India's Water Magazine

WaterAge

April 2022 ₹ 200 | US $ 10

Your knowledge and information partner

TECHNOLOGY TRENDS IN

WASTEWATER/ SEWAGE WATER

Initiative of

SHUDH JAL FOUNDATION
JAL AAJ AUR KAL

Find us on:

www.waterage.in

AADYS
COMPONENTS PVT. LTD.

One-stop-shop for Components

Ensuring smooth running for your Water & Wastewater Plants

The components from Aadys Components are rapidly getting approvals in municipal water and wastewater treatment as well as in industrial process applications across all industries and strongly recommended by water treatment specialists. Aadys Components provides a wide of range of components for water & wastewater treatment plants which are offered either as individual item, equipment, skid mounted packages or fully integrated systems. All components are sourced from world class manufacturers and industry leaders in their respective fields. The company continually strives to improve its capabilities and performance in order to provide the highest quality and technologically advanced products available in the industry.

COMPONENTS

- FRP Vessels
- RO Membranes
- RO Membrane Housings
- Dosing Pumps
- Sludge Dewatering Screw Press
- Filter Media
- Resins
- On-line Monitoring System
- Instruments
- RO Anti0scalants
- Iron Removal Media
- Valves etc.

SEGMENTS SERVED

- OEMs
- Industries
- Hospitals/Hotels/Malls
- SEZs
- Defence
- Institutions
- Public Health Departments
- Public Sector Undertakings (PSUs) etc.

AADYS COMPONENTS PVT. LTD.

CORPORATE OFFICE:
605, Bhikaji Cama Bhawan,
New Delhi-110066.
Ph: +91 11 41551444

HEAD OFFICE:
SCO 146-147, IIIrd Floor, Sector-34A,
Chandigarh-160022.
Ph: +91 172-5275055, 4012755

E-mail: sales@aadys.co.in

www.aadys.co.in

MANAGEMENT

FOUNDER	:	Sanjiv Chaudhary
GROUP EDITOR	:	Yogesh Tomar
EDITOR–IN–CHIEF	:	Renu Tomar
ASSISTANT EDITOR	:	Manisha Singh
DESIGN & GRAPHICS	:	Virender Kumar
MARKETING & OPERATION	:	Poonam Singh

PRINTER
Fine Art: D–7 /3, Okhla Industrial Area, Phase 2, New Delhi 110 020

PRINTED AT
Fine Art:
D–7 /3, Okhla Industrial Area, Phase 2, New Delhi 110 020

PUBLISHER
WaterAge
Initiative of SHUDH JAL FOUNDATION
605, Bhikaji Cama Bhawan, Bhikaji Cama Place, New Delhi – 110 066

EDITOR
Renu Tomar
#4048, B 5 & 6, Vasant Kunj, New Delhi – 110 070

For editorial contributions / press releases, write to: **editor@waterage.in**
For advertising enquiries, write to: **info@waterage.in**
For magazine & e–newsletter subscription, write to: **enquiry@waterage.in**
For support and feedback, write to: **enquiry@waterage.in**

Published by **WaterAge** (Initiative of SHUDH JAL FOUNDATION) : 605, Bhikaji Cama Bhawan, Bhikaji Cama Place, New Delhi – 110 066, **E–mail: enquiry@waterage.in**

Editor's Note

RENU TOMAR
(Editor-in-Chief)

Dear Readers,

India is on the verge of a water crisis, and treated wastewater is a viable option that uses models other than the centralized method to provide a long-term and cost-effective solution.

Also, the quantity of gray/wastewater is expanding in lockstep with the fast growth of cities and home water supplies. Because of the harmful effects of municipal, industrial, and hospital wastewater on water, land, air, and agricultural products, wastewater treatment and correct disposal of the resulting sludge are required for environmental protection. Effective wastewater treatment provides significant economic benefits in terms of water conservation and eliminating wasteful water losses.

Wastewater treatment is critical for central urban development initiatives including Atal Mission for Rejuvenation and Urban Transformation (AMRUT), Jal Shakti Abhiyan, Swachh Bharat Mission, Smart Cities Mission, and Namami Gange. They also emphasize the reuse of wastewater for a variety of applications, particularly non-potable ones such as horticulture and flushing.

Effective wastewater treatment provides significant economic benefits in terms of water conservation and eliminating wasteful water losses. The water treatment process produces safe, reused water and has the potential to provide a number of additional advantages. It can reduce a country's waste output, provide electricity through methane harvesting, and make natural fertilizer from the garbage collected in the process.
There are many technologies available for treating organic and inorganic wastewater streams, some of these technologies have recently emerged, ranging from chemical and physical to biological approaches. In this edition, the experts have described a few such technologies.

