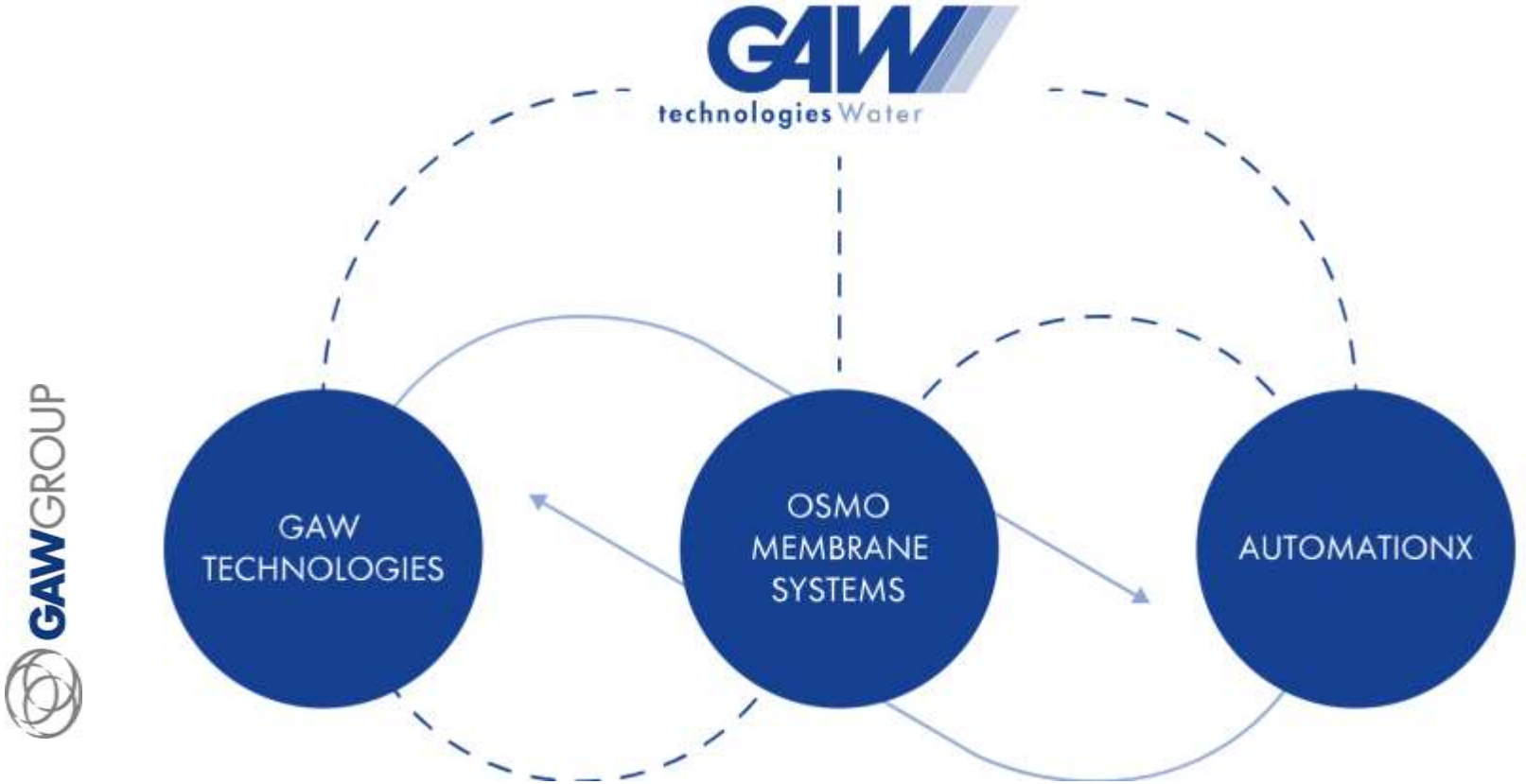
GAW water technologies

EXCELLENT WATER FOR EXCELLENT PAPER

GAW water technologies

GAW water technologies is a joint business division of GAW technologies, OSMO membrane systems and AutomationX combining their core competencies in pulp and paper, water treatment and process automation



GAW water technologies provides highly efficient water treatment solutions from a single source and tailored to the customer's needs for the pulp or paper industry.

Excellent water for excellent Paper
Water and wastewater treatment in pulp & paper

Boiler feed water treatment for steam generation

- Condensate treatment
- Make-up water
- Recycling of cooling water

Ultrapure water for reliable steam generation with minimized energy and chemical consumption.

