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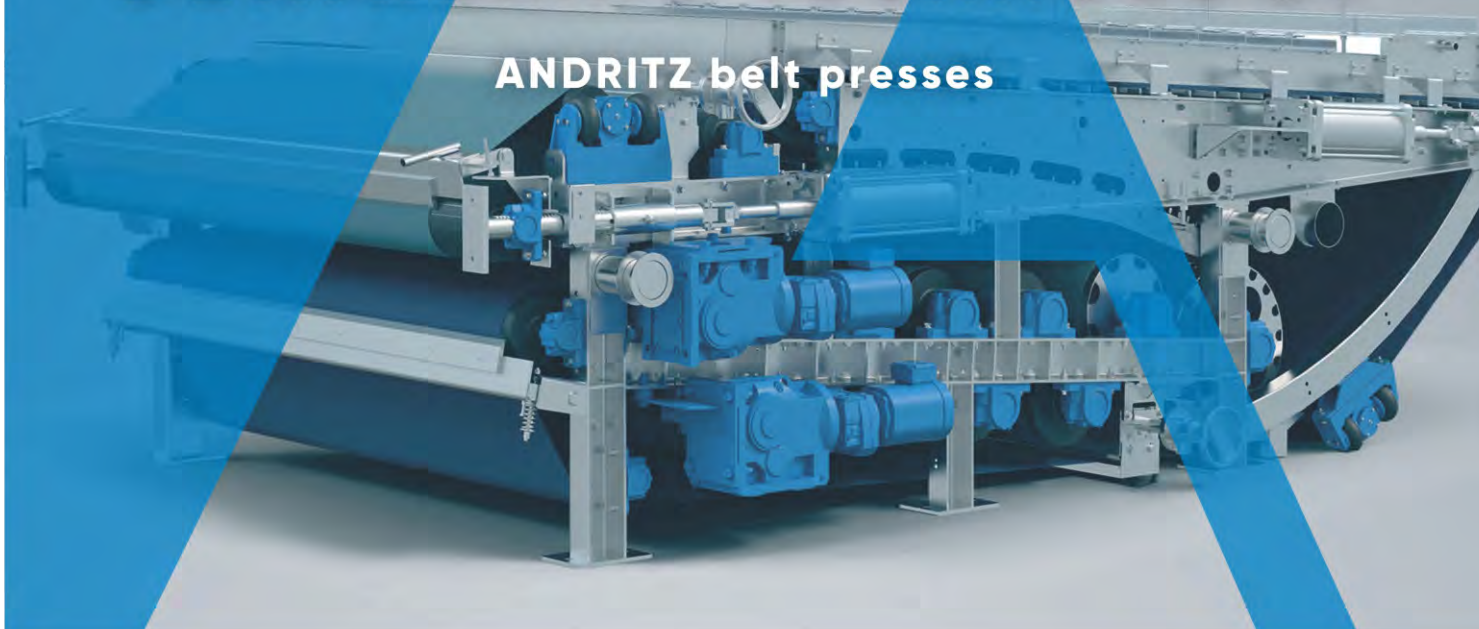
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TRANSFORMING WATER CONSERVATION: PIONEERING INNOVATIONS FOR A SUSTAINABLE FUTURE

Dear Readers,

Welcome to the November edition of EverythingAboutWater Magazine, where we shift our focus to the transformative realm of water conservation. As global water resources face unprecedented challenges, the call for innovative and sustainable conservation practices has never been more urgent. This edition highlights groundbreaking technologies that are reshaping how we preserve and manage water in a rapidly changing world.

We delve into advancements such as smart irrigation systems, real-time leak detection tools, and water-efficient fixtures that are making significant strides in minimizing water wastage. Additionally, this issue explores the integration of IoT (Internet of Things) and AI-driven solutions in water resource management, enabling precise monitoring, predictive maintenance, and optimized distribution networks. From agricultural practices to urban water systems, these innovations are proving instrumental in achieving higher efficiency and sustainability.

Our feature articles and case studies provide valuable insights into how industries, municipalities, and communities worldwide are adopting these cutting-edge technologies. We also address key challenges such as scalability, affordability, and public awareness, offering practical solutions to overcome these barriers. Special emphasis is placed on the role of public-private partnerships and grassroots initiatives in fostering a culture of water stewardship.

Furthermore, we examine the environmental benefits of these conservation measures, including reduced energy consumption, minimized water stress on ecosystems, and the role of circular water economies. The issue concludes with a forward-looking perspective on the policies and global collaborations required to drive water conservation efforts on a larger scale.

This edition is a must-read for innovators, policymakers, environmentalists, and all stakeholders dedicated to shaping a sustainable water future. Together, let us embrace these pioneering technologies and collective actions to safeguard our most precious resource for generations to come.

Thank you for being part of this journey as we explore the innovations and strategies redefining water conservation.

Thanks & Regards,

Simran Arora

Associate Editor

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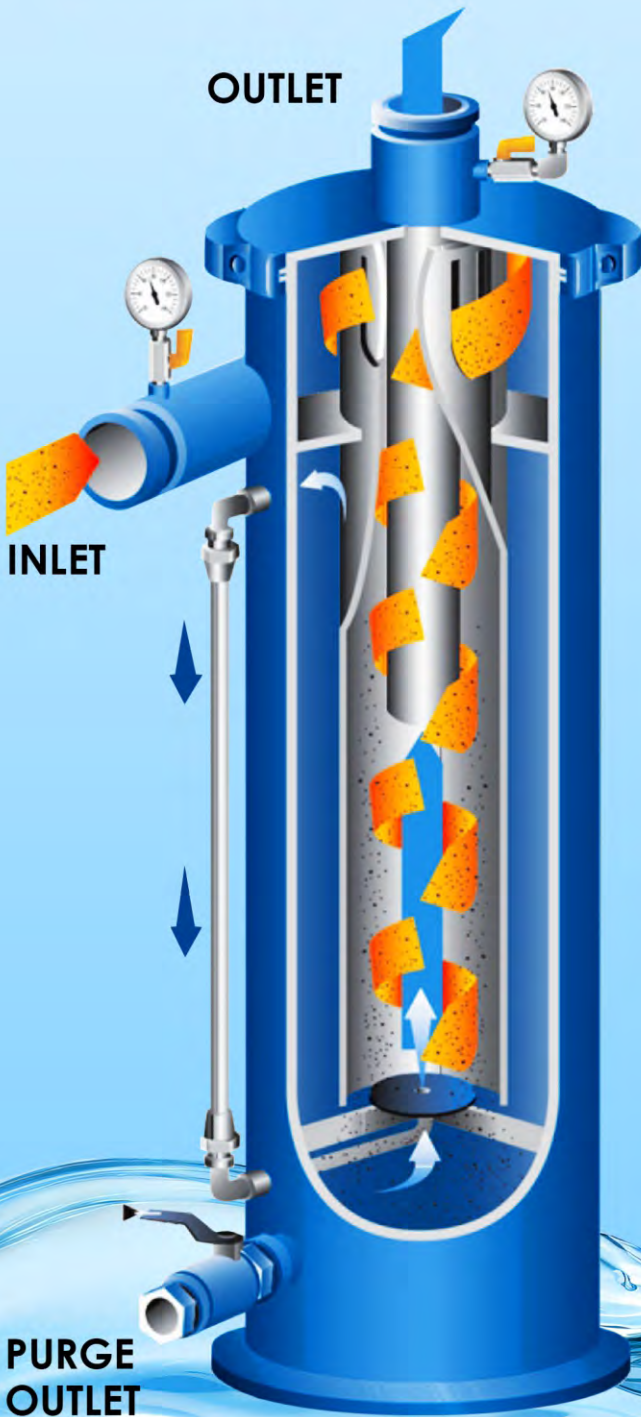
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NATIONAL W

DROPLETS

Ballast Water Treatment Facility at NIOT's Seafront Site in Tirupati District Inaugurated

Ravichandran, Secretary, Ministry of Earth Sciences, inaugurated the facility on Friday. He explained the threat posed by bio-invasive organisms transmitted through ballast water to the long coast of 7,516 km. along the Indian subcontinent, which has an enviable and strategic position in international shipping.

“Realising the effects of invasive species and its threat to marine biodiversity, the International Maritime Organisation (IMO) had taken efforts to address the transfer of invasive species and formulated guidelines to prevent the transfer of unwanted species through ballast water. We have developed this treatment and test facility to validate the ballast treatment equipment for certification by the Ministry of Shipping and IMO,” he explained.

Mr. Ravichandran later laid the foundation stone for the proposed Centre for Marine Microbial Repository under Deep Ocean Mission Vertical-3, NIOT Campus in Chittedu village, which is a unique and first-of-its-kind facility for long term storage of deep-sea microbes in India.



Greater Noida authority to build 5 sewage treatment plants

In principle, the CEO okayed the estimate of 40 crore for a 12 MLD STP project (for Sector IT City) on Monday after IIT Delhi gave a go-ahead for the detailed project report. GREATER NOIDA: The Greater Noida authority has decided to build five sewage treatment plants (STPs) to treat wastewater and recycle the same for irrigation purposes. The five will comprise one of 45 Million Litres Daily (MLD) capacity plant in Sector 45, 12 MLD capacity plants in Sector IT City, 50 MLD capacity in Sector Knowledge Park V, 42 MLD capacity in Sector Ecotech VI, and 72 MLD capacity in Sector MU.

“We are developing adequate infrastructure and civic facilities keeping in view the demands of this growing city. And building the STPs is the same in the direction of making the city ecologically sustainable and creating benchmarks. With the help of STPs, the authority will be able to treat wastewater and recycle the same for irrigation and other purposes,” said Ravi Kumar NG, Chief Executive Officer (CEO), Greater Noida authority. In principle, the CEO approved the estimate of 40 crore for the 12 MLD STP project (for Sector IT City) on Monday after the Indian Institute of Technology Delhi (IIT Delhi) gave a go-ahead for the detailed project report (DPR).

“As the authority’s CEO has given approval for this 12 MLD STP, the authority will now process it as per the law, paving way for the work to start at the ground in next three to four months. This STP is important as it will treat waste water in IT City, Murshadpur and Gharbara village areas thereby helping addressing sewage treatment issues in this cluster,” said Ashutosh Diwevedi, additional CEO (ADCEO), Greater Noida authority.

The authority has also issued tender to finalise construction agency for the 45 MLD capacity plant to be built in Sector 1 — home to dozens of newly developed group housing projects. The CEO has already given a go-ahead for the project that will facilitate handling these sewage treatment in these group housing projects. The authority will spend 80 crore on this project’s construction.

ATER NEWS

“We are likely to finalise the construction agency for this 45 MLD project in the next one month or so. We have a target to start work on this project in January-end, 2025 as per the plan,” said ADCEO. Meanwhile, the CEO has also asked the water works department to prepare DPR of three new STPs in Knowledge Park-V, Knowledge Park-VI, and MU. Once the DPR and budget estimate of these three projects are ready, these will be tabled for discussion and approval in future.

Currently, the Greater Noida authority has 4 STPs functional in the city areas to treat the sewage of residential areas. The biggest STP of 137 MLD capacity located in Kasna area, the second STP of 20 MLD in Sector Ecotech-III, third of 15 MLD in Sector Ecotech-II, and the fourth of 2 MLD in Badalpur, where the treated wastewater is recycled for irrigation purposes located in nearby green areas, said officials.

Sixty-one Water Supply Projects to be Implemented Under AMRUT 2.0

Sixty-one water supply projects are set to be implemented across local bodies in the state under the second phase of the Atal Mission for Rejuvenation and Urban Transformation (AMRUT 2.0) scheme. The projects are to be implemented at a total cost of ₹470.78 crore.

The State Level High Powered Steering Committee (SHPS) of AMRUT 2.0 had in August cleared 72 water supply projects under the State Water Action Plan 3 at a total cost of ₹583.17 crore, with Central assistance of ₹249 crore, State share of ₹209.97 crore and local body share of ₹124.20 crore. However, 11 of these projects were set aside for the time being due to various issues including pending NOCs for land. The government has now accorded administrative sanction for the remaining 61 projects.

Water connections

One of the biggest allocations is for Urban Water Supply and Sanitation (UWSS) project in the Manjeri municipality at a cost of ₹26.11 crore. Another ₹24.03-crore project has been planned for pipeline extension and providing water connections in various zones of the Kannur Corporation. Under a ₹19.11-crore project, full coverage of functional household tap connections is planned in the Kalpetta municipality. A water supply and sanitation project, including the provision of new distribution network, household tap connections, and replacement of old pipes have been planned for the Kottakkal municipality at a cost of ₹16.53 crore.

In the Nedumangad municipality, a ₹15.45-crore project has been planned for upgrading the existing 13.75 MLD water treatment plant at Perumala and for providing 3000 household tap connections. In the Thiruvananthapuram Corporation, the projects include a ₹11.74-crore main line along the Pattom-Medical College route, a ₹10.93-crore project for laying pipes and providing house connections in the coastal area at Vizhinjam, Harbour, Kottappuram, Mulloor and Venganoor wards and a 17.57-crore project for full water supply coverage in Punchakkari, Thiruvallam, Vellar and Poonkulam. In the Tirur municipality, a ₹14.88-crore project has been planned for new distribution network and household tap connections.

DROPLETS

Erik Roesink Honored with AMTA 2024 Hall of Fame Award for Advancing Clean Water Solutions

Erik Roesink's, founder and Chief Technology Officer of NX Filtration, tireless dedication to enhancing clean and affordable water access for all has earned him the prestigious AMTA 2024 Hall of Fame Award. In light of mounting climate change and escalating water challenges, Erik's commitment to innovative solutions with reduced chemical and energy footprints stands as a beacon of hope.

Throughout his esteemed career, Erik has been a trailblazer in the field of membrane technology, particularly in the development of hollow fiber PES membranes for microfiltration, ultrafiltration, and nanofiltration applications worldwide. His journey began in 1985 at X-flow in the Netherlands, where he played a pivotal role in revolutionizing membrane technology.

As a distinguished Professor at the University of Enschede, Erik continued his groundbreaking work, focusing on hollow fiber membranes with Nanofiltration characteristics. His vision was clear – to introduce a new membrane technology capable of addressing global water challenges, particularly micropollutants, while minimizing energy and chemical footprints.

The culmination of Erik's efforts led to the founding of NX Filtration in 2016, marking a significant milestone in the industry. Since then, NX Filtration has emerged as a leader in providing sustainable solutions for drinking water and wastewater reuse applications worldwide.

NX Filtration's HFNF membranes, spearheaded by Erik's innovative research, have demonstrated unparalleled effectiveness in removing micropollutants such as pesticides, hormones, PFAS, pharmaceuticals, and color, along with bacteria and viruses. Notably, these achievements have been realized with significantly reduced energy consumption and chemical dosing compared to traditional UF/RO membrane combinations.

MCC Proposes to Rejuvenate Four More Water Bodies Amid Concerns Over Flow of Sewage to Already Dredged Bodies

The Mangaluru City Corporation (MCC) has proposed to rejuvenate four more waterbodies. However, water in some bodies already rejuvenated remains non-potable with continued flow of sewage. The MCC has now proposed to spend ₹26.95 crore for the rejuvenation of four more waterbodies and development of three parks under the second phase of the Centrally-sponsored Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0.

The council of the civic body in its meeting on November 28 approved this proposal. Of the total project cost, ₹1.95 crore has been allocated for the operation and maintenance. The water bodies proposed for rejuvenation are Jogimatta and adjacent lakes ₹2.4 crore); Byradi lake ₹1.35 crore); Baggundi lake (₹14 crore) and Kadekar Mallikarjuna lake (₹3.7 crore). The parks proposed for development are Souharda lane park ₹55 lakh); Kodical Kallakanda Park (₹2.2 crore) and Kadri Park (₹2.75 crore).

Rejuvenated Earlier

Of the lakes proposed for rejuvenation, the Mangaluru Urban Development Authority (MUDA) had invested in the rejuvenation of Byradi lake and Jogimatta lake when Ravishankar Mijar was the chairman between 2019-20 and 2022-23.



Asked about proposing to rejuvenate the two water bodies again, an official of the corporation told The Hindu said, “The scope of rejuvenation is wide. It need not be taken into account only for dredging. It could be preventing seepage of sewage to water bodies or their beautification. The government appointed consultant for the proposed projects will identify the scope of work to which the fund under AMRUT 2.0 should be invested as per the guidelines. Hence the scope of work is yet to be identified.

Sewage Flow

Nemu Kottari, Secretary, Gujjarakere Teertha Samrakshana Samithi, Jeppu, told The Hindu that merely removing silt and beautifying waterbodies without stopping flow of sewage serves no purpose.

A case in point is the sprawling Gujjarakere at Jeppu spread over about three acres. The government invested about 10 crore in its rejuvenation which included dredging and beautification since 2001. “Its water is still not potable due to sewage seepage. Hence whenever a waterbody is rejuvenated, priority should also be given to stop flow of sewage. Otherwise the investment made is a waste,” Mr. Kottari said.

Mr. Kottari, whose samithi has been fighting for stopping sewage flow to Gujjarakere for some time now, said that sewage flows to the rejuvenated Moily Kere, Kavoore Kere and Byaradi Kere relentlessly. Another member of the samithi said that there is a settlement of labourers near the Jogimatta waterbody. The sewage from the settlement flows to Jogimatta kere, he claimed.

The member said that there are many industries and residences in the surroundings of Baggundi lake. If the MCC rejuvenated it without taking steps to stop the flow of sewage and other waste to the lake, it would also join the ranks of Gujjarakere. Mr. Mijar said that about 32 water bodies were either rejuvenated or repaired during his three-year term as MUDA chairman. About ₹20 crore was invested for the projects.

Coimbatore Corpn. Plans ₹245 Crore Reverse Osmosis Plant to Reduce Stress on Freshwater Sources

This project, estimated to cost 245 crore, aims to address untreated sewage discharge into lakes and river channels and reduce industrial dependency on fresh water sources.

The Corporation Commissioner M. Sivaguru Prabakaran said, “We plan to set up a Tertiary Treatment Reverse Osmosis (TTRO) or a Tertiary Treatment Reverse Filtration (TTRF) plant. The proposed plant will be developed under a Public-Private Partnership (PPP) model. It aims to treat STP water, with the diluted output from the RO plant undergoing further treatment before being released into the Noyyal River system. The recovery ratio of the system will depend upon the water feed, design, and technology used. The survey will include the study of groundwater usage in the city and the water standards of treated water from the STP.”

Mr. Prabakaran further drew a comparison to Chennai, where TTRO plants managed by the Metro Water Department sell treated water to

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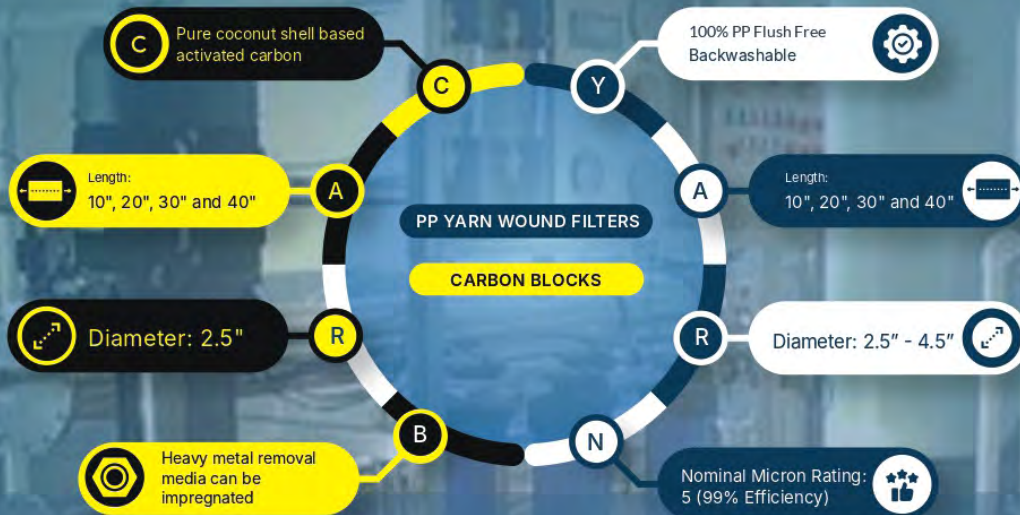


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industries at ₹75 a kilolitre. “A profit-sharing model will be implemented here as well. Details, including the technology to be used, revenue sharing, and water selling rates, will be finalised after the survey, which is expected to conclude in six months.”

This initiative aims to reduce the stress on freshwater sources in the city, which are currently used for non-drinking purposes. The Corporation’s broader goal is to complete the construction of four proposed STPs by 2026, fully eliminating untreated sewage discharge into the city’s water bodies. Additionally, TTRO and TTRF plants are planned to be set up at all STP sites in the city.

Rs.25-lakh Project to Clean Sewer Lines at Pratapgarh Village

The work of cleaning and ensuring the connectivity of the sewer lines for the discharge of the Sewage Treatment Plant (STP) at Pratapgarh village is expected to cost Rs. 25 lakh. According to sources in the Faridabad Metropolitan Development Authority (FMDA), the sewer lines connected to the STP in Pratapgarh village span around 70 km., and tenders amounting to nearly Rs. 25 lakh have been floated for the work. The FMDA took up the task a few months ago.

While the total capacity of the newly upgraded STP in Pratapgarh is around 100 MLD, it currently receives less than 40 per cent of its discharge capacity. The cleaning work will help increase the discharge to the STP, ultimately unclogging the network.

“The primary issue with the STP’s partial functioning is the low discharge of untreated waste, caused by the severe choking of the majority of the sewer lines, including the main trunk line,” said a civic administration official. He added that the lack of proper and regular cleaning of the lines had led to overflowing and waterlogging during the monsoon season.

Currently, up to 70 percent of the waste is being discharged into drains and canals. The authorities have stated that while the cleaning work of

the sewer lines is still in its early stages, the FMDA plans to clean the main lines, which stretch over 99 km., within a year. Over 28 km. of lines have already been cleaned as part of the special drive.

The project, estimated to cost around Rs. 25 crore, was initiated nearly seven months ago. The department is also working on connecting the main sewer lines to address the ongoing issues of choking and overflow, according to officials.

FMDA Chief Engineer Vishal Bansal confirmed that the project to clean some of the main drains and sewer lines was taken up in accordance with the state government’s instructions. He stated that the department is proceeding as per the plan developed for the initiative.

How Thirukazhukundram is Setting an Example in Reviving Waterbodies.



Chennai: Once a parched town relying on tractors to fetch water, Thirukazhukundram is now in revival mode. The panchayat leveraged multiple govt. schemes to restore 16 long-neglected ponds and boost groundwater levels in nearby villages, investing 4.17 crore.

Located in Chengalpeta district, Thirukazhukundram Special Grade Municipality spans 11.20 sq. km. and encompasses 18 wards with 8,300 households spread across Mangalam, Rudrankoil, M. N.Kuppam and Thirukazhukundram panchayats. Daily water consumption is 24 lakh litres, mainly sourced from Palar River and Keerapakkam Lake. The 16 ponds in the area were essential groundwater sources, but years of neglect led to a drop in groundwater levels by 2015. Worse, the Palar which once supplied 50% of the municipality’s drinking water, dried up due to inadequate rainfall and the municipality brought water by tractors, limiting each household to 2-4 pots.

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residents to call for measures to strengthen groundwater levels. G. D. Yuvaraj, the panchayat chairman, said that upon taking office, he secured funds from the 15th Finance Commission to create a model pond. "We revived Sunambu Kulam in Mangalam by deepening it and raising the bund height, allowing it to hold up to 30 ft. water. After the rains, water storage increased, and nearby wells saw improved water quality," he said.

In 2023, Vannam Kulam in Thirukazhukundram town was selected for restoration under Kalaingar Urban Development Scheme (KNMT). "Previously, water would dry up by April or May. After desilting, it now lasts over a year," Yuvaraj said. "We have also undertaken revival of ThondanarTheertham, Indira Theertham, Andu Arasan Kulam, and Valai Kulam under Amrut 2.0 and KNMT. Soon, these ponds will be full, with desilting, strengthened banks, walkways, and new lighting to beautify the area." C. S. Seenuvasan, a resident, says only a few ponds were desilted 15 years ago, and only one was successfully revived. "Our well water is also salty," he noted, emphasising the long-standing demand for pond restoration. "It's essential that these ponds are well-maintained in the years ahead, with regular desilting." Aravindan Sampath Kumar, a long-time resident, said the restoration has also enhanced safety. "A walking track has been added at Vannam Kulam, behind Thirukazhukundram Boys School. Lights have been installed to deter anti-social activities, and now yoga and self-defence classes are held here. Just three years ago, the area was in a pathetic state," he said.

G-STIC 2024: Pathways for Sustainable Solutions and Water Reuse



October 23: The 7th G-STIC Conference successfully concluded today after 2 days of rigorous sessions, enthralling presentations, rewarding networking, practical insights, on-ground case studies and data, and above all, an inspiring showcase of the global passion for sustainability and innovation. With a focus on harmonising technology, policy, and business pathways for a sustainable future, the conference featured impactful discussions on climate action, water sustainability, and innovation.

The G-STIC Platform and Conference

G-STIC (Global Sustainable Technology & Innovation Community) is a community of more than 10,000 stakeholders consisting of innovators, entrepreneurs, researchers, captains of industry and policymakers from around the globe. The annual, rotating G-STIC Conference ranks among the largest global conferences dedicated to technological innovation and sustainable development. The G-STIC community, innovators, investors and social and economic actors gather at the conference to discuss market-ready technological innovations and solutions that have the potential to substantially impact the Sustainable Development Goals.

Together, they delve into new approaches and strategies to scale up and accelerate the deployment of these solutions. The conference also serves to build knowledge bases and global expert networks in support of the technological transitions needed for the implementation of the Agenda 2030 and the Paris Agreement.

G-STIC 2024

G-STIC 2024 was held in Delhi, India with a plethora of sessions focused on water, health, energy, climate, education and the interconnections among them all. G-STIC 2024 offered a holistic platform to explore cross-cutting solutions that address the world's most pressing sustainability challenges.

The conference began with a high-level Inaugural Session, featuring welcome and opening remarks by Dr. Jitendra Vir Sharma, Senior Director, TERI, followed by a G-STIC overview presented by Mr. Dietrich Van der Weken, General Manager of G-STIC: Global Sustainable Technology & Innovation Community, Vlaamse Instelling voor Technologisch Onderzoek (VITO), Belgium. This was followed by a Welcome Address by Mr. Nitin Desai, Chairman, Governing Council, TERI, along with video messages from Dr. Vibha Dhawan, Director General, TERI, and Ms. Inge Neven, CEO of VITO, Belgium and a Special Address by Dr. Paulo Gadelha, Former President of Fiocruz, Brazil, Coordinator of the Fiocruz Strategy for 2030 Agenda. Wrapping up the

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inaugural session was a Vote of Thanks delivered by Mr. Anshuman, Director, Water Resources Division, TERI. Ministerial Inaugural Address by Chief Guest, Shri Hardeep Singh Puri, Hon'ble Minister of Petroleum and Natural Gas, Government of India.

In his highly anticipated inaugural address, Minister Puri underscored India's commitment to addressing the interconnected challenges of energy demands, and climate change. He delivered a powerful speech addressing India's energy needs, its commitment to sustainability, and the trilemma of affordability, sustainability, and availability in energy. Minister Puri emphasised India's proactive approach towards green energy solutions such as ethanol blending, green hydrogen, and LPG distribution. He urged industries, policymakers, and technologists to foster partnerships that bring scalable solutions to the forefront of sustainability.

H.E. Mr. Didier Anna L. Vanderhasselt, Ambassador of Belgium to India, presented the keynote address at the session, highlighting India's growing influence on global sustainability and innovation. He praised India's leadership in tackling climate change and advancing socio-economic development. The Ambassador noted Belgium's strong presence in India through projects led by VITO and Belgian businesses in sectors like renewable energy, semiconductors, space, life sciences, and defence. He emphasised the importance of collaboration between research institutions and private sectors, aligning this with the G-STIC mission and Belgium's economic policies.