Read these informative articles & case studies and provide us with your feedback and suggestions. Write us at **editor@waterage.in**

Constructions

Building Confidence

Triveni Constructions

Engineers • Planers • Contractors

Established in 1999

MES Enlisted 'S' Class EPC

Civil Engineering Works
- Building and Roads
- Water Supply and Sewage Disposal
- Pre Engineered Buildings

Electrical Engineering works
- Low Tensin Electric Works (upto 1100 Volts)
- High Tension Electric Works (excluding 33 kV)
- Solar Panel

Electrical/Mechanical Engineering Services
- Water and Sewage Treatment






Constructions

Triveni Constructions

Engineers • Planers • Contractors

Established in 1999

Head Office: College Road, Pathankot-145 001 (Punjab)
E-mail: standard.bedi@gmail.com
Branch Office: E-08 Wave Estate, Sector-85, Mohali S.A.S Nagar-140 308 (Punjab)
M.: +91 98143 21749, +91 98141 32026, **T.:** +91 172 4039 981
E-mail: triveni_anand@yahoo.com, triveniconstructions.mohali@gmail.com,

AKASH Blowers Pvt. Ltd.

Air Blower

Acoustic Enclosures

Ring Blowers

Sludge Dewatering Machine

Centrifugal Blowers

Vacuum Booster

Aqua Culture Blowers

Water Cooled Blowers

PRODUCT RANGE:

- Twin & Tri – Lobe Roots Blowers
- Gas Blowers
- Water Cooled Blowers
- Vacuum Boosters
- Acoustic Enclosures
- Aqua Culture Blowers
- Blowers Spares
- Ring Blowers
- Sludge Dewatering Machine

Regd. Office & Factory
1710/1712/1713, M.I.E.,
Part – B, Bahadurgarh, Distt. Jhajjar,
Haryana – 124507, INDIA

+91–702 702 9009

info@akashblowers.com

www.akashblowers.com

Amazon Web Services with Water.org and WaterAid to Provide Water Resources across India

Amazon Web Services, Inc. (AWS) has announced that its community water projects, in collaboration with global nonprofits Water.org and WaterAid, have provided access to clean water for more than 250,000 Indian citizens in the states of Maharashtra, Telangana, and Andhra Pradesh, India, since 2020. Moving forward, AWS plans to accelerate its work with Water.org, WaterAid, and other global nonprofits to expand initiatives focused on preserving water resources, improving access to clean water, developing sustainable sanitation operations, and continuing to improve the water efficiency of its own operations, in India and around the world.

In collaboration with Water.org and local organizations, AWS provides affordable loans in the three Indian states to help nearby communities finance the installation of piped water connections and toilets in individual houses. With WaterAid, AWS assists with rainwater harvesting, groundwater recharge systems, piped water installations, and community awareness programs in Telangana and Andhra Pradesh.

With India's population of 1.38 billion people, these programs are especially important. According to Water.org, more than 6% of Indian citizens lack access to safe water. A lack of household water connections and toilets contributes significantly to waterborne illnesses, stunting, and death. In addition, as millions navigate the COVID–19 pandemic, accessing safe water is critical to families' health in India.

"In India, the support provided by AWS to Water.org has enabled long–lasting, climate–resilient water and sanitation solutions for over 210,000 people in Maharashtra, Telangana, and Andhra Pradesh," said Michael Mayernik, Water.org Head of Corporate Partnerships. "Installations have included household piped connections, water taps, rainwater harvesting and storage, toilets, borewells, community water filtration, and infrastructure improvements. These projects also account for an estimated 500 million liters per year of recurring water volume benefit. Most beneficiaries are female, and with reliable access to water, health is improved, kids stay in school, income increases, and opportunities, especially for women and girls, expand. Water is the way to break the cycle of poverty, to protect and save lives, and to make a more equitable future possible."

Water.org develops programs by partnering with microfinance institutions, self–help group federations, and state rural livelihood missions to empower local communities in India with water resources. In Maharashtra, Water.org works with the Mahila Arthik Vikas Mahamandal (MAVIM), which is the State Women's Development Corporation of the Government of Maharashtra, to market water supply and sanitation (WSS) loan products. To date, the various field activities with MAVIM have reached more than 130,000 people in Maharashtra. This includes WSS training and raising awareness in communities on loan products such as accessible family toilets and rooftop rainwater harvesting systems. In 2021, Water.org and MAVIM also installed community water purification plants in the Thelegaon and Deurwada villages, where each plant can provide clean water for up to 150 families.

