



**AquaEnergy Expo**  
Magazine

The Voice of Water and Energy World

FEBRUARY 2024 | ISSUE 2



**VEOLIA**

LEADS DECARBONIZATION

**FOR DISTRICT HEATING**  
**BY USING ARTIFICIAL**  
**INTELLIGENCE IN UK**

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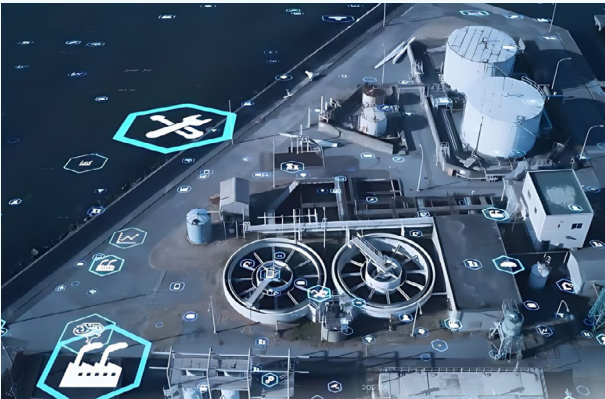
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# Editor Word

Let's break all Barriers towards sustainability! Even though this edition of Aqua Energy Expo Magazine looks forward into 2024, I'd like to use this space to look back on mergers, acquisitions and industry reshaping in 2023 . We have just begun 2024 and we are still in the thick of 2023 issues since they didn't get resolved with the turning of the calendar.

In this issue you can read about the significant takeovers in the united States and Europe and their impact on water sector on page 17.

On the cover, We provide you with an in-depth look at Veolia's pioneering efforts in decarbonization, showcasing how AI-powered monitoring and control are driving sustainable advancements in district heating networks. Veolia has succeeded in reducing carbon emissions through its monitoring and control systems of district heating networks and the use of advanced Artificial intelligence (AI) .

How fantastic to be a producer more than being a consumer ! Let's discover the best examples of wastewater treatment plants which act as a source of energy to fulfill their needs and export energy to neighboring utilities. In "Pathway to an energy-neutral water sector".

We examine the innovative potential of biomethane as a sustainable energy source, offering insights into how this technology can drive the water sector towards energy neutrality with no carbon emissions and low cost aswell.

Not only Europe but also the desert of The Middle East has something to show to the world which is called "NEOM". NEOM is leading the world towards a sustainable and a cleaner future through a completely 100% renewable energy powered city to be the first example completely eco-friendly city , on page 59.

Reseachers efforts are worthy to us and the good news to tell is that they have made significant advancements in producing hydrogen directly from seawater opening up the possibilities of an abundant and sustainable source of green hydrogen see page 45 to know more about "Renewable Energy Systems for Water Desalination Applications".

Hand in hand we can build a better future for our environment and spread knowlege throughout the world of how much clean water and energy is crucial for our survival .

Warm Regards,

*Mohamed Khalifa*



**Mohamed Khalifa**

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# Pathway to an Energy-neutral water sector

The global water sector's energy consumption and efficiency are of significant concern, with the International Energy Agency (IEA) highlighting the substantial energy consumption in the sector, equivalent to roughly 120 million tons of oil per year. This underscores the potential for energy savings through the exploitation of available energy efficiency and recovery potentials. Additionally, the potential for turning wastewater treatment plants (WWTPs) from energy consumers to energy producers is significant, as demonstrated by the Marselisborg WWTP's successful reduction of energy consumption and increased energy production. Furthermore, in Taarnby, a new energy center utilizes excess heat from the nearby WWTP for district cooling and heating, showcasing the concept of sector coupling. These developments highlight the innovative and sustainable solutions in the water sector to address energy consumption and efficiency challenges.

## 1. Energy Efficiency and Consumption in the Global Water Sector

The International Energy Agency (IEA) has highlighted the significant energy consumption in the global water sector, which amounts to roughly 120 million tons of oil equivalent (Mtoe) per year. This is nearly equivalent to Australia's total energy use. The IEA emphasizes the potential for energy savings in the water sector through the exploitation of economically available energy efficiency and energy recovery potentials within the water supply and water treatment sector. The analysis draws on the WEO-2012's central policy scenario to demonstrate the importance of expanding power generation and biofuels

output, which underpin an 85% increase in the amount of water consumed through 2023 to 2035.

The IEA stresses the importance of finding ways to ensure that the use of water and energy does not limit access to the other, as both resources are essential.

## 2. Energy Generation in WWTPs : HRAS Reactors and Biomethane Potential

The potential for turning wastewater treatment plants (WWTPs) from energy consumers to energy producers is significant. WWTPs are known to consume a substantial portion of municipal electricity bills, with wastewater companies considering electricity as the second largest operational cost after labor.

However, wastewater contains embedded energy that can be harnessed to make wastewater management energy neutral, producing the same amount of energy that it consumes. High-rate activated sludge (HRAS) reactors have been investigated for their potential contribution to energy generation in WWTPs, particularly in the removal of COD.

The analysis of a pilot plant operating HRAS without iron salts addition revealed promising results, including the investigation of sludge retention time (SRT) on COD recovery and biomethane potential.

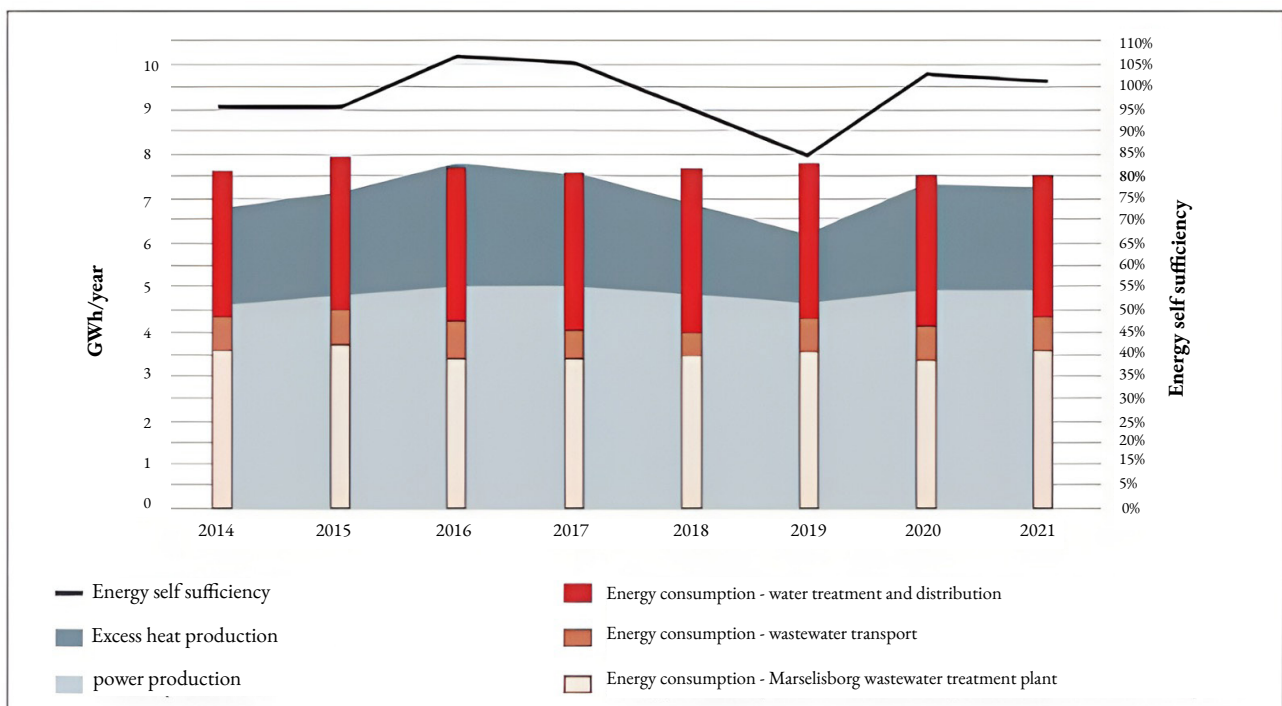
The study indicated that a plant configuration in which HRAS is coupled to autotrophic biological nitrogen removal (BNR) could yield a net energy production of approximately 0.1kWh/m<sup>3</sup> of treated water, demonstrating the potential for energy generation in wastewater treatment processes.

### 3. Energy-Neutral Wastewater Treatment at Marselisborg WWTP

The Marselisborg WWTP has successfully reduced energy consumption while increasing energy production. On average, it now produces almost enough energy to match the total water cycle of the catchment area, encompassing both drinking water supply and wastewater treatment. This achievement is attributed to a two-tier strategy: reducing energy consumption and increasing energy production. In 2005, Aarhus Vand initiated efforts to enhance energy production at the Marselisborg catchment area, equipping almost all water cycle equipment with variable speed drives to optimize energy usage. This technology also contributes to a better sludge balance, improving energy production.

Additionally, the WWTP utilizes a series of online sensors to provide real-time information, enabling automatic calculation of setpoints for the variable speed drives, resulting in an energy-efficient operation. The WWTP also functions as a biorefinery, producing energy from biogas created from household wastewater.

**“From 2016 to 2021, the Marselisborg WWTP generated close to 100% more energy than required for treating wastewater, with the excess energy being used to supply the area with drinking water, “Figure 1”**”



( Figure 1 )

### 4. TAARNBY WWTP : Utilizing Excess Heat for District Cooling and Heating

In the municipality of Taarnby, located within greater Copenhagen, a new energy center provides district cooling and heating to businesses and residents. This energy center harnesses excess heat from the nearby WWTP to offer heating in the winter and cooling in the summer. The surplus heat is captured by four large heat pumps, resulting in cost reduction, decreased energy consumption, and lower emissions. The interconnection of excess heat from the WWTP, district heating, district cooling, and the electricity grid exemplifies sector coupling,

process optimization and digitalization are estimated to have contributed to 70% of these improvements. which involves reusing and recycling energy by connecting systems and end-use sectors. Heat pumps have the capability to recover heat embedded in wastewater outlets, with the outlet water from the wastewater facility typically being 7–9 °C higher in temperature than the receiving water. This improves heat pump efficiency and ensures a shorter payback time. The surplus heat can be transferred to neighboring buildings or into the local district heating system, further demonstrating the concept of sector coupling.



## Smart Water Innovations Transforming the Water Industry

The smart water market is rapidly growing, and regional trends indicate a strong focus on investment in smart water solutions, particularly in regions with severe water loss consequences. In addition, innovative solutions for water quality monitoring are emerging, with advancements in technology addressing the need for safe drinking water. Furthermore, advanced drone technology is revolutionizing water utilities, providing powerful tools for inspection and maintenance practices. The digital water market has also seen significant growth, with smart metering playing a crucial role. Moreover, GIS applications in construction and pipe network management have become essential for facilitating comprehensive solutions in a systematic way. These developments highlight the transformative impact of technology on the water industry and the proactive measures being taken to address water-related challenges.

### 1. Smart Water: A Growing Market and Regional Trends

The term “smart water” refers to a variety of data-driven initiatives aimed at managing water and wastewater systems. These tools are designed to identify inefficiencies in water or energy use and to alert operators when water quality deteriorates. The strength of smart water lies in its ability to provide real-time information directly to operators or consumers. In North America, the smart water market represents nearly \$5 billion in spending, with 119 specific capital projects in 2024 representing \$534 million in spending. The most expensive smart water project in 2024 is a \$55 million AMI project in Nevada, and California, Texas, and Arizona together

represent nearly half of all projects. California alone accounts for over 28% of all projects, driven by high populations, drought-prone regions, and significant funding availability. The dominance of opportunities in U.S. communities is likely due in part to the larger pool of funding made available through programs like the Infrastructure Investment and Jobs Act (IIJA) and the American Rescue Plan Act (ARPA), which specifically encourage spending on innovative technologies. This indicates a strong trend toward investment in smart water solutions, particularly in regions with severe water loss consequences.

### 2. Innovative Solutions for Water Quality Monitoring

Water quality monitoring is essential for ensuring access to safe drinking water, especially as the population grows and climate change impacts water scarcity and contamination. Engineers have developed innovative solutions to address this need. For instance, researchers at Ritsumeikan University in Japan have created a cost-effective water quality monitoring device that uses microbial fuel cell (MFC) biosensors to detect organic water pollution in lakes and rivers. This device produces its own electricity and can serve as an early detection system for freshwater contamination. In England, students at the University of Bath have developed the OASIS device.

“**OASIS device is a portable water quality sensor that rapidly analyzes water quality, including pH level, turbidity, and temperature using GIS mapping with quick and accurate results**”

The device is valuable for rural communities with well water. Additionally, the University of Alabama is developing software that will enable water quality monitoring using satellite and drone imaging, reducing the time and cost associated with monitoring inaccessible freshwater sources.

### 3. Advanced Drone Technology for Water Utilities

Drones have made significant strides in technology, offering utilities advanced imaging capabilities and specialized sensors for detailed inspections. With precise imaging technologies and autonomous navigation systems, drones can efficiently cover large areas, navigate complex terrains, and adapt to changing environments during inspections. Ground-based drones are also gaining prominence, especially for utilities dealing with challenging terrains, as they can navigate rugged landscapes and inspect pipelines in hard-to-reach areas.



Water utilities are deploying drones for leak detection, vegetation management, and emergency response, enhancing the speed and efficiency of their operations. However, drone usage is regulated by the Federal Aviation Administration (FAA), which imposes strict guidelines on commercial drone operators. To mitigate these challenges, many utilities are turning to consulting and service companies that offer drones as a service, allowing them to pay for the use of drones and the data collected from them on an as-needed basis. The adoption of drone technology represents a paradigm shift in inspection and maintenance practices for water and wastewater utilities, providing them with powerful tools to address challenges proactively.

### 4. Smart Metering and Digital Water Market Growth

The digital water market has seen significant growth, with smart metering playing a crucial role. According to Eric Bindler, senior research director for Bluefield Research, metering constitutes around 40% of the global market for digital water, with global digital water spend expected to reach \$55 billion in 2030.

Smart water meters are evolving to meet the efficiency and sustainability goals of water utilities, with a move toward solid-state meters and the integration of additional sensors within residential meters. The focus on proactive customer engagement is driving software developments, with a 12.7% annual growth rate expected for metering-related software. The smart water meter market has also experienced significant reshaping due to mergers and acquisitions, with industry players strategically integrating new technologies and management capabilities into their portfolios. Furthermore, metering connectivity spending is expected to grow at an 11.9% rate through 2030, with a shift toward cellular-based metering and emerging technologies like Amazon Sidewalk and low-power wide-area networks (LPWAN). However, supply chain vulnerabilities have been highlighted by the COVID-19 pandemic and semiconductor shortages, affecting the production capabilities of certain companies. The recent Infrastructure Investment and Jobs Act (IIJA) includes provisions that encourage domestic sourcing, which has the potential to reduce vulnerabilities but may also limit supply chain diversity.

### 5. GIS Applications in Construction and Pipe Network Management

The use of computer technology in construction has been common since the 90s, and Geographical Information System (GIS) has become a valuable tool in data-driven industries. GIS applications are widespread in the construction industry, particularly in construction safety, flood studies, and pipeline management including water works and sewerage. The pipe network management involves planning, designing, and management of the network, utilizing remote sensing, photogrammetry drone, or field survey methods for planning, and GIS or separate application environments for designing.



design applications are coupled with GIS, such as CAD with GIS, EPANET with GIS, and SWMM with GIS.



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## Water Sector : Mergers, Acquisitions and Industry Reshaping in 2023

This article will focus on the most significant takeovers in the United States and Europe and their impact on water sector

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## Water Sector : Mergers, Acquisitions and Industry Reshaping in 2023

The water sector is confronted with challenges and opportunities due to global population growth, urbanization and climate change. The demand for clean water faces hurdles such as scarcity, Aging infrastructure and pollution. However, this period offers innovative solutions and prospects for sustainable water management.

Environmental stewardship, technological innovation and economic viability create a dynamic space where water businesses address pressing issues and explore new avenues for growth. In 2023, substantial mergers and acquisitions reshaped the industry.

This article will focus on the most significant takeovers in the United States and Europe and their impact on water sector.

### 1. Bluefield Research Team : 210 Deals in First Half of 2023

These chemicals have been detected in various regions in the first half of 2023, the independent advisory firm Bluefield Research team recorded 210 deals and marked a 29% decrease from recorded 294 deals during a similar period in 2022.



It attributed this decline to factors such as recession concerns, rising cost of capital and general economic uncertainty.

The number of approved acquisitions in the first half of 2023 was the lowest since 2019, but activity picked up in the second quarter, with American Water and Central States Water Resources increasing their activity in their core service territories.

### 2. Water-Related Mergers and Acquisitions: 2021 vs. 2023

Looking back to 2021, there was a significant decrease in water-related mergers and acquisitions in 2023 compared to the surge in that year. Bluefield Research reported a total of 498 deals in 2021, many of which involved substantial sums of money.

In 2021, there were 13 deals exceeded US\$1 billion, compared to just three in 2020. Also, the total value of disclosed deals increased from \$35 billion in 2020 to \$80 billion.

Reese Tisdale, President & CEO of Bluefield Research, attributed this increase to factors such as a focus on environmental, social, and governance (ESG) practices, federal infrastructure legislation and available investment capital.

### 3. Key Billion-Dollar Deals in 2023

In 2023, despite a significant decrease in the number of alliances since 2021, there were several noteworthy billion-dollar deals that were successfully closed. Let's take a closer look at these deals.

### 3.1 The Xylem-Evoqua Merger: A Billion-Dollar Deal

In early 2023, Xylem announced its plan to acquire Evoqua, a leading provider of water treatment solutions, in a deal valued at approximately \$7.5 billion. The merger aimed to address global water challenges by combining the expertise of both companies.



The newly merged company, with a revenue of over \$7 billion, is expected to achieve cost synergies of \$140 million within three years. Following the acquisition, Xylem restructured its reportable segments for greater financial transparency, integrating Evoqua's segment with its own businesses. This move was implemented from January 1, 2024, under the new segment name "Water Solutions and Services (WSS)".

### 3.2 The Solenis-Diversey Merger : A Multi-Billion Dollar Deal



In March 2023, Solenis, a global specialty chemicals leader, announced its plan to acquire Diversey in a \$4.6 billion all-cash deal. Following the merger, Diversey would become a private entity, providing Solenis with cross-selling opportunities for cleaning and hygiene solu-

tions. This move aimed to meet the increasing demand for water management and hygiene products. Later that year, Solenis completed the acquisition of CedarChem, improving its chemical and wastewater treatment offerings. However, the terms of the private deals were not disclosed.

### 3.3 Obayashi's Expansion: Acquiring MWH Constructors

In 2023, the Japanese construction firm Obayashi focused on the US water market and purchased 90% of MWH Constructors, a company involved in building water treatment facilities in the US, previously owned by Oaktree Capital. The acquisition, valued at €126 million (almost US\$138 million), enabled Obayashi to expand its presence in the water infrastructure construction market and increase its corporate value by establishing MWH US as a subsidiary.