Process water treatment for the manufacturing process

- Purification of well, brackish and surface water
- Desalination of pre-treated well, brackish and surface water

Robust membrane filtration for maximum supply security, highest product quality and optimized operating costs.

Treatment of processed water

- Recovery of raw products, e.g. color
- Recycling and return of process water

Reduced operating costs through recovery of resources and reductionof wastewater

Recycling of biologically treated wastewater

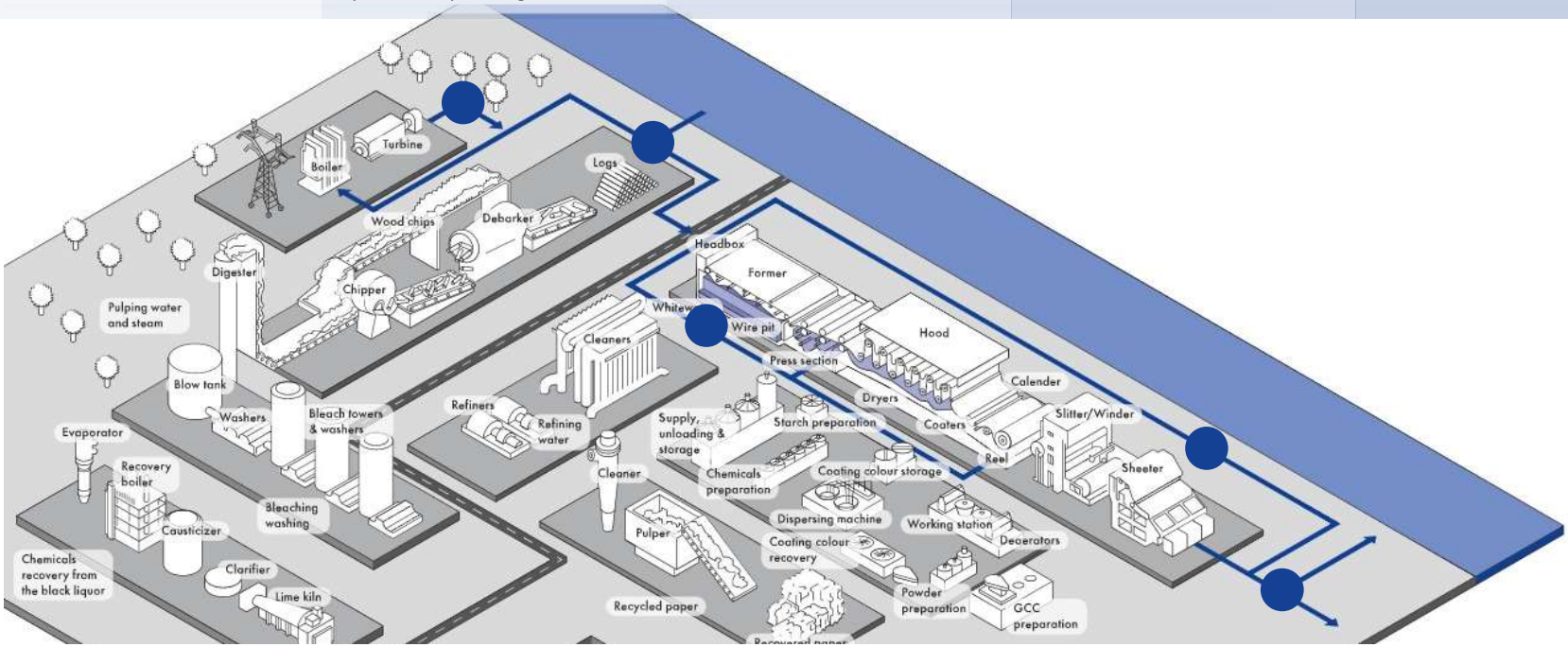
- Fine reduction of organic matter, solids and salt content
- Removal of specific impurities

