AquaEnergy Expo Magazine
Blue I Green I Sustainable I Smart

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CARBON CAPTURE & STORAGE

The Pumping Infrastructure Behind a Low-Carbon Future



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Why **Do Some Water Projects Fail Despite the Quality of the Equipment?**

FILTRALITE®

How **Filtration Media Supports More Sustainable Water Treatment Processes**

KL KingLee Technologies
Your Pure Water Partners

ENVISHIELD

Multiple Scaling Risks. One Powerful RO Protection Strategy. Pretreat Plus® G2000 for Complex Feedwater.

NexTurbo TECHNOLOGIES **Blowers:**

The Future of *High-Efficiency Aeration Without VFD In* ***WWTPs***

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Innovative Solutions to Achieve Sustainability in Water and Energy

From The Editor

Water and environmental infrastructure are entering a period of rapid transformation—one in which efficiency, reliability, sustainability, and resource recovery are becoming inseparable. In this issue of Aqua Energy Expo Magazine, we explore how engineering innovation is reshaping the way we capture carbon, treat water, manage wastewater, and protect natural resources.

Our cover story, "Carbon Capture & Storage: The Pumping Infrastructure Behind a Low-Carbon Future," looks beyond CO_2 capture itself to the pumps, compression, transportation, and injection systems that make CCS possible. As carbon management expands, reliable fluid handling will become increasingly important across the entire value chain.

We also examine why even high-quality equipment cannot guarantee the success of a water project. **Al Mousa Trading Company**, supported by global partnerships with Grundfos, Wilo, SPP Pumps, Peerless Pump, Viessmann, Saint-Gobain, Balmoral Tanks, and Hepworth, demonstrates how engineering planning, installation, commissioning, and maintenance can determine long-term performance.

Sustainability takes another dimension in our feature on **Filtralite®**, where advanced filter media demonstrates how better filtration can reduce backwash water and energy consumption while increasing plant capacity. In RO treatment, **King Lee Technologies** and **Envishield** highlight a proactive approach to managing multiple scaling risks through application-specific antiscalant selection and water analysis.

Energy efficiency is equally central to our wastewater coverage. **NextTurbo** Technologies presents its VFD-free aeration approach, while **Sternova Solutions** focuses on automated biomass balance and smarter RAS/WAS control to improve biological stability, settling, and nitrogen removal.

Beyond treatment, this issue explores the growing value of wastewater itself. From the Scaling Water Reuse Initiative (SIANI) and the agricultural experience of Murcia to nutrient recovery, wastewater is increasingly being viewed as a resource rather than an endpoint.

We also look toward smarter environmental management through real-time river monitoring, including the UK rivers case study, and examine the future of high-salinity water management through MLD, ZLD, advanced membranes, and DuPont's FilmTec membrane-first approach.

Finally, we turn to one of the defining challenges of the digital era: the hidden water footprint of AI and data centers. Together, these stories share one message: the future belongs to systems that use every drop, every unit of energy, and every resource more intelligently.



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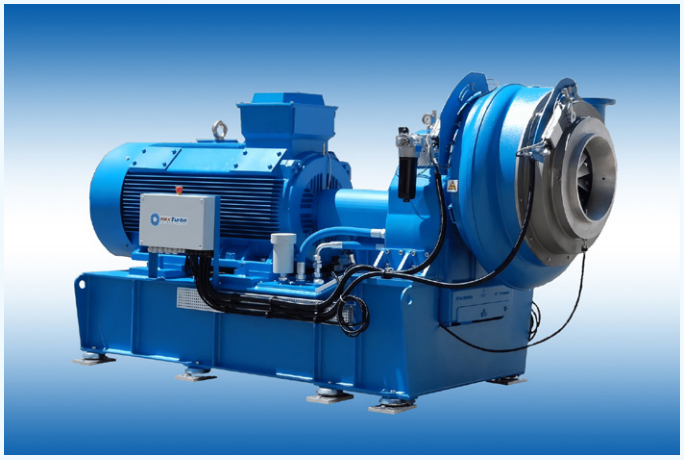
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Carbon Capture & Storage: The Pumping Infrastructure Behind a Low-Carbon Future

As industries move toward lower-carbon operations, carbon capture and storage (CCS) is emerging as an important pathway to reduce carbon dioxide emissions in sectors where eliminating emissions remains challenging.

The concept is straightforward: capture CO_2 before it reaches the atmosphere, condition and compress it, transport it to a suitable location, and finally inject it into deep geological formations for long-term storage. Yet behind this seemingly simple sequence lies a complex chain of processes in which fluid handling, pressure management, reliability, and containment are fundamental.

The growing interest in CCS has also highlighted an often-overlooked component of the process: pumping infrastructure. From solvent circulation during capture to the movement of dense-phase CO_2 and its high-pressure injection underground, pumps operate at several critical points throughout the CCS chain.

Their performance can directly influence the reliability, energy requirements, and operational stability of the overall system.

From Emissions to Containment

CCS is designed to prevent carbon dioxide generated by large industrial and energy-intensive processes from being released into the atmosphere. Applications can involve power generation as well as industries such as steel, cement, refining, petrochemicals, natural gas processing, and chemical manufacturing.

Carbon capture can generally be achieved through three principal approaches: pre-combustion capture, post-combustion capture, and oxy-fuel combustion.

Each follows a different route to separate CO_2, but all ultimately produce a concentrated CO_2 stream that must be conditioned for subsequent transport and storage.

Where Pumping Becomes Critical

The role of pumps extends well beyond simply moving fluids from one point to another. CCS processes involve fluids with demanding combinations of pressure, temperature, density, chemical characteristics, and phase behaviour. Consequently, pumping equipment must be selected according to the specific conditions encountered at each stage. During capture, pumps can be required for solvent circulation, cooling-water systems, scrubbing processes, solution transfer, and other auxiliary services. Depending on the process, single-stage or multistage configurations may be appropriate. In applications involving corrosive solvents or chemically aggressive fluids, containment and material compatibility become particularly important considerations.



The challenge becomes even more pronounced once the captured CO_2 leaves the separation stage. Before transportation, carbon dioxide must be compressed or liquefied to reach a condition suitable for efficient movement. At this point, the behaviour of CO_2 changes significantly with pressure and temperature, requiring equipment capable of operating reliably under tightly controlled conditions.

Compression: Managing CO_2 Under Pressure

Compression represents one of the most energy-intensive and technically demanding stages of the CCS chain. After capture, CO_2 is conditioned and compressed to the pressure required for transportation or subsequent injection.

One approach is to compress CO_2 as a gas. Another is to liquefy it and then raise its pressure using pumping equipment. The latter approach can reduce the amount of energy required for pressure increase because liquids generally require less work to pressurize than gases. However, refrigeration and temperature management must be carefully considered as part of the overall energy balance.

The physical properties of CO_2 make this stage particularly sensitive. Carbon dioxide has a critical point at approximately 31.1°C and 73.8 bar, and industrial applications may involve it in both liquid and supercritical states. Operating close to these conditions means that pressure, temperature, density, and phase behaviour cannot be treated independently when designing fluid-handling systems.

For this reason, pumping solutions used in CO_2 service must be engineered around the actual operating envelope rather than simply the required flow rate. Reliability under pressure, resistance to leakage, suitable materials, and appropriate sealing arrangements can all become decisive factors.

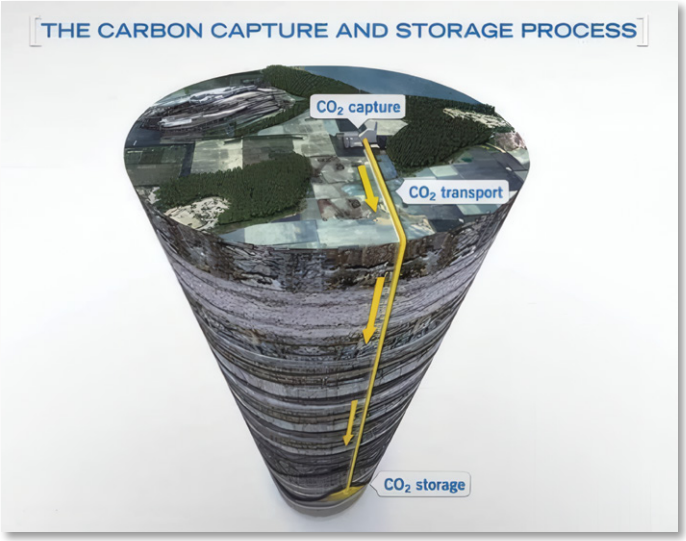


Transportation: Moving Carbon Across Long Distances

Once CO_2 has been compressed or liquefied, it must be transported from the capture facility to a utilization or storage site. Pipelines are particularly suitable for moving large quantities over long distances, while ships can provide flexibility where geographical conditions make pipeline infrastructure impractical.

For pipeline transportation, CO_2 is commonly brought into a dense or supercritical phase in which it behaves more like a liquid than a conventional gas. This enables it to be transported efficiently while maintaining the pressure and temperature conditions required for stable operation.

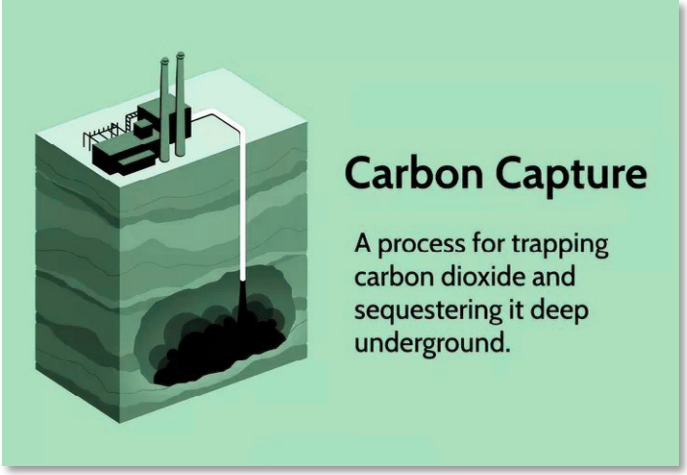
The transportation stage therefore introduces another demanding pumping requirement. High-pressure systems must maintain continuous movement of CO_2 while accounting for variations in temperature and density. The equipment must also provide dependable containment because leakage is not only an operational concern but can undermine the environmental purpose of the entire process.



Injection: The Final Engineering Challenge

The final stage of CCS is the injection of CO_2 into deep geological formations. Suitable storage formations can include saline aquifers and depleted oil and gas reservoirs. The selected formations must be evaluated to ensure that the injected carbon dioxide can remain contained over the long term. Injection typically takes place at significant depths, requiring high pressures to overcome the conditions within the geological formation. This creates demanding requirements for pumping equipment, particularly in applications involving dense-phase or supercritical CO_2.

At this stage, the pump is no longer simply part of a transport system; it becomes a critical interface between surface infrastructure and the geological storage environment.



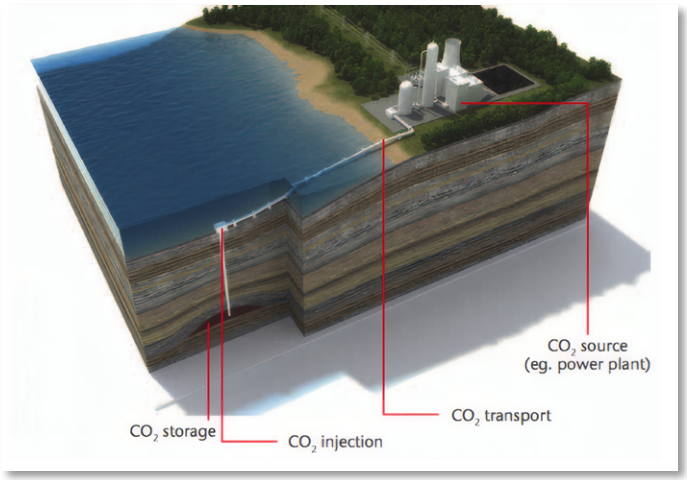
Stable pressure delivery, dependable operation, and effective containment are essential for maintaining controlled injection.

The relationship between transportation and injection also means that some pumping configurations can serve both stages, provided they are designed for the required pressure, flow, temperature, and CO_2 conditions.

Designing for a Difficult Fluid

CO_2 may appear chemically simple, but handling it at industrial scale presents a sophisticated engineering challenge. Its physical state can change considerably with variations in pressure and temperature, while applications may involve low temperatures, high vapour pressures, and high flow capacities.

The pumping system must therefore be evaluated as part of the complete process rather than as an isolated component. Factors such as fluid properties, operating temperature, pressure, density, materials, wear, sealing, and expected performance all influence the suitability of a particular configuration.



Leak prevention is especially important. In CO_2 applications, containment is closely connected to both operational safety and environmental performance. Where conventional sealing arrangements present limitations, approaches designed to minimize leakage can offer an important advantage, particularly when handling fluids under high pressure or in conditions where maintaining containment is challenging.

Beyond Storage: Turning CO_2 into a Resource

CCUS expands the concept beyond permanent geological storage by introducing utilization as another pathway for captured carbon dioxide. Instead of being permanently stored, CO_2 can serve as a feedstock for selected industrial applications.

Potential uses include the production of urea, synthetic fuels and chemicals, carbonation processes, building materials, and certain industrial cooling applications. This creates a different perspective on carbon dioxide: rather than viewing it solely as a waste stream, it can become a raw material within selected industrial processes.

From an engineering perspective, however, utilization does not eliminate the need for reliable handling. CO_2 still needs to be transported, pressurized, liquefied, or circulated depending on the application. Pumping and compression therefore remain essential links between capture and the eventual destination of the recovered carbon.





Efficiency Starts with the Fluid Path

The effectiveness of a carbon capture project is not determined by the capture process alone. Energy consumption and reliability across compression, transportation, and injection can significantly influence the overall performance of the system.

This makes the design of the fluid path strategically important. Pump selection should consider not only hydraulic requirements but also the physical behaviour of CO_2 and the conditions under which the equipment will operate. In some applications, alternative arrangements can reduce compression work or improve energy performance, while appropriate equipment selection can also simplify maintenance and improve operational reliability.

The same principle applies to solvent circulation during capture. Efficient and reliable fluid movement helps maintain stable process conditions and supports continuous operation. In large-scale CCS facilities, even apparently small improvements in pumping efficiency can become meaningful when equipment operates continuously across extensive process systems.

Building the Infrastructure for Carbon Management

The future of CCS will depend not only on the ability to capture carbon dioxide, but also on the infrastructure required to move and manage it safely. Capture facilities, conditioning systems, compression equipment, pipelines, shipping infrastructure, storage sites, and injection systems must operate as one connected chain.



Pumps occupy a strategic position within this chain because they interact directly with many of its most demanding fluids and operating conditions. Their contribution may be less visible than the capture technology itself, but reliable pumping is essential for maintaining the continuous movement of CO_2 from the point of capture to its final destination.

As CCS projects develop, engineering attention will increasingly extend beyond capture efficiency toward the optimization of the entire carbon-management pathway. Pressure management, energy consumption, containment, material compatibility, temperature control, and long-term reliability will all become increasingly important.



Conclusion | The Pumping Perspective on a Low-Carbon Future

Carbon capture and storage is often presented as a question of how efficiently CO_2 can be separated from industrial emissions. In practice, the challenge is much broader. Captured carbon must be conditioned, compressed, transported, and ultimately stored or utilized—and every transition between these stages requires dependable fluid handling.

This places pumps & associated pressure-management equipment at the heart of the CCS infrastructure. From circulating solvents to moving dense-phase CO_2 and delivering it into deep geological formations, pumping systems provide the physical link that allows captured carbon to move through the process. The broader lesson is clear: a successful carbon-management strategy requires not only advanced capture processes but also robust infrastructure capable of handling CO_2 throughout its entire journey. As industries pursue lower-carbon operations, the engineering behind that journey will become just as important as the capture itself.



Why Do Some Water Projects Fail Despite the Quality of the Equipment?

Water infrastructure projects are expected to operate reliably for decades, yet failures can still occur even when using premium pumps, valves, pipes, tanks, and water treatment systems. In most cases, the issue is not the equipment itself but how the project is planned, executed, and maintained. With over 20 years of engineering expertise, Al Mousa Trading Company, a member of Al Mousa Group, delivers integrated water, energy, and infrastructure solutions across Saudi Arabia. By combining high-quality products with engineering studies, equipment selection, installation, commissioning, preventive maintenance, and after-sales support, the company helps clients achieve reliable, efficient, and long-lasting project performance.

Successful Projects Begin with Proper Engineering Planning

One of the most common reasons water projects fail is poor planning. Incorrect flow calculations, inaccurate system sizing, or overlooking future operational requirements can lead to costly problems that no amount of high-quality equipment can solve. Even the most advanced pumping system will struggle if it has been selected based on an incomplete engineering assessment. Al Mousa Trading addresses this challenge by providing engineering studies and technical consultation before project implementation begins.

Its engineering team evaluates each project's operational requirements, environmental conditions, and future expansion needs to recommend

solutions that deliver both immediate performance and long-term reliability. By identifying potential issues early, the company helps clients avoid expensive design mistakes and build a strong foundation for project success.

Selecting the Right Equipment Is More Important Than Buying the Most Expensive Equipment

High-quality equipment only performs well when it is selected for the right application. Choosing oversized pumps, incompatible piping systems, or unsuitable water treatment solutions can increase energy consumption, reduce efficiency, & create unnecessary maintenance challenges.

To help customers make the right decisions, Al Mousa Trading supplies a comprehensive portfolio of engineering products from internationally recognized manufacturers. Its product portfolio includes water pump systems, HVAC solutions, water storage tanks, piping systems, district cooling solutions, heating systems, and water treatment technologies. Because these products are carefully selected according to each project's technical requirements, clients receive integrated solutions rather than individual components that may not work efficiently together.



Global Partnerships Strengthen Every Solution

The reliability of a water project also depends on the quality and reputation of the manufacturers behind its equipment. Working with trusted global brands provides access to proven technologies, certified products, and long-term technical support.

Al Mousa Trading has established strategic partnerships with internationally recognized manufacturers, including Grundfos, Wilo, SPP Pumps, Peerless Pump, Viessmann, Saint-Gobain, Balmoral Tanks, Hepworth, and several other global engineering brands.

These partnerships allow the company to deliver innovative technologies that meet international quality standards while ensuring customers benefit from reliable products and expert technical support throughout the project lifecycle.

Professional Installation Makes the Difference

Even perfectly selected equipment can fail if installation is not carried out correctly. Improper alignment, incorrect pipe connections, poor electrical integration, or failure to follow manufacturer guidelines can significantly reduce system efficiency and shorten equipment lifespan. To eliminate these risks, Al Mousa Trading provides professional installation and supervision services performed according to international engineering standards and manufacturer specifications.

By ensuring every component is installed correctly from the start, the company helps customers achieve optimal system performance while minimizing future operational issues.



Testing and Commissioning Reduce Operational Risks

Many project failures occur because systems are placed into operation without comprehensive testing. Commissioning is essential to verify that every pump, valve, control system, and mechanical component performs according to the original engineering design.

Al Mousa Trading conducts detailed testing and commissioning services before project handover. Performance verification allows engineers to detect and resolve potential issues before they affect daily operations. As a result, clients benefit from safer, more reliable, and more efficient water systems from the very first day of operation.

Preventive Maintenance Protects Long-Term Performance

Even the best-designed water systems require ongoing maintenance. Over time, mechanical wear, environmental conditions, and continuous operation can reduce efficiency if routine inspections are neglected. Small issues that remain unnoticed often develop into expensive repairs or unexpected downtime.

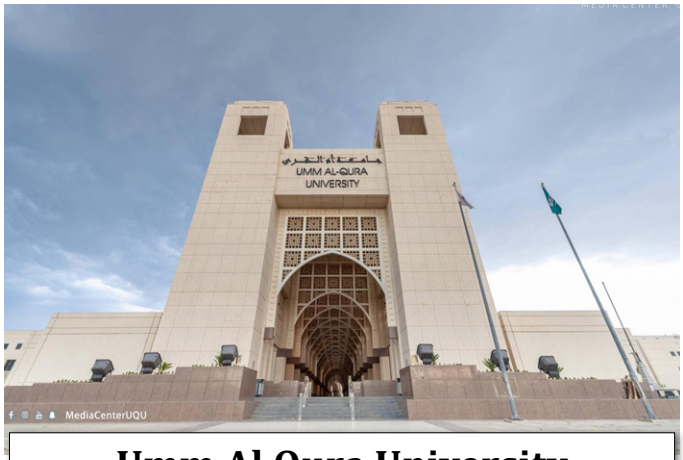
To help customers maintain reliable performance, Al Mousa Trading offers preventive maintenance, inspection, and technical support services. Regular servicing extends equipment lifespan, improves energy efficiency, reduces operating costs, and minimizes interruptions, allowing organizations to protect their long-term investment.



Case Study| Engineering Expertise Beyond Equipment Supply

The value of combining engineering expertise with premium equipment can be seen in Al Mousa Trading's contribution to several landmark projects across Saudi Arabia. The company has supplied engineering solutions for projects including Umm Al Qura University, King Faisal Specialist Hospital & Research Centre, King Abdullah Park, Hilton Hotels, and the Civil Defense Hajj Command.

These projects required more than supplying equipment. They demanded careful engineering planning, proper product selection, professional installation, and continuous technical support to ensure reliable performance under demanding operating conditions. By providing integrated engineering solutions throughout the project lifecycle, Al Mousa Trading helped deliver dependable infrastructure that continues to serve critical facilities efficiently.



Umm Al Qura University



King Faisal Specialist Hospital and Research Centre



King Abdullah Park



Hilton Hotels



Civil Defense Hajj Command

Conclusion

High-quality equipment is undoubtedly an essential part of every successful water project, but it is never the only factor. Careful engineering planning, selecting the right products, professional installation, comprehensive testing, and regular maintenance all contribute to long-term reliability and operational efficiency.

Al Mousa Trading demonstrates that preventing project failure requires a complete engineering approach rather than simply supplying equipment. Through its integrated services, extensive product portfolio, partnerships with leading global manufacturers, and experience in delivering major infrastructure projects, the company helps customers transform quality equipment into reliable, high-performing water systems that continue to deliver value for years to come.

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WHY DO SOME WATER PROJECTS FAIL DESPITE THE QUALITY OF THE EQUIPMENT?



AL MOUSA TRADING HAS THE ANSWER

- ENGINEERING PLANNING
- EQUIPMENT SELECTION
- GLOBAL PARTNERSHIPS
- PROFESSIONAL INSTALLATION
- TESTING & COMMISSIONING
- PREVENTIVE MAINTENANCE
- PROVEN PROJECT EXPERIENCE

Because successful water projects require more than quality equipment— they require the right engineering partner.

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FILTRALITE®



How Filtration Media Supports More Sustainable Water Treatment Processes

As the water industry works to reduce energy use, conserve water, and lower carbon emissions, sustainability has become a key priority. While attention often focuses on pumps, membranes, and automation, filter media also plays a vital role.

Advanced solutions such as Filtralite® go beyond suspended solids removal by improving filtration efficiency, reducing water and energy consumption, and supporting more sustainable plant performance.

Reducing Backwash... The First Step Toward Sustainability

Manufactured from lightweight expanded clay with a highly porous structure, Filtralite® retains more suspended solids than conventional media. As a result ,Filtralite can reduce the frequency of backwashing, lowering water consumption, minimizing operational interruptions, and maintaining stable filtration performance.

Filtralite® Solutions for Different Treatment Applications

Filtralite® offers specialised solutions for a wide range of water treatment applications:

- **Filtralite® PURE:**

Designed for drinking water treatment and desalination pretreatment, improving filtration efficiency and protecting downstream membranes.

- **Filtralite® CLEAN:**

Developed for wastewater treatment, enhancing solids removal and improving operational stability.

- **Filtralite® AIR:**

Designed for air filtration and odour control, extending sustainable solutions beyond water treatment.

Lower Energy Consumption, Lower Carbon Emissions

Reducing backwash frequency not only saves water but also lowers energy demand, as every backwash cycle requires pumping and moving large volumes of water.

This leads to lower operating costs and improved overall plant efficiency, while lower energy demand can contribute to reducing operational carbon emissions, depending on the local energy mix and operating conditions.

Increasing Plant Capacity Without Major Upgrades

By improving hydraulic performance and extending filtration cycles, advanced filter media enables treatment plants to process higher water volumes using existing infrastructure, potentially reducing or delaying the need for filtration system expansions.



Real-World Success: Pedraza Drinking Water Plant, Spain

The benefits of Filtralite® are clearly demonstrated at the Pedraza Drinking Water Plant in Spain, where conventional sand-anthracite media was replaced with Filtralite® PURE across all four filters to improve iron and manganese removal. The upgrade increased production capacity from 220 m^3/h to 300 m^3/h—a 36% increase—while reducing operating hours during peak demand. Thanks to the media's higher solids retention capacity, backwash frequency decreased, saving approximately 140 m^3 of water per day and reducing backwash water consumption from 4.4% to 0.9% of total production.

The project also reduced operating costs and cut water and energy losses associated with backwashing by more than 75%, while maintaining filtered water turbidity below 0.3 NTU. The investment paid for itself within just one year, demonstrating that upgrading filter media delivers both environmental and economic value.



Long-Term Performance for Sustainable Operations

Designed with a service life Filtralite® can remain in use for more than 20 years, Filtralite® minimizes replacement frequency, reducing maintenance requirements and the environmental impact associated with frequent media replacement. This contributes to more sustainable plant operation throughout its lifecycle.

Why Filter Media Matters More Than Ever

Today, sustainability in water treatment is measured not only by water quality but also by how efficiently plants utilize water, energy, infrastructure, and resources.

Filter media has evolved from a basic filtration component into a strategic asset that enhances operational performance, lowers costs, and supports environmental sustainability—making the right filter media choice an essential step toward a more efficient and sustainable future

FILTRALITE®

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THE HIDDEN LINK BETWEEN FILTER MEDIA & PLANT SUSTAINABILITY

Smarter Filtration Starts with Smarter Filter Media

- Can Reduce Backwashing
- Lower Energy Consumption
- Can Contribute to Lower Operational Carbon Emissions
- Higher Plant Capacity
- Can Remain in Use for More Than 20 Years



Pedraza Drinking Water Plant, Spain

PROVEN RESULTS

36%
Increase in Plant Capacity

75%
Reduction in Backwash Water & Energy Losses

< 0.3 NTU
Filtered Water Turbidity

Filtralite® PURE

Better Filter Media.
Better Sustainability.



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Multiple Scaling Risks. One Powerful RO Protection Strategy.

Pretreat Plus® G2000 for Complex Feedwater

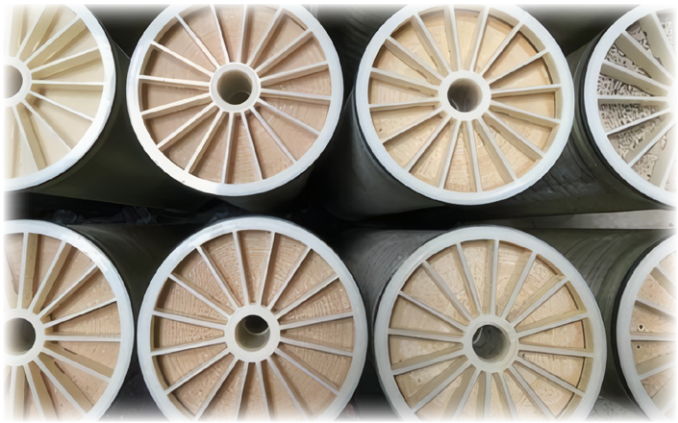
In demanding industrial and mining water applications, Reverse Osmosis (RO) systems can face complex feedwater conditions containing multiple scale-forming compounds. As water passes through the RO system, dissolved minerals become increasingly concentrated. When their concentrations exceed solubility limits, they can begin to form deposits on membrane surfaces.

The impact can extend far beyond visible scale. Scaling may result in reduced permeate flow, increased pressure requirements, more frequent membrane cleaning, and higher operating costs. Over time, these effects can compromise both membrane performance and the overall efficiency of the RO system.

This is why scale control should be treated as a proactive part of RO pretreatment, rather than a corrective measure applied after scaling has already affected the system.

A Broader Approach to Scale Control

Antiscalants are an essential component of RO pretreatment. By interfering with the growth, formation, and deposition of scale-forming compounds, they help protect membrane surfaces and maintain more stable system performance.



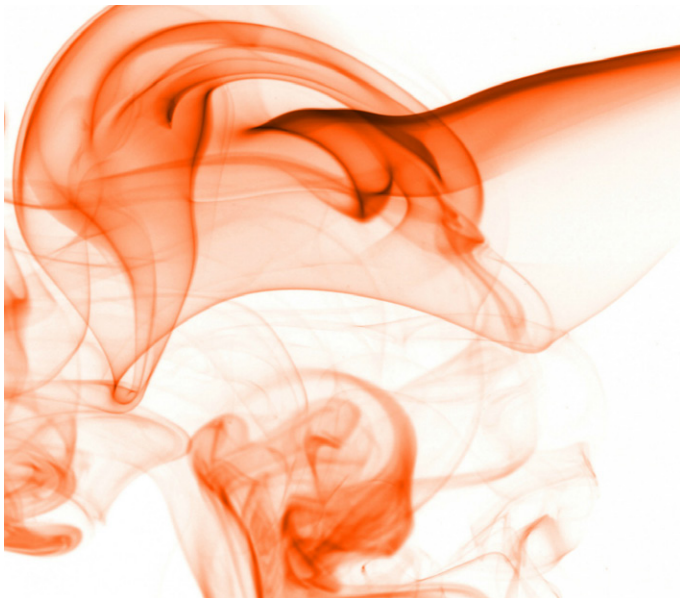
However, not all feedwaters present the same scaling challenge. An RO system may encounter sulfate scales, carbonate scale, silica, or dissolved metals—and in some applications, several of these risks may occur simultaneously. Selecting an antiscalant therefore requires more than simply choosing a general-purpose product. The formulation must be suitable for the specific water chemistry and operating conditions.

This is where Pretreat Plus® G2000, developed by King Lee Technologies, offers a broader approach. As part of the King Lee Technologies Synergy line, G2000 is a synergistic antiscalant formulated to provide broad-spectrum control for challenging industrial and mining water applications.

Pretreat Plus® G2000: Designed for Multiple Scaling Risks

Rather than focusing on a single type of scale, Pretreat Plus® G2000 is designed to address several common inorganic scaling challenges within one formulation. Its capabilities include:

- Calcium sulfate, barium sulfate, and strontium sulfate scaling with large concentrations.
- Carbonate scale
- Silica-related scaling
- Moderate levels of dissolved metals (Ferrous, manganese)
- Inorganic scale formation through enhanced dispersing performance



This broad-spectrum capability becomes particularly valuable when feedwater chemistry presents multiple scaling risks at the same time. For RO operators, the objective is not simply to prevent a visible deposit. It is to maintain the conditions required for the membrane system to operate consistently.

Supporting More Reliable RO Performance

Effective scale control can help operators reduce the operational impact associated with scaling and maintain more consistent RO performance. By addressing different scale-forming compounds within a single formulation, Pretreat Plus® G2000 supports a more comprehensive approach to RO pretreatment. Its liquid formulation also allows for practical dosing and integration into existing water treatment systems. But product selection is only one part of effective scale management.

The appropriate dosage depends on the characteristics of each application. Factors such as:

- Feedwater pH
- Temperature
- Recovery rate
- Concentration levels
- Feedwater composition
- Specific scaling potential

should all be considered when developing the treatment strategy.

The Right Antiscalant Starts with the Right Water Analysis

There is no universal antiscalant dosage that can be applied to every RO system.The chemistry of the feedwater, operating conditions, recovery rate, and scaling potential all influence the appropriate product selection and dosage. To support this process, King Lee Technologies' HydraCalc® can be used to evaluate water chemistry and operating conditions and assist in antiscalant selection and dosing decisions. This analytical approach allows operators to move away from a reactive strategy—waiting for scaling to affect membrane performance—and toward a more proactive approach based on the actual conditions of the RO system.



Analyze the water. Understand the scaling risk. Select the appropriate treatment. That is the foundation of effective scale management.

King Lee Technologies + Envishield in Saudi Arabia

King Lee Technologies brings decades of experience in membrane chemistry and water treatment solutions, while Envishield, the exclusive distributor of King Lee Technologies in Saudi Arabia, provides access to these advanced chemical solutions for customers across the Kingdom. Together, King Lee Technologies and Envishield support water treatment professionals dealing with challenging RO applications by combining advanced antiscalant technology with application-focused expertise.

From Reactive Cleaning to Proactive RO Protection

Scaling does not have to become a recurring cycle of performance loss, pressure increases, and membrane cleaning. For applications exposed to sulfate, carbonate, silica, and dissolved metals, Pretreat Plus® G2000 provides a synergistic, broad-spectrum approach to scale control. Combined with proper water analysis and application-specific dosing, it can help water treatment professionals take a more proactive approach to protecting RO membranes and maintaining reliable system performance.

The goal is not to manage scaling after it happens. The goal is to control the conditions that allow scaling to happen in the first place.

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IS SCALING PUTTING YOUR RO PERFORMANCE AT RISK?

Multiple Scaling Risks Can Reduce RO Performance

THE SOLUTION

Pretreat Plus® G2000

Synergistic Antiscalant for Complex Feedwater

KEY BENEFITS

- Controls **high scaling potential** from sulfate, carbonate & silica
- Controls **dissolved metals** (ferrous and manganese)
- Provides **broad-spectrum** scale control
- Enhances **scale dispersion** & **RO protection**

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Next Turbo Blowers: The Future of High-Efficiency Aeration Without VFD In WWTPs

Energy efficiency has become a critical priority in modern wastewater treatment plants. Since aeration is one of the largest consumers of electricity in wastewater treatment, selecting an efficient and reliable blower technology can have a significant impact on operating costs, process performance, and long-term sustainability. This is where NextTurbo Technologies introduces a different approach to modern aeration.

Advanced Blower Technology for Modern Wastewater Treatment

NextTurbo develops advanced single-stage integrally geared centrifugal blowers specifically designed for municipal and industrial wastewater treatment applications. NextTurbo focuses on delivering high efficiency, operational flexibility, reliability, and long-term lifecycle value.

Its blowers are operating in numerous wastewater treatment projects worldwide, including major installations across the Middle East.

What Makes NextTurbo Different?

What makes NextTurbo different is its approach to airflow regulation. Unlike conventional high-speed centrifugal blowers that rely on Variable Frequency Drives (VFDs), NextTurbo blowers do not require a VFD for airflow control.

Instead, they operate at a constant impeller speed and use an advanced Dual Modulating Vane Technology, combining Variable Diffuser Vanes (VDV) and Inlet Guide Vanes (IGV).





Dual Modulating Vane Technology

The Variable Diffuser Vanes regulate airflow downstream of the impeller, while the Inlet Guide Vanes optimize the incoming airflow according to operating and ambient conditions. Together, these systems provide precise airflow regulation while maintaining nearly constant pressure capability. This allows the blower to remain close to its optimum operating conditions over a wide range of airflow requirements.

NextTurbo maintains constant speed and regulates airflow through its vane control system. This enables high efficiency across a broad operating range without relying on VFD-based speed control.

The Advantages of a VFD-Free Design

The VFD-free design also provides important electrical and operational advantages. VFD systems introduce electrical conversion losses and harmonic distortion and may require additional cooling equipment, harmonic filters, and electrical components. By eliminating the VFD from the airflow regulation system, NextTurbo simplifies the blower package, reduces electrical complexity, and can reduce auxiliary energy consumption while supporting long-term reliability.

Wide Airflow Regulation Capability

Another key advantage is the blower's wide airflow regulation capability. NextTurbo blowers can efficiently regulate airflow from approximately 40% to 100% of rated capacity, providing the flexibility required to respond to continuously changing oxygen demands in wastewater treatment plants. Variations in biological loading, seasonal conditions, and process requirements can all affect airflow demand. The ability to operate efficiently across a wide range helps optimize aeration, reduce unnecessary energy consumption, and minimize frequent start-stop operation.



Application-Specific Engineering for Maximum Efficiency

Efficiency is further supported by NextTurbo's application-specific engineering philosophy. Rather than relying solely on standardized off-the-shelf configurations, blower design can be tailored to the project's required airflow, discharge pressure, ambient temperature, altitude, and installation conditions. Impeller geometry and gearbox selection are optimized to match the application, helping avoid unnecessary oversizing and maximize performance throughout the equipment's lifecycle up to more than 25 years

Reliability in Demanding Wastewater Environments

Reliability is equally important, particularly in wastewater treatment environments where equipment may be exposed to high temperatures, humidity, dust, and corrosive gases such as hydrogen sulfide (H_2S).

NextTurbo's mechanical design and reduced dependence on sensitive high-frequency electrical components support reliable continuous operation in demanding environments. The equipment is also designed with maintenance and serviceability in mind, helping facilitate inspection, preventive maintenance, and component replacement while reducing downtime.

Proven Performance in Major Wastewater Projects

The effectiveness of this approach has been demonstrated through installations in major wastewater treatment facilities, including projects in Jebel Ali and Al Warsan in the UAE, Umm Al Hayman in Kuwait, and Tubli in Bahrain, among others.

These applications demonstrate NextTurbo's capability to provide reliable and energy-efficient aeration solutions under demanding operating conditions.



Al Aweer (Warsan) STP (UAE)

435 MLD – Veolia / Al Kharafi/ DM

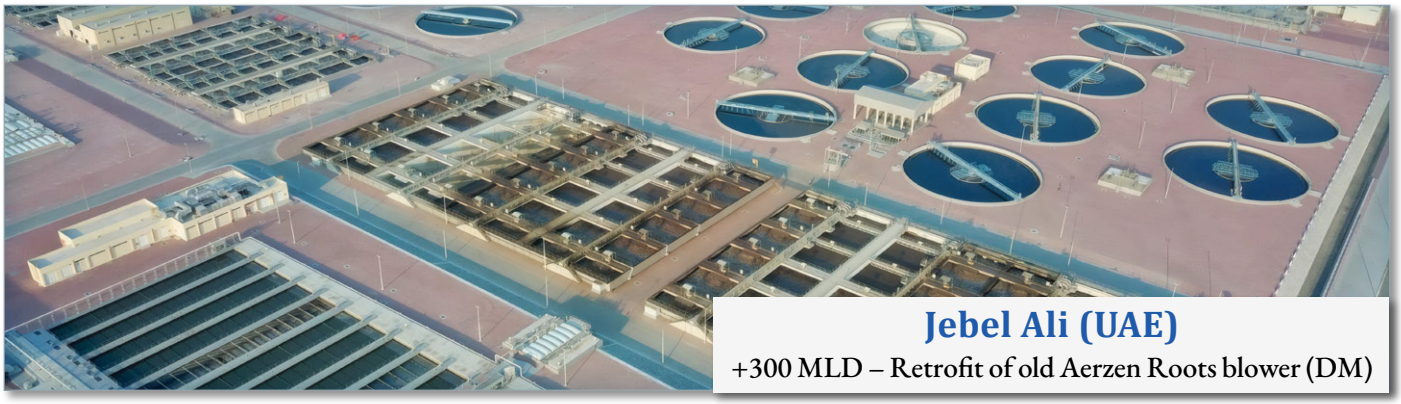
The Future of Efficient Aeration

As wastewater treatment plants increasingly focus on energy efficiency, sustainability, and lifecycle cost reduction, blower technology has become more than simply a source of air—it has become a key part of overall plant performance. By combining VFD-free airflow regulation, Dual Modulating Vane Technology, wide operating flexibility, customized engineering, and robust mechanical design, NextTurbo offers a smarter approach to modern aeration.

No VFD. More Efficiency. Smarter Aeration.

NextTurbo blowers are engineered to help wastewater treatment plants reduce energy consumption, optimize aeration performance, and achieve reliable long-term operation.

NextTurbo an ideal choice for the next generation of wastewater treatment plants.



Jebel Ali (UAE)

+300 MLD – Retrofit of old Aerzen Roots blower (DM)

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NextTurbo

Smarter Blower.
Smarter Aeration.



VFD-Free Operation
No VFD required

Dual Modulating Vane Technology
Precise airflow control

40–100% Airflow Regulation

High Efficiency &
Lower Energy Consumption

Application-Specific Engineering

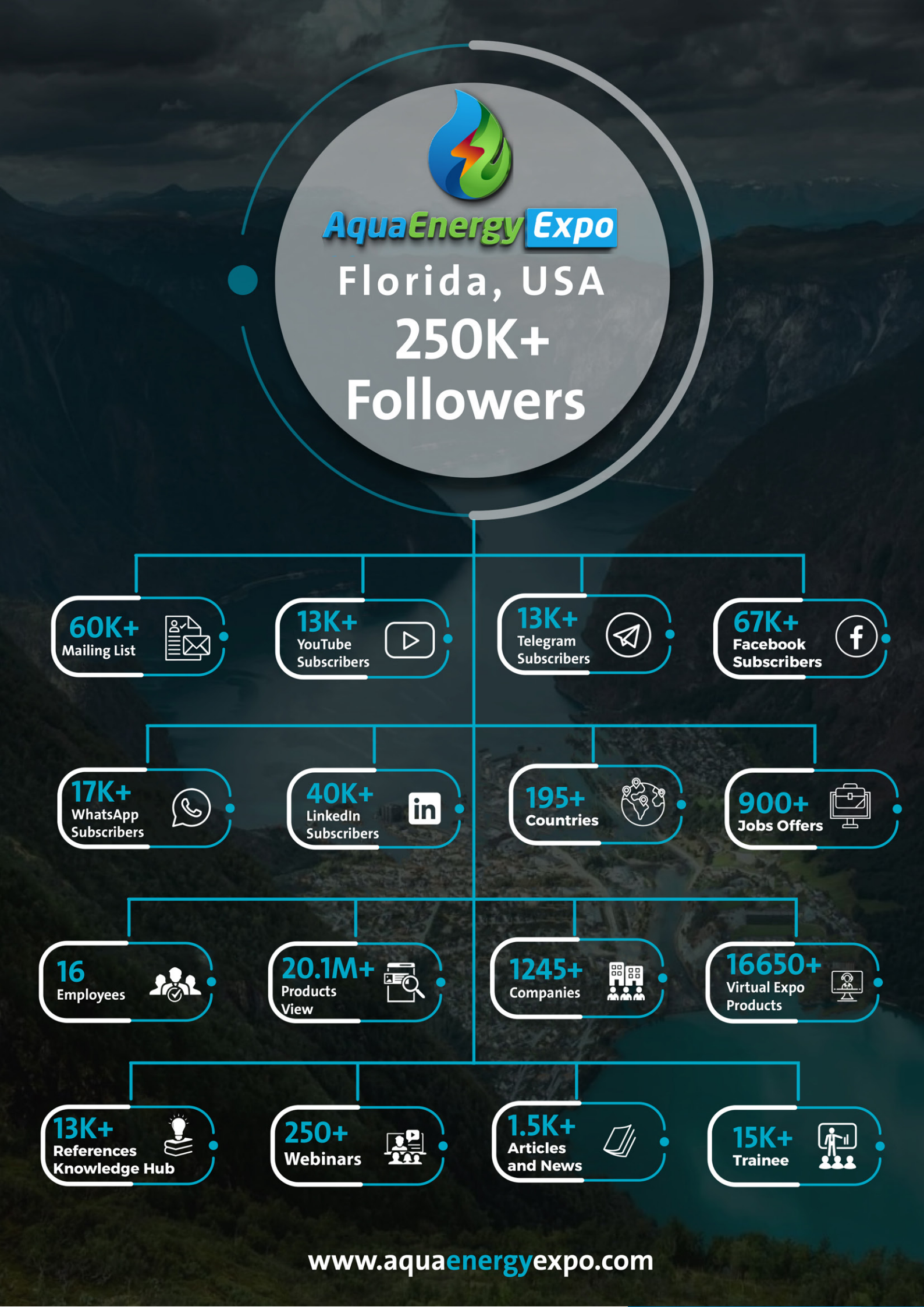
Reliable Long-Term Operation

Proven Worldwide in WWTPs

Smart Sustainability for Water & Energy is the official representative of **NextTurbo Technologies** in Egypt.

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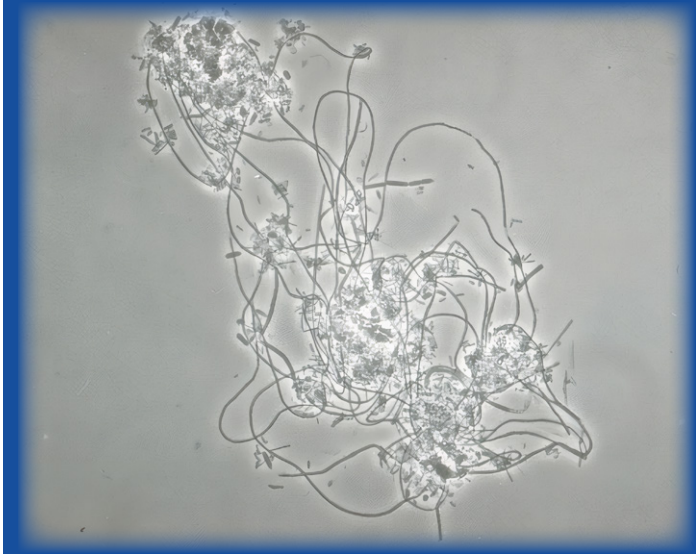


Smart Biomass Balance Control:

A Practical Path to Better Wastewater Treatment Performance

How automated control of biomass balance, RAS, and WAS can improve biological stability, sludge settling, nitrogen removal, and final effluent quality. Biological wastewater treatment is a living process. The real work is not done only by tanks, blowers, and clarifiers. It is done by the biomass, which is a living microbial community inside the treatment system. This community removes organic pollutants, supports nitrification, and helps achieve nitrogen removal. When the biomass is healthy and balanced, plant performance is stable. When the biomass becomes weak or unbalanced, treatment problems begin to appear.

For this reason, biomass balance is one of the most important targets in any activated sludge plant. A good biomass balance means that the right microorganisms are active, sludge age is under control, floc structure is strong, settling is good, and final effluent quality remains stable. If this balance is lost, the plant may face poor organic removal, ammonia breakthrough, weak denitrification, sludge bulking, foaming, solids carryover, and unstable final water quality.



Why Biomass Balance Is So Important

In biological treatment systems, different microorganisms do different jobs. Heterotrophic bacteria remove biodegradable organic matter. Nitrifying bacteria oxidizes ammonia. Denitrifying bacteria reduces nitrate under anoxic conditions when enough carbon is available. These groups must stay in balance.

If nitrifiers are lost, ammonia removal drops. If filamentous microorganisms grow too much, sludge settling becomes poor. If sludge becomes too old or too young, both treatment efficiency and clarification can suffer. This means that wastewater treatment is not only a mechanical or hydraulic operation. It is also a biological control process. A stable plant needs a stable biomass. And a stable biomass needs good operational control.

The Central Role of RAS and WAS

Two of the most important tools for biomass control are RAS and WAS.

RAS, or Return Activated Sludge, sends settled biomass from the secondary clarifier back to the aeration tank. This helps maintain the biomass concentration (MLSS) needed for treatment. But RAS is not only about returning sludge quantity. The quality of the returned sludge is also very important. If the sludge is poorly settled, biologically weak, overloaded with filamentous growth, or badly compacted, returning it will not support process stability in the right way.

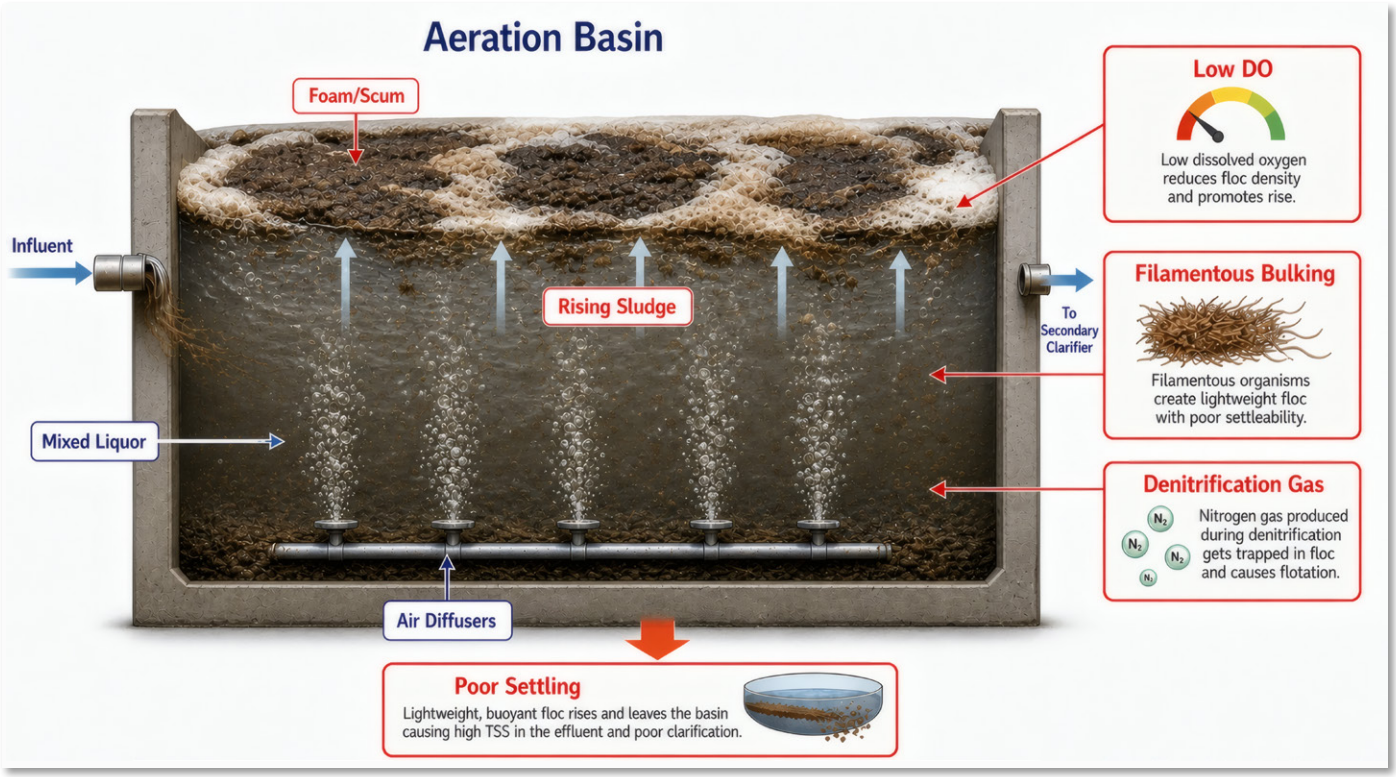
WAS, or Waste Activated Sludge, controls how much sludge is removed from the system. This directly affects sludge age, solids retention time, microbial balance, nitrification capacity, and floc quality. If too much sludge is wasted, the plant may lose important slow-growing bacteria, especially nitrifiers. If too little sludge is wasted, sludge can become too old, less active, and more difficult to settle. This is why RAS and WAS should not be treated only as flow-control points. They are key biological control points.

What Happens When Sludge Control Is Weak

Many plant problems start with poor control of RAS and WAS.

If RAS is too low, biomass can remain too long in the clarifier. This may increase sludge blanket depth, reduce biomass concentration in the reactor, and weaken treatment stability. If RAS is too high, the clarifier may face hydraulic stress, and sludge compaction may become weaker.

If WAS is not adjusted correctly, sludge age moves away from the target range. Short sludge age may reduce nitrification and weaken floc formation.



Long sludge age may create old sludge conditions with lower activity and poorer settling. Both situations can reduce final effluent quality.

Poor sludge control also supports the growth of undesirable microorganisms. This may lead to bulking, foaming, pin floc, rising sludge, and suspended solids loss in the final effluent. In other words, the question is not only how much sludge is moving. The real question is whether the plant is keeping the right biomass and removing the wrong biomass at the right time.

A Smarter Solution from Sternova Solutions

Sternova Solutions has developed a practical answer to this challenge through advanced automated control of biomass balance, with strong focus on RAS and WAS quantity and quality.

Founded in 2008 by environmental engineers and biotechnologists, Sternova Solutions has built a robust portfolio of technologies in wastewater treatment, air purification, and sludge management. The company follows a circular-economy model that supports lower water loss, reduced energy consumption, and sustainable environmental performance. In wastewater treatment, one of the company's strongest areas is biomass rehabilitation and smart sludge management. Sternova Solutions understands that biological treatment performance depends not only on keeping sludge in the system, but on keeping the right biomass in the right condition. This is where automated control becomes highly valuable.

Automated Biomass Balance Control

Sternova Solutions promotes a modern control philosophy: manage sludge based on biological needs, not only fixed manual settings.

Its automated approach helps treatment plants improve control of:

- Biomass concentration in the aeration tank
- Sludge age and solids retention time
- RAS quantity and return stability
- RAS quality and sludge condition
- WAS quantity and wasting accuracy
- Preservation of nitrifiers and floc-forming organisms
- Clarifier blanket behavior and settling performance
- Response to changes in flow and load
- Bioaugmentation may be applied, if needed

Bioaugmentation may be applied, if needed, by dosing a selected microbial product at a controlled rate in the RAS modification unit so the added culture is thoroughly mixed with the return activated sludge before it re-enters the biological process.

This approach can help reinforce the desired biomass, improve recovery after upset conditions,

and support more stable settling and treatment performance, especially when the plant is experiencing filamentous growth, shock loading, or weak biological activity. The dosing rate should be based on plant conditions, supplier guidance, and operational monitoring such as DO, SVI, MLSS, ammonia, and effluent quality to confirm that the treatment is delivering the intended benefit.

This is a major step forward compared with traditional manual operation. Instead of waiting for sludge bulking, ammonia breakthrough, or clarifier problems to appear, plants can maintain a healthier biomass proactively.

Controlling Quality as Well as Quantity

A major strength of the Sternova approach is that it does not look at sludge only as tons, flow, or suspended solids. It treats sludge as a living biological system.

That means RAS and WAS must be controlled not only by quantity, but also by quality. The system must help preserve desirable biomass, reduce weak sludge conditions, and limit the dominance of unwanted microorganisms.

For example, if the sludge begins to show signs of weak floc structure, poor settling, excessive filamentous growth, or falling nitrification performance, the answer should not be only a simple flow adjustment.

The plant needs guided biological correction supported by smart sludge control. This is where Sternova Solutions adds real value.

Supporting the Desired Biomass

Good treatment depends on keeping the desired microorganisms strong and active.

These include floc-forming organisms, nitrifiers, and the biological groups needed for stable organic and nitrogen removal. At the same time, plants must limit the conditions that allow harmful or undesirable organisms to dominate.

Sternova Solutions combines automated sludge control with biomass rehabilitation strategies. This can include improving retention of valuable biomass, removing poor-quality excess sludge more effectively, and applying external biological support when needed. In difficult cases, this integrated approach can help restore biomass efficiency faster and more reliably than conventional operation alone.

Better Settling and Better Final Effluent

When biomass balance improves, the whole plant benefits. Sludge settles better. Clarifier performance becomes more stable. Solids carryover decreases. Organic removal improves. Nitrification becomes stronger. Nitrogen removal becomes more reliable.





Final effluent quality becomes more consistent. This is why automated control of RAS and WAS is so important. It is not simply a sludge handling function. It is one of the most direct and effective ways to protect the biological heart of the treatment process.

For many plants, especially those with repeated sludge problems, manual control is no longer enough. Operating conditions change too often, and biomass response can be too sensitive. Automated systems offer a more accurate and stable way to maintain the right sludge balance every day.

About Sternova Solutions

Sternova Solutions was founded in 2008 by environmental engineers and biotechnologists to deliver advanced environmental solutions in wastewater treatment, air purification, and sludge management. The company's technology portfolio is built around sustainability, circular-economy principles, lower resource loss, and continuous innovation for municipal and industrial applications.

Conclusion

Understanding biomass is essential in biological wastewater treatment, but understanding alone is not enough. Plants also need practical tools to maintain biomass balance every day. One of the most important of these tools is smart control of RAS and WAS.

By focusing on automated biomass balance control and on both the quantity and quality of returned and wasted sludge, Sternova Solutions offers a practical and modern solution for one of the most important challenges in activated sludge treatment. The result is stronger biomass stability, better settling, improved nitrogen control, and more reliable final effluent quality.

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Dr. Iman Fouad

"Water Time Engineering: Toward Smarter and More Efficient Water Treatment & Desalination Plants"

Saturday, September 19

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From Wastewater to Water Security: Unlocking the Value of Every Drop

For decades, wastewater has largely been viewed as something that must be collected, treated, and discharged. But as water scarcity intensifies and pressure on freshwater resources grows, this traditional perception is beginning to change. Wastewater is increasingly recognized not simply as a waste stream but as a resource containing water, nutrients, and other valuable components that can be recovered and returned to productive use.

This shift in perspective is at the heart of a growing global movement toward water reuse and resource recovery. The opportunity is significant: the Scaling Water Reuse Initiative (SIANI) reports that only 11% of municipal water is currently reused globally, while aiming to reach 50% by 2045. Achieving that transformation would require expanding annual municipal reuse from approximately 67 km^3 today to 428 km^3 by 2045.

A New Water Strategy: Use, Recover, Reuse

The logic behind water reuse is straightforward but increasingly powerful. Every drop of treated water that is reused can reduce the need to withdraw additional freshwater from rivers, lakes, and aquifers. At the same time, reuse can reduce the amount of treated or untreated wastewater discharged back into the environment. The Scaling Water Reuse Initiative therefore frames reuse as more than a technical solution. It represents a change in the way societies think about water itself: from a resource that is consumed once to one that can circulate through multiple applications. The initiative's proposed global ambition is to make reuse a first choice for water, supported by technological innovation, appropriate regulation, investment, and stronger public engagement.

This approach also addresses a fundamental weakness in conventional wastewater management. Treatment and sanitation systems require significant investment, yet wastewater is often treated primarily as a cost rather than an asset. Reuse can change that equation by giving treated wastewater an economic value and creating stronger incentives for investment in sanitation and treatment infrastructure.

When Wastewater Becomes an Agricultural Resource

The potential of wastewater extends beyond recovering water itself. It also contains nutrients and organic matter that can potentially be recovered and used in agriculture.

The connection between wastewater, agriculture, and food security becomes particularly clear in regions where water scarcity places pressure on agricultural production. The experience of Spain's Murcia region provides a striking example. Facing chronic water shortages, the region developed an extensive wastewater reuse system, with approximately 98% of wastewater treated through a network of 100 wastewater treatment plants and reused, primarily for agricultural irrigation. This reclaimed water supports fruit and vegetable production and contributes to agricultural exports.



The significance of this model goes beyond simply replacing freshwater. Agriculture and food production account for more than 70% of global freshwater use, while water scarcity affects billions of people during at least part of the year. At the same time, soil degradation and instability in fertilizer availability create additional pressures on food production. Recovering water and nutrients from wastewater can therefore create an important link between sanitation, water security, and food security.

Recovering More Than Water

A truly circular approach to wastewater asks a broader question: what resources are contained within the waste stream?

Wastewater generated each year globally contains approximately 16.6 million tonnes of nitrogen, 3 million tonnes of phosphorus, and 6.3 million tonnes of potassium. Instead of allowing these nutrients to enter aquatic ecosystems, resource recovery approaches can return them to productive agricultural systems.



This has implications for both agriculture and the environment. Traditional fertilizer production depends heavily on industrial processes and finite resources, while excess nutrients discharged into water bodies can damage aquatic ecosystems. Recovering nutrients from sanitation systems offers an opportunity to address both challenges simultaneously. The potential is particularly significant for nitrogen and phosphorus. Recycling nutrients available in human urine could cover up to 25% of global agricultural demand for nitrogen and phosphorus.

Initiatives in Europe are therefore exploring source-separation approaches designed to capture nutrients earlier and with less contamination or dilution, potentially improving recovery efficiency. In this model, wastewater treatment becomes something much more valuable than an endpoint. It becomes part of a circular system in which water & nutrients can move back into productive cycles.

Wastewater Reuse is a Climate Strategy

The connection between wastewater and climate action is another dimension of this transformation. Water scarcity, drought, and unpredictable weather patterns increasingly challenge agricultural systems. Reusing treated wastewater can provide an additional and more resilient source of water for agriculture, reducing dependence on increasingly stressed freshwater supplies.

Resource recovery can also contribute to climate mitigation. Reusing nutrients recovered from sanitation systems can reduce dependence on synthetic fertilizers, while preventing nutrient-rich wastewater from being discharged into sensitive aquatic ecosystems.

Nutrient enrichment can damage ecosystems such as mangroves, coral reefs, and seagrass beds, which themselves play an important role in carbon storage. This creates a powerful connection: water reuse can support adaptation, while resource recovery can contribute to mitigation.

Scaling Water Reuse: Closing the Global Gap

Despite the growing potential, the global transition is still in its early stages. The Scaling Water Reuse Initiative estimates that only 11% of municipal water is currently reused. Its proposed pathway would increase this share to 50% by 2045, requiring reuse capacity to expand approximately 6.4 times from today's level. The initiative estimates that achieving the target would require annual growth of around 9.7%.

Meanwhile, the SIANI analysis points to another fundamental challenge: hundreds of billions of cubic metres of wastewater are generated globally every year, yet less than half is treated. The untreated remainder can carry pollutants into natural ecosystems, turning what could be a resource into an environmental burden.

The gap is therefore not simply about building more treatment plants. It is about changing the purpose and economics of wastewater management—from disposal toward recovery and reuse.





Making Reuse Economically Attractive

Technology alone will not deliver this transformation. The Scaling Water Reuse Initiative identifies two parallel shifts required to scale reuse: changing how society thinks about reused water and changing the economics that determine whether projects are viable.

Increasing the value of reused water, reducing treatment costs through innovation and scale, and creating smarter regulatory frameworks are all part of this equation.

The economic value of reclaimed water also depends on what it replaces. Water supplied for irrigation, industrial processes, or other applications does not necessarily have the same value. This means that successful reuse strategies must consider not only how water can be treated, but where reclaimed water can create the greatest value.

There is also an opportunity to move beyond water sales alone. The Scaling Water Reuse Initiative describes a broader value proposition involving wastewater treatment, reclaimed-water sales, and the recovery of energy and materials.

Such a model can potentially transform wastewater infrastructure from a cost centre into a platform for resource generation.

The Human Factor

Perhaps one of the most important barriers is not technological at all: public perception. Concerns about health, environmental risks, and the quality of reused wastewater can influence public acceptance, even when perceptions may not accurately reflect actual risk. Scaling Water Reuse Initiative emphasizes that scaling reuse requires not only risk management but also effective communication about both risks and benefits.

The Scaling Water Reuse Initiative similarly identifies public attitudes as a central component of its strategy. Making reuse a first choice for water requires society to recognize treated wastewater as a sustainable water source rather than simply associating it with waste. That means the future of water reuse will depend not only on treatment technologies and infrastructure, but also on communication, trust, regulation, and the willingness of communities and industries to embrace a circular approach.

From Wastewater Treatment to Resource Recovery

Wastewater management is evolving from a linear model—use, collect, treat, discharge—toward a circular model in which water and other resources are recovered and returned to productive use.

Water can be reused for agriculture and other applications. Nutrients can be recovered for agricultural production. Organic matter can contribute to soil restoration. And the economic value created through these resources can help strengthen the case for investment in wastewater infrastructure.

But scaling this vision requires coordinated action. The Scaling Water Reuse Initiative identifies three important areas: better communication and public engagement, innovation in separating and recovering waste streams, and new financing mechanisms capable of attracting investment.

The Scaling Water Reuse Initiative approaches the same challenge from the global water-reuse perspective, bringing together utilities, industry, finance, civil society, government, technology providers, and researchers around a shared ambition.

Conclusion | A New Future for Wastewater

The future of water management may ultimately depend on a simple change in perspective: stop seeing wastewater as the end of the water cycle. It can be the beginning of another one. The global ambition to move from 11% municipal water reuse toward 50% by 2045 demonstrates the scale of the transformation being proposed. The agricultural experience of Murcia demonstrates how reclaimed water can help sustain production in water-stressed regions. And the broader resource-recovery perspective shows that wastewater contains far more value than water alone. The opportunity is therefore not simply to treat more wastewater. It is to extract more value from every drop. As water scarcity, food security, and climate pressures become increasingly interconnected, wastewater can move from being one of the world's most persistent environmental challenges to becoming an essential component of a more resilient and circular water economy.

The question is no longer only

"How do we treat wastewater?"

It is becoming:

"How much value can we recover from every drop?"

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Nesma & Partners and the Saur Group Sign Strategic MoU to Support Saudi Arabia's Water Transformation

Nesma & Partners and Saur have signed a Memorandum of Understanding to develop advanced and sustainable water projects across Saudi Arabia. The partnership will focus on desalination, sewage treatment, and industrial water facilities, covering project development, engineering, construction, and long-term operations and maintenance. Combining Nesma & Partners' execution capabilities with Saur's expertise in digital water solutions, the collaboration aims to strengthen water infrastructure, improve resource management, and support Saudi Arabia's sustainability goals and Vision 2030. The agreement also reflects the growing economic partnership between Saudi Arabia and France and highlights the importance of international expertise and local collaboration in advancing the Kingdom's transformation.



Acwa and Veolia Sign Agreement to Continue Optimizing Development, Design, and Performance of Desalination Plants in Saudi Arabia and Beyond



Acwa and Veolia have signed a memorandum of understanding to enhance seawater desalination across the entire value chain, from plant design and equipment selection to chemical dosing, monitoring, and daily operations. The collaboration aims to improve energy efficiency, reduce costs and environmental impacts, and enhance water quality across Acwa's desalination fleet. Even small reductions in energy use could generate significant savings at large-scale facilities, with Acwa's major plants potentially saving around 22 GWh annually per site. The partnership will also support projects in Azerbaijan and Senegal, reinforcing Saudi Arabia's Vision 2030 goals for more affordable, sustainable, and less carbon-intensive water solutions.

Aqualia Awarded Three-Year O&M Contract for 150,000 m^3/day Floating Desalination Plants in Yanbu, Saudi Arabia

Aqualia has secured a three-year contract with Saudi Arabia's National Shipping Company (Bahri) to operate and maintain three floating desalination plants in Yanbu. The facilities consist of three reverse osmosis units mounted on barges, with a combined capacity of approximately 150,000 cubic meters of potable water per day. Under the agreement, Aqualia will provide technical and operational services to ensure efficient, reliable, and high-quality water production. The project strengthens Yanbu's water security and supports Saudi Arabia's sustainability goals. It also expands Aqualia's presence in the Kingdom, building on its experience managing major desalination and water treatment facilities nationwide.



NWC Concludes a Contract to Rehabilitate, Operate, and Maintain 9 STPs in 4 Regions at More Than SAR1.3 Billion

The National Water Company (NWC) has signed its tenth long-term operation and maintenance (LTOM) contract, valued at over SAR 1.3 billion, with a Saudi-Chinese consortium to rehabilitate, manage, and maintain nine sewage treatment plants across four regions in its Northern Cluster. The plants have a combined treatment capacity exceeding 337,000 cubic meters of wastewater per day. The agreement supports the National Water Strategy by increasing private-sector participation, improving operational efficiency, and promoting environmental sustainability. NWC's broader LTOM program aims to attract local and international investment, modernize existing assets, transfer knowledge, localize advanced technologies, and strengthen Saudi Arabia's water sector.



Egypt Establishes $100m Fund for Water, Dam Projects in Southern Nile Basin States



Egypt has established a $100 million financing mechanism to support development projects, including dams, across southern Nile Basin countries and strengthen regional water cooperation. The initiative will fund projects aligned with participating countries' priorities, building on Egypt's existing contributions such as hydropower, solar-powered groundwater systems, water-storage facilities, flood protection, and capacity-building programs. Egyptian officials stressed that regional cooperation should deliver tangible development benefits while ensuring transboundary Nile water management follows international law, including cooperation, consultation, and harm prevention. The ministers also discussed Egypt's preparations for the 2026 UN Water Conference and its planned hosting of UNCCD COP18 in 2028.

ACCIONA Signs Sanitation Contract for 85 Municipalities in Paraíba, Brazil

ACCIONA has signed a 25-year public-private partnership with Paraíba's water and sewerage company, Cagepa, to expand sanitary sewer services across 85 municipalities in Brazil. With an estimated investment of €498 million, the project aims to provide universal sanitation access to more than 1.7 million residents. It includes the construction of 104 wastewater treatment plants and 2,800 kilometers of sewerage networks. ACCIONA will oversee infrastructure expansion, operation, and maintenance, while Cagepa will retain responsibility for water supply and customer service. The agreement strengthens ACCIONA's longstanding presence in Brazil's sanitation sector and expands its portfolio of major infrastructure projects.





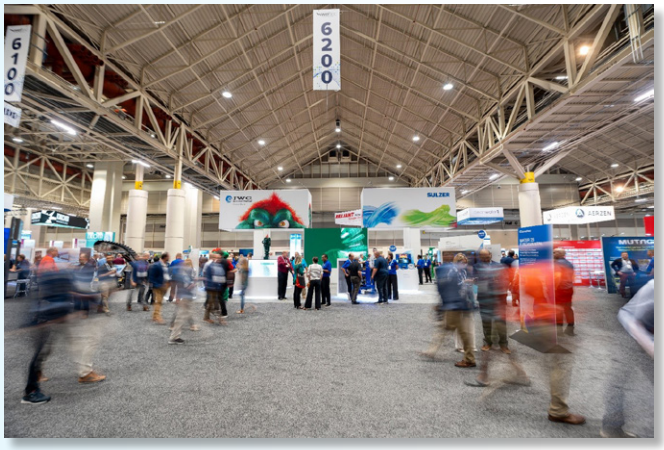
Global Water Events

WEFTEC 2026

Date: From 28 to 30 September 2026
Location: New Orleans, La. USA

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Website: www.weftec.org



FiltXPO 2026

Date: 28 & 29 October 2026
Location: Minneapolis , Minnesota

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Website: filtxpo.com

Aquatech China

Date: From 28 to 30 October 2026
Location: China



China is making monumental investments in this sector, recognizing the critical need to address water shortages in its cities. With a mandate for cities to reclaim 25% of used water, the commitment is clear. This drive is further evidenced by the planned construction of 100 new sewage treatment plants.

Website: aquatechtrade.com/shanghai

Aquatech Asia

Date: From 25 to 27 November 2026
Location: Bangkok



The most recent addition to the well-known Aquatech portfolio is Aquatech Asia, which will be present at flagship trade shows in China, Mexico, and Amsterdam. Southeast Asian water experts, innovators, and decision-makers will come together at Aquatech Asia.

Website: aquatechtrade.com/asia

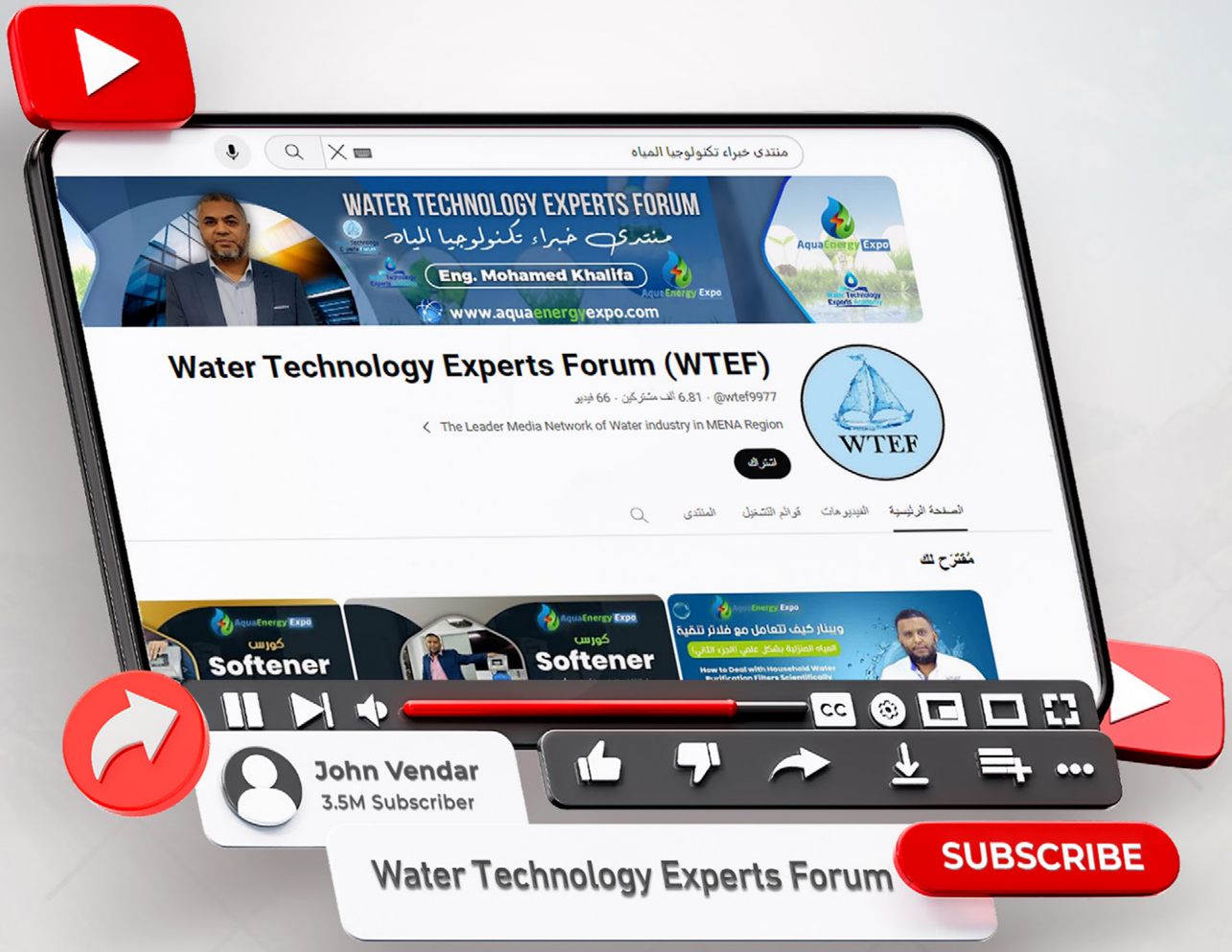
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A New Era of River Monitoring:

Sensors, Data and the Future of Water Management

For decades, monitoring rivers and streams has depended heavily on periodic sampling and laboratory analysis. While this approach remains important, it can struggle to capture rapid changes in water conditions. A pollution event following heavy rainfall, a sudden rise in river level, or a rapid change in water chemistry may develop long before a conventional sampling programme can detect it. The growing use of sensors, wireless communication, and data-driven monitoring is beginning to change this model, shifting river management from periodic observation to continuous, real-time awareness.

From Periodic Sampling to Continuous Observation

Modern river monitoring systems can continuously collect data from multiple locations, creating a more detailed picture of how a water body changes over time.

Sensors positioned near or within rivers can measure parameters such as water temperature, conductivity, pH, turbidity, and dissolved oxygen, while additional measurements can include water level, flow, and weather conditions.

Continuous datasets can reveal seasonal patterns, sudden variations, and pollution events that may otherwise be missed between individual sampling campaigns.

This shift is particularly important because river conditions are rarely static. Rainfall, drought, agricultural runoff and other environmental events can rapidly alter both water quantity and quality. Instead of asking what the condition of a river was when a sample was collected, continuous monitoring makes it possible to ask a more useful question:

what is happening in the river right now?



Smarter Monitoring of River Levels

One of the most direct applications of sensor-based monitoring is measuring river level. Non-contact sensors, including ultrasonic systems, can determine the distance between a sensor positioned above the water and the water surface. Changes in this distance can then be translated into changes in river level.

When measurements are transmitted wirelessly at regular intervals, water managers can monitor rising or falling levels without visiting the monitoring site. Sampling can be adjusted based on the level of risk, with more frequent measurements potentially enabling earlier detection of rapidly developing flood conditions.



Deploying sensors at several points along a river network can provide an even more valuable picture. Rather than observing a single location, monitoring stations distributed along upper, middle, and lower sections can track how water levels change as conditions move through the catchment. Combined with rainfall and weather information, these measurements can support earlier warnings and more informed flood management.

Looking Beyond Water Level

River monitoring, however, is not only about floods. The same principle of continuous observation can be applied to water quality. Integrated monitoring systems can measure a broad range of parameters, including temperature, conductivity, pH, turbidity, dissolved oxygen, algae, and nutrients. Water level and flow measurements can also be incorporated, allowing changes in water quality to be considered alongside changes in hydrological conditions.

Weather observations provide another layer of information, helping identify relationships between rainfall, environmental conditions and water-quality changes.

This combination is important because individual measurements rarely tell the entire story. A sudden increase in turbidity, for example, becomes more informative when considered alongside rainfall, river level and flow. Over time, continuous datasets can therefore help reveal patterns that isolated samples cannot easily show.

Detecting Pollution as It Happens

Perhaps one of the most significant developments is the effort to move from measuring general water-quality indicators toward identifying specific contaminants in real time.

Traditional water-quality monitoring often requires samples to be collected and transported to laboratories before the presence of pollutants can be confirmed. This creates an unavoidable delay, particularly when pollution is associated with events such as intense rainfall, flooding, or landslides. Such events can cause contaminants, including pesticides stored in soils, to enter water sources rapidly.

New sensor approaches are being developed to address this gap. Optical sensing combined with microfluidic systems has demonstrated the potential to analyse multiple pesticides rapidly, while advanced signal processing can help distinguish pollutants even when they occur at low concentrations. Research is also exploring the use of artificial intelligence to improve the sensitivity and interpretation of sensor data.



The significance of this development goes beyond faster measurement. If a contaminant can be detected close to the time it enters a river, water managers may have a greater opportunity to investigate its movement, identify risks, & take preventive action before the pollution spreads further.

Turning Data into Decisions

Collecting data is only the beginning. The real value of real-time monitoring comes from transforming measurements into information that can support decisions.

Connected monitoring systems can transmit measurements wirelessly to digital platforms, where data can be stored, visualised and analysed. Dashboards can provide an overview of current river conditions, while automated alerts can notify responsible users when predefined thresholds are exceeded or when water levels change rapidly. Historical datasets can then be used to identify trends and support longer-term water-resource planning and infrastructure management.

This creates a continuous feedback loop: measure, transmit, analyse, alert and respond. In flood-prone areas, the objective may be early warning. In polluted watersheds, the priority may be identifying abnormal water-quality changes.

In long-term environmental management, the accumulated data can help reveal seasonal trends and changes in ecosystem conditions. The technology can also support more advanced forms of environmental modelling.

Sensor data can serve as a foundation for digital representations of river systems, particularly when combined with information such as rainfall, soil moisture, terrain, and other environmental variables. Such approaches can provide a more integrated understanding of how a river responds to changing conditions.

Toward Smarter and More Resilient Rivers

Real-time river monitoring represents more than a technological upgrade. It changes the way rivers can be understood and managed. Instead of relying primarily on occasional snapshots, continuous sensing creates a dynamic picture of water quantity, water quality, and environmental change. The combination of IoT connectivity, distributed sensors, automated alerts, advanced water-quality analysis and data-driven modelling can help transform raw measurements into actionable environmental intelligence. It can support earlier responses to floods, faster recognition of pollution events and better understanding of long-term changes in river systems.

The ultimate value of these systems, however, will depend not simply on how much data can be collected, but on how effectively that data is interpreted and translated into action. As monitoring moves closer to real time, the future of river management may increasingly depend on having the right information at the right place—and, most importantly, at the right moment.



Case Study: Real-Time Monitoring on UK Rivers

A practical example can be found in Hampshire, UK, where nearly 20 monitoring devices are being installed along the Test, Itchen and Blackwater rivers. The initiative provides frequent measurements of parameters including dissolved oxygen, ammonia and water temperature, creating a continuous picture of river health.

Local riverkeepers are involved in selecting monitoring locations and observing the resulting data. The distributed network is intended to help identify pollution incidents more quickly and understand where changes are occurring along the rivers. Importantly, the project recognises that water quality can be influenced by multiple sources, including agricultural runoff, road runoff and wastewater-related discharges.

The initiative also illustrates the value of collaboration. Rather than relying solely on conventional monitoring requirements, local stakeholders and the water sector are using a larger monitoring network to build a more detailed understanding of river conditions. The project is accompanied by significant investment in infrastructure intended to improve water quality and reduce the impacts of storm-related discharges.





From Brine Disposal to Resource Recovery: The Next Step in High-Salinity Water Management

For decades, brine has been treated as an unavoidable by-product of desalination and industrial water treatment, requiring disposal or additional processing. Today, growing water scarcity, stricter discharge regulations, rising energy costs, and increasing interest in resource efficiency are changing this perspective. Brine is increasingly viewed as a stream that can be further concentrated, better managed, and potentially used to recover water and valuable resources.

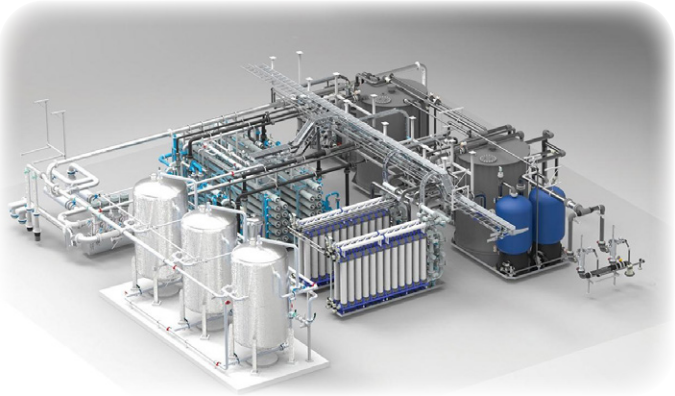
This shift has brought Minimal Liquid Discharge (MLD) and Zero Liquid Discharge (ZLD) to the forefront of advanced brine management. Modern treatment strategies increasingly prioritize membrane-based separation and concentration before relying on energy-intensive thermal processes, aiming to maximize water recovery, reduce the volume requiring final treatment, and improve the overall efficiency of high-salinity water management.

From Brine Disposal to Resource Recovery

The conventional desalination process produces two principal streams: recovered water and concentrated brine. While the first has an obvious economic value, the second traditionally represents a cost. MLD and ZLD challenge this model by seeking to recover additional water and minimize the amount of liquid ultimately requiring disposal.

MLD is generally designed to reduce the volume of liquid discharge while recovering a significant proportion of the water. ZLD takes the concept further by aiming to eliminate liquid discharge, typically leaving a concentrated solid residue. Both approaches are not single technologies but combinations of treatment processes selected according to the composition of the feed, the required recovery, operating conditions, regulations, and economic constraints.

The distinction is important because maximum recovery does not necessarily mean maximum efficiency. ZLD can involve significant capital expenditure, energy consumption, and operational complexity, particularly when the final stages rely on evaporation and crystallization. MLD can therefore provide a practical alternative where complete elimination of liquid discharge is unnecessary or economically unjustified.



The Role of Advanced Membranes in Brine Treatment

A typical MLD or ZLD treatment train begins with pretreatment, followed by a concentration stage and, where necessary, final evaporation and crystallization. Membrane processes such as reverse osmosis can recover water and concentrate dissolved salts before the stream reaches more energy-intensive stages. By reducing the volume entering thermal treatment, membrane-based concentration can improve the overall energy and economic profile of the system.

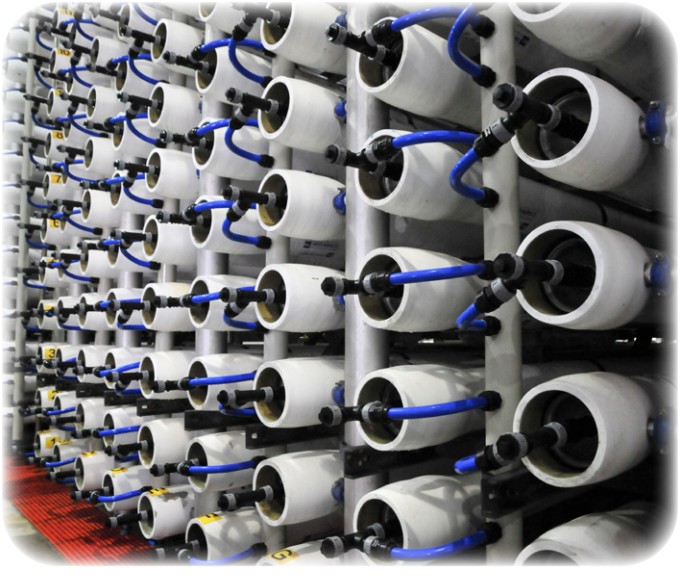
This membrane-first principle is becoming increasingly important as engineers seek to push recovery further without relying entirely on thermal processes. Research into membrane-based brine management now encompasses several approaches, including membrane distillation, forward osmosis, electrodialysis, osmotically assisted reverse osmosis, low-salt-rejection reverse osmosis, and ultra-high-pressure reverse osmosis. These technologies are being evaluated not only for water recovery, but also for their potential role in MLD, ZLD, brine concentration, crystallization, and resource recovery. The underlying engineering challenge is that increasing salinity also increases osmotic pressure.

As a result, conventional membrane processes eventually encounter thermodynamic and operational limits. Scaling, fouling, membrane durability, and the energy required to operate at elevated pressures become increasingly important as concentration rises.

Pushing the Limits of Brine Concentration

One promising development is Low-Salt-Rejection Reverse Osmosis (LSRRO). Unlike conventional reverse osmosis, LSRRO intentionally allows a greater fraction of dissolved salts to pass through the membrane. This can reduce the effective osmotic-pressure barrier and create opportunities for concentrating brines beyond the practical range of conventional RO.

Recent research has examined LSRRO alongside high-pressure RO and other advanced membrane configurations as potential pathways for treating increasingly concentrated brines. However, these technologies do not provide unlimited concentration capability. Their performance depends strongly on salinity, pressure, membrane characteristics, and process configuration. A recent comparative assessment found that LSRRO and high-pressure RO can perform effectively at moderate brine concentrations, while other membrane configurations may become more attractive as salinity increases further. At extreme hypersalinity, thermal treatment can remain necessary because osmotic pressure places fundamental limits on membrane-based recovery.





Membranes First, Thermal Treatment Where Necessary

The most compelling opportunity may therefore not be choosing between membranes and thermal processes, but combining them intelligently. Membranes can perform the earlier stages of water recovery and brine concentration, while thermal technologies can be reserved for the highly concentrated stream where membrane recovery becomes increasingly difficult.

This hybrid approach can reduce the amount of water that must be evaporated or crystallized and can therefore reduce the thermal burden of ZLD systems. Reviews of sustainable desalination processes have documented a wide range of hybrid configurations combining membrane and thermal processes, with performance varying according to feed salinity, recovery targets, and system design.

As a result, ZLD should be viewed differently. Instead of treating it as a single end-of-pipe technology, it is better understood as an integrated treatment strategy in which each separation process is used where it provides the greatest technical and economic value.



From Water Recovery to Resource Recovery

The next stage of brine management goes beyond reducing liquid discharge. Highly concentrated streams can potentially become feedstocks for recovering salts and other valuable materials.

Lithium is one of the most frequently discussed examples. Research has identified desalination brines as potentially attractive sources because concentration processes can increase the concentration of valuable minerals.

A range of non-evaporative approaches—including membrane, electrochemical, ion-exchange, and extraction-based methods—are being investigated. However, the economic and environmental feasibility of resource recovery depends heavily on brine composition, process efficiency, energy demand, and management of the remaining residual stream. Hybrid approaches may ultimately prove more practical than relying on a single technology.

This broader perspective changes the objective of brine treatment. Instead of:

Freshwater production → Brine disposal

The emerging model becomes:

Water recovery → Brine concentration → Resource recovery → Minimal residual discharge

Such an approach aligns brine management with the principles of water reuse and the circular economy.



Case Study| DuPont and the Membrane-First Approach

A practical illustration of this direction is provided by DuPont's positioning of advanced membrane solutions for industrial MLD and ZLD applications. The company's FilmTec portfolio has been presented for applications across industrial sectors including chemical and petrochemical processing, chlor-alkali production, battery manufacturing, metals, power generation, pulp and paper, textiles, desalination, industrial water reuse, and direct lithium extraction.

The broader significance of this example is not the individual products themselves, but the design philosophy they represent: using membrane-based concentration to push water recovery further before relying on downstream treatment.

In this context, advanced membrane concentration becomes one component of a larger MLD/ZLD treatment train rather than an isolated solution. The approach reflects the industry's wider movement toward reducing brine volumes, improving water recovery, and creating greater flexibility for downstream treatment and resource recovery.

Designing the Next Generation of Brine Management

The future of high-salinity water treatment is unlikely to depend on a single technology. Instead, effective solutions will increasingly rely on combining different processes according to the specific characteristics and treatment requirements of each brine stream. MLD can offer a practical balance between water recovery, energy consumption, and cost where some residual discharge remains acceptable, while ZLD may be more appropriate where discharge restrictions are strict or exceptionally high recovery is required.

Advanced membrane technologies can extend the brine concentration stage and maximize water recovery, while thermal processes remain important for treating highly concentrated streams.

Resource recovery also adds a new dimension by creating opportunities to recover salts, lithium, and other valuable materials. Ultimately, the goal is not simply to eliminate brine, but to manage it more intelligently through integrated, efficient systems that support water recovery, resource reuse, and a more circular and resilient approach to high-salinity water management.



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Water Challenges Behind Artificial Intelligence: Toward More Sustainable Data Centers

Artificial intelligence is rapidly transforming the digital infrastructure that supports modern life. Behind every AI model, cloud service, and digital application lies a physical network of servers, power systems, cooling equipment, and data centers. As computational workloads become increasingly intensive, however, another resource is moving to the center of the sustainability debate: water.

The expansion of AI is creating new pressure on water resources because the enormous computing capacity required by modern AI systems generates substantial heat that must be managed continuously. Total water consumption across the AI supply chain is projected to reach approximately 1,200 billion litres by 2030, compared with around 560 billion litres in 2023. Cooling represents roughly a quarter of this consumption, while primary energy supply accounts for about two-thirds. The challenge therefore extends beyond the walls of a data center. It is becoming a broader question of how societies can support digital growth while protecting water resources that are already under pressure.

The Water Footprint Behind the Cloud

The phrase “cloud computing” can make digital services appear almost weightless. In reality, the cloud depends on highly physical infrastructure. Servers require electricity, electricity generates heat, and that heat must be removed to maintain reliable operation. Water-based cooling has traditionally played an important role in achieving this objective. The problem becomes particularly significant when data centers are located in hot or water-stressed regions, where cooling requirements can rise precisely when water availability is most constrained.



Data-center cooling is highly seasonal, with demand tending to peak during the hottest months. In the United States, data centers directly consumed approximately 66 billion litres of water for cooling in 2023. But direct consumption tells only part of the story.

The water footprint of data centers can also extend indirectly through the electricity required to operate them. Power generation itself can require significant quantities of water. This means that evaluating the sustainability of AI infrastructure using a single metric—such as electricity or direct water consumption—can provide an incomplete picture.



Why Location Matters

Water is fundamentally different from electricity. Electricity infrastructure can be expanded, and electricity can be transported across networks, whereas water availability is strongly connected to geography, hydrology, and climate.

This distinction makes the location of future AI infrastructure increasingly important. Many data centers are being developed in regions where surface and groundwater resources are already constrained. As AI workloads continue to grow, the additional demand for cooling can intensify competition for local water resources.

The issue is therefore not simply whether the global data-center industry consumes a large or small percentage of available water. The critical question is where that water is being consumed and what other users depend on the same resource.

Data-center expansion has generated concerns among communities, farmers, and environmental groups in water-stressed regions. Data centers should be viewed within the wider landscape of water-intensive industries, including agriculture, mining, and other activities. The goal is not to portray data centers as the sole cause of water scarcity, but to ensure that their rapid expansion does not amplify existing local water challenges.

Cooling Is Becoming a Strategic Technology

As AI servers become more computationally dense, conventional air-cooling approaches face increasing limitations. This is accelerating interest in liquid-based cooling technologies capable of managing higher heat loads more efficiently.

Several technologies are emerging as important tools in reducing water dependence. Direct-to-chip liquid cooling circulates liquid through channels positioned directly at the chip, allowing heat to be removed efficiently in a closed-loop system.

Immersion cooling, meanwhile, places IT equipment in dielectric fluid to dissipate heat without relying on conventional evaporative cooling. Both approaches can offer lower water-use profiles compared with more water-intensive evaporative systems. Direct-to-chip cooling, immersion cooling, hybrid systems, and water-side economizers are among the technologies that can reduce water consumption. The message is becoming increasingly clear: cooling is no longer simply an engineering requirement—it is a strategic sustainability decision.



From Freshwater Consumption to Water Reuse

Reducing demand is only one side of the solution. The other is reconsidering the source of the water used for cooling. Instead of relying exclusively on freshwater, data centers can explore reclaimed or treated wastewater as an alternative source.

Reclaimed wastewater can eliminate freshwater withdrawal for the cooling-water supply. However, treating, pumping, and distributing reclaimed water requires additional energy and chemicals. The wastewater-reuse scenario had approximately twice the global warming potential of the freshwater scenario under the modeled conditions, with treatment energy accounting for roughly 80% of the difference.

This does not undermine water reuse. Instead, it reveals a more sophisticated principle: Saving water can require energy, and sustainable infrastructure must account for both.



The Water–Energy Trade-Off

This interaction between water and energy is one of the most important considerations in developing more sustainable data-center infrastructure. A cooling system that minimizes direct water consumption may require additional electricity. Conversely, highly water-efficient systems are not automatically the most sustainable if their energy requirements create significant additional environmental impacts. Therefore, cooling systems should be evaluated across multiple environmental dimensions rather than focusing exclusively on freshwater consumption.

This broader perspective considers the interaction between water conservation, energy demand, chemical use, and greenhouse-gas emissions.

This approach changes the question from:

"How much water does this data center use?"

to:

"What is the overall environmental cost of the cooling system at this location?"

That is a much more useful question for engineers, utilities, regulators, investors, and data-center developers.



Measuring Water Performance

Better solutions must be accompanied by better measurement. As water becomes an increasingly important consideration in data-center development, understanding how much water is consumed, where it comes from, and how efficiently it is used is becoming essential. Tracking water consumption, monitoring reuse rates, and evaluating overall water efficiency can help operators identify opportunities to reduce unnecessary demand and improve resource management.

Measurement also supports greater transparency and accountability. As concerns over water stress increase, greater attention is being placed on water withdrawals, recycling, consumption patterns, and the relationship between infrastructure and local water resources. Clear and consistent reporting can help decision-makers assess potential impacts and make more informed choices when planning and operating data centers. Ultimately, what is measured can be managed, improved, and incorporated into better decisions.

By making water performance a visible part of infrastructure planning, the industry can move toward data centers that are not only more powerful and efficient, but also more responsible toward the resources and communities around them.

Building a More Water-Resilient AI Infrastructure

The future of AI will require more than faster processors and larger data centers. It will require infrastructure capable of operating within the physical limits of the environments in which it is built. That means selecting appropriate locations, matching cooling technologies to local climate and water conditions, reducing freshwater dependence, improving recycling and reuse, and measuring water performance transparently. It also means recognizing that no single solution will work everywhere.

In one location, direct-to-chip or immersion cooling may provide the most appropriate path. In another, reclaimed municipal wastewater may offer an opportunity to reduce freshwater withdrawals. Elsewhere, the additional energy requirements associated with advanced water treatment may change the environmental balance.

Conclusion | The Next Frontier of Digital Sustainability

Artificial intelligence is often described as a technology capable of solving some of humanity's greatest challenges. Yet the infrastructure that makes AI possible must itself become more resource-conscious.

The water challenge does not mean that digital expansion must stop. Instead, it creates an opportunity to redesign the relationship between computing infrastructure and natural resources.

The emerging direction is clear: less dependence on freshwater, smarter cooling, greater reuse, stronger measurement, and more transparent water management.

The data center of the future will therefore not be judged only by how much computing power it delivers. Its sustainability will increasingly depend on how intelligently it manages the resources required to deliver that power.

AI may operate in the digital world, but its infrastructure remains firmly connected to the physical one. And as that infrastructure expands, water security must become part of the definition of digital resilience itself.



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Shell Completes Acquisition of ARC Resources

Shell plc has completed its acquisition of ARC Resources Ltd., following all required shareholder, court and regulatory approvals. The transaction adds approximately 370 kboe/d of oil and gas production, supporting Shell's strategy and an expected production CAGR of around 4% through 2030. ARC shareholders will receive CAD $8.20 in cash plus 0.40247 Shell shares per ARC share. The deal values ARC's equity at approximately US$13.9 billion, with an enterprise value of US$16.5 billion, including assumed net debt and leases. Shell expects the acquisition to generate double-digit returns, strengthen long-term cash flows, and increase free cash flow per share from 2027 onward.



TotalEnergies Completes the Transfer of its 10% Interest in Arctic LNG 2



TotalEnergies has completed the transfer of its 10% stake in Arctic LNG 2 to NordLine, a subsidiary of Novatek, and is no longer a shareholder in the project. Under the transfer agreement, TotalEnergies retains its rights to recover approximately US$1.3 billion representing its share of shareholder loans provided to Arctic LNG 2. However, repayment is subject to applicable sanctions and may therefore only take place in the future if permitted. The transaction marks TotalEnergies' complete exit from ownership of Arctic LNG 2 while preserving its financial claim related to the loans previously extended to the project.

LONGi Launches LONGi ONE in Egypt, Accelerating the Next Era of Integrated Solar and Storage

LONGi's Egypt Storage & PV Launch Event, held under the theme "Tomorrow Starts with ONE," brought together government officials, renewable energy developers, investors, EPC companies, and industry leaders to explore opportunities for solar and energy storage in Egypt and the MENA region. With Egypt targeting 42% renewable energy penetration by 2030, the event highlighted the growing need for grid flexibility, energy storage, and intelligent energy management. LONGi introduced LONGi ONE, an integrated solution combining photovoltaic generation, battery storage, digital intelligence, and lifecycle services. Designed for utility-scale, commercial, industrial, and challenging-grid applications, the platform aims to improve energy utilization, reliability, safety, and long-term project value.



Iberdrola Strengthens Its Commitment to the Circular Economy through the Refurbishment of Its UK Wind Farms



ScottishPower Renewables has highlighted the economic and environmental benefits of repowering wind farms, using Scotland's first commercial wind farm, Hagshaw Hill 1, as an example. After its decommissioning, 99.9% of the removed materials were recycled or reused, demonstrating the value of circular economy principles. The project also supported local businesses, job creation, and new opportunities in renewable component recycling. Hagshaw Hill 1, which began operating in 1995, has been replaced by 14 modern turbines, raising capacity to 80 MW—enough to supply around 57,000 homes annually. The initiative shows how repowering can expand clean energy while promoting resource efficiency and local economic development.

ADNOC, XRG and Masdar Deepen Germany Partnerships with Strategic Energy, Industry and Technology Agreements



ADNOC, XRG, and Masdar have announced new agreements with major German companies, strengthening UAE–Germany cooperation in energy, industry, and advanced technology. The deals, signed during President Sheikh Mohamed bin Zayed Al Nahyan's state visit, could enable over €5 billion in investment and build on an additional €40 billion of intended long-term investment in Germany. Agreements cover areas including LNG supply, gas and LNG collaboration, renewable energy, offshore wind auctions, offshore wind and battery storage, low-carbon ammonia supply chains, and feasibility work on methylene diphenyl diisocyanate (MDI) value chains. Separate technology MoUs focus on advanced tech and AI. The new UAE–Germany Investment Council aims to identify and accelerate priority opportunities.

ORLEN Expands LNG and BioLNG Use in Shipping



ORLEN and the Port of Gdynia are expanding their cooperation to assess how LNG and bioLNG bunkering can be developed in the Tricity area. The partnership will examine market demand, required infrastructure, operating conditions, and regulatory requirements, focusing on the feasibility of waterside ship-to-ship bunkering and alongside bunkering. It will also include knowledge sharing, evaluating different bunkering models, and reviewing approaches used at other European ports. The initiative supports ORLEN's strategy to strengthen its LNG and renewable fuel capabilities as transitional and lower-emission options for transport, aligning with the FuelEU Maritime framework and evolving future fuel technologies.



Global Energy Events

International Energy Storage & Battery Conference & Exhibition

Date: From 9 to 11 October 2026
Location: Shanghai World Expo Exhibition and Convention Center



Council (Preparatory), New Energy Industry Association for Asia and the Pacific, European Association of Energy Storage Trade, China Electric Power Construction Association, Shanghai Federation of Industrial Economics, Shanghai New Energy Industry Association, and the SNEC PV, Storage & Hydrogen Energy Alliance, the SNEC ES+ 13th (2026) International Energy Storage & Battery Conference & Exhibition (abbreviated as "2026 SNEC ES+ Exhibition") will be grandly held.

Website: energystorageexpo.org

Battery Asset Management Summit Europe 2026

Date: 2 & 3 December 2026
Location: Hotel nhow Roma, Italy



Europe saw unprecedented growth in energy storage last year, with a record-breaking 12GW installed, and Battery Energy Storage Systems (BESS) continued to dominate this expansion. What continued to set this summit apart was the strength of its community. Through technical workshops & structured networking, stakeholders came together not only to learn but also to work through the real operational challenges shaping Europe's storage landscape.

Website: batteryeurope.solarenergyevents.com

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