## 4. European Acquisitions and Industry Expansion

In 2023, Europe experienced significant acquisitions, demonstrating the region's dynamic business landscape. These acquisitions brought about strategic shifts and new opportunities for growth and innovation in the European market.

### 4.1 Gradiant's Strategic Entry into the European Market

Europe witnessed significant acquisitions, including Gradiant's acquisition of a 51% stake in Germany's H+E Group (Hager+Elsässer), marking its entry into the European market. H+E Group (Hager+Elsässer), an established European water solutions provider, offers end-to-end solutions for advanced manufacturing.



This strategic move highlights Gradiant's commitment to providing advanced solutions for the semiconductor industry. The announcement was part of a larger transaction in which SGF I and II divested a controlling interest in Aquarion, a Switzerland-based industrial water and wastewater treatment company. Aquarion offers comprehensive solutions to sectors such as semiconductor, energy, food & beverage and pharmaceuticals.

#### 4.2 Veolia's Divestment and Strategic Agreements in 2023

Looking back to 2021, Veolia and Suez, both major players in the water and wastewater sector in France, engaged in a significant battle that resulted in Veolia's acquisition of Suez. In 2023, Veolia continued to divest a portion of its operations as part of the Suez acquisition agreement.



This included a deal with Italgas, Italy's largest gas distributor, worth over 100 million euros, to acquire Veolia's stakes in companies providing water services in Lazio, Campania and Sicily.

Additionally, Veolia made an agreement to sell SADE-CGTH, its wholly owned subsidiary specializing in water and infrastructure network construction and rehabilitation, to NGE, an independent public works group, for a value of €260 million.

#### 4.3 Siemens Expands Water Industry Portfolio

At the end of the year, the well-known German technology company Siemens expanded its presence in the water industry by acquiring BuntPlanet, a technology company from Spain located in San Sebastian.

The acquisition was intended to incorporate BuntPlanet's cloud-based AI solutions for water utilities, which include top-rated software for smart metering, water quality, and leak detection, into Siemens' Xcelerator business platform. This move aims to offer Siemens' clients a more complete and integrated solution for water network management.

#### 5. Conclusion

The water sector faced significant challenges and promising opportunities in 2023, with a transformative landscape offering innovative solutions for sustainable water management.

Despite a decrease in the number of mergers and acquisitions compared to 2021, several notable billion-dollar deals took place. These included Xylem's acquisition of Evoqua, Solenis' acquisition of Diversey, and Obayashi's purchase of MWH Constructors.

In Europe, Veolia continued to divest operations, while Siemens expanded its water industry portfolio by acquiring BuntPlanet. These developments reshaped the industry and its key players, setting the stage for further innovation and growth in the water sector.





# The Water Projects Which Will Redefine The Water Industry in 2024

**W**ater is a vital resource for all living beings, but it is also a scarce and valuable commodity. The water industry faces several challenges and opportunities in 2024 as it strives to provide safe, reliable, and affordable water services to a growing and changing population. This article explores some of the most innovative and impactful water projects that will redefine the water industry in 2024. The total value of the largest worldwide projects scheduled to be put up for bid next year is approximately \$27 billion. The opportunities lie in different regions, such as the Middle East, Sub-Saharan Africa, North America, and Latin America. These projects span different sectors, regions, technologies, and highlight the potential of smart water solutions, renewable energy, circular economy, and public-private partnerships. These projects showcase how the water industry can adapt, transform, and thrive in a dynamic and uncertain world, whether it is through desalination, reuse, metering, or leak detection.



## 1. Dubai Strategic Sewerage Tunnels project

The Dubai Strategic Sewerage Tunnels project is a major initiative by the Dubai Municipality to improve the efficiency and sustainability of the city's wastewater management system. The project involves the construction of two deep tunnels, one in Deira and one in Bur Dubai, that will collect and transport sewage by gravity to the existing treatment plants in Al Warsan and Jebel Ali. The project also includes 220 km of link sewers and two deep pumping stations. The project will eliminate more than 100 sewage pumping stations that currently consume a lot of electricity and require frequent maintenance. The project will also reduce carbon emissions, enhance public health, and support the future growth and development of Dubai. The project is expected to be completed by 2025 and will have a lifespan of 100 years. Some more details about the Dubai strategic sewerage tunnels project are:

- The project is estimated to cost around \$1.8 billion and will be financed by a mix of public and private funds.
- The project will use tunnel boring machines (TBMs) to excavate the tunnels, which will range from 3.5 m to 6 m in diameter and from 25 m to 90 m in depth. The project will also use microtunneling technology to construct the link sewers, which will involve the insertion of a TBM into a shaft and the digging of the tunnels.
- The project will create over 5,000 jobs during the construction phase and over 500 jobs during the operation and maintenance phase. The project will

The project will also support the local economy by sourcing materials and services from local suppliers and contractors.

- The project will contribute to the environmental sustainability of Dubai by reducing the power consumption and carbon footprint of the wastewater system, as well as minimizing the risk of sewage overflows and leaks.
- The project will also support the urban development of Dubai by providing adequate sewage capacity for the existing and planned areas, such as the Palm Deira, the Dubai Creek Harbour, and the Expo 2020 site.



### 2. Saudi Arabia Ras Al-Khair 2 project

The Ras Al-Khair 2 project is a part of Saudi Arabia’s vision to diversify its energy sources and increase its water security. The project aims to build an independent water plant (IWP) that will produce 600,000 cubic meters of desalinated water per day using reverse osmosis technology. The project will be developed by the Saudi Water Partnership Company (SWPC) under a 25-year build-own-operate (BOO) contract with a private sector partner. The project will be located in the industrial city of Ras Al-Khair, near the Arabian Gulf Coast, and will supply water to the Eastern Province and Riyadh.



- The project is expected to be operational by 2025 and will have a lifespan of 30 years. Some more details about the Ras Al-Khair 2 project are:

- The project is estimated to cost around \$1.2 billion and will be financed by a mix of equity and debt from local and international sources.
- The project will use membrane-based technology to desalinate seawater and reduce the environmental impact of the process. The project will also implement energy recovery devices to reduce the power consumption and carbon footprint of the plant.
- The project will create over 2,000 jobs during the construction phase and over 300 jobs during the operation and maintenance phase. The project will also support the local economy by sourcing materials and services from local suppliers and contractors.
- The project will contribute to the national water security of Saudi Arabia by increasing the water supply and reducing the dependence on fossil fuels for water production. The project will also support the industrial development of Ras Al-Khair, which hosts several mega projects in the mining, petrochemical, and power sectors.

### 3. Saudi Arabia Ras Al-Khair 3 Project



The Ras Al-Khair 3 project is a part of Saudi Arabia’s vision to diversify its energy sources and increase its water security. The project aims to build an independent water plant (IWP) that will produce 400,000 cubic meters of desalinated water per day using reverse osmosis technology.

The project will be developed by the Saudi Water Partnership Company (SWPC) under a 25-year build-own-operate (BOO) contract with a private sector partner.

The project will be located in the industrial city of Ras Al-Khair, near the Arabian Gulf coast, and will supply water to the Eastern Province and Riyadh. The project is expected to be operational by 2025 and will have a lifespan of 30 years. Some more details about the Ras Al-Khair 3 project are:

- The project is estimated to cost around \$500 million and will be financed by a mix of equity and debt from local and international sources.

- The project will use membrane-based technology to desalinate seawater and reduce the environmental impact of the process. The project will also implement energy recovery devices to reduce the power consumption and carbon footprint of the plant.
- The project will create over 1,000 jobs during the construction phase and over 200 jobs during the operation and maintenance phase. The project will also support the local economy by sourcing materials and services from local suppliers and contractors.
- The project will contribute to the national water security of Saudi Arabia by increasing the water supply and reducing the dependence on fossil fuels for water production. The project will also support the industrial development of Ras Al-Khair, which hosts several mega projects in the mining, petrochemical, and power sectors.

#### 4. The Saudi Arabia Shuqaiq 4 IWP

The Saudi Arabia Shuqaiq 4 IWP project is a part of the country's vision to diversify its energy sources and increase its water security. The project aims to build an independent water plant (IWP) that will produce 400,000 cubic meters of desalinated water per day using reverse osmosis technology. The project will be developed by the Saudi Water Partnership Company (SWPC) under a 25-year build-own-operate (BOO) contract with a private sector partner.

- The project will be located in the industrial city of Shuqaiq, near the Red Sea coast, and will supply water to the Jizan and Asir regions.

- The project is expected to be operational by 2025 and will have a lifespan of 30 years. Some more details about the Saudi Arabia Shuqaiq 4 IWP project are:
- The project is estimated to cost around \$384 million and will be financed by a mix of equity and debt from local and international sources.
- The project will use membrane-based technology to desalinate seawater and reduce the environmental impact of the process. The project will also implement energy recovery devices to reduce the power consumption and carbon footprint of the plant.
- The project will create over 1,000 jobs during the construction phase and over 200 jobs during the operation and maintenance phase. The project will also support the local economy by sourcing materials and services from local suppliers and contractors.
- The project will contribute to the national water security of Saudi Arabia by increasing the water supply and reducing the dependence on fossil fuels for water production. The project will also support the industrial development of Shuqaiq, which hosts several mega projects in the mining, petrochemical, and power sectors.



### 5. The Egypt Matrouh desal package project

The Egypt Matrouh desal package project is part of the country's vision to diversify its energy sources and increase its water security. The project aims to construct three to four independent water plants (IWPs) that will produce a total of 300,000 cubic meters of desalinated water per day using reverse osmosis technology. The project will be developed by the Egyptian Sovereign Fund (ESF) under a 25-year build-own-operate (BOO) contract with a private sector partner.

- The project will be located in the Matrouh region on the Mediterranean coast, and will supply water to the governorate and the surrounding areas. The project is expected to be operational by 2025 and will have a lifespan of 30 years. Some more details about the Egypt Matrouh desal package project are:

- The project is estimated to cost around \$1 billion and will be financed by a mix of equity and debt from local and international sources.



- The project will use membrane-based technology to desalinate seawater and reduce the environmental impact of the process. The project will also implement energy recovery devices to reduce the power consumption and carbon footprint of the plant.
- The project will create over 3,000 jobs during the construction phase and over 400 jobs during the operation and maintenance phase. The project will also support the local economy by sourcing materials and services from local suppliers and contractors.
- The project will contribute to the national water security of Egypt by increasing the water supply and reducing the dependence on fossil fuels for water production. The project will also support the tourism development of Matrouh, which is a popular destination for visitors from Egypt and abroad.

### 6. Conclusion

The global water industry is expected to experience significant growth in 2024, with international projects worth over \$27 billion set to be up for tender. These projects span across different regions and sectors, presenting various opportunities for the water sector supply chain. For instance, Egypt is planning to follow Saudi Arabia's successful PPP pipeline, while California is expanding its wastewater reuse projects. The various developments and insights highlighted in this article showcase the changing landscape of the global water industry and the importance of finding innovative, sustainable solutions. By seizing the opportunities presented by these projects, stakeholders can contribute to the progress of the water sector and ensure the availability and sustainability of water resources.



## Accelerating Innovation in the Water Sector: A Collaborative Approach

In the face of critical water and sustainability challenges, the water sector is coming together to accelerate solutions and drive innovation. Leaders from academia, technology providers, trade associations, and non-governmental organizations (NGOs), have formed a consortium to address these challenges and advance breakthrough water solutions. The Reservoir Center for Water Solutions, located in Washington, serves as a global collaboration hub to foster innovation and drive action.

### 1. The Reservoir Center: A Collaborative Hub

The Reservoir Center for Water Solutions, located on the Anacostia River, aims to address global water challenges through collaboration. With thirty-three partners, the Center brings together resources, knowledge, and partnerships to drive progress, focusing on water scarcity, resilience, and affordability. Collaboration is essential in addressing complex water challenges globally, and the Center recognizes the need for diverse perspectives and expertise. Through innovation programs, education, mentoring, and community outreach, the Center aims to catalyze innovative solutions and drive positive change in the water sector. Mami Hara, CEO of the US Water Alliance, highlights the critical juncture for the water sector and emphasizes the opportunity to address challenges related to water investment, climate resilience, and water equity. The Reservoir Center acts as a catalyst for progress, providing a common ground for knowledge sharing, partnership cultivation, and inclusive participation.

### 2. The Role of Education and Innovation

Education and innovation play crucial roles in addressing water-related challenges. Education is essential for raising awareness about water conservation, sustainable water management, and the importance of preserving water resources.

It helps individuals understand the impact of their actions on water quality and quantity, leading to more responsible water usage.

Innovation, on the other hand, drives the development of new technologies and solutions for water conservation, purification, and distribution. It enables the creation of more efficient irrigation systems, water treatment plants, and sustainable water supply solutions. Innovation also plays a key role in developing new methods for recycling and reusing water, as well as in improving water monitoring and management systems.

**“Together, education and innovation contribute to the sustainable use and management of water resources, leading to a more resilient and water-secure future for communities and ecosystems”**

### 3. Achieving 2050 water sector goals with Spring Accelerator

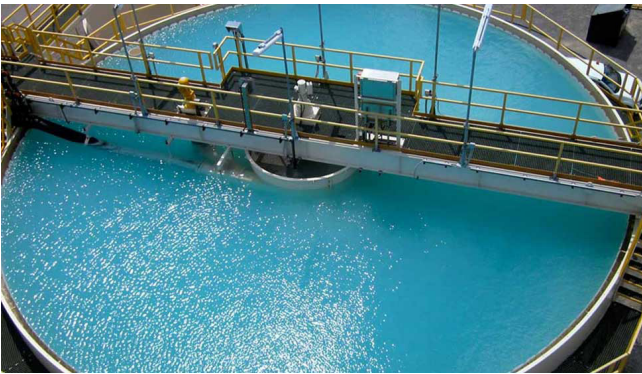
The water sector faces many challenges in delivering sustainable, efficient, and resilient services to customers and the environment. To address these challenges, the sector needs to embrace innovation and collaborate across different stakeholders. This is the vision of the 2050 Water Innovation Strategy, which sets out 12 ambitions for transforming the UK and Ireland’s water sector. One of the initiatives that supports this vision is Spring, an innovation accelerator that brings together water companies, suppliers, academia, and experts from other sectors to deliver better outcomes for customers, society, and the environment. Spring aims to remove the barriers to mobilizing trials at pace within the water sector, by



creating a new four-step, end-to-end process that ensures greater cross-sector alignment and reduces trial duplication.

- The new Spring Accelerator process consists of the following steps:
  - The Ambition Surgery: A challenge-setting mechanism for the industry to connect, articulate the problem, and define a specific challenge, aligned with an ambition from the Water Innovation Strategy 2050. Conference-style events will bring water companies, suppliers, academia, and experts from other sectors together.
  - The Innovation Marketplace: A directory for innovators to submit their solutions against the call for innovation. The application has been designed to provide a quick but thorough assessment of prospective solutions.
  - The Trial Design: A collaborative process to design and plan the trial, involving the innovator, the water companies, and Spring. The trial design will include the objectives, scope, methodology, data requirements, and success criteria of the trial.
  - The Trial Delivery: A coordinated process to deliver the trial, involving the innovator, the water companies, Spring, and other relevant stakeholders. The trial delivery will include the mobilization, execution, monitoring, evaluation, and reporting of the trial.

#### 4. Innovation Insights and Strategies in the Water Sector



#### 5. Water Innovation Sustainable Projects Circular Water Economy

Water innovation plays a crucial role in circular water economy projects, which are initiatives that aim to minimize the use and waste of water resources, and to maximize their value and regeneration. Some of the benefits of water innovation in circular water economy projects are:

- Industry Research (UKWIR) provides a framework and best practices for collaborative innovation in the water industry, based on the experience of water companies, regulators, and researchers.

- Water can't wait: Increasing the rate at which advances in water security are adopted: Based on a high-level conference discussion with stakeholders from the public and commercial sectors, the World Bank's blog post explores how to create an environment that is supportive to water innovation.
- Collaborative innovation in the water industry : This guide by the University of Sheffield and the UK Water.

#### 6. Addressing Global Challenges Through

- It can reduce water consumption and waste, as well as improve water quality and reuse, by using smart metering, leak detection, water treatment, and circular economy approaches.
- It can enhance water productivity and competitiveness, by using water-efficient technologies, processes, and products, as well as water-smart services and business models.
- It can preserve and regenerate natural systems, by using nature-based solutions, ecosystem services, and green infrastructure, as well as restoring and protecting water sources and biodiversity. Some examples of circular water economy projects that involve water innovation are:
  - The Water in Circular Economy and Resilience (WICER) initiative, which is a project by the World Bank's Global Water Practice to help embrace and implement circular and resilience principles in cities around the world.
  - The CLEARANCE project, which is a research project funded by the European Union's Horizon 2020 programmer to explore the potential of circular economy approaches to reduce river pollution by agricultural nutrients with the use of carbon-storing ecosystems.
  - The NextGen project, which is a research project funded by the European Union's Horizon 2020 programmer to demonstrate innovative technological, business, and governance solutions for water in the circular economy in ten high-profile cases across Europe.

#### 7. Smart Water Management

Smart Water Management system is a term that refers to the use of IoT technologies to monitor, control, and optimize the distribution and quality of water resources. Smart Water Management system can help reduce water consumption, waste, and pollution, as well as improve the efficiency, resilience, and sustainability of water systems. Some of the benefits of Smart Water Management system are:

- It can provide real-time data and feedback on water quantity and quality, enabling proactive decisions and actions.
- It can detect and prevent leaks, bursts, and contamination, saving water and reducing costs and risks.
- It can optimize the operation and maintenance of water infrastructure, such as pumps, valves, pipes, and meters, enhancing performance and reliability.
- It can support water conservation and demand management, such as smart metering, pricing, and billing, encouraging behavioral change and awareness among users.
- It can enable the integration of renewable energy sources and smart grids, increasing the resilience and flexibility of water systems.
- It can facilitate the collaboration and coordination among different stakeholders, such as water utilities, regulators, customers, and communities, improving governance and transparency.

## 8. Water-Energy Nexus

Water innovation is the process of developing and implementing new technologies, practices, and policies that can improve the efficiency, sustainability, and resilience of water and energy systems. Water innovation plays a crucial role in the Water-Energy Nexus project, which is an interdisciplinary journal that covers research on the relationship between water and energy sectors, and how they affect each other in terms of efficiency, sustainability, and resilience.

### 8.1 Some of the topics that water innovation can contribute to the Water-Energy Nexus project are:

Port tools, incorporating multiple objectives and stakeholders, and addressing uncertainties and trade-offs.

### 8.2 Energy efficiency in water and wastewater treatment and distribution:

This topic explores how to reduce the energy consumption and greenhouse gas emissions of water and wastewater systems, such as by :

- Recovering energy from waste streams.
- Implementing smart water networks.
- Optimizing pumping and aeration.
- Using renewable energy sources.