Day 1 Sessions

The inaugural session was followed by 2 plenary sessions for first half of the day 1. Plenary 1 was on Health and Climate with a focus on The Paris Agreement, 2030 Agenda and Health followed by Plenary 2 on Water with the theme: Water as a Driver of Multi sectoral Sustainability and Economic Development. The second half of the day saw multiple Deep Dive and Plenary sessions, some of them running in parallel. The plenary sessions included discussions on 'Green Hydrogen Market Creation Mechanisms for Ensuring and Derisking Offtake' and 'AI in or Versus Education: Future Strategies on Innovation Policy for Education'. The Deep Dive session themes included 'Health, Equity and Climate Change', 'Implementation of Climate Action Through the Lens of Different Stakeholders – Part I', 'AI in or Versus Education: Future Strategies on Innovation Policy for Education'. It also included a Special Session on 'Water Sustainability – Leapfrogging Water Reuse and Improved Efficiencies'. Special Address by Ms. Debashree Mukherjee, Secretary (DoWR, RD&GR), Ministry of Jal Shakti, Government of India.

In her address at the Special Session on water, Ms. Debashree Mukherjee provided a stark reminder of the water challenges India faces in light of climate change. She highlighted the increasing frequency of extreme weather events such as heavy precipitation and floods, noting that climate change is already disrupting India's water cycle and exacerbating the country's water management challenges. Ms. Mukherjee also stressed the need for better management of water resources, both surface and groundwater, through storage solutions such as dams and reservoirs, and emphasised the critical role of public participation in achieving these goals.

In addressing the agricultural sector, which consumes 83% of India's water, she called for a radical shift towards improving water use efficiency. She noted the success of initiatives like micro-irrigation and piped distribution networks to minimise losses. She also emphasised the importance of wastewater reuse, citing the Namami Gange program as a pivotal initiative. "We have a national framework for wastewater reuse, and industries such as thermal power plants are now mandated to use treated water within a 25-kilometer radius of STPs. This is a critical step in moving towards a more sustainable water management model."

Day 2 Sessions

The second day of G-STIC 2024 built on the momentum with dynamic discussions on technological innovations, policy frameworks, and sustainable business practices. Panels explored how cutting-edge technologies can address critical global issues such as wastewater treatment, renewable energy, and climate resilience, diving straight into the issues, with concurrent plenary, deep dive and special sessions. The plenary session focused on 'The Role of Energy Mix Planning and Power Grids to Achieving Net Zero', while the Special Sessions deliberated on 'Digital Technologies to Achieve the SDGs', and 'Uniting for nature: Multi stakeholder Solutions for Biodiversity'. The Deep Dive sessions had exhaustive discussions on 'Education Technology and Innovation: Challenges for Quality and for Teachers', 'Agriculture and Food Sustainability', 'Green Hydrogen Common Infrastructure Readiness and Global Supply Chain Integration', 'WEFE Nexus – Towards Common Grounds to Strengthen Water Security', and 'Implementation of Climate Action through the Lens of Different Stakeholders – Part II'. Keynote Address by Ms. Archana Varma, Mission Director, National Water Mission (NWM), Ministry of Jal Shakti, Government of India

In her keynote address for the deep dive session on water, Ms. Varma highlighted the profound interdependence between water, energy, food, and ecosystems (WEFE). Through relatable examples, Ms. Varma



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underscored how decisions in one sector impact policies across others. This interconnectedness necessitates a holistic approach to ensure sustainable growth and equity across sectors. She stressed that India, with 18% of the world's population but only 4% of its water resources, faces significant challenges in water management, exacerbated by rapid urbanisation and industrialisation. Ms. Varma also pointed to the need for sustainable energy and water conservation measures to avert a looming water crisis by 2050, when water availability may fall below critical thresholds. She emphasised the National Water Mission's focus on conservation, reducing wastage, and ensuring equitable water distribution across states. She stated that community involvement is central to these efforts, particularly through initiatives like the Jal Shakti Abhiyan, which engages women and rural communities in water conservation. Ms. Varma concluded with a call for a "whole-of-society" approach to water management to improve water use efficiency and secure India's water future.

Closing Session and Conclusion

Key figures from across the globe, including industry leaders, policy makers, and researchers, shared their experiences and insights into tackling sustainability challenges, making G-STIC 2024 a resounding success. Participants explored collaboration opportunities between governments, businesses, and research institutions to accelerate progress toward the Sustainable Development Goals (SDGs).

G-STIC 2024 concluded with insightful reflections and a strong call to action at the closing session. Mr. Anshuman, Director of the Water Resources Division, TERI, India, delivered the closing remarks and vote of thanks, emphasising the collaborative spirit and innovative solutions that emerged throughout the event. Mr. Dietrich Van der Weken, General Manager, G-STIC at VITO, Belgium, summarised the key takeaways, highlighting the urgent need to harmonise technology, policy, and business pathways for a sustainable future.

A powerful keynote address by Mr. Nitin Desai, Chairman of the Governing Council at TERI, India, underscored the critical importance of sustainable innovation in addressing global challenges like water, climate, and energy. The closing session reinforced the conference's goal of fostering cross-sectoral collaboration for a sustainable future. G-STIC 2024 emphasised the urgency of leveraging technology for a sustainable future.

In looking ahead, the conference set a clear task: to accelerate the deployment of market-ready technologies, foster deeper partnerships, and ensure that collective efforts are both scalable and

sustainable. G-STIC has once again demonstrated that technological advancement, when paired with policy support and economic incentives, can drive the transformations we need.

G-STIC 2024 Hosts

G-STIC was jointly hosted by VITO (the prime research and technology organisation on cleantech and sustainable development in Belgium) and 9 other not-for-profit independent technology research institutes: CSIR (The Council for Scientific and Industrial Research, South Africa), FIOCRUZ (Fundação Oswaldo Cruz, Brazil), GIEC (Guangzhou Institute of Energy Conversion, China), JITRI (Jiangsu Industrial Technology Research Institute, China), MASEN (Moroccan Agency for Sustainable Energy), NACETEM (National Centre for Technology Management, Nigeria), STEPI (Science and Technology Policy Institute, South Korea), TERI (The Energy and Resources Institute, India) and TII (Technology Innovation Institute, United Arab Emirates).

Wabag Secures `1,000-cr. Order From Indosol Solar for Seawater Desalination Plant



VA Tech Wabag announced that it had secured a 1,000-crore order from Indosol Solar Pvt. Ltd., to set up a 100 MLD sea water desalination plant for the latter's solar PV manufacturing facility in Andhra Pradesh. The order includes the engineering procurement, scope of design, engineering, supply, installation, testing and commissioning of the 100 MLD desalination plant, which will be executed over a 38-month period, followed by a 15 years operation and maintenance contract, VA Tech Wabag said.

This desalination plant will be built to meet the requirements of the 10 GW integrated solar PV manufacturing unit of Indosol Solar in Andhra Pradesh, the water technology firm said in a statement. "This mega order marks Wabag's entry into the Solar PV sector which is a key segment for the future," said Saravanan Krishnan, Head Desalination, India Cluster.

iPUMPNET Unveiled by the Union Minister of Jal Shakti & Wins ET Infra Focus Award 2024 for Best Brand in Water Technology



The Hon'ble Union Minister of Jal Shakti, Shri C. R. Paatil, has unveiled iPUMPNET, a revolutionary solution developed indigenously by Pump Academy Private Limited, during the 8th India Water Week expo at Bharat Mandapam, New Delhi, on 17th September 2024. He was accompanied by Ms. Vini Mahajan, Secretary-Jal Shakti; Ms. Debashree Mukherjee, Secretary Water-Resources, River Development & Ganga Rejuvenation, along with other senior officials of the Ministry.

During his visit to the Pump Academy booth at the India Water Week Expo, the Hon'ble Union Minister of Jal Shakti was briefed about the iPUMPNET system, which shows great potential in making water pumping stations smart and responsive. This cutting-edge system harnesses the power of artificial intelligence (AI) and the Internet of Things (IoT) to enhance the efficiency of water pumping stations and promotes a smarter, more sustainable approach to water management.

With its advanced remote monitoring and control capabilities for pumping infrastructure, iPUMPNET revolutionizes crucial water asset management by improving efficiency in water distribution, wastewater management, and irrigation. The system boosts productivity by up to 35%, reduces energy use by up to 25%, minimizes water loss, cuts carbon emissions, and extends equipment lifespan by up to 50%, ultimately saving costs and enhancing sustainability.

Pump Academy Private Limited has been conferred with the prestigious Economic Times Infra Focus Award 2024, earning recognition as the Best Brand in Water Technology for its revolutionary

solution, iPUMPNET. The award recognizes the company's innovative approach to water management and its significant contribution to the water infrastructure sector. It was presented during the ET Infra Focus Summit held in Delhi on September 19, 2024. This recognition underscores the company's commitment to developing solutions that address critical water management challenges while promoting sustainability and resource optimization.

Mr. Anil Sethi, the Founder Chairman of Pump Academy Private Limited, commented: "The advanced technology embedded in iPUMPNET has great potential to optimize water asset management across India. By leveraging AI and IoT, we are not just improving efficiency; we are paving the way for a more sustainable and water-secure future. This solution aligns perfectly with the government's vision for smart water management and could play a crucial role in addressing India's water challenges. We are elated by the appreciation from the Hon'ble Minister and look forward to contributing to the nation's water conservation efforts with technology interventions."

He further said that: "We are deeply honoured to receive this prestigious recognition from the Economic Times. iPUMPNET represents our dedication to innovation in water technology. This award not only validates our efforts but also motivates us to continue pushing the boundaries of what's possible in smart water management. We believe that technologies like iPUMPNET will play a crucial role in shaping a water-secure future for India."

Brief about Pump Academy:

Pump Academy Private Limited was established with a mission to encourage innovation and leverage digital technologies to improve the efficiency of pump operation and maintenance in water utilities and industries. Pump systems contribute to approximately 20% of the world's electrical energy demand, and in certain applications, they account for up to 50% of electrical energy usage, being the largest consumers of electricity.

Pumping stations play a vital role in extracting and distributing water to meet the diverse needs of individuals, industries, and agriculture. The maintenance, energy consumption, and longevity of pumping stations are often overlooked. Recognizing this gap, Pump Academy has emerged as a pioneering organization, offering innovative solutions, iPUMPNET, to optimize pumping stations, extend their lifespan, improve operational efficiency, and reduce electrical consumption and carbon emissions. Pump Academy is revolutionizing the industry with its innovative approaches, setting a new standard in the optimization and management of pumping stations.

Union Minister Shri C.R. Paatil presides over the Valedictory Session of the 8th India Water Week 2024 in New Delhi

Bhu-neer portal of CGWA for ground water regulation launched
The Valedictory Session of the 8th India Water Week (IWW) 2024 was organized today in New Delhi, under the chairmanship of Union Minister for Jal Shakti, Shri C.R. Paatil, with the August presence of Minister of State Dr. Raj Bhushan Choudhary. Secretary (DoWR, RD & GR), Smt. Debashree Mukherjee delivered the welcome address during the session.

Shri C.R. Paatil delivered the valedictory address and expressed his appreciation for all the participants from around the globe as well as across the country. The Minister also acknowledged the tireless efforts for successfully organizing the event by the dedicated team of officers from the Ministry of Jal Shakti, its two Departments viz. DoWR, RD & GR and DoDWS and its various organizations viz. NWDA, CWC, CGWB, NIH, NMCG, NRCD, NWIC, CSMRS, CWPRS, WAPCOS etc. He expressed confidence that the collective deliberations and outcomes of the 8th India Water Week will go a long way towards addressing the unique water issues of India through a collaborative and innovative approach.

A brief on the 8th IWW 2024 was presented by Shri Rakesh Kumar Verma, Additional Secretary (DoWR, RD & GR), Ministry of Jal Shakti. He enumerated various important recommendations that emerged from the 8th IWW 2024 on the various facets of water sector viz. Collaboration & Cooperation for Water Security, Integrated Water Resources Development & Management, Challenges in Water Sector Infrastructure, Risk and New Approaches to Climate Resilience, Groundwater Sustainability and Management, Water Governance and Financing, Water related Disasters and its Management etc.

During the session, Bhu-neer portal of CGWA for ground water regulation was e-launched. Further important publications viz; National register of Major and Medium irrigation projects in India, Assessment of water resources in India, Compendium of sedimentation of reservoirs in India by CWC and Coffee Table book of Heliborne survey conducted by CGWB were also released during the session.

Exhibitor's awards were also given under four categories.

Category I- Best Central Ministry/Organization- CWPRS, Pune

Category II- Best State Government- Kerala

Category III- Best Industry- Ion-exchange India Ltd

Category IV- Best Startup- Blueverse India Pvt Ltd, Mumbai, Maharashtra.

The event was inaugurated on 17th September, 2024 by Hon'ble President of India. Continuing with the same spirit of the last two days, Day-3 also showed great zeal and enthusiasm among participants who turned up in large numbers.

An important part of the Day-3 of the event was Water Leaders' Forum in which seven sessions covering themes on partnerships on accelerating innovation in water sector; integrated flood management; partnership and cooperation for integrated water resources management; public private partnership in water sector; sustainable water management for industry & businesses; partnerships for climate action in water sector; circularity in waste water management were held with a lot of insightful deliberations amongst the panelists and participants.

Further, seven sessions of Water Conventions with three themes viz; water governance and financing, water related disaster and its management and challenges in water sector infrastructure were held with the active participation of stakeholders which offered a diverse and comprehensive perspective with a multifaceted approach and innovative ideas for the future highlighting current challenges in water management.

Two sessions of Practitioners' Forum were held today on the topics achieving universal access to drinking water in rural areas; synergizing actions for ecological sustainability and human wellbeing, with experts sharing their experiences and practical lessons.

A big attraction of Day-3 was the Startup Forum, which is a dynamic platform for innovative thinkers and private entrepreneurs in the water sector who presented Smart water tools and technologies; showcasing cutting-edge solutions across a variety of crucial areas of the water sector. In all nine startups presented their innovative solutions in the water sector.

Various Fora / sessions that started on Day-1 of the event with huge participation of delegates, experts, policy makers, industry, researchers etc. successfully concluded today. The Exhibition, spanning 4,800 square meters and featuring over 143 exhibitors, has been a remarkable part of the entire event.



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30K Villagers Toil for 10 Months to Bring UP River Back on Course



PRAYAGRAJ: In an inspiring effort, over 30,000 people belonging to 20 villages in three blocks of Uttar Pradesh's Pratapgarh district toiled for over 10 months to revive the earlier course of a seasonal river. Over the last decade, the Sakarni (Sanskrit for one who listens), a rivulet that feeds the Sai, a tributary of the Ganga, saw large-scale encroachment by farmers on its banks. Consequently, the rivulet changed its course and became shallow in stretches.

A local green activist, Ajay Krantikari, who heads an NGO called "Paryavaran Sena", led a campaign to bring back the river to its natural course and first raised the issue before the district environment committee, which is headed by the district magistrate. On October 13, 2023, following Krantikari's efforts, the district authorities included the Sakarni river under the small rivers' rejuvenation list under MGNREGS. Old revenue records were scanned to ascertain the natural course of the river, which was almost lost to the local residents.

Over the next 10 months, nearly 30,000 people worked under MGNREGS to bring the river back to its natural 27.7km-long course. Besides, they also found employment in their respective blocks during the rejuvenation work on the rivulet. The district administration spent Rs. 1.35 crore to make this happen.

Shri Krishna, Pratapgarh district development officer, said, "The rejuvenation work of the small river Sakarni has been done with the help of villagers. Now, the river is flowing along its natural course. After conducting a detailed survey and analysis, we removed all the encroachments upon the natural course of the river." He said the seasonal river is now providing livelihood to people of Laxmanpur and adjoining blocks.

PMRDA annuls water pledge for new projects in 23 merged villages, and nearby areas

PUNE: While the Pune Municipal Corporation (PMC) is struggling to supply water to the 34 newly merged villages due to lack of supply network and insufficient drinking water, the Pune Metropolitan Region Development Authority (PMRDA) has been assigned the responsibility of supplying water to over 40 villages outside 5 km of the PMC limits within the PMRDA limits for new housing projects. As a result, the PMRDA has revoked the water supply commitment from developers for new housing projects.

PMRDA revokes water supply commitment from developers for new housing projects in 23 merged villages and areas outside 5 km of PMC limits.

PMRDA commissioner Yogesh Mhase on Monday issued a new circular cancelling the previous order that sought an affidavit from developers ensuring water supply to residents. The new directive stated that new constructions in the 23 newly merged villages and those outside 5 km of the PMC limits within the PMRDA limits will not need a water supply guarantee from local bodies.

The new order said that the PMRDA oversees around 814 villages where proposals for development permissions or occupancy certificates are submitted to the authority. To ensure availability of water in these villages, instructions have already been issued. Among these villages, 23 are now under the jurisdiction of the PMC. It is then the PMC's responsibility to provide water and other necessary facilities to these villages. To support this, 75% of the development fees collected by the PMRDA from these villages is transferred to the PMC.

The order further stated, "Additionally, outside 5 km of the PMC limits within the PMRDA limits, the concerned municipal corporation is required to supply water. In light of these requirements, previous orders have been set aside and new directives have been issued. For the 23 villages within the limits of the Pune and Pimpri-Chinchwad municipal corporations as well as areas within 5 km of these municipal limits."

Sunil Marle, director of town planning at PMRDA, said, "According to the state government directives, municipal corporations are responsible for supplying water in areas within 5 km of the municipal limits or within the PMRDA's jurisdiction. We are currently issuing building permissions for 23 villages. Developers no longer need to submit an affidavit from local bodies for water supply when applying

for building permission. This rule now also applies to constructions outside 5 km of the PMC and PCMC limits within the PMRDA's jurisdiction."

Prasana Joshi, superintendent engineer of the water supply department of the PMC, said, "We are already struggling to supply water to the 23 newly merged villages. How can we supply water to villages outside the 5 km limit of PMC?"

The PMRDA order also stated that for other areas, cases seeking occupancy certificates that have been approved based on Gram Panchayat certificates or developers' water supply assurances will need to be submitted to the executive committee (EC) for guidance on further action. Additionally, proposals should be submitted to the engineering department for preparing water supply plans for these cases.

Jal Shakti Dept Asked to Install Treatment Plant for Water Scheme

Taking stern view of the presence of faecal coliform found in the drinking water supply scheme of Larah in Kasauli area, a National Green Tribunal (NGT) appointed committee has directed the Jal Shakti Department (JSD) to install a sewage treatment plant (STP) and ensure apt treatment of the water in the said scheme.

The NGT had taken note of a news item "Kasauli Distillery dumps effluents into water source, supply affected" which appeared in December, 2023. The tribunal constituted a joint committee to examine the water source which found that faecal coliform perpetually polluted the water of the said scheme where some hotels also let out their sewage waste.

Samples were drawn from the intake point and outlet points of the scheme to test the quality of water.

The laboratory analysis results of the final outlet of water supply scheme undertaken by the joint committee and analysed by the Central Pollution Control Board (CPCB) had indicated the presence of faecal coliform and total coliform in the water even after chlorination, which was the lone water treatment undertaken by the department. As per the Indian Standard of drinking water – specification (IS 10500: 2012), the water intended for drinking or treated for drinking should not contain E coli or thermo tolerant coliform bacteria, and total coliform bacteria.

"Water Supply Scheme of Jal Shakti Vibhag is required to be upgraded



in terms of treatment of organic and microbial contaminants by implementing appropriate stages including but not limited to pre-chlorination, chemical and/or biological treatment, to ensure supply of safe drinking water," the committee headed by Deputy Commissioner had recommended. Members of State and Central Pollution Control Boards were also part of the committee.

The Jal Shakti Department (JSD) has been directed to review the treatment system of the said water supply scheme and provide an apt tertiary treatment and disinfection system before distributing the water to the gram panchayat of Garkhal and Sanawar.

The revelation has put a question mark on the water disinfectant system of the Jal Shakti Department which was barely confined to primary treatment of chlorination.

"The installation of a Sewage Treatment Plant (STP) at the said scheme would prevent discharge of untreated domestic/sewage waste into the drains leading to the Water Supply Scheme of Jal Shakti Vibhag which is used to supply drinking water supply to nearby village panchayats," noted the committee.

The Jal Shakti Department has to submit an action taken report in compliance with the directions of the NGT before the next date of hearing in January 2025. Following this the JSD Dharampur was directed to take immediate measures to ensure compliance to drinking water standards and provide safe drinking water to the residents by the joint committee.

Assistant Engineer JSD Bhanu Uday, when asked, said they are preparing the project report for installing a STP and providing apt water purification system for the said scheme. He added that a cluster scheme would be worked out to set up a STP for the area.

CLEAN INDIA SHOW OPENS TODAY WITH AN ADVANCED AND TECH-BASED SHOWCASE TO TAKE CLEANING, HYGIENE AND WASTE MANAGEMENT SOLUTIONS TO THE NEXT-LEVEL

Mumbai, 21st November 2024: The 20th edition of Clean India Show, along with its concurrent expos – Waste Technology India Expo, LaundrexIndia Expo and Autocare Expo has successfully opened today with a grand inauguration at Bombay Exhibition Centre, Mumbai. The show has attracted 170+ exhibitors coupled with nearly 600+ brands showcasing their latest solutions developed for enhanced cleaning, waste management, laundry and autocare industry. The event also attracts a large turnout of qualified visitors and delegates from 60+ segments, government departments as well as private organisations.

With hygiene standards becoming non-negotiable and growing importance of waste management as well as professional cleaning becoming standardised across diverse public and private facilities, Clean India Show with its concurrent shows opened today showcasing a series of advanced range of products and solutions from the industry.

Amidst the presence of esteemed dignitaries, the 20th edition of the expo was inaugurated by (LtoR):

1. Ms MohannaLakshmi M, Editor- Clean India Journal
2. Mr Winston Pereira, Executive Director, Messe Frankfurt Trade Fairs India Pvt Ltd
3. Mr Rohit Arora, Chief Growth Officer-Support Services, Compass Group
4. Mr Nimesh Ajmera, Director – Purchase, Architecture – Sustainability Projects and IT Division, Ajmera Realty & Infra India Ltd.
5. Mr Sanjay Katkar, Municipal Commissioner, Mira Bhayandar Municipal Corporation
6. Mr Chandresh Mehta, Director/Promoter, Compass Group
7. Mr Manoj Parekh, Managing Director, OCSGroup – India



8. Mr Ulhas Parlikar, Global Consultant-Waste Management, Circular Economy, Policy Advocacy & Co-processing
9. Mr Ashish Jain, Founder, Indian Pollution Control Association
10. Mr J.P. Nair, Managing Director, VIS GroupMr Vivek Mata, Managing Director, Charnock Equipments Pvt Ltd
12. Mr Nitin Nagrale, Founder, Hospitality Purchasing Managers Forum

13. Mr. Johannes Schmid-Wiedersheim, Director, Texcare International / Brand Management Textile Care & Cleaning, Messe Frankfurt Exhibition GmbH
14. Mr. Suresh Bhatia, President, DLAI
15. Mr. Blake McKeown, Commercial Director-AMEA Region, Reckitt Pro Solutions
16. Mr. Jayaram Nair, Chairman, VIS Group

Declaring the 20th Clean India Show open, **Mr Sanjay Katkar**, Municipal Commissioner, Mira Bhayandar Municipal Corporation, expressed: "There is a significant need for cleanliness in India. These expos help bring innovative solutions for making India cleaner. Even the Mira Bhayandar Municipal Corporation (MBMC) relies on a digital waste management system using an app ecosystem. This system helps us segregate 85% of solid waste and has identified strategic locations to minimize the time it takes for waste to be transported. They have also set up waste processing plants in three different areas to manage waste better. As waste is collected and processed efficiently, it helped us prevent flooding during the rainy season. I believe this show will highlight more innovations. In Indian society, the role of industries is crucial, as they develop innovative solutions, while government bodies assist in implementing them, thereby reducing and managing waste efficiently."

The cleaning and hygiene, waste management and technology, laundry and autocare industry has seen an overhaul recently, especially post-COVID with increased focus on hygiene, sanitation. Industries have now dedicated standard protocols in place when it comes to cleanliness and hygiene. On this backdrop, a staunch increase in smart solutions have emerged as an advanced approach that is here to stay. As smart cities grow, upgrading mobility infrastructure and encouraging urban-local bodies (ULBs) to implement smart waste management systems aim to restore hygiene and support the Swachh Bharat Mission.

Mr Jayram Nair, Chairman, Virtual Info Systems (VIS Group) shared his thoughts as: "The solutions and products showcased at the 20th edition of Clean India Show will bring about a change in the way we manage facilities, waste, laundry, automobiles and other spaces. It will also educate and encourage respective industry segments to accommodate and gel with the smart solutions we see here on display from India and across the globe. We have dedicated sessions for the conferences which contemplates sustainable solutions, government policy, smart solutions for waste management, water conservation for laundry sector among many more creating a knowledge rich experience for the visitors and attendees."

Sharing similar sentiments, Mr Raj Manek, Executive Director & Board Member, Messe Frankfurt Asia Holdings Ltd., expressed: "I find Clean India Show - one such holistic amalgamation of industry sectors who are closely connected but require distinctive solutions. This show taps the industry temperament which needs smart solutions to grow and efficiently manage respective operations in-line with government initiatives. It is a platform that encourages innovation, knowledge-

sharing and networking opportunities for our exhibitors and visitors. Our goal is to help them stay ahead of the curve in the rapidly evolving cleaning and waste management industry landscape."

The feature features launch of innovations in the industry with demonstration and first of its kind product launches. Besides several interesting displays, some unmissable innovations include:

- Cleanfix will be launching its robotic cleaning machine, RA660 Navi XL, with automatic docking system on day one. This robotic cleaning machine is designed for the wet and dry cleaning of large areas such as warehouses, production facilities, data centres and etc.
- Famso, an Australian facility management company will launch its Facade Cleaning Drone (KTV Working Drone) in India. This drone eliminates human exposure to risky heights, increases speed, access to architecturally challenging area and reduces overall cost for building maintenance.
- Adachi Svipegreen Private Limited will be launching its TiGreen Decentralised Wastewater Treatment which houses TiGreen Radical bubble technology that effectively treats wastewater. It enhances the efficiency of biological treatments by increasing the surface area for microbial activity, which can lead to cleaner water being returned to the environment or reused.

Clean India Show, along with its concurrent expos – Waste Technology India Expo, LaundrexIndia Expo and Autocare Expo will conclude on 23rd November 2024.

Press information and photographic material:

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HMJS launches "Bhu-Neer" Portal for ground water withdrawal permits

The Hon'ble Minister of Jal Shakti, Shri C.R. Paatil digitally launched the newly developed "Bhu-Neer" portal on 19th September 2024 during the concluding ceremony of India Water Week 2024. The "Bhu-Neer" is an advanced portal developed by Central Ground Water Authority (CGWA), under the Ministry of Jal Shakti, in collaboration with the National Informatics Centre (NIC), for improved groundwater regulation across the country. This portal will serve as a one-stop platform for managing and regulating groundwater resources, aimed at ensuring transparency, efficiency, and sustainability in groundwater usage. "Bhu-Neer" is designed to provide comprehensive details regarding the legal framework governing groundwater extraction, regulations at the state and national levels. Its centralized database will allow users to access critical information on groundwater compliance, policies, and sustainable practices.

The portal is developed with several user-friendly features to offer streamlined process flow to the project proponents seeking groundwater withdrawal permits. Having a simplified yet informative interface, and features like PAN based single Id system, NOC with QR code etc., "Bhu-Neer" marks a significant improvement over its previous version NOCAP. The "Bhu-Neer" portal, is another step towards promoting the Hon'ble Prime Minister's vision of Ease of Doing Business by making ground water regulation a seamless and faceless exercise. The portal is now live for public use and all project proponents can visit the portal for ground water withdrawal related queries, clarifications, tracking application status, payment of statutory charges.



Water Industry Commission for Scotland says Scottish Water has improved its performance but is not meeting some of its own targets

The Water Industry Commission for Scotland (WICS) has published its latest performance report on Scottish Water. In the report, the economic regulator of the Scottish water industry said that Scottish Water is performing in line with the requirements of the Final Determination in 2023-24 while recognising there is likely to be £500m of less investment than was assumed when charge caps were set.

