



Sustainable water purification
designed and engineered in Stockholm

STOCKHOLM WATER TECHNOLOGY

SWT for Textile Industry



Next-gen technology

Membrane-free treatment.
Predictive algorithms for smart
purification.
Online monitoring and
programmable interface.

Sustainable and safe

High water recovery.
Low energy consumption.
Preferential ion removal.
Low operating pressure.
Chemical free treatment.

Customized solutions

Modular design for scalable
system capacity.
Flexible financing options.
Low capital investment and
operating cost.

What we do

We are a Scandinavian company that exists in order to design and develop sustainable water solutions. We have developed both hardware and software that in synergy offer programmable and high-water recovery at low energy compared to traditional technologies. The result is a system that is efficient, clean, smart and sustainable.

Our technology

We purify water with a patented technology called CAP3D, which is based on the principles of electro-capacitive deionization. The technology has been developed & commercialized after more than a decade of R&D and is in many ways conceptually similar to that of a super capacitor.

A programmable electrostatic potential is applied on electrodes in contact with the water, which in turn removes charged species and certain organic pollutants from it.

- Contaminants removed by SWTs' CAP3D:**
- Heavy metals ions (copper, cadmium, Iron, etc)
 - Salts (calcium, magnesium, etc)
 - Anions (Nitrates, phosphates, sulphates, carbonates, etc)

- Key benefits include:**
- ✓ Low chemical use
 - ✓ Low energy use
 - ✓ Membrane free technology
 - ✓ High degree of process control
 - ✓ Remove ionic & microbial pollutants in ONE step

Typical Energy Consumption: 1 kWh/m³

Typical Water Recovery: 70% - 80%

MODULAR Architecture

Cell + Module + System

What we create can in short be divided into three different sub-systems.

At the most basic level, our technology is packaged into cylindrical **cells**. These cells are then combined into larger units that we call **Modules**. The modules can in turn be scaled and tailored into larger **systems** in order to fulfill the specific requirements of the customer. Our STRÖM and FORS are examples of such systems.

C18 Module



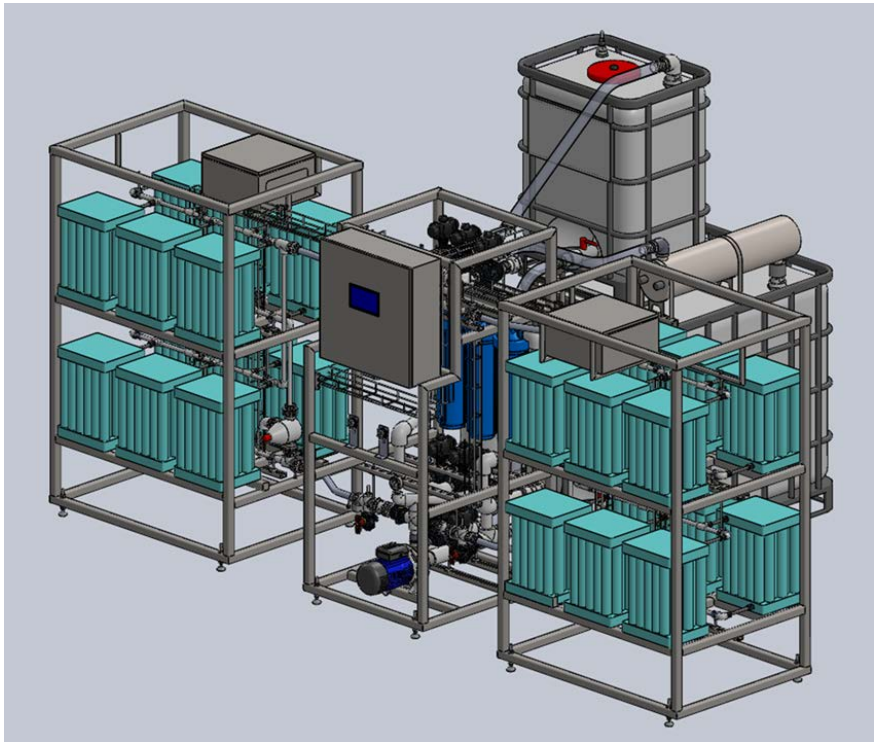
C36 Module



STRÖM



FORS



System Capacity:	Up to 150 Liters per hour	Up to 3 500 Liters per hour
Operational Control:	Fully autonomous	Fully autonomous, Plug & Play
Water Quality:	Software programmable	Software programmable
No. of sensors:	Up to 10 sensors	Up to 20 sensors
Big Data:	Enabled with trending capability	Enabled with trending capability
Parallel operation:	Yes	Yes - with Master/Slave architecture