### 8.3 Energy for water transmission/treatment/distribution and end-use:

This topic examines how to provide reliable and affordable energy for water supply and demand, such as:

- Using decentralized or hybrid systems.
- Improving water quality and reuse, enhancing water productivity and conservation.
- Addressing water-energy nexus challenges in different sectors and regions.

“**They aim to improve water access, promote water conservation, enhance water quality, and foster water-related resilience in communities worldwide**”

### 8.4 Integrated water-energy systems and nexus modelling:

This topic studies how to optimize the performance and resilience of water-energy systems and nexus, such as by using system analysis, simulation, optimization, and decisions up to these updated projects.

Accelerating Water Innovation demonstrate a commitment to addressing global water challenges through innovative and sustainable approaches.

### 8.5 Water for energy production and end-use:

This topic investigates how to manage water resources for energy production and consumption, such as by assessing water availability and stress, improving water efficiency and recycling, mitigating water-related risks and impacts, and developing water-smart energy technologies and policies.





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# WATER NEWS BRIEF

FEBRUARY | 2024



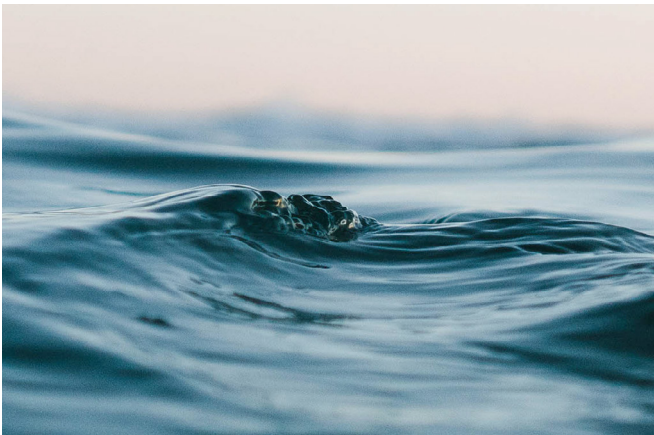
## AFDB appoints Oluwatomisin Adeola Fashina as Senior Director, IT and Chief IT Officer

The African Development Bank appointed Dr. Oluwatomisin Adeola Fashina as Senior Director, Information Technology and Chief Information Technology Officer starting from 16th January 2024. Fashina, a Nigerian national, brings over 30 years of experience in technology and financial services management. He joins from Ecobank Group, where he held various executive positions, overseeing operations, technology, digital transformation, and innovation. Fashina holds a Bachelor of Science in Computer Engineering, an MBA in Marketing, and a PhD in Business Management. Fashina said: "I am grateful to President Adesina for his confidence and the opportunity to lead the Information Technology Department and its talented staff.

I am also humbled and at the same time excited to be given the chance to lead the Bank's efforts of ensuring world-class service enhancement with the overarching mandate of combining operational resilience with building and implementing an outstanding technology strategy to achieve a sustained advantage for the Bank."



## Saudi Arabia's NWC has completed the operation of 8 new stations to purify drinking water



The NWC has completed the operation of 8 new drinking-water purification stations in the King Fahd suburb of Al-Bayda Governorate in the Eastern Province. The company explained that it pumps a maximum capacity of more than 20,000 cubic meters of desalinated water daily from the eight stations in the King Fahd suburb using a mini reverse-osmosis (RO) system. This is part of a project to improve water quality and increase coverage with desalinated water in the Eastern Province. The company is currently evaluating the efficiency of the stations and plans to construct 7 more stations in other locations to reach a total production of 76,600 cubic meters of desalinated water per day. These efforts align with the national water strategy and support the goals of the Kingdom's Vision 2030.

## World Bank approves \$231 million project to improve water quality in Vietnam

The World Bank Board of Directors has approved the Binh Duong Province Water Environment Improvement Project, which aims to significantly enhance water quality and wastewater treatment for over half a million residents in southern Vietnam. The project, with a total investment of \$311 million, will be financed by the World Bank and the Government of Vietnam. It will focus on transforming wastewater management in Thuan An, Di An, and Tan Uyen cities, covering an area of more than 33,000 hectares and directly benefiting approximately 550,000 residents by 2032. The project is designed to increase wastewater services in urban areas, reduce pollution in the Sai Gon and Dong Nai River systems, and incorporate climate-resilient and sustainable infrastructure. Additionally, it will integrate principles of the circular economy to promote resource efficiency and sustainability. This initiative is seen as an important step in creating a cleaner, healthier environment in Binh Duong province and contributing to sustainable growth and development.



## Alejandro Jiménez to lead business development in ACCIONA's Infrastructure division



Following recent changes in the company, ACCIONA announced a new management team appointment. Alejandro Jiménez Benítez, a civil engineer and MBA holder, has been appointed as the head of Business Development and Strategy in the Infrastructure Division. Having joined ACCIONA in 2002, Jiménez has held various positions in the Water and Service businesses, focusing on business development and strategy. He was previously the Director of Business Development, Strategy, and Sustainability in Water. In a key interview, Jiménez highlighted ACCIONA's international expansion, especially in the Middle East, and its ability to adapt to global market challenges. He also emphasized the company's strength in offering comprehensive services in the water sector, from desalination projects to sustainable infrastructure management.

## Xylem commits to advancing Italy's sustainable water future through Publiacqua contract

The partnership between Xylem and Tuscany's Publiacqua, under a three-year contract, aims to enhance the resilience and operational efficiency of Medio Valdarno's water infrastructure through innovative technologies. This includes meter data analytics, real-time leak detection modules, and predictive maintenance tools. The transformation of water management is powered by Xylem Vue, a software and analytics platform that streamlines utility data and simplifies water and wastewater services. With advanced data analytics, Publiacqua's operators can proactively identify and address potential pipe failures, optimizing maintenance schedules and enhancing the overall efficiency of the water network. This initiative is more than technological advancement; it impacts real lives and sets a global example for tackling water challenges. Previously, Publiacqua has made significant investments in Xylem solutions to enhance treatment processes and wastewater transport, maintaining robust and smart water management across their network of plants and pipelines.



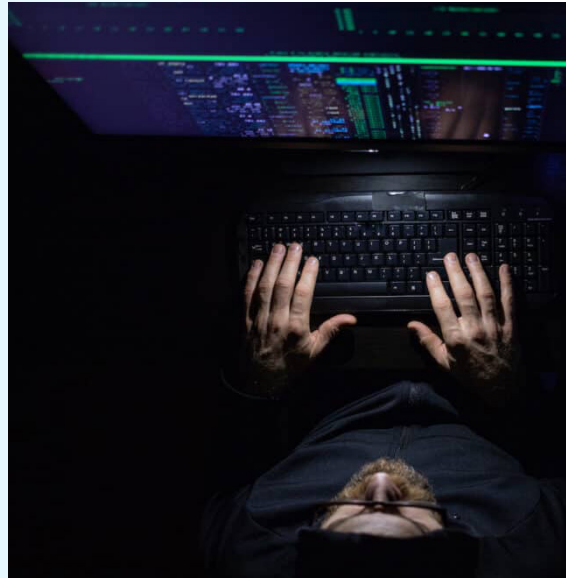
## Dr. Al Al-Sheikh Mubarak, appointed CEO of the National Water Company, Saudi Arabia



The Board of Directors of the National Water Company (NWC) in Saudi Arabia has appointed Dr. Fuad bin Ahmed Al-Sheikh Mubarak as the new CEO, while the former CEO, Mr. Nemer bin Mohammed Al-Shebl, has been appointed as Advisor to the Chairman of the Board, Engineer Abdulrahman bin Abdulmohsen Al-Fadli. The company expressed gratitude to Mr. Nemer Al-Shebl for his service as CEO and wished him success in his new role. Dr. Fuad bin Ahmed Al Al-Sheikh Mubarak, who has a PhD in Financial Accounting from Newcastle University, brings significant expertise to his new role as CEO, having previously served as the First Officer of the Saudi Irrigation Organization (SIO) since 2015. The NWC, a Saudi joint-stock company wholly owned by the Saudi Government (specifically the Public Investment Fund), aims to provide water and wastewater treatment services that meet global standards.

## CISA release incident response guide for water, wastewater sectors

The Cybersecurity and Infrastructure Security Agency (CISA), along with the Federal Bureau of Investigation (FBI) and the Environmental Protection Agency (EPA), has released an incident response guide specifically tailored for the water and wastewater Systems (WWS) Sector. This guide aims to provide owners and operators in the sector with best practices for responding to cyber incidents, covering all stages of the incident response lifecycle. It was developed in collaboration with over 25 industry, nonprofit, and state/local government partners and does not require technical expertise to be utilized effectively. The guide emphasizes the importance of preparation, detection and analysis, containment, eradication, recovery, and post-incident activities. Officials from CISA, FBI, and EPA have encouraged all WWS utilities to review and implement the recommended actions outlined in the guide to enhance their incident response planning and collaboration with federal partners and the WWS sector.



## EPA makes available \$3M to establish stormwater Centers of Excellence

The U.S. EPA has announced the availability of \$3 million through the Centers of Excellence for Stormwater Infrastructure Technologies grant program. The EPA is seeking applications from institutions of higher education, research institutions, and nonprofit organizations to establish national Centers of Excellence for Stormwater Infrastructure Technologies. These centers will focus on expanding stormwater infrastructure solutions across the country, conducting research on new technologies, providing technical assistance to governments, and collaborating with regional institutions. This initiative, made possible by the Bipartisan Infrastructure Law, aims to address the challenges faced by communities in managing stormwater issues and to improve local water quality. The EPA's Assistant Administrator for Water, Radhika Fox, emphasized the importance of enhancing stormwater infrastructure to help communities and ecosystems become more resilient in the face of climate stress. Interested parties can find more information on the request for applications on the EPA's website.



## Skyports Drone Services and Makutu launch water quality drone flights with Northumbrian Water

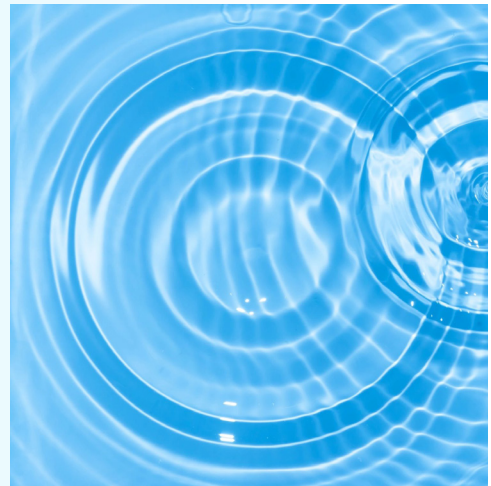
Skyports Drone Services and Makutu have launched a new drone inspection service in collaboration with Northumbrian Water, aimed at monitoring and improving the quality of river and coastal water. The service combines Skyports Drone Services' drone operations and winch technology with Makutu's water testing solution. The maiden test flights demonstrated the use of electric drones for automated water quality surveys, enabling access to hard-to-reach areas, reducing carbon footprint, and providing faster results. The service aims to replace labor-intensive data collection processes, particularly in rural or challenging environments. The deployment of Speedbird Aero aircraft equipped with specialist winch technology allows for the collection of water samples and real-time data analysis. Northumbrian Water expressed excitement about the potential positive impact on environmental monitoring and water quality improvement. The collaboration is seen as a significant milestone in environmental stewardship and technological innovation, paving the way for more informed decision-making in water course management.



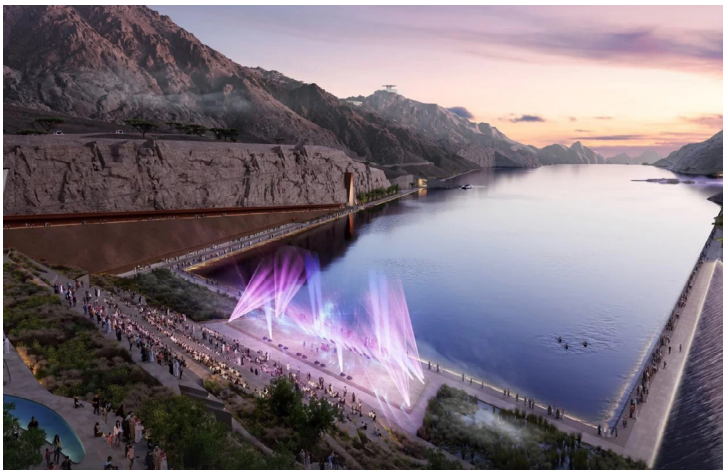


## Itron Expands Production of Aquadis+ Volumetric Water Meters to Indonesia

Itron, Inc. (NASDAQ: ITRI) is expanding the production of its Aquadis+ volumetric water meter to Southeast Asia, with manufacturing now taking place in Itron's facility in Cikarang, Indonesia. This expansion aims to better serve Itron customers in Asia Pacific countries and meet the growing demand for the Aquadis+ water meter. The meter has proven to be highly efficient and accurate in measuring water volumes, and it is smart metering ready. Manufacturing the Aquadis+ closer to Itron's Asia Pacific customers will increase pricing adaptability, reduce environmental impact, and improve delivery time and service. This move reinforces Itron's commitment to its customers in the region and aligns with its goals of sustainability and customer service enhancement. The Aquadis+ water meter has been installed in over 20 million units globally and is designed to ensure accuracy, reliability, and adaptability to various installation scenarios.



## Neom awards multibillion-dollar dam deal



NEOM has awarded a significant contract worth an estimated SR20bn (\$5bn) to Italian contractor WeBuild for the construction of dams at the Trojena mountain resort. These dams will create an artificial lake for the upcoming Asian Winter Games in 2029. The main dam will be 145 meters high and 475 meters long, constructed using 2.7 million cubic meters of roller compact concrete (RCC). Additionally, a second dam within the lake, a third dam, and the foundations for the Bow Building, which will house a hotel, are also part of the project. This marks the second major contract awarded for the Trojena development.

## Grundfos appoints Divisional CEO, Industry

Grundfos has appointed Inge Delobelle as the Executive Vice President and Divisional CEO of Industry. With over a decade of experience at the executive level in multinational industrial companies, including ThyssenKrupp, where she served as CEO for TK Elevator Europe and Africa, Delobelle brings extensive business and technological understanding. Poul Due Jensen, CEO and group president of Grundfos, expressed confidence in her ability to lead the Industry division, citing her track record of driving profitable growth and managing technology transition. Delobelle will assume her new role on March 1, 2024, and will join Grundfos' Group Management. She holds a Postgraduate Diploma in European Enterprise Management from the Dorset Business School, University of Bournemouth, and the University of Applied Sciences Fulda, as well as a Master's degree in Applied Business Economics from the Catholic University of Leuven in Belgium and the Institut d'Administration des Entreprises of Poitiers in France.



## Veolia's Municipal Water division suffers ransomware cyberattack

Veolia North America's Municipal Water division recently fell victim to a ransomware cyberattack, impacting software, systems, and personal information, as well as disrupting customers' bill payments. The attack, announced on January 19, led to the potential compromise of individuals' personal information, although specific details were not disclosed at the time. In response, Veolia took back-end systems and servers offline, temporarily affecting online bill payment systems and customers' ability to pay water bills. With more than 200 communities under its service, Veolia operates as both a regulated utility and a contract operator of water and wastewater systems across America. Ransomware attacks, which involve the encryption of valuable data followed by a demand for ransom, pose a significant threat to public-serving institutions. To mitigate such risks, creating secure backups of critical data is advised.



## New Micronovo tackles FOG – naturally



A new natural wastewater treatment solution, Novoflow, has been introduced in the United Kingdom by Micronovo. This environmentally friendly product, comprising bacteria, enzymes, and fungi, effectively eliminates pollutants from various wastewater sources, including those heavily impacted by sewage, fats, oils, and greases. Novoflow operates in rivers, lakes, open seas, and treatment plants without causing harm to watercourses. It competes with harmful pathogens for nutrients in the presence of organic waste and facilitates complete decomposition of pollutants, making the treated wastewater safe for irrigation or return to the natural water cycle. Unlike filters, chemicals, or traditional bacteria, Novoflow is entirely biological and converts organic matter into CO<sup>2</sup> and mulch. When used in wastewater treatment plants, it forms active mud that acts as a powerful filter once it reaches a certain level. Micronovo's Novoflow is exclusively available in the UK, Ireland, and India through Designed Network Solutions.

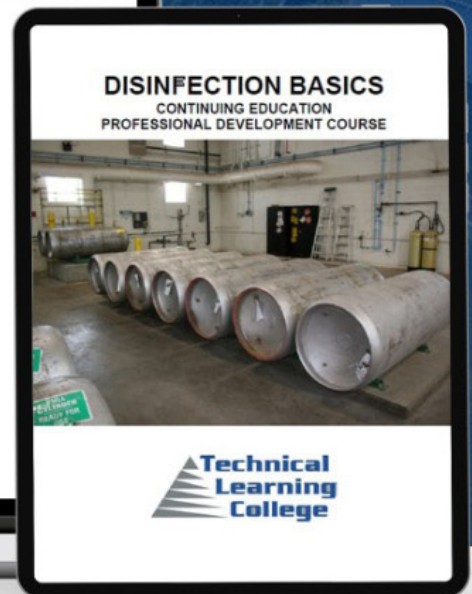
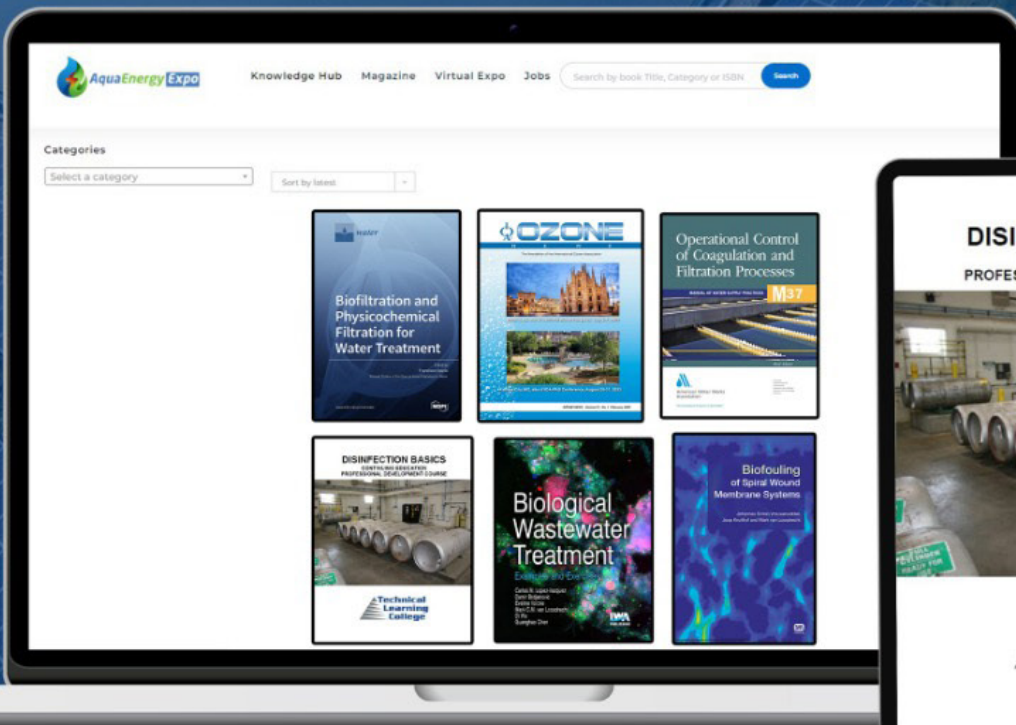
## Jürgen von Hollen is new Nanostone Water CEO

Nanostone Water (NSW) has appointed Jürgen von Hollen as CEO, effective immediately. Jürgen joined NSW in August 2023 to develop a growth strategy for the company's technology in addressing global water treatment challenges. He has experience in scaling technology companies in global markets and has a track record of delivering growth and stakeholder value. Jürgen's appointment has been praised by Mike Ahearn, chairman of NSW investor, True North Venture Partners, who expressed confidence in NSW's ability to make a positive impact on global water supplies.





