

Satellite IoT:

Revolutionizing the Monitoring and Management of Remote Water Systems

FILTRALITE®

Scaling Desalination Capacity Without Compromising Water Quality:
How Filtralite® Transformed Performance at SWRO Fouka II



Beyond Procurement:
How Al Moussa Trading Co. Helps De-Risk Water Projects



Binder Group:
Leading the Future of Smart Aeration



Every Cubic Meter of Air Has a Cost:
How Next Turbo Is Transforming Energy Efficiency in Wastewater



The Future of Clean Water: How WETCO is Leading Innovation in Ultrafiltration and Water Purification Solutions



The Strategic Vanguard of Water Sustainability:
How MASKOUB International's Gold Sponsorship Catalyzed the Aqua Energy Expo 2025





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Innovative Solutions to Achieve Sustainability in Water and Energy

From The Editor

The water sector is rapidly transforming as water scarcity, climate change, urbanization, and rising energy demand drive the need for innovation. Digital technologies, intelligent automation, advanced treatment systems, and sustainable engineering are reshaping water management. This edition highlights the key technologies and forward-thinking solutions driving a more efficient and resilient water future. We begin with desalination through the Filtralite® case study at the SWRO Fouka II plant, illustrating how innovative filtration media can significantly improve pretreatment performance, protect reverse osmosis systems, and support major increases in production capacity without compromising water quality. Infrastructure delivery is equally important.

Al Mousa Trading Company highlights how engineering expertise, global technology partnerships, rigorous testing, and long-term maintenance services reduce project risks and contribute to reliable, future-ready water infrastructure.

Energy efficiency remains a defining theme throughout this issue. Binder Group presents its intelligent VACOMASS® aeration control technologies, demonstrating how precise airflow management can dramatically reduce energy consumption in wastewater treatment plants.

Complementing this, Next Turbo showcases advanced centrifugal turbo blowers designed to maximize efficiency, operational flexibility, and long-term cost savings.

Innovation in water purification is explored through WETCO, offering valuable insights into

ultrafiltration technologies, membrane applications, and the growing role of advanced treatment systems in securing high-quality water for industrial and municipal applications.

Supporting regional industrial development, MASKOUB International demonstrates how localized engineering, reverse innovation, and advanced manufacturing are creating cost-effective solutions for water and wastewater treatment across the Middle East and Africa.

Likewise, X Plus Trading showcases integrated fluid control, automation, and industrial supply solutions that strengthen operational reliability across multiple industries.

This edition also explores key industry trends, including AI's growing impact on water management and the water-energy challenges of expanding data centers. It highlights sustainable cooling, water reuse, advanced treatment technologies, and the role of Satellite IoT in enabling real-time monitoring and efficient management of critical water infrastructure. We hope this issue informs, inspires, and encourages meaningful dialogue as we continue advancing toward a more sustainable future for the global water industry.



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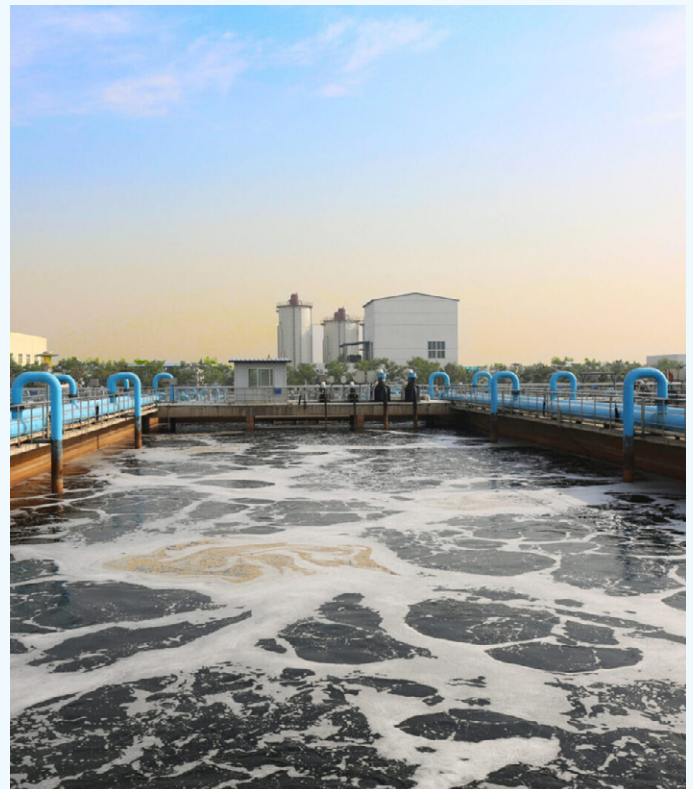


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Satellite IoT: Revolutionizing the Monitoring and Management of Remote Water Systems

Water is one of the most precious natural resources, and proper management of the water is vital for communities, agriculture, industries, and environmental sustainability. But there are still major challenges in monitoring water systems in remote locations. Water reservoirs, pipelines, irrigation networks, and pumping stations are often located in remote areas where conventional communication infrastructure is unavailable or unreliable. This makes it difficult to collect real-time data and respond quickly to issues such as leaks, equipment failures, or water quality issues.

Recent developments in Internet of Things (IoT) and satellite communication technologies have provided a promising solution to these challenges. Satellite IoT is where connected sensors meet satellite networks, enabling data to be transmitted from just about anywhere on Earth. Satellite IoT is transforming remote monitoring and control of water systems by offering reliable

connectivity outside the reach of cellular networks.

Understanding Satellite IoT

The Internet of Things (IoT) is a network of devices embedded with sensors, software, & other technologies that enable data collection and sharing. IoT devices can be used in water management systems for parameters like water level, pressure, flow rate, temperature, and water quality. Traditional IoT systems mainly use cellular, Wi-Fi, or terrestrial communication networks. These technologies work well in urban and populated areas but may not provide enough coverage in remote areas. This is overcome by satellite IoT, whereby data is sent via satellite, not through ground-based infrastructure. Satellite IoT allows sensors placed in remote water facilities to send data directly to satellites, which then send it to cloud platforms and monitoring centers. This provides operators with real-time information, regardless of the monitored asset's location.

Critical Challenges Facing Remote Water System Monitoring

There are many monitoring challenges for remote water systems. One of the biggest problems is the absence of a communication infrastructure. Many water assets are in deserts, mountains, forests, or rural areas with limited or no cellular coverage. Another obstacle is the high cost of manual inspections. Water utilities often have to send staff to inspect reservoirs, pumping stations, or pipelines. These inspections take time, travel, and labor - all of which increase operating costs.

In addition, late detection of problems can have serious consequences. A small leak in a remote pipeline can go unnoticed for days or weeks, resulting in large losses of water and damage to infrastructure. Failures in pumps or problems with water quality, if not quickly identified, could also jeopardize the reliability and safety of water supplies. These challenges underscore the need for a monitoring solution that provides continuous visibility for remote water systems.

How Satellite IoT Improves Water Monitoring

Satellite IoT facilitates remote water monitoring by providing continuous connectivity and real-time access to critical operational data. Sensors placed all over the water system take readings and send them through satellite networks to central platforms. Operators can access this information via dashboards and can be notified when abnormal conditions are detected. For example, if the water level in a tank falls below a predetermined level or the pressure in a pipeline fluctuates unexpectedly, the system can notify maintenance personnel automatically.



This real-time monitoring allows organizations to transition from reactive maintenance to proactive management. Operators can identify potential issues early and take corrective action before they escalate, instead of waiting for failures to occur. Also, since satellite networks offer broad geographical coverage, monitoring can be done even in places where terrestrial communication networks are not available. This guarantees continuous data collection and increases overall system reliability.



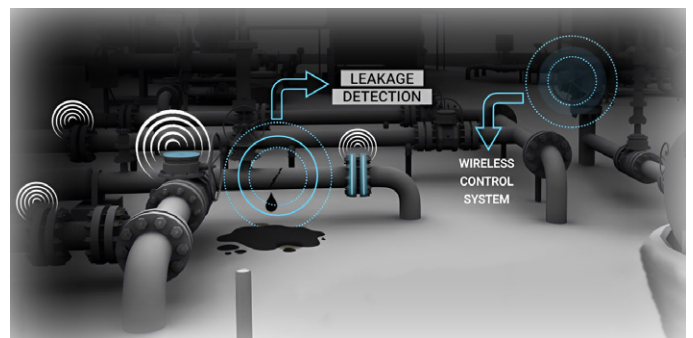
Applications of Satellite IoT in Water Monitoring

• Monitoring Levels of Water

One of the most common applications of Satellite IoT is monitoring water levels in reservoirs, storage tanks, rivers, and dams. Sensors continuously measure water levels and transmit data to operators. This information helps utilities manage water supplies efficiently and prepare for droughts, floods, or seasonal demand fluctuations.

• Leak Detection and Pipeline Monitoring

Water leakage is a major challenge for utilities worldwide. Satellite IoT-enabled sensors can detect unusual pressure changes or flow patterns that indicate potential leaks. Early detection reduces water losses, minimizes repair costs, and prevents damage to surrounding infrastructure.



• Monitoring of Water Quality

Maintaining water quality is essential for public health and environmental protection. Sensors can measure parameters such as pH, turbidity, temperature, and dissolved oxygen. Satellite connectivity allows these measurements to be transmitted from remote locations in real time, enabling rapid responses to contamination events or environmental changes.

• Irrigation Management

Agricultural irrigation systems often cover vast areas where communication infrastructure is limited. Satellite IoT allows farmers and irrigation managers to monitor water usage, soil moisture levels, and irrigation equipment performance remotely. This improves water efficiency and supports sustainable agricultural practices.



• Monitoring of Pumping Stations

Pumping stations play a critical role in water distribution networks. Satellite IoT can monitor pump performance, energy consumption, and operational status. Automated alerts help operators detect equipment failures early and reduce downtime.

Key Benefits of Satellite IoT for Remote Water Systems

• Global Connectivity

Perhaps the most significant advantage of Satellite IoT is its ability to provide connectivity almost anywhere. Unlike cellular networks, satellite coverage extends to remote and isolated locations, ensuring that critical water infrastructure remains connected.

• Real-Time Data Access

Satellite IoT enables continuous data collection and transmission. Operators can access current information rather than relying on periodic inspections or delayed reports. Real-time visibility improves decision-making and operational efficiency.

• Reduced Operational Costs

By reducing the need for frequent site visits, Satellite IoT lowers transportation and labor expenses. Remote monitoring allows organizations to focus maintenance efforts where they are truly needed, improving resource allocation.



• Improved Reliability and Resilience

Water systems often serve critical communities and industries. Continuous monitoring helps ensure that potential problems are detected and addressed quickly, improving service reliability and system resilience.

• Better Resource Management

Accurate and timely data allows utilities and water managers to optimize water distribution, reduce losses, and improve conservation efforts. This contributes to more sustainable use of water resources.

Considerations in Satellite IoT Implementation

While Satellite IoT provides many benefits, there are a few things to consider when deploying these systems. Deployment costs could be higher than those of conventional monitoring systems, especially where specialized sensors and satellite communication equipment are necessary. Power management is another significant consideration. Many remote monitoring devices are powered by batteries or solar energy, making energy-efficient communication technologies essential.

Organizations also have to deal with cybersecurity concerns. Protecting data and communication networks from unauthorized access is becoming more important as more devices become connected. Despite these challenges, continuing technological advancements are lowering costs, increasing energy efficiency, and improving security, making Satellite IoT more accessible for water management applications.

Future of Satellite IoT in Water Monitoring

The future of Satellite IoT is strongly linked to the growth of low-Earth orbit (LEO) satellite constellations. These new satellite networks increase coverage, reduce latency, and lower communication costs. Also, the use of artificial intelligence and advanced analytics will further enhance water monitoring capabilities.

AI-based systems are able to process sensor data, identify patterns, and predict possible failures before they occur. This predictive approach will assist utilities in optimizing their maintenance strategies and improving their operational performance. As satellite technology keeps evolving, Satellite IoT is set to be a more important part of smart water management systems around the world.

Conclusion

Remote water systems face unique monitoring challenges because of remote location, low connectivity, and high maintenance needs. Combining advanced sensors with global satellite communication networks, Satellite IoT is a viable solution. The technology allows real-time monitoring of water levels, water quality, pipelines, irrigation systems, and pumping stations, even in the most remote environments.

Satellite IoT is allowing organizations to improve water resource management via continuous connectivity, lower operational costs, and enhanced system reliability. As satellite networks grow more sophisticated and affordable, they will serve as an increasingly important tool to monitor remote water systems, helping to secure sustainable water management and reliable access to this critical resource.



Case Studies Agriculture

Satellite IoT is being used by the agriculture sector to increase output and reduce costs. Farmers may maximize crop productivity and minimize waste by keeping an eye on temperature, soil moisture, and other environmental variables. This is sometimes called “smart farming.” Additionally, cattle may be tracked and their health monitored via satellite IoT, which enhances animal welfare overall and lowers losses.

Synnefa in Kenya has been able to operate outside of terrestrial infrastructure thanks to satellite IoT, which transmits sensor data to enable smarter predictions for optimal harvesting times. Precision farming has been so successful that Synnefa has been able to help farmers save more than 50% of water, reduce fertilizer application rates by 41%, and increase production by 30% when compared to yields before the use of their devices.



Renewable Energy

The advantages of satellite IoT are increasingly being felt in the energy sector. The technology makes it possible to remotely monitor renewable energy infrastructure in real-time, preventing downtime and optimizing energy output by enabling the early detection of any problems or malfunctions. Data on weather patterns, energy production, and equipment performance are gathered and analyzed to maximize the performance of renewable energy assets. This information can be utilized to increase the longevity of renewable energy assets, lower expenses, and improve efficiency.

Scaling Desalination Capacity Without Compromising Water Quality: How Filtralite® Transformed Performance at SWRO Fouka II

As global demand for desalinated water continues to grow, desalination plants face increasing pressure to expand production while maintaining consistent water quality and operational reliability. Achieving higher output is no longer enough—modern plants must also minimize membrane fouling, reduce maintenance requirements, and optimize long-term operating costs.

The experience of SWRO Fouka II in Algeria demonstrates how advanced filtration media can successfully address these challenges.

A Strategic Seawater Desalination Project

Commissioned in 2025, the SWRO Fouka II desalination plant has an initial production capacity of 300,000 m³/day. Operated by AEC (Algerian Energy Company), now ADC, the facility

required a pretreatment solution capable of handling the highly variable conditions of Mediterranean seawater while supporting future capacity expansion.

The plant's objectives included:

- Maintaining consistently high feed water quality.
- Protecting reverse osmosis (RO) membranes from fouling.
- Managing seasonal fluctuations, high turbidity events, and algal blooms.
- Increasing production capacity without compromising operational stability.

To meet these objectives, the plant implemented a dual-media filtration system consisting of a 1-meter filter bed made up of 0.6 m Filtralite® and 0.4 m sand, using Filtralite® NC 0.8–1.6 as the primary filtration media.

Why Filtralite® PURE?

Thanks to its highly porous structure and large specific surface area, Filtralite® provides superior particle retention and suspended solids removal, significantly improving pretreatment performance before the RO process.

Its unique expanded clay technology allows water to flow efficiently through the filter while capturing contaminants more effectively than conventional filtration media. This makes it particularly suitable for seawater desalination plants operating under challenging conditions.

Measurable Improvements in Water Quality

The installation of Filtralite® delivered immediate and measurable improvements in feed water quality.

Significant Reduction in SDI

The Silt Density Index (SDI) was reduced from 5.6 to 2.23, providing substantially better protection for downstream RO membranes and helping extend membrane lifespan.

Outstanding Turbidity Removal

Feed water turbidity decreased from 1.2 NTU to only 0.09 NTU, demonstrating highly efficient removal of suspended solids and producing cleaner water for the desalination process.

These results highlight the effectiveness of Filtralite® in delivering stable, high-quality feed water even when seawater conditions fluctuate throughout the year.



Enabling Higher Capacity Through Better Pretreatment

One of the project's most remarkable achievements was its ability to support significantly higher filtration rates while maintaining stable filtration performance.

The plant is planning to increase filtration velocity from 6.5 m/h to 13–14 m/h, enabling a major increase in production capacity from 300,000 m³/day to 680,000 m³/day.

This demonstrates how optimized pretreatment can unlock substantial capacity expansion without sacrificing water quality, operational efficiency, or membrane protection.

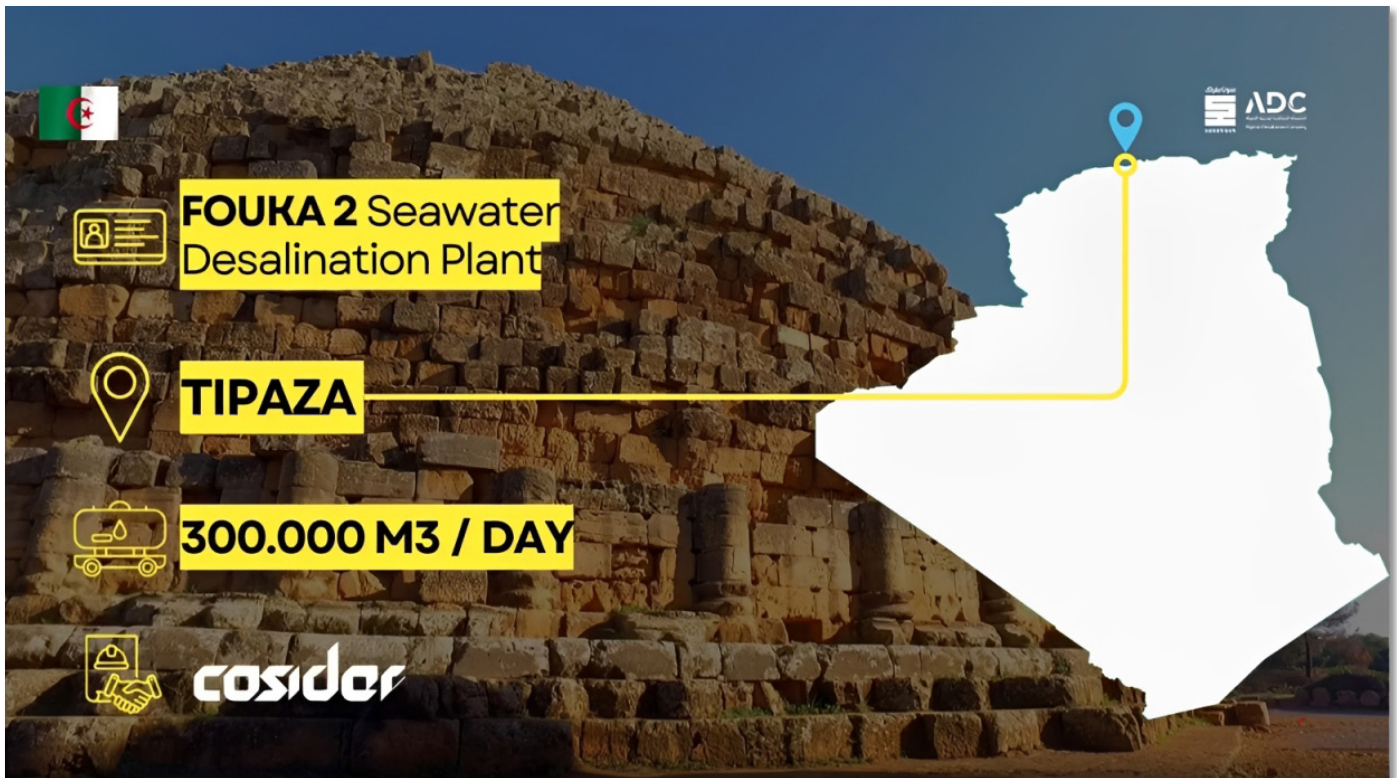


Operational Benefits Beyond Water Quality

In addition to improving pretreatment performance, Filtralite® delivered several operational advantages:

- Enhanced protection of RO membranes.
- Superior suspended solids retention.
- Higher filtration efficiency.
- Improved colour and odour removal.
- Lower filter media regeneration costs.
- Stable performance during seasonal seawater variations.
- Better resistance to algal bloom events due to its highly porous structure.
- Effective handling of high turbidity conditions.

Operational performance was equally impressive. The filtration system achieved an average of 55 hours between backwash cycles while recording 0% filter media loss. These results demonstrate exceptional durability, process stability, and reduced maintenance requirements, helping lower overall operating costs.



Key Performance Metrics

Parameter	Result
Plant Capacity	300,000 m ³ /day
Filter Bed Depth	1 m (0.6 m Filtralite® + 0.4 m Sand)
Filtration Media	Filtralite® NC 0.8–1.6 + Sand
SDI In	5.6
SDI Out	2.23
Turbidity In	1.2 NTU
Turbidity Out	0.09 NTU
Time Between Backwash	55 hours
Filter Media Loss	0%
Planned Filtration Velocity	6.5 → 13–14 m/h
Planned Production Capacity	680,000 m ³ /day

Conclusion

The SWRO Fouka II project demonstrates that advanced pretreatment is a critical enabler of efficient, large-scale desalination. By significantly improving SDI and turbidity, protecting RO membranes, extending backwash intervals, and supporting more than a twofold increase in production capacity, Filtralite® PURE proved to be far more than a filtration media—it became a key contributor to plant performance, operational reliability, and future scalability.

As desalination facilities worldwide strive to produce more water with greater efficiency, the SWRO Fouka II case highlights how investing in advanced filtration technology can deliver measurable improvements in both water quality and long-term operational excellence.

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CASE STUDY

FILTRALITE® PURE

Pre-Treatment in Desalination

INCREASING CAPACITY & ENHANCING PERFORMANCE

Filtralite® Pure is a high-performance expanded clay filter media designed for efficient seawater pretreatment, delivering proven results in real desalination plants.



KEY RESULTS

SDI

SDI

5.6 → 2.23



Turbidity (NTU)

1.2 → 0.09



55

Hours
Between Backwash



0%

Filter Media Loss

CHALLENGES



Seasonal Raw
Water Variations



Algal Blooms
Increasing Clogging Risk



High Inlet
Turbidity Events

KEY BENEFITS



Protects
RO Membranes



Higher
Filtration Efficiency



Better Suspended
Solids Retention



Lower
Regeneration Costs

PERFORMANCE UPGRADE



Filtration Velocity

6.5 m/h → 13-14 m/h

PRODUCTION CAPACITY



300,000

m³/day



680,000

m³/day



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Beyond Procurement: How Al Mousa Trading Co. Helps De-Risk Water Projects

In today's water sector, project success depends on more than equipment supply. Reducing technical and operational risks requires the right expertise, technology, and long-term support. Through integrated engineering solutions and partnerships with leading global manufacturers, Al Mousa Trading Company helps deliver reliable, efficient, and future-ready water infrastructure projects.

Starting with Smart Engineering

The foundation of every successful water project is proper planning. Before equipment is selected or installed, Al Mousa Trading supports clients through technical assessments, engineering studies, and solution development tailored to specific project requirements. By identifying challenges early and ensuring systems are designed according to operational needs, the company helps prevent costly redesigns, performance issues, and implementation delays later in the project. This proactive approach significantly reduces technical and financial risks before construction even begins.



Access to Proven Global Technologies

Once project requirements are defined, selecting reliable technologies becomes essential.

Al Mousa Trading collaborates with some of the world's leading manufacturers to provide high-performance solutions for water and infrastructure applications. Its portfolio includes globally recognized brands such as:

GRUNDFOS

PEERLESS PUMP

VIESMANN

SPP PUMPS

BALMORAL

Oalixaxis

Aquaterterra

LiquiTech

FILTRALITE®

Through these strategic partnerships, clients gain access to advanced pumping systems, water storage technologies, filtration solutions, piping networks, and energy-efficient equipment designed to meet international standards. Working with proven technologies minimizes equipment-related risks & ensures long-term operational reliability.

Precision Installation and Commissioning

Even the most advanced equipment can underperform if installation is not executed properly. To ensure optimal performance, Al Mousa Trading provides specialized installation and commissioning services carried out by experienced engineers and technicians.

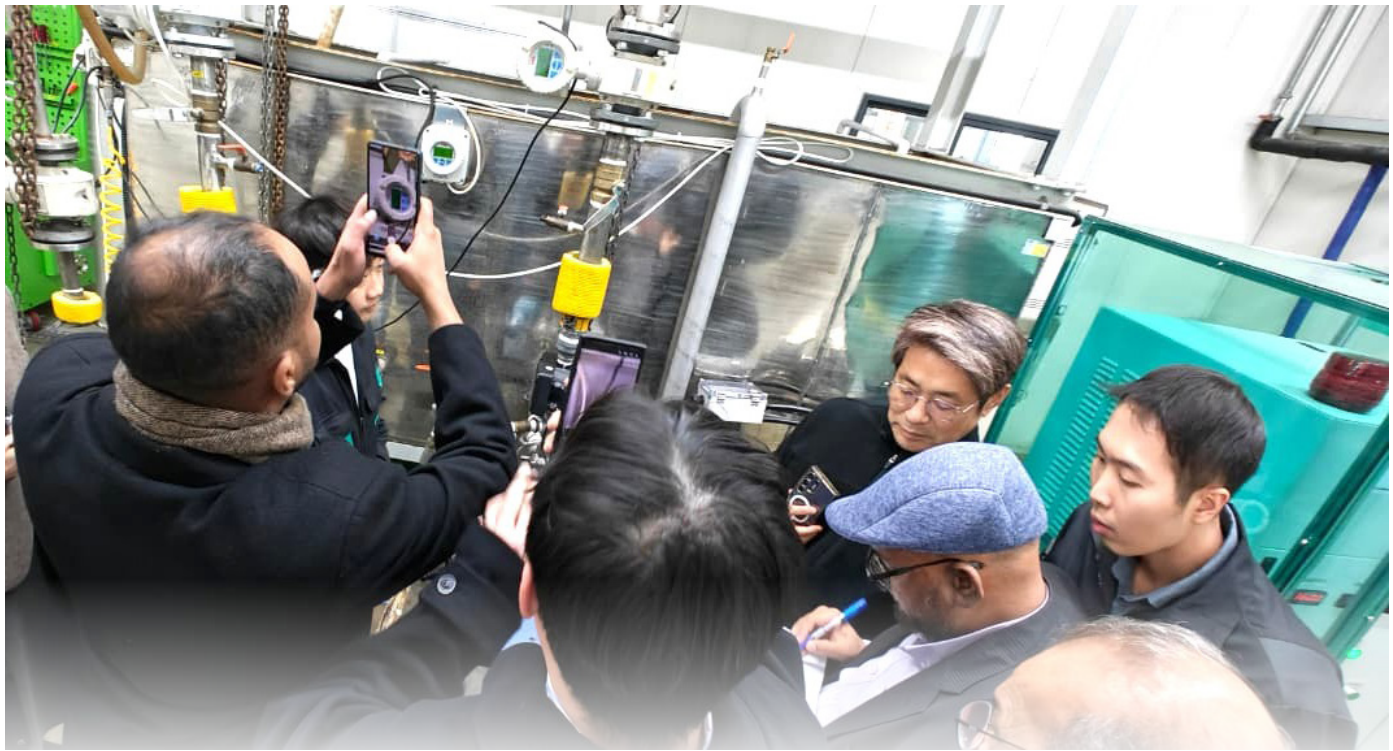
Every system is installed according to strict quality standards and subjected to detailed commissioning procedures before operation. This ensures that performance targets are achieved from day one while minimizing startup risks and unexpected project delays.



Testing, Commissioning, and Proven Results

A critical part of reducing project risk is ensuring that equipment performs exactly as specified before it reaches the project site. Al Mousa Trading Company places strong emphasis on testing, validation, and quality assurance to guarantee long-term reliability and operational efficiency.

This commitment was recently demonstrated during the Roshn Sedra Project (Phases 3, 4 & 5), where Al Mousa Trading collaborated with its global partner Wilo, alongside East Consultant Engineering Company and China Harbour Company, to conduct a Factory Witness Test at Wilo's manufacturing facility in South Korea. The testing process verified system performance and quality standards before shipment, helping to minimize installation risks, prevent operational issues, and ensure the delivery of reliable, energy-efficient pumping solutions for one of the Kingdom's major developments.



Long-Term Reliability Through Maintenance

Project success does not end after commissioning. Sustainable performance requires ongoing maintenance and technical support. Al Mousa Trading provides preventive and corrective maintenance services for pumps, motors, water systems, and critical infrastructure assets. Through regular inspections and proactive servicing, the company helps clients extend equipment lifespan, minimize unplanned downtime, and maintain operational efficiency throughout the life of the project.

Conclusion

As water infrastructure projects become increasingly complex, organizations need partners capable of managing risk at every stage of development. Al Mousa Trading Company has evolved beyond the traditional procurement model by combining engineering expertise, global technology partnerships, installation capabilities, testing services, and long-term maintenance support. The result is a comprehensive approach that transforms risk management into a competitive advantage. By helping clients make better decisions, deploy proven technologies, and maintain reliable operations, Al Mousa Trading continues to play a vital role in delivering resilient and future-ready water infrastructure projects across Saudi Arabia.



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FROM PLANNING TO PERFORMANCE: HOW AL MOUSA TRADING CO. DE-RISKS WATER PROJECTS

Al Mousa Trading Co. adopts a comprehensive approach to water projects, helping clients minimize technical and operational risks while ensuring reliable, efficient, and sustainable outcomes.

THIS IS ACHIEVED THROUGH:



**SMART PROJECT PLANNING
AND ENGINEERING EXPERTISE**



**PROVEN GLOBAL
TECHNOLOGIES AND SOLUTIONS**



**PROFESSIONAL INSTALLATION
AND SEAMLESS COMMISSIONING**



**RIGOROUS TESTING
AND QUALITY ASSURANCE PROCESSES**



**DEDICATED MAINTENANCE
AND LONG-TERM SUPPORT**



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Binder Group: Leading the Future of Smart Aeration in WWTPs

For wastewater treatment professionals, aeration is far more than a utility process. It is the operational heartbeat of biological treatment, influencing treatment performance, energy efficiency, process stability, and long-term operating costs. Yet despite its critical role, aeration remains the largest energy consumer within most treatment facilities, representing approximately 50–70% of total electricity demand.

For plant managers and operators, the challenge extends beyond supplying air. It is about delivering the right amount of air, at the right location, at the right moment, while maintaining process stability and controlling operational expenditure.



This is precisely where Binder Group has established its expertise—transforming aeration from an energy-intensive necessity into a strategic driver of operational excellence.

Precision Is No Longer Option

As treatment requirements become increasingly stringent and energy prices continue to rise, conventional approaches to airflow management reveal their limitations. Many traditional valves were originally designed for water applications, resulting in restricted control ranges, poor repeatability, & unnecessary pressure losses. Binder Group responded to these challenges by developing the VACOMASS® Aeration Control System, a portfolio specifically engineered for precise airflow measurement, distribution, & intelligent control.



The VACOMASS® family combines several complementary technologies:

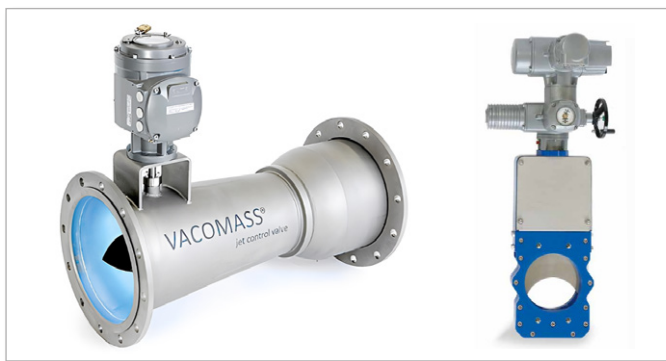
- VACOMASS® Jet Control Valve
- VACOMASS® Elliptic Diaphragm Control Valve
- VACOMASS® Square Diaphragm Control Valve
- VACOMASS® Thermal Mass Flow Meters
- VACOMASS® flexcontrol

Rather than functioning as individual components, these technologies operate as an integrated ecosystem designed to enhance process reliability, optimize energy consumption, and support operators in achieving consistent treatment performance.

Reducing Pressure Loss Means Unlocking Hidden Value

Pressure losses may appear insignificant during the design phase, yet over years of operation they become one of the most influential factors affecting overall energy consumption. Conventional control valves frequently operate with pressure drops ranging from 40 to 70 mbar, increasing blower demand and driving operational costs upward. Binder Group has taken a fundamentally different engineering approach.

The VACOMASS® Jet Control Valve operates with pressure losses as low as 2–5 mbar, while the VACOMASS® Elliptic Diaphragm Control Valve typically performs within the 10–15 mbar range. Furthermore, the Jet Control Valve enables pressure recovery of up to 75%, converting hydraulic efficiency into tangible energy savings.



This philosophy goes beyond equipment optimization. It represents a commitment to reducing lifecycle costs, lowering energy demand, and supporting more sustainable wastewater treatment practices for decades to come.

Data Creates Better Decisions

Without accurate airflow measurements, maintaining stable dissolved oxygen levels and optimizing biological treatment becomes increasingly difficult. Binder Group's VACOMASS® Flow Meters address this challenge through thermal mass measurement technology capable of delivering highly reliable readings independent of pressure or temperature fluctuations.



Their advantages include:

- Measurement capabilities up to 220°C
- Maintenance-free sensor technology
- Robust stainless-steel construction
- Corrosion-resistant design
- Fast dynamic response
- Simplified installation and servicing

The ability to position the airflow sensor only 0.5×D upstream of the valve also supports compact installations while preserving measurement accuracy, allowing engineers greater flexibility during plant design and modernization projects.

Technology Designed Around People

Even the most advanced technology has limited value if it complicates operations.

Behind every efficient treatment plant is a team responsible for balancing compliance requirements, treatment quality, energy efficiency, and asset reliability. Operators need systems that simplify decision-making rather than increase complexity. For this reason, Binder Group developed VACOMASS® flexcontrol as an open, PLC-based platform designed with practical operation in mind.



Its modular architecture provides:

- Transparent control strategies
- Independent control loops
- Seamless integration with existing automation systems
- Adaptability to site-specific requirements
- Advanced aeration algorithms for nitrogen removal and diffuser maintenance

The result is more than a control platform. It is a decision-support environment that empowers operators to move from reactive operation toward predictive and performance-oriented plant management.

Proven Performance Beyond Technical Specifications

Performance in wastewater treatment is ultimately measured in operational results.

Binder Group technologies have been successfully implemented across numerous facilities worldwide, ranging from municipal treatment plants to some of the largest wastewater infrastructures in operation today.

Real-world applications demonstrate measurable improvements.



One German installation reported energy savings exceeding 50% following the replacement of conventional butterfly valves with VACOMASS® diaphragm control valves. In another application, ammonia-based aeration strategies achieved 30% aeration savings, demonstrating how intelligent control combined with precise airflow regulation can significantly enhance overall efficiency.

These results reinforce an important industry reality: sustainable performance is achieved not through isolated equipment upgrades, but through integrated engineering solutions designed to optimize the entire aeration process.

Building the Next Generation of Aeration Systems



The wastewater industry is evolving rapidly, driven by increasing environmental expectations, stricter regulations, and growing pressure to improve operational efficiency.

Binder Group continues to support this transformation through solutions that combine engineering expertise, intelligent automation, and long-term operational value.

By integrating VACOMASS® control valves, advanced flow measurement technologies, flex-control, and the Aqualogic® Controller System, treatment plants gain access to a comprehensive framework for smarter aeration management.

Because the future of wastewater treatment is not simply about supplying more air.

It is about delivering air with greater precision, lower losses, higher reliability, and a deeper understanding of how every decision influences performance, sustainability, and operational success.

“That future is already being engineered by Binder Group.”

SHAPING SMARTER WATER FUTURES

Intelligent aeration solutions
that deliver **performance**,
efficiency, and **sustainability**.



MAXIMUM ENERGY SAVINGS

Up to 75% pressure recovery
with ultra-low pressure loss.



PRECISION CONTROL

Right air, right place,
right time.



SMART TECHNOLOGY

Intelligent, open, and
operator-friendly.



ACCURATE MEASUREMENT

Reliable airflow data for
stable performance.



SUSTAINABLE IMPACT

Lower energy demand.
Higher efficiency.
Lasting impact.



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Every Cubic Meter of Air Has a Cost: How **Next Turbo** Is Transforming Energy Efficiency in Wastewater Treatment

For every wastewater treatment plant, there comes a point when improving treatment performance is no longer the biggest challenge—operating the plant efficiently is. Plant managers, maintenance teams, and process engineers are under constant pressure to reduce energy consumption, maintain stable biological treatment, and extend equipment life without compromising reliability.

Among all plant processes, aeration remains one of the most energy-intensive. Every cubic meter of air delivered to the biological process has a cost, and every unnecessary kilowatt consumed directly impacts operating budgets.

As facilities strive to become more sustainable while controlling long-term expenses, the conversation is shifting from simply producing airflow to delivering it with maximum efficiency.

This is exactly where **Next Turbo** has focused its engineering philosophy.

Engineering Airflow Around Real Plant Conditions

Wastewater treatment plants rarely operate under ideal or constant conditions. Influent flow changes throughout the day, biological loading fluctuates, and oxygen demand continuously rises and falls. These variations require aeration equipment capable of responding quickly while maintaining high efficiency. Traditional blower technologies often perform well only near their design point. Once operating conditions change, efficiency can decline, forcing operators to consume more power simply to maintain the required process performance. Over time, this translates into higher operating costs, increased mechanical stress, and more frequent maintenance activities. Rather than designing equipment for a single operating condition, Next Turbo engineered its centrifugal turbo blowers to perform efficiently across the varying demands encountered in real wastewater treatment facilities.

Efficiency Is More Than Lower Power Consumption



Selecting a blower today is no longer about purchasing rotating equipment. It is about investing in a solution that delivers measurable value throughout its operational life.

Plant owners increasingly evaluate equipment based on factors such as:

- Stable performance under changing operating conditions.
- Reduced maintenance requirements.
- Simplified installation and commissioning.
- Long-term operational reliability.
- Lower total cost of ownership.

These considerations have become just as important as initial capital investment, particularly for municipal and industrial wastewater treatment facilities expected to operate continuously for many years.

Intelligent Airflow Control Without Compromise



One of the defining characteristics of Next Turbo blowers is their ability to regulate airflow from 40% to 100% of design capacity while maintaining outstanding operating efficiency.

Instead of relying solely on conventional speed control, Next Turbo incorporates its advanced Dual Point Control technology, combining Inlet Guide Vanes (IGV) with Variable Diffuser Vanes (VDV) to continuously optimize airflow according to actual process demand. This approach allows airflow regulation without creating unnecessary discharge pressure losses while helping the blower maintain high efficiency across a wide operating range.

For operators, this means the aeration system reacts to the biological process instead of forcing the process to adapt to the equipment.

GTB Series: Compact Design, Maximum Efficiency



The GTB Series reflects Next Turbo's commitment to simplifying blower technology while improving performance.

Its compact design integrates a reduced lubrication oil reservoir within the gearbox, an integrated oil distribution system, and hydrodynamic-housed hybrid ceramic bearings.

By eliminating the need for a separate pre-lubrication oil pump and reducing lubrication requirements during operation, the GTB Series is engineered to achieve exceptionally low energy consumption while maintaining reliable performance.

Available in power ratings from 37 kW up to 800 kW, the GTB Series provides an ideal solution for a broad range of municipal and industrial wastewater treatment applications, offering both operational flexibility and reduced maintenance demands.

GTB Series: Designed for Large-Scale Performance

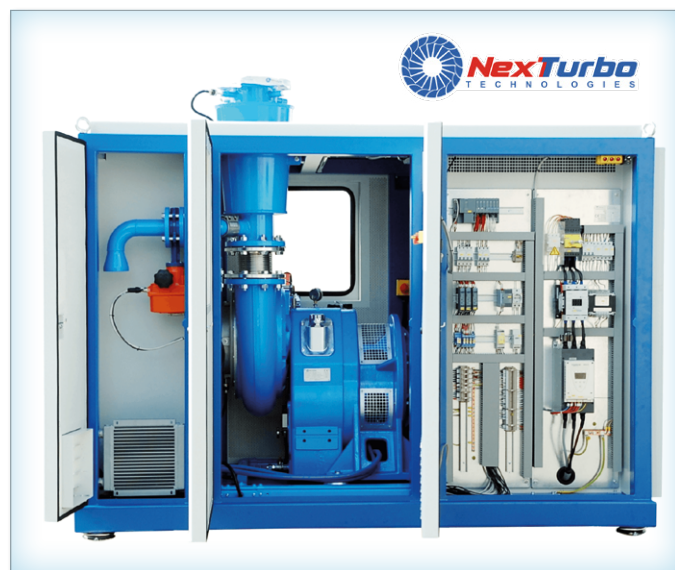


For applications requiring higher airflow capacities and greater power, Next Turbo offers the GTB Series.

Built with hydrodynamic tilting-pad bearings and designed for demanding operating environments, the GTB Series supports drive powers of up to 2,000 kW with operating pressures reaching 20 mWC. Its robust baseframe configuration, integrated oil reservoir, and dedicated pre-lubrication system make it particularly suitable for large municipal facilities and heavy industrial processes where reliability is essential.

Whether supporting a growing municipality or a large industrial complex, the GTB Series delivers the stability required for continuous, high-capacity aeration.

Simplifying Projects Beyond the Blower



Performance does not stop at the machine itself. Installation complexity, commissioning time, and system integration all influence the success of a project.

To address these challenges, Next Turbo offers Plug & Play packages that arrive pre-cabled and pre-tested, integrating major components—including the control panel, motor control center, blow-off valve, filtration system, cooling equipment, and acoustic enclosure—into a single engineered solution.

For projects requiring greater installation flexibility, modular enclosure packages can be adapted to individual blower room layouts, allowing easier integration into both new facilities and retrofit applications.

Looking Beyond Air Delivery

The future of wastewater treatment will not be defined by how much air a blower can produce, but by how intelligently that air is delivered.

By combining advanced airflow control, wide operating flexibility, compact engineering, and solutions ranging from 37 kW to 2,000 kW, Next Turbo enables treatment plants to improve operational efficiency while reducing long-term operating costs.

Because in today's wastewater industry, the smartest investment is not simply moving more air—it's making every cubic meter of air work harder.

Every Cubic Meter of Air Has a Cost: How Next Turbo Is Transforming Energy Efficiency in Wastewater Treatment

High-efficiency solutions engineered to reduce energy consumption, optimize performance, and lower total cost of ownership.



HIGH EFFICIENCY

Lower energy consumption



INTELLIGENT CONTROL

Dual Point Control (IGV + VDV)



RELIABLE & DURABLE

Built for demanding operations



LOWER TOTAL COST OF OWNERSHIP

Long-term value, less maintenance



GTB SERIES

Compact design.
High efficiency.
Integrated reliability.



GTH SERIES

Built for high capacity.
Up to 2,000 kW.
Designed for demanding applications.



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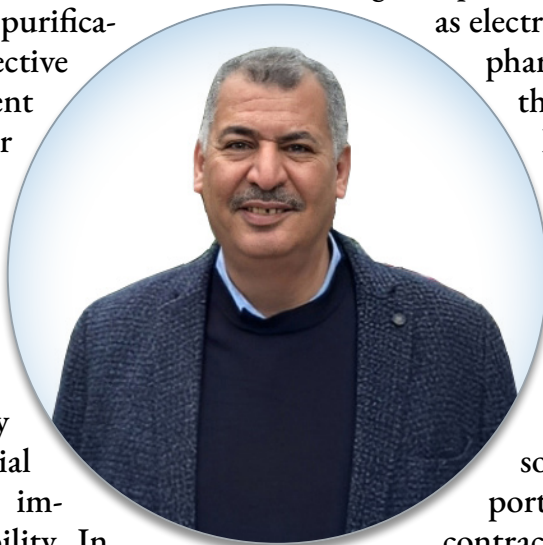


WETCO
Water Engineering Technology Co.



**The Future of Clean Water: How WETCO
is Leading Innovation in Ultrafiltration
and Water Purification Solutions**

Water quality is an increasingly critical concern in our rapidly industrializing world. Ultrafiltration (UF) has emerged as a vital water purification method, offering an effective solution to meet the stringent demands for clean, safe water across various sectors. This technology operates under low pressure, making it energy-efficient compared to other filtration methods. Its versatility and effectiveness make ultrafiltration a key component in various industrial applications, contributing to improved quality and sustainability. In this article, we'll delve into the world of UF membranes with Chemist Tarek El-Sherif, General Manager at WETCO, exploring the intricacies of ultrafiltration, its mechanisms, applications, advantages, & the market trends shaping its future.



With over 5,000 clients, WETCO caters to a diverse clientele, including small businesses and large corporations across various sectors such as electricity, petroleum, fertilizers, and pharmaceuticals, extending its reach throughout Cairo and Upper Egypt. The company's primary focus is on water treatment, dedicating significant resources to providing cutting-edge technologies and competitive products. WETCO continually expands its service offerings to deliver a wide array of solutions and professional support to its customers. It engages in contracting activities, including the design, construction, supply, installation, and operation of water treatment plants. Additionally, WETCO represents international companies by distributing their products and providing installation, operation, and maintenance services.

Founding of the Company

WETCO, established in 2002, is a leading water treatment joint-stock company in Egypt, recognized for its exceptional services and high-quality products sourced globally from renowned suppliers. WETCO, established in 2002, is a leading water treatment joint-stock company in Egypt, recognized for its exceptional services and high-quality products sourced globally from renowned suppliers.

“WETCO is an innovative water treatment joint Stock Egyptian Company established in 2002. We are one of the leading players who provide exceptional services and source premium quality products from around the world in collaboration with globally recognized suppliers and manufacturers.”

Eng. Mohamed Amer, CEO of WETCO, remarked that.





Aqua Energy Expo 2025: WETCO's Leadership in Innovation

It is worth mentioning that WETCO Company will be the platinum sponsor and top exhibitor at the Aqua Energy Expo MEA 2025, scheduled for September 1-3, 2025, at the Cairo International Convention Center in Egypt. This prominent event will highlight various sectors within water and energy technology, such as desalination, smart water meters, and renewable energy. WETCO is dedicated to water treatment, offering advanced technologies and competitive products, while engaging in activities like designing and constructing treatment plants and supplying equipment. Participating in the Aqua Energy Expo MEA 2025 presents a unique opportunity for WETCO to showcase its expertise and innovative solutions to a diverse audience from across Africa and the Middle East.

The exhibition will attract key stakeholders, including government bodies, industry leaders, and potential clients, providing WETCO with valuable networking opportunities. By engaging with an extensive audience, WETCO can further establish its reputation as a leader in water treatment technology.

WETCO's core business areas include:

- Design and supply of industrial water treatment systems.
- Design and supply of desalination systems, including reverse osmosis (RO).
- Stocking and supplying filtration aids and ion exchange resins.
- Providing a variety of parts and accessories for water applications.
- Offering operational support, troubleshooting, and maintenance services.

WETCO's vision is to be the preferred choice for water management solutions, while its mission emphasizes continuous improvement in service quality, ethical conduct, and strong relationships with customers and partners, ensuring excellence in all operations.

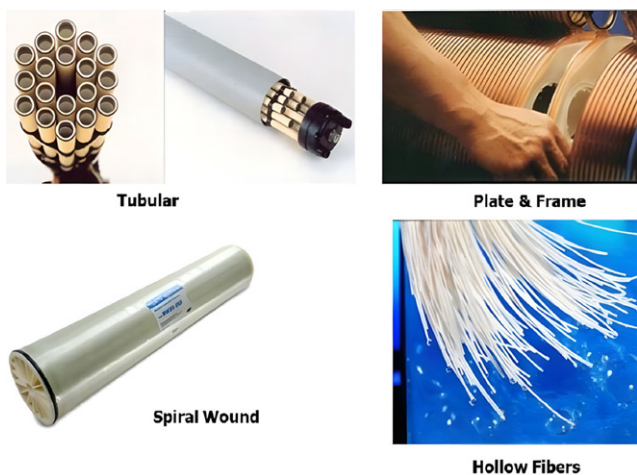
What is Ultrafiltration (UF) & its Role in Water Treatment?

Ultrafiltration (UF) is a separation method that uses porous membranes, driven by pressure differentials, to filter out suspended solids and high molecular weight solutes. This process operates alongside microfiltration (MF), nanofiltration (NF), and reverse osmosis (RO).

UF membranes have perforations typically ranging from 0.1 to 0.01 microns, which effectively block larger molecules from passing through while allowing treated water and low molecular weight elements, such as minerals, to permeate. Compared to microfiltration, ultrafiltration systems are more advanced due to their smaller membrane perforations, enabling the removal of a greater variety of contaminants, including:

- Proteins
- Viruses and bacteria
- Endotoxins
- Microplastics
- Silt and silica
- Organic matter
- Chlorine-resistant organisms
- High molecular weight solutes

However, ultrafiltration is not effective against low molecular weight pollutants like minerals and dissolved salts. Ultrafiltration (UF) systems showcase versatility in treating various water sources, making them ideal for applications such as brackish water, wastewater, groundwater, and seawater treatment. These systems are effective as stand-alone solutions and can also complement other plants, particularly in conjunction with reverse osmosis (RO). UF systems are frequently employed for pretreating feed water with high silt density before it enters RO systems.



Types of Ultrafiltration Membranes

Ultrafiltration (UF) membranes come in various configurations, each designed for specific water treatment needs. Choosing the right membrane type is crucial for optimizing the ultrafiltration process. Here are the main types of UF membranes used in water treatment:

• **Hollow Fiber Membranes:** Composed of bundles of hollow fibers with microscopic pores, these membranes allow water to flow either inside-out or outside-in. They offer a high surface area relative to their volume, making them compact and efficient, especially for large municipal facilities. Its advantages: Ideal for high solids content; widely used in municipal water treatment.

• **Spiral Wound Membranes:** This design features flat sheet membranes coiled around a central permeate collection tube. Feed water circulates between the sheets, with filtered water spiralling inward. These modules are compact and energy-efficient, commonly used in industrial & residential applications. Its advantages: Reduced energy consumption; prevalent in the food & beverage sector.

• **Tubular Membranes:** Made of polymer materials, these tube-shaped membranes allow water to flow through porous walls. They are effective for high-solids content and easy to clean, suitable for industrial applications with challenging feed streams. Its advantages: Effective for high-fouling scenarios; frequently used in industrial wastewater treatment.

• **Plate and Frame Membranes:** Featuring flat sheet membranes stacked between supporting plates, these modules can withstand high pressures, making them ideal for specialized industrial uses. Advantages: High-pressure resistance; suitable for viscous liquids.

What are the Benefits of Ultrafiltration?

Ultrafiltration (UF) presents several advantages over traditional pretreatment methods:

• **Adaptability:** UF membranes effectively act as physical barriers against particles, colloids, bacteria, and viruses, ensuring high water quality despite influent variations.

• **Consistent Quality:** With fine pores, UF membranes achieve turbidity levels below 0.1 NTU, an SDI of less than 3%/min, and over 6-log removal of pathogens like *Cryptosporidium* and *Giardia*.

• **Reduced Footprint:** UF systems occupy up to 50% less space and weight compared to media filtration, lowering land and construction costs.

- **Easy Integrity Testing:** Modules can be tested online for leaks with minimal downtime.
- **Isolated Maintenance:** Individual modules can be repaired or replaced without impacting overall plant performance.
- **Simplified Design:** UF systems maintain stable water quality without the complexities of multimedia filtration, leading to easier design and more automated control.
- **Lower Environmental Impact:** UF minimizes chemical usage by employing size exclusion for contaminant removal, reducing environmental concerns related to wastewater.
- **Cost Efficiency in RO Stages:** UF enhances downstream processes by improving water quality, allowing for higher design flux in reverse osmosis (RO), lower membrane cleaning needs, and reduced replacement rates, while minimizing the use of cartridge filters.

Microfiltration vs Ultrafiltration

Microfiltration, with a filtration precision of 0.1-50 microns, is suitable for coarse filtration tasks such as removing sediment, rust, odor, and color in water. It employs elements like PP, activated carbon, and ceramic filters, commonly applied in whey and skimmed milk production. However, due to its lower accuracy, it falls short in eliminating bacteria and other harmful substances, providing only average results against sediment and rust.

In contrast, ultrafiltration boasts a precision range of 0.001-0.1 microns, enabling the removal of rust, sediment, suspended solids, colloids, bacteria, and large organic matter.

Constituent	Comparative Efficacy		
<i>Giardia</i>	UF	=	MF
<i>Cryptosporidium</i>	UF	=	MF
Bacterial	UF	=	MF
Virus	UF	>>>	MF
TOC	UF	>	MF
Colloid	UF	>	MF

This process retains essential mineral elements, making it ideal for producing mineral and mountain spring water. With a water recovery rate exceeding 95%, ultrafiltration is efficient, easily maintained through flushing and backwashing, and enjoys a longer service life. Choosing between the two depends on budget constraints and specific water treatment needs. Ultrafiltration, with its higher flow rate, excellent removal efficiency, versatility, and compatibility with other filtration methods, emerges as a more cost-effective solution compared to microfiltration.

Qualified Feed Water Quality Parameters

The UF modules can withstand temporary fluctuations in feed water quality, as indicated by the maximum allowable limits. If the feed water quality falls outside the specified design range shown below, a pilot study should be conducted to verify performance, or pretreatment options should be considered. Depending on the application, it is advisable to use a safety screen with a mesh size of 150 – 300 microns before the UF system. Various technologies can be employed, including self-cleaning screens, as well as bag, cartridge, or disc filters. Additionally, based on the type of water or the range of feed water parameters, other pretreatment methods such as oxidation, coagulation, sedimentation, and media filtration may also be recommended.

Parameter	Unit	Design Basis	Maximum Allowable
Turbidity	NTU	<50	300
TOC	mg/l	<10	40
Particle Size	micron	<150	300
COD Mn	mg/l	<20	60
Oil /Grease	mg/l	0	< 2
pH continuous	6-9	2-11	
Temperature	C°	25	40
Cl2 continuous	mg/l	0.5	200
TSS	mg/l	50	100

How does it Work?

The ultrafiltration process typically involves several stages:

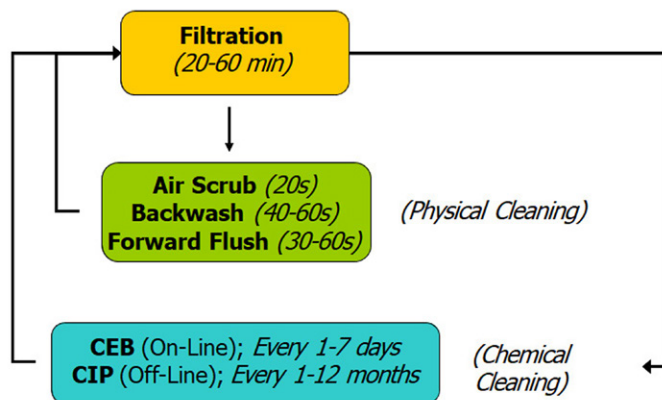
► Filtration

Ultrafiltration systems primarily operate in filtration mode, where feed water is pumped through membranes to produce filtrate.

This process usually involves dead-end filtration, converting nearly all feed into filtrate, unlike cross-flow filtration, which allows some feed to exit as reject.

Filtration cycles last between 20 to 90 minutes, depending on the quality of the feed water.

These systems maintain a constant flow rate, but as solids accumulate on the membrane surface, transmembrane pressure (TMP) increases, necessitating a backwash sequence for cleaning. Backwashing can be triggered by time, volume of filtrate, or TMP set points, with the latter being ideal for variable feed water quality. The backwash process includes several steps: Air Scour, Gravity Drain, backwashing through both the top & bottom outlets of the module, followed by a final Forward Flush or rinse to ensure effective cleaning.



▶ Physical Cleaning

• Air Scour

The Air Scour step is crucial for maintaining ultrafiltration membrane efficiency by loosening particulates that accumulate on the membrane surface. During this phase, oil-free air is injected from the bottom of the module, generating ascending bubbles that agitate the membrane surface. This agitation dislodges materials stuck to the membrane, allowing them to be expelled through the module's top port for disposal. The Air Scour typically lasts between 20 to 30 seconds, after which the module is drained by gravity to remove the dislodged particulates.

• Gravity Drain

Following the Air Scour, the Gravity Drain step is essential for flushing out the loosened materials from the system.

The duration of this step varies based on system volume and piping configuration, generally lasting 30 to 60 seconds. If gravity drainage is impractical due to system design or if it takes too long, a forced flush can be employed. This involves using the backwash pump to push water through the bottom outlet of the module, although this method requires more water and energy.

• Backwash Top

Once the gravity drain is completed, the Backwash Top step is initiated. In this phase, filtrate water is pumped backward through the membrane fibers, effectively pushing accumulated materials away from the membrane and directing them to waste via the top module outlet.

The backwash flux during this step ranges from 100 to 120 LMH, with a typical duration of 30 to 45 seconds.

Depending on the application, chlorine may be added to the backwash stream to enhance the removal of foulants or to inhibit microbial growth. Combining the Air Scour with the Backwash Top step can improve cleaning efficiency.

• Backwash Bottom

After completing the Backwash Top step, the process moves to the Backwash Bottom step. In this phase, filtrate flows from the inside of the fibers to the outside and is expelled through the module's bottom outlet. The backwash pump remains active to ensure continuous cleaning and protect the membranes. This step lasts approximately 30 to 45 seconds, and chlorine may be added to aid in removing foulants.

The backwash steps can be repeated as needed, depending on the level of fouling, and monitoring the quality of the backwash wastewater can optimize the duration of these cleaning processes.

• Forward Flush

The backwash sequence concludes with the Forward Flush step, which uses feed water to rinse the system and remove any remaining solids or trapped air from previous steps. In this phase, water flows over the outside of the fibers (feed side) while the filtrate valve is closed, exiting through the module's top outlet.

This step generally lasts between 30 to 60 seconds, or long enough to refill the modules and purge any air and water from the outlet

After completing the Forward Flush, the system returns to Filtration mode, and the cleaning cycle begins anew.

► Chemical Cleaning

Fouling in the UF process refers to the gradual rise in transmembrane pressure (TMP) while maintaining a constant product flow, or conversely, a decrease in filtrate flow at a steady feed pressure. This phenomenon is typically caused by the deposition or adsorption of contaminants from the feed stream onto the membrane surface or within its inner structure. To quickly address issues such as leaks or blockages.

• Cleaning Enhancement Back Wash (CEB)

Cleaning Enhanced Backwash (CEB) improves ultrafiltration membrane (UF) cleaning by adding chemicals like chlorine or acids to the backwash stream, tailored to specific foulants. Typically performed daily to weekly based on feed water quality, CEB is automated but can be adjusted or triggered by transmembrane pressure (TMP) set points.

The process includes a soak step of 5 to 20 minutes after chemical addition for effective contaminant interaction. It's recommended to reverse the backwash order, starting with bottom backwash to maintain chemical presence. Following soaking, a routine backwash is completed, including air scour and gravity drain to eliminate particulates and residual chemicals. Initial filtrate may need discarding, and CEB can operate at a reduced flux of about 80 LMH.

• Cleaning In Place (CIP)

A Clean-In-Place (CIP) operation is essential for maintaining fiber cleanliness through backwashing and chemical recycling. The frequency of CIP depends on feed water quality, typically occurring every 1 to 3 months. Initially, routine backwash steps—air scour, draining, and backwashing through both top and bottom drains—are conducted 3 to 8 times to eliminate contaminants that don't require chemicals. After backwashing, the module is drained to prevent dilution of CIP chemicals, which are then recycled externally for 30 minutes.

Heating the CIP solution to 40°C enhances contaminant removal. Following the initial recycle, a soaking period of at least 60 minutes is implemented, with an additional 30-minute chemical recycle afterward.

An air scour is performed before draining to eliminate concentrated chemicals. Finally, backwashing and forward flushing are done to clear any remaining contaminants from the fibers. If both acid and alkali cleaning is necessary, the CIP steps are repeated for each chemical solution. This systematic approach ensures optimal membrane performance and longevity.

CEB	CIP
Maintenance cleaning.	Intensive cleaning.
Shorter in duration (but higher frequency).	Longer in duration (but lower frequency).
Require less operator involvement. Automatic.	Manually initiated.
It is done with Ultrafiltrate.	Chemical solution is prepared with Demin/RO water, usually at higher concentrations.
Chemical solution is flushed out from the system.	Chemical solution is recirculated through the system.
Cleaning occurs at ambient temperature.	Heating of the cleaning solution is recommended.

Market Trends

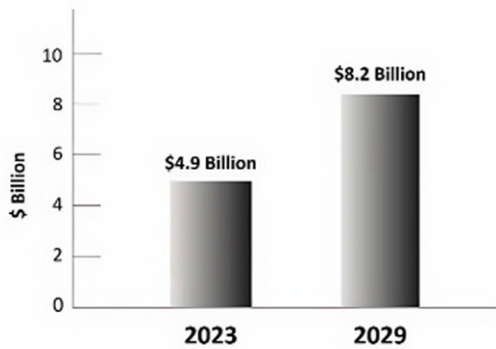
According to BCC Research, the global ultrafiltration membranes market is growing significantly, valued at \$4.9 billion in 2023 and expected to reach \$8.2 billion by 2029, with a compound annual growth rate (CAGR) of 9.4%.

This growth is fueled by several factors: the rising demand for efficient separation and purification processes in industries aiming to enhance product quality and safety while reducing waste; stringent environmental regulations requiring high-quality membranes for pollutant removal; increasing water scarcity driven by climate change and population growth, necessitating better water management solutions; and advancements in ceramic-based ultrafiltration membranes, known for their durability and effective contaminant removal.

Together, these elements are leading to greater adoption of ultrafiltration technologies across various sectors.

Ultrafiltration Membranes: Technologies and Global Markets

Market forecast to grow at a CAGR of 9.4% (2023-2029)



Aqua Energy Expo MEA: WETCO's Leadership in Innovation

The International Water and Energy Exhibition and Conference in the Middle East and Africa – Aqua Energy Expo MEA witnessed an exceptional participation from WETCO (Water Engineering Technology Co.) as the Platinum Sponsor and a top exhibitor. The company's prominent presence at Booth D1 & D2 attracted significant engagement, reflecting strong market trust in its smart utility and treatment solutions.



In addition to its physical showcase, WETCO delivered an impactful scientific contribution to the Arab-African Conference for Investment in Water and Energy; Chemist Mohamed Amer, CEO of WETCO, served as a key panelist in a high-level discussion titled "Challenges and difficulties facing water treatment companies and solutions to these challenges and difficulties", receiving an official Certificate of Appreciation from the exhibition management.

Expanding its reach into the virtual space, WETCO also hosted a highly successful online technical webinar led by Chem. Eng. Tarek Mohamed El-Sherif, General Manager at WETCO, focusing on "Ion Exchange Resins (IER) Troubleshooting", which garnered extensive views and interactive professional engagement.



Platinum Sponsor of the International Exhibition and Conference for Water and Energy in the Middle East & Africa. (Aqua Energy Expo MEA 2026)

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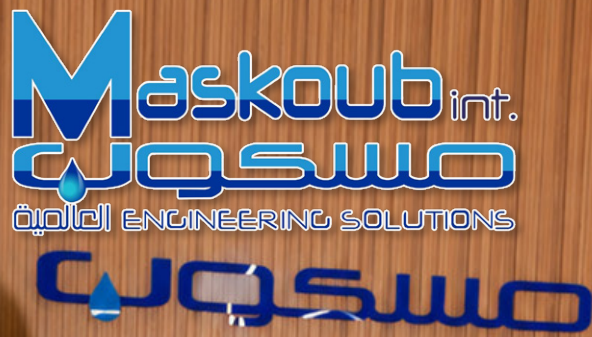
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The Strategic Vanguard of Water Sustainability: How MASKOUB International's Gold Sponsorship Catalyzed the AquaEnergy Expo 2025





In water-scarce regions like the Middle East and North Africa (MENA), where the World Bank estimates a daunting 50% gap between water supply and demand by 2030, traditional reliance on imported treatment infrastructure has become an unsustainable financial and logistical burden. Exorbitant costs, compatibility failures in regional environments & supply chain vulnerabilities have necessitated a radical shift toward technological self-reliance. At the forefront of this industrial revolution stands MASKOUB International for Contracting, an Egyptian engineering pioneer that has successfully localized over 12 critical water technologies through systematic reverse engineering, achieving 60% to 90% cost reductions. As the prestigious Gold Sponsor of the Aqua Energy Expo MEA 2025, MASKOUB International did not merely exhibit its portfolio; it fundamentally redefined the event's economic, technical, and strategic value. This comprehensive article merges MASKOUB's foundational engineering blueprints with its high-profile participation at the expo, detailing how its actual operational capabilities added unprecedented value to the exhibition and set a new benchmark for industrial water treatment across the region.

1. Company Background and Core Philosophy: Engineering Ingenuity Meets Environmental Stewardship

Founded in 2004, MASKOUB International for Contracting operates at the critical intersection of engineering ingenuity and environmental stewardship. Specializing in an expansive suite of services—including water and wastewater treatment, oil-water separation, and advanced sludge management—the firm caters to a vast and diverse clientele. Its partners span government agencies, private manufacturing sectors, and international organizations throughout the Middle East.

Beyond executing turnkey treatment plants, MASKOUB has carved a highly specialized niche in chemical innovation and custom fabrication. By developing proprietary polymer coagulants and highly efficient chlorine dioxide systems tailored specifically to regional industrial environments, the company addresses immediate operational bottlenecks while cultivating long-term resource independence for Egypt and the broader MENA region.

The core philosophy driving MASKOUB is rooted in the belief that reverse engineering is not an act of simple copying; rather, it is a sophisticated process of contextualization. MASKOUB's engineers systematically dissect global technologies, identify glaring performance gaps under local conditions, and redesign systems utilizing locally available materials and manufacturing capabilities. This methodology bridges the gap between theoretical global knowledge and local economic realities, resulting in what development economists classify as "appropriate technology"—solutions that are affordable, maintainable, and infinitely scalable for emerging markets.

2. Unveiling the Blueprint: MASKOUB's Structured Innovation Model

The operational success of MASKOUB relies heavily on its rigorous, six-step structured innovation model, which ensures that every localized product meets or exceeds international benchmarks:

1. Define & Diagnose:

The company begins by identifying specific industrial pain points, such as high energy consumption, equipment corrosion, or biological fouling.

2. Theoretical Modeling:

Engineers deploy reverse engineering principles alongside Computational Fluid Dynamics (CFD) simulations to map out the physical and mechanical behaviors of the technology.

3. Rapid Prototyping:

Leveraging cutting-edge 3D printing technologies acquired from emerging Egyptian mechanical engineering firms, MASKOUB rapidly produces precise, physical prototypes to facilitate agile, iterative design adjustments based on real-world feedback.

4. Pilot Testing:

Scaled or prototype units are subjected to rigorous testing in actual, field-level operational conditions to validate their structural and functional performance.

5. Optimization:

The design undergoes extensive refinement driven entirely by empirical field feedback and measured performance metrics.

6. Local Production:

The finalized, optimized technology is scaled up for mass commercial production by utilizing robust Egyptian supply chains, directly eliminating import dependencies.





3. From Blueprint to Reality: Actual Technological Innovations and Field Achievements

MASKOUB's actual impact is best understood through its specific, high-efficiency product lines and documented technical breakthroughs, which took center stage at the Aqua Energy Expo 2025:

Moving Bed Biofilm Reactor (MBBR) Media

MASKOUB's expertise in MBBR technology evolved beyond manufacturing high-performance biofilm media into developing advanced process enhancements. Building on its locally engineered MBBR media, MASKOUB introduced two innovative systems. The first, Hyper MBBR™, integrates the proprietary Hyper Mixer with biofilm carriers to improve mixing efficiency, reduce aeration demand, minimize media collisions, extend media lifespan, and enhance biofilm stability.

The second, Cyclo IFAS™, employs selective biomass concentration technology to increase effective sludge age (SRT), reduce excess sludge production & improve treatment efficiency without increasing reactor volume. Together, these innovations deliver lower operating costs, higher biological performance, and greater sustainability for municipal & industrial wastewater treatment plants.

Hyperbolic and Mesh Mixers

Recognizing that traditional vertical paddle mixers consumed excessive, unsustainable amounts of electricity, MASKOUB's engineers looked to fluid dynamics principles to completely redesign mixing mechanisms. Utilizing repurposed motors sourced from Cairo's local markets and deploying slow-motion videography to meticulously

visualize fluid flow patterns, they developed a fiberglass-impeller hyperbolic mixer. Now a staple in anoxic treatment tanks, this innovation redefines energy efficiency by reducing operational power consumption by a staggering 90%.

The Biomotex Hybrid Biofilm System

Launched in 2021, the Biomotex system epitomizes MASKOUB's commitment to modernizing legacy infrastructure rather than abandoning it. By replacing aging, inefficient Rotating Biological Contactor (RBC) disks with high-surface-area MBBR media, this hybrid system retrofitted municipal and industrial plants, increasing effective biological surface area tenfold while drastically cutting energy consumption. Notably, this system predated similar European hybrid solutions, establishing Egypt as a genuine hub for water innovation.

Chlorine Dioxide Production line

European water treatment designs frequently faltered when encountering the biological realities of regional water systems, particularly regarding biofilm resistance in cooling towers and poultry processing facilities. Following failed partnerships with European firms, MASKOUB independently developed localized chlorine dioxide generators capable of disrupting aggressive biofilms without generating corrosive byproducts. In a landmark industrial trial within a 3,500-cubic-meter cooling tower, MASKOUB's system completely eliminated the need for imported chemical scale inhibitors and biocides, proving the company's autonomous capability in chemical and biological innovation.





Domestic Rotary Drum Screens Localization

MASKOUB successfully developed and manufactured Rotary Drum Screens locally as part of its strategy to localize key wastewater treatment equipment. Through an extensive reverse-engineering program and multiple design improvements, MASKOUB optimized drum geometry, screen fixation & internal washing systems to achieve reliable solids removal with minimal maintenance.

The units were specifically engineered to handle high-fiber wastewater streams commonly found in paper mills, food processing plants, textile factories, and slaughterhouses. By combining robust construction with locally sourced components, MASKOUB delivered a cost-effective and dependable alternative to imported systems, reducing procurement costs, simplifying maintenance, and strengthening local manufacturing capabilities.

Chemical Breakthroughs: nano Poly Ferric Chloride (n PFC)

Addressing the critical requirements of industrial wastewater treatment, MASKOUB conducted extensive Jar Testing across various industrial sectors. This intensive research led to the synthesis of nano Poly Ferric Chloride (n PFC), a highly effective, cost-competitive local polymer coagulant. After overcoming initial hurdles related to reaction kinetics and chemical catalysis, MASKOUB successfully established a stable synthesis method. The product is fully market-ready under the commercial name Poly Ferric Chloride, with ongoing R&D leveraging microwave technology to further reduce reaction times.

Hydrocyclones and River Water Clarification Systems

To advance sludge thickening, MASKOUB engineers dissected global hydrocyclone designs, built a dedicated pilot unit, and optimized flow rates by evaluating pressure differentials against theoretical design data. Similarly, for river water clarification, the company engineered a prototype unit utilizing localized mixers and a 1-cubic-meter-per-day capacity to master velocity gradients. This allowed them to scale tank dimensions precisely according to specific mixing requirements, significantly boosting clarification performance.

4. The Impact of MASKOUB's Gold Sponsorship at the Aqua Energy Expo 2025

The Aqua Energy Expo MEA 2025 served as the definitive platform for MASKOUB International to showcase these market-ready breakthroughs to a global audience. Moving beyond the role of a traditional corporate exhibitor, MASKOUB's presence as a Gold Sponsor injected massive economic and technical value into the event, fundamentally altering its dynamic and elevating its regional importance.

Strategic Realignment of the Exhibition

Supported by key governmental bodies—including the Ministry of Housing, Utilities, and Urban Communities; the Ministry of Investment and Foreign Trade; the Ministry of Water Resources and Irrigation; and the New and Renewable Energy Authority (NREA)—the expo was designed to foster regional sustainability. MASKOUB's Gold Sponsorship anchored these governmental objectives to tangible, domestically manufactured realities. By displaying working, field-tested alternatives to imported systems, MASKOUB shifted the exhibition's narrative away from a mere trade show for foreign equipment toward an active showcase of regional industrial self-reliance.





Elevating the Expo's Technical Prestige

By presenting sophisticated, peer-reviewed engineering methodologies—such as Computational Fluid Dynamics (CFD) modeling, velocity gradient optimization, & microwave-assisted polymer synthesis—MASKOUB elevated the academic & technical caliber of the expo. International delegates, engineering consulting firms, and municipal authorities encountered an Egyptian firm operating at the absolute cutting edge of R&D, positioning the Aqua Energy Expo as a legitimate source of primary industrial innovation rather than a secondary market for aging Western or Asian technologies.

Driving Economic Value and Localized Market Accessibility

One of the most profound values MASKOUB added to the expo was the democratization of advanced water treatment technology. Historically, high-tech systems like zero-liquid discharge (ZLD), advanced desalination, and automated dosing skids were the exclusive domain of wealthy multinational corporations, leaving local SMEs financially excluded. By showcasing localized alternatives that achieve 60% to 90% cost reductions and 90% energy savings, MASKOUB provided practical, accessible solutions for thousands of regional businesses attending the event. This generated immediate commercial interest, creating a vibrant B2B ecosystem within the exhibition halls and driving substantial local investment.

Conclusion

MASKOUB International's participation as a Gold Sponsor at the Aqua Energy Expo MEA 2025 stands as a watershed moment for the regional water and energy sectors. By seamlessly merging global engineering principles with local pragmatic requirements, the company proved that reverse engineering, when executed via a structured innovation model, is an engine for genuine technological evolution. As climate change and industrial acceleration intensify water scarcity across the Middle East and Africa, MASKOUB's proven model offers a vital, scalable, and highly replicable framework for nations striving to achieve absolute self-reliance in critical environmental technologies.



Gold Sponsor of the International Exhibition and Conference for Water and Energy in the Middle East & Africa. (Aqua Energy Expo MEA 2026)



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WEBINARS

Meet our Experts at Aqua Energy Expo Weekly Webinars



Friday
JULY
10



Webinar Title

"Microgrid: Smart Energy
for a More Sustainable Future"



Speaker:

Eng. Salah Ghorab



Time: 08:00 – 10:00 PM (KSA & Cairo Time)



Saturday
JULY
11



Webinar Title

"Carbon Measurement and
Management in the Era of
Climate Change"



Speaker:

Eng. Salwa Abo Zaid



Time: 08:00 – 10:00 PM (KSA & Cairo Time)



Saturday
JULY
25



Webinar Title

"Computational Fluid Dynamics
(CFD) in Water Treatment projects:
Can the AI do it? How to be
prepared for the future?"



Speaker:

Dr. Amr Refay



Time: 08:00 – 10:00 PM (KSA & Cairo Time)









AquaEnergy Expo

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WATER NEWS BRIEF

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Egypt, Coca-Cola Explore Renewable-energy-powered Agricultural Drainage Water Treatment Project

Egypt's Ministry of Water Resources and Irrigation and Coca-Cola are exploring a partnership to treat and desalinate agricultural drainage water using renewable energy under Coca-Cola's Replenish 2.0 program. The proposed initiative aims to convert moderately saline drainage water into a sustainable irrigation source, reducing dependence on Nile River supplies. Aligned with Egypt's Water Resources Strategy 2050, the project supports water reuse, climate resilience, and agricultural sustainability. Backed by years of research with international organizations, the initiative has been deemed technically, environmentally, and economically feasible. Discussions will continue on financing and implementation, with the project expected to strengthen water security, food production, and public-private collaboration.



Amazon and Aganova to Use AI to Stop 165 million Litres of Water Waste in Recife



Amazon and Aganova have partnered to reduce water loss in Recife, Brazil, by deploying AI-powered acoustic leak detection technology. Using Amazon Web Services (AWS), Aganova's Nautilus system will inspect about 69 kilometers of large-diameter pipelines, identifying hidden leaks and air pockets that traditional methods often miss. The initiative, implemented with local utility Compesa and supported by Efficco Saneamento, is expected to save 165 million liters of water annually—equivalent to 66 Olympic-sized swimming pools. The project aims to improve water distribution efficiency, reduce pressure on the Boa Viagem aquifer, strengthen infrastructure, and support sustainable water management in one of Brazil's fastest-growing coastal cities.

2bn Euros Over 15 Years: SUEZ Secures Its Largest Contract in the Middle East, to Support the Sustainability of the Water Sector in Oman

Oman's national water company, NAMA Water Services, has launched a performance-based contract with SUEZ to improve water and wastewater services in Muscat and the North and South Sharqiyah Governorates, serving 2.3 million people. Supporting Oman Vision 2040, the project aims to reduce water losses from 34% to 11% by 2040, ensure reliable 24-hour water supply, and enhance operational efficiency through advanced digital technologies and smart leak detection. The contract also includes upgrading desalination and wastewater facilities, expanding water reuse, and implementing capacity-building programs with over 83% Omanization, strengthening local expertise and ensuring sustainable, high-quality water management.



The Saudi National Water Company Has Finalized 50 Projects in Water and Sanitation

Saudi Arabia's National Water Company (NWC) completed 50 water and sanitation projects worth more than SAR 2.4 billion (\$640 million) during the first half of 2026, supporting the Kingdom's Vision 2030 goals. The programme included 33 water projects and 17 sanitation projects aimed at improving service coverage, operational efficiency, and infrastructure resilience. The initiatives added over 1,360 km of pipelines, including 883 km of water networks and 477 km of wastewater networks, while increasing water storage capacity by 210,000 cubic metres. They also expanded wastewater treatment capacity by 15,500 cubic metres per day and pumping capacity by 307,000 cubic metres per day, strengthening the country's water infrastructure.



Samsung E&A Has Successfully Secured a \$790 Million Water Contract in the Middle East



Samsung E&A has secured a water treatment project in the Middle East worth approximately \$790 million, including a \$247 million contract awarded to its headquarters and an additional \$543 million contract for a foreign subsidiary. The company has also signed a 20-year operations and maintenance agreement for the facility, running from 2030 to 2050, valued at more than 2.5% of its 2025 consolidated revenue. While the client and project details remain confidential, the contract supports Samsung E&A's annual order target of 12 trillion won and reflects growing opportunities in the Middle East's expanding infrastructure and water sectors.

Qatar's Ashghal Has Succeeded in the Treatment and Reuse of 98% of Wastewater

Qatar's Public Works Authority (Asghal) has achieved a 98% wastewater treatment and reuse rate, processing 3.46 billion cubic metres of wastewater for irrigation, agriculture, groundwater recharge, and environmental conservation. Of the treated water, 32% irrigates green spaces, 31% supports fodder crop cultivation, 22% replenishes aquifers, and 14% is stored in seasonal lagoons. Between 2013 and 2025, Qatar's drainage network expanded by 207%, reaching 9,707 km, alongside major investments in treatment plants, pumping stations, and distribution networks. These developments support urban growth, strengthen water security, and reduce reliance on freshwater resources through sustainable wastewater reuse.



Global Water Events

Indo Water 2026 Expo & Forum

Date: From 11 to 13 August 2026

Location: JIExpo Kemayoran, Jakarta, Indonesia

Join at Indo Water 2026 Expo & Forum, the Indonesia's No. 1 International Water and Wastewater Technology Event. Through exhibitions, conferences, seminars, and workshops, connect industry leaders, innovators, and professionals to showcase the latest technologies & solutions in water resource management, sewerage, industrial wastewater, purification, and irrigation.

Website: indowater.com



Aquatech Mexico

Date: From 1 to 3 September 2026

Location: Centro Banamex ,Av. del Conscripto 311, Mexico City

On 1st to 3rd September 2026, Aquatech Mexico will take place. You're invited to join other professionals, experts and investors interested in doing business in the water technology industries in the Americas. Join 3 action-packed days that provide the ideal platform to make profitable business relationships, exchange ideas and learn all about opportunities in this specific region for the water technology.

Website: aquatechtrade.com/mexico



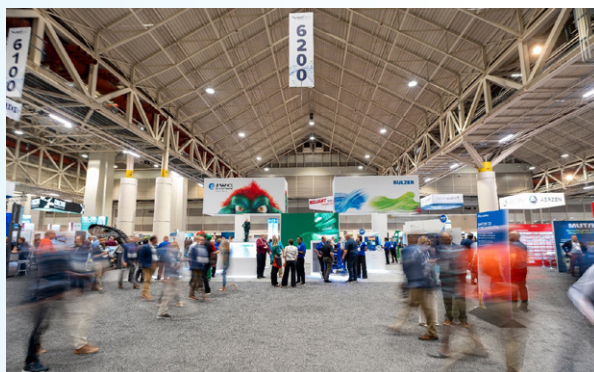
WEFTEC 2026

Date: From 28 to 30 September 2026

Location: New Orleans, La. USA

Solving water challenges takes more than great ideas, it takes connection, collaboration, and action. At WEFTEC 2026, you'll find all three through cutting edge solutions, hands on learning experiences, and a global network of water professionals.

Website: www.weftec.org



FiltXPO 2026

Date: 28 & 29 October 2026

Location: Minneapolis , Minnesota

Grow your business by connecting with decision-makers across diverse industries who are actively sourcing advanced

filtration and separation solutions. Engage with 1,200+ filtration professionals from around the world. Expand your North American market reach. Generate leads across high impact sectors, including: Water and Wastewater Treatment, Power Generation, Oil & Gas.

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



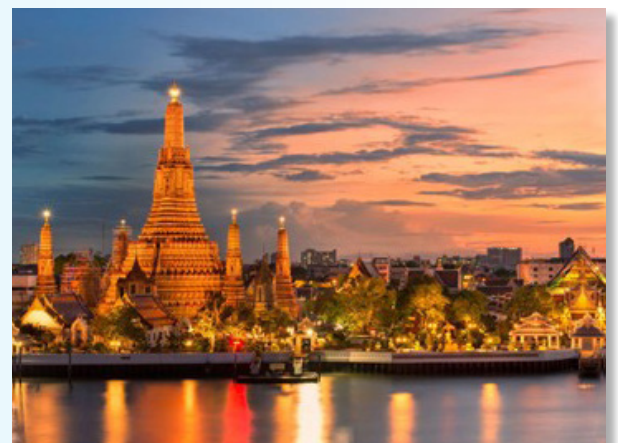
Aquatech Asia

Date: From 25 to 27 November 2026

Location: Bangkok

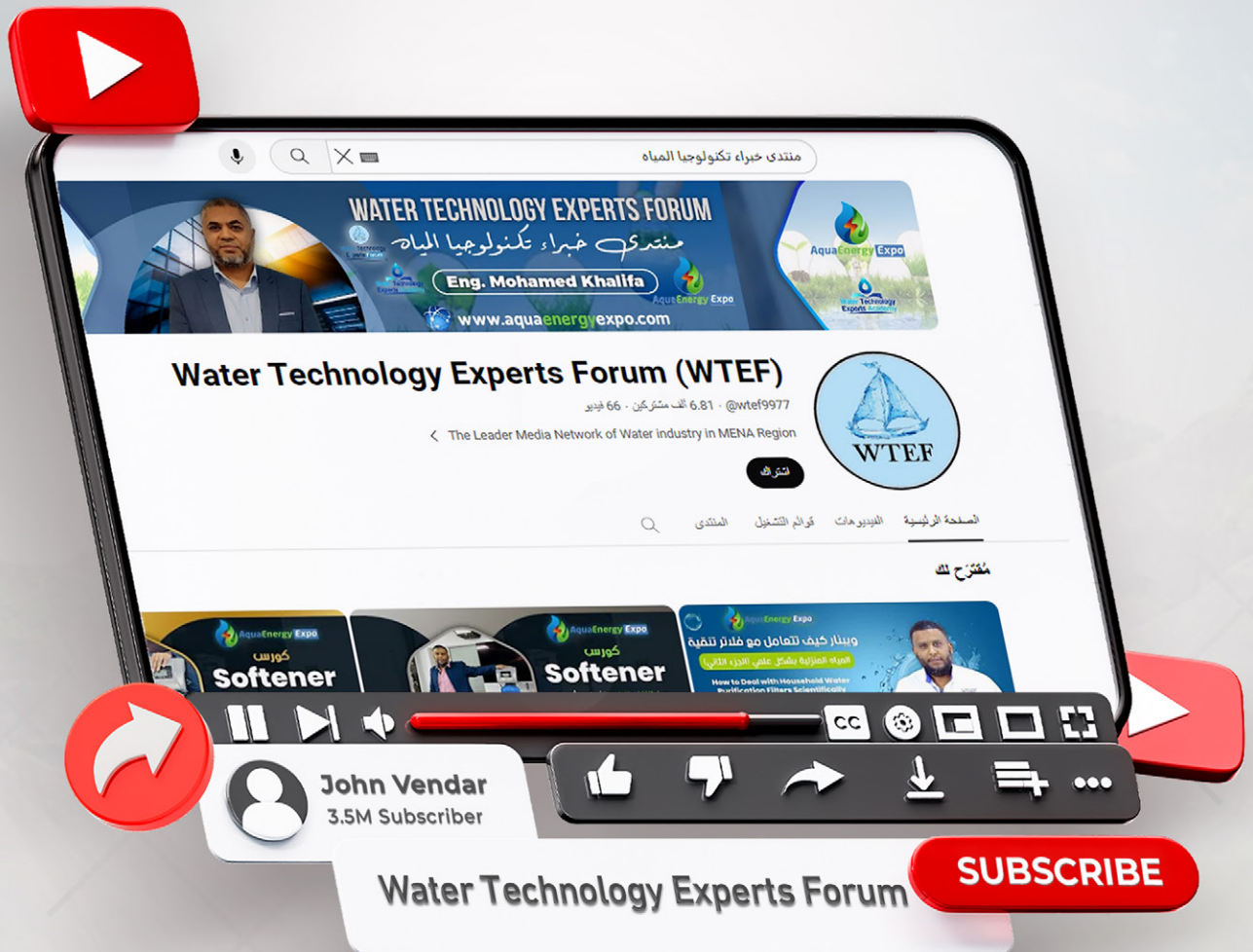
The most recent addition to the well-known Aquatech portfolio is Aquatech Asia, which will be present at flagship trade shows in China, Mexico, and Amsterdam. Southeast Asian water experts, innovators, and decision-makers will come together at Aquatech Asia.

Website: aquatechtrade.com/asia



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The Outstanding Presence of XPlus at the AquaEnergy Expo Middle East and Africa

A defining milestone in X Plus Trading Company's journey of industrial leadership was its outstanding participation in the Aqua Energy Expo Middle East & Africa. Serving as a premier business-to-business platform, the exhibition provided the ideal stage for X Plus to showcase its integrated fluid control & automation

solutions to a broad audience of project managers, factory owners & engineering consultants. At the heart of its pavilion, the company successfully bridged the gap between global technology and local manufacturing needs by presenting live, operational demonstrations of its authorized brands, including Supmea, Acetech, Rebecca, and Eternal Water.



Visitors to the X Plus booth experienced first-hand how advanced automation instruments, such as Supmea's Turbine flowmeters and digital EC controllers, integrate seamlessly with Acetech's high-grade sanitary pipes and valves. This active participation not only highlighted X Plus's role as a trusted engineering partner capable of eliminating operational downtime in sensitive sectors like pharmaceuticals and food processing, but it also cemented the company's commitment to advancing industrial sustainability, resource efficiency, and localized technical support across the region.



In the world of manufacturing, success starts with choosing the right supplier. That's where XPlus Trading Company comes in a leader in commercial agencies and industrial supplies, placing quality and reliability at the heart of everything we do.

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At XPlus, we don't just deliver products — we build long-term partnerships based on trust, exceptional service, and competitive pricing. We believe our clients' success is our success, which is why we continuously develop solutions that meet market needs and embrace the latest technologies.

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Navigating the Water-Energy Nexus in AI Infrastructure

Artificial intelligence is transforming industries at an unprecedented pace, driving innovation in healthcare, finance, manufacturing, and infrastructure. Behind this digital revolution lies a rapidly expanding network of AI data centers that require enormous computational power. However, the energy demand of these facilities is only part of the story. Cooling high-performance processors generates massive heat loads, making water a critical resource in data center operations. As AI infrastructure scales globally, the water footprint of data centers is becoming an increasingly important environmental concern. Effective water management strategies are now essential to ensure technological advancement does not come at the expense of water sustainability.

The Rising Thermal Demand of AI Infrastructure

The rapid growth of artificial intelligence has significantly changed the architecture and operating requirements of modern data centers. Traditional computing facilities were designed around CPUs with moderate power requirements, but AI workloads depend heavily on GPUs that consume far more energy.

A standard CPU may require 150–200 watts, while advanced AI GPUs can consume more than 1,200 watts each. When thousands of these processors operate simultaneously, rack power densities rise dramatically.

This increase in computational intensity creates extreme thermal loads. Managing such concentrated heat using conventional air cooling becomes inefficient and impractical. As AI infrastructure continues expanding, thermal management is becoming one of the most critical engineering challenges. Cooling systems must evolve to handle higher heat densities while maintaining efficiency, reliability, & environmental responsibility.



Why Water Matters in AI Cooling?

Water plays a central role in cooling AI data centers because of its superior thermal properties. Compared with air, water can absorb and transport far more heat per unit volume, making it significantly more effective for high-density cooling applications. This makes water-based cooling systems ideal for facilities processing AI workloads around the clock.

Direct-to-chip liquid and immersion cooling are increasingly replacing traditional air-cooling systems. In these methods, liquids absorb heat directly from computing hardware, enabling faster, more efficient heat removal. Water's high specific heat capacity and thermal conductivity enable cooling systems to maintain stable temperatures even under extreme loads.

As AI servers become more powerful, reliance on water-based cooling will likely increase. This makes efficient water use and recycling crucial for long-term sustainability in the digital economy.

The Water-Energy Nexus in Data Centers

Water and energy are deeply interconnected in data center operations. Cooling systems designed to reduce water consumption often require more electricity, while energy-efficient systems may consume more water. This creates a complex engineering trade-off between power usage effectiveness (PUE) and water usage effectiveness (WUE).

Closed-loop chiller systems, for example, minimize direct water consumption by recirculating water within a controlled system. However, these systems require large amounts of electricity to operate compressors & chillers. On the other hand, evaporative cooling systems consume more water but can significantly reduce energy use by leveraging the natural cooling effect of evaporation. Finding the optimal balance between water & energy efficiency is essential. Operators must evaluate local climate conditions, water availability, & electricity sources to design sustainable cooling strategies.



Pressure on Local Water Resources

The expansion of AI data centers is increasing pressure on municipal and regional water supplies. Large-scale facilities can consume millions of liters of water each day, especially when using evaporative cooling technologies. In water-stressed regions, this demand can create tension between industrial growth and community needs.

A single large AI data center can consume water equivalent to thousands of households. This becomes especially concerning in regions already facing drought, groundwater depletion, or climate-related water scarcity. Communities are increasingly scrutinizing large data infrastructure projects due to concerns over water access and environmental impact.

As a result, water sourcing strategies are becoming as important as cooling technologies themselves. Sustainable growth requires careful planning to ensure data centers do not compromise local water security.



Challenges of Blowdown and Brine Management

Cooling towers improve thermal efficiency but introduce another major challenge: blowdown management. As water evaporates during cooling, dissolved minerals such as calcium, silica, and salts remain behind, increasing concentration levels within the system. If not controlled, these contaminants can cause scaling, corrosion, and biofouling. To prevent operational damage, facilities periodically discharge concentrated water through a process called blowdown. While necessary, this creates wastewater containing high concentrations of dissolved solids. Managing this brine stream presents both economic and environmental challenges.

Disposal costs vary depending on regulations and location. Stricter environmental policies often limit discharge options, pushing operators toward more advanced treatment solutions. Effective brine management is therefore essential for maintaining both operational performance and regulatory compliance.

Advanced Water Treatment Technologies

Modern water treatment technologies are enabling AI data centers to reduce freshwater consumption while improving cooling reliability. Reverse osmosis (RO), filtration systems, and advanced membrane technologies help recover usable water from wastewater streams and reduce blowdown volumes.

High-recovery membrane systems can extract more clean water from challenging feed streams, including brackish groundwater and industrial wastewater. Pretreatment processes such as softening, biological control, and chemical dosing help protect membranes from fouling and scaling.

Innovations in desalting and concentration management are also improving water recovery rates. Some facilities are moving toward near-zero liquid discharge systems, where almost all water is reused internally. These technologies reduce dependence on municipal water supplies while minimizing environmental discharge.

For AI facilities, integrating advanced water treatment is becoming a strategic necessity rather than an optional sustainability measure.



Alternative Water Sources for Sustainable Cooling

To reduce stress on potable water supplies, many data centers are exploring alternative water sources. Instead of relying solely on municipal drinking water, operators are increasingly using reclaimed wastewater, industrial greywater, and brackish groundwater for cooling purposes.

Recycled water offers significant sustainability benefits by converting waste streams into valuable cooling resources. However, these alternative sources often contain higher concentrations of dissolved solids, organics, and biological contaminants. This requires robust pretreatment and monitoring systems.

Using non-potable water for cooling helps preserve drinking water for communities while improving circular water use. In regions facing water scarcity, alternative sourcing may become a requirement for future data center development. The shift toward water reuse represents a major step in sustainable AI infrastructure planning.



The Future of Sustainable AI Data Centers

As AI continues to reshape global economies, data center design must evolve beyond traditional performance metrics. Future facilities will need to optimize computational output, energy efficiency, and water stewardship simultaneously. Sustainability is no longer a secondary consideration—it is a core engineering requirement.

Digital monitoring systems, AI-driven predictive maintenance, and smart water analytics will help operators improve efficiency in real time. Sensors can detect leaks, optimize cooling cycles, and identify scaling risks before failures occur. This data-driven approach enables more precise resource management.

The next generation of AI data centers will likely combine advanced cooling, water recycling, and intelligent automation. Facilities that successfully integrate these systems will be better positioned to meet growing demand while minimizing environmental impact.



Conclusion

The growth of AI presents extraordinary opportunities, but it also introduces significant infrastructure challenges—particularly in water management. As computing power increases, so does the need for advanced cooling systems capable of handling extreme thermal loads efficiently. Water has emerged as one of the most valuable resources in this equation.

Sustainable AI development depends on balancing innovation with responsible resource management. Through advanced cooling methods, alternative water sourcing, wastewater recovery, and intelligent monitoring, data centers can dramatically reduce their environmental footprint. The future of AI should not be defined solely by processing power, but also by how responsibly we manage the natural resources that make digital progress possible.

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The Digital Transformation of Water Utilities: Driving Efficiency, Resilience and Sustainable Growth

Digital transformation is rapidly reshaping the global water industry, enabling utilities to operate more efficiently, reduce operational costs, strengthen resilience, and achieve ambitious sustainability goals.

From artificial intelligence and predictive analytics to cloud computing and cybersecurity, digital technologies are revolutionizing every aspect of water and wastewater operations. Organizations that embrace these innovations are positioning themselves at the forefront of the next generation of smart water infrastructure.

Energy Optimization: Driving Efficiency and Sustainability

Energy consumption represents one of the largest operating expenses for water and wastewater facilities worldwide. Today, digital technologies are transforming how utilities manage energy performance and operational efficiency.

Advanced monitoring systems, intelligent process control, and AI-driven optimization enable

operators to maximize pump and treatment performance while significantly reducing electricity consumption. The result is a powerful combination of lower operating costs, enhanced operational efficiency, reduced carbon emissions, and improved environmental sustainability.

Intelligent Leak Detection: Protecting Every Drop

Non-revenue water remains one of the most significant challenges facing water utilities worldwide. Fortunately, intelligent technologies are changing how operators identify and manage water losses.

Smart acoustic sensors, real-time pressure monitoring systems, and AI-powered analytics enable utilities to detect leaks at an early stage, minimizing water losses, reducing maintenance costs, and improving overall distribution network performance. In an increasingly water-stressed world, protecting every drop has become both an operational and environmental priority.

Cloud Computing: Enabling Smarter Decision-Making

Cloud-based platforms have transformed operational management by providing secure, real-time access to critical information from virtually anywhere. Operators & management teams can monitor multiple facilities simultaneously, analyze performance indicators, generate operational reports & collaborate more effectively across organizations. This increased visibility and accessibility enable faster, smarter & more informed decision-making while improving operational efficiency throughout the entire water value chain.



Cybersecurity: Safeguarding Critical Water Infrastructure

As digital technologies become increasingly integrated into water operations, cybersecurity has evolved into a strategic priority for utilities worldwide. Modern water organizations are investing in secure communication protocols, encrypted data transmission, identity & access management systems & continuous network monitoring to protect critical infrastructure from emerging cyber threats. A secure digital environment not only safeguards operational continuity but also strengthens long-term resilience & protects valuable assets.



Case Study | Taweelah Reverse Osmosis Plant: A Global Benchmark for Digital Water Infrastructure

The Taweelah Reverse Osmosis Plant in the United Arab Emirates is one of the world's largest seawater reverse osmosis facilities and represents a leading example of digital transformation in the water sector. The facility incorporates advanced SCADA systems, real-time monitoring platforms, predictive maintenance technologies, intelligent asset management solutions, and continuous operational analytics to optimize every stage of the desalination process.

These advanced digital capabilities have enabled significant improvements in energy efficiency, reduced unplanned downtime, enhanced asset reliability, and consistently high water quality performance while supporting one of the region's largest potable water production capacities. The Taweelah project clearly demonstrates that strategic investment in digital technologies delivers measurable operational improvements while strengthening sustainability, resilience, and long-term performance.



Building Digital Capabilities for Long-Term Success

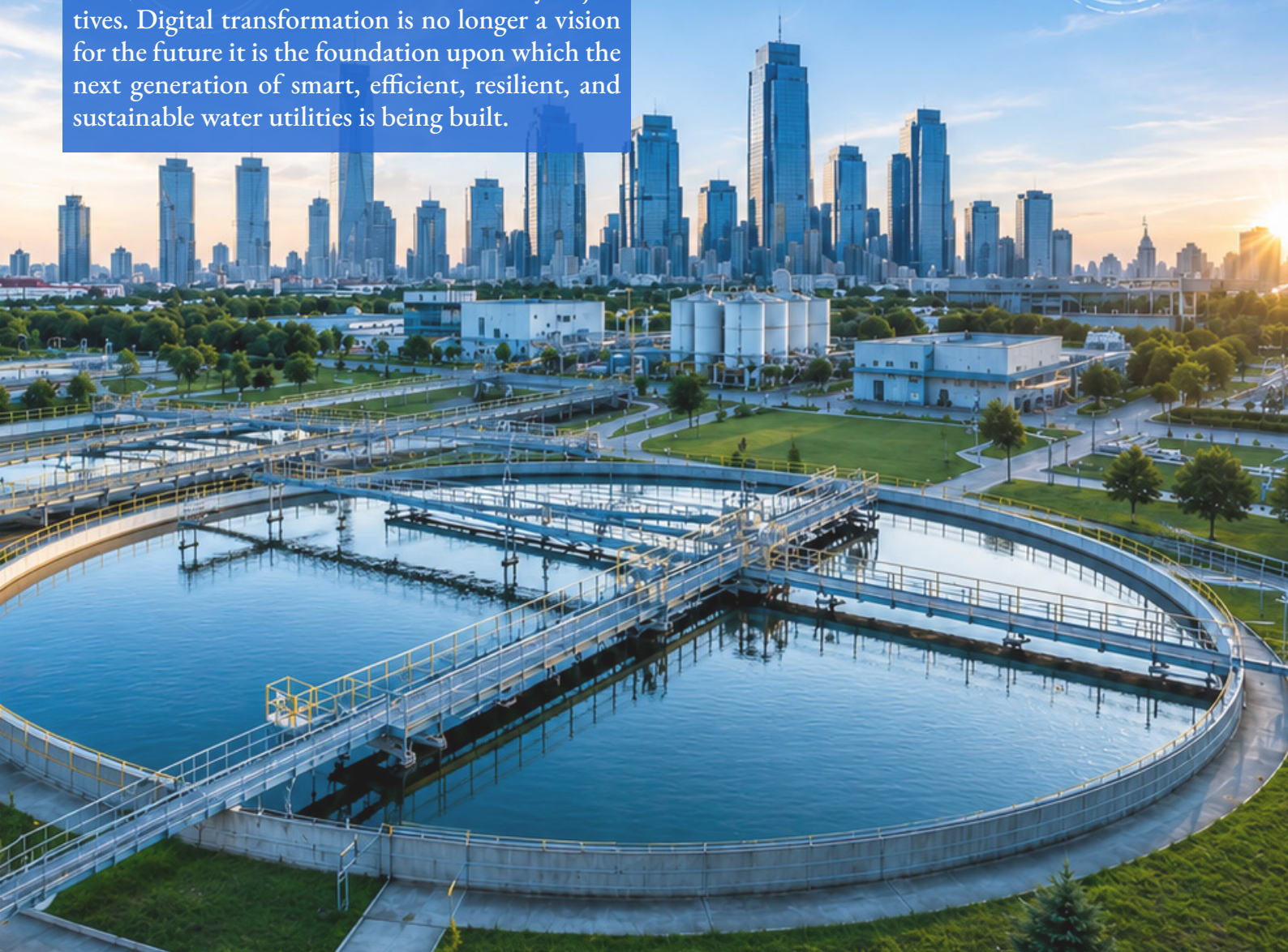
Technology alone cannot deliver successful digital transformation. Long-term success depends on skilled professionals who can effectively interpret operational data, leverage intelligent technologies, and continuously optimize plant performance.

Developing digital competencies, investing in workforce capabilities, and fostering a culture of innovation remain essential for maximizing the value of modern technologies and ensuring sustainable operational excellence.

The Future of Water Starts Now

The future of water management will be defined by intelligent infrastructure, predictive analytics, automation, artificial intelligence, and fully connected operational ecosystems.

Organizations that invest in digital transformation today will be best positioned to improve efficiency, reduce operating costs, strengthen resilience, and achieve ambitious sustainability objectives. Digital transformation is no longer a vision for the future it is the foundation upon which the next generation of smart, efficient, resilient, and sustainable water utilities is being built.



Buyers Guide for Water and Renewable Energy Companies

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December 2024



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Shell completes sale of Jiffy Lube International and Premium Velocity Auto to Monomoy Capital Partners

Shell's Pennzoil Quaker State Company has finalized the \$1.3 billion sale of Jiffy Lube International and Premium Velocity Auto (PVA) to Monomoy Capital Partners. The deal transfers the Jiffy Lube brand, its network of over 2,000 franchised and company-owned service centers in the U.S., plus Canadian licensees, along with PVA's 360 locations across 20 states. Shell will retain its core lubricant brands—Pennzoil, Quaker State, Rotella—and continue manufacturing, marketing, and distribution in the U.S. and Canada. A long-term supply agreement with Monomoy ensures continuity, while the divestment supports Shell's strategy of focusing on core assets.



Renewables: TotalEnergies Divests its Distributed Solar Generation Activities in Europe



TotalEnergies has completed the sale of its 170 MW distributed solar portfolio, primarily rooftop installations across France, Belgium, the Netherlands, Spain, Portugal, the UK, and Luxembourg, to Amarengo and AMPYR Distributed Energy. The move aligns with the company's strategy to focus on large utility-scale solar and wind projects, where economies of scale offer greater efficiency and profitability. Amarengo and AMPYR will continue operating the assets, ensuring uninterrupted service for customers. The divestment will not slow TotalEnergies' renewable expansion, as the company added 8 GW of renewable capacity over the past year, reaching 35 GW by March 2026, with a target of more than 75 GW by 2030.

SunPower Closes \$10 Million Share Exchange

SunPower Inc. has completed its stock exchange offer, replacing \$10 million in cash interest payments due on its Convertible Notes with company stock for nearly all eligible investors. CEO T.J. Rodgers thanked shareholders for their strong support, noting that all but one investor accepted the exchange, reflecting confidence in the company despite its current share price. Rodgers also stated that the second quarter of 2026 likely marked the low point for both SunPower and the U.S. residential solar industry. With cost-cutting measures, improved financial flexibility, a record project backlog, and expectations of strong growth, SunPower anticipates a stronger performance in the coming quarters.



Iberdrola Becomes the World's First Electricity Company Certified for Its Management of Psychological and Emotional Wellbeing

Iberdrola has become the world's first electricity company to receive ISO 45003 certification, the international standard for managing psychological health and safety in the workplace. Awarded by LRQA after an independent audit, the certification recognizes Iberdrola's structured approach to promoting mental wellbeing alongside physical safety. Complementing ISO 45001, the standard addresses areas such as stress management, workload, organizational culture, and work-life balance. The achievement reflects the company's commitment to employee health, safety, and wellbeing through internationally recognized best practices. It also reinforces Iberdrola's leadership in responsible people management and aligns with its occupational health and sustainable human capital policies.



Turkey Nears 12-month Deal to Keep Iraq-Turkey Crude Oil Pipeline Flowing Uninterrupted



Turkey and Iraq are close to signing a 12-month extension agreement to ensure uninterrupted operation of the Iraq-Türkiye Crude Oil Pipeline, according to Turkey's Energy and Natural Resources Minister Alparslan Bayraktar. The pipeline, which transports Iraqi crude oil to the Mediterranean port of Ceyhan, is currently governed by a 1973 agreement set to expire on July 27, 2026. During talks in Baghdad with Iraqi Oil Minister Basim Mohammed Khudair, both sides discussed expanding oil and natural gas cooperation. Turkey emphasized strengthening existing infrastructure and integrating the pipeline into the broader Development Road Project as a regional energy corridor.

UK Power Networks Ranks in UK Top 10 for Customer Service

UK Power Networks, which supplies electricity to 8.5 million homes and businesses across London, the East, and the South East, has been ranked the UK's top utility in the July 2026 UK Customer Satisfaction Index (UKCSI). Scoring 84.4 out of 100, the company achieved its eighth utilities-sector lead and ranked 10th overall among UK organizations. It performed strongly in ethics, customer support, and complaint handling. The recognition reflects its focus on customer care, reliability, and support for vulnerable customers. UK Power Networks' continued success highlights its organization-wide commitment to improving services, earning it multiple industry awards and recognition as Utility of the Year.



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



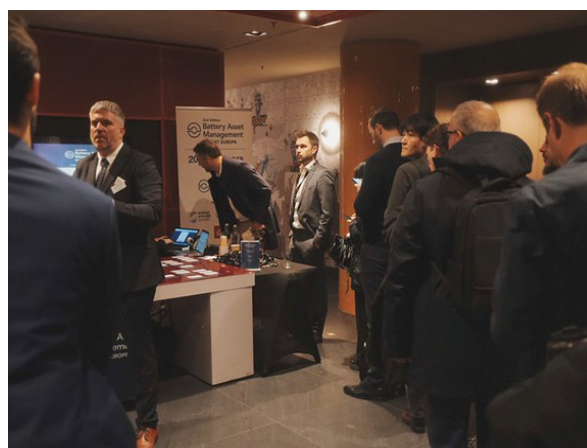
Battery Asset Management Summit Europe 2026

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: battery europe.solarenergyevents.com





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