





## OUR COMPANY

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## OUR TREATMENT SOLUTIONS

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## OUR JOB, OUR COMMITMENT

Economic growth, social responsibility, and environmental conservation are the interdependent and mutually reinforcing pillars of **sustainable development**. Our clients' key business requirements and respect for the law are essential to design compliant water and wastewater treatment plants, with a focus on textile industry. Therefore, we help our customers relate to the environmental aspects of their business through the most advanced services and facilities.

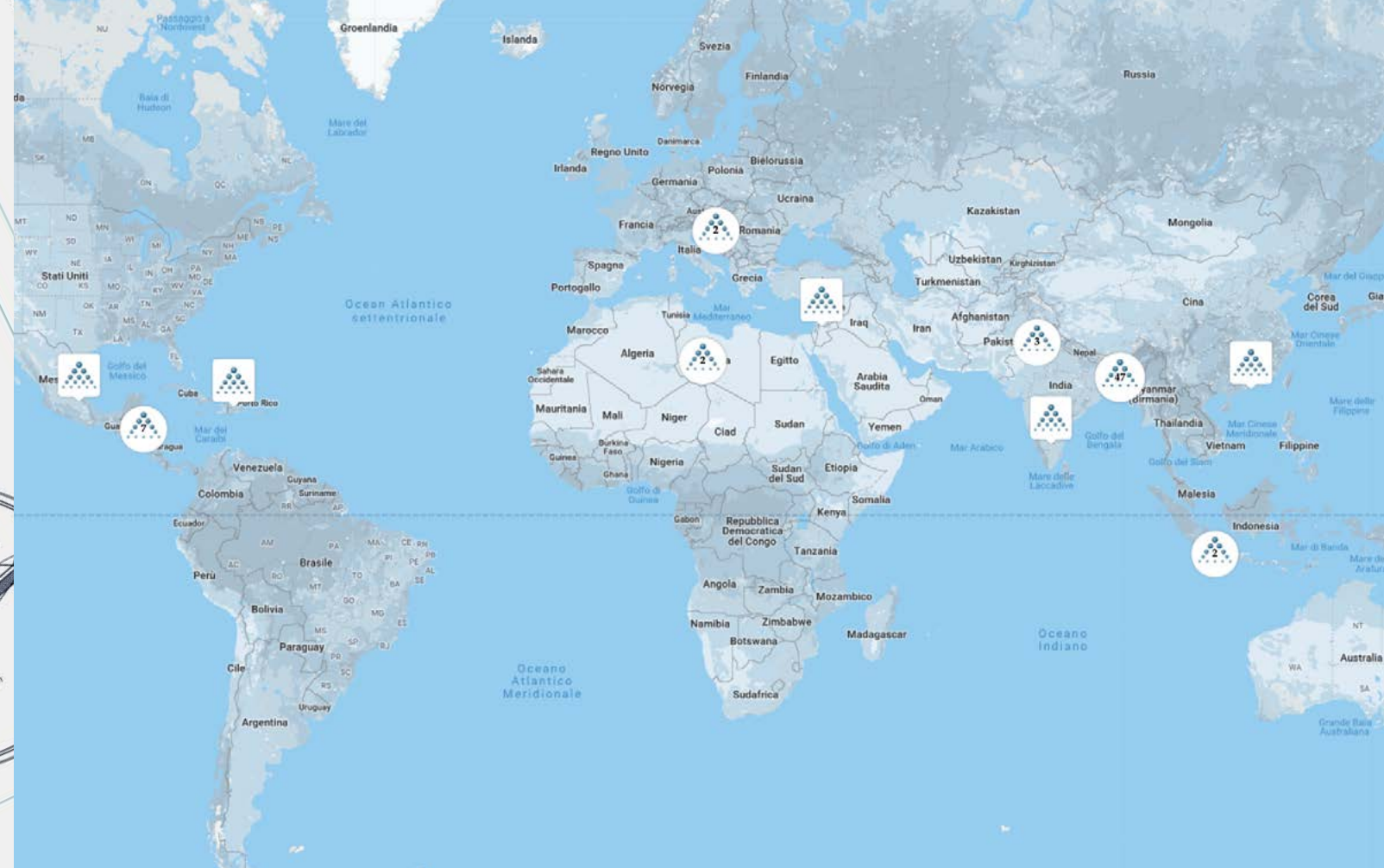
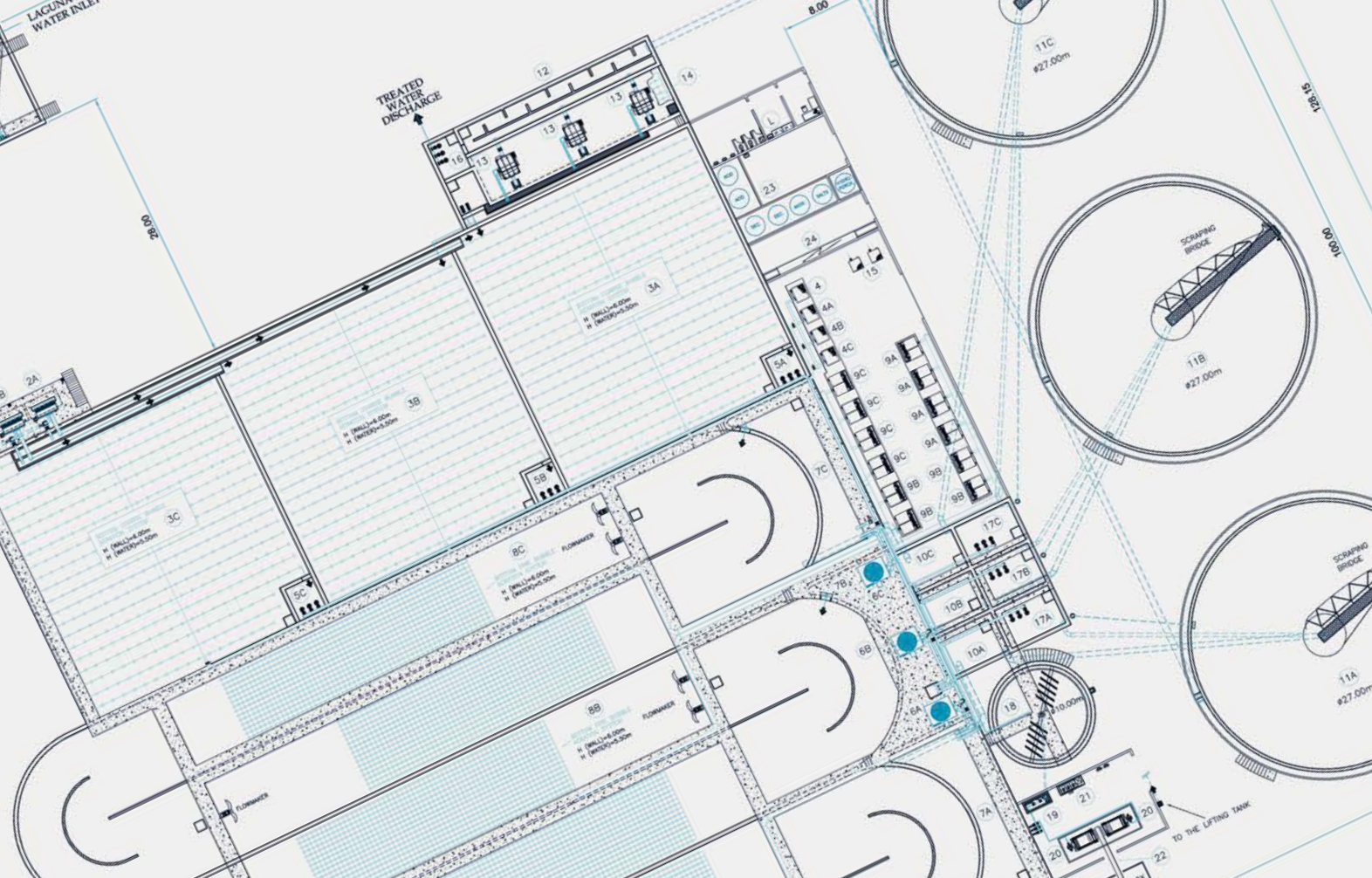
Panta Rei Water Solutions is an Italian private company involved in the industry of Water and WasteWater Treatment Plants from their design to their construction. **People** and state-of-the-art technologies are our assets.

## PANTA REI IN THE WORLD

Panta Rei has a **global view** of business aimed to guarantee a complete and immediate service to its customers. In this regard, Panta Rei Water relies on its consultants who offer their service in several countries.

This modus operandi represents and guarantees the accuracy of the company, who's **core business** is to designs, realizes and mantains water, wastewater and recovery plant s.





## A LEGACY OF EXPERIENCE

Our engineers and technicians who gave life to Pantare have gathered a significant amount of experience in companies of the same sector. After having gained the necessary technical knowledge, we have formed a team to face the market by ourselves, choosing the **best strategies** in order to meet our customers' needs.

From the very beginning, back in 2007, Pantare's purpose has been to give a substantial and professional answer to our clients, focusing our attention on their real needs and ensuring a quality product.

Acknowledging market dynamics, anticipating and interpreting customer expectations, all in perfect harmony with the sustainability principles, which is our main goal.

## A WORLDWIDE ECHO

Pantare has become a worldwide renowned company. World-leading companies have chosen our water and wastewater solutions as part of their environmentally-sustainable growth and development strategies.

We have matured a large list of **satisfied clients** from Southeast Asia, Middle East and Europe to Central America, and we always try to establish an interactive relationship with them, proposing innovative technologies for their environmental sustainability.





## CUSTOMER CARE AS A CORE VALUE

Agents and workshops in situ, along with after sales and maintenance services are our added value. Our technical staff are always available, and our engineers are always willing to offer their consultancy or solve treatment plant related issues.

We do not only offer a water treatment plant, but an accomplished product through our total care contracts with the **service level agreements**, which ensure the best technical support.



## ENHANCED CONNECTIVITY

Following its continuous development program and policies, Panta Rei allows clients to **monitor plants**, in real time, through an internet connection. Thanks to PantApp it is possible to visualize the main running parameters of the water treatment plant from any remote location. Furthermore, it is possible to retrofit the existing plants with this new technology through a simple procedure.





## OUR EXPERTISE

As Panta Rei, we offer our expertise in different kinds of water and wastewater treatment and recovery processes, both of the water and the raw materials contained in it.

Our experience ranges from primary water treatments for rivers and wells to produce drinking water to high quality industrial water for specific applications.

After having worked for more than ten years in the **textile industry** field, we have developed and implemented technologies which are specifically focused on the dyeing factories needs, which have become our core business.

## QUALITY AS AN ATTITUDE

We focus our attention on the continuous improvement of the processes, products and services, thanks to the optimization of the organizational structure and adoption of the best business practices.

In order to increase our competitiveness on an ever-demanding and ever-changing market, we place quality on top, and we are an **ISO certified** company.





—  
**We just took  
a giant step  
towards zero  
wastewater discharge  
in the environment**  
—

## PANTA REI JOINS THE ZDHC ROADMAP TO ZERO PROGRAMME

Panta Rei is joining the ZDHC Roadmap to Zero Programme to eliminate Hazardous Chemicals Discharge in textile manufacturing.

By doing so, Panta Rei supports the Programme's vision of widespread implementation of sustainable chemistry and best practices in **textile industry wastewater discharge** to protect consumers, workers and the environment.



Ø **ZDHC**  
CONTRIBUTOR

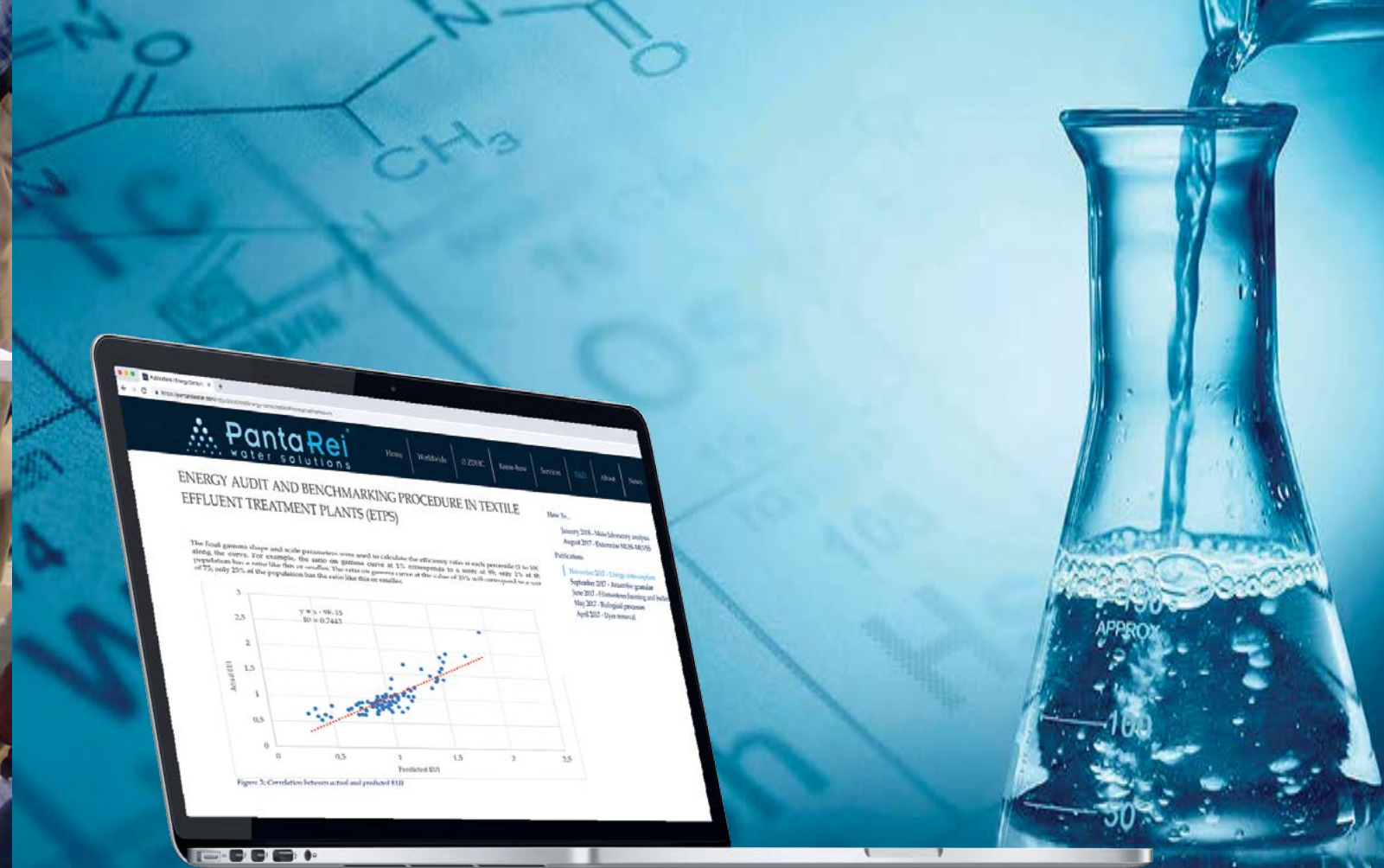
## ZERO DISCHARGE OF HAZARDOUS CHEMICALS

The ZDHC membership fits perfectly within Panta Rei's ambition to play a catalytic role in making wastewater discharges more sustainable.

By joining ZDHC, Panta Rei commits to working collaboratively on this task and towards the milestones set in the Zero Programme through **active engagement** with other brands, retailers and stakeholders.

Ø **ZDHC**  
ACCREDITED TRAINING PROVIDER





## R&D - HOW TO...

At Panta Rei, we wish to provide our customers and anyone interested in the wastewater treatment topics with **useful tips and tricks** on how to approach and face some common issues that may arise during the regular plant operations, and make them run smoothly, by sharing our experience and practical findings.

## R&D - PUBLICATIONS

It is not possible to play a leading role in the industry if part of the resources are not invested in the R&D department. Study and research are the heart of innovation and progress. Panta Rei is proud to implement the **results of these activities** to real-life projects, thus effectively creating practical applications of new technologies.





## WASTEWATER TREATMENT PLANTS FOR TEXTILE INDUSTRIES

The textile industry demands a significant amount of water, especially in the **washing and dyeing processes**, an industrial procedure which gives as a result a complex wastewater that requires particular attention.

Panta Rei has built a strong experience in this sector, and over the years it has become our core business and **our specific area of expertise**.

We have installed water and wastewater treatment plants for some of the **largest textile groups in the world**, and we are currently purifying over 100 million liters of wastewater per day coming from this industry, in order to make sure that our customer's discharges are **compliant** with the most restrictive environmental regulations.

Our standard plant, the activated sludge treatment with suspended biomass, has some of **the lowest running and maintenance costs** while the effluent characteristics are able to meet the request parameters.

Our services include the engineering, supply, installation, commissioning and start-up of our treatment plants, as well as a guaranteed after-sales service.

Our team will provide you with the best treatment option for your effluent; with our treatment options, the social responsibility, environmental compliance and sustainability are not an economic burden but **an investment in the future**.

*Panta Rei has a cost-effective solution for any wastewater coming from the textile sector.*





## BRINE RECOVERY SYSTEM

**Salt for the dyeing process** is a major daily expense in the textile industry, especially for natural fabrics such as cotton. Besides the economic aspects concerning the money savings, environmental issues linked to excessively salty water discharges make water and **salt reuse a priority** for all the cotton dyeing companies having strong environmental and sustainability policies.

**Our technology** allows us to treat just the **dye bath**, which represents a small water amount as compared to the whole amount of water generated by the textile process. Moreover, the dye bath does not contain a significant concentration of hardness and therefore salt can be recovered without residual hardness.

Water coming from the dye bath is screened and filtered before the **Ultrafiltration** (UF) stage.

**Ceramic membranes** are our choice for the UF section because they have a robust structure, resist temperature values of up to 130°C, pH ranges between 0 and 14 and are almost impossible to foul thanks to wide passage channels and a high filtration velocity.

The **system efficiency** allows for the removal of the suspended solids, as well as macromolecules and colloidal particles.

The **Nanofiltration** (NF) section contains spiral polymeric membranes especially made for textile industrial applications.

The NF treatment line is able to **recover up to 95% of the salt**, while the remaining 5% of the water flow contains the rejected bivalent salts, color and impurities, and it is disposed of.

***Your plant and plant parts designed to guarantee maximum customization.***





## WATER RECOVERY FOR TEXTILE INDUSTRIES

The road towards water recovery implies a series of treatments for the water, in order to guarantee the best quality of the final effluent, which is to be promptly reused in the production cycle.

First of all, Panta Rei provides a proper biological treatment in order to carry out the degradation and reduction of the main pollutants such as BOD, COD and suspended solids. Then, a filtration and preliminary treatment stage is set. So a membrane treatment follows the process line.

The first section is made of an **ultrafiltration** treatment to guarantee a fine removal of the suspended solids and protect the following membrane treatment steps. Then, a **reverse osmosis** section reduces the total dissolved solids concentration and all the residual pollutants in order to

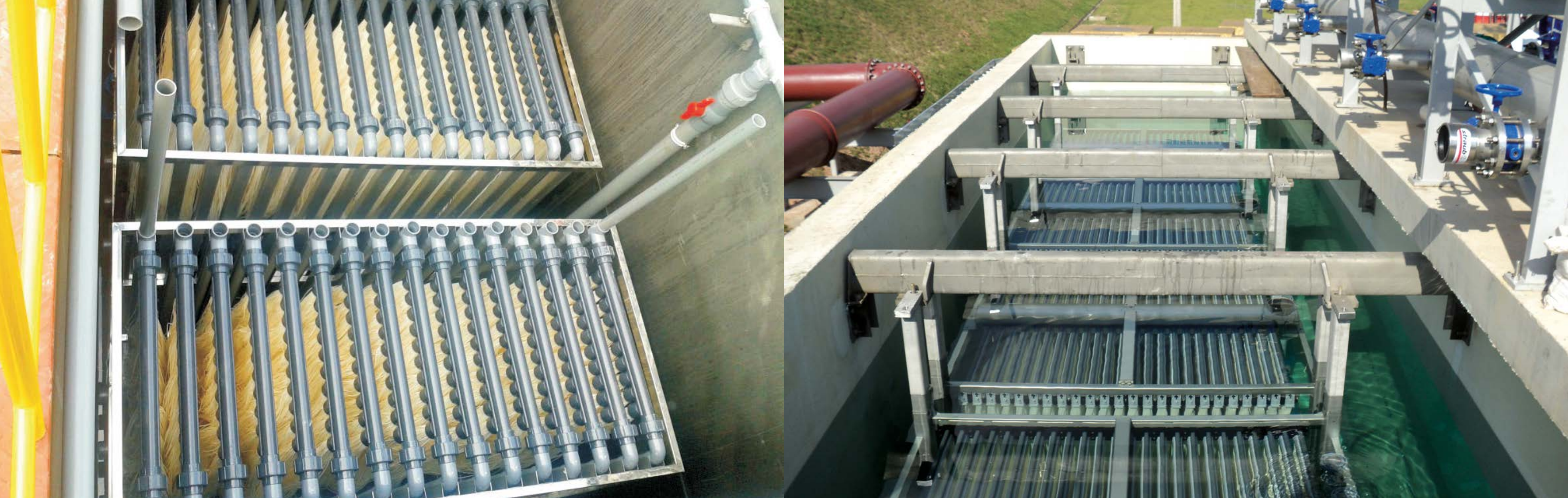
produce a high quality water whose characteristics make it suitable to be reused in the dyeing process, the boilers or any other application requiring high purity water.

Panta Rei provides a **process analysis** to determine the cost and benefits as a function of the recycled water amount, capital cost and power consumption.

We can treat the reject of the reverse osmosis membranes with natural, multi-stage or vacuum evaporators in order to close the water process loop with a water recovery system and thus guarantee **full compliance** even with the most stringent environmental laws.

*The prompt solution to comply the imperative of recycle the water and dispose of the residual matter.*





## MBR- MEMBRANE BIOREACTORS

Membrane Bioreactors are an excellent alternative to the traditional conventional activated sludge (CAS) technology, since they perform the **separation of the sludge and the water**, arriving to an ultrafiltration grade. This means that not only the liquid-solid separation is achieved, but also that the effluent is free of bacteria and therefore a disinfection is carried out.

The MBR membranes supplied by Panta Rei are a special hybrid type, which combines the best features of the **hollow fiber and flat sheet technologies**. Starting from PET sheets, through an innovative and patented modelling process followed by a casting stage with a PVDF thin film, these hybrid membranes are geometrically equal to the hollow fiber type but more robust.

The membranes are constantly cleaned through a system consisting of extraction pumps and cleaning blowers. The main advantages of the MBR technology offered by Panta Rei are:

- **More than 30% total space savings**, due to the fact that the clarifier is no longer needed and that the biomass concentration in the biological reactor can be doubled.
- **Excellent outlet water characteristics**: no suspended solids, no bacteria, COD values lower than 100 mg/L and BOD less than 5 mg/L.
- Possibility to feed the water from the MBR outlet **directly into a reverse osmosis**, for a water recovery process, without any previous filtration or ultrafiltration processes.
- Significantly **lower operational costs**, due to the optimization of the backwash and cleaning procedures.

*Less space, better water quality.  
The first step of the path towards water recovery.*





## FLUFF & FIBERS REMOVAL

Through the matured experience in the textile industry, we have been able to implement a special type of screening, a **disc microfiltration**, to be placed before the secondary treatments, such as the biological oxidation, in order to carry out a proper screening.

The innovative approach is the use of a disc microfiltration system with a 100 – 200 microns sieve, with stainless steel filtration segments, which can effectively **block the passage** of fluff and fibers.

The disc microfiltration **works continuously**, and backwashes automatically when needed, therefore there are no dead times involved in the operation. Fluff and fibers are thus rejected and **collected separately**, preventing them from entering the treatment steps located after the pretreatment section.

The application of a disc microfiltration unit can allow for **10 to 20% energy savings**, plus additional advantages in terms of a lower amount of sludge generated (**15-20% sludge reduction**)

Another advantage that can be obtained from the application of a disc microfiltration, is the **heat recovery**. Thanks to the fact that fibers and other solid particles are promptly removed from the water flow, the effluent can be passed to a heat exchanger, without clogging it, so that the effluent effectively becomes an **energy source**.

The implementation of a proper pretreatment unit in an effluent treatment plant yields the following **main advantages**:

1. Reduction of overall operating costs through energy savings.
2. Enhanced process performance.
3. Heat recovery possibilities without clogging, thus transforming a waste into a resource.

*Savings through adequate pretreatments.*



( WATER <sup>Recovery</sup> +  $\phi$  <sup>Liquid Discharge</sup> ) = max ( TEXTILE SUSTAINABILITY )







Panta Rei s.r.l.  
Via Cavour 17 | 30032 Fiesso d'Artico (Venezia) | Italy  
Tel. +39 049 7968832 | [info@pantareiwater.com](mailto:info@pantareiwater.com)  
[www.pantareiwater.com](http://www.pantareiwater.com)