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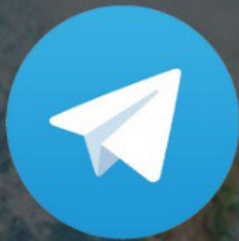
**Eng. Hanan Fayed**



**Dr. Mohamed Shaaban**



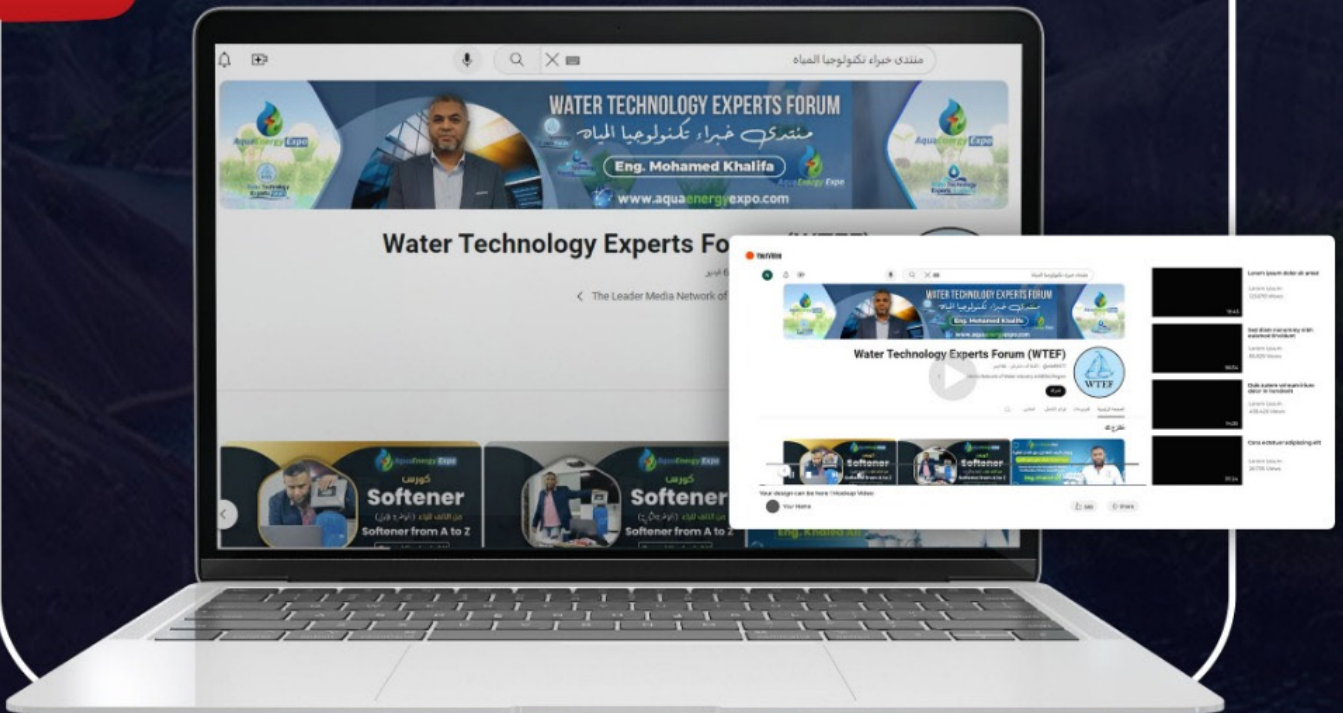
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Eng. Mohamed Abdelaal

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- Membrane Structure
- Membrane Equations
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## Smart Water Technologies, Enhancing Water Utilities Operations

Eng. Hanan Fayed

Director of Business Development  
at Aqua Energy Expo Magazine



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- Introduction (overview of smart water networks)
- Common Business Drivers
- Application of water distribution networks
- Guidelines for energy efficient smart water connectivity
- Current challenges and realtime data for solving them
- Solutions introduced by (Pipelife - Keypro - Elisa)
- Xylem's smart solutions (Case studies)
- Satellite-based sensors for water Management
- Future trends of smart water technologies

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## "Membrane Desalination Technology"



Dr. Mohamed Shaaban

- Introduction to Water Desalination
- Different Desalination Technologies
- Reverse Osmosis
- RO Unit Main Components
- RO Classification
- RO Membranes Manufacturers Differences.
- Reverse Osmosis Main Difference between Brackish and Sea Water RO Units



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 Time :from 8 to 10PM  
(Saudi Arabia Time)

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# Global Water Events

## Water & Wastewater Equipment, Treatment & Transport Show

Date: From 24 to 26 Jan 2024

Location: Indianapolis, Indiana

The Water & Wastewater Equipment, Treatment & Transport Show (WETT) is a showcase of the latest innovations within the wastewater industry. The show brings together industry experts, technologies and services. It provides 90+ expert-led courses, live show demonstrations, hundreds of interactive booths and networking opportunities.

Website: [wwettshow.com](http://wwettshow.com)



## BRITISH WATER Micropollutants Conference

Date: 8 February 2024

Location: Leeds, UK

British Water will continue the conversation on how micropollutants affect the water sector in the third BW Micropollutants Conference. Our speakers will cover the latest topics on current legislation and ongoing initiatives about the environmental risks associated with micropollutant emissions and treatment approaches.

Website: [www.britishwater.co.uk](http://www.britishwater.co.uk)

## AOAP Conference and Exposition & NDPA Water Safety

Date: From 12 to 14 Feb 2024

Location: The Grand Sierra Resort and Convention Center in Reno, Nevada

The AOAP Conference and Exposition & NDPA Water Safety Conference is an opportunity for professionals from around the world to learn about the latest trends, legislation, and issues facing our industry. Education, networking & professional development opportunities during the conference are one of a kind.

Website: [ndpa.org](http://ndpa.org)

## WEF/AWWA Utility Management Conference 2024

Date: From 13 to 16 February 2024

Location: Portland, Oregon

The 2024 WEF/AWWA Utility Management Conference offers 6 pre-conference workshops and 36 technical sessions focused on a wide variety of topics related to water and wastewater utility management.

Website: [www.wef.org](http://www.wef.org)



## WEX Global

Date: From 4 to 6 March 2024

Location: Madrid, Spain

WEX Global is a three-day event which brings together the sector's leading experts to discuss water sustainability.

Website: [wex-global.com](http://wex-global.com)



## Membrane Technology Conference

Date: From 4 to 7 March, 2024

Location: West Palm Beach, Florida

The AMTA/AWWA Membrane Technology Conference explores the latest developments in membrane technology, as it affects water and wastewater treatment. The conference reveals new directions in water and wastewater treatment technologies, desalting and membrane bioreactor applications.

Website: [www.awwa.org](http://www.awwa.org)





## The Collection Systems Conference and Stormwater Conference 2024

Date: From 9 to 12 April, 2024

Location: Location The conference will be hosted at the Connecticut Convention Center in Hartford, CT.

The Collection Systems Conference and Stormwater Conference 2024 is an exhibition focused on the design and operations of wastewater collection systems, as well as wet weather control and stormwater management.

Website: [www.wef.org](http://www.wef.org)



## Texas Water Conference

Date: From 9 to 12 April, 2024

Location: NEC, Birmingham, B40 1NT, UK

The conference is celebrating its 28th year as the Largest Regional Water Conference in the U.S. It caters to professionals in the wastewater and water industry, including water quality engineers, treatment plant technicians and scientists. Also government officials, regulatory agency personnel, manufacturers and their agents, libraries, universities and groups and individuals concerned with protecting public health and the environment.

Website: [www.txwater.org](http://www.txwater.org)

## MACH Exhibition

Date: From 15 to 19 April, 2024

Location: NEC, Birmingham, B40 1NT, UK

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# Renewable Energy Systems for Water Desalination Applications



**G**reen hydrogen has emerged as a promising solution to decarbonize industries and power heavy vehicles without contributing to carbon dioxide emissions. However, the production of green hydrogen has been limited by the high costs associated with electrolyzers and the reliance on freshwater sources. The good news is that researchers from different institutions have made significant advancements in producing hydrogen directly from seawater, opening up the possibility of an abundant and sustainable source of green hydrogen.

that generating 1 kilogram of hydrogen can consume up to 10 kilograms of water. If green hydrogen were to replace traditional hydrogen production entirely, it could lead to a massive strain on freshwater resources.

For instance, running trucks and key industries on green hydrogen alone could require approximately 25 billion cubic meters of freshwater annually, equivalent to the water consumption of a country with 62 million people.

“*Seawater electrolysis has been hailed as a wonder technology for creating green hydrogen — seen by some as the fuel of the future*”

## 1. The Challenge of Green Hydrogen Production

Currently, the majority of hydrogen production involves breaking apart methane, which releases carbon dioxide and contributes to climate change. Green hydrogen, on the other hand, is produced by splitting water molecules using renewable energy, resulting in only oxygen and hydrogen. This clean and sustainable approach has the potential to revolutionize various industries and reduce greenhouse gas emissions. However, the cost of producing green hydrogen remains high, primarily due to the expensive catalysts used in electrolyzers and the reliance on freshwater sources. Electrolysis, the process of splitting water, requires a significant amount of water, with estimates suggesting

## 2. Efforts to Make Salt Water Green Hydrogen Production Viable Coating of electrodes

Stanford researcher Hongjie Dai and his team aimed to find a technique to keep ocean water from corroding the submerged anodes due to its high salt content. They discovered coating the anode with rich layers of negative charges reduces the breakdown of the underlying metal. They employed iron, nickel hydroxide, and nickel sulfide to create a negatively charged coating that protects the anode during electrolysis.

As a result, they could generate ten times more electricity through the multilayer device, accelerating hydrogen production from salt water.

## 3. Salt Water Electrolysis with a semi-permeable Membrane

Researchers led by Evan Pugh and Bruce Logan have succeeded in splitting seawater to produce green hydrogen. The pre-desalination procedure in this process is costly. However, the team has reduced the cost by employing a thin semi-permeable membrane to filter water in the reverse osmosis treatment.

The reverse osmosis membrane replaced the typical ion exchange membrane seen in electrolyzers. Reverse osmosis works by applying pressure to the water

and forcing it through the membrane while leaving the chloride ions behind.

#### 4. Platinum Catalyst to Prevent Recombination of Ions

A novel catalyst has been created by scientists from Shaanxi Normal University and Swinburne University's Centre for Translational Atomaterials that can synthesize green hydrogen from seawater via solar energy. The researchers designed the Ocean-H<sub>2</sub>-Rig prototype to use this new catalyst. It can manufacture green hydrogen from salt water floating on the water's surface. In typical photocatalysts, water splits into hydrogen and oxygen when electrons and holes are separated in response to solar light. The separated electrons and holes tend to unite again, drastically lowering the photocatalytic activity and the efficiency of hydrogen synthesis. The photo-generated electrons are successfully extracted by the single-atom platinum catalyst created in this work, preventing undesired recombination. It significantly boosts the effectiveness of hydrogen production. The reusable catalyst is among the most efficient ever reported since it promotes highly efficient hydrogen generation with an exceptional quantum yield of 22.2% under LED-550 illumination.



#### 5. Salt Water Electrolysis via Forward Osmosis

Harvard researchers successfully used forward osmosis to separate salt water into clean hydrogen and oxygen gas. They created hydrogen gas by forward-osmosis and electrochemical water splitting, which is useful for storing renewable energy. The researchers enhanced the natural mechanism of osmosis to collect clean water from natural sources such as the ocean. There is no requirement for a separate water purifying system because this technology enables salt water use.

#### 6. The Benefits of Seawater Conversion for Green Hydrogen

- The use of seawater for hydrogen production presents several advantages over conventional methods.

This is particularly beneficial in regions with abundant coastlines and ample sunlight, where the combination of renewable energy and seawater conversion could drive the establishment of a thriving green hydrogen industry.

- Seawater conversion offers a more cost-effective and energy-efficient alternative to desalination, which is typically required for conventional electrolyzers. Desalination processes can significantly increase the operational and maintenance costs of hydrogen production, making it less economically viable.



By bypassing desalination and directly utilizing seawater, the cost of green hydrogen production can be significantly reduced, making it more competitive with fossil fuel-sourced hydrogen.

- Seawater conversion eliminates the production of chlorine gas, which is a byproduct of electrolysis when using saltwater. Chlorine gas can be highly corrosive and detrimental to the longevity and efficiency of electrolyzers. By preventing the formation of chlorine gas, researchers have achieved successful and prolonged operation of electrolyzers, ensuring the stability and reliability of green hydrogen production from seawater.

#### 7. Addressing Freshwater Scarcity Concerns

While the use of seawater for green hydrogen production offers numerous benefits, concerns have been raised regarding the potential impact on freshwater supplies. The production of green hydrogen at a large scale using seawater electrolysis could require significant amounts of freshwater, potentially exacerbating existing water scarcity issues. To address this concern, researchers have proposed alternative methods that minimize the consumption of freshwater while still utilizing seawater as the electrolyte. One such approach involves the use of membranes that allow only freshwater vapor to pass through from the surrounding seawater bath. This internal distillation process replenishes the freshwater supply within the electrolyzer, limiting the need for additional freshwater resources. Furthermore, integrating green hydrogen projects with existing desalination plants could provide a sustainable solution.

Commercial desalination plants already possess efficient membrane systems capable of producing freshwater while adding minimal costs to green hydrogen production.

By leveraging the infrastructure and expertise of desalination plants, the integration of green hydrogen production could be streamlined and economically viable.

### 8. The Path to Commercialization

The use of seawater directly for green hydrogen production can significantly reduce the strain on freshwater resources. In water-scarce areas, the ability to tap into seawater as a natural feed for electrolysis offers a sustainable

solution. By eliminating the need for desalination or other pre-treatment systems, the technology can reduce costs and minimize environmental impact.

#### 8.1 Supporting National Green Hydrogen Missions

Countries like India, which have set ambitious targets for green hydrogen production, can benefit greatly from seawater electrolysis.

India's National Green Hydrogen Mission aims to produce at least five million metric tonnes of green hydrogen per year by 2030.

By utilizing seawater directly for electrolysis, India can avoid putting additional pressure on freshwater resources and maximize the use of industrial and municipal wastewater for hydrogen production.

#### 8.2 Integration with Desalination Plants

Some experts argue that integrating green hydrogen production with desalination plants could offer a practical solution to the freshwater challenge.

Desalination plants already have efficient mechanisms for extracting freshwater from seawater and could provide a cost-effective way to obtain purified water for electrolysis.

By leveraging the existing infrastructure and expertise of desalination plants, the water requirements for green

“  
**India's National Green Hydrogen Mission aims to produce at least five million metric tonnes of green hydrogen per year by 2030**  
 ”



hydrogen production could be met without further straining freshwater resources. This integration could significantly reduce the cost and environmental impact of green hydrogen production.

### 9. Overcoming Technological Challenges

The research on seawater electrolysis is still in its early stages, and the technology readiness level (TRL) is relatively low. However, researchers are optimistic about the future commercialization of seawater electrolysis. Collaborations with industry partners and further optimization of the technology are essential steps towards achieving TRL 7 or 8, where commercialization becomes feasible.

### 10. Ohmium and Aquastill's Offer Low Cost Co-benefits

Ohmium, a California-based company that develops green hydrogen electrolyzers, has found a partner in Aquastill, a provider of desalinated water systems. The two will work together to produce green hydrogen fuel from desalinated ocean water.

Aquastill's desalination device uses waste heat as an input, and will make use of residual heat from Ohmium's electrolysis process. This offers co-benefits in cooling Ohmium's system while powering desalination.

The two companies are currently developing how to optimize integration of the systems, which are highly modular and can be scaled from megawatt to gigawatt scale. Offshore wind energy was identified as a potential electricity source for the modular system, and solar is often a great match due to its high modularity and ability to be installed on bodies of water.

Ohmium's second generation proton exchange membrane electrolyzer produces at a rate of 9.0 kg per hour with a four-second ramp-up time. It is compatible with three-phase with 480 VAC/60Hz, 415 VAC/50Hz, or 400VAC/50Hz with optional DC integration.

The US Department of Energy (DoE) is targeting lower green hydrogen costs. Launched in 2021, the Hydrogen Shot program has a "1-1-1" goal, targeting costs of \$1 per 1 kilogram in 1 decade. In 2022 renewable energy-fueled hydrogen cost roughly \$5 per kilogram, so this target represents a cost reduction of 80% in one decade.

The DoE's investments in green hydrogen are on the rise. In 2021, it supported \$285 million in funding, and in 2022, the President's Fiscal Year 2022 Budget Request included the application for \$400 million in funds for green hydrogen development.

### 11. Future of Salt Water Green Hydrogen Production

Seawater is a naturally abundant resource; therefore, producing green hydrogen from it via electrolysis can help to some extent with the world's current energy crisis. However, corrosion of electrodes from salt waters hampers the mass production of green hydrogen. Therefore, there is a critical need for strong and effective electrocatalyst technology that can avoid or withstand chloride corrosion and precipitate formation on the electrodes. Considerable attempts have been made in seawater electrolysis, although long-term stability and selectivity have not yet been accomplished.