The textile industry

Stockholm Water Technology products are a good fit for the treatment of complex wastewater from the textile industry. Most of the pollutants in textile waste waters are high in suspended solids, chemical oxygen demand, heat, colour, acidity, and other soluble substances. Materials which need to be eliminated from textile wastewater are mainly COD, BOD, nitrogen, heavy metals and dyestuffs or colorants.

In the textile industry, specific water use can range from 25 to 180 L per kg of fabric. The World Bank estimates that 17 – 20% of industrial water pollution comes from dyeing and finishing treatment given to fabrics.

Circulating water technologies are needed to reduce the impact on fresh water sources.

How our technology can help

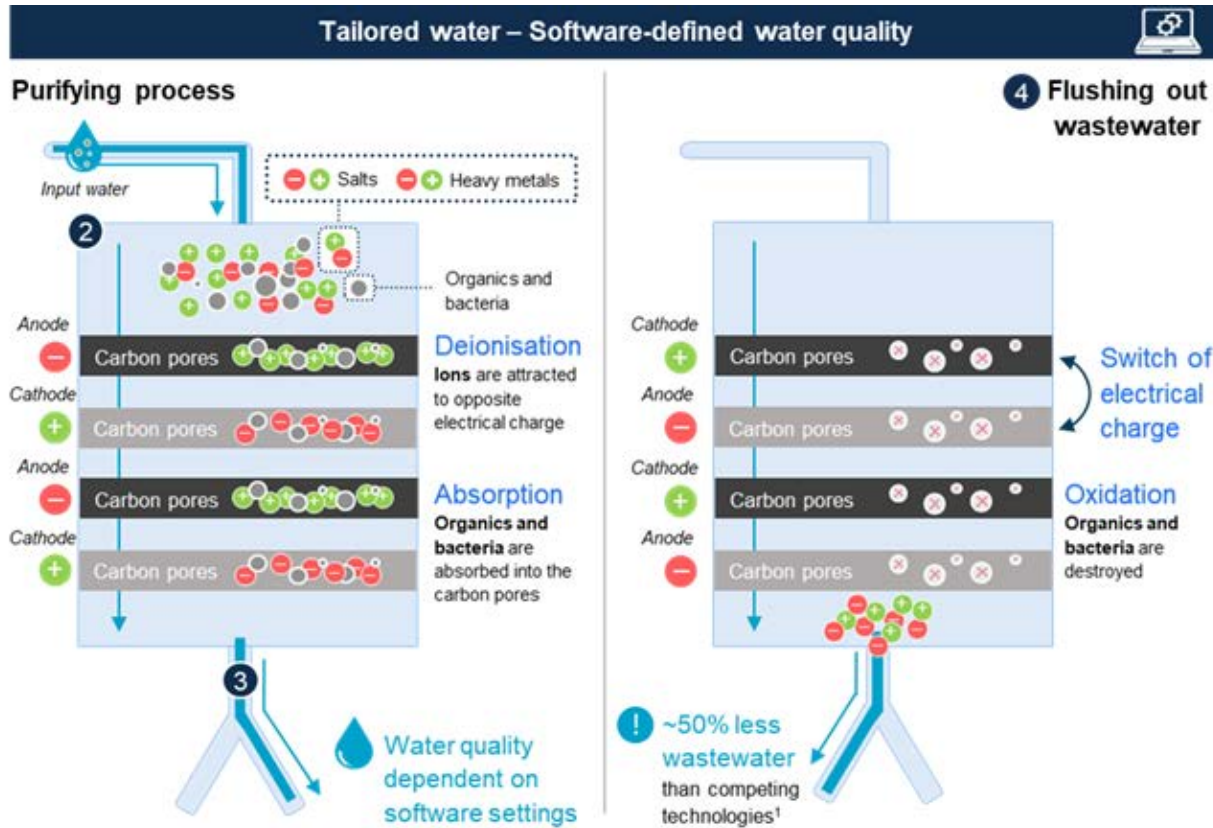
Our products are viable to be used both on the input and wastewater side of the textile industry. Our systems can tackle both ionic and microbial pollutants in the wastewater from the textile industry using a combined action of the following three process steps.