The regulator said that whilst Scottish Water has improved its performance on investment delivery to return within its target range for performance, there are some areas where Scottish Water is not meeting its own targets, including the delivery of a small number of projects due to be completed in previous regulatory periods, leakage and its new developer Customer Experience Measure.

The Final Determination set a charge cap of CPI plus 12.6% over the six-year regulatory period, which equates to a cap of CPI plus 2% on average in each year of the regulatory period. By the end of the first three years of the regulatory period, Scottish Water had raised charges by CPI minus 4.4%. This is 10.5% below the assumed position from the Final Determination, largely because Scottish Water responded to the cost-of-living crisis during 2021 and 2022. As a result of the profiling of charges, WICS expects Scottish Water to have £500m of lower funding available for investment than was assumed in its Final Determination.

Scottish Water incurred £975m (excluding completion investment) on capital investment in 2023-24, around £25m higher than the amount assumed in the Final Determination. This means that Scottish Water has invested around £80m less than forecast in the Final Determination during the first half of the regulatory period (2021-22 to 2023-24).

In last year's report, WICS noted that Scottish Water was around a month behind schedule in the measure it uses to track overall progress on investment delivery and around six months behind in completing projects that had started on-site. Scottish Water has made good

ATER NEWS

progress in recovering its position and is now within its target range (of +/-3 months around its forecast) for completing projects that started on-site. It also remains within its target range at an aggregate level.

In last year's report, WICS noted that Scottish Water had not met its targets for delivering the investment projects carried forward from the previous regulatory control period covering 2015-21 (known as completion projects). WICS now notes that Scottish Water has delivered a further five projects in 2023-24, meaning that it has now delivered 64 of the 86 completion projects. However, this remains short of the 84 Scottish Water expected to deliver by March 2024. Through the Scottish Government Investment Group (SGIG), stakeholders continue to monitor Scottish Water's progress in this area to ensure that customers get the benefits they have already paid for.

Scottish Water continues outperforming the allowance for operating expenditure and the charges for Private Finance Initiative contracts, with actual expenditure around 3% lower than the allowed-for expenditure. In 2023-24, the primary source of this outperformance relates to a one-off refund of around £25m. Without this one-off refund, Scottish Water's expenditure would be broadly in line with the allowed-for expenditure.

Scottish Water has broadly maintained its levels of service performance in 2023-24. This includes its household and non-household Customer Experience Measures and Outcome Performance Assessment, which covers areas of operational performance such as water interruptions, water pressure, and sewer flooding. Performance in each of these areas is within its target range. However, for the first time in seven years, Scottish Water's leakage from its network increased, falling outside the upper end of its target range by around 2%.

Benson Sewage Treatment Works ready to take on more capacity as part of Thames Water's investment programme

Having started work on Benson Sewage Treatment Works in June 2022, Thames Water has completed a £9.7 million upgrade increasing the sites capacity by 29% from 58 to 75 litres per second.

The increase in treatment capacity will greatly reduce the risk of storm overflows during spells of heavy rainfall. The upgrade also includes an additional stage in the treatment process which will help to return a better quality of effluent to the river.

Recently, Freddie van Mierlo, MP for Henley and Thame, local councillors and Thames 21 were invited to visit the site, to showcase the improvements and demonstrate the process of treating wastewater every day.

Awwab Abbasi, Project Manager at Thames Water said: "We are pleased to have completed our upgrades at Benson sewage treatment works to improve our site for residents, businesses and the environment in the area. As custodians of this important infrastructure, we need to ensure our sites are resilient to the pressures of climate change and population growth so we can continue to provide reliable services to our customers.

DROPLETS

Orbis Signs US Distribution Partnership with Core & Main

Orbis Intelligent Systems, a leader in water technology, is announcing a national distribution partnership with Core & Main, a trusted name in water infrastructure solutions. This collaboration combines Orbis' innovative SmartCap technology with Core & Main's extensive industry leadership and expertise, marking a significant milestone in the water industry.

Orbis and Core & Main are partnering to enhance water network performance and efficiency through the SmartCap technology. This acoustic fixed-base pipe monitoring system, housed in a fire hydrant cap, uses real-time data to detect leaks and reduce non-revenue water loss, providing a crucial role in modern water management.

Orbis, with its focus on cutting-edge infrastructure monitoring technologies, stands out as a key partner for water utilities and municipalities. Now, Orbis' SmartCap solution will be accessible nationwide through Core & Main's expansive distribution network.

To explore how Orbis' SmartCap technology can benefit your water operations, visit Orbis Intelligent Systems, or contact your local Core & Main CORE+ product specialist.



"This upgrade to our network will help protect customers and the health of the rivers and waterways. We believe all discharges are unacceptable and we are committed to seeing healthy and thriving waterways, however we can't do it alone. While we play an important role in this, we aren't the sole custodians of river health. We need everyone working together to help our waterways thrive."

Freddie van Mierlo MP for Henley and Thame said: "I'm grateful to Thames Water for showing me around Benson Sewage Treatment Works and walking me through the upgrades that have taken place there. I welcome all investment in the constituency to increase capacity to handle sewage and decrease storm discharging. Clearly far more needs to be happening across Henley and Thame, and I will be working actively with partners to achieve that".

The upgrade of Benson STW is part of Thames Water's plans to improve 250 of its wastewater sites to help manage the effects of population growth and climate change. These include nearby sites at Cholsely and Dorchester and others in Oxfordshire including its sites in Witney and Oxford.

Councillor Andrea Powell for Benson & Crowmarsh Ward, South Oxfordshire District Council said: "It was very interesting and reassuring to see the significant investment made by Thames Water in Benson STW. We know how much local people care about river pollution and the effective treatment of increasing levels of sewage caused by major housing developments in the area."

Councillor Sue Cooper for Benson & Crowmarsh Ward, South Oxfordshire District Council said: "Having visited the Benson Sewerage Treatment Works almost 40 years ago it was really interesting to see the extra capacity and level of sophistication. I know our local residents are keen to know that there is sufficient capacity there to cope with all the new housing in our area so it will be good to be able to reassure them."

South West Water leading the way to improve Combe Martin's water quality



South West Water is helping to improve water quality in Combe Martin and reduce the use of storm overflows.

Teams have worked on a range of measures in the North Devon village, such as sealing 19 manholes and lining 250 metres of sewer, to prevent ground water from entering sewers and adding unnecessary strain to the network.

This work has helped upgrade Combe Martin's bathing water classification, as set by the Environment Agency, from 'poor' in 2019 to 'good' in 2022 and 2023.

Reducing the use storm overflow spills is also a big priority in this area and teams have maximised the use of wastewater storage tanks, which has led to a 68% reduction in spills in the area since 2019.

In addition, South West Water has helped lead the way in a number of environmental improvements after joint investigation work with the Environment Agency found that agriculture and dog waste were having significant water quality impacts in the Combe Martin area.

To combat this, the company has planted thousands of trees along the River UMBER's edge to reduce pollution through agricultural run-off, and more awareness has been raised locally about the negative impact dog poo can have on water quality.

South West Water is also planning to remove surface water from its sewers in the area to reduce storm overflow spills even more and keep improving the village's bathing water quality. It will also complete a scheme to divert spills to an outfall pipe around 500 metres out to sea, further protecting the beach.

Andy Potts, South West Water's Area Operations Manager, said:

"I'm proud to be part of the team making big improvements across our region. Our work in Combe Martin has already made a difference to water quality in the area but we know there is more to do. "That's why me and hundreds of colleagues are working hard to deliver improvements and reduce the use of storm overflows every day."

Barbara Martin, from Combe Martin Water Watch, said:

"We are really pleased to now consistently achieve good water quality at our beautiful beach in Combe Martin. Our group have worked tirelessly with South West Water, the EA and other stakeholders to achieve this."



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“The community now have a good understanding of how to help, including twice-daily beach cleans by volunteers, and working together has been key to this. We look forward to further improvements and an excellent rating as soon as possible.”

Bruce Newport, Area Environment Manager, Environment Agency, added:

“We are proud to have been part of a great group of people who, over the past decade, have worked tirelessly to raise water quality standards at Combe Martin. “Every opportunity to make positive change has been taken: ranging from natural processes in land management, community engagement to investment opportunities.”

South West Water is working to roll out similar solutions across the region as it works to become the first water company to meet the government’s target of achieving less than 10 spills per overflow, per year – a decade ahead of target.

More than £30 million upgrade at Bewl Reservoir

Southern Water is currently undertaking a £30 million project that involves the installation of three large hydraulic syphons, as part of an upgrade at the Bewl Reservoir.

The syphons will allow Southern Water to reduce the water level of the reservoir more quickly, if needed. For example, to carry out repairs to the dam or to reduce high water levels during periods of exceptionally high rainfall.

The equipment will be capable of moving 41m³ of water per second or the volume of 1 Routemaster bus every 3 seconds for 5 days. The pipes are 1.7m in diameter so if you are 5 foot 5 inches in height you could walk through the pipework.

Tamzyn Janes, Project Manager at Southern Water said:

“Like all reservoirs, Bewl is regularly inspected, and we constantly carry out improvements when needed. We have invested more than £30 million in this project, with the installation of three hydraulic syphons into the wall to make the reservoir easier to maintain.”

The Bewl Reservoir

When the water in the reservoir needs to be lowered, pumps start to fill up the syphon pipework. Pumps remove air to ensure the pipes are completely full of water. Valves in the discharge chamber are then opened which starts the syphon flowing. The water discharges down to a culvert into the existing spillway and into the River Bewl.

The upgrades will future proof the reservoir against the effects of climate change. Work started in April last year. In September 2024, Southern Water drilled through a section of the wall of the dam. This has allowed them to install pipework in preparation for the installation of the syphons, which will start in late 2024. The works are expected to finish during the winter of 2025/2026. There is a regulatory requirement to provide emergency drawdown facilities to achieve a 5m drop level within a 5-day period.



Bewl Facts

- The Bewl Reservoir can hold 31,000 million litres, held behind a 28m high, 903m long earth embankment
- Up to 26 million litres of water can be treated every day
- Bewl Reservoir has the capacity to provide up to 150 litres of water a day for nearly 200 million people
- The surface area of Bewl is the same size as 436 Wembley football pitches
- Bewl Reservoir is the largest body of water in the South East
- When full Bewl Reservoir holds the equivalent of one gallon of water for every man, woman and child on earth

Below the surface: Why water companies prioritise worker safety over asset protection

Richard Broome, Managing Director at LSBUD, explores the contradictory approach to safety in the water industry, highlighting the stark contrast between the protection of workers and the under-protection of assets from third-party strikes.

The water industry is undoubtedly committed to the safety of its workers. Stringent measures, protocols, and policies are in place to ensure that on-site teams are safeguarded against risks when working on critical infrastructure projects.

Yet, when it comes to protecting their own vast network of underground infrastructure, water companies fall short. This discrepancy raises an important question: why do companies



prioritise the safety of their people but not their assets, especially when the consequences of damage can be so severe?

A divided approach to safety

Water companies are vastly conflicted when it comes to safe digging best practices. Despite having over 400,000 kilometres of underground pipes across the UK, they remain reluctant to protect their own infrastructure through the collaborative sharing of asset information. Only 20 percent of water companies are registered to LSBUD's central, collaborative portal, leaving up to 350,000 kilometres of water pipelines across the UK unprotected. This hesitation creates a confusing contradiction: workers are being safeguarded, but the very infrastructure they are working on remains vulnerable.

Those that have registered their assets include Portsmouth Water, South Staffs Water, Sutton and East Surrey Water and Cambridge Water. People looking to dig safely in their areas have instant access to gas, electricity, and water plans at the same time and, as a result, damage incidents are falling, proving that collaboration works. But damaging even a single water pipe can have significant consequences.

One of the most significant consequences of this gap in asset protection is the risk posed by third-party strikes. Damage to water pipelines can cause severe disruptions to water services, crippling businesses, leaving homes without clean running water, and even impact critical services like hospitals. Third-party damage can also inflict severe financial, reputational, and environmental consequences. For example, damaged pipes can allow contaminants into the water supply, creating potential health risks for entire communities.

It therefore comes as a surprise that there are still huge swathes of the UK's water pipeline network that are poorly protected from potential third-party strikes, and the resulting consequences. So, what are the reasons why water companies prioritise protecting their workers, but not their assets?

Cultural disconnect

One reason for this discrepancy may be rooted in the industry's culture. Water pipelines are typically located deeper underground than other utilities. A poorly prepared or executed excavation is more likely to strike broadband, gas, or electricity assets first. However, as a result, as they are less likely to be the first asset hit during an excavation, it creates a false sense of security for water companies. This belief, though understandable, ignores the potentially severe consequences of a pipeline strike.

Data security

Further complicating the issue is the water industry's concern over data security, with some companies having reservations surrounding data access and privacy. They fear that sharing their underground asset data could expose vulnerabilities or pose privacy risks. However, modern safe digging portals ensure that asset owners retain full control over who can access their data, addressing these concerns while still protecting critical infrastructure.

Commercial interests

Water companies are often commercially driven when it comes to their asset plans, with established commercial arms that sell this data alongside other land and property searches. While this practice is perfectly legitimate, it can inadvertently discourage third-parties from accessing this information, increasing risk to those very assets, and of course those doing the digging. Allowing an asset owner to choose who to charge, separating those who are looking to work safely from those who wish to sell the plans as part of a wider service, is fundamental to a balanced approach.

So, what is needed from water companies to improve the industry?

Collaboration is key

Even though water companies understand the implications of not protecting their pipes, it is still commonplace across the majority of the industry. Although Ofwat has increased pressure in recent years with the introduction of its PR19 regulations, it has not had the impact many thought it would.

So, collaboration is key, alongside open communication and transparency. From an asset owner's perspective, sharing data protects the physical pipes by improving project planning and pre-excavation awareness. By joining a central system, asset owners

benefit from the 'safety of the herd' effect. From a people point of view, knowing where underground pipes and cables are helps ensure that on-site delays and injuries can be avoided.

Final thoughts

The water industry's steadfast commitment to worker safety is commendable, but it cannot come at the expense of protecting critical infrastructure. As the AMP8 period approaches, water companies face growing pressure to balance safety and cost. By addressing the contradictions in their approach and embracing more collaborative, transparent practices, the water sector can ensure that both people and pipelines remain protected, future proofing the industry.

New process maximises material recovery in water treatment plants

A research and innovation project funded by the Re:Source strategic innovation has made significant progress in transforming water treatment plants into resource plants. The process, an add-on to EasyMining's Ash2Phos technology, maximises the recovery of phosphorus, iron coagulants, and silicate sand from sewage sludge ash, contributing to circular material use.

The project, which began in August 2022, has tested an add-on process for EasyMining's Ash2Phos technology in a pilot-scale environment to prepare for large-scale industrial implementation. In addition to the recovery of 90 percent of phosphorus already secured in the main process, over 85 percent of the iron in sewage sludge ash could be recovered, providing sustainable alternatives to traditional coagulants.

"Our process demonstrates that it is possible to significantly increase the recovery of iron, improving circularity in the water treatment sector while reducing reliance on virgin materials," says Cristian Tunsu, Laboratory Manager at EasyMining.

The silica sand is the largest, in terms of volume, co-product from the Ash2Phos technology. The new process, developed as an add-on to the Ash2Phos-technology, recovers iron as high-purity coagulants (ferric chloride) and improves phosphorus and aluminium recovery. The silicate sand left behind is now free of iron compounds, increasing its potential uses. With this add-on, around 85 percent of the iron in sewage sludge ash can be recovered, and testing has shown that the recovered ferric chloride matches the quality of commercial alternatives.

Further collaboration with Feralco and Sydvaatten confirmed that the

process can produce ferric chloride of high purity, meeting drinking water quality standards. The technology was also found to significantly reduce carbon emissions. A life cycle assessment for the planned Ash2Phos plant I Helsingborg revealed that recycled ferric chloride has a carbon footprint of 75 kg CO₂ per tonne, compared to 140 kg CO₂ for ferric chloride produced from virgin magnetite.

The cleaned silicate sand, now free from iron compounds, offers a wide range of applications, including as a cement substitute in concrete, offering substantial CO₂ savings. EasyMining is currently evaluating a European Technical Assessment (ETA) for these recycled materials.

"We are seeing great interest from sectors like water treatment and construction, where the ability to recover iron and replace cement with silicate sand could lead to considerable cost savings and reduced CO₂ emissions," adds Tunsu.

The project has significantly strengthened collaborations within the water treatment sector while opening up for new business opportunities. By enabling water treatment plants to function as resource plants, the initiative allows for the transformation of waste into valuable raw materials for circular use. The project is funded by the Swedish Energy Agency, Vinnova and Formas via the strategic innovation programme RE:Source.

Saudi Arabia Launches \$3.2bn New Water, Sanitation Projects



NWC has already implemented six projects to improve the drinking water supply system and increase operational efficiency

Saudi Arabia's National Water Company has announced plans to implement water and sanitation projects worth SAR11.6 billion (\$3.2 billion) across the kingdom covering key regions such as Aseer, Qassim and Al Baha as part of the government's utility infrastructure development plan. The foundation stones for all these projects were laid in the presence of Engineer Abdulrahman bin Abdulmohsen Al Fadhli, the Saudi Minister of Environment, Water, and Agriculture.

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In the Aseer region, NWC will be developing a total of 87 water and sanitation projects at an investment of over SAR5 billion, stated Prince Turki bin Talal bin Abdulaziz Al Saud, the Emir of the Aseer Region. He was speaking after laying the foundation stones for 73 environmental, water and agricultural projects in the Aseer region that cost more than SAR3.5 billion. These efforts are aimed at achieving environmental and water sustainability in line with the goals of the Kingdom's Vision 2030, he added.

NWC has already implemented six projects to improve the drinking water supply system and increase operational efficiency. These projects included the extension of water transmission lines and networks of different diameters with a total length of more than 302km, the development and replacement of existing pumps, and the implementation of pressure and flow control valve rooms in daily distribution reservoirs in several districts of Abha City, governorates and villages in the region, at a cost of more than SAR134 million. Al Fadhli said National Water Company had strengthened its water transmission and distribution system in the region by implementing a major project – linking the 19-km-long line from Tarjis Dam treatment plant to Namas Governorate.

The scope of work includes construction of two reservoirs with a total capacity of 11,000 cu m, a pumping station with a total capacity of 25,000 cu m per day, and a distribution station at a total cost of more than SAR79.3 million. In addition, water sources in Khamis Mushait and Uhud Rafidah governorates were developed through the implementation of a project to complete the water treatment plant at Wadi Tandaha Dam with a production capacity of (16,800) cu m per day.

In Qassim region, NWC will be implementing 66 water and environment projects worth more than SAR4.2 billion. Emir of Qassim Region Prince Dr. Faisal bin Mishal bin Saud bin Abdulaziz inaugurated 21 water and sanitation projects at a cost of more than SAR2.2 billion in the presence of Minister Al Fadhli.

“We are proud of the development projects launched today in the Qassim region in the fields of water, environment, and agriculture, which will contribute to improving the quality of life, enhancing food security, and providing sustainable water solutions that serve the region and meet the goals of Vision 2030,” he added. Al Fadhli said National Water Company has implemented 10 water projects at a cost of more than SAR933.5 million to boost the drinking water distribution system and manage demand in the Qassim region.

These projects included the construction of water transmission lines,

main lines and networks of various diameters with a total length of over 579km, the construction of 7 operational reservoirs with various storage capacities totaling 109,000 cu m and several pumping stations with a total capacity of more than 294,000 cu m per day.

Minister Al Fadhli pointed out that in order to support environmental sustainability, eliminate environmental damage and increase the coverage of environmental services, the National Water Company has implemented 10 environmental projects, including the construction of transmission lines and sewerage networks of various diameters and lengths of more than 355.2 kilometers in various locations in the Qassim region.

“The company also constructed two wastewater treatment plants with a total capacity of more than 11,200 cubic meters per day and lift stations with a total capacity of 128,700 cubic meters per day at a total cost of more than SAR1.2 billion,” he added.

In the Al Baha Region, NWC is developing 17 key projects at a total cost of more than SAR1.7 billion including 10 projects in the water sector at more than SAR1.6 billion in addition to 6 projects in the agriculture sector at a cost of more than SAR100 million and one project in the environment sector at more than SAR509,000. Emir of Al Baha Region Prince Dr. Hussam bin Saud bin Abdulaziz laid the foundation stone for 17 projects of the environmental, water, and agricultural system in the region, at a cost of more than SAR1.7 billion.

Of these 10 are linked to the water sector, including 7 projects for the NWC to implement water and sewage networks in the region, at a cost of more than SAR294 million in addition to two projects for the Saudi Water Authority (SWA), at a cost of more than SAR1.3 billion to enhance water security and meet the growing demand for desalinated water in the region.

Speaking at the launch, Al Fadhli said: “These projects included 17 for the supply of water and sewage services in the region, implemented by NWC at a cost of more than SAR674 million. Also, an environmental project for the National Center for Vegetation Development and Desertification Control (NCVC) is being set up at a cost of more than SAR7.3 million.”

The scope of work for NWC includes setting up of two drinking water purification plants in Makhwah and Qalwa governorates, and the construction of two reservoirs with a capacity of 75,000 cu m for each reservoir in Baljarshi and Qalwa governorates, he added.

RSE and Biomatrix partner to advance nature-based water management solutions



RSE has announced a strategic partnership with Biomatrix, aimed at delivering innovative nature-based solutions for sustainable water management.

Biomatrix specialises in designing and installing ecological water management systems, integrating natural processes to improve water quality, enhance biodiversity, and create sustainable, regenerative ecosystems in urban and rural environments.

RSE is a trusted clean water technology company – developing products and services for purifying drinking water, recycling wastewater and cleaning water in industrial processes. RSE's bases across the UK are pioneering new solutions for the water sector through the offsite manufacture and a modular approach to water management technologies.

The collaboration is a natural fit as both companies, headquartered in Northeast Scotland, share a common focus on modular design, low carbon recycled materials, and innovative solutions which protect and enhance water resources.

RSE's equity investment in Biomatrix demonstrates a strong commitment to natural solutions and sustainable water treatment innovation, and integration of ecological and technological expertise.

"This partnership with Biomatrix Water demonstrates RSE's dedication to advancing sustainable water treatment solutions," stated Steve Slessor, CEO of RSE. "Nature-based solutions are essential to achieving environmental objectives and, by incorporating Biomatrix's expertise, we can deliver modular, scalable solutions that address storm overflows and enhance water ecosystems across the UK and internationally."

Galen Fulford, Managing Director of Biomatrix, commented:

"We are excited to collaborate with RSE to broaden our reach in delivering nature-based water management solutions. After several years of developing innovative approaches alongside RSE, formalising this partnership represents a natural progression as we work together to drive sustainable innovations that address environmental challenges, supporting water quality, biodiversity, and resilience in communities globally.

"Partnering with our friends at RSE will enable us to better serve the water sector, continuing to grow our Forres-based company and providing new leadership opportunities for our team. Working with RSE's network of 2,000 staff, we aim to deliver greater value and efficiency to our customers and to bring more water systems to life."

Global Freshwater Supplies in the Balance

While the world's attention has been on the US election, the rising number of extreme weather events — from disastrous flooding in Spain to southern Africa's worst drought in a century — highlights the need to remain focused on climate change, biodiversity loss and a changing water cycle.

These crises are related and the symptoms are getting worse. When drought kills crops, millions of people suffer; and when water extremes (too much or too little) hit vulnerable societies, the resulting displacements, migration and conflicts can affect everyone.

Yet no one is listening. The recent COP16 biodiversity summit in Cali, Colombia, received little international attention and failed to produce a roadmap to ramp up funding for species protection. Instead, delegates merely celebrated their decision to charge private companies for the use of genetic biodiversity information and to establish a new working group for indigenous peoples.

While important, these developments are marginal in relation to the task of halting biodiversity loss. Worse, they could serve as a smokescreen for global inaction, just as we have seen over the years in global climate negotiations, where long sessions on trade and "loss and damage" obscured the lack of action on phasing out fossil fuels.

Although the Global Biodiversity Framework — adopted in Montreal in 2022 — established ambitious targets to protect 30 percent of the planet by 2030, 158 countries still have not submitted formal plans on how they will play their part.

This inaction cannot continue. Human activities are threatening the stability of the climate and the natural systems upon which human well-being depends. Food security, human health and social stability are all on the line. The COP16 negotiations are supposed to continue “at a later date” — but the world cannot afford to let COP16 pass without significant progress toward protecting our planet’s biodiversity and ecosystems.

Without urgent, systemic, collective action, the effects of climate change, biodiversity loss and the water crisis will only intensify. Biodiversity and nature are central to maintaining stable climate patterns and the hydrological cycle. Wetlands and forests, which store huge amounts of carbon, rely on stable water cycles and thriving biodiversity to function effectively.

Similarly, terrestrial ecosystems currently absorb 25 percent of carbon dioxide emissions, helping to prevent atmospheric levels from rising beyond 420 parts per million. Yet extreme hydrological events — droughts and floods, combined with heat during the 2023 “super El Nino” cycle — eroded this massive carbon sink substantially.

This was a serious warning sign. Unchecked biodiversity loss alone could cause us to exceed the Paris Climate Agreement’s target of limiting global warming to 1.5 degrees Celsius, with dire consequences for vulnerable communities worldwide.

In our final report for the Global Commission on the Economics of Water, we show how interconnected our world is not just through the blue water in our rivers and lakes, but also through “green water” in soil moisture. Moreover, we are all connected through “atmospheric rivers” — moisture transported from the soil, through plants and forests, to the atmosphere, where it flows between regions to provide essential rainfall.

Commission’s new report highlights vital steps to increase Wales’ flood resilience

The National Infrastructure Commission for Wales (NICW), has revealed its latest report — “Building Resilience to Flooding in Wales by 2050”.

The report presents bold but practical recommendations for Welsh Ministers to future-proof Wales against the growing risks of flooding over the next 25+ years.

With one in seven properties in Wales now at risk of flooding, the report couldn’t come at a more important time — especially with this figure set to increase by more than a third as the effects of climate change

worsen and the UK Committee on Climate Change warning that Wales is not ready for the impacts.

Outlining 17 recommendations within a Future Flooding Framework for Wales, the report emphasises natural solutions for tackling this — placing nature and community integration at the forefront of increasing Wales’ resilience to flooding.

This approach is typical of NICW, the independent infrastructure advisory body for Wales — which works with local communities to ensure its recommendations reflect real-world needs and create practical, locally-driven outcomes.

Eluned Parrott, Lead Commissioner on the project, said:

“As part of our work, we visited some of the communities who have been affected by flooding in recent years, such as the Conwy Valley and Pontypridd. The impacts felt have been devastating, but we also learned that these communities are not content to be passive victims and are ready to act.

“What’s more, during the eighteen months that we’ve been working on this project, it has become increasingly clear that we cannot “concrete” our way out of the risks we face. We must adopt more holistic solutions, such as restoring the natural environment’s ability to store water higher in river catchments, and empowering local communities to take action.”

To achieve this, the report lists the recommendations within four key categories: Governance, Structure and Policy; Collaboration, Partnerships, and Community; Funding and Capacity; and Awareness, Skills and Data.

In summary, to drive regional collaboration the report recommends a catchment-based approach and engaging local communities directly in flood-related decisions — with initiatives like Citizen Juries and a new Water Resilience Forum.

On the governance side, the report calls for the appointment of a Water Commissioner and the creation of a 30-year resilience strategy to drive Wales-wide, innovative flood solutions.

To boost awareness and skills, the report suggests integrating climate adaptation into Wales’ school curriculums and providing flood resilience training at a regional level.

Lastly, to enhance funding and capacity, it recommends diversifying



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funding sources and introducing Welsh Government subsidies to help homeowners invest in flood resilience measures. All 17 recommendations can be accessed in full here.

Dr Eurgain Powell, Lead Commissioner, said:

“Although flooding can have a devastating effect on people’s lives, awareness of flood risk; how to access information; and what actions local governance and real people need to take to respond to flooding, remains very low.

“To resolve this, our work has shown that we need a different approach — one that works with people and nature to drive real change. Ultimately, we believe that success will be driven by good communication and a shared responsibility and sense of urgency between government, business and communities.

“We hope the findings of this report will empower communities to voice and act on their own futures, with the support of the Welsh Government — to ensure a resilient, dynamic, and abundant future for generations to come.”