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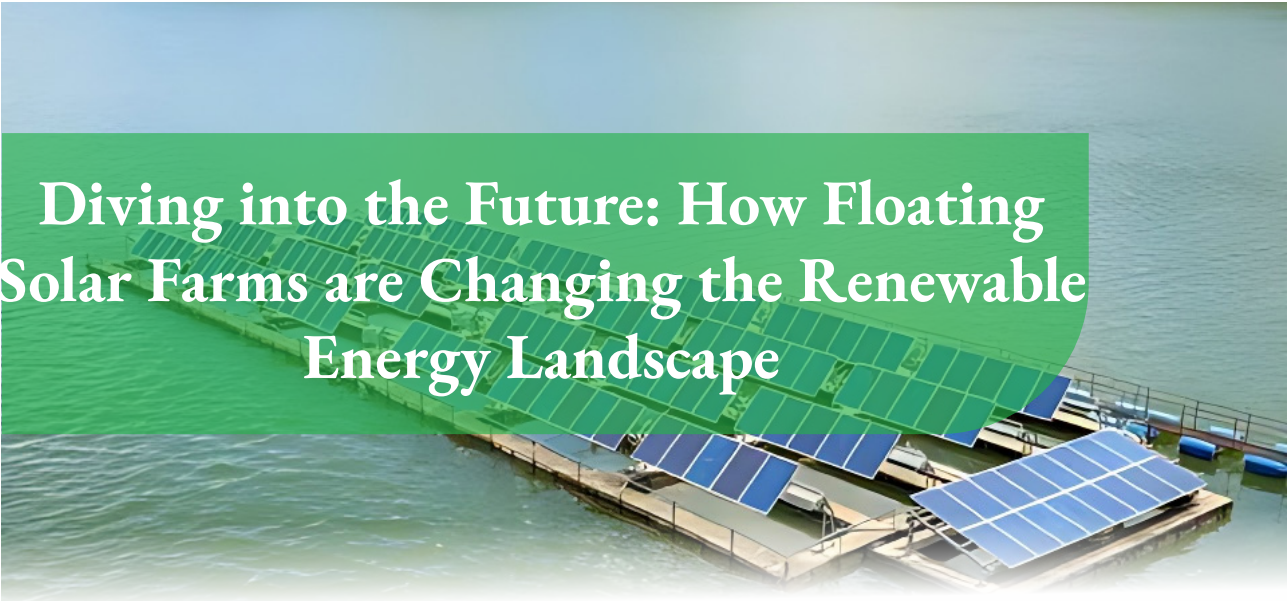
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# Diving into the Future: How Floating Solar Farms are Changing the Renewable Energy Landscape

Renewable energy sources have become a critical component in our efforts to combat climate change and reduce our reliance on fossil fuels. Among the various renewable energy technologies, solar power has gained significant prominence in recent years. Traditional solar farms, with their large arrays of photovoltaic panels mounted on the ground, have been the go-to solution for harnessing solar energy. However, a new and innovative approach is emerging: floating solar farms. Floating solar farms, also known as floating photovoltaic (FPV) systems or floating solar panels, are an exciting advancement in renewable energy technology. As the name suggests, these farms consist of solar panels mounted on floating platforms, usually deployed on bodies of water such as lakes, reservoirs, or even the open sea. This innovative design offers numerous advantages over traditional solar farms, making them an attractive option for the future of renewable energy.

## 1. Floating Solar Farm Technology, Structure, and Design

Floating solar farms are built using a combination of existing solar panel technology and floating platform systems. The solar panels used in these farms are typically the same as those used in traditional ground-mounted solar farms. These panels convert sunlight into electricity using photovoltaic cells. The main difference lies in the structure and design of the floating platforms that support the solar panels. The floating platforms are engineered to withstand the challenges posed by water bodies, such as waves, wind, and varying water levels. They are typically made of high-density polyethylene (HDPE) or other durable materials that are resistant to corrosion and degradation in a water environment. These platforms are designed to be modular, allowing for easy installation and scalability. They can be interconnected to form larger arrays, making it possible to create floating solar farms of various sizes to meet different energy demands.

## 2. Advantages of Floating Solar

Floating solar farms offer several advantages over traditional solar farms, making them a compelling choice for renewable energy generation.

- **Increased Energy Efficiency:**

The cooling effect of water enhances the performance of solar panels, resulting in increased energy efficiency. The reflective nature of water also allows for better light absorption, further boosting energy output.

The average energy produced by the floating PV is 1190 W in average solar irradiation of 896 W/m and the normal PV produces 1030 W in average solar irradiation of 940 W/m in the two-hour experiment, which means that the average total energy gain by the FPV panel is 15.5% higher than the normal PV panel.

- **Environmental Benefits:**

Floating solar panels offer several environmental benefits. Firstly, the presence of solar panels on water bodies reduces evaporation, which is particularly crucial in areas prone to droughts. By minimizing evaporation, floating solar contributes to water conservation efforts. Furthermore, these installations help reduce algae blooms in freshwater bodies, preventing potential harm to aquatic ecosystems and ensuring a safe water supply. Additionally, by generating clean energy, floating solar reduces reliance on fossil fuels and contributes to a significant reduction in greenhouse gas emissions.

- **Optimal Land Utilization:**

By utilizing bodies of water, floating solar farms make efficient use of space. They do not require vast land areas, which are often limited and costly. This makes floating solar farms particularly beneficial in densely populated regions where land availability is a constraint.

- **Reduced Water Evaporation:**

By covering water bodies, floating solar farms help

to reduce water evaporation. This is especially crucial in arid regions where water scarcity is a pressing issue. The shade provided by the solar panels helps to conserve water resources.

- **Synergy with Hydropower:**

Floating solar farms can be integrated with existing hydropower infrastructure, taking advantage of the same water bodies. This combined approach allows for the simultaneous generation of solar and hydropower, maximizing the utilization of resources.

### 3. Environmental Impact of Floating Solar Farms and Sustainability

One of the key advantages of floating solar farms is their positive environmental impact. By harnessing solar energy, these farms contribute to the reduction of greenhouse gas emissions and the mitigation of climate change. The environmental benefits of floating solar farms include:

- **Reduced Carbon Footprint:**

By generating electricity from the sun, floating solar farms reduce the reliance on fossil fuels, thereby decreasing carbon dioxide emissions. This helps to combat climate change and improve air quality.

- **Preservation of Land and Ecosystems:**

Traditional solar farms require large land areas for installation, often leading to deforestation or disruption of ecosystems. In contrast, floating solar farms utilize existing bodies of water, minimizing the need for land use and preserving natural habitats.

- **Water Conservation:**

**Potential Environmental Impact:** Although floating solar energy systems have many advantages, it is important to evaluate and reduce any potential environmental effects. For example, shading water bodies can have an effect on aquatic life and oxygen levels, and the materials used to construct panels can affect the quality of water. Appropriate mitigation strategies must be put in place to ensure that any environmental effects are as small as possible.

- **Biodiversity Enhancement:**

Floating solar farms can also be designed to support aquatic life by providing artificial habitats for fish and other aquatic organisms. This creates opportunities for biodiversity enhancement and ecological restoration. Floating solar farms align with the principles of sustainability by maximizing the use of renewable resources, minimizing environmental impact, and promoting the long-term well-being of ecosystems.

### 4. Case studies of successful floating solar farm projects

Several floating solar farm projects around the world have demonstrated the feasibility and success of this

innovative technology. These case studies highlight the diverse applications and benefits of floating solar farms in different contexts.

- **Yamakura Dam Floating Solar Power Plant, Japan**

The Yamakura Dam Floating Solar Power Plant, located in Chiba Prefecture, Japan, is one of the largest floating solar farms in the world. With an installed capacity of 13.7 megawatts (MW), it generates clean energy to power approximately 4,700 households. The project successfully demonstrates the compatibility of floating solar farms with water bodies used for other purposes, such as irrigation and flood control.

- **Tata Power Floating Solar Plant, India**

The Tata Power Floating Solar Plant, situated in Kayamkulam, Kerala, India, exemplifies the use of floating solar farms in challenging environments. The plant is installed on a saltwater reservoir, making it the first of its kind in the world. With an installed capacity of 500 kilowatts (kW), it provides clean energy to the local community, while the floating platform helps to reduce water evaporation and preserve the reservoir's freshwater resources.

- **Huainan Coal Mine Subsidence Area Floating Solar Farm, China**

The Huainan Coal Mine Subsidence Area Floating Solar Farm in Anhui Province, China, represents the successful transformation of a former coal mining area into a renewable energy hub. The floating solar farm, with a capacity of 150 megawatts (MW), is built on a subsidence area, showcasing the adaptability and versatility of floating solar farms in repurposing previously unusable land.



These case studies demonstrate the potential of floating solar farms to address various energy needs, adapt to different geographical conditions, and contribute to sustainable development. solar panels and ensure the long-term viability of the floating solar farm. Innovative engineering solutions, such as advanced anchoring systems and flexible platform designs, can help mitigate these challenges.

### 5. Environmental Impact Assessment

Before deploying a floating solar farm, it is essential to conduct thorough environmental impact assessments. These assessments help identify potential ecological, hydrological, and social impacts and develop appropriate mitigation measures. By carefully considering the local environmental context and engaging stakeholders, potential risks can be minimized, and the project can be designed to coexist harmoniously with the surrounding ecosystem.

### 6. Project Financing and Cost

Like any renewable energy project, the initial investment cost of a floating solar farm can be a significant barrier to implementation. However, as the technology matures and economies of scale are realized, the costs are expected to decrease. Additionally, innovative financing mechanisms, such as power purchase agreements and green bonds, can help make floating solar farms financially viable. By addressing these challenges through advanced engineering, environmental planning, and innovative financing models, the successful implementation of floating solar farms can be achieved.

### 7. Maintenance and Long-Term Viability

Maintenance plays a crucial role in ensuring the long-term viability and performance of floating solar farms. Regular inspections and cleaning of the solar panels are necessary to maximize their energy output. The durability of the floating platforms is also essential.

Proper maintenance, including regular inspections for signs of wear and tear, is necessary to ensure their stability and structural integrity. Any necessary repairs or replacements should be carried out promptly to prevent any disruptions in energy generation.

### 8. The Average Cost of Power for Floating Solar Projects

The average power cost is around ( $\sim$ \$0.038)/kWh to ( $\sim$ \$0.040)/kWh, which is the PPA (power purchase agreement) signing-off rate. However, some variations may be based on the availability of modules, BCD (Basic Customs Duty), ALMM (Approved List of Models and Manufacturers), and other factors that affect transactions and cause minor delays.

The cost difference between ground-mounted and floating structures is only 7 to 10%, with the latter being slightly more expensive due to its technology. However, over time, the cost difference will be offset by savings in operation and maintenance costs.

Currently, the availability of modules is a major concern, with more than 60% of them being imported and the BOS part accounting for around 75 to 80% of the overall cost. However, even with these factors, the power cost of ( $\sim$ \$0.038)/kWh is still considered reasonable by many states. Additionally, selling excess energy at a rate of ( $\sim$ \$0.061)/kWh can help offset the cost of power bought at a lower rate. Over the years, the power cost has decreased from around ( $\sim$ \$0.049)/kWh to the current rate.



## 9. Market Growth and Industry Outlook

The market for floating solar farms has witnessed significant growth in recent years, driven by increasing demand for renewable energy and advancements in technology. The industry's outlook is promising, with several factors contributing to its continued growth.

- **Technological Advancements**

Continuous research and development efforts are driving technological advancements in floating solar farm systems. Innovations in platform design, solar panel efficiency, and energy storage solutions are improving the performance and cost-effectiveness of floating solar farms. These advancements are expected to unlock new opportunities and further accelerate market growth.

- **Policy Support and Incentives**

Governments worldwide are recognizing the importance of renewable energy and are implementing supportive policies and incentives. These include feed-in tariffs, tax credits, and grants that encourage the development of floating solar farms. Such policy support provides stability and certainty to investors and helps drive market growth.

- **Increasing Environmental Awareness**

There is a growing global awareness of the need to transition to renewable energy sources and reduce carbon emissions. Floating solar farms, with their environmental benefits and sustainable features, are gaining attention as a viable solution. This increased environmental awareness is expected to drive the demand for floating solar farms, further propelling market growth.

## 10. Future Prospects and Growth of Floating Solar Farms

The future prospects for floating solar farms are promising, with the potential to transform the renewable energy landscape.

The technology's unique advantages, coupled with its environmental benefits and economic viability, position it as a crucial player in the global energy transition.

- **Expansion into New Geographies:**

Floating solar farms have primarily been deployed in Asia, with countries like China, Japan, and South Korea leading the way. However, the technology's potential is not limited to these regions. As awareness and adoption increase, floating solar farms are expected to expand into new geographies worldwide, including Europe, North America, and Africa.

- **Integration with Energy Storage:**

Energy storage is a critical component of the renewable energy ecosystem, helping to address the intermittent nature of solar power generation. The integration of floating solar farms with energy storage solutions, such as batteries or pumped hydro storage, can enhance their capabilities and ensure a reliable and consistent energy supply.

- **Hybrid Systems and Synergies:**

Floating solar farms can be integrated with other renewable energy technologies to create hybrid systems. For example, combining floating solar farms with wind turbines or wave energy converters can maximize energy generation potential. These hybrid systems offer opportunities for increased energy output and better utilization of resources.

- **Advancements in Floating Platform Design:**

Ongoing research and development efforts are focused on improving floating platform designs, making them more efficient, cost-effective, and environmentally friendly. Innovations in platform materials, anchoring systems, and construction techniques are expected to drive further advancements in floating solar farm technology.





## Veolia Takes the Lead in Decarbonization with AI Monitoring and Control for District Heating Networks

District heating systems play a crucial role in decarbonizing the heating sector by providing low-carbon energy to a network of buildings. Veolia, a global leader in environmental services, is at the forefront of decarbonization efforts in district heating networks. With the world facing the urgent need to reduce greenhouse gas emissions, Veolia has recognized the importance of transitioning to cleaner and more sustainable energy sources. Through the use of advanced artificial intelligence (AI) technologies, Veolia is revolutionizing the monitoring and control systems of district heating networks, resulting in significant reductions in carbon emissions.

### 1. The Role of AI in Monitoring and Control for District Heating Networks

AI has emerged as a game-changer in various industries, and district heating networks are no exception. By harnessing the power of AI, AI algorithms continuously analyze data from sensors and meters, the AI system can optimize temperature and network pressure enabling real-time detection of anomalies and potential issues, leading to a reduction in peak loads by up to 20% and an increase in heat delivery capability by 25%. Veolia's AI systems also enable predictive modeling, allowing for accurate forecasting of energy demand and supply. This ensures that heating networks are operating at their optimal capacity, avoiding both overproduction and underproduction. By optimizing energy distribution, Veolia can reduce the reliance on fossil fuels and integrate higher shares of renewable energy sources, further contributing to decarbonization efforts.

*“Donald Macphail, Chief Operating Officer - Treatment at Veolia, emphasizes the significance of district heating systems in achieving this goal. He states, “District heating systems are a proven technology to help reduce this carbon footprint”*”

By integrating AI into the Sheffield District Energy Network, Veolia is taking a significant step towards achieving a net-zero future.

### 2. How Veolia is Using AI to Monitor and Control Their District Heating Networks

Veolia has implemented AI monitoring and control systems across its district heating networks, revolutionizing the way these networks operate. Through the installation of smart sensors and meters, real-time data is collected and fed into AI algorithms for analysis.



These algorithms continuously learn and adapt, improving their accuracy over time. One of Veolia's flagship AI systems is the Virtual Power Plant (VPP). The VPP integrates various energy sources and storage systems, optimizing the use of renewable energy and reducing the reliance on conventional power plants. By intelligently balancing energy supply and demand, the VPP ensures a stable and sustainable energy supply to district heating networks. This not only reduces the carbon footprint but also enhances the resilience and reliability of the heating systems.

### 2.1 Benefits of AI Monitoring and Control for Decarbonization

The integration of AI monitoring and control systems brings numerous benefits to the decarbonization of district heating networks. Firstly, it enables precise and real-time monitoring of energy consumption, allowing for immediate detection of inefficiencies and potential issues. This real-time feedback loop enables quick intervention and adjustments, ensuring optimal energy performance and reducing waste. Secondly, AI systems enable predictive modeling, improving the overall planning and management of district heating networks. Accurate forecasting of energy demand and supply allows for better allocation of resources and optimization of energy distribution.



This not only enhances energy efficiency but also enables the integration of renewable energy sources, further reducing carbon emissions. Furthermore, AI monitoring and control systems provide valuable insights and analytics, enabling data-driven decision-making. By analyzing historical data, trends and patterns can be identified, leading to more informed and effective strategies for decarbonization. This empowers district heating operators to make proactive and targeted interventions, leading to improved system performance and reduced environmental impact.

### 2.2 Case Studies and Success Stories of Veolia's AI Monitoring and Control Implementation

Veolia's AI monitoring and control systems have been successfully implemented in numerous district heating networks worldwide, resulting in significant decarbonization and energy efficiency improvements. One notable case study is the implementation of AI systems in a large urban district heating network in Stockholm, Sweden. By utilizing AI algorithms for real-time monitoring and control, Veolia achieved a 30% reduction in carbon emissions within the first year of implementation. The AI systems enabled better management of energy supply and demand, optimizing the use of renewable energy sources and reducing reliance on fossil fuels.

**The Sheffield District Energy Network has been operating since 1988 and has been supplying low-carbon energy to over 125 commercial and public sector buildings**

This success story showcases the transformative potential of AI in decarbonizing district heating networks. The network sources its energy from the Sheffield Energy Recovery Facility, which converts non-recyclable household

waste into heat supplies. More than 50% of the heat generated qualifies as renewable under the Renewable Energy Guarantees of Origin (REGO) scheme, making it a sustainable solution for the city.

### 2.3 Challenges and Potential Limitations of AI Monitoring and Control

While AI monitoring and control systems offer immense potential for decarbonization, they are not without challenges and limitations.



One of the main challenges is the availability and quality of data. For AI algorithms to function effectively, they require accurate and reliable data.

In some cases, the lack of historical data or inconsistent data collection practices may hinder the performance of AI systems.

Another challenge is the initial investment required for the implementation of AI monitoring and control systems.

While the long-term benefits are significant, there may be upfront costs associated with installing smart sensors, meters and other infrastructure required for data collection.

However, the return on investment in terms of energy savings and carbon reduction often outweighs these initial costs.

Additionally, the complexity of AI algorithms and the need for continuous monitoring and maintenance can pose challenges for district heating operators. Adequate training and technical support are crucial to ensure the smooth operation of AI systems and to fully leverage their potential for decarbonization.

### 3. The Future of Decarbonization and AI in District Heating Networks

The future of decarbonization in district heating networks is closely intertwined with the advancements in AI technologies. As AI continues to evolve and improve, the possibilities for optimizing energy performance and reducing carbon emissions will only increase.

With the integration of machine learning and predictive analytics, AI systems will become even more efficient and accurate in managing heating networks. Furthermore, the future of decarbonization will see an increased focus on renewable energy sources, such as solar and geothermal. AI will play a crucial role in effectively integrating these intermittent energy sources into district heating networks, ensuring a reliable and sustainable energy supply.

### 4. Conclusion and Key Takeaways from Veolia's Leadership in Decarbonization

Veolia's innovative use of AI monitoring and control for district heating networks showcases the transformative potential of technology in decarbonization efforts. Through real-time monitoring, predictive modeling and data-driven decision-making, Veolia has achieved significant reductions in carbon emissions while optimizing energy performance.

The success stories and case studies of Veolia's AI implementation serve as inspiration for other organizations and governments to embrace technology in their decarbonization journey.