Reliable compliance with limit values for the discharge of wastewater

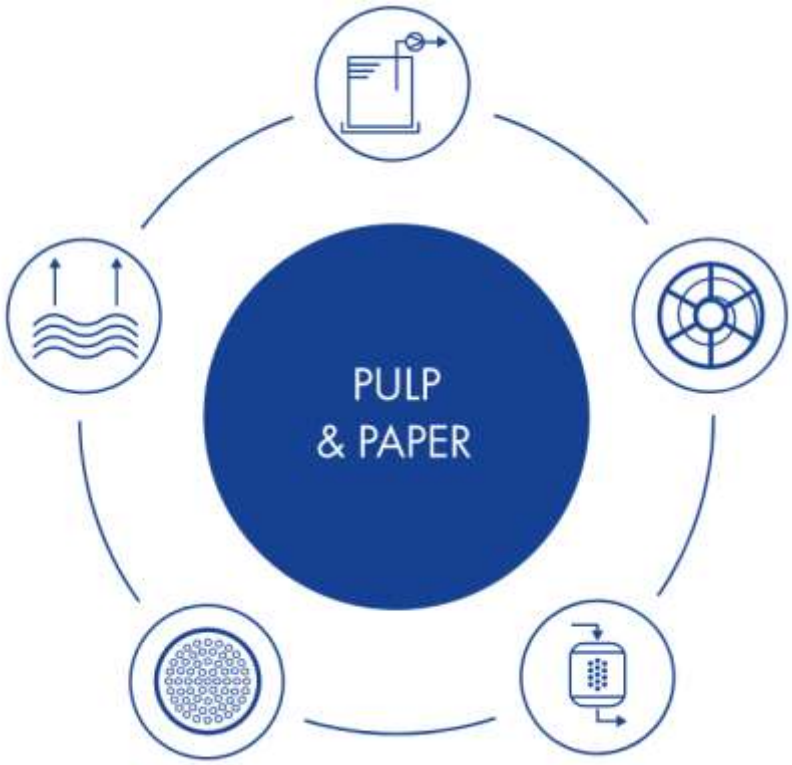
Polishing of biologically treated water

- Fine reduction of dissolved and suspended matter from the upstream wastewater treatment stages
- Removal of specific impurities