Thames Water gets ready to deliver upgrades to its critical infrastructure across the region over the next five years

Thames Water has concluded a £400m Asset, Capital and Engineering Professional Services framework procurement exercise to support its infrastructure upgrades over the next five years (2025-2030).

Thames Water anticipates its capital programme during AMP8 will be up to three times the size of its existing programme, as it seeks to address the twin challenge of ageing infrastructure and climate change on its assets.



- The framework has sought to reduce supplier capacity risks as the industry ramps up investment and provide our suppliers with clarity about upcoming project requirements. It will give Thames Water access to Engineering, Environmental, Commercial and Programme Management Professional Services worth up to £400m as it works to improve, maintain and innovate its Water Treatment Works, Sewage Treatment Works, and the wider water and sewage network.

Thames Water said the framework has sought to innovate the way it operates with its supply chain, to encourage collaboration across suppliers and extend best practice learnings back into Thames Water. The framework has awarded agreements to the following companies

- AECOM
- Arcadis
- AtkinsRéalis
- Binnies
- Costain
- CPC Project Services
- Jacobs
- Mott MacDonald
- Stantec
- Turner & Townsend
- Preetinder Dhanoa, Capital Procurement Business Partner at Thames Water, said:

“We are delighted to confirm these critical framework awards, which will be used to source asset engineering and capital professional services that are critical to the success of Thames Water’s AMP8 programme. This agreement will introduce a number of improvements to our previous arrangements, including driving value through innovation and partnership working.

“We have proposed a highly ambitious business plan for 2025-2030 based on customers’ feedback and insight. Our plan will deliver a reliable, secure and affordable service for customers, while further materially improving Thames Water’s environmental footprint, and the establishment of a supplier framework sets the company up for successful delivery.”

Water industry launches world-first interactive storm overflows map

NOVEMBER 2024

GLOBAL WATER NEWS

In a world first Water UK has launched an interactive map showing the operation of every single storm overflow in England. From today anglers, kayakers and swimmers in England will be able to see, to the minute, when and where a storm overflow has discharged.

The 'National Storm Overflows Hub' will show the operation of all 14,187 storm overflows in England. Alongside the map, the Hub includes an extensive question and answer page to help inform the public.

The Hub has been created by Water UK, the water industry trade body representing every water company in the UK, in partnership with Stream, a cross-industry group working to drive transparency, innovation and collaboration through open and shared data.

The Hub has been developed in line with expert advice from an independent steering group which includes the Rivers Trust, Surfers Against Sewage, the Consumer Council for Water, the Environment Agency, Ofwat and the Department for Environment, Food and Rural Affairs (DEFRA). These groups have been actively involved in the creation and development of the Hub, and it has benefitted from their expertise.

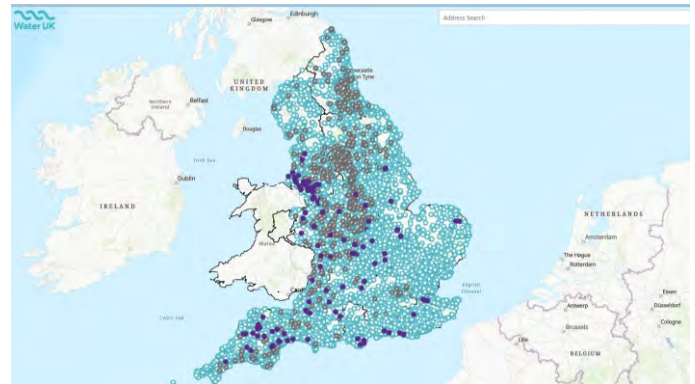
Visitors to the Hub will also be able to find out details of the 'National Storm Overflows Plan for England.' This plan includes the investment required to end sewage overflowing into England's waterways. The first phase of the plan includes a proposal to nearly triple investment over the next five years to £10 billion which, if approved by Ofwat, will cut spills by at least 40% by 2030.

The launch of the map follows individual water companies publishing their own maps covering their region earlier this year. England is already the first nation in the world to have 100% monitoring of its network of storm overflows.

An Application Programming Interface (API) has been created to allow third parties, such as charities and campaign groups, to access the data and broaden its reach by making it available via their websites.

David Henderson, Chief Executive, Water UK said:

"England is the first nation in the world to have an interactive map showing the location and live operation of every single storm overflow. For the first time, whether you're a paddler or a swimmer, an angler or a kayaker, you'll be able to see when, where and for how long a storm overflow has been active.



"The water industry in England was already the most transparent water sector in the world, with 100% of its overflows monitored – the only nation in the world to do so. "Now we want to go even further and invest a record £108 billion over the next five years to ensure the security of our water supply in the future and end sewage entering our rivers and seas. Ofwat needs to approve these plans in full so we can get on with it." Rob Wilson, Chair of the Consumer Council for Water (CCW), said:

"We know people want clear communication and more openness from water companies on their environmental performance and the launch of this easy-to-use interactive map is an important step towards rebuilding trust." "It has been great to witness water companies, environmental groups, campaigners and others working collaboratively to bring this project to life and it shows what can be achieved when the sector unites behind a common goal that will benefit people and the environment." Ben Seal, Head of Access and Environment at Paddle UK, on behalf of the Clean Water Sports Alliance said:

"Having campaigned for real-time monitoring of sewage overflows, Paddle UK and the 10 other National Governing Bodies of watersports that make up the Clean Water Sports Alliance, welcome the launch of a new National Storm Overflow Hub. It marks a significant step forward in increasing transparency and giving a fuller picture of the scale of pollution being caused by the water sector. "Water users from across England and Wales, who are reliant on access to clean water, will be able to use this information to see when and where pollution is being discharged into their local river or sea.

"There is however, much more that needs to be done to give that needs to be done to give recreational water users the information they need to make confident, informed choices. "This is a welcome step in the right direction by Water UK and we look forward to helping shape future work".

Scottish Water launches new enterprise model delivering multi-billion pound transformation of water and waste water infrastructure and jobs



The largest procurement ever undertaken by Scottish Water has been launched to transform the country's public assets to keep taps flowing and protect the environment. Firms are being invited to bid to be involved in a ground-breaking enterprise-style approach to enhancing Scotland's water and waste water infrastructure over the period 2027 to 2033, with a potential extension for another six years.

The overall value of the enterprise – known as Delivery Vehicle 4 – is between £5bn and £9bn and is the highest value venture put into place by Scottish Water. It is anticipated that the total Scottish Water SR27 investment programme will support around 4000 jobs and create opportunities for 1500 young people. Director of Capital Investment, Rob Mustard, said the programme would bring significant benefits to communities, the economy and the environment.

Rob Mustard, Scottish Water

He said: "DV4 is the most significant programme of investment and way of working we have ever implemented. It supports our goals of financial sustainability, service excellence, and going beyond net zero, all while contributing to a flourishing Scotland."

Replacing the current 12-year-old Delivery Vehicle 1 (Dv1), DV4 will oversee asset investments and handle high-value and complex construction and engineering projects. Mr Mustard said: "We're moving to an 'advanced partnering' model, shifting from traditional contracting to a more collaborative approach. This model brings partners together through agreed outcomes, ensuring we deliver value for our customers and innovation in every project."

The procurement is being advertised as one contract notice in two parts; successful participants will work closely with Scottish Water's expert teams across the country and the collaborative effort is designed to boost efficient and effective project delivery.

A further network will also be created, providing opportunities for SMEs and micro-specialists to collaborate with the main partners. A regional framework will also be procured consisting of small and medium enterprises, supporting capital and operational requirements. Mr Mustard said: "This supply chain will support over 4000 jobs and create opportunities for over 1500 young people. This initiative is not just about economic growth; it's about delivering real social value to our communities."

A market engagement day for DV4 took place on 24th October, drawing over 200 delegates from about 70 businesses. This event offered insights into Scottish Water's new supply chain design and the upcoming procurement. The procurement process officially started on Monday November 25th and is expected to be fully completed by March 2026.

Mr Mustard added: "The DV4 model represents a significant evolution in how we approach capital investments. It's designed to drive innovation, efficiency, and sustainability, aligning with our long-term goals of environmental stewardship and community enhancement. We're eager to partner with others to achieve these ambitions."

CIWEM urges action on PFAS 'forever chemicals' in UK's water systems

Following the launch of a Policy Position Statement (PPS), CIWEM, the Chartered Institution of Water and Environmental Management, has issued an urgent call to address the persistent issue of per- and polyfluoroalkyl substances (PFAS), also known as 'forever chemicals,' in the UK's water systems.

PFAS are a large group of synthetic chemicals and have been used in a wide range of industrial and consumer products for decades. These include firefighting foams, water-repellent fabrics, anti-stick coverings, packaging, ski wax, pesticides and more, resulting in multiple contamination sources ranging from manufacturing facilities and firefighting training areas to farmland and landfills.

The extreme persistence of PFAS means that historical contamination continues to impact environments long after their initial release. This persistence, combined with their mobility in water and soil, leads to ongoing pollution even when immediate sources are controlled.

CIWEM's PPS also highlights that assessing and managing PFAS contamination presents further challenges. Thousands of PFAS compounds exist with varied chemical structures, making comprehensive testing costly and complex. Treatment technologies



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like membrane filtration, ion exchange, and activated carbon are effective but expensive, and new methods to destroy PFAS entirely are still under research. Advances in both testing and remediation are essential to keep up with emerging compounds and ensure safe, sustainable water treatment solutions.

Alastair Chisholm, Director of Policy, CIWEM said:

“Media and environmental regulators are sounding the alarm on PFAS, especially their presence in water. While drinking water accounts for less than 20% of our PFAS exposure, these chemicals impact every step of the water and wastewater cycle, posing serious challenges across the board.”

He continued: “Removing PFAS from water and wastewater is incredibly costly, a burden that shouldn’t fall on water companies alone. PFAS producers and handlers must step up to prevent further pollution, and if they’re responsible for releasing PFAS into the environment, they should bear the costs of cleanup to protect and decontaminate our soil and water. Conventional water treatments can’t eliminate them, so proactive solutions are essential.” Highlighting the health risks and environmental implications of PFAS, CIWEM’s Policy Position Statement advocates for an eight-point plan:

Polluter-pays system: Make PFAS producers financially responsible for pollution cleanup and prevention, relieving water companies of high remediation costs. **Standardised detection:** Establish uniform methods to detect and measure PFAS, ensuring consistency as technology advances. **Targeted PFAS bans:** Ban non-essential PFAS while allowing exemptions for critical uses, reducing exposure and environmental impact.

Fund research: Invest in studies on PFAS health effects, alternative treatments, and safer substitutes to better manage and mitigate risks. **Comprehensive monitoring:** Implement a holistic approach to manage raw water pollution and emerging contaminants, including PFAS and microplastics, throughout the water cycle. **PFAS risk map access:** Share the Environment Agency’s PFAS contamination risk map with water companies to support informed decision-making.

Biosolids regulation: Mandate PFAS monitoring in biosolids and set limits on harmful compounds before land application, updating regulations as science progresses. **Product labelling:** Label PFAS-containing consumer products, empowering consumers to make informed choices and reduce unnecessary exposure.

Data shows that some PFAS compounds can also have serious health effects, causing harm to the thyroid and liver, raising cholesterol, and

increasing the risk of kidney and testicular cancer. Exposure during foetal development is also linked to negative health effects.

Chisholm added: “The science is clear. PFAS are here to stay if we don’t act. We need immediate, coordinated efforts to address this growing environmental threat. We cannot afford to leave it to future generations.” For more information on CIWEM’s initiatives and to access the full Policy Position Statement on PFAS, please visit CIWEM’s website.

Spain Intends to Replicate Morocco’s Successful Drought-Fighting Strategies



Morocco’s innovative approach to combating water scarcity is gaining global recognition, with plans underway to build Africa’s largest desalination plant in El Jadida province. Doha – Spain is looking to its southern neighbor, Morocco, for inspiration in combating the severe water scarcity that has plagued parts of the country, particularly Catalonia and Andalusia.

According to the Spanish newspaper El Periódico de Catalunya, the Catalan government plans to implement a desalination plant strategy similar to Morocco’s in an effort to alleviate the drought crisis. Morocco has been grappling with water shortages for years, further exacerbated by the lack of rainfall over the past six years. The country’s reservoirs currently stand at a mere 29% of their capacity.

In response, the Moroccan government has implemented various measures to ensure a stable water supply, including cloud seeding and the construction of mobile desalination plants primarily used for agricultural purposes. In June, Morocco’s Crown Prince Moulay El Hassan launched the construction of Africa’s largest desalination plant in the commune of LamharzaEssahel, El Jadida province.

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GLOBAL WATER NEWS

With a projected annual production capacity of 300 million cubic meters, the plant is expected to serve an estimated 7.5 million inhabitants. The \$653 million project is part of Morocco's comprehensive strategy to address water scarcity, aligning with the 2020-2027 National Program for Drinking Water Supply and Irrigation.

In September, the Wall Street Journal commended Morocco's innovative approach to mitigating water scarcity by harnessing renewable energy to power advanced desalination plants. The country aims to source 52% of its electricity from renewables by 2030. The Agadir desalination plant, for instance, procures 275,000 cubic meters of water daily, with 150,000 cubic meters allocated for drinking water, sufficient to cover the basic daily needs of one million people.

The Safi seawater desalination plant, managed by the OCP Group, is also set to play a crucial role in alleviating the region's water crisis. Inaugurated in 2022, the plant boasts an annual production capacity of 40 million cubic meters, with plans to increase its output to 30 million cubic meters annually for Safi and an additional 20 million cubic meters for industrial use in the broader Marrakech-Safi region by 2026.

Furthermore, the JorfLasfar seawater desalination plant, operated by OCP Group, is scaling up its production to combat water scarcity in El Jadida and nearby areas. The plant expanded its output to 45 million cubic meters annually by 2022 and is on track to reach a production capacity of 300 million cubic meters by 2026.

Despite these efforts, Morocco's agriculture sector remains vulnerable to water scarcity, with approximately 80% of the cultivated area reliant on rain-fed agriculture as of 2022.

Inspired by Morocco's holistic water management approach, French President Emmanuel Macron expressed his admiration during a meeting organised by the OCP Group in October, as part of his three-day state visit to the country. Macron stated that France should take inspiration from Morocco's strategy, which includes water highways and urban desalination projects. As Spain looks to emulate Morocco's success in tackling water scarcity, Catalonia plans to have the Tordera II desalination plant in Blanes operational by 2029, with an investment of €290 million.

This expansion is expected to increase the production capacity from 20 to 80 cubic hectometers of water. By 2030, Catalonia aims to have an additional 280 cubic hectometers of water available through its desalination plant strategy.



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USIBC SIGNS MOU WITH GOVERNMENT OF TELANGANA, HOSTS AI AND GCC INDUSTRY ROUNDTABLE

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Hyderabad, Telangana, 10 December 2024 — The U.S. Chamber of Commerce's U.S. India Business Council Global Private Limited (USIBC GPL) and the Department of Information Technology, Electronics & Communications (IT E&C), Government of Telangana, signed a Memorandum of Understanding (MOU) to bolster U.S.-India collaboration and partnership in technological innovation.

The MOU was signed in the presence of Chief Guest, Honourable Minister for Information Technology (IT), Electronics & Communications (E&C), Industries & Commerce (I&C), and Legislative Affairs, Shri D Sridhar Babu and Special Chief Secretary to the Government of Telangana for IT E&C and I&C, Shri Jayesh Ranjan, Guest of Honour, Ms. Jennifer Larson, U.S. Consul General Hyderabad, and USIBC Managing Director Rahul Sharma.

The MoU outlines cooperation in key focus sectors including IT, Artificial Intelligence (AI), electronics and Global Capability Centers (GCCs). The signing was followed by an industry roundtable on AI and GCCs, reinforcing Hyderabad and Telangana's role as a global technology hub.

Honourable Minister Shri D. Sridhar Babu noted, "Telangana has emerged as a global leader in innovation, and this MoU marks a new chapter in deepening our partnership with the United States. Our collaboration with USIBC is focused on driving investment, fostering innovation, and generating employment opportunities, paving the way for a future powered by cutting-edge technologies such as AI and GCCs."

"Guest of Honour Ms. Jennifer Larson remarked, "The United States and India share a vision of leveraging technology to solve global challenges. This MoU is a testament to the strong collaboration between

Telangana and U.S. businesses, showcasing how regional partnerships can drive innovation, economic growth, and mutual prosperity."

"Special Chief Secretary to the Government of Telangana for IT E&C and I&C, Shri Jayesh Ranjan said, "Hyderabad's thriving technology ecosystem, supported by a robust talent pool and progressive policies, is a testament to the state's commitment to innovation. This partnership with USIBC will further position Telangana as a leading destination for global investments in emerging technologies."

The discussion highlighted Hyderabad's thriving ecosystem of skilled professionals and its pivotal role in U.S.-India collaborations. The participants explored AI-driven opportunities across sectors as well as the ways to optimally harness AI technological innovation for global good while at the same time prevent misuse via regulation, governance, ethical use, in a manner that does not stifle innovation. Rahul Sharma, Managing Director of USIBC, stated, "This MoU represents a pivotal moment in strengthening the technological and economic ties between the United

States and Telangana. By leveraging the state's dynamic ecosystem and the expertise of U.S. industry, we are unlocking new opportunities in AI and GCCs that will define the next phase of global innovation."

USIBC is proud to support this partnership, which underscores our dedication to advancing transformative initiatives and creating pathways for sustainable growth and shared success." USIBC is thrilled to deepen technological ties between U.S. and Indian regional governments and pursue activities with industry under U.S.-India initiative on critical and emerging technologies (iCET).

Launched at the U.S. Chamber of Commerce in January 2023, USIBC has worked closely with governments and industry in pursuing activities across iCET sectors including AI, semiconductors and electronics, advanced telecommunications, space tech, among other areas





DANFOSS INDIA REAFFIRMS AMBITIONS TO SUPPORT THE OFFICIAL 'MAKE IN INDIA' INITIATIVE BY ACCELERATING STRATEGIC LOCALIZATION OF HVACR COMPRESSORS AND CONTROLS

- Danfoss India presents a strong localization roadmap to cater to the estimated demand increase in the Indian Refrigeration & Air Conditioning (RAC) sector
- Danfoss India's ongoing additional investment commitment of INR 500 crores, announced early this year, will support the development of local manufacturing capabilities for HVACR (Heating, Ventilation, Air Conditioning & Refrigeration) Compressors and Controls
- India continues to be Danfoss' fastest-growing market, keeping the company on track to achieve its target of INR 5000 crores by 2026, with the expansion of geographic footprint in the region and the creation of more green professionals to support the nation's carbon neutrality ambitions.

2nd December 2024, Chennai: In a move that aligns with the Government of India's 'Make in India' initiative, Danfoss, a global leader in energy-efficient technologies, plans to progressively ramp up local manufacturing capabilities in India within the next five years. As the country's HVACR sector continues to expand rapidly, Danfoss management's decision to support its customers through increased localization and the addition of new production lines for HVACR compressors, heat exchangers & controls will help bring world-class Danfoss solutions to the Indian market at an accelerated pace.

The decision to invest in ramping up local manufacturing capabilities in India will help minimize the company's dependency on imports for the Indian market. It will also lead to repeated efforts to build/strengthen the local supplier ecosystem, a prerequisite for meeting the increasing market demands for Danfoss' solutions. It marks a major milestone in Danfoss' India manufacturing landscape, thus adding more sustainable, efficient, and affordable cooling solutions to its "Make in India" portfolio.

Kristian Strand, President, Danfoss Commercial Compressors, Denmark, emphasized, "India is a key pillar in our global strategy and has been for many years. We are committed to driving growth and sustainable innovation in the region, especially with a view to the fast-evolving market dynamics in the HVACR sector. Our focus on localizing our compressors' production, is not just about meeting local demand. It is also about helping to develop a local supplier ecosystem and investing long-term in India's future as a key player in our Global Climate Solutions operations. This strategic decision reaffirms our confidence in India's capabilities and our dedication to contributing to Danfoss India's growth and development."

Danfoss' range of compressors, heat exchangers & controls covers approximately 60-70% of customer requirements in India,

highlighting its commitment to staying close to customers to meet market demands.

The company aims to significantly increase its localization across various product segments in a phased manner as part of its strategic focus. Danfoss India's ongoing additional investment of INR 500 crores, announced earlier this year, is aimed at enhancing local manufacturing capabilities, leveraging local talents & transforming them into capable green professionals for the world, and expanding the company's geographic footprint in the region with more India for India solutions. This investment will also ensure that Danfoss remains competitive and responsive to geopolitical shifts and emerging business opportunities while staying on track with its 'Make in India' ambitions.

Mr Madhur Sehgal, Head of Climate Solutions, Danfoss India Region, highlighted, "The localization of our diverse compressors' portfolio & RAC controls will definitely be a game changer for the Indian HVACR industry. Through this localization move, we aim to develop a local supplier ecosystem, which is a prerequisite to succeed with our 'Make in India' ambitions, support our customers in their cooling & decarbonization journey, and contribute to India's green transition to ensure a sustainable tomorrow. Our unwavering focus will be on faster delivery of cutting-edge products and enhanced customer satisfaction."

In addition, Danfoss is dedicated to building more green professionals to drive future industry growth in India: Danfoss is actively engaging with select academic institutions pan India through its University Engagement Programs & CSR initiatives, setting up Centers of Excellence & supporting Research Facilities to nurture regional talent, promote studies on Sustainability within Engineering & Management domains, improve the percentage of women in HVACR sector, and create future green leaders, engineers, technicians and service staff for the country and the globe. The company also collaborates with Govt ITIs and Rural Community Colleges to support Refrigeration and Air conditioning-related courses to build a skilled HVACR community right from service technician levels to entrepreneurs & industry white-collars.

Ravichandran Purushothaman, President - Danfoss India Region, expressed, "Danfoss commitment to India is unwavering and deeply rooted in our strong belief in the Danfoss India team's solid potential as a manufacturing powerhouse for national and global markets. By nurturing indigenous talent & scaling up our local production capabilities for Air Conditioning and Refrigeration, we aim to deliver European-quality products & solutions more swiftly to the Indian market."

Danfoss India's investments in ramping up its local production capabilities also align with its strategic vision to exceed customer expectations, adapt swiftly to dynamic market demands, and

continue manufacturing in India for India and global markets. The company continues to redefine industry standards, combined with solidifying its name in the market for high quality, reliability, and performance, thus paving the way for a greener future and leading by example through its remarkable projects across varied industry sectors, duly supported by its strong employee and partner network nationwide, thereby reinforcing its position as a preferred decarbonization partner for India.

More information:

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S a m a y e s h w a r i V i t h a s p a -
samayeshwari.vithaspa@mslgroup.com

About Danfoss A/S:

Danfoss engineers solutions that increase machine productivity, reduce emissions, lower energy consumption, and enable electrification. Our solutions are used in such areas as refrigeration, air conditioning, heating, power conversion, motor control, industrial machinery, automotive, marine, and off- and on-highway equipment. We also provide solutions for renewable energy, such as solar and wind power, as well as district-energy infrastructure for cities. Our innovative engineering dates back to 1933. Danfoss is family and foundation-owned, employing more than 42,000 people and serving customers in more than 100 countries through a global footprint of 95 factories.

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About Danfoss India

Danfoss India is an industry leader focused on energy-efficient solutions and is a 100-percent-owned subsidiary of Danfoss Group. Danfoss India serves a wide range of industries that rely on Danfoss products like drives, heating valves, controls & solutions for refrigeration, air conditioning, HVAC, heavy industries, district cooling, hydraulics, fluid conveyance, and underfloor heating applications. Danfoss engineers technologies that enable the world of tomorrow to do more with less. Danfoss India Region is headquartered at Oragadam Chennai. Our focus is to design and innovate products for both India and outside market. Danfoss' nationwide sales and support network, a strong network of channel partners, and over 3500+ employees in India. Mr. Ravichandran Purushothaman is the President of Danfoss in India.

YOKOGAWA RELEASES OPREX SUBSEA POWER CABLE MONITORING TO DETECT DAMAGE AND ENABLE CONDITION-BASED MAINTENANCE AT OFFSHORE WIND FARMS

Yokogawa Electric Corporation (TOKYO: 6841) announces the release today of OpreXTM Subsea Power Cable Monitoring, a system for monitoring cables used in the transmission of electricity generated at offshore wind power facilities. By constantly monitoring temperature increases in the subsea power cables caused by damage, this product enables condition-based maintenance and the reduction of operational costs required for inspection and maintenance.

Subsea power cables at offshore wind power generation facilities are prone to faults and damage from natural disasters and accidents, and damage to these cables can lead to significant financial losses due to disruptions in the supply of power generated by these facilities. This makes regular inspection and maintenance essential. However, the cables are placed on the seabed over long distances, and maintenance requires the use of work vessels and divers, which results in substantial costs.

By utilizing Yokogawa's fiber optic temperature sensor*, OpreX Subsea Power Cable Monitoring is able to constantly monitor the temperature of subsea power cables and pinpoint abnormalities. This enables condition-based maintenance, in which maintenance is performed with optimum timing, thereby reducing the costs and workload required for regular inspections and maintenances, and maximizing operational efficiency. It can be applied to both new and existing offshore wind farms. This product can also be integrated into Yokogawa's OpreX Collaborative Information Server with video monitoring and other solutions, thereby enabling smooth and highly efficient operations through the centralized management of information on the operations management screen.

With its capabilities and established track record in serving the wind power generation industry, Yokogawa is able to provide support for every

aspect of this business, from the construction of systems to overall systems maintenance. With its focus on the system of systems concept, whereby collection of independently operated and managed systems connect to form a larger system, Yokogawa provides long-term integrated support and contributes to safe and secure operations.

* DTSX Fiber Optic Temperature Sensor:
<https://www.yokogawa.com/solutions/products-and-services/measurement/field-instruments-products/fiber-optic-sensor/>

Major Target Markets
Renewable energy

Applications
Monitoring of subsea power cables

For More Information
OpreX Subsea Power Cable Monitoring
<https://www.yokogawa.com/solutions/products-and-services/asset-management-and-integrity/subsea-power-cable-monitoring/>

Wind Power
<https://www.yokogawa.com/industries/renewable-energy/wind-power/>

About OpreX
OpreX is the comprehensive brand for Yokogawa's industrial automation (IA) and control business. The OpreX name stands for excellence in the technologies and solutions that Yokogawa cultivates through the co-creation of value with its customers, and encompasses the entire range of Yokogawa's IA products, services, and solutions. This brand comprises the following five categories: OpreX Transformation, OpreX Control, OpreX Measurement, OpreX Execution, and OpreX Lifecycle. One of the product groups that make up the OpreX Transformation category is the OpreX Asset Management and Integrity family, which

includes OpreX Subsea Power Cable Monitoring. OpreX Transformation delivers operational excellence throughout an enterprise's activities, from production through to supply chain optimization and risk and business management. With the OpreX brand, Yokogawa will deliver integrated solutions that address specific needs and support its customers in their efforts to transform and grow their businesses.

About Yokogawa

Yokogawa provides advanced solutions in the areas of measurement, control, and information to customers across a broad range of industries, including energy, chemicals, materials, pharmaceuticals, and food. Yokogawa addresses customer issues regarding the optimization of production, assets, and the supply chain with the effective application of digital technologies, enabling the transition to autonomous operations.

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CUTTING-EDGE INNOVATIONS IN WATER CONSERVATION: HOW SMART TECHNOLOGIES ARE TRANSFORMING INDIA'S WATER MANAGEMENT

Jitender Thirwani

Chief Operating Officer, SmarterHomes Technologies Pvt. Ltd.

India faces a severe water crisis, with around 600 million people experiencing high to extreme water stress. The NITI Aayog estimates that by 2030, India's water demand could double its available supply, leading to severe water scarcity for hundreds of millions of people and a potential 6% loss in GDP. Addressing this crisis requires more than traditional conservation methods; advanced technologies like IoT, AI, and cloud-based solutions are transforming water management across the country. Here's a look at how these innovations are impacting India's water landscape.