By prioritizing sustainability and investing in AI solutions, we can pave the way for a greener and more sustainable future.





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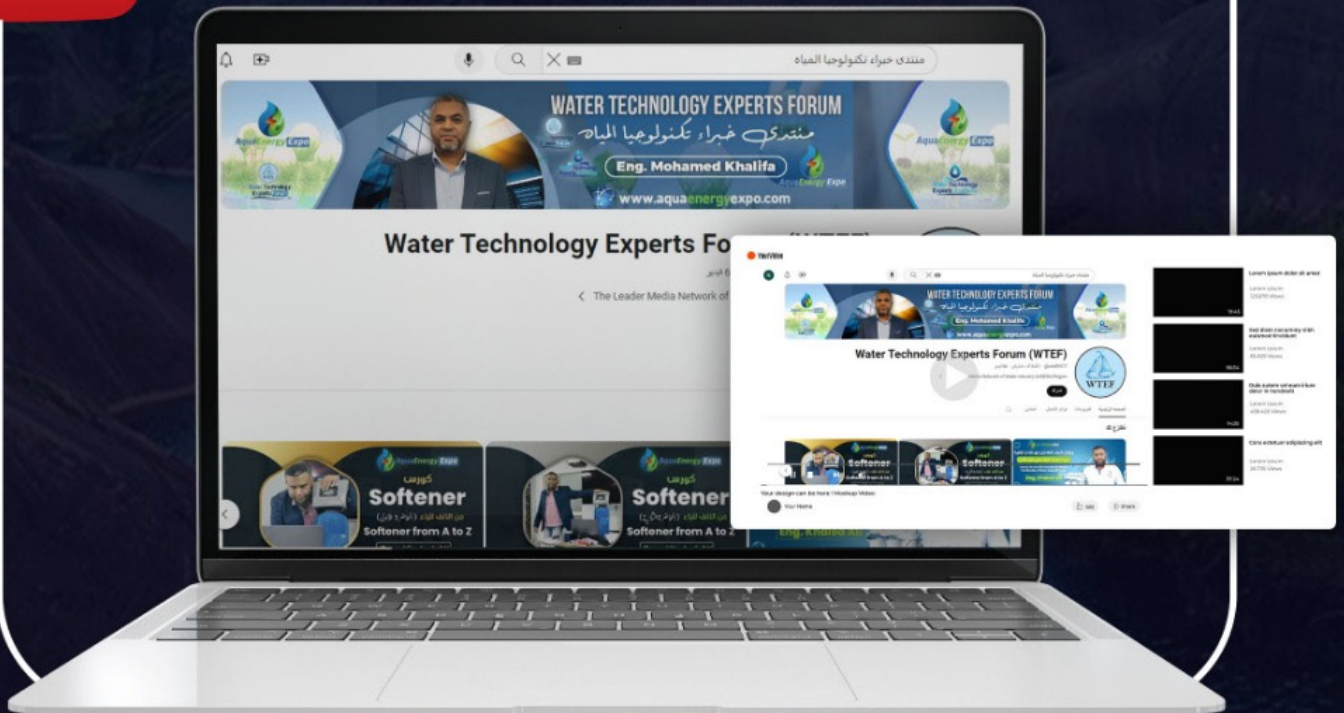
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# ENOWA. NEOM

## ENOWA Breaks all Barriers to Sustainability, Renewable Energy Mix in NEOM

It's an interesting challenge to build a new renewable system from scratch! NEOM aims to be home to the world's first large-scale 100% renewable energy system by 2030. Thanks to NEOM's location in the northwest of Saudi Arabia, it offers a unique vantage point for leveraging both solar and wind power in one innovative dual system, paving the way for the next frontier in clean energy. In this article, we'll take a closer look at Neom's energy sector, including its current energy mix, investments, and opportunities for businesses. As a part of NEOM journey to sustainability let's figure out many challenges and how could NEOM face them.

### 1. Renewable Energy Mix in Neom



This \$550 billion 'giga-project' appears to demonstrate Saudi Arabia's ambitious sustainability goals: Neom will be 100% renewable, zero-carbon, and have no roads or cars. As of right now, Neom's main energy sources are diesel and natural gas generators. To lessen its reliance on fossil fuels and meet its 2030 target of using only renewable energy, the city is making significant investments in renewable energy sources.

Neom's energy strategy calls for a combination of solar, wind, and hydrogen energy to power the city. By 2025, the city hopes to have installed 3.3 gigawatts (GW) of renewable energy, and by 2030, 9.5 GW. Compared to the city's current 0.4 GW renewable energy capacity, this is a huge increase.

### 2. ENOWA's role at NEOM, 100% Renewable Energy System



As part of its future fully renewable grid, ENOWA Energy has initiated the first grid infrastructure project, designing and executing substations and transmission lines spanning hundreds of kilometers. Such as the power grid infrastructure will have the objective of transmitting clean solar PV and wind energy from their sources to the demand points. This has never been accomplished anywhere else in the world and is a special moment for NEOM. ENOWA also represents NEOM as the principal shareholder in the world's largest green hydrogen production plant, which will be developed in an equal joint venture with Air Products and ACWA Power.

Coming on-stream in 2025, the green hydrogen plant is expected to be the first of several similar plants to make NEOM a hub for green hydrogen production and innovation.

The output of desalination, brine, is usually waste, but ENOWA plans to produce significant quantities of valuable, industrial materials such as industrial-grade salt, magnesium, and potassium, which can be sold commercially and effectively.

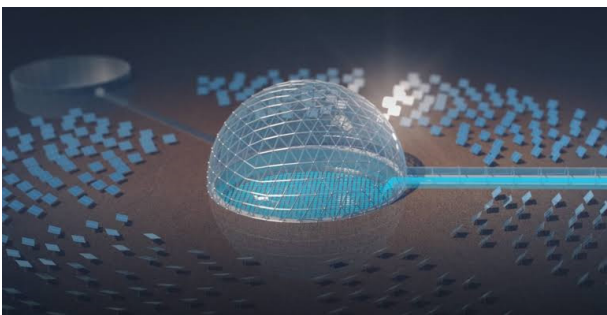
**“ Saudi Arabia’s Minister of Environment, Water, and Agriculture and the chairman of ENOWA, Eng Abdulrahman AlFadley (above), said: “ENOWA’s innovative approach will create the blueprint for new, sustainable industries in Saudi Arabia whilst creating a vibrant economic sector. As a trendsetter, ENOWA will become the benchmark for integrated sustainable energy, water and hydrogen systems and extend its approach to other industries to grow the sustainability marketplace both in the region and abroad.” ”**

### 3. Solar Energy Projects

Both photovoltaic (PV) and concentrated solar power (CSP) technologies are used in Neom’s solar energy projects. The city is in a prime location for solar power generation because of its expansive desert terrain.

#### 3.1 The Solar Dome

An Amazing feat of Efficiency and Technology One of Neom’s most famous solar energy projects is the Solar Dome, an architectural wonder that perfectly captures the spirit of environmentally friendly architecture.



This massive building, which is located in the center of the city, uses photovoltaic panels that are integrated into its transparent facade to harness solar power.

In addition to producing clean energy, the Solar Dome offers shade and a cozy atmosphere for both locals and guests, demonstrating Neom’s dedication to fusing sustainability and human-centered design.

#### 3.2 The Solar-Powered Desalination Plant:

Sustaining Water Resources Water scarcity is a significant challenge faced by arid regions like Neom. To address this issue sustainably, Neom has implemented a solar-powered desalination plant. This pioneering facility employs renewable energy to extract salt and impurities from seawater, providing clean, potable water to the city’s residents and industries. By integrating solar energy into the desalination process, Neom reduces reliance on traditional, energy-intensive methods, contributing to a more efficient and environmentally friendly water supply system.

#### 3.3 The Solar Innovation Center

Promoting Collaboration and Research Neom developed the Solar Innovation Center to promote cooperation with top specialists globally and accelerate advancements in solar energy technologies. Scientists, engineers, and creative thinkers can investigate cutting edge solar technologies, create novel materials, and maximize energy conversion efficiency from this cutting edge research facility. The Solar Innovation Center establishes Neom as a global leader in renewable energy research and development while simultaneously accelerating the city’s sustainable development.

#### 3.4 Solar-Powered Transportation

Pioneering Sustainable Mobility Recognizing the need for sustainable transportation, Neom has integrated solar energy into its mobility solutions. The city boasts an extensive network of solar-powered charging stations for electric vehicles, enabling emission-free transportation for residents and visitors alike. Furthermore, Neom is actively exploring solar energy for other modes of transportation, such as solar-powered buses and autonomous vehicles, promoting a clean and green mobility revolution.

### 4. Wind Energy Projects

Neom’s wind energy initiatives are concentrated on the construction of offshore and onshore wind farms. There is a lot of potential for offshore wind energy projects along the city’s coastline.

#### 4.1 The Wind Wall

The “Wind Wall” is one of Neom’s biggest wind energy projects. An enormous building called the Wind Wall is intended to capture wind energy and produce electricity. With a projected capacity of 7 gigawatts, the project will rank among the biggest wind farms globally. Equipped with advanced turbines and aerodynamic features, the Wind Wall maximizes energy capture while minimizing environmental impact. By effectively channeling wind power, this innovative structure not only contributes to Neom’s energy needs but also serves as an iconic symbol of sustainable development.

## Vertical Axis Wind Turbines

Getting the Most Out of Wind Energy With multiple benefits over conventional horizontal axis turbines, Neom is seeing the potential of vertical axis wind turbines, or VAWTs. VAWTs are less intrusive on bird species, more compact, and perform well in windy circumstances. Neom's use of VAWTs demonstrates its dedication to investigating cutting-edge wind energy technologies and optimizing the wind energy potential of the area in an ethical and sustainable way.

## Green Hydrogen Projects



By electrolyzing water with renewable energy sources like sun and wind, green hydrogen is created. Neom wants to be a center for the production and export of green hydrogen. The city is a perfect place to produce green hydrogen because of its abundance of renewable energy resources.

“ **The “Hydrogen Valley” is one of Neom’s biggest green hydrogen initiatives. It is anticipated that the enormous Hydrogen Valley project will generate 650 tons of green hydrogen daily. Along with generating employment possibilities for the local populace, the project will cut annual carbon emissions by more than 3 million tons.** ”

## Green Hydrogen Export

Neom's export of green hydrogen contributes to both the worldwide shift towards a low-carbon economy and sustainable growth inside its own borders.

## Hydrogen Infrastructure:

Neom is concentrated on creating an extensive hydrogen infrastructure. This entails setting up pipes for the transportation of hydrogen as well as hydrogen production and recharging stations. Neom's creation of a strong hydrogen ecosystem makes it possible to integrate hydrogen into a number of industries and sectors, such as transportation, manufacturing, power production, and even residential applications. This promotes sustainable growth and lowers greenhouse gas emissions. The objec-

tives of Neom's renewable energy initiatives are carbon emission reduction and energy self-sufficiency. In addition to giving the community access to renewable energy, these initiatives will give the locals work opportunities. Neom has big plans to become a major hub for renewable energy projects, like the Wind Wall, Hydrogen Valley, and Solar Dome.

## 5. Challenges in Implementing Renewable Energy in NEOM and Their Solutions

It is important to identify the issues and come up with solutions to enhance the utilization of the resources in complementing and where possible substitute the fossil energy sources. Therefore, the discussion seeks to provide solutions to various issues faced in the process of generating the energy and setting up of wind and solar resources.

### 5.1 Challenge of the Weather Change, Inability to Predict the Amount of Cloud Cover by the Grid Operator

Regarding the solar energy, the difficulties experienced when predicting the cloud cover is a significant concern because it leads to variation in sun light and rays reaching the surface of the solar panels. In this case, the solar panels and wind turbine should be placed in the same location and their output combined before being connected to the grid or being used for internal purposes within the system.

### 5.2 Challenge of Dust and Sand Accumulation on the Solar Panels

The dust and sand on the surface of the solar panels reduce the effectiveness to generate electric energy because the absorption levels are reduced. For instance, a company named Nomadd has successfully designed and marketed waterless robots with the capability of crawling over the panels. Having in place system would assess and detect the accumulation of the dust and sand on the panels.

For instance, Kipp and Zonen company have manufactured a gadget regarded as CHP1 Pyrheliometer, which is a radiometer system connected to the solar panel to evaluate the changes in the amount of solar energy absorbed. In case there is a significant reduction of energy, the management can check out to find out whether the capacity of the panels is affected by the accumulation of dust and sand particles.

Therefore, the robots are effective in cleaning panels in large solar projects. With the technology such as CHP1 Pyrheliometer identified above, projects managers can detect accumulation of dust remotely and undertake the cleanup exercise using robots effectively and efficiently.

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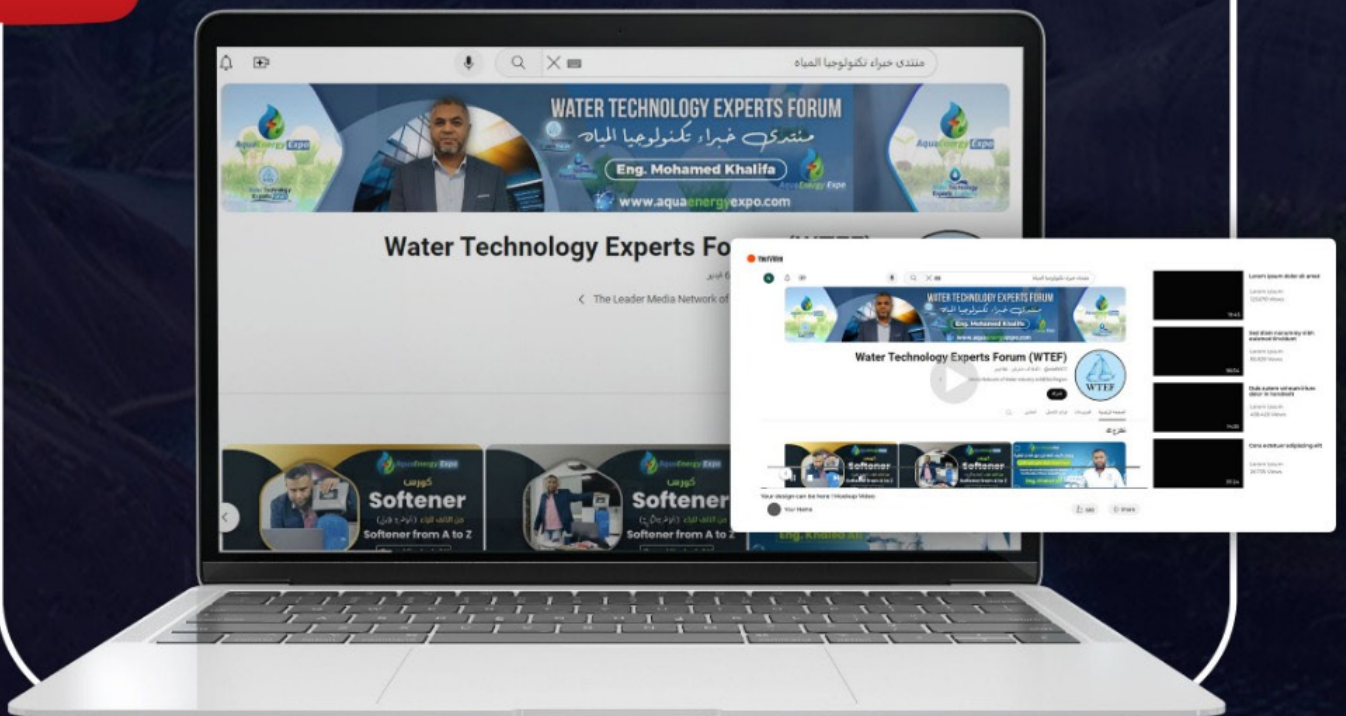
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## Blockchain Technology, Revolutionizing the Energy Grid

The 21st century has seen significant advancements in ICT, leading to the development of smart grids crucial for decarbonizing societies. However, integrating renewable energy sources presents challenges. To address these challenges and foster the adoption of RES, innovative solutions are needed. So, blockchain technology offers promising solutions for decentralized grid management and RES integration, with its decentralized data storage, peer-to-peer exchange, and verification mechanisms revolutionizing the energy grid. In this article, we will explore the potential of blockchain technology in transforming the energy grid. We will delve into the core principles of blockchain, its applications in the energy sector, and the ongoing projects and trends shaping the industry. By harnessing the power of blockchain, we can unlock new possibilities for decentralized grid operation and accelerate the transition to clean energy.

### 1. Understanding Blockchain Technology

Blockchain technology, initially introduced as the foundation for cryptocurrencies like Bitcoin, has evolved beyond its original purpose. At its core, blockchain is a decentralized database, or distributed ledger technology (DLT), that ensures transparent and secure record-keeping. Unlike traditional centralized systems, where a few entities control the flow of information and transactions, blockchain operates as a peer-to-peer (P2P) network. This decentralized nature allows all stakeholders on the blockchain to view approved transactions, preventing alterations once approved and requiring consensus among users. Blockchain's key features, such as transparency, traceability, and decentralization, make it an ideal technology for various online digital transactions.

In the context of the energy sector, blockchain can address key challenges associated with RES integration, such as grid balancing, energy trading, and data management.

### 2. The Use of Blockchain to Address Outdated Grid Infrastructure

The CIGRE, an international non-profit organization based in Paris that focuses on the electrical grid, has a special team dedicated to exploring the potential of blockchain technology. In April 2023, they published a technical report discussing the use of blockchain systems in electricity trading. The report highlights how combining ICT and blockchain can help modernize power systems by addressing their outdated infrastructure over the course of the next few decades. CIGRE predicts that blockchain, in conjunction with smart grids, will have the biggest impact on the advancement of the power system.

Recently, some blockchain pilot initiatives have been implemented in the energy industry. One example is the GridExchange project in Canada, which utilizes blockchain technology to facilitate energy exchange between a utility company and its clients. This project follows the success of a previous pilot program launched by Alectra, a utility company in Ontario, in 2021 and 2022.

This project follows the success of a previous pilot program launched by Alectra, a utility company in Ontario, in 2021 and 2022. The primary objective of the initial pilot was to showcase the benefits of blockchain in offering real-time transparency, tracking, and management of decentralized energy resources, as well as creating a marketplace for them.



The next course of action will be to enhance the architecture to decrease operational costs and complexity, while also improving performance and scalability.

In a statement, Brian Bentz, president and CEO of Alectra, addressed the current results, stating that the initial pilot has been crucial in empowering consumers to have more control over their energy consumption. This aligns with Alectra's goal of achieving net zero emissions by 2050 and the launch of GridExchange will further contribute to reducing emissions and delivering value to customers and the Ontario power grid.

### 3. Advantages of Energy Blockchain Technology

The adoption of energy blockchain technology offers several advantages for the energy sector. These advantages include:

- **Greater Efficiency and Lower Costs:**

Traditional energy grids often suffer from bureaucratic processes, intermediaries, and high transaction costs. By leveraging blockchain's automation capabilities and eliminating the need for intermediaries, energy trading processes can become more efficient and cost-effective.