Reliable compliance with limit values for the discharge of wastewater



State-of-the-art technologies for the most efficient solution



Ultrafiltration

Reverse Osmosis
Nanofiltration

Ion Exchange

Membrane
degassing

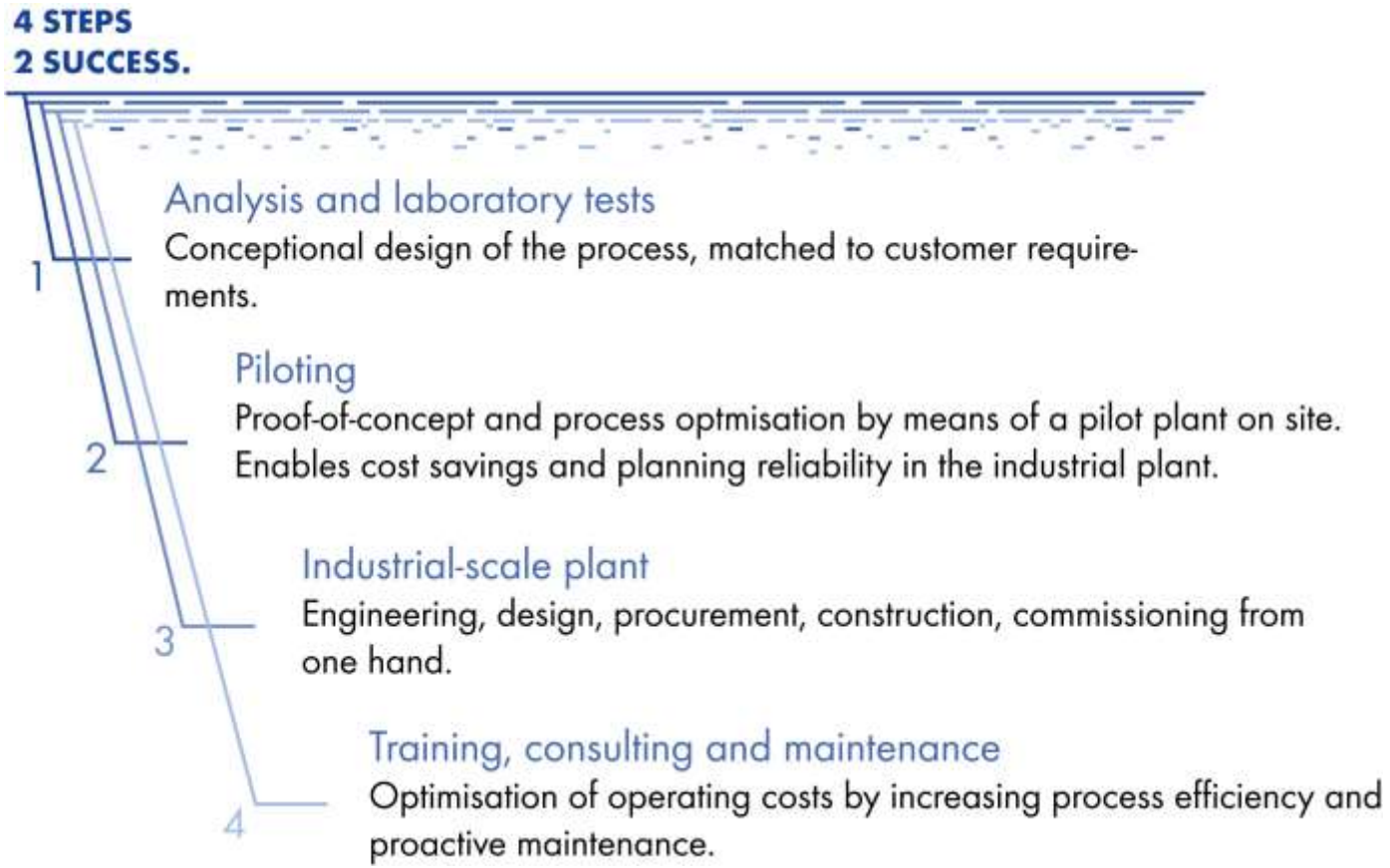
Accessories

Also applied:

- DAF systems / lamella separators
- Multimedia and activated carbon filters

4 steps to success

Successful project handling from A to Z



Customer satisfaction – without compromise

Engineering excellence

- In-depth process understanding of customer requirements
- Seamless plant integration into existing infrastructure
- Proprietary processes to boost performance