AI AND PREDICTIVE ANALYTICS: SMARTER WATER MANAGEMENT

Artificial Intelligence (AI) and predictive analytics are enhancing water distribution and reducing wastage in cities across India. In Maharashtra, AI-driven water management systems have been used to predict demand based on historical data, seasonal patterns, and real-time consumption trends. By optimizing resource allocation, this AI approach has resulted in a 25% reduction in water shortages in pilot urban areas and minimized water loss due to over-supply in certain zones (Maharashtra Jal Pradhikaran, 2022).

In Karnataka, AI-driven leak detection systems have been implemented by the state water department,

helping to identify inefficiencies within municipal water infrastructure. Early results indicate a 20% reduction in water loss through predictive maintenance and proactive repairs (Karnataka Urban Water Supply and Drainage Board, 2023). These technologies enable utilities to forecast usage, prevent shortages, and manage distribution more efficiently, which is crucial for water-scarce regions.

AUTOMATED LEAK DETECTION: SAVING MILLIONS OF LITERS

India loses an estimated 35-40% of its water supply to leaks in urban areas, according to the Central Public Health and Environmental Engineering Organization (CPHEEO). In response, automated leak detection technologies are being piloted in cities like Mumbai and Pune. Using acoustic sensors and machine learning algorithms, these systems have reduced leakage rates significantly. In Mumbai, leak detection technologies saved over 5 million liters of water daily in trial zones by catching small leaks before they turned into major issues (Brihanmumbai Municipal Corporation, 2023).

In Hyderabad, similar trials demonstrated that automated leak detection systems could reduce water loss by up to 30%, contributing to substantial cost savings for the municipal water board .

(Hyderabad Metropolitan Water Supply and Sewerage Board, 2022). This technology is not only essential for conservation but also for reducing the operational costs of water utilities, allowing them to reallocate resources to expand service areas.

CLOUD-BASED MONITORING: WATER MANAGEMENT IN THE PALM OF YOUR HAND

Cloud-based water management solutions are giving users—from residents to facility managers—access to real-time data and insights via mobile applications. These apps allow users to monitor consumption, receive leak alerts, and even control water flow remotely. In Delhi, pilot programs in commercial buildings showed that cloud-based monitoring reduced water consumption by 15-20% due to real-time alerts and remote management capabilities (Delhi Jal Board, 2023).

In many high-rise apartment complexes in Gurgaon, cloud-based monitoring solutions have empowered residents to track and limit their water use, resulting in a 12% drop in household water consumption on average (Gurgaon Metropolitan Development Authority, 2023). By making water usage data accessible at the touch of a button, these platforms are cultivating a more responsible approach to water consumption and conservation.

SMART METERS: PRECISION AND ACCOUNTABILITY IN WATER USE

Smart meters are helping Indian cities and communities take control of their water usage. These IoT-enabled devices provide real-time data on water consumption, allowing users to track and adjust their usage based on live information. In Bengaluru, studies have shown that implementing smart water meters in residential communities can reduce consumption by 20-30%, with an estimated savings of 3.5 million liters per day in large apartment complexes (Bengaluru Water Supply and Sewerage Board, 2023).

Across Indian metros, smart meters are aiding water utilities in quickly detecting leaks and alerting users to unusual consumption, which can prevent significant water wastage. Data from Chennai, where smart metering initiatives have been implemented in commercial buildings, indicates similar reductions, saving an average of 10-15% per building on daily consumption (Tamil Nadu Water Supply and Drainage Board, 2022).

BEYOND TECHNOLOGY: INSPIRING A CULTURE OF WATER STEWARDSHIP

Technology alone is only part of the solution. To drive impactful change, fostering a culture of water stewardship is essential. Many state governments and local organizations in India are running awareness campaigns to educate people on the benefits of efficient water use, often combined with technology-enabled water monitoring systems. In Pune, a government-led awareness initiative alongside smart meter installations helped reduce residential water usage by 10-15% as households became more mindful of their consumption (Pune Municipal Corporation, 2023).

In Chennai, local water conservation campaigns have been paired with metering and AI-based monitoring systems, leading to a 20% reduction in water consumption among commercial users who engaged with the program (Chennai Metro Water, 2023). These efforts highlight that while technology can guide, true conservation comes from awareness and a

commitment to sustainable practices.

LOOKING AHEAD: A VISION FOR SUSTAINABLE WATER MANAGEMENT

With IoT, AI, predictive analytics, and cloud-based solutions, India is making strides in addressing its water challenges. Studies suggest that implementing smart water management solutions across urban areas could reduce water losses by up to 40%, significantly easing water stress in the country's most affected regions (NITI Aayog, 2022). These technologies not only provide essential data but also encourage a shift in how people value and use water.

As these solutions become more widely adopted, India has the opportunity to create resilient water management systems that secure resources for generations to come. Through responsible usage, smart technology, and a collective commitment to conservation, every drop saved today is a step toward a sustainable future.

ABOUT THE AUTHOR



Jitender Thirwani has been part of the journey of SmarterHomes over the last decade. Jitender has over 18 years of experience in Business Development, Channel Sales, and Project Management.

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ABOUT SMARTERHOMES

SmarterHomes is a response to a real-world problem of lack of water metering in apartment buildings. Revolutionizing water management with IoT innovation. Empowering communities to measure, conserve, and thrive in the face of water scarcity challenges.



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MONITORING POLLUTED HIGHWAY RUNOFF. A MODERN ENVIRONMENTAL SOLUTION

Lalit Mohan

Flexim Flow India



Polluted water from motorways and highways is a significant environmental concern, contributing to the degradation of aquatic ecosystems and posing risks to human health. When vehicles travel on these roads, they deposit various pollutants such as oil, heavy metals, and tyre particles. Rainwater washes these contaminants into nearby waterways, resulting in polluted runoff. This runoff can then lead to the deterioration of water quality, harm aquatic life, and disrupt natural habitats.

CLAMP-ON ULTRASONIC FLOW MEASUREMENT – AN INNOVATIVE SOLUTION

One innovative solution to monitor and manage this runoff is clamp-on ultrasonic flow measurement technology. Unlike traditional flow measurement methods, which often require invasive installation techniques, clamp-on ultrasonic flow meters offer a

non-intrusive alternative. These devices are easily attached to the exterior of pipes, allowing for accurate flow measurement without the need for pipe modifications or system shutdowns.

SUCCESSFUL IMPLEMENTATION IN BELGIUM

As a leader in this technology, Emerson's Flexim clamp-on flow measurement systems are being implemented across Belgium to monitor highway runoff. By providing precise data on the volume and flow rate of runoff water, authorities are able to assess the extent of pollution and take timely action to mitigate its impact. The data collected helps in devising effective strategies for water treatment and pollution control, ultimately protecting the environment and public health.

BENEFITS OF CLAMP-ON ULTRASONIC FLOW





MEASUREMENT

The benefits of clamp-on ultrasonic flow measurement are manifold. The installation is straightforward and cost-effective, eliminating the need for any pipe modifications. Additionally, the technology is highly accurate and reliable, capable of measuring flow rates in various pipe materials and sizes. It also provides real-time data, which is crucial for timely decision-making and environmental management.

A CALL TO ACTION

Those facing similar challenges with highway runoff, could benefit greatly from adopting the Flexim approach. Implementing clamp-on ultrasonic flow measurement systems would allow for comprehensive monitoring of this runoff, helping to identify pollution hotspots and prioritise remediation efforts. By investing in such advanced technology, environmental protection measures can be enhanced, ensuring cleaner waterways and healthier ecosystems.

The integration of clamp-on ultrasonic flow measurement presents a practical and efficient

solution for monitoring polluted water runoff from motorways and highways. With the successful deployment of Flexim technology in Belgium serving as a model, others have a clear path to improving their own environmental monitoring and protection initiatives.

To find out more about the real-world water and wastewater management benefits of clamp-on ultrasonic flow measurement, contact Lalit Mohan – www.emerson.com | Lalit.Mohan@Emerson.com | +91 9811449285

ABOUT THE AUTHOR



A graduate in Chemical Engineering from Dr. S. S. Bhatnagar University Institute of Chemical Engineering, Panjab University, Chandigarh, India, Lalit Mohan has over 26 years of experience in Sales & Marketing of process instrumentation and automation in India and overseas.

With a deep understanding of process, he is able to support customers in optimizing their processes with the products he promotes. Flow metering is a passion, and Lalit loves learning new technologies. This insight helps him to position the perfect solution for his customers.

Lalit has worked on almost all flow technologies, and has been employed as Managing Director – India with Flexim Flow India Pvt Ltd for the past 8 years.

Lalit Mohan
Flexim Flow India

A BEACON OF HOPE IN A THIRST WORLD

Dilip Yewalekar, Senior Vice President

Senior Vice President, Jain Irrigation Systems Ltd.

Manisha Kinge, Manager

(M.Tech-Agri Engg), Jain Irrigation Systems Ltd.

REVIEW

Every human has the prime right to have safe drinking water on the earth. A safe water supply is the backbone of a healthy economy, yet is woefully prioritized, globally. Less than 50 percent of the population in India has access to safely managed drinking water. Two-thirds of India's 775 districts are affected by extreme water depletion and water shortage for drinking because of a lack of planning on water management. Another problem is the fast rate of groundwater depletion in India and other countries. Groundwater from over 30 million access points supplies 85% of drinking water in rural areas and 48 percent of water requirements in urban areas. (Source: JMP 2017).

Many National & international agencies (UN, Unicef, Unesco, FAO) are working to meet the challenges of WASH (Water, Sanitation & Hygiene) for humans.

Glasgow, 10th Nov 2021, The UNEP, and India signed an agreement on climate change and committed to achieving the target of SDG 6.3, and water conservation, energy conservation, environmental protection, and green energy are the task to achieve. By 2040, more than 50% countries in the world will fall under 50% water stress (Fig.1). In 2015, Sustainable Development Goals (SDGs) assessed, that less than 49% of the rural population is using safely managed drinking water (improved water supply located on-premises, available when needed, and free of contamination). (Source: JMP 2017). Till other districts are suffering from water shortage. Seawater is an option to overcome the shortage of water at least in the cities located along the coast.

It is not safe and advisable to use seawater directly for drinking purposes, because seawater contains a lot of

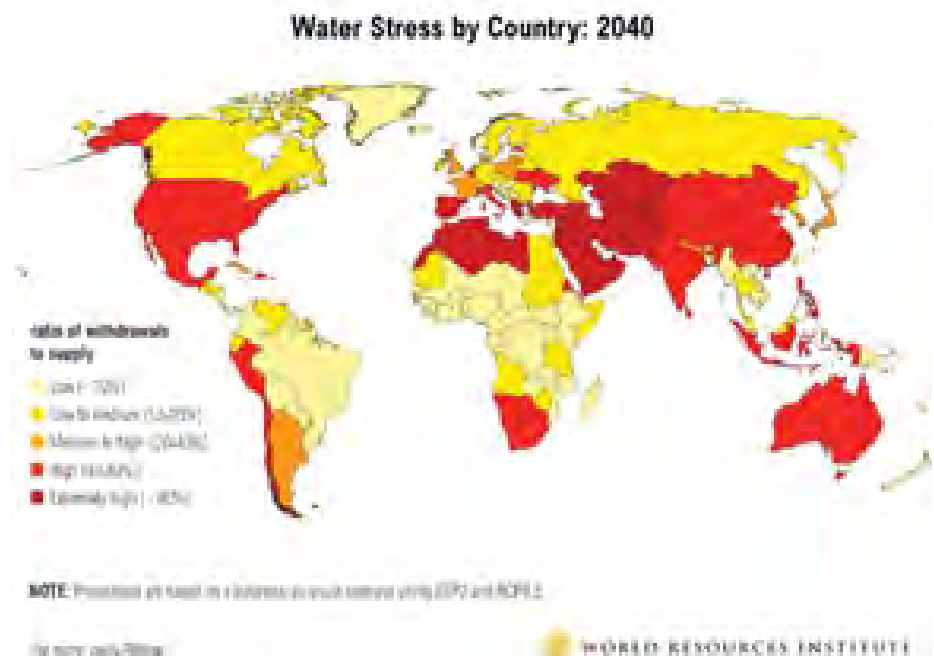


Figure 1: Water Stress Countries by 2040

salts, harmful chemicals & pathogens for humans. After desalination of seawater, the seawater can make potable for humans. But setting up the seawater desalination plant is a costly affair. Countries like Israel, USA, Gulf, have set up seawater desalination plants to serve potable water for the community. Because of the lack of technology and awareness only a few seawater desalination plants have been set up in India in Chennai & Gujarat. Now Government of India has geared up to set up a number of desalination plants in many places.

WHAT IS DESALINATION?

Desalination is the process of removing salts and other minerals from water, making it suitable for human consumption, irrigation, or industrial.

SEAWATER DESALINATION?

Seawater desalination is considered a solution to resolve water shortage in the world and helps to overcome the problem of at least drinking water in the majority of cities. Few of them are functional in India, Chennai, and abroad. It is not a new technology in the

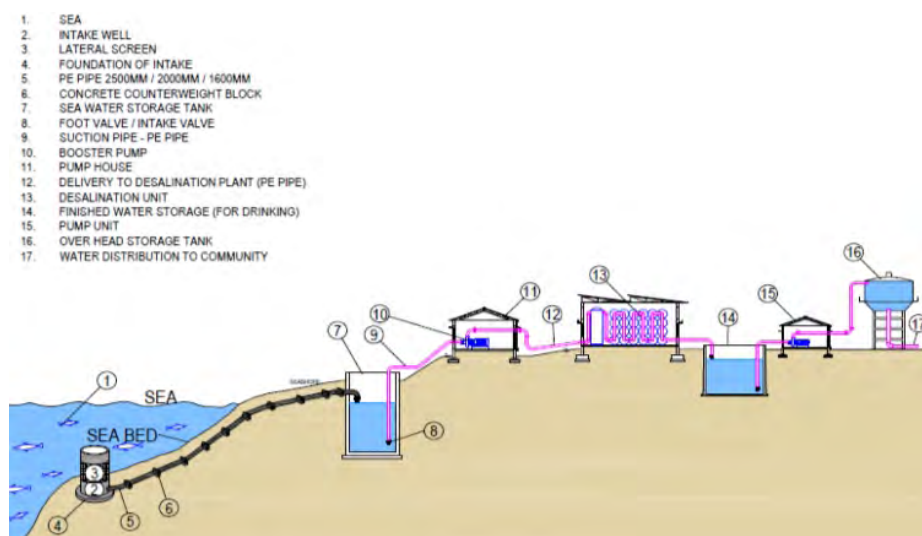


Figure 2. Schematic layout of a seawater desalination plant

world but is not taken as a serious option.

SALINE WATER?

Seawater is a complex mixture of 96.5 percent water, 2.5 percent salts, and smaller amounts of other substances, including dissolved inorganic and organic materials, particulates, and a few atmospheric gases. Seawater contains a high concentration of dissolved salts and is expressed in parts per million (ppm). Sodium, Chloride, Magnesium, Calcium, Sulphates, and Bromides, are present in seawater. Those chemicals are very reactive with metal in presence of Oxygen and cause corrosion. Based on concentration level appropriate treatment is performed to reduce its corrosive effects.

SEAWATER DESALINATION PLANT?

Seawater desalination plant comprising of the intake structure located in the sea bed, intake pipe placed at sea bed from sea to the water tank, filtration unit, desalination plant, finish water storage tank and main water distribution tank and distribution network to community. The schematic layout seawater desalination plant is shown in figure 2.

THE PERSPECTIVE OF THE WATER IN INDIA

India has only 4% fresh water available and is not sufficient to meet the demand for drinking water in the cities. India is among the world's most water-stressed countries according to the World Bank (figure 1). Water availability today has fallen down to 1/3rd of the water we had in the 1950s. The National Commission for Integrated Water Resources Development Plan has

estimated overall water demand of 1180 billion cubic meters which was 710 in 2010. Niti Aayog in their report has declared the current water scarcity as 'the worst water crisis in Indian History where about 60 crore people are facing high to extreme water stress. By 2030, the country's water demand is projected to be twice the available supply. This may affect our country in terms of food security, farmers' livelihoods, and the nation's economic development. Over the past few decades, groundwater has been exploited exponentially in India. As a result, India is the second-largest user of groundwater, digging out 25% of the total water extracted in the world. In terms of wastewater, we are not at all good enough to manage it.

FACTS OF INDIA'S WATER RESOURCES (SOURCE: THE NATIONAL SAMPLE SURVEY OFFICE-NSSO AUG 2014)

- Water resources in India include information on precipitation, surface and groundwater storage, and hydropower potential. India experiences average precipitation of 1,170 mm per year or about 1,720 cubic meters of fresh water per person per year.
- One option to solve the country's water woes is to create Rivers Inter-link & another option is to desalinate the seawater for drinking.
- Most of the rains occur during its monsoon seasons (June to September), with the northeast and north receiving far more rains than India's west and south.
- The main source of groundwater is the recharge from monsoon precipitation. About

58% of countries' annual rechargeable groundwater is contributed by monsoon rainfall. Other sources of recharge viz. seepage from canals, tanks, ponds, and other water structures and irrigation account for about 32%.

- The water crisis is imminent in villages because of the over-harvesting of ground-water resources.
- India records the world's highest per capita water-borne diseases because of unsafe water even more than some of the least developed nations.
- In most large cities about one-third of water never reaches the consumer because of leaks and poor maintenance. According to the Centre for Science and Environment, over 35% of water in Delhi and about 30% in Mumbai is lost because of leakage.
- About 70% of surface water resources in India are polluted.
- The major contributing factor to water pollution is wastewater from different sources, intensive agriculture, industrial production, infrastructure development, and untreated urban run-off.
- Every day 2.9 billion litres of wastewater from industrial and domestic sources are dumped into the river Ganga without treatment.
- Domestic effluents contribute a substantial proportion of water pollution in India. More than 70% of domestic untreated effluents are disposed-off to the environment.
- Countries with per-capita water availability of fewer than 1700 m3 per year are categorized as water-stressed, with per capita available water of 1545 m3 India is definitely a water-stressed country (India-WRIS wiki 2015, Census, 2011).
- The projected per capita water availability will become 1401 m3 and 1191 m3 by 2025 and 2050 respectively and eventually India is likely to become a water-scarce country (India-WRIS, 2015).
- 700 million people worldwide could be displaced by intense water scarcity by 2030.
- More people in rural India have access to phones than to safe drinking water. It is estimated that only 18 percent of the total rural population of 833 million have access to treated water. (Forbes India, 2015).

In a nutshell there is shortfall of drinking water for many cities and in future we have to opt sea water for drinking purpose after desalination. So in this context,

technology advancement in desalination is elaborated to get clarity and understanding.

THE EVOLUTION OF DESALINATION TECHNOLOGIES

Desalination has come a long way from its early days when energy-intensive thermal methods dominated the landscape. Modern advancements have significantly improved the efficiency and environmental footprint of desalination plants. The following sections explore the latest technological innovations in the field.

MEMBRANE TECHNOLOGIES

- **Reverse Osmosis (RO):** RO remains the most widely used desalination technology, relying on semi-permeable membranes to separate salt from water. Recent advancements in membrane materials and design have significantly improved the efficiency and energy consumption of RO systems.
- **Forward Osmosis (FO):** FO is an emerging technology that utilizes a draw solution to extract water from a saline solution. FO systems have the potential to reduce energy consumption compared to traditional RO systems, making them a promising option for future desalination plants.
- **Electro-dialysis (ED):** ED uses electrical potential to remove ions from saline water. While less energy-intensive than RO, ED is primarily suitable for treating brackish water with lower salinity levels.

ENERGY EFFICIENCY

- **Energy Recovery Devices (ERDs):** ERDs capture and recover energy from the high-pressure brine stream, significantly reducing the overall energy consumption of desalination plants.
- **Renewable Energy Integration:** Integrating renewable energy sources, such as solar and wind power, into desalination plants can further reduce their environmental impact and lower operating costs.
- **Innovative Energy Recovery Technologies:** Researchers are exploring novel energy recovery technologies, including osmotic power generation and thermos-acoustic energy conversion, to improve the energy efficiency of desalination systems.

BRINE MANAGEMENT

- **Brine Minimization Technologies:** Advanced membrane technologies and innovative process designs can minimize the amount of brine produced during desalination.
- **Brine Disposal and Reuse:** Responsible brine disposal and reuse practices are essential to mitigate the environmental impact of desalination. Brine can be used for various purposes, including irrigation, industrial processes, and aquaculture.

MODULAR AND DECENTRALIZED DESALINATION

- **Modular Desalination Systems:** Modular desalination systems offer flexibility and scalability, allowing for the deployment of smaller-scale plants to meet local water needs.
- **Decentralized Desalination:** Decentralized desalination can reduce the strain on centralized water infrastructure and improve water security in remote and underserved areas.

ZERO LIQUID DISCHARGE (ZLD)

ZLD systems aim to eliminate liquid waste by recovering water and converting the remaining brine into solid salts or other reusable forms. While ZLD requires significant energy, combining it with renewable energy sources can offset this drawback.

VAPOUR COMPRESSION AND ADVANCED THERMAL TECHNIQUES

- **Energy-efficient vapour compression:** desalination methods have shown a marked improvement in energy consumption, making thermal technologies more viable in areas where RO might not be suitable.
- **Dilution Strategies:** Innovations in diluting brine before discharge, using natural water bodies or mixing it with treated effluents, help minimize the impact on marine life. These methods are carefully designed to maintain ecological balance.

LOWER CAPITAL AND OPERATIONAL COSTS:

- **Modern desalination plants** are increasingly being built using modular designs and automated systems, which reduce the initial capital investment and ongoing maintenance costs.

- **Public-Private Partnerships (PPPs):** Governments are collaborating with private entities to fund large-scale desalination projects, sharing risks and ensuring the development of infrastructure capable of serving growing urban populations.

ENVIRONMENTAL AND ECONOMIC CHALLENGES

- **Energy Consumption:** Desalination is an energy-intensive process, contributing to
- **Greenhouse gas emissions.** However, advancements in energy efficiency and the integration of renewable energy sources can significantly reduce the environmental footprint of desalination.
- **Brine Disposal:** Proper brine disposal is crucial to protect marine ecosystems. Brine
- **Minimization technologies and responsible disposal practices** can mitigate the negative impacts of brine discharge.
- **Ecosystem Impact:** Desalination plants can have localized impacts on marine ecosystems,
- **Such as changes in water temperature and salinity.** Careful site selection and environmental impact assessments can minimize these effects.
- **Financial Sustainability:** Long-term financial sustainability is essential for the successful
- **Operation of desalination plants.** Innovative financing models, such as public-private partnerships, can help secure the necessary funding.

FUTURE DIRECTIONS AND RESEARCH

The future of desalination research focuses on enhancing technology to meet the twin challenges of sustainability and affordability.

ARTIFICIAL INTELLIGENCE AND AUTOMATION

AI-driven systems can optimize plant operations, predict maintenance needs, and improve overall efficiency. Machine learning algorithms help in real-time monitoring and adaptive adjustments, ensuring optimal performance.

BIOMIMETIC MEMBRANES

Inspired by natural processes like the water transport mechanisms in mangroves and fish gills, biomimetic membranes mimic biological systems to filter salt more effectively and with less energy.

ENHANCED PRE-TREATMENT PROCESSES

New pre-treatment methods, such as ultrasonic and electrochemical techniques, are improving water quality before desalination, leading to longer membrane lifespans and reduced operational costs.

CHALLENGES AND THE ROAD AHEAD DESPITE THESE ADVANCEMENTS, CHALLENGES REMAIN

Environmental Impact: Even with improved brine management techniques, large-scale desalination can have ecological consequences if not carefully monitored.

ENERGY DEMAND

Desalination remains an energy-intensive process, and balancing energy efficiency with production

POLICY AND REGULATION

Policymakers must enact and enforce regulations that support sustainable practices, incentivize renewable energy integration, and ensure environmental protection.

CASE STUDY

Tamil Nadu currently boasts of two functional desalination plants churning out 200 million liters of water per day (MLD) to quench its capital's thirst. Chennai is almost entirely dependent on the monsoon for its water supply, the failure of which puts the city in a tight spot. The state government, back in 2003-04, decided to go in for desalination to augment the municipal water supply. The two 100 MLD plants, one in Minjur and the other in Nemmeli, now contribute



Photo 1. PE Pipe 1600 mm, Seawater intake pipe at Chennai, Desalination plant.

close to one-third of the city's total water supply. Sustained governmental support has enabled Tamil capacity in India, making it the second-best in the country after Gujarat. Jain Irrigation has installed an HDPE Pipe of 1600 mm as a seawater intake pipe at Chennai Municipal Corporation for a desalination plant. (Photo 1).

CONCLUSIONS:

The role of desalination in addressing the global water crisis is more critical than ever. Through continuous technological innovations, strides in energy efficiency, and responsible environmental practices, desalination can evolve from being a stopgap measure to a cornerstone of water security. As nations around the world embrace these advancements, the potential for a sustainable, reliable water future becomes increasingly attainable.

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- M.Tech- Civil- Structural Engg, PG Diploma in Piping Engg, AMIE, UK, ASAE, USA,
- Google Scholar, Research Gate Scholar. Member of ICID. Fellowship World Bank and Mashav, Israel. Faculty: Govt College of Engg, Jalgaon. Faculty: Micro Irrigation Course of ICID & CWC, Govt of India. Reviewer-ICID Conference, Beijing, China 2023

AWARDS:

- The EEF Global Water Leadership Award – Global Water foundations.
- Strategic Leader in Micro Irrigation – ABSA Award. Professional Excellence Individual Award – Aqua foundations. Great Manager 250 Award, Economics Times, honored by Hon Kumar Mangalam, Birla Group. Best Innovative Article in Sabujeema International Magazine
- Overall all experience of 36+ years in Water Management – Irrigation, Agriculture, Civil Engineering, Planning, Designing, Execution, Management & marketing in India and Abroad. 100+ papers/publications at national/international conferences/magazines/books.



Manisha Kinge
(M.Tech-Agri Engg), Jain Irrigation Systems Ltd.

- Manisha Kinge (M.Tech-Agri Engg)
- Manager – Design & Projects (Dom/Export),
- Faculty: Micro Irrigation Course of ICID & CWC, Govt of India.

AWARDS:

- Recipient of ABSA 2023 Award: Women Creating Impact in Agriculture - Micro Irrigation
- Best Innovative Article in Sabujeema International Magazine
- Overall experience of 18+ years in Water Management – Irrigation, Agriculture - Planning, Designing, Execution, Management & marketing in India and Abroad.
- 35+ papers/publications at national/international conferences/magazines/books.

DIGITAL TRANSFORMATION IN WATER UTILITY

Ran Kedem,

Partner at Reali Technologies Ltd

BACKGROUND:

Many water utilities around the world have been suffering for years from underinvestment, alongside significant deterioration of the water system due to aging infrastructure and inadequate maintenance.

Today, water utilities face additional challenges, such as increased water consumption coupled with a decrease in water sources due to extreme climatic events, pollution, and inefficient management of existing systems. Additionally, there is a need to enhance control and monitoring of all water systems to ensure a continuous supply of safe drinking water to the entire population. This challenge is even greater in rural and remote areas, where there are additional issues such as resource scarcity, lack of skilled manpower, rising operational costs, and limited budgets.

To address these challenges, it is necessary to focus on two levels: the operational level and the data management level.

At the operational level, we can define five main challenges:

- Intermittent water supply
- Limited maintenance and service levels
- Lack of automation, remote monitoring, and control, resulting in a lack of real-time data
- Delayed response to critical events, causing significant damage and expenses
- Limited or non-existent corporate governance, both at the utility and state/national levels.

In terms of data challenges, there was a time when the primary issue was the insufficient data available about the operation within the water network. However, today, the capacity to gather real-time data from the field is virtually limitless. This abundance of information introduces new challenges related to managing this data and utilizing it in real-time to address the operational challenges previously



Draw 1 – Water utilities challenges

mentioned.

