsidy)
- Cooperation of 7 partners (two textile plants)



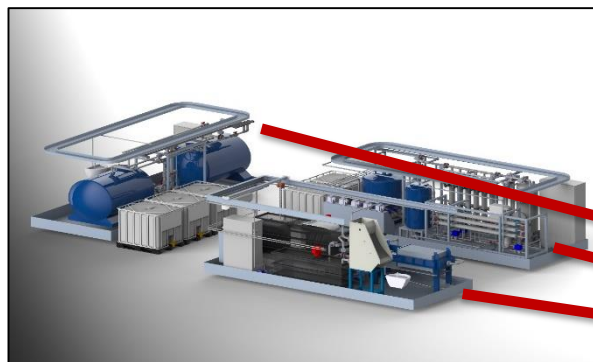
Demonstration of the EColoRO™ concept

✓ Sustainable

- Maximise water reuse
- Minimise energy and chemicals input

✓ Economic

- Less OPEX
- Lower overall water cost

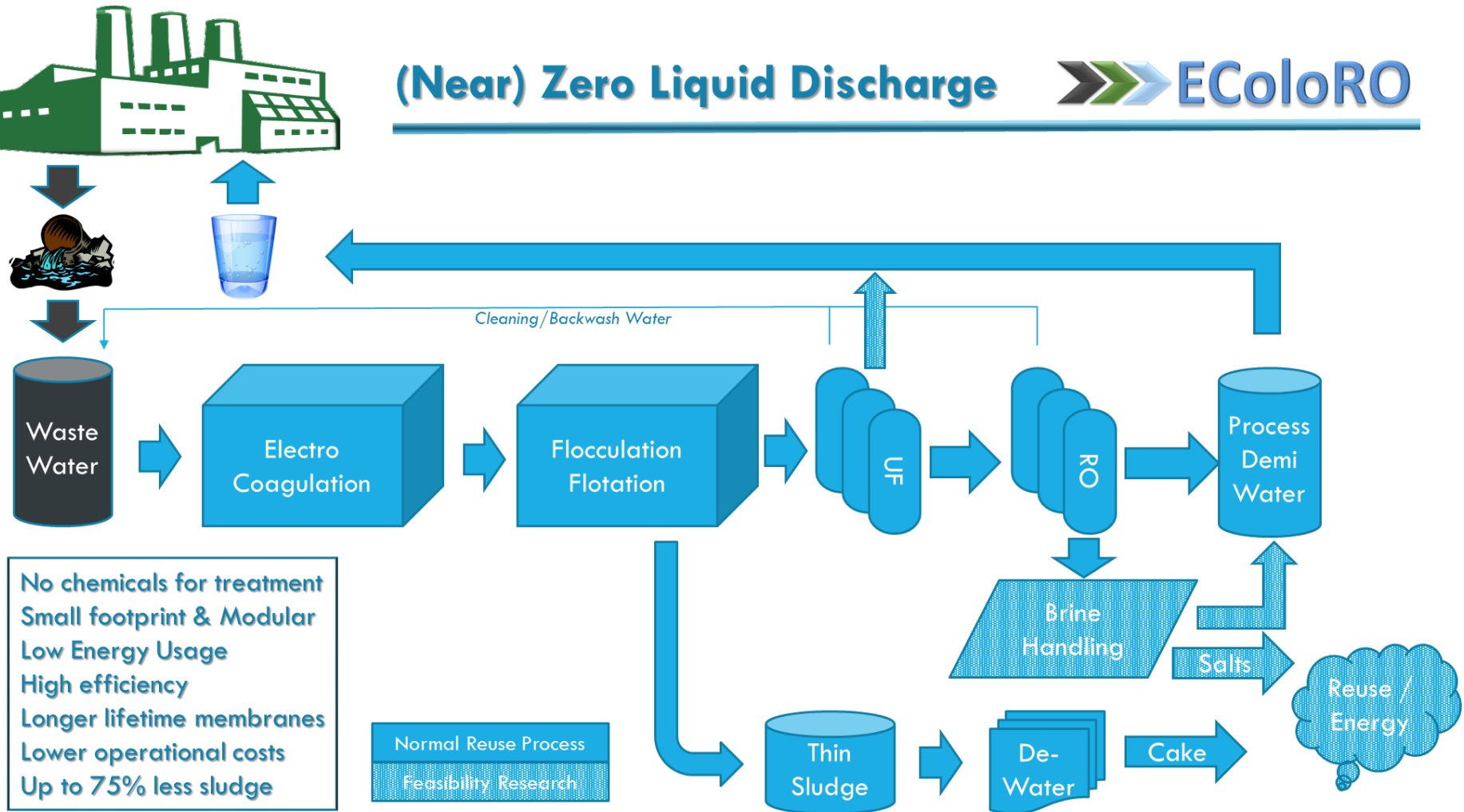


We close the industrial water loop with high technology

The EColoRO™ concept



(Near) Zero Liquid Discharge



We close the industrial water loop with high technology

- **More volume – more process water needed and waste water discharged**
- No waste water treatment on site (only buffering and pH correction)
- Alternative for classic physico-chemical process
- **High intake water cost**
- **High wastewater discharge cost**
- Public WWTP capacity is full – demand for lower load to public sewer in the near future
- **Total Water cost**
- Environmental & zoning permit
- Alternative for well water (reduction or prohibition on use)
- **Customers want to buy from sustainable suppliers -> GREEN PLANT**

Two cases were piloted and economically evaluated



Output of the process

✓ Produced water quality

- ✓ demin quality
- ✓ perfect for dying operations
- ✓ **water recovery = 65-80%**

✓ Brine

- ✓ Volume 4 to 5 times reduced
- ✓ 50% less load
- ✓ No ecotoxicity



✓ Sludge

- ✓ Easy dewatering without PE
- ✓ Dry matter up to 3 times normal percentages
- ✓ Specific reuse possible (metal recycle, S absorber...)

Cost Evaluation – Case 1



- **Actual water cost: 2,37 €/m³**
- **Cost EColoRO concept – 2,3 €/m³**
 - CAPEX (10 years): 0,3 €/m³
 - OPEX: 2 €/m³