Process Steps

Adsorption – The activated carbon cloth electrodes have a high potency for adsorption of specific organic agents in the wastewater. However SWT will include pre-treatment to remove most of the BOD & COD, while focusing on the ionic and heavy metal contaminants

Electrosorption – Elements which are not naturally adsorbed onto the activated carbon cloth electrodes are electrosorbed using the effect of the applied potential on the electrode surfaces. This includes all heavy metals, salts and other charged species including microbes

Faradaic breakdown – In all treatment, certain organic and microbial pollutants do pass through and get adsorbed on the SWT electrodes. Once adsorbed, the electron and chemical reactions occurring at the electrode surface can lead to destruction of the adsorbed organic pollutants in water, rendering them harmless. Similarly, the heavy metals and salt based pollutants can be removed from the wastewater stream.



Where to use SWT CAP3D technology

SWT technology is versatile in terms of handling different types of input and output water from the textile industry These unique properties make SWT’s product suitable to work in different purification stages:

INPUT PROCESS WATER

For process input water SWT technology can be used to polish the incoming water used for different production processes. The output water quality can be adjusted to meet specific needs for each process. No chemicals are needed, thus avoiding any problem for further purification. This allows the customer to lower the OPEX and reduce the carbon footprint.

PRODUCTION STEP WASTEWATER

In the production line, SWT technology can be used as a centralized or decentralized solution. Treatment of water from high contaminant processes can be localized through a decentralized solution which reduces the burden on the final wastewater treatment plant and can lower the total water footprint.

END OF LINE WASTEWATER

In the wastewater treatment plant our technology is suitable to be a tertiary or quaternary solution scheme. In this case, it can be used as one of the final purification stage to polish the wastewater contaminant levels towards a desired quality prior to discharge.

Objectives of the treatment

Ensure discharge of expected water quality at all times via software defined control.

Remove pollutants efficiently and at lower energy needs.

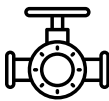
Avoid and minimize other environmental impacts such as addition of chemicals to water.

Produce treated water for input, reuse and recycling.



Wastewater treatment

CAP3D can be used as one of the final polishing steps in the wastewater treatment line (after mixing of waste process water from all production steps).



Input process water

CAP3D technology can be used to polish the fresh water for use in the production line.

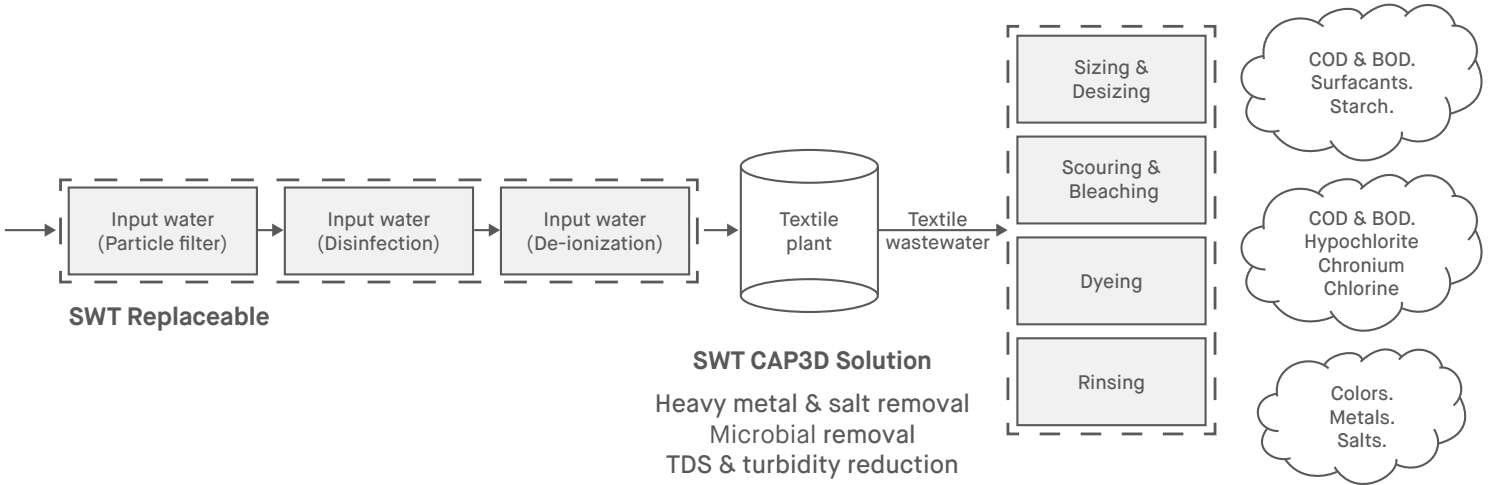
Typical applications include de-hardening & deionization of ground, surface & municipal water .



Production line

CAP3D technology can be used as a decentralized system close to the production line at specific production steps

Simpler treatment and water recirculation leading to decrease of net wastewater volume.



SWT Collaboration Methodology

Among the above-mentioned options, the decentralized production line solution is where SWT technology can most beneficial for the end user.

The proposed collaboration plan is as follows:

Start collaborating by working with the customer to identify process steps and key contaminants generated (to be removed) per process step. Based on customer need and outcome of study, a process step is chosen, the input water and wastewater of which can be treated by SWT CAP3D technology.

After choosing the suitable process, a non-intrusive pilot unit (typically a STRÖM unit) is installed at the customer site. The pilot can be used to determine the efficacy and efficiency of the SWT unit in a realistic condition, directly by the customer. This period usually lasts about 3 months and is used to see the effect of SWT unit on the contaminants of interest.

Subsequently and upon a go-ahead by the customer, a larger unit is installed to treat all or a big proportion of the water for the process step. Typically one or two FORS units are installed during this period, during which the customer can get a clear idea of the OPEX costs, energy needs and manpower needs (if any) for the SWT unit.

This phase which can last up to 6 months, gives the customer all the information required for a full project go-ahead.



Targeting of suitable process

The choice of process to showcase the benefits of SWT CDI technology will be based on water requirements and contaminants.



Onsite Pilot test

A non-intrusive pilot is installed at site to study contaminant removal performance.

Time: 3 months



Larger System Onsite

A larger unit (typically SWT FORS) is installed upon successful pilot evaluation from the customer. This phase allows clear CAPEX, OPEX and other requirements analysis by the customer & SWT

Time: 6 months



Full Scale Unit

If customer is satisfied and larger system does not meet process needs, a full scale unit is installed



Targeting of new processes

Once the environmental and economical benefits will be showcased for the selected process, other processes can be targeted.

A decentralized system

SWT proposes a decentralized system to achieve smart & efficient wastewater and process water treatment. A scheme of the proposed process can be seen in the image below. The main advantages of a decentralized water treatment solution are as follows:

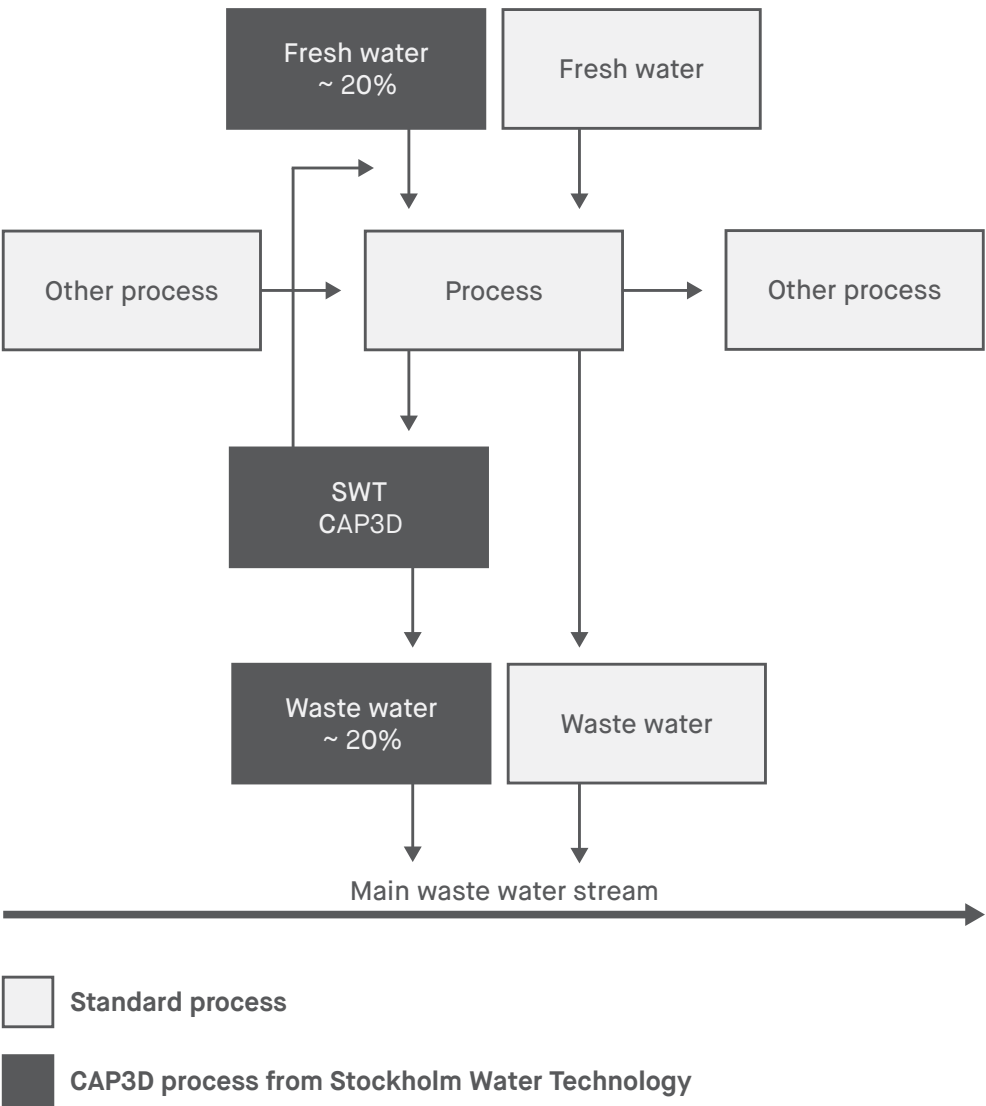
- ✓ Ability to precisely control quality of water per process step and hence conserve energy required for water treatment
- ✓ Simpler and more cost effective wastewater recovery procedures

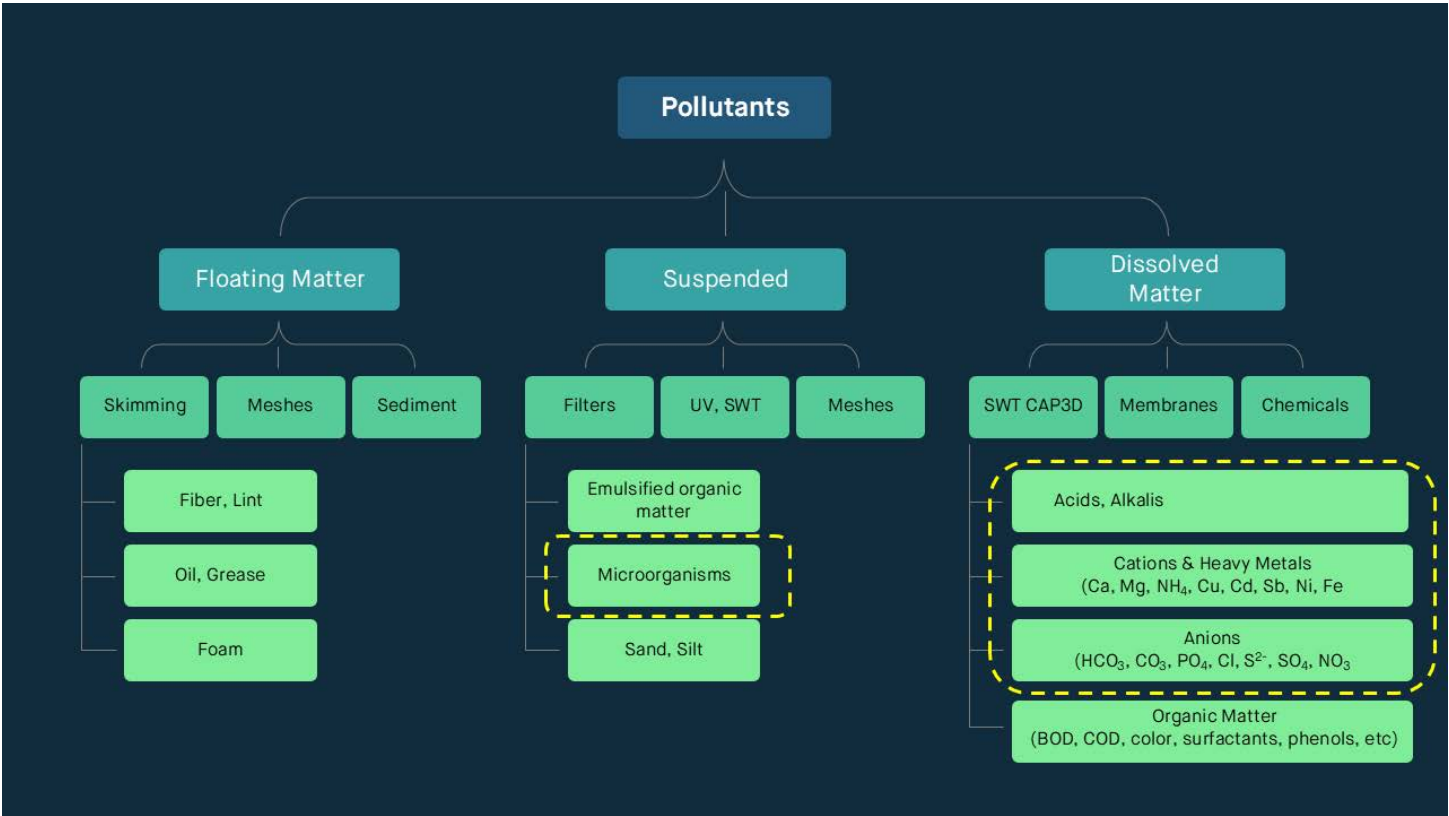
OBJECTIVES OF DECENTRALIZATION

Efficient removal of contaminants, to obtain water with high quality to be used in the process

Increase the water recovery, to lower the fresh-water demand.

Decrease the volume of wastewater generated.





Contminants in Yellow Box can be managed by SWTs' CAP3D based systems

Previous SWT Data for Reference

Contaminant	Before SWT Unit	After SWT Unit	Industry
Sulphates (SO ₄ ²⁻)	3 400 mg L ⁻¹	1 400 mg L ⁻¹	Textile Wastewater
Copper (Cu ²⁺)	80 mg L ⁻¹	1 mg L ⁻¹	Biogas wastewater
Cadmium (Cd ²⁺)	0,9 mg L ⁻¹	0,18 mg L ⁻¹	Flue gas condensates
Hardness (°dH)	24 °dH	3 °dH	Several applications
Calcium (Ca ²⁺)	330 mg L ⁻¹	35 mg L ⁻¹	Ground water treatment
Magnesium (Mg ²⁺)	126 mg L ⁻¹	14 mg L ⁻¹	Ground water treatment
Nickel (Ni)	21,4 µg L ⁻¹	7,2 µg L ⁻¹	Industrial wastewater
Iron (Fe)	17,1 mg L ⁻¹	0,05 mg L ⁻¹	Industrial wastewater
Ammonia (NH ₄)	40 mg L ⁻¹	28 mg L ⁻¹	Industrial industry
Chlorides (Cl)	760 mg L ⁻¹	68 mg L ⁻¹	Industrial wastewater
Fluorides (F)	1,2 mg L ⁻¹	0,2 mg L ⁻¹	Mining wastewater
Chromium (Cr)	8,95 µg L ⁻¹	2,7 µg L ⁻¹	Laundry wastewater reuse
Antimony (Sb)	4,4 mg L ⁻¹	1,1 mg L ⁻¹	Mining wastewater
BOD	570 mg L ⁻¹	130 mg L ⁻¹	Textile wastewater

Please note that while BOD can be reduced by SWT products, it is not recommended as the primary solution for BOD reduction.

Ionic contaminant removal efficincies in the Table above can vary based on water composition.

Why choose SWT

IKEA and Stockholm Water Technology share the idea of saving the environment while protecting the business. Thought the use of our patented solution, textile segments can rely on a cost-effective solution to remove a wide range of contaminants and to lower the fresh water needs. Moreover, our commitment to the environment is line with the major guidelines from UN, to achieve a more sustainable business.



Goal

Reaching sustainability.
Taking care of business.



Technology

Innovative and patented technology.
Adjustable water quality.
Decentralized or centralized.
Effective on a wide range of contaminants.



Environment

High water recovery.
Low water utilization.
CO₂ emission savings up to 0,5 kg per m³ of treated water.

Efficient.
Membrane-free.
Smart.
Sustainable.