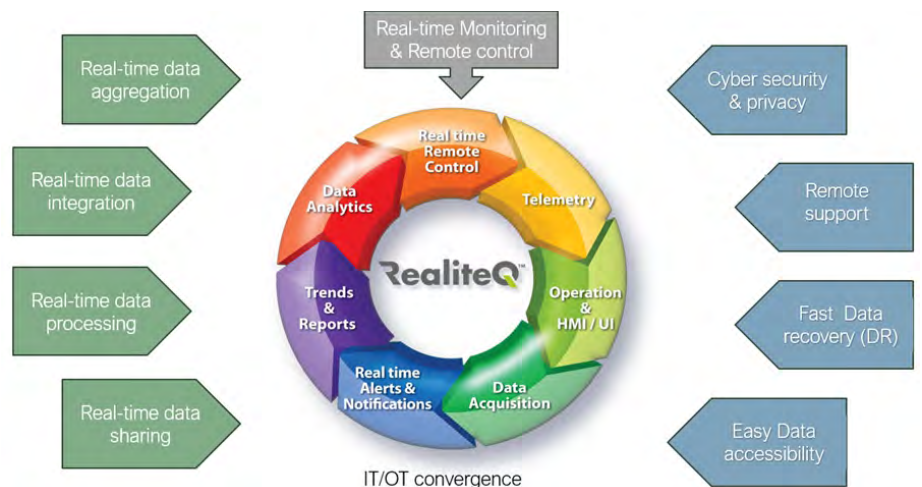
The first step in improving the operation of water systems lies in the real-time collection and management of relevant and accurate data from remote facilities. Considering this, the characteristics required of data management systems in water corporations include the following parameters:

- Real-time data collection from all critical sites
- Real-time monitoring and remote control
- Real-time data aggregation
- Real-time data integration
- Real-time data processing
- Real-time data sharing

Additionally, we must address the cybersecurity challenge due to global threats to strategic facilities, including water systems.

THE DIGITAL TRANSFORMATION CHALLENGE:

Digital transformation is the integration of the physical-operational layer with the digital-informational layer. It involves incorporating Internet of Things (IoT) and cloud computing technologies into an organization to enhance control, safety, efficiency, productivity, and ultimately improve the organization's operations and business outcomes.



Draw 2 – "Must have" requirements from modern information technology system

Without a doubt, digital transformation represents the most significant revolution in the water market since the introduction of control and automation technologies.

In 2016, GWI magazine published a report highlighting that the water and wastewater industry is transitioning to a digital revolution. Digital transformation is a game changer for water utilities, adding value by connecting real-time data, people, and processes



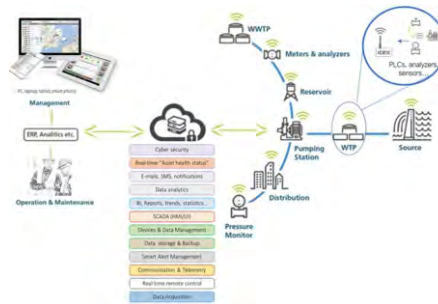
Draw 3 - Value Creation Connecting in Real-Time Data + People + Processing

However, a recent publication by the SWAN forum stated, "The United States represents the epicentre of the global digital economy, at least in terms of technology development and go-to-market strategies. The U.S. municipal water sector, however, has lagged its peers in other advanced economies" (SmartWater Report, SWAN).

This phenomenon characterizes not only the water companies in the USA but is typical of a considerable part of the water companies around the world. Various studies point to a variety of reasons for this, but all agree on three main factors contributing to the slow adoption of the digital transformation process:

- Cost (construction and maintenance)
- Technological complexity (installation, maintenance, and use) due to a lack of skilled teams
- Information security (especially cyber protection)

To address these challenges and simplify the digital transformation process while ensuring it remains secure and affordable for all, a fifth market segment has been introduced in recent years. This segment offers comprehensive cloud software and IoT hardware solutions that span from the infrastructure level, including communication, up to the ICT and SCADA systems level, and extend to cybersecurity and data analytics. This market segment is developing at a fast pace and is led by RealiteQ". (Frost & Sullivan)



Draw 4 – Holistic platform for water utilitiesg

in this article we will present a case study of implementation of digital transformation in large water utility with decentralized system, using most advanced holistic platform.

CASE STUDY: DIGITAL TRANSFORMATION IMPLEMENTATION IN WATER UTILITY

Background:

The Water Commission of the State of Mexico – CAEM, is a decentralized public entity known as the "State Commission for Water and Sanitation," with its own legal status and assets. Its general purpose is to build, maintain, operate, and manage potable water and sewer systems for the benefit of urban and rural communities in the State of Mexico. Essentially, it is responsible for the distribution of potable water in the State of Mexico and its municipalities, and thus operates specialized facilities for the storage, distribution, and exploitation of potable water wells.

In the second half of 2019, there was an overflow in one of the most important water storage tanks in the eastern area of the State of Mexico. This situation presented the first opportunity to demonstrate the effectiveness of process automation in water management facilities through real-time remote control and monitoring via the IIoT platform from RealiteQ. This initiative started with the Cerro Gordo tank located in the municipality of Ecatepec, which has now become possibly the largest project in Mexico in terms of the number of installations controlled remotely and in real time.

The organization's management was aware of the technology offered by RealiteQ through prior work with our local solutions integrator, who immediately proposed a plan to eliminate the operational risk of continued tank overflows due to operational errors, primarily caused by the lack of personnel or the handling of valves and pumping equipment at specific times.

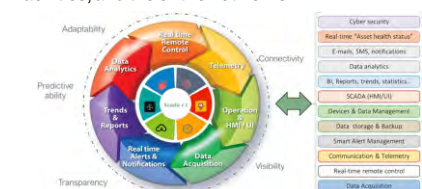
Within a week, our local integrator implemented the improvement plan, which involved automating the tank's operational processes. Manual measurements were replaced with a complete set of digital sensors to obtain tank levels, start and stop pumping equipment, gather data from various flow meters installed in the network, and automated valves to control flow based on operational directives defined by CAEM management according to water distribution needs. Since then, the Cerro Gordo tank has been remotely controlled in real-time and operates autonomously according to operational guidelines, minimizing personnel intervention. As a result, there have been no tank overflows since it began operating automatically through the RealiteQ platform.

ABOUT REALITEQ SCADA 4.0 HOLISTIC PLATFORM

RealiteQ Scada 4.0 - Bundle of IIoT & cloud programs & tools from the infrastructure level through the ICT, SCADA level and up to the Cybersecurity & data analytics level for real time, remote-control operation & Data management



RealiteQ is a Holistic solution for digital transformation - single-source solution of IIoT hardware and Cloud software from the infrastructure level through the ICT & SCADA level and up to the Cybersecurity & data analytics level, providing a comprehensive solution for real-time, Secured, remote-control operation & Data management from "A" to "Z" (Data acquisition, telemetry, real-time & historian data management, Alert & Notification, data analytics & BI, cybersecurity, remote control & visualization) of devices, sites, facilities, and the entire networks.



Draw 5 – RealiteQ Scada 4.0 – the fifth segment

RealiteQ allowing real-time interfacing between all the different devices from different manufacturers on site and connecting all sites in the network together, allowing data sharing and improve the transparency within the utility to provide the highest quality information to the operational level and decision-makers.

The technology consists of four system components:

- ICEX (Integrated Cellular and Ethernet Explorer) – Smart gateway installed in remote sites.
- COMP (Central Online Management Portal) – Mediates communication, data, security & users.
- UI – Browser-based graphical user interface (HMI/SCADA)
- VPN – for remote secured accesses to PLC on remote sites

RealiteQ is on the one hand, the most advanced solution existing today but on the other hand, it is simple to install, use and maintain, it is highly secured, and most importantly it is affordable to any organization from the smallest to the largest.

SCOPE OF WORK:

With the evidence of efficiency in managing such installations, CAEM decided to extend the pilot project to its entire network and for that they have been engaged with APRA - a Mexican company dedicated to offering end-to-end comprehensive solutions. The collaboration model designed for CAEM is an integral service that develops the process automation plan, transitioning from manual/analog to digital operation, and is responsible for the equipment, maintenance, and replacement of all necessary components for the operation of the automation system. This ensures that each component functions adequately and that those that fail are replaced as quickly as possible, ensuring uninterrupted operation once a facility is automated.

Additionally, APRA handles all the design work of automated processes and their programming, as well as the initial configuration of the platform and the multiple control dashboards.

The service is complemented by ongoing training for users authorized by CAEM management.

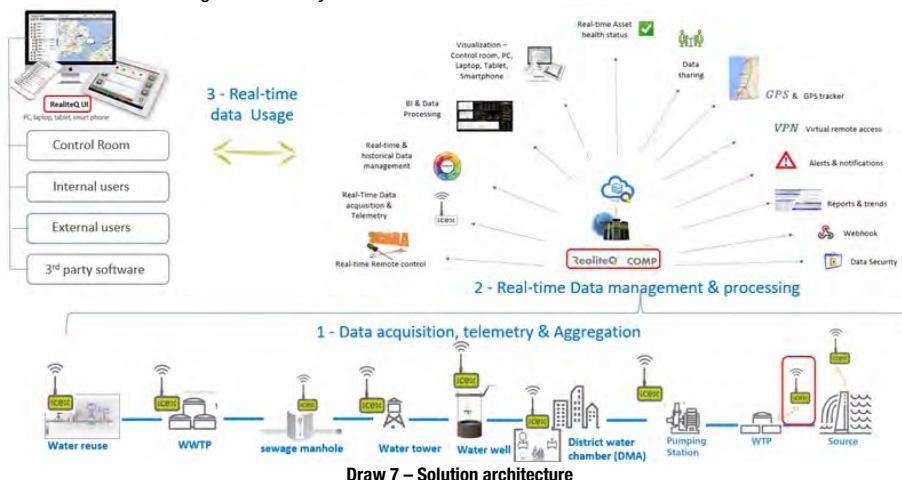
THE PROJECT INCLUDES:

- Installation of electrical and communication network engineering to comply with the project specifications at each site.
- Automation configuration: networking, device programming, provision of various measuring instruments and sensors.
- 24/7 permanent maintenance of the automation system: maintenance and replacement of any device required in the operation of the tanks.



Draw 6 – Project scope of work, the 5 stages

- Remote monitoring and control of site operation 24/7 from any place.
- All sites are connected to one centralized remote monitoring and control system.
- Water storage tanks with capacities up to 50,000 cubic meters
- Water conveyance lines with diameters up to 60 inches over dozens of kilometers



Draw 7 – Solution architecture

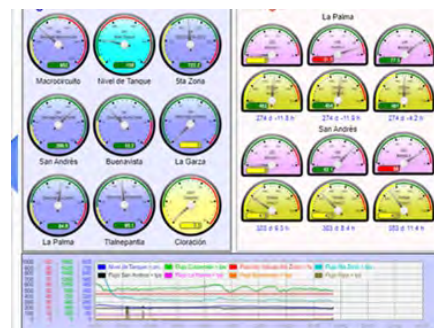
THE PROJECT OBJECTIVES:

- Remote monitoring and control of site operation 24/7 from any place.
- The facility can be operated under the guidelines authorized by Operations DG remotely and in real time, without restriction of schedules or the distance it is.
- Values of all measured and controlled parameters are presented in real time in an intuitive, easy to follow manner. Historical data of important measured parameters enables optimizing of different parts and the whole process.

- Pumping plants
- Monitoring of pressure in conveyance lines at critical points
- Automated valves controlled by target flow or specific volume across different communities or urban areas
- Deep potable water wells where the production of each installation and the status of their assets, such as pump motors, are monitored
- Water Treatment Plant
- Weather stations for monitoring climatological variables, mainly rainfall

Over the past four years, the original scope of process automation for potable water management has expanded to various types of installations in more than 120 facilities.

Currently, CAEM controls via the RealiteQ wide range of facilities including:



Draw 8 – RealiteQ dashboard of BI & Trends



Draw 8 – RealiteQ dashboard of BI & Trends

As part of the solution CAEM have all the tools they need to improve the operational efficiency of the connected facilities using RealiteQ UI which includes, operational dashboards, trends, tables, smart alert and notification system, BI dashboards....:

RESULTS & OUTCOME:

Using RealiteQ not only allow to have real-time monitoring and remote control (SCADA) of the remote facilities, but it also provides:

IT/OT convergence (real-time data integration)- Real-time processing & integrates information technology (IT) with operational technology (OT) used to monitor events, processes, and devices, adjusts in networks sites, machines, enterprise and industrial operations and offers significant benefits in cost, quality, speed and reliability.

Data management - RealiteQ platform is much more than just a remote-control platform, it is a real-time data management system from A to Z, from the data acquisition to Big data analytics. By using RealiteQ you are not only operating and controlling the system in real-time, but you also can use the data to increase efficiency.



Draw 9 – The connected facilities



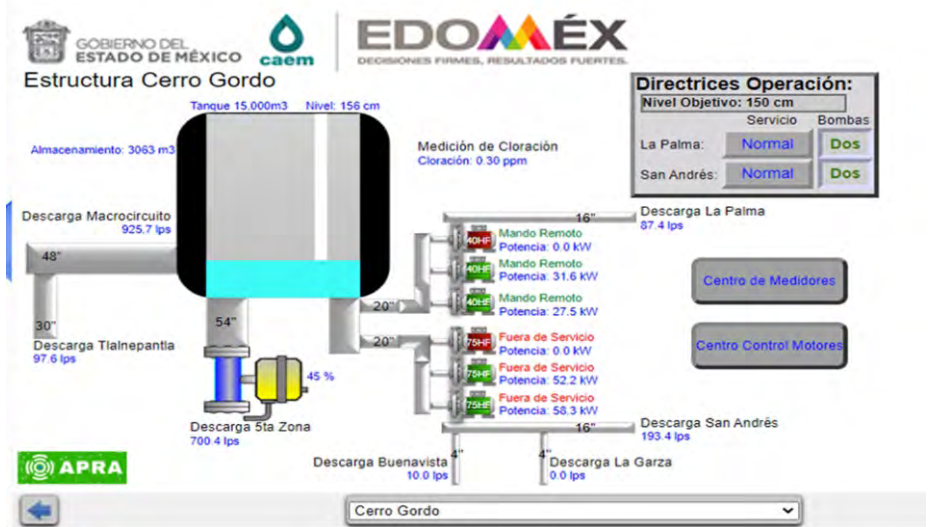
Draw 10 – some of the facilities

Data Aggregation - Real time Data aggregation and data analysis to improve the utility operational efficiency is one of the biggest challenges water utilities are facing today, RealiteQ makes it available, accessible, and affordable to any utility by providing real-time secured IT/OT convergence.

Real time display of assets health - RealiteQ provides for real time graphic display (on a Google map and more) of the status of each of the devices (assets) connected using a dashboard display.

- secure hierarchical central system at the country (and even global) level. The system allows for access by an unlimited number of users (according to personal authorizations) while building a clear hierarchy from the worker on the ground to the facility level, network operator, regional manager... to the entire country and world

The project was very successful and the main CAEM



Draw 11 – RealiteQ SCADA dashboard for remote control

- **Smart alerts system** – highly advanced mechanism for managing faults. Each fault may be defined as a fault that requires a confirmation action, deliberate faults may be silenced for an extended time, there is no limit to the number of faults or the number of fault recipients, a “nagging” mechanism may be used for recurrent alerts until the problem is resolved, and there is an alert escalation mechanism, ensuring that it is transferred to a number of parties based on the priority for remedial action .
- **Secure hierarchical system** – the Comprehensive Cloud based SCADA system allows for connection of local systems to a
 - has achievements from the project were:
 - Increase in safety in the operating guidelines.
 - Reduce operational costs
 - Reduce water loss
 - Save energy
 - Service without interruption.
 - Stability in different basic parameters, such as:
 - Storage levels.
 - Exact water consumption for each circuit
 - Eliminating the overflow of storage tanks
 - Reducing emergency response times
 - Operating water distribution circuits remotely
 - Having information on operational trends of different installations

- Sharing critical potable water availability information with municipalities.

COSTUMER TESTIMONY (CAEM - ING. SALVADOR IBARRA. DIRECTOR OF FACILITIES MAINTENANCE):

- The communication between different CAEM's areas improved given a better, quicker and accurate information flow about several performance operative variables produced at facilities level.
- Better control and efficiency in water distribution. Now we can determine target flows at specific times and areas of the city based on hard and accurate data in real time using the ReliteQ's Central Management Online Portal.

- Improved relationship with community leaders. We can share with the community and its representatives accurate and reliable information about the flows that are delivered in certain periods of time at different seasons of the year and demonstrate that we comply with the agreed commitments.
- With RealiteQ the time to attend municipal authorities' requirements for the distribution of drinking water has improved significantly because now from the central online management portal we can change the flows in different conduction lines simultaneously and in real time, having the ability to respond immediately to the demands of the community.
- Reduction of maintenance costs. We have reduced total stop hours at facilities due to the failure of pumping equipment. With the

RealiteQ platform it is possible to permanently monitor the main performance variables of the pumping equipment and determine in advance when any equipment requires repair.

- We achieved the elimination of the risk of flooding of facilities due to sudden excess inflows that are greater than storage tank capacity, it resulted in the total loss of expensive water pumps and electrical installations.
- The use of the RealiteQ Platform allows us to operate our facilities in a safer environment for our collaborators. Before RealiteQ, it was normal to send personnel to facilities far from the city to manipulate valves or pumps at night and in high-risk areas in security terms. Now all facilities inflows and outflows are monitored at any time by the responsible personnel.

CONCLUSIONS:

I believe that the solution presented in this article and the successful case study is very relevant for the water market in India (cities as well as remote rural villages) as well as many other areas in the world who suffered from all of some of the challenges described in this article

This corresponds very closely with the priorities set by the Government of India and the initiatives that the Government of India has been leading in recent years. The government of India's focus on improving water management and conservation, as well as increasing access to clean water for all citizens. The government is encouraging and investing in digital transformation initiatives in the water utilities sector.

One of the main initiatives for digital transformation in the water utilities sector in India is the "Smart Cities Mission" focuses on the use of digital technologies to improve the quality of life and service delivery in the cities. Another initiative is the "AMRUT" (Atal Mission for Rejuvenation and Urban Transformation) and "AMRUT 2.0 scheme, which aims to provide basic infrastructure in 500 cities and towns across India. The scheme also focuses on the use of digital technologies to improve water management and Distribution.

ABOUT THE AUTHOR



Ran Kedem,
Partner at Reali Technologies Ltd

Partner at Reali Technologies Ltd, a breakthrough company in IoT & Cloud computing for real-time remote control and data management. The developer of RealiteQ – Scada 4.0

Ran has 30 years of executive management experience in Global Business development in the field of advanced environmental technologies with emphasis on water & agriculture. Ran holds two academic degrees B.Sc. in Water and soil sciences and MBA.

Prior to Reali technology Ran was part of the founding team and served as EVP at Miya, (a global company specialized in large scale NRW & water efficiency projects), leading some of the world largest and most successful NRW reduction projects. Recently (August 2024) Ran was an expert guest lecturer in a four-day course on achieving 24/7 drinking water supply in Urban Centers was successfully organized by Atal Mission for Rejuvenation and Urban Transformation (AMRUT), and Indian Institute of Technology, Madras. Ran also was a panel member at the CII-Triveni Water Institute. The panel was about "Disruptive Technologies, Digital IoT for Water and Wastewater Management" was an intriguing session at the recently concluded CII Water-Tech Summit 2024.

Ran was a member of the Steering Committee "International Standards for smart Water management" (ISO/TC).

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HIDROING DEVELOPS SMART WATER SOLUTIONS FOR 144-YEAR-OLD WATER SUPPLY NETWORK IN ZAGREB, CROATIA

Sandra DiMatteo

Marketing Director for Water at Bentley Systems

OPENFLOWS AND OPENUTILITIES SAVE 16 MONTHS WHEN DELIVERING ONE OF THE LARGEST DIGITAL TWINS IN EASTERN EUROPE

MODERNIZING ONE OF THE WORLD'S OLDEST WATER SUPPLY SYSTEMS

Originally constructed in 1878, the 144-year-old Zagreb water supply system is one of the oldest functioning water networks in the world. At that time, the capacity of the constructed system was 53.2 liters per second via a 4-kilometer-long pipeline that provides water to 11,150 of the 30,000 inhabitants in Zagreb, the capital and largest city of Croatia. ViO



Hidroing was tasked with developing a GIS system and hydraulic model of one of the world's oldest water supply systems.

Zagreb has been responsible for the city's public water supply since its inception, including



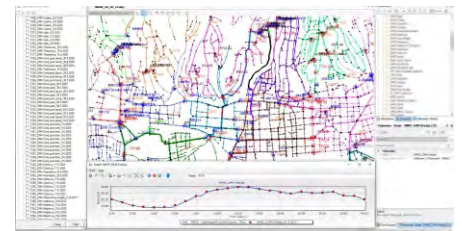
Using OpenFlows and OpenUtilities, they finalized the hydraulic model in just 20 months instead of the expected 36 months..

construction and rehabilitation of the network infrastructure. The organization ensures reliable water distribution to the growing number of residents. To cover water services for now over 900,000 people across 800 square kilometers, the water supply network was expanded, spanning 3,500 kilometers with seven water sources, more than 400 components, and a daily water intake of 310,000 cubic meters.

Over the last two decades, water loss has grown significantly and sharply worsened after the occurrence of earthquakes in 2020. To resolve these losses and modernize the network, ViO Zagreb retained Hidroing to develop a detailed master plan and water loss program, digitalizing the system for optimal water distribution over the next 30 years of operation. "The project was developed to be used as a statistical and reporting tool, [where digital] protocols were developed for direct data analysis in activities of water loss reporting," said Igor Dundović, project manager at Hidroing.

STRIVING TO OPTIMIZE NETWORK OPERATIONS

The EUR 1 million project required Hidroing to develop a detailed hydraulic model based on an updated GIS model that enabled water loss analysis and detailed diagnosis of the supply system, including modeling of district meter area (DMA) zoning and numerous measurement points. "Our final goal was to establish a hydraulic model with all GIS data to be used for conceptioneering by ViO Zagreb development sector,



The digital twin provides a single source of truth for the owner, improving decision-making and driving smart water management over the next 30 years..

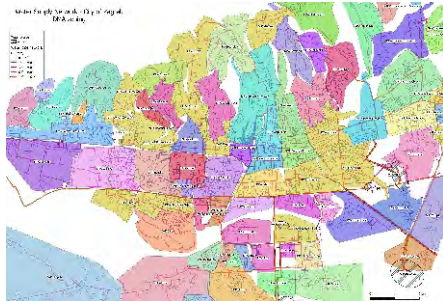
and as a digital twin for ViO Zagreb's operational sector," said Dundović.

However, Hidroing faced significant data collection challenges and difficulties measuring flow, pressure, and chlorine levels. To meet the owner's digital expectations, streamlining access to reliable network data and optimizing network operations, they realized

that they needed an integrated technology solution to facilitate smart water management.

BENTLEY APPLICATIONS SUPPORT DIGITAL TWIN SOLUTION

After considering their options, Hidroing selected



Bentley's OpenFlows and OpenUtilities applications for GIS development, 3D modeling, hydraulic modeling, and on-site operations and facility management. "As a big project with a big database, our company decided to use Bentley products for all tasks," said Dundović. They modeled 3,000 measurement points, 144 DMA zones with individual scenarios and water balance management, and 3,500 kilometers of pipeline, creating and calibrating a hydraulic model. Using Bentley applications, they linked water loss calculation input data, including pipe length, the number of service connections, flow, real water loss, and average pressure. They stored and reported this statistical network data through the GIS platform and transferred it directly to the hydraulic model, providing a single source of truth to extract data based on real-life changes in the system and resolve water loss.

Bentley's hydraulic modeling solution enabled them to combine all network analyses into a digital twin, simulating system operations and more than 150 scenarios, including scenarios for every DMA zone. models in Eastern Europe, facilitating smart water solutions.

A DIGITAL TWIN INDUSTRIALIZES NETWORK MANAGEMENT

Using Bentley's advanced digital platforms, Hidroing established a digital twin to improve processes and development of the Zagreb water supply system. The integrated modeling and analysis solution enabled real-time processing of input data, eliminating time-consuming manual data manipulation and validation, accelerating model calibration and delivery by 16

months. Using OpenFlows and OpenUtilities, the team delivered a final model and digital twin, pinpointing 50 actions to reduce water loss. "Final delivery time was reduced from an estimated 36 months to 20 months. This time reduction enabled faster digital twin implementation and an earlier start to the water loss reduction program," said Dundović. The digital twin solution brings direct savings in water loss and minimizes environmental impact by reducing water intake and electricity usage.

Given the recent earthquakes and frequent ruptures of the Zagreb water pipes over the last few years, ViO Zagreb recognized the importance of digitalizing their water network and implementing smart water management processes. To meet the owner's technology expectations, Hidroing delivered a digital twin that can be used for ViO Zagreb to make more informed decisions regarding their supply system's development, operations, and future planning, industrializing network management of the capital city's water infrastructure. "After devastating earthquakes during March 2020 in the city of Zagreb, these kinds of projects are even more significant in a way that during development of master plans, water safety and distribution alternatives are now mandatory," said Dundović.

Project Summary

Organization: Hidroing d.o.o.

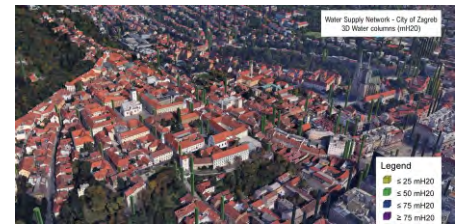
Solution: Water, Wastewater, and Stormwater Networks

Location: Zagreb, Croatia

Project Objectives:

- To combine all network analyses into a digital twin.
- To provide a single source of truth for improved decision-making and optimal water supply operations.

Project Playbook: ContextCapture, MicroStation



,OpenFlows HAMMER, OpenFlows WaterGEMS, OpenFlows WaterOPS, OpenUtilities.

Fast Facts

- Recent earthquakes and significant water loss prompted ViO Zagreb to digitalize their water supply system for better network management.
- Hidroing was retained to develop a master plan and water loss program for the network's next 30 years of operations.
- Hidroing used Bentley applications to combine all network analysis into one of the largest digital twins in Eastern Europe.

ROI

- Using OpenFlows and OpenUtilities, Hidroing modeled 3,000 measurement points and 3,500 kilometers of piping, creating a calibrated hydraulic model.
- Bentley's applications streamlined data integration between the GIS system and model, saving 16 months while delivering a network digital twin.
- The digital twin facilitates better decision-making and smart management for one of the world's oldest water supply systems.

"Bentley products helped us in reducing [resource] hours, which directly increased the speed of final product implementation and the usage of the hydraulic model for water loss reduction." — Igor Dundović, Project Manager, Hidroing d.o.o.

ABOUT THE AUTHOR



Sandra DiMatteo is the industry marketing director for water at Bentley Systems. She can be reached at sandra.dimatteo@bentley.com.

Sandra DiMatteo

Marketing Director for Water at Bentley Systems

QDOS CWT CHEMICAL METERING PUMP DOSES CHLORINE WITHOUT FAIL FOR OVER 15,000 HOURS AT ERGON INC.

Adeel Hassan

Product Manager at Watson-Marlow Fluid Technology Solutions

- A Qdos CWT (Conveying Wave Technology™) chemical metering pump is dosing chlorine at Ergon – West Virginia Inc.'s crude oil refinery in Newell
- Ergon has switched to Qdos CWT for its reliability and longer life to dose chlorine
- Diaphragm pumps lasted eight to ten months on average for Ergon, but the Qdos CWT had a life of more than 21 months (equivalent to 15,000 hours)

A Qdos CWT (Conveying Wave Technology™) chemical metering pump ran for over 21 months dosing chlorine at Ergon – West Virginia Inc.'s paraffinic refinery in Newell, West Virginia in the United States, after replacing a diaphragm pump which lasted less than half the time on average.

The Qdos CWT pump, which is now available with 130 PSI (9 bar) pressure capability, is dosing chlorine into the raw water stream as part of a process to produce sodium hydrosulfide (NaHS) for the paper and pulp industry.

Diaphragm injection pumps were lasting eight to ten months in the chlorine application for Ergon, which wanted a longer lasting, lower maintenance alternative option.

Ergon installed a Qdos CWT pump, which ran continuously from February 8, 2022 to November 21, 2023.

Qdos CWT, part of the Qdos range from Watson-Marlow Fluid Technology Solutions (WMFTS), has improved reliability and reduced maintenance for Ergon for this application at the crude oil refinery, which has a wide customer base for a variety of paraffinic process and base oils Ergon produces at Newell.