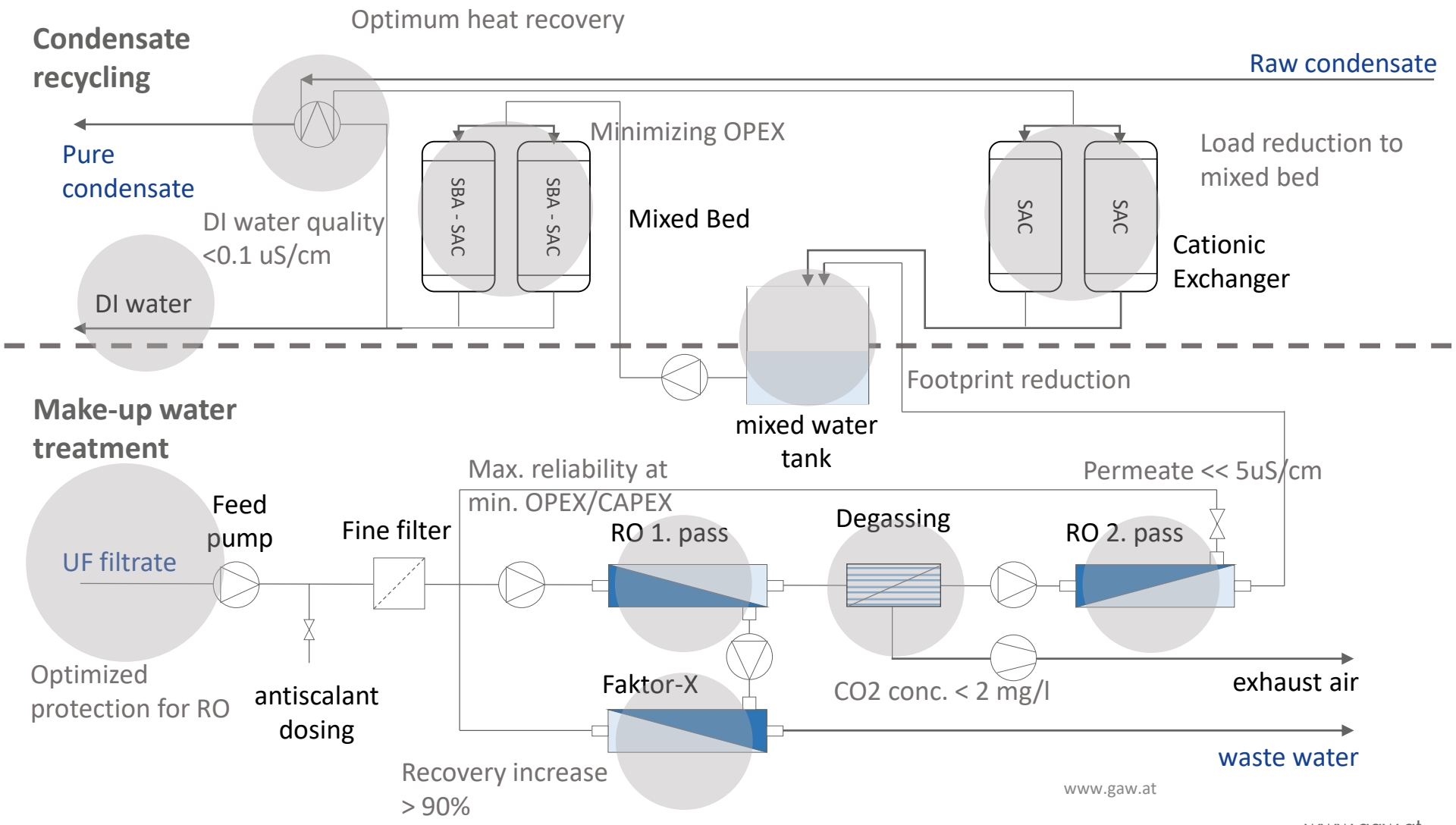
Operating excellence

- Focus on optimized life-cycle-cost
- Minimized utilities and resources consumption
- Preventive maintenance programs

Customer excellence

- Customized solutions precisely tailored to customer needs
- Extensive consulting support in every project stage
- Investment protection through early verification of key process figures

Optimized plant design – A matter of know-how and experience



www.gaw.at

More than 40 years customer satisfaction

Selected references in pulp & paper

Customer	Paper Type	Application	Water Type	Scope of Supply	Capacity [m³/h]
Technocell – Felix-Schöller	Photo and decor paper	Process water generation	Surface water	3 RO plants	125
Palm	Newsprint	Cooling water make-up water	Well water	Fe-, Mn-removal, RO plant	50
Palm	Newsprint	Process water generation	Surface water	RO plant	450
UPM	Newsprint	Boiler feed water	Surface water/condensate	Condensate recycling & UF/RO plant	340
UPM	WFC, WFU, specialty	Waste water recycling	Secondary effluent	UF-RO plant	100
Palm	Newsprint, MFS, SC	Process water generation	Surface water	UF plant	900
Palm	Container board	Boiler feed water	Drinking water/condensate	Condensate recycling & RO plant	230
Palm	Container board	Waste water recycling	Secondary effluent	RO plant	24
ProGroup	Container board	Boiler feed make-up water	Brackish water	RO plant	23

Consequent customer support - worldwide

GAW technologies

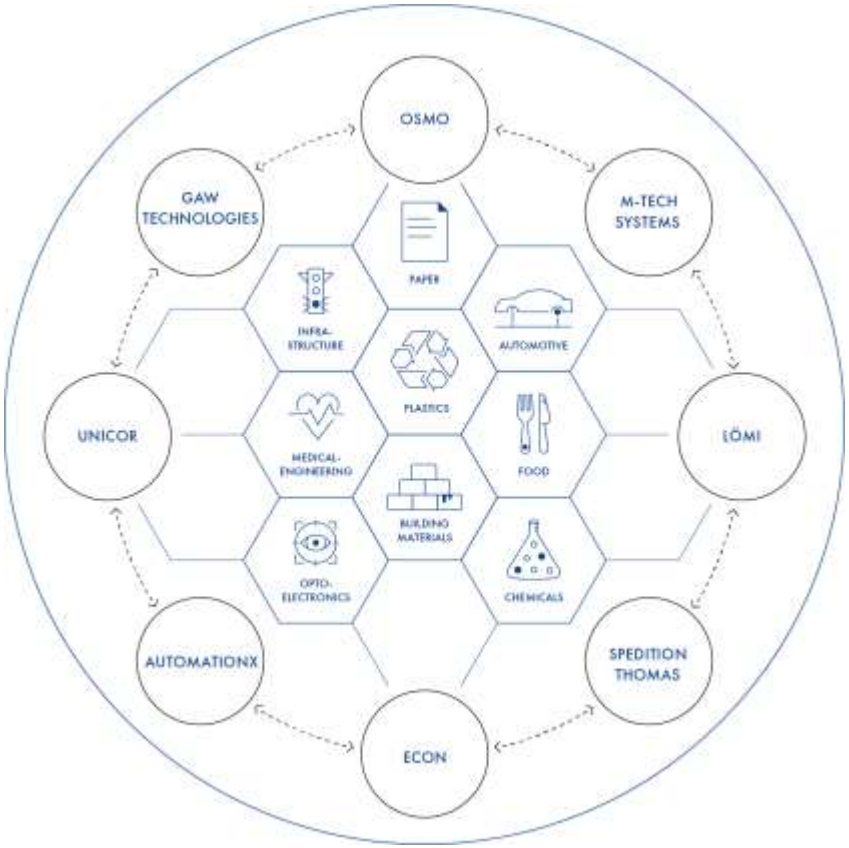
GAW technologies, a member of the GAW Group, guarantees technological competence in international industrial plant engineering and construction.