AWS's collaboration with Water.org and WaterAid in India is one way that AWS practices water stewardship. For AWS, running its operations sustainably also means reducing the amount of water used to cool data centers. AWS's holistic approach minimizes both energy and water consumption in its data center operations. This guides its water use strategy for each AWS Region—which starts with evaluating climate patterns, local water management and availability, and opportunities to avoid using drinking water sources. In some locations, AWS uses outside air for cooling much of the year, and on the hottest days when it does need water for cooling, AWS optimizes its systems to use minimal water. AWS is constantly innovating the design of its cooling systems and uses real–time sensor data to adapt to changing weather conditions to further reduce water use. AWS also uses reclaimed or recycled water instead of potable drinking water for cooling in multiple geographic regions and is working with local utilities to expand the use of reclaimed water wherever possible.

Many of our Amazon facilities in India also have the ability to collect and recycle water on–site with rainwater collection tanks or recharge wells and in–house sewage treatment plants, making it possible to reuse water for flushing and gardening.

INR 1,000 crore Set Aside for Mekedatu Balancing Reservoir & Drinking Water Project

The BJP Government in Karnataka, which is under pressure to act on the proposed 9,000–crore Mekedatu Balancing Reservoir and Drinking Water Project in the wake of the recently–concluded padayatra by the Opposition Congress, has allocated 1,000 crore for the project in the State Budget.

"The project will be implemented by getting required clearances from the appropriate authority of the Centre," stated the Budget. This is an

apparent effort to counter the campaign being taken up by Congress in the Cauvery basin ahead of the 2023 Assembly polls. The DPR in this regard is yet to be approved while the neighboring Tamil Nadu has put up serious resistance to the project.

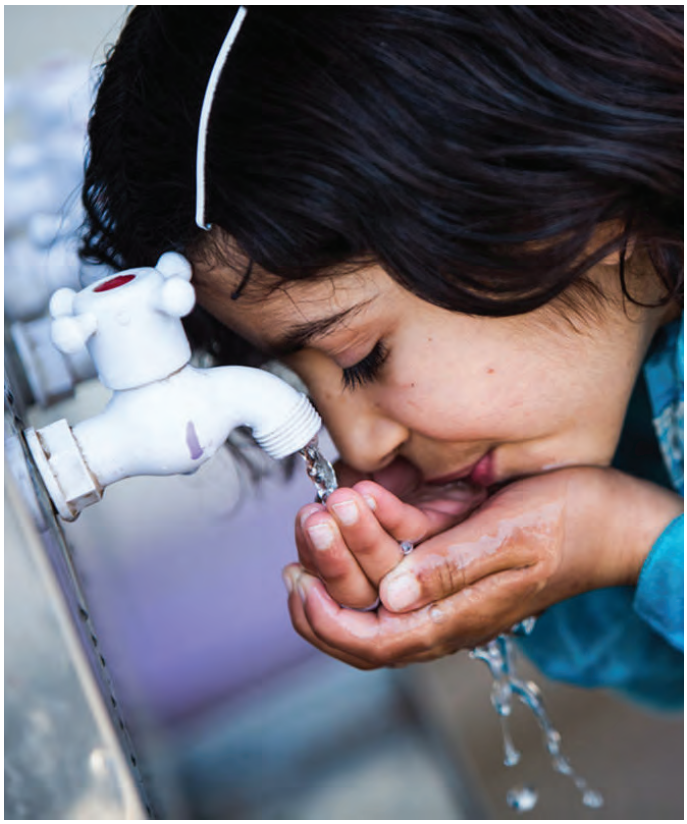
The project has assumed importance not only because it would regulate the flow of water to Tamil Nadu, but also seeks to supply drinking water to Bengaluru city and surrounding areas that are under pressure to take care of the water requirement of its growing population.

The Budget also announced the allocation of INR 5,000 crore for the implementation of Phase–3 of the Upper Krishna Project. It says that priority would be given to the land acquisition, rehabilitation, and reconstruction work.

It has also given INR 1,000 crore for the implementation of Kalasa and Banduri Nala Diversion Projects. It says that action is being taken to obtain necessary clearances from the Centre for the utilization of allocated water to the projects in accordance with the Mahadayi Tribunal Award. INR 3,000 crore has been been given for launching works related to stage 1 of the Yettinahole Comprehensive Drinking Water Project during this financial year. Under this, measures would be initiated to supply water during the next kharif season by completing the phase–2 works of the 260 km gravitation canal, T.G. Halli–Ramanagaram feeder canal, Madhugiri feeder canal, and Gowribidanur feeder canal in the current year, it says.

Government Schools in Haryana Get Safe Drinking Water Under Initiative of ICD Patparganj Commissionerate

Inland Container Depots (ICD) Patparganj Commissionerate under Delhi Customs, executed a unique and innovative project under Swachh Bharat Abhiyan named 'Sajal' aimed at providing clean, potable, and ambient temperature water to 8,000 school children in 20 rural schools spread across five districts of Haryana.



This initiative was made possible by the efforts of