Bob Bowers, Maintenance Planner/Coordinator at Ergon West Virginia, Inc., said: "The pump is dosing 200 ppm (parts per million) chlorine into the raw water stream for our softener that feeds the fuel gas treatment system. It pumps 6 mL per hour, day in and day out without a hitch. The water from the softening system is used to help flush hydrogen sulfide (H₂S) from our refinery fuel gas and carry it to our NaHS unit, a product which is used in paper mills.

"The Qdos pump has greatly improved reliability and simplified service for our application. Maintenance for this system has been reduced to keeping the chlorine tank full and adding salt to the softener.

"The softener runs continuously, 24-7, for our fuel gas

treatment plant. Reliability is key to keeping the feed water to the softener treated biologically, which is what this pump provides - chlorine for that treatment.

"The original Qdos pumphead was installed in February of 2022 and ran roughly 15,600 hours [equivalent to 651 days, over 21 months]. The original outlasted anything else we tried in that application by nearly triple. That is head and shoulders above the previously used diaphragm pump for service time."

Ergon's Energy & Specialty Solutions (ESS) segment transforms molecules that would otherwise be used as transportation fuels into non-combusted specialty naphthenic and paraffinic products for niche markets. Paraffinic process and base oils produced at Newell are used in a variety of applications, including automotive and industrial lubricants, grease, chemical process industries, and rubber applications.

Qdos CWT, one of six peristaltic pumps in the Qdos range which is designed to meet chemical metering and dosing requirements, delivers all the benefits of a peristaltic pump, but with significantly longer service life than traditional tube designs.

The longer CWT pumphead life, coupled with the

recently enhanced 130 PSI (9 bar) pressure, enables Qdos CWT to meet requirements in more demanding applications.

Benefits of the Qdos CWT include:

- Accuracy of $\pm 1\%$ and repeatability of $\pm 0.5\%$ in dosing
- Flow rates to 31.7 USGPH (30 L/h) at pressures of up to 130 PSI (9 bar)
- Long service life at high pressure
- Reliable, low-maintenance metering

WHAT IS CONVEYING WAVE TECHNOLOGY?

Conveying Wave Technology (CWT) employs the peristaltic principle to operate a unique fluid contact element. To achieve the peristaltic pumping action, the pump incorporates a fluid contact element rather than a tube, which acts against a PEEK track. As a result, the fluid contact elements are subjected to very low stress levels. In use, this means a Qdos CWT



CWT pump will deliver significantly longer service life than a traditional pump.

ABOUT ERGON

Ergon is a group of privately held companies that operate under four primary business segments: Energy & Specialty Solutions, Pavement & Coating Resources, Integrated Services & Logistics, and Exploration & Production.

ABOUT WATSON-MARLOW FLUID TECHNOLOGY SOLUTIONS

Watson-Marlow Fluid Technology Solutions (WMFTS) is a world leader in manufacturing peristaltic pumps and associated fluid path technologies for the life sciences and process industries. WMFTS is part of Spirax Group (formerly Spirax-Sarco Engineering plc), with 47 operating units worldwide (December 31, 2023).

ABOUT THE AUTHOR



As Product Manager for Watson-Marlow Fluid Technology Solutions, Adeel Hassan oversees the Qdos range of chemical metering pumps, widely used in water treatment plants globally. He is actively involved in understanding the challenges faced by customers and leads product development initiatives to drive efficiencies across the sector. In addition to extensive product management experience for several leading manufacturers, Adeel has spent time in the Middle East working on automation projects for the water treatment industry. He holds an MSc in Technology and Innovation Management from the University of Sussex, UK.

Adeel Hassan

Product Manager at Watson-Marlow Fluid Technology Solutions

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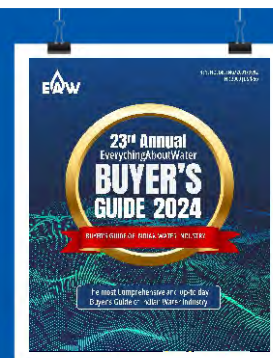
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LAKE STEWARDS FIGHT TO PRESERVE THE LAKE LIFESTYLE

Jeff Elliott,
Calif.-Based Technical Writer

Entrusted HOA and lake board members seek the best path forward to preserve the lake lifestyle in the face of algal blooms, health risks, lake closures, unpleasant odors, and falling property values

For generations, Americans have embraced the Lake Lifestyle, a way of life centered around the beauty, recreation, and tranquility of our nation's lakes. It serves as a gathering place for families, where memories are created, and daily stresses dissipate. Whether fishing, diving off the dock, or enjoying the scenic views, life by the lake offers a uniquely special experience.

Regrettably, this cherished lifestyle faces significant risk from eutrophication, a process where excess nutrients from fertilizers, septic systems, and stormwater runoff inundate lakes. This triggers a series of issues including harmful algal blooms, health risks, lake closures, unpleasant odors, unsightly scum, and falling property values as the lake's desirability diminishes.

When this situation arises, members of the Homeowners Association (HOA), Lake Board, or Committee hold the immense responsibility of making critical decisions to safeguard the community's lake, efficiently allocate resources, and preserve the Lake Lifestyle for current and future generations. Despite significant financial investments over many years, there has been little improvement in the condition of US lakes. In fact, according to a GAO report, the health of our lakes has deteriorated consistently over the past two decades.

In many cases, these decision makers call on lake consultants or management companies to evaluate the situation and recommend solutions. The initial step typically involves identifying invasive weed species and conducting diagnostic tests to measure a variety of symptoms such as nutrient levels in various chemical forms, water clarity and chemical parameters such as pH and conductivity. Frequently, the application of chemicals like biocides to kill off algae and weeds is advised.

And this is where the process breaks down. In most cases, the short-term "fixes" proposed do not address the root causes of lake deterioration and instead only worsen the lake's condition over time. These test protocols mainly assess factors that are second order symptoms and not root causes, so they do not accurately reflect the lake's true health or prognosis and provide no foundation to demonstrate quantifiable outcomes from interventions.

Compounding the issue, information and progress is often reported in annual Lake Management Reports that demand the layperson navigate challenging and confusing data tables and statistics. This complexity can be overwhelming and lead to uncertainty about what course of action to take to remediate the lake and restore it.

"For many, determining the best path forward can be as unclear and murky as the lake itself. You have to understand and target the root causes of your lake's issues. If they aren't directly addressed, your investment is being wasted. A holistic, science-based strategy that tackles the underlying causes of the eutrophication of the lake is the only way to

revitalize the entire ecosystem" says Dave Shackleton, president of Clean-Flo International, a US-based leader in biological water management solutions for managing water quality in biological environments such as wastewater treatment, rivers, lakes and reservoirs.



Despite costly efforts, lake health has declined over the past two decades.

EVALUATING LAKE HEALTH: MEASURE WHAT MATTERS

Effective restoration of lake and water reservoir health begins with monitoring key metrics that go beyond confirming the poor condition of the lake. These metrics should assess the entire ecosystem and provide indicators that can be used to evaluate sustained improvement.

"A proper Lake Management Action Plan should begin with a thorough analysis of the factors that threaten your lake's health, to develop a meaningful scorecard" explains Shackleton.

"This scorecard should provide a clear understanding of the lake's current status and the potential risks it faces."

This should begin with quantifying hypoxia through regular monitoring of dissolved oxygen levels. Hypoxia can lead to fish kills and other ecological damage, that eventually lead to toxic HABs and lake closures, so these metrics are critical to evaluating oxygenation strategies.

Sediment accumulation is the prime driver of hypoxia and fuels nutrient recycling, which promotes the growth of invasive weeds, excessive algae and eventually harmful algal blooms (HABs). Bathymetric sonar scanning is the only way to quantify sediment reduction which is key to depleting the sediment nutrient stockpile that sustains the eutrophic state of the lake.

Finally, regularly monitoring the phytoplankton profile provides a detailed analysis of the type and abundance of algae and cyanobacteria in the lake. Measuring a parameter such as chlorophyll- does not give the granular detail necessary for effective preventative actions to be taken. Continuous monitoring of algae populations is necessary to track changes and adjust lake management strategies as needed.

"Only by carefully analyzing the intricate interplay of factors such as hypoxia, sediment accumulation, nutrient recycling, and negative transformations to the lake's ecosystem can we craft targeted, customized strategies that tackle the root causes of the issues holistically," explains Shackleton.

"Targeting root causes and measuring impact and improvement ensures transparency and accountability in terms of performance management that allows lake stewards to provide evidence of the positive outcomes of their investment and efforts to their stakeholders," he adds.

TARGET THE ROOT CAUSES, NOT THE SYMPTOMS

According to Shackleton, many lake management strategies prove inadequate because they target second order symptoms instead of the primary root cause factors that drive eutrophication in lakes.

Eutrophication is the technical term for the process that occurs when water bodies become overly enriched with nutrients, resulting in sediment nutrient accumulation that provides a fertile rooting bed for invasive weeds in shallower areas. These



Strategies such as oxygenation and bio-dredging now exist to help lake stewards make the right decisions on lake health.

nutrients are also recycled back into the water, fueling further algae growth and creating a feedback loop that perpetuates the cycle of degradation. A tipping point is eventually reached when sediment nutrient recycling is sufficient to independently sustain eutrophic conditions and facilitate a switch to cyanobacteria dominance. In short, HABs become more prevalent, persistent, and intense. By the time you have to test for toxins from a harmful algae bloom (HAB), the battle has been lost.

While the notion of quickly eradicating algae to improve the lake's appearance by using biocidal chemicals is enticing, this can lead to a detrimental feedback loop that accelerates the deterioration of the lake's ecosystem; the dead algae cells sink to the bottom to add to the sediment, the elimination of cyanobacteria can result in the release of toxins, and over time, the continued application of algacides causes sediment nutrient stockpiles to increase, hypoxia to worsen and nutrient recycling to be amplified.

REMEDIATION ACTIONS THAT TARGET WHAT MATTERS

A proactive, holistic approach ensures the lake receives the care it needs for sustainable long-term health and resilience. Fortunately, there are effective, comprehensive solutions that leverage cutting-edge technologies and proven techniques.

Oxygenation is key to preventing hypoxia. The Lake Management Action Plan should include specific actions designed to restore and maintain adequate oxygen levels throughout the lake.

"Too many folks are fooled into believing that aeration is the same as oxygenation," explains Shackleton. "It is not. The fact that you have an aeration

system blowing bubbles into the water does not mean it is being oxygenated. Fortunes have been spent on aeration systems that have failed to deliver oxygenation and eliminate hypoxia."

Rapid Acting Dissolved Oxygen Restoration (RADOR) technology, however, has been proven in numerous studies to oxygenate the whole water column, sustain high, stable, dissolved oxygen levels, reduce nutrient levels and minerals in the water column and can keep phosphorus locked into the organic sediments.

Clean-Flo designs its RADOR systems using compressors of various sizes based on the lake and application, along with self-sinking airline and diffusers that ensure that no water sports or other fun activities are impacted and maintain full oxygenation from the bottom to the surface of the water.

As nutrients accumulate in the sediment, they become part of the permanent morphology of the lake. Therefore, an important step is to implement interventions that work off those nutrient rich sediments in the way nature intended, without physically having to dredge to remove them and then dump them safely somewhere at great cost.

Bio-dredging, which involves the use of enzymes to break down organic muck, is the most effective technique to achieve this.

"Boosted by natural enzymes, aerobic bacteria and micro-organisms consume the organic muck and nutrients, while zooplankton feed on these, increasing the natural food source for fish," says Shackleton.

Critical micronutrients supplementation can stimulate the growth of organisms that form the foundation of a productive food web. This enables balance to be restored at the level of phytoplankton and zooplankton, providing better nutrition for the food web.

"Consistent use of these techniques over time reduces nutrient availability, restores the ecological balance at the planktonic level, and helps maintain clean, healthy water," explains Shackleton. "As water quality improves, swimming conditions get safer. The reduction of organic sediments helps control aquatic weeds by minimizing the nutrient-rich rooting bed that mucky sediment provides for their growth."

EASY-TO-UNDERSTAND REPORTING

Lake decision makers must demand clear, concise

information to share with their stakeholders to demonstrate the value of their lake management investments.

"Lake Management Action Plans should include simple, easy to understand analyses, intuitive visualizations, and clear language with relevant results that accurately and objectively measure performance and improvements by measuring what matters," says Shackleton.

Preserving the cherished Lake Lifestyle requires lake stewards to be empowered with the right guidance and information to make informed decisions. By focusing on root causes rather than symptoms, implementing comprehensive monitoring of key

metrics, and adopting proactive, science-based strategies, stewards can ensure the long-term health and resilience of their lakes. Clear communication and evidence of positive outcomes and improved lake health support these efforts, fostering transparency and accountability. Ultimately, these actions safeguard not only the natural beauty of lakes but also the precious memories and experiences they provide for generations to come

ABOUT CLEAN-FLO

With a 50-year track record of cleaning water biologically, from sewage treatment to drinking water reservoirs, Clean-Flo offers a full range of scientific, engineering, field maintenance, biological, and adaptive lake management services.



The threat of eutrophication leads to harmful algal blooms and ecological degradation.

For more information, visit www.clean-flo.com; email contact@clean-flo.com; or call 1-800-328-6656

ABOUT THE AUTHOR



Jeff Elliott is a Torrance, Calif.-based technical writer. He has researched and written about industrial technologies and issues for the past 20 years.

Jeff Elliott,
Calif.-Based Technical Writer

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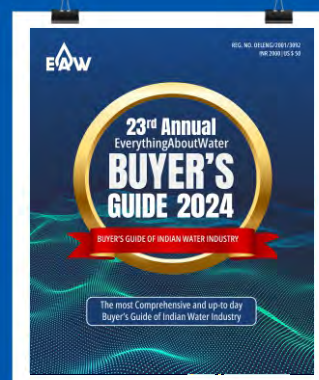
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SWRO FOR WATER SUPPLY TO COASTAL CITIES – A VIABLE ALTERNATIVE – CASE STUDY AT CHENNAI

Dr. S Saktheeswaran, Examiner for Doctoral

Dr. Jawahar Thomas, Freelance Water and Wastewater Firm

Dr. S Sundaramoorthy, Former Engineering Director, Chennai Metropolitan Water Supply & Sewerage Board.

ABSTRACT

The water need of Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) to fully serve the said area by 2026 is 2248 million liters per day (MLD) whereas the maximum potential from surface water, ground water and sea water desalination (SWRO of 200 MLD) is only 1954 MLD. The cost of SWRO water is about Rs 55 per Kiloliter (KL) whereas the tariff for public is just about Rs. 5 per KL by Government subsidy which cannot be sustained for long. Out of 1810 MLD, 837 MLD is from Krishna River of contiguous state of Andhra Pradesh and 180 MLD is from Cauvery River of contiguous state of Karnataka. These are influenced by the vagaries of South-west monsoon of July to September and North-east monsoon of October to December. Thus, the only concordant reliable options are (a) more of SWRO by heavy financial burden or (b) indirect augmentation of aquifer by advanced treated sewage and is prudent. A pilot plant of 10 MLD has been commissioned at Chennai. This article cites this pilot plant and gives an overview for a fuller reuse of sewage by augmenting the riverine aquifer.

DEMONSTRATION OF DRINKABILITY OF RENOVATED SEWAGE BY CMWSSB

Starting from 1965, it has taken a marathon half a century of fundamental and applied R&D to perfect the suitable treatment technology for the city sewage which has resulted in the powers of the higher echelons to voluntarily demonstrate their faith in the



The third author as the Engg. Dir., CMWSSB drinking renovated sewage before the World Bank officials, the chairperson and engineers of CMWSSB-1995



The renovated sewage of Koyambedu TTRQ demonstrated as drinkable by the Honourable Minister, Secretary MoHUA GOI and CEO of Contractor Firm-2019

Fig.1. Demonstration of the Drinkability of Renovated Sewage at Chennai

quality of advanced treated sewage being of drinking grade as in Fig. 1

PILOT PLANT FOR AUGMENTATION OF PUBLIC WATER SUPPLY SOURCE

This pilot plant is a 10 MLD plant. Its broad process flow sheet is in Fig.2

Though ultra filtration is supposed to take care of the smallest known organism namely the virus, still the

ultra violet irradiation is provided in the downstream as an additional barrier to ensure organisms are not carried over. The activated carbon filtration (ACF) is provided in the downstream more as a traditional process unit for adsorption of traces of colour and its release requires thermal regeneration at about 700 to 900 °C in oxidative furnaces that decompose and oxidize the impurities and highly dependent on parameters such as temperature and duration. Other processes in various stages of trials are Pyrolysis and Microwave reactors which even if found to be



Fig. 2 Broad Treatment Process Flow sheet for the Lake Augmentation

successful do not fit into a water supply plant in public sector for the obvious challenges of tendering system for procurement, absence of Indian Standards to specify in the tender call etc in prototype application. This makes the situation as a "mountain of a molehill"

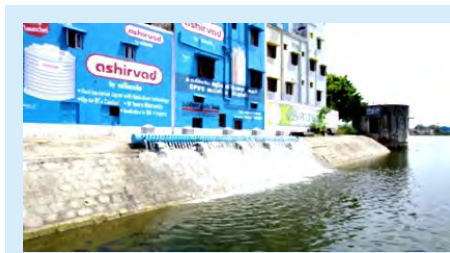


Fig.3 Bio-Monitoring and Discharge of Product water of the Pilot Plant onto the Lake.

as the residual organic colour can be easily bleached by the familiar Sodium Hypochlorite or chlorine in its Hydroxyl ions. Even the toughest reactive textile dye effluents have been debonded in its moiety. Similar is the case with Ozone gas which though has a light colour, does not have any odour and requires many safety precautions. All the same, these are "extra precautions" understandably incorporated when such a task is first undertaken. May be in prototype, these will give way to the simpler chlorine and not chlorine dioxide which is known to cause explosion in contact with ammonia. In the case of chlorine, the reaction with ammonia is mono, di and tri chloramines and which nitrogen is released into the ambience which itself has about 80 % of it. The bio monitoring as in fish survival in the product water and its discharge onto the lake is shown in Fig. 3. A moot point is the zero phosphorous as otherwise the 1300 ML water body may slowly go into eutrophication and will become unfit. This is manageable by adding Poly Aluminium Chloride (PAC) after the SBR and precipitate held in multi grade filter.

ABOUT WATSON-MARLOW FLUID TECHNOLOGY SOLUTIONS

The United Nations Development Programme (UNDP) way back in 1980, undertook the study of a

river basin on the northern city and called the Kortalaiyar river originating at some 136 km on the west and draining eastward to the Bay of Bengal. Its final reach is skirting Chennai city at about 20 km. Except the North east monsoon months of October to December, the entire river basin is barren. This and subsequent studies have revealed a geological formation of a confined aquifer length as in Fig.4

The buried channel lithology was further studied for a limited 25 km from the sea as in Fig.5. At an average aquifer depth of 20 m and voids of 40 % in the sand, the total voids would be 10165 ML or about 6 days water storage or about 30 days for the full length. The entire renovated sewage flowing into a drinking water source as Porur lake can be let into this and close to 1600 MLD of water can be pumped



Fig. 5. Lithology of the seaward 25 km of the Buried Channel

back (Fig.6). The advantage is it is without evaporation loss after some initial two weeks of soil saturation and it will be a fill near the sea mouth and drawal along its length.

THE ECONOMICS RELATIVE TO THE SEAWATER DESALINATION

In contrast to Rs 5 per 1000 liters from treated sewage injection and extraction, the seawater desalination operational cost is Rs 55 per 1000 liters and is a dent in the balance sheet of CMWSSB as reviewed by Asian Development Bank in 2017 and extracted in Table 1.

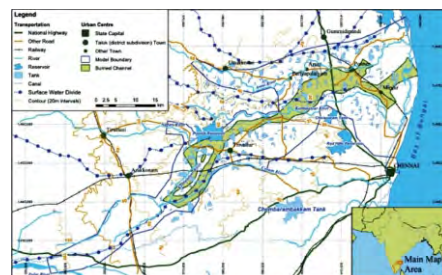


Fig.4. Kortalaiyar River Basin Showing the Buried Channel, Chennai, and India country

Traverse, km			Aquifer depth, m			Area sqm
From	To	Length	Initial	Final	Mid	
1	5	4	5.5	5.5	5.5	22000
5	10	5	5.5	17	11.25	56250
10	15	5	17	17	17	85000
15	20	5	17	44	30.5	152500
20	25	5	44	33	38.5	192500
						Total 508250

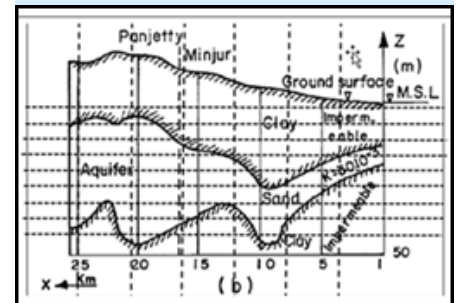


Fig. 5. Lithology of the seaward 25 km of the Buried Channel



Fig. 6 The Routing of the city Sewage

Locations marked 1 to 4 are the sewage treatment centers placed around the city on outskirts .Already these are secondary treated plants, The centers marked as 2 and 4 already function with each 45 MLD operating plants with tertiary treatment and reverse osmosis (TTR) beyond the secondary stage as in Fig.7.Thus a peripheral pumping main can collect the entire TTR water and lead to injection point at sea mouth. TTR sewage TDS will be 500 mg/l compared to 45,000 in seawater. Thus injected water will not seep out.



Fig. 7

This 2017 report on the revenue vs. expenditure is based on the then water tariff at Rs 50 per month per dwelling. This has been increased subsequently to Rs 80 in 2019. Even then, in the foreseeable future in 2024, the gain is only 39 million USD which cannot offset the purchase of desalinated water at 62 million USD and which cost is at a 90 % subsidy to the public. It is a simple inference to recognize the futility of this forever. Moreover, other coastal towns and particularly the inland cities in the state which suffer the monsoon failures will raise their legal rights for similar subsidised SWRO water. Thus it cannot go on forever.

Table 3: Financial Performance and Projections of Chennai Metropolitan Water Supply and Sewerage Board (\$ million)

Particulars	Existing	Existing	Existing	Existing	Existing	Existing	Existing
	2012	2014	2016	2018	2020	2022	2024
I. Revenue							
- Water & Sewerage Fee	37.0	40.6	44.3	64.9	74.3	83.1	116.8
- Water & Sewerage Tax	16.1	17.3	25.4	54.6	72.9	116.9	333.6
- Others Income	10.9	13.2	10.9	10.9	10.9	10.9	10.9
- Grants and Subsidies	19.3	40.0	13.4	114.5	152.4	245.5	369.4
Total	83.3	111.2	134.1	244.8	310.2	456.4	711.4
II. Expenditure							
- Salaries & wages	24.7	24.5	30.7	47.3	55.7	73.0	95.8
- Power	9.9	12.1	28.0	60.0	79.9	128.6	207.1
- Purchase of Desalinated Water	19.6	26.8	28.9	62.0	62.5	132.9	214.0
- O&M & Others	20.6	39.4	33.2	55.7	73.3	115.9	163.7
Total	74.7	102.8	120.8	225.0	261.3	446.4	680.6
Surplus/Deficit	8.6	8.4	13.3	19.8	48.9	110.0	2.8
III. Debt Service	14.6	14.1	13.9	28.1	21.7	8.4	6.1
Surplus/Deficit	17.1	19.7	27.2	11.7	27.2	101.6	16.7
Operating ratio ⁽¹⁾	90.9%	92.6%	90.1%	91.9%	93.9%	96.8%	99.6%

Table-1
Seawater Desalination Relating to Revenue and Expenditure at Chennai

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CONCLUSIONS:

Given the physical and financial constraints and inter-state dependencies, Chennai Metropolis needs sewage TRO for its full sewage and exploit the buried channel for a fill and draw reservoir as otherwise, the writing on the wall is clear that the population will emigrate and leave behind the huge present infrastructure as monuments. The model recorded here will also help similar water short coastal locations.

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GREY WATER MANAGEMENT AND NATURAL PURIFICATION PROCESSES

Sri Tarun Kumar,
Rural Development Department

INTRODUCTION

Grey water refers to the wastewater generated from domestic activities, including water from bathrooms, kitchens, and laundry. While it is typically contaminated, it is not as hazardous as black water (from toilets). In areas with high population density, such as the Lower Ganges Basin and other river basins, managing grey water presents a significant challenge. This article discusses the natural purification and settlement processes of grey water that exist within local ecosystems. The primary contaminants found in grey water include:

Detergents and Surfactants: From laundry and dishwashing soaps, these can be harmful to aquatic life.

Organic Matter: Food residues and organic compounds from cleaning products can lead to biological oxygen demand (BOD) issues.

Fats, Oils, and Greases (FOG): These can come from kitchen waste and can clog plumbing systems and sewage treatment facilities.

Nutrients: Nitrogen and phosphorus from personal care products and cleaning agents can contribute to eutrophication in water bodies.

Microorganisms: Bacteria, viruses, and protozoa can be present, raising health concerns if grey water is not treated properly.

Chemical Residues: Various chemicals from

personal care products, cleaners, and other household items can contaminate grey water.

PH Levels: The acidity or alkalinity of grey water can vary based on the sources, affecting its potential for use in irrigation or other applications.

Understanding these contaminants is crucial for effective grey water management and treatment, especially if the water is to be reused for irrigation or non-potable purposes.

NATURAL PURIFICATION PROCESSES

Here are some common natural cleaning processes:

Constructed/Available Wetlands: These are engineered ecosystems that mimic natural wetlands. They use plants, soil, and microbial processes to filter and break down pollutants in grey water. Water flows through the root zone of plants, where microbes digest organic matter and nutrients.



Bio filtration Systems: These systems use layers of natural materials (like sand, gravel, and soil) to filter grey water. As the water passes through, microorganisms in the bio filter break down contaminants.

Soil Absorption: Grey water can be dispersed into the soil through systems like leach fields or mound systems. The soil acts as a natural filter, and beneficial microorganisms help degrade pollutants.

Natural Settling: Allowing grey water to sit in a basin can help heavier solids settle to the bottom, which can then be removed.

Bios wales: These are landscape elements designed to concentrate or remove debris and pollution from surface runoff water. They use vegetation and soil to filter grey water as it flows through.

Importance of Aquatic Plants: Certain plants can absorb and break down contaminants from grey water. By using specific species that thrive on nutrients, grey water can be treated while also supporting plant growth. For heavy metal remediation, Indian mustard (*Brassica juncea*) and sunflower (*Helianthus annuus*) are commonly used due to their ability to accumulate metals like lead and cadmium in their tissues. In the case of organic pollutants, willow (*Salix* spp.) and poplar (*Populus* spp.) are favoured for their capacity to break down hydrocarbons and other organic contaminants through processes like phytodegradation. Water hyacinth (*Eichhornia crassipes*) is particularly effective in treating nutrient-rich water, as it can absorb excess nitrogen and

phosphorus, and it also helps in removing heavy metals from aquatic environments. For nutrient remediation, reed (*Phragmites australis*) and bulrush (*Schoenoplectus* spp.) are effective, as they can uptake these nutrients and improve water quality. Additionally, vetiver grass (*Chrysopogon zizanioides*) is recognized for its ability to stabilize soil and mitigate erosion while absorbing heavy metals and organic pollutants. Each of these species plays a vital role in restoring contaminated environments, contributing to ecological health and sustainability.

HERE ARE SOME EXAMPLES:

Naurangiya, a panchayat nestled in the Motihari block of East Champaran district, is witnessing a transformative change aimed at addressing a longstanding issue: waterlogging and inadequate drainage. With its elevation ranging from 279 to 319 feet above sea level, the area features a predominantly flat residential landscape that has struggled with effective water management, particularly during the monsoon season.).

For years, the lack of a proper drainage system meant that grey water—typically generated from household activities—flowed freely onto the roads. This situation worsened during heavy rains, as rainwater mixed withFor years, the lack of a proper drainage system meant that grey water—typically generated from household

activities—flowed freely onto the roads. This situation worsened during heavy rains, as rainwater mixed with grey water, creating muddy, impassable conditions that hindered daily life and mobility for residents. The accumulation of stagnant water not only obstructed movement but also posed health risks, fostering unsanitary conditions. In response to these challenges, the local administration turned to the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) to develop a sustainable solution. By employing Geographic Information Systems (GIS), planners were able to identify the most effective drainage projects tailored to the specific needs of the panchayat. The strategy involved creating natural treatment areas where grey water could be processed using indigenous plants like water hyacinth. This eco-friendly approach not only



addresses drainage issues but also promotes biodiversity and environmental sustainability. Here Water hyacinth is very effective at absorbing excess nutrients like phosphorous and nitrogen. It also helps in containment removal and oxygenation. Reed can degrade pesticides and other organic contaminants. They have taken eight drainage schemes and now they have all weather effective drainage system and a natural water treatment system to reuse in irrigation.

In the Janiapur Panchayat of the Nanpur Block in the Sitamarhi district, grey water from a ward was contaminating a local pond. The panchayat cleaned a small pond-like structure nearby, known as a "dabra," and diverted all the grey water there. They then connected the dabra to the pond via a drain. Aquatic plants and vetiver naturally grew in the dabra. This structure now serves to stabilize the grey water, allowing clean water to flow into the pond through the drain.

SENSITIVITY AND UTILITY

These natural purification processes not only improve water quality but also provide water recycling opportunities for local communities. By utilizing these methods, it is possible to manage grey water sustainably, reducing the burden on conventional wastewater treatment systems and promoting a healthier ecosystem.

CONCLUSIONS:

The management of grey water through natural processes is an effective and environmentally friendly approach, particularly in densely populated areas like the Lower Ganges Basin. By leveraging the capabilities of aquatic plants and sedimentation, communities can enhance water quality and contribute to sustainable water resource management. Emphasizing these natural methods can lead to improved public health, environmental sustainability, and a better quality of life for residents in these regions.

ABOUT THE AUTHOR



Sri Tarun Kumar,
Rural Development Department

In the heart of Bihar, where rural communities rely heavily on agriculture and natural resources, Sri Tarun Kumar stands out as a dedicated officer in the rural development department. With a passion for ecological sustainability, he has been instrumental in promoting initiatives that create pathways for economic growth with environmental stewardship, displaying a remarkable commitment to the welfare of the rural population. One of Sri Tarun Kumar's hallmark initiatives in line with the broader vision of Rural Development Department, Bihar and under guidance of Senior Officials of the department, has been the promotion of the agroforestry model. Understanding that traditional farming practices often lead to deforestation and soil degradation, he advocates for integrating trees into agricultural landscapes. In this article Tarun Kumar delves into Grey Water Management and Natural Purification Processes. This piece provides a comprehensive look at effective strategies for managing grey water, emphasizing the importance of sustainable practices in water resource management.

The Growing Financial Burden of Micropollutants in Drinking Water in India

1. What Are Micropollutants?

Micropollutants are trace chemicals in water, including pharmaceuticals, pesticides, heavy metals, personal care products, and industrial pollutants. These chemicals can be harmful even at very low concentrations.

2. Scope of the Problem in India

Widespread Contamination: Recent studies show that micropollutants have been detected in drinking water across India, particularly in urban centres and agricultural regions. Major rivers like the Ganga, Yamuna, and Brahmaputra have been reported to contain high levels of pharmaceutical residues and industrial chemicals.

Source: CPCB, 2020; UNICEF Report on Water Quality, 2019; World Bank, 2020.

3. Financial Costs

A. Detection and Monitoring

Cost of Testing: The cost of detecting micropollutants through specialized testing is about ₹40,000 – ₹80,000 per sample for detailed analysis. For large-scale monitoring, this can easily run into crores of rupees annually.

Monitoring Network: Expanding India's water quality monitoring infrastructure, including real-time sensors, could cost the government ₹5,000 crore over the next decade.

Costs in the EU: The cost of removing micropollutants from drinking water in Europe alone is estimated to exceed €1 billion annually.

B. Health Impact Costs

Health Costs: The long-term health consequences of exposure to micropollutants — such as cancer, hormone disruption, and neurological

disorders—are expected to lead to escalating healthcare costs.

Direct Healthcare Costs: Estimated ₹1.5–₹2 lakh crore annually due to waterborne diseases and chemical exposure.

Social and Economic Costs: Loss of workforce productivity, increased hospitalization, and long-term treatment expenses.

C. Ecosystem and Biodiversity Costs

Loss of Ecosystems: Micropollutants contribute to the degradation of freshwater ecosystems, leading to reduced biodiversity, affecting fisheries and agriculture.

Fisheries: The fishing industry in India, valued at ₹1.2 lakh crore annually, is vulnerable to declining fish populations due to water contamination. Globally, the losses in fisheries alone due to chemical pollutants cost about \$2.5 billion annually.

Agricultural Impact: Irrigated crops absorbing pollutants can result in lower yields and food safety concerns, leading to annual agricultural losses estimated at ₹15,000–₹20,000 crore.

Ozone is the best available technology for Micro pollutant removal and Ozone + GAC is usually the most effective technology to remove soluble and suspended pollutants from drinking water sources.

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THE GREAT BLUE HOLE: A MARINE MARVEL



Nestled off the coast of Belize, the Great Blue Hole stands as one of the most mesmerizing and significant marine phenomena in the world. This giant marine sinkhole, located in the Lighthouse Reef Atoll, is not only a diver's paradise but also a beacon for marine researchers and adventurers alike.

Visible from space, the Great Blue Hole spans over 300 meters across and plunges more than 120 meters deep, forming a perfect circle of deep blue surrounded by vibrant coral reefs. Its formation dates back to the last Ice Age when sea levels were significantly lower, and the area was a limestone cave system. As the oceans rose, the caves flooded and collapsed, creating the striking sinkhole we see today.

For divers, the Great Blue Hole offers an unparalleled underwater experience. Jacques Cousteau, the legendary ocean explorer, famously declared it one of the top ten dive sites in the world. Divers can explore the hole's crystal-clear waters, encountering stalactites and stalagmites that testify to its ancient past. The marine life here is equally captivating, with sightings of Caribbean reef sharks, nurse sharks, and the occasional hammerhead shark.

Beyond its allure for recreational divers, the Great Blue Hole holds significant scientific value. Marine biologists and geologists are drawn to its depths to study its unique ecosystem and geological formations. The hole serves as a natural laboratory, offering insights into climate change and sea level rise, given its well-preserved geological record.

The Great Blue Hole's significance extends to its contribution to Belize's tourism and economy. As part of the Belize Barrier Reef Reserve System, a UNESCO World Heritage site, it attracts thousands of visitors annually, contributing to the conservation efforts of the surrounding marine environment.

In essence, the Great Blue Hole is a testament to nature's grandeur and mystery. Whether you're an avid diver, a marine scientist, or simply an admirer of natural wonders, this incredible site promises an experience that is both thrilling and enlightening. The Great Blue Hole is not just a dive into the deep; it's a dive into the history and heart of our planet.



T E N D E R

Hiring of Utility Vehicle for Operation and Maintenance of 15 Mid Dabose Water Treatment Plant and Other Pressure Filter Plant in Sattari Taluka Year 2024 25

Category	Transportation, Courier, Cargo Services tenders		
Location	Goa, Sattari		
Bid Open Date	18 December 2024	Tender Value	8.39 Lac
Doc Collection Date	16 December 2024	FTID	241205436710

Treatment Plantstp of 500 cum per Day Capacity at Surangani Colony and 02 no Stp of 5 Kld Capacity at Power House at Bsps; R and M of Water

Category	Construction, Infrastructure, Civil Work tenders		
Location	Himachal Pradesh, Sihunta		
Bid Open Date	09 December 2024	Tender Value	1.01 Crore
Doc Collection Date	09 December 2024	FTID	241205422310

Construction of Rcc Weir, Sump Well, Pump House, Fencing and Laying of Pipes Including Electrical Power Supply for Drawing/Tapping of Water from Wah Khlek Khlek to Water Treatment Plant (Wtp) and Wate

Category	Power, Power Plants tenders		
Location	Meghalaya, Cherrapunjee		
Bid Open Date	26 December 2024	Tender Value	2.57 Crore
Doc Collection Date	24 December 2024	FTID	241205458030

Custom Bid For Services - Supply Installation and Commissioning of Two Uv Water Treatment Plants

Category	Construction, Infrastructure, Civil Work tenders		
Location	Goa		
Bid Open Date	07 December 2024	Tender Value	5.51 Lac
Doc Collection Date	07 December 2024	FTID	241205481560

Construction of Concrete Drain with Cover for Grey Water Treatment from Durjo Ghjosh House to Jagannath Ghosh House at Bazar, Activity Id- 90032815

Category	Sewer, Sewerage, Sanitation, Environmental Services tender		
Location	West Bengal, Bhatar		
Bid Open Date	17 December 2024	Tender Value	1.70 Lac
Doc Collection Date	14 December 2024	FTID	241205499270

Creation of Drainage Channel For Grey Water Treatment From Natun Pukur Par Submersible to Natun Pukur at Barkona

Category	Sewer, Sewerage, Sanitation, Environmental Services tenders		
Location	West Bengal, Memari		
Bid Open Date	18 December 2024	Tender Value	1.90 Lac
Doc Collection Date	16 December 2024	FTID	2412054114060

T E N D E R

Creation of Drainage Channel for Grey Water Treatment From Hasem Sekh House to Mantu Sekh House at Renya

Category	Sewer, Sewerage, Sanitation, Environmental Services tenders		
Location	West Bengal, Memari		
Bid Open Date	18 December 2024	Tender Value	1.80 Lac
Doc Collection Date	16 December 2024	FTID	2412054118220
Annual Maintnace of Filter Plants, Machinery, Pools and Material, Liquid Chlorine Gas Cylinder Supply, Chemical and Cleaning Material Supply of Water Quality Control etc. at Prakash Swimming Pool, Bh			
Category	Transportation, Courier, Cargo Services tenders		
Location	Madhya Pradesh, Huzur		
Bid Open Date	13 December 2024	Tender Value	19.99 Lac
Doc Collection Date	11 December 2024	FTID	241205441190



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EVENT CALENDAR



November 2024

Produced Water Management, Treatment & Reinjection 2024

28 Oct - 01 Nov 2024

Dubai, UAE

10times.com/e1x5-z5p1-f9sp

Deepwater Operations Conference & Exhibition 2024

05 - 07 Nov 2024

Moody Gardens Hotel Spa and Convention Center, Galveston, USA

www.offshore-event.com/2024home/home

Vietwater 2024

06 - 08 Nov 2024

Saigon Exhibition and Convention Center, Ho Chi Minh, Vietnam

vietwater.com

SADC Groundwater Conference 2024

13 - 15 Nov 2024

Maseru, Lesotho

www.sadc.int

Annual WMAO Conference 2024

19 - 20 Nov 2024

Crowne Plaza Columbus North - Worthington, Columbus, USA
wmao.org

Clean India Show 2024

21 - 23 Nov 2024

Bombay Exhibition Centre (BEC), Mumbai, India
ctwindia.com/clean-india-show/

Floodex 2024

27 - 28 Nov 2024

ExCeL London, London, UK
floodex.co.uk

National Drainage Show 2024

27 - 28 Nov 2024

ExCeL London, London, UK
drainageshow.com

December 2024

GeoSmart India (GSI)

02 - 05 December 2024

Hyderabad, India

geosmartindia.net/2024/

Pak Water & Energy Expo 2024

03 - 05 Dec 2024

Karachi Expo Center, Karachi, Pakistan
www.pakwaterexpo.com

Exhibition on Water / Water Forum

04 - 06 December 2024

Belgrade Fair - Hall 3 / Belgrade / Serbia
www.sajamvoda.rs

Aquatech China 2024

11 - 13 Dec 2024

Shanghai New International Expo Centre (SNIEC), Shanghai, China

www.aquatechtrade.com/shanghai

January 2025

Water Exhibition & Conference

14 - 16 Jan 2025

ADNEC Centre Abu Dhabi, Abu Dhabi, UAE

www.worldfutureenergysummit.com

NEWEA Annual Technical Exhibition & Conference

26 - 29 Jan 2025

Boston Marriott Copley Place, Boston, USA
annualconference.newea.org

InterAqua

29 - 31 Jan 2025

Tokyo Big Sight, Koto, Japan
en.www.interaqua.jp

Michigan Onsite Wastewater Conference

07 - 08 Jan 2025

Kellogg Hotel and Conference Center, Lansing, USA
events.anr.msu.edu/event

February 2025

Indomach

06 - 08 Feb 2025

Adityapur Auto Cluster, Jamshedpur, India
indomach.in

World Ag Expo

11 - 13 Feb 2025

International Agri-Center, Tulare County, USA
www.worldagexpo.com

Mountain States Ground Water Expo

13 - 14 Feb 2025

Aquarius Casino Resort, Laughlin, USA
mountainstatesgroundwater.com

Water and Waste Expo

20 - 22 Feb 2025 Pragati Maidan, New Delhi, India
indiawatersolidwaste.in

World Water Tech Innovation Summit

25 - 26 Feb 2025

Park Plaza London Riverbank, London, UK
worldwatertechinnovation.com

Membrane Technology Conference & Exposition

24 - 27 Feb 2025

Long Beach, USA
www.amtaorg.com/awwaamta-membrane-technology-conference-exposition

Water Today's Water Expo

26 - 28 Feb 2025

Chennai Trade Centre, Chennai, India
www.waterexpo.biz

March 2025

International Conference on Advances in Water

Treatment and Management

1 - 2 March 2025

Gandhinagar, Gujarat, India www.pdeu-h2o.com

Sioux Empire Water Festival

4 - 5 March 2025

Sioux Falls, USA
sewf.org

Hot Water & Hot Air

4 - 6 March 2025

Portland, USA

www.aceee.org/2025-hot-water-hot-air-forums

International Conference on Water Management Modeling

5 - 7 March 2025

Toronto, Canada
www.icwmm.org

Oman Sustainability Week

11 - 15 May 2025

Muscat, Oman

www.omansustainabilityweek.com

ISH - World's leading trade fair HVAC + Water

17 - 21 March 2025

Frankfurt, Germany

ish.messefrankfurt.com/frankfurt/en.html

Aqua Netherlands

18 - 20 March 2025

Evenementenhal Gorinchem, Netherlands
www.aquanederland.nl/en

Water & Clean Tech India Expo

19 - 21 March 2025

Pragati Maidan, New Delhi
www.smartcitiesindia.com

Water Philippines Expo & Conference

19 - 21 March 2025

SMX Convention Center, Manila, Philippines
www.waterphilippinesexpo.com

April 2025

China Clean Expo Shanghai

31 Mar - 03 Apr 2025

Shanghai New International Expo Centre(SNIEC), Shanghai, China
www.chinacleanexpo.com/en

American Worlds Water Association Annual Conference

07 - 10 Apr 2025

Anaheim, USA

www.inawwa.org/event/2025-annual-conference-april-21-25th/

Baku Water Week

08 - 10 Apr 2025

Baku Expo Centerbakuwaterweek.az/en/

Water Environment Association of Ontario Annual Conference

13 - 15 Apr 2025

EVENT CALENDAR



London Convention Centre, London, Canada
weao.org/about/

Smart Water Systems

14 - 15 April 2025
London, United Kingdom
www.smgconferences.com

MiningWorld Russia

23 - 25 Apr 2025
Crocus Expo International Exhibition Center,
Krasnogorsk, Russia
miningworld.ru/en/

Our Ocean Conference KOREA

28 - 30 Apr 2025
Centum City Industrial Complex, Busan, South
Korea
ourocean2025.kr

2025 Water for Food Global Conference

28 Apr - 02 May 2025
University of Nebraska
waterforfood.nebraska.edu

May 2025

Water Management Show (WaterEx)

01 - 03 May 2025
ICCB, Dhaka, Bangladesh
shsavor-watermanagement.com

International Water Summit 2025

05 - 06 May 2025
Midreshet Ben-Gurion,
Israel
www.watersummitziwr.com

Power of Water Canada Technical Conference & Trade Show 2025

07 - 09 May 2025
Niagara-on-the-Lake, Canada
powc25.vfairs.com/en/

Stormwater and Wastewater Conference Saudi Arabia 2025

11 - 12 May 2025
Jeddah Hilton, Jeddah, Saudi
Arabia
stormwaterandwastewaterksa.com

Commonwealth Chemistry Congress (CCC)

11 - 14 May 2025
Stellenbosch, South
Africa
commonwealthchemistry.org

Industrial Water Management - Effective Process

Water Treatment 2025
15 - 16 May 2025
ibis Styles Berlin Treptow, Berlin, Germany

Enlit Africa

20 - 22 May 2025
Cape Town, South Africa
www.enlit.world/events/enlit-africa-2024/

CWRA Annual Conference 2025

25 - 29 May 2025
Penticton,
Canada
canadacwra.org/upcomingconferences/

June 2025

World Environment Expo 2025

04 - 06 Jun 2025
Greater Noida,
India
indiaworldenvironment.in

Green Tech 2025

03 - 05 Jun 2025
Berlin, Germany
greentechfestival.com

AWWA Annual Conference & Expo 2025

08 - 11 Jun 2025
The Colorado Convention Center, Denver,
USA
<https://ace.awwa.org/>

Water & Long-Term Value 2025

10 June 2025
Skytop Studio, Rome, USA

Infrastructure Africa 2025

11 - 12 Jun 2025
Johannesburg, South Africa
www.infrastructure-africa.com

Future of Utilities Summit 2025

11 - 12 Jun 2025
QEII Centre, London, UK
futureofutilities.com/events/summit/

Groundwater Quality 2025

10 - 13 Jun 2025
Bordeaux INP, Talence, France
groundwaterquality2025.fr

DrinkTechAsia 2025

12 - 15 Jun 2025
Bangkok, Thailand
www.propakasia.com

China (Guangzhou) International High-end Drinking Water Industry Expo 2025

12 - 14 Jun 2025
Guangzhou, China
waterexpocn.com/en/

Michigan Water Environment Association Annual Conference 2025

15 - 18 Jun 2025
Boyne Mountain Resort, Boyne Falls, US
www.mi-wea.org

IFAT Brasil 2025

25 - 27 Jun 2025
Sao Paulo Expo, São Paulo, Brazil
en/brasil/

July 2025

Thai Water Expo 2025

02 - 04 Jul 2025
Queen Sirikit National Convention Center, Bangkok,
Thailand
www.thai-water.com

Qingdao International Water Conference 2025

02 - 04 Jul 2025
Hilton Qingdao Golden Beach, Qingdao, China

www.cda-apdwr2009.com/english/

Indo Fisheries Expo & Forum 2025

02 - 04 Jul 2025
Grand City Mall & Convex Surabaya, Surabaya,
Indonesia
indofisheries.id

Frontiers in Water Biophysics 2025

12 - 16 Jul 2025
Centro Di Cultura Scientifica Ettore Majorana, Erice,
Italy
www.waterbiophysics.eu/

Louisiana Rural Water Association Conference 2025

13 - 17 Jul 2025
Lake Charles Civic Center, Lake Charles, USA
lrwa.org/annual-conference/

International Forum on Water 2025

14 - 17 Jul 2025
Athens Institute For Education and Research
(ATINER), Athens, Greece
www.atiner.gr/waterBuild

4Asia 2025

15 - 17 Jul 2025
AsiaWorld-Expo,
Hong Kong
www.build4asia.com

August 2025

AgriTech India 2025

01 - 03 Aug 2025
BIEC, Bengaluru,
India
agriotechindia.com

ISWPT 2025

02 - 04 Aug 2025
Bangkok,
Thailand
iswpt.org

Indo Water Expo & Forum 2025

13 - 15 Aug 2025
Jakarta,
Indonesia
indonesiaindowater.com

World Congress on Mechanical, Chemical, and Material Engineering (MCM 2025)

19 - 21 Aug 2025
Paris,
France
mcmcongress.com

The Water Expo 2025

20 - 21 Aug 2025
Fort Lauderdale,
USA
www.thewaterexpo.com

KWEA & KSAWWA Joint Annual Water and Wastewater Conference 2025

26 - 28 Aug 2025
Topeka,
USA
[kswaterwastewater.com](http://www.kswaterwastewater.com)

20th EverythingAboutWater Expo 2025

28-30 Aug 2025
Pragati Maidan, New Delhi
www.eawaterexpo.com

BAYWATCH



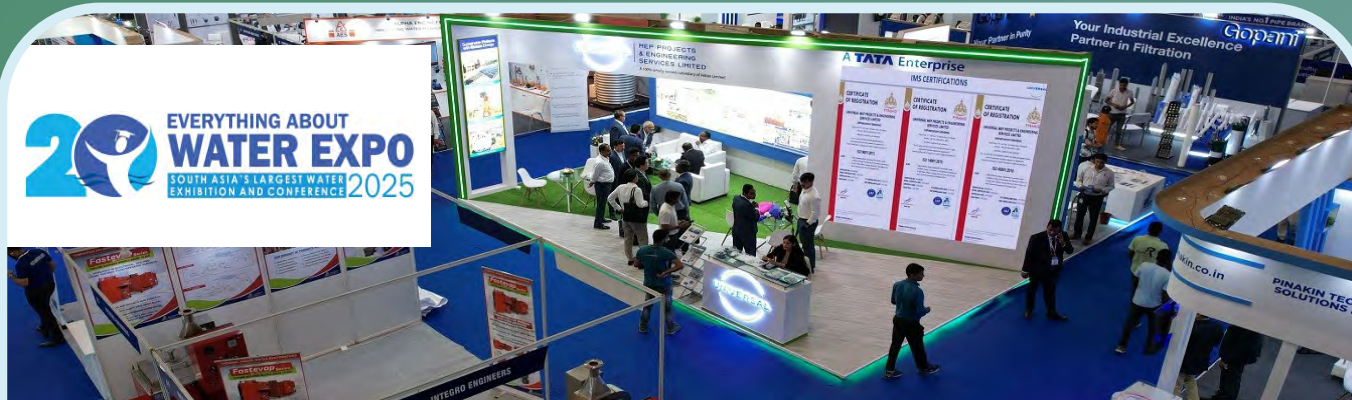
Aquatech China is the leading water technology trade show in China, covering all aspects of water: drinking water, industrial water, waste water treatment, sludge treatment, smart water solutions and water management. The increasing need for (clean) water combined with promoting environmental

protection and strong enforcement of new regulations creates huge opportunities for international companies specialised in (waste)water technologies in China. Aquatech China is the only trade show in China focusing entirely on water.

Date: 19-21 November 2024

Venue: Royale Chulan, Hotel – Kuala Lumpur

Website: www.waterlossasia.com



20th EVERYTHING ABOUT WATER EXPO
SOUTH ASIA'S LARGEST WATER EXHIBITION AND CONFERENCE 2025

The 20th EverythingAboutWater Expo 2025 stands as a remarkable and all-encompassing annual event in India, spotlighting cutting-edge technologies and solutions within the water sector. This event serves as an exceptional gateway for stakeholders worldwide to immerse themselves in the expansive and dynamic realm of the Indian Water management Industry, facilitating the exchange of business opportunities, networking, and the exploration of innovative Water solutions

India is currently on a trajectory towards severe water stress, with projections indicating a critical situation by 2030. The rapid pace of Industrialization and the burgeoning population have significantly widened the gap between water supply and demand, a matter of deep concern for both the Central and State Governments. Within the framework of the 20th EverythingAboutWater Expo 2025 unparalleled business prospects will emerge for both domestic and international players in the Water Industry. Attendees will have the opportunity to gain valuable insights, discover future trends, and navigate the evolving landscape of the Indian Water market.

Date: 28-30 August 2025

Venue: Bharat Mandpam, Pragati Maidan, New Delhi

Website: www.eawaterexpo.com

BAYWATCH



Join the National Groundwater Expo and Annual Meeting Las Vegas 2024 to meet thousands of experts from the groundwater industry who come together to explore solutions for current and future challenges. To take part in the third largest water conference, different companies look for the best trade show booth rental las vegas top-rated trade show booth supplier in the US.

The trade show is the most exhaustive annual meeting of water industry experts in North America. The trade show is planned for 10-12 Dec 2024 in Las Vegas, United States.

National Groundwater Expo is also known as National Groundwater Awareness Week (NGWA). The exhibition is mainly focused on the management and usage of groundwater. The event provides an excellent opportunity for individuals to learn about the preservation and importance of water. The National Groundwater Expo is a forum where diverse groundwater experts come together to share their collective experiences and understandings about the improvement of the drinking water supply.

Date: 10-12 December 2024

Venue: Las Vegas, Nevada, US

Website: groundwaterweek.com



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powerful currencies in order to propel our world forward in unprecedented ways. Ultimately, we're striving for a cleaner, greener tomorrow.

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Date: 14 - 16 January 2025

Venue: ADNEC, Abu Dhabi

Website: www.worldfutureenergysummit.com

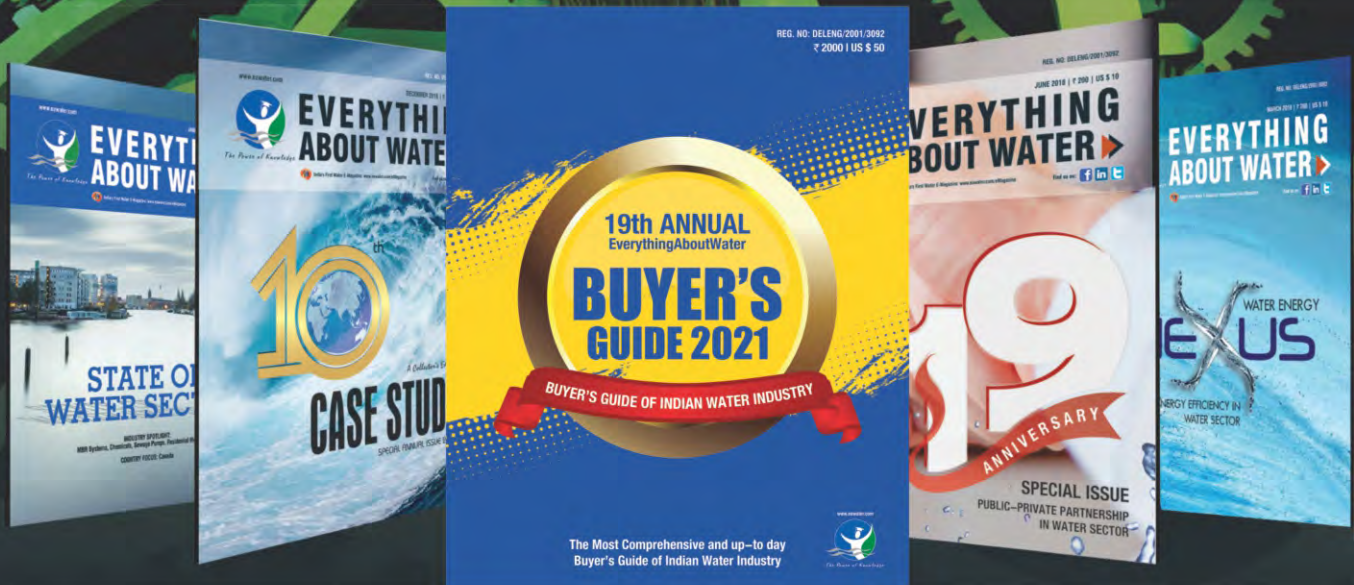
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114	CII Water & Waste Expo 2025	19	+91 98183 91920	amit.sharma@cii.in	www.watersolidwaste.in
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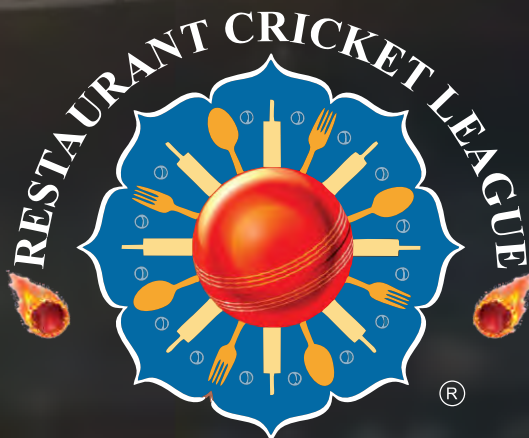
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