With more than 70 years of experience, we are the experts for industrial

- preparation and production of chemicals and coating compounds
- water and wastewater treatment solutions
- automation and digitalization of industrial processes

Coating	Digitalization	Water
Preparation	Optimization	Recycling

The GAW GROUP



As a worldwide operating company network for industrial plant and mechanical engineering construction, GAW Group offers innovative, customized and complete solutions all from one hand.

The grouping of resources in the company network creates valuable synergies, for the advantage of our customers.

Employees: > 550 | Turnover: > 130 Mio. EUR | R&D Ratio: > 8.6%

Process water generation

Reliable supply and corrosion prevention in a British paper mill

Project Background

Chloride load in process water exceeded limits specified for the paper machine. Customer feared corrosion of equipment.

Objective & Challenge

Desalination of process water with focus on optimized OPEX.
Challenge: fluctuating salinity – high algae and humidic acids.

Solution

Low fouling RO with specific GAW water technologies pre-treatment and cleaning process features.

Customer benefits

- ✓ Reliable continuous process water supply
- ✓ Improved economics in paper making process
- ✓ Better process water quality allows higher paper grades production and runability

Plant start-up
2012

Treated water
River

Capacity
450 m^3/h

Boiler feed water generation

Ultrapure water for a new RDF steam power plant

Project Background

For a new, state-of-the art paper mill ultrapure water for steam generation was required for its RDF power plant.

Objective & Challenge

Plant reliability and a proven track record of the plant supplier was a main criteria. Minimizing wastewater was another important point for the overall green concept of the paper mill.

Solution

The OSMO RO process includes proprietary Faktor X technology to optimize recovery. A specific ion exchanger design further increased plant reliability.

Customer benefits

- ✓ 80% reduction of fresh water consumption due to the integrated water treatment plant
- ✓ Reliable, continuous process water supply

Plant start-up

2020

Treated water

Condensate and city water

Capacity

200+30 m^3/h

Process Wastewater Treatment

Recovery of flexographic inks from washing water

Project Background

Colored washing water from flexographic printing process causes high costs for treatment and disposal.

Objective & Challenge

Removal and recovery of flexographic ink. re-use of treated water and minimized discharge water.

Solution

Implementation of an integrated membrane system using ultrafiltration and nanofiltration. It completely removes particulate and dissolved ink from washing water.

Customer benefits

- ✓ Significant reduction of wastewater disposal fees
- ✓ Cost savings through recycling of printing inks
- ✓ Challenging discharge regulations are fully met

Plant start-up
2010

Treated water
Brackish Water

Capacity
23 m^3/h

Wastewater treatment

Waste water recycling reduces water and power consumption

Project Background

Customer targeted reduction of production costs and environmental impact by minimizing water footprint

Objective & Challenge

Partial recycling of the secondary effluent of the activated sludge plant to be used as process water.
Challenge: nearly complete removal of all impurities and color along with desalination of the wastewater.

Solution

A multi-barrier filtration process featuring ultrafiltration and reverse osmosis membranes. The UF plant runs environmentally friendly without coagulation.

Customer benefits

- ✓ Fresh water savings of approx. 850,000 m³/h yearly
- ✓ Reduced waste water discharge fees
- ✓ Savings in power consumption of annually 9,500 MWh, reducing the CO2 footprint by 1,700 tons

Plant start-up
2018

Treated water
Secondary effluent

Capacity
100 m³/h

Cooling water treatment

Reduction of conditioning agents in a waste paper mill

Project Background

The cooling tower honeycombs of a paper mill experienced heavy clogging caused by hardness and silicic acid. The existing treatment was ineffective and caused high costs for maintenance and conditioning agents.