Cost item	Cost per m ³	Cost share
Power	0,67	34%
Iron (EC)	0,40	20%
Chemicals	0,10	5%
Operational Labour	0,12	6%
Maintenance (spare parts & labour)	0,08	4%
Sludge removal	0,20	10%
Brine removal	0,43	21%
TOTAL	2,00	100%

- **Total yearly water cost with new concept**

Cost item	Amount	Cost	Total cost
Water reused	237 362 m ³ /yr	2,30 €/m ³	545 933 €
Water replenishment	114 638 m ³ /yr	1,02 €/m ³	116 931 €
Total water amount	352 000 m³/y	1,88 €/m³	662 864 €



Cost Evaluation – Case 2



- Actual water cost: 1,47 €/m³
(“Normal” water cost = 2,18 €/m³)
- Cost EColoRO concept – 2,84 €/m³
 - CAPEX (10 years): 0,31 €/m³
 - OPEX: 2,53 €/m³

EColoRO concept	Cost per m ³	Cost share
Power	1,19	47%
Iron (EC)	0,24	9%
Chemicals	0,21	8%
Operational Labour	0,27	11%
Maintenance (spare parts & labour)	0,07	3%
Sludge removal	0,31	12%
Brine removal	0,23	9%
TOTAL	2,53	100%

- Total yearly water cost with new concept

Cost item	Amount (m ³ /yr)	Cost (€/m ³)	Total cost (€)
Water reused	107 250	2,84	304 963 €
Water replenishment	57 750	0,07	4 124 €
Total water amount	165 000	1,87 €	309 087 €



Water recycle is sustainable and economically feasible in the textile sector with the EColoRO™ concept

Economy embraces Sustainability



But there are important show stoppers



- ✓ **Water is still too cheap and plenty available (Europe) -> sense of urgency???**
- ✓ **Brine treatment is an economic and legislative challenge**
- ✓ **Novel technology or approach**
 - *The customer is reluctant*
 - *Technology development needs financial investment*



Thank you for your attention!



www.ecwrti.eu

www.ecoloro.nl