- **Enhanced Transparency and Trust:**

Blockchain technology provides a transparent and immutable ledger of energy transactions, ensuring that all stakeholders can view and verify the origin and authenticity of energy sources. This transparency fosters trust among participants and reduces the risk of fraud and manipulation.

- **Decentralized Grid Management:**

With the increasing participation of consumers as prosumers (consumers who also generate energy), traditional centralized grid control systems struggle to

accommodate the diverse needs and characteristics of each prosumer. Blockchain enables decentralized grid management, allowing for real-time or near real-time coordination and optimization of energy generation and consumption.

- **Secure Data Exchange:**

Data privacy and security are critical concerns in the energy sector. Blockchain technology provides a secure framework for data exchange, reducing the risk of unauthorized access and ensuring the integrity of energy-related data.

### 4. Case Studies of Successful Blockchain Energy Projects

Several successful blockchain energy projects have already emerged, showcasing the potential of this technology. One such project is the Brooklyn Microgrid in New York, where residents can trade solar energy using blockchain-based smart contracts. Another notable example is the WePower platform in Estonia, which allows individuals to invest in and trade renewable energy projects. These case studies demonstrate the feasibility and effectiveness of blockchain in transforming the energy sector and promoting sustainable energy practices.

### 5. Ongoing Projects and Trends in Blockchain Adoption

Several blockchain-based energy projects have already been implemented or are in progress worldwide. These projects demonstrate the potential of blockchain technology in transforming the energy sector. Here are some notable examples:



- **Sun Exchange**

Sun Exchange has developed a blockchain-based system that allows investors to invest in solar PV generation. The system utilizes smart contracts to automate transactions and ensure timely payments to investors. This project has successfully enabled the development of solar-powered businesses and schools in South Africa.

- **Impact PPA**

Impact PPA uses blockchain technology to provide investment for microgrid power projects. The platform allows for automated payouts to investors, owners, and the government. By connecting smart meters to the blockchain, consumers can easily pay for electricity via their mobile devices. Impact PPA has successfully deployed this technology in Haiti, Ghana, India, Somalia, and other countries.

- **Iberdrola**

Iberdrola, a leading electricity retailer, has deployed a blockchain-based platform to track and monitor the supply of renewable energy. The platform, developed in collaboration with the Energy Web Foundation, provides transparency and authentication of energy sources, ensuring the delivery of clean energy to customers.

- **Power Ledger**

Power Ledger has developed various blockchain-based applications, including a peer-to-peer (P2P) local community trading system. This system allows prosumers to sell excess solar energy directly to local consumers without intermediaries. Power Ledger's pilot projects have demonstrated the feasibility and benefits of P2P energy trading on a microgrid level.

## 6. Overcoming the Obstacles for Blockchain Adoption in the Power Industry

According to David Bowker, a member of CIGRE's blockchain working group, the power sector is increasingly adopting blockchain for its efficient protocol in verifying information and transactions. In fact, many companies are currently exploring the use of blockchain for various purposes such as asset registry, peer-to-peer trading, grid-level transactions, energy financing, electric vehicle charging, and renewables tracking. Despite progress, there are still obstacles to overcome. According to CIGRE, the grid must transform into the "internet of energy." According to Bowker, a decentralized and permissionless innovation platform is crucial for critical infrastructure, while still upholding strict reliability and security standards. He believes that blockchain will only become a crucial part of an energy solution when it is fully integrated into the grid. However, current blockchain applications for energy do not follow this approach and do not have the capability to fulfill it.

## 7. Future Prospects of Blockchain Technology in Creating a Sustainable Energy Future

The future prospects of blockchain technology in creating a sustainable energy future are promising. As blockchain becomes more scalable and energy-efficient, it has the potential to revolutionize the energy sector by enabling the widespread adoption of renewable energy sources and empowering consumers to actively participate in the energy market. The combination of blockchain, renewable energy, and the IoE can lead to a decentralized and democratized energy system that is resilient, efficient, and sustainable.

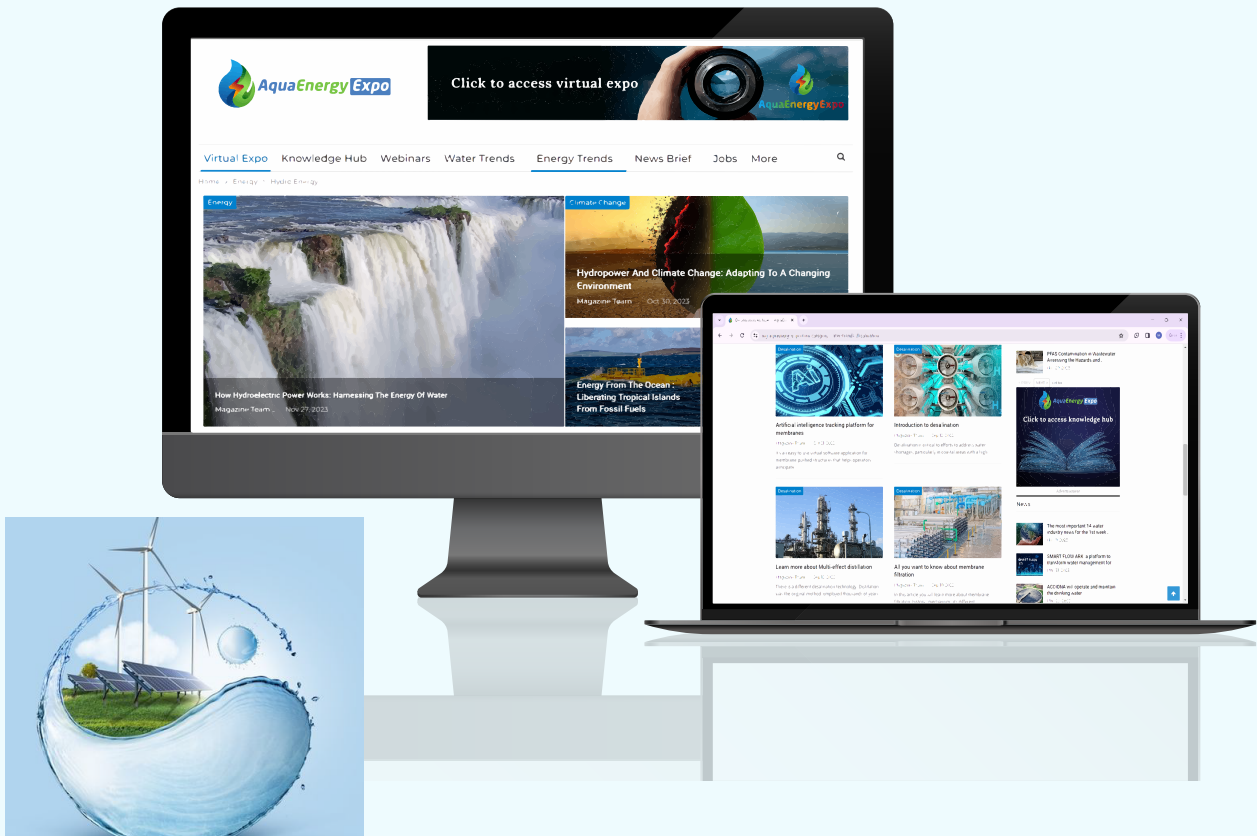




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M a g a z i n e

# Energy News Brief

February | 2024

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## British councils refuse over 4GW of renewable projects, study finds



According to a report conducted by Britain Remade, 70 local councils have jointly refused planning applications for 4.4 GW of renewable energy projects, including solar and battery storage. The pro-growth campaign organisation cited instances of rejected projects, such as battery storage that could store up to 680 MW of renewable energy. Over 350 councils have passed motions to combat climate change, yet obtaining planning approval remains a difficult component of implementing renewable energy resources. Sam Richards, founder and campaign director of Britain Remade, described the report as “breath-taking” and urged local councils to match words with actions to help meet the 2050 net zero aim.

## Suzlon Bags 225 MW Wind Energy Project from Everrenew Energy

Suzlon Group has secured a 225 MW wind energy project with Everrenew Energy in Tamil Nadu, India. The project involves installing 75 turbines to power 185,000 homes and reduce CO2 emissions. The company aims to boost the commercial and industrial (C&I) renewable sector in India. The 3 MW turbines will be installed at two sites in Tamil Nadu. Suzlon will also provide operations and maintenance services post-commissioning, contributing to the increasing use of renewable energy in India.



## GE Vernova wins turbine order for SunZia wind project in New Mexico



GE Vernova’s onshore wind business has secured a major order from Pattern Energy to supply 2.4GW turbines for the SunZia Wind project in New Mexico. The project, with a total capacity of over 3.5GW, will be paired with SunZia Transmission, an 885km-long, 525kV HVDC line with a 3GW transmission capability. Pattern Energy broke ground on the transmission line in September 2023 and secured an \$11bn financing package in December. GE Vernova will supply 674 3.6-154 turbines for the project, marking the largest single onshore wind turbine order in the company’s history. The collaboration aims to enhance site performance and reduce unnecessary variations.

## US battery storage capacity to nearly double in 2024

The Energy Information Administration stated that U.S. battery storage capacity could surge by 89% by the end of 2024 if all planned energy storage systems are operational on time. Battery storage involves storing excess power during low demand and releasing it during high demand. In 2023, the total operational utility-scale battery capacity was around 16 GW, with plans to add another 15 GW in 2024, reaching 30 GW by year-end. California and Texas have significant solar and wind capacity, leading to a growing need for battery storage. However, supply chain issues are causing delays in large-scale battery projects, extending completion times to 12-18 months.



## PFO signs concession deal for 52-MWp PV project in Cote d'Ivoire



PFO Africa has signed a concession for a 52 MW central solar system in Sokhoro, on the Côte d'Ivoire. This project will create jobs, contribute to the national market and align it to the projected target when using a 600 MW solar capacity in 2026. PFO Africa, based in Abidjan, is in the sector.

Energy with a new agreement with concessions with the available power. The contract allows the construction of a central solar photovoltaic of 52 MW in Sokhoro, in the Ferkessédougou division, on the last day of 2024 and is scheduled to operate at the end of 2025.

## The Hydrogen Stream: H2 Green Steel gets \$7 billion for production in Sweden.

H2 Green Steel has secured €6.5 billion for a green steel plant in Sweden, with €4.2 billion in project financing and a €250 million EU grant. ZeroAvia received \$3.25 million from the California Energy Commission to develop a mobile LH2 refueling truck. They plan to support hydrogen-electric engines for aircraft by 2025. Lhyfe and Source Galileo will develop green hydrogen production facilities in the UK and Ireland. Nel Hydrogen Electrolyser signed a €5 million contract for hydrogen production equipment in South Korea, while TECO 2030 and partners are working on a hydrogen fuel cell-powered maritime project in the Adriatic Sea.



## BlueFloat submits EIA for 1.3GW floating offshore wind in Italy

The Odra Energia floating offshore wind project, developed by BlueFloat Energy and Renantis, has submitted an environmental impact assessment report to the Government of Italy. The project will soon enter the public consultation phase following stakeholder engagement and project refinements. With 90 floating wind turbines, it aims to produce four terawatt-hours of clean energy annually, meeting the needs of one million Italian households and offsetting two million tonnes of carbon dioxide emissions. The development and construction are estimated to cost €4bn (\$4.3bn) and are expected to create 1,500 direct jobs and 4,000 indirect jobs during peak periods, with over 150 permanent jobs anticipated over the project's 30-year life span.



## Iberdrola and Norwegian wealth fund to invest €2bn in renewables



Iberdrola and the Norwegian sovereign wealth fund plan to invest €2bn in renewable energy on the Iberian peninsula, adding 1.3GW of capacity by 2026. Currently, the alliance has incorporated 674MW of wind and solar energy, with negotiations underway to add 643.5MW of solar PV capacity. This strategic partnership aims to accelerate the decarbonization process in the region, with Iberdrola retaining a 51% stake in the assets. The renewable energy portfolio will power 400,000 homes annually and offset 350,000 tonnes of CO<sub>2</sub> emissions each year. The collaboration builds on their previous alliance and demonstrates a commitment to advancing renewables.

## Strata breaks ground on 1.02GWh battery storage project in US

Strata Clean Energy is constructing a 255MW/1.02GWh Scatter Wash battery storage complex in Phoenix, Arizona, set to be operational by April 2025. It aims to supply electricity to 250,000 homes for four hours daily for 20 years, supporting Arizona Public Service (APS) customers and storing renewable energy. Strata entered a 20-year tolling agreement with APS and chose Mortenson as the engineering, procurement, and construction partner. The project will utilize Tesla's Megapack 2XL battery system. This initiative represents a significant advancement in sustainable energy solutions and demonstrates Strata's dedication to addressing critical grid challenges and promoting a more sustainable future.



## Origin Energy approves a 300MW battery storage project in Australia

Origin Energy has approved the construction of a 300MW/650MWh battery energy storage system (BESS) at the Mortlake power station in Victoria, Australia. The project, expected to be operational by late 2026, aims to enhance grid stability by storing excess power during high renewable generation periods and releasing it during peak demand times. The battery project, representing an A\$400m investment, is part of Origin's strategy to accelerate renewable energy and storage in its portfolio. Fluence Energy has been selected to supply the battery system and will provide its Gridstack energy storage product along with a 15-year service agreement to support Origin's renewable energy and storage strategy.



## Equinor and bp finalise US offshore wind swap



Equinor and BP have agreed to reorganize their joint ownership of offshore wind projects in the US through a swap transaction. Equinor will take full ownership of the Empire Wind lease and projects, including BP's 50% share of the South Brooklyn marine terminal lease. Meanwhile, BP will assume full ownership and operational control of the Beacon Wind lease and projects. The transaction is expected to close in the second or third quarter of 2024. Equinor aims to be a leading company in the energy transition and has secured the Empire Wind lease, which includes two projects with a combined capacity of up to 2.01GW.

## The Hydrogen Stream: Europe prioritizes PEM electrolysis

According to Thomas Hillig, managing director of Thenergy, Europe prefers polymer electrolyte membrane (PEM) electrolysis to alkaline electrolysis. Thenergy's map covers 80% of electrolyzers utilised for green hydrogen production, with a total capacity of around 170 MW. Ecoclean has begun serial production of modular AEL electrolyzers on a megawatt scale, while Lhyfe and EDP Renewables have inked a 15-year renewable electricity supply agreement. Thyssenkrupp Steel Europe has issued a public tender for up to 151,000 tonnes of low-carbon hydrogen to power direct-iron reduction facilities. Masdar and Daimler Truck have agreed to investigate the viability of exporting liquid green hydrogen from Abu Dhabi to Europe by 2030, with the goal of decarbonising road freight transport in Europe. Daimler Truck is creating a customer trial.





## UAE Leaders Inaugurate Noor Power Station 1, Marking Milestone in Renewable Energy

His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President, Prime Minister, and Ruler of Dubai, and His Highness Sheikh Maktoum bin Mohammed bin Rashid Al Maktoum inaugurated the Noor Power Station 1, the largest concentrated solar energy project at the Mohammed bin Rashid Al Maktoum Solar Park in Dubai. This project represents a significant investment of 15.78 billion UAE dirhams and has a production capacity of 950 megawatts. Sheikh Mohammed highlighted the UAE's commitment to sustainability through innovative clean and renewable energy projects, aiming to establish world-class infrastructure for an environmentally friendly future.



## EDPR acquires Australian renewables developer ITPD



EDP Renewables (EDPR), a subsidiary of Portuguese energy company EDP Group, has acquired ITP Development (ITPD) to bolster its presence in Australia's renewable energy sector. The acquisition brings in a portfolio of over 1.5GW, primarily focused on wind and solar projects, including a 480MW solar photovoltaic system and a 200MW battery energy storage system project in Queensland. This aligns with Australia's goal to increase renewable electricity generation to 82% by 2030 and transition fully to renewable energy by 2040. Furthermore, EDPR is targeting markets like Australia, Singapore, and Japan due to their favorable decarbonization opportunities and strong climate targets.

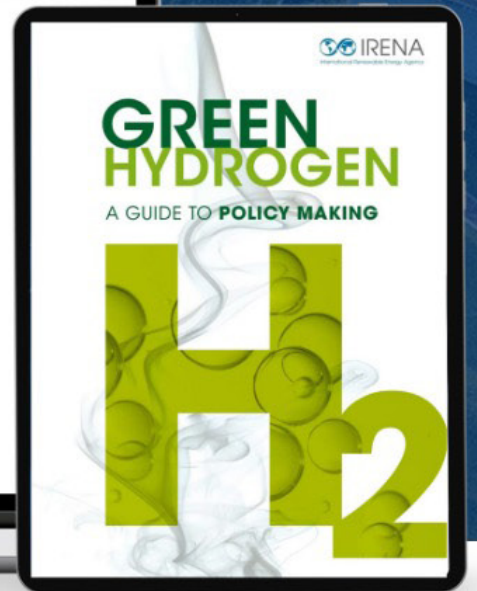
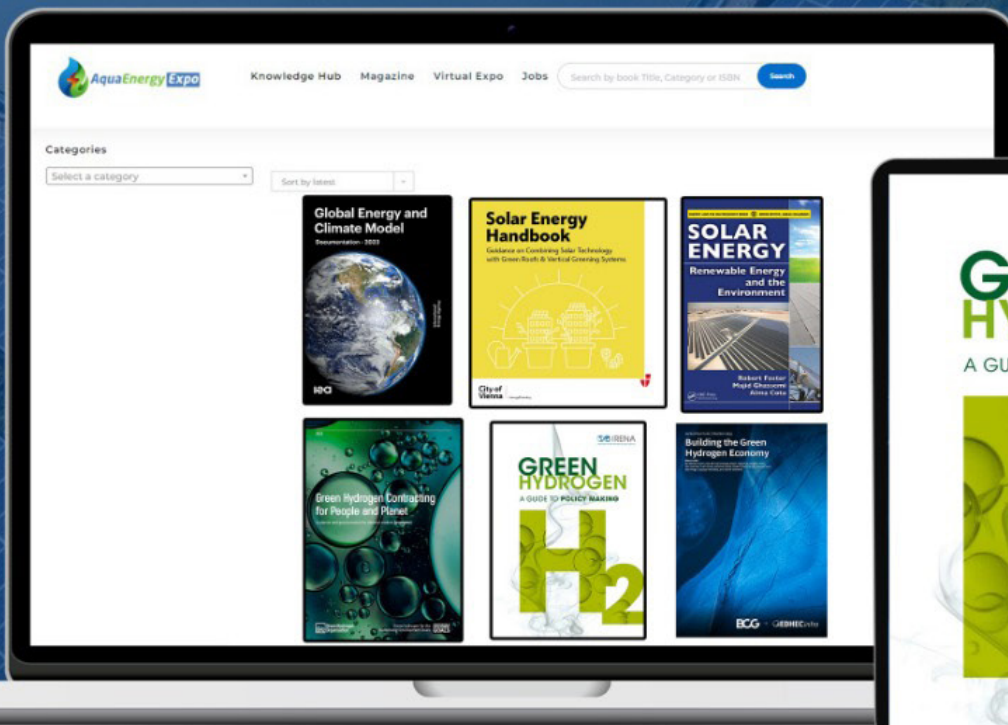
## EC clears EUR-550m support scheme for renewable hydrogen in Italy

Italy plans to invest €550m (\$595m) to promote the use of renewable hydrogen in industrial processes, as part of the Italian National Recovery and Resilience Plan (PNRR). The initiative aims to substitute methane and other fossil fuels with renewable hydrogen, with projects required to reduce greenhouse gas emissions by at least 40% or energy consumption by 20%. The European Commission supports the scheme to decarbonize industrial processes and reduce Italy's reliance on imported fossil fuels. The European Council's Renewable Energy Directive sets targets for the use of renewable fuels in industrial processes. Margrethe Vestager, European Commission Executive Vice-President, emphasizes the significant decarbonization impact of the plan.





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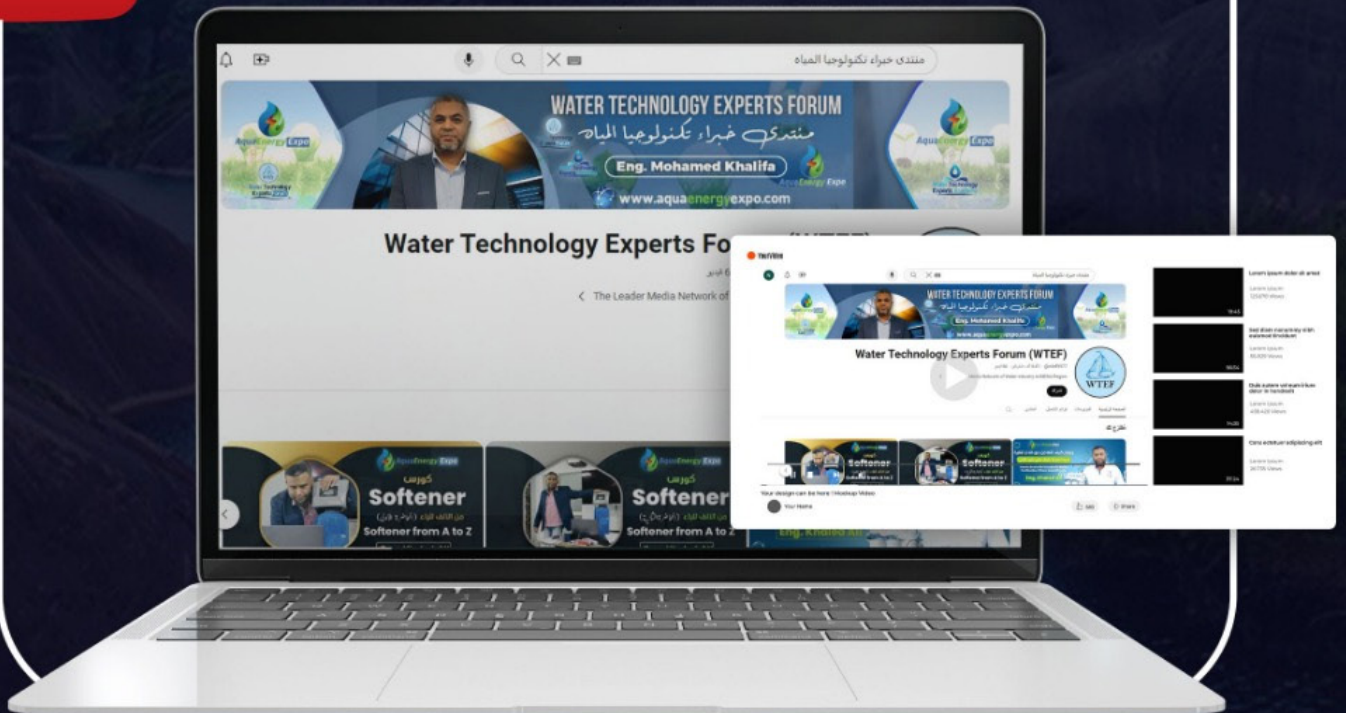
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# Global Energy Events

## 2024 Intersolar North America and Energy Storage North America

Date: From 16 to 19 Jan 2024

Location: San Diego Convention Center 111  
Harbor Dr. San Diego, CA 92101

Intersolar North America and Energy Storage North America highlight the latest energy technologies, services, companies, and organizations striving to create a positive impact on climate change and support our planet's transition into a more sustainable energy future.

Website: [www.intersolar.us](http://www.intersolar.us)

Registration: [www.xpressreg.net](http://www.xpressreg.net)



## Electrical Energy Storage and Technologies Conference

**EESAT**  
San Diego, CA January 29-30, 2024

**IEEE**  
**Power & Energy Society**  
**ESSB**  
COMMITTEE

**THE ENERGY STORAGE REVOLUTION**  
CALL FOR PAPERS

Date: From 29 to 30 Jan 2024

Location: San Diego San Diego, US

EESAT has been the leading technical forum for showcasing advancements in energy storage technologies and applications since 2000. It is currently sponsored by the IEEE Energy Storage and Stationary Battery (ESSB) Committee.

Website: [www.cmte.ieee.org](http://www.cmte.ieee.org)

Registration: [www.cmte.ieee.org](http://www.cmte.ieee.org)

## Hydrogen Live 2024

Date: From 7 to 8 February 2024

Location: Titanic Hotel, Rum Warehouse, Liverpool United Kingdom

Foresight Hydrogen Live 2024 is a premier event focusing on the hydrogen value chain. Taking place on February 7 and 8 at the Titanic Hotel in Liverpool, it offers a valuable opportunity for industry leaders, innovators, policymakers, and investors to collaborate and influence the future of hydrogen.

Website: [www.decarbonisationtechnology.com](http://www.decarbonisationtechnology.com)

Registration: [www.decarbonisationtechnology.com](http://www.decarbonisationtechnology.com)



## Egypt Energy Show

Date: From 19 to 21 February 2024

Location: Cairo

The EGPES 2024 Conferences help shape the future energy agenda to unlock the potential of the energy transition and drive sustainable production and climate-conscious practices. The EGPES strategic dialogue focuses upon the need for a new global energy system, one that reduces reliance on single energy sources and supports supply and demand cycles globally.

Website: [www.egypes.com](http://www.egypes.com)

Registration: [www.egypes.com](http://www.egypes.com)



## Go Hydrogen Business

### Summit 2024

Date: From 21 to 22 February 2024

Location: Antwerp Belgium

Go Hydrogen is a business summit focused on practicality, covering important projects, production, and emerging technologies in the hydrogen economy. The summit aims to provide a meeting platform for project owners and off-taker companies to network and conduct business together.



Website: [www.decarbonisationtechnology.com](http://www.decarbonisationtechnology.com)

Registration: [www.decarbonisationtechnology.com](http://www.decarbonisationtechnology.com)

## Wind Energy Asia 2024

Date: From 6 to 8 March 2024

Location: Taiwan

Wind Energy Asia is the only wind industry-focused tradeshow in Taiwan. Thanks to its knowledge and vast connections into the local supply chain allied with its international reputation, Wind Energy Asia provides great business opportunities by gathering international and local players on the best networking platform for the wind industry in Taiwan.

Website: [www.windenergy-asia.com](http://www.windenergy-asia.com)

Registration: [www.futureenergyasia.com](http://www.futureenergyasia.com)



## Waterpower Week

Date: From 13 to 15 March 2024

Location: Capital Hilton in Washington, D.C.

Waterpower Week 2024 has support opportunities that fit the needs of your budget and will help you surpass your company's marketing goals.

Website: [www.waterpowerweek.com](http://www.waterpowerweek.com)

Registration: [www.edgereg.net](http://www.edgereg.net)



## International Conference on Renewable Energy and Sustainable Energy (ICRESE-2024)

Date: From 25 to 27 March 2024

Location: Paris, France

The conference offers a dynamic blend of expert keynotes, interactive workshops, and unparalleled networking opportunities, fostering collaborations that will shape the course of Renewable Energy and Sustainable Energy technology.

Website: [www.conference2go.com](http://www.conference2go.com)

Registration: [www.renewableenergy.com](http://www.renewableenergy.com)



## 26th World Energy Congress

Date: From 22 to 25 April 2024

Location: Rotterdam Ahoy, Rotterdam, the Netherlands

The 26th World Energy Congress is a critical turning point for leadership on clean and inclusive energy transitions worldwide and an opportunity to spring forward in re-designing energy for people and planet.

Website: [worldenergycongress.org](http://worldenergycongress.org)

Registration: [www.worldenergycongress.org](http://www.worldenergycongress.org)



## Solar & Storage Live Story

Date: From 1 to 2 May 2024

Location: Brisbane Convention & Exhibition Centre

Solar & Storage Live is the world’s largest series of trade shows and conferences organised globally by Terrapinn Limited in the UK, USA, South Africa, Egypt, Saudi Arabia, Philippines, Thailand and Vietnam etc..., and coming to Brisbane Australia in May 2024.

Website: [www.terrapinn.com](http://www.terrapinn.com)

Registration: [www.secure.terrapinn.com](http://www.secure.terrapinn.com)



## CLEANPOWER 2024 Conference & Exhibition

Date: From 6 to 9 May 2024

Location: Minneapolis, MN | Minneapolis Convention Center

CLEANPOWER® is the clean energy industry’s premier event, bringing policy leaders, industry experts, and major players together for a week of learning, networking, and innovation.

Website: [www.cleanpower.org](http://www.cleanpower.org)

Registration: [www.xpressreg.net](http://www.xpressreg.net)



## Future Energy Asia

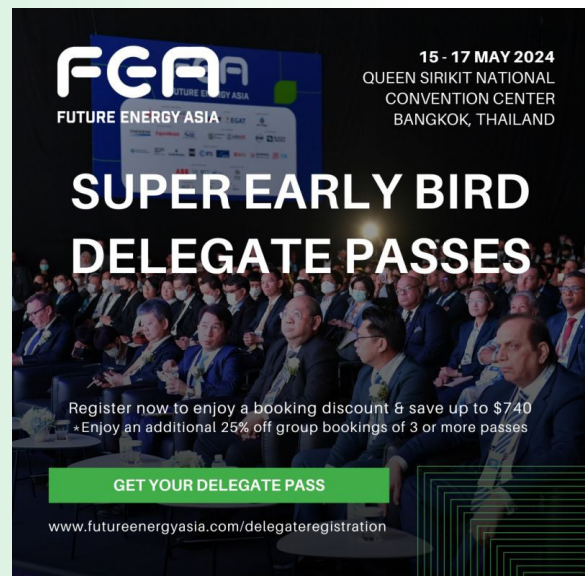
Date: From 15 - 17 May 2024

Location: In Asia

In 2024, Future Energy Asia will host international ministers, Energy CEOs, policymakers, and technical experts to analyze energy trends, drive innovations for the transition to net zero, and build partnerships for accessible, secure, and affordable energy for all.

Website: [www.futureenergyasia.com](http://www.futureenergyasia.com)

Registration: [www.futureenergyasia.com](http://www.futureenergyasia.com)



## PV ModuleTech USA

Date: From 21 to 22 May 2024

Location: Napa, USA

This event will address the module landscape that is expected to unfold for U.S. buyers in the coming years; in particular new domestic manufacturing. Special attention will be given to the module offerings, full value-chain traceability and the financial health of the companies currently supplying the market.



Website: [www.pv-tech.org](http://www.pv-tech.org)

Registration: [www.moduletechusaenergyevents.com](http://www.moduletechusaenergyevents.com)

## Energy Powering Opportunity

Date: From 11 to 13 June 2024

Location: BMO Centre at Stampede Park - Calgary, Canada

The Global Energy Show Canada is the largest B2B exhibition and conference engaging with industry buyers and sellers, stakeholders and partners, CEOs and young professionals together to share knowledge and fuel innovation in the ever-changing energy landscape.



Website: [www.globalenergyshow.com](http://www.globalenergyshow.com)

Registration: [www.globalenergyshow.com](http://www.globalenergyshow.com)

## Hydrovision International

Date: From 15 to 18 July 2024

Location: Denver, Colorado, USA | Colorado Convention Center

The conference and exhibit provide an unparalleled platform for learning and procurement that addresses every facet of hydropower, spanning Operations and Maintenance, Environmental Issues and Water Management, Equipment and Technology, Industry Trends and Analysis, and New Development.



Website: [www.hydroevent.com](http://www.hydroevent.com)

Registration: [www.hydroevent.com](http://www.hydroevent.com)



## 2024 World Battery & Energy Storage Industry Expo (WBE 2024)

Date: From 8 to 10 August 2024

Location: Guangzhou, China

WBE has developed into a professional exhibition with the largest number of exhibitors in battery enterprises and the highest participation of professional visitors and foreign buyers. Relying on its worldwide influence and thousands of overseas buyers.

Website: [www.en.battery-expo.com](http://www.en.battery-expo.com)

Registration: [www.en.battery-expo.com](http://www.en.battery-expo.com)



## ICBR 2024 International Congress for Battery Recycling

Date: From 10 Sep to 12 Sep 2024

Location: Basel, Switzerland

ICBR 2024 is the global platform for addressing challenges in the battery recycling industry. For 29 years, ICBR has united experts and decision makers from the entire battery recycling value chain, including recyclers, manufacturers, collection organizations, OEM's, policymakers, materials and services providers, and more.

Website: [www.events.icm.ch](http://www.events.icm.ch)

Registration: [www.events.icm.ch](http://www.events.icm.ch)



## WindEnergy Hamburg 2024

Date: From 24 to 27 September 2024

Location: Hamburg, Germany

WindEnergy Hamburg is one of the world's biggest and most important wind business platforms for exchanging news and views, building networks and closing major deals. National and international wind industry associations cooperate with WindEnergy Hamburg and encourage their members to attend.

Website: [www.windenergyhamburg.com](http://www.windenergyhamburg.com)

Registration: [www.windenergyhamburg.com](http://www.windenergyhamburg.com)



## The Energy Event of Finland

Date: From 22 to 24 October 2024

Location: Tampere

The largest energy event in Finland brings together energy production, power transmission and storing, energy users, environmental and circular economy and real estate decision makers under the same roof in October. The event will showcase sustainable, smart, productive, and modern solutions to the energy transition.

Website: [www.energiamessut.expomark.fi](http://www.energiamessut.expomark.fi)

Registration: [www.energiamessut.expomark.fi](http://www.energiamessut.expomark.fi)

### ENERGY 2024

The Energy Event of Finland  
22-24 Oct 2024, Tampere

→ BOOK YOUR STAND

## HYDRO 2024

Date: From 18 to 20 November 2024

Location: Messe Congress Graz (MCG), Austria

The HYDRO 2024 Technical Exhibition will showcase the most active and innovative companies in the hydropower and dams industry worldwide. Click on the button below to see the latest list of exhibitors, or to book a stand.

Website: [www.hydropower-dams.com](http://www.hydropower-dams.com)

Registration: [www.hydropower-dams.com](http://www.hydropower-dams.com)



## 6th Annual International Summit and Exhibition Balkan's Power

Date: From 4 to 5 December 2024

Location: Sarajevo, Bosnia and Herzegovina

6th Annual International Summit and Exhibition: Balkan's Power is a professional platform, bringing together chief ministers, major investors, decision-makers of the leading hydro, wind and solar power plants and investment project initiators, as well as regulators, to consolidate efforts focused on efficient implementation of key projects for the construction and reconstruction of power plants across Balkan region.

Website: [www.balkanspowersummit.com](http://www.balkanspowersummit.com)

Registration: [www.balkanspowersummit.com](http://www.balkanspowersummit.com)

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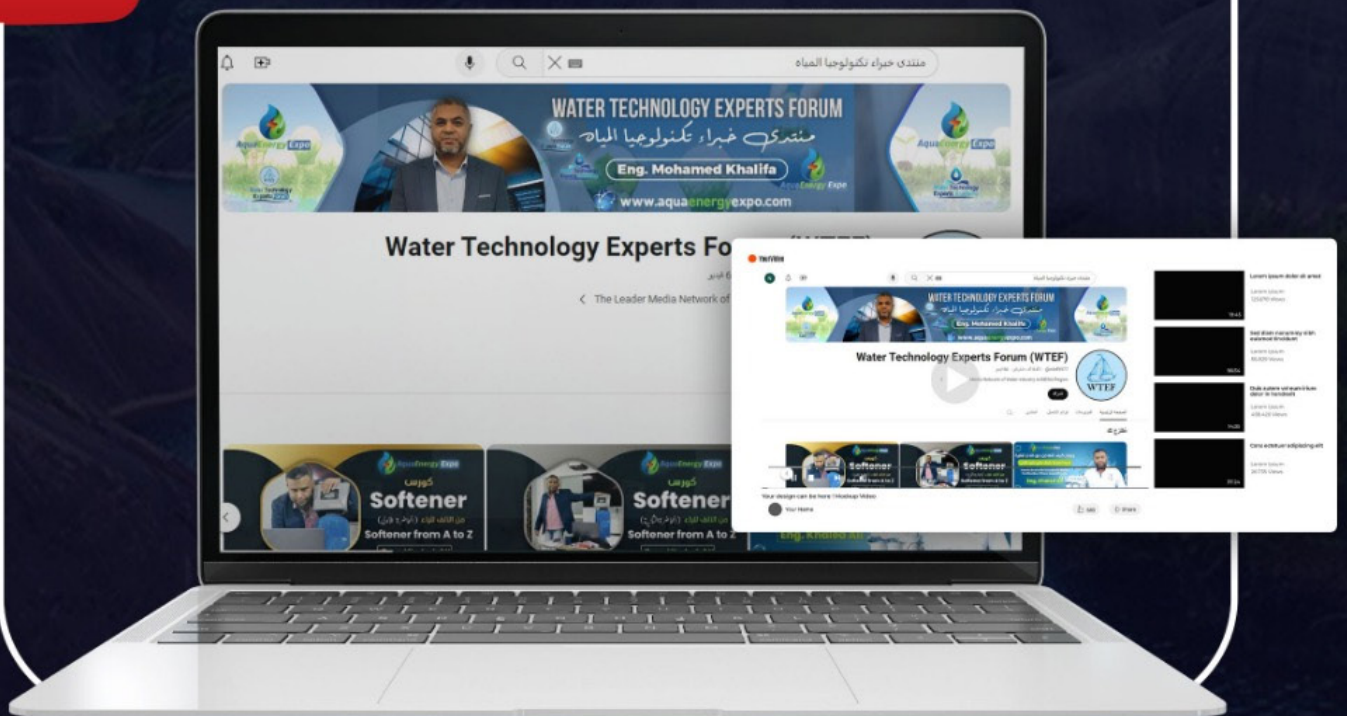
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