Objective & Challenge

Reduction of operational costs by reducing hardness and silicic acid in the cooling water.

Solution

The feed water source now is well water treated by iron and manganese removal units and an RO system. The much better water quality allows to run the cooling water cycle at a concentration factor of almost 10.

Customer benefits

- ✓ Savings of ca. Euro 100,000 in conditioning agents yearly
- ✓ Minimized maintenance for the cooling towers
- ✓ Redundancy for boiler feed water supply since RO can be used for this application as well

Plant start-up
2012

Treated water
Well Water

Capacity
50 m^3/h

Process water generation
Ultrafiltration reduces operating costs

Project Background
Strong increase in operation costs caused by deteriorating quality of the river water used for process water generation.

Objective & Challenge
Optimization of existing water pre-treatment.
Challenge: production of consistently good water in spite of varying river water quality

Solution
Installation of an ultrafiltration (UF) plant as pre-treatment after existing sandfiltration. A proprietary process design ensures the UF can cope with varying feed water

Customer benefits
- ✓ Increased reliability of process water supply
- ✓ Significant reduction of chemical consumption
- ✓ Reduced plant maintenance & system down time
- ✓ No coagulants required for UF

Plant start-up
2017

Treated water
River Water

Capacity
900 m^3/h

Boiler feed water generation

Plant re-design restores reliable make-up water supply

Project Background

An existing RO plant suffered from various design flaws that resulted in frequent membrane replacement and reduced availability.

Objective & Challenge

Review and overhaul of the complete plant.
Challenge: tight schedule to keep plant down-time as short as possible including mobile solution.

Solution

Plant re-engineering with focus on reduced hydraulic loads and automation with maximum use of existing plant components.

Customer benefits

- ✓ Greatly increased availability and reliability
- ✓ Membrane service life was quadrupled to 10 years life time
- ✓ Automation avoids operating errors
- ✓ Reduced chemical consumption

Plant start-up
2010

Treated water
Brackish Water

Capacity
23 m^3/h

Process water generation

Process water demineralisation reduces use of retention agents

Project Background

Excessive consumption of retention agents in the process water for photo and decor paper production.

Objective & Challenge

Partial demineralization of the process water.
Challenge: very high hardness and fluctuating feed qualities.

Solution

Reverse osmosis system for surface water application. After the first plant operated successfully 4 more RO plants followed.

Customer benefits

- ✓ Highly reduced consumption of retention agents
- ✓ Payback period of less than 2 years
- ✓ Minimized plant supervision through full automation

Plant start-up
2007/2009/2012

Treated water
River Water

Capacity
125 m^3/h

Boiler feed water

Treated river water for a combined cycle power plant

Project Background

Feed water source for the power plant of a paper mill was to be changed from well water to river water to ensure security of supply.

Objective & Challenge

Turnkey make-up water treatment and condensate recycling based on sustainable, state-of-the-art technology. Challenge: river water with extreme seasonal fluctuations and high colloidal silica content

Solution

Pre-treatment with ultrafiltration operated environmentally friendly without flocculants. Sustainability and low life cycle costs also determined the selection of the other process technologies.

Customer benefits

- ✓ Very reliable plant operation for more than 6 years
- ✓ Cost savings compared with previous water treatment
- ✓ Environmentally friendly design of the water treatment plant meets the customer's green goals

Plant start-up
2014

Treated water
River Water and condensate

Capacity
120 + 220 m^3/h

Wastewater treatment

Reducing waste water discharge by advanced membrane technology

Project Background

After a sharp increase in fees for wastewater discharge, the customer decided to build its own wastewater treatment plant and recycle part of the treated water.

Objective & Challenge

A consistent conductivity of less than 50 uS/cm in process water.
Challenge: heavily fluctuating wastewater feed quality.

Solution

GAW designed and built a 2-pass reverse osmosis system with low fouling technology integrated in the wastewater treatment plant delivered by an EPC.

Customer benefits

- ✓ Significant savings on wastewater discharge fees
- ✓ Based on good experiences customer evaluates recovery increase to reduce fresh water consumption

Plant start-up
2008

Treated water
Secondary effluent

Capacity
24 m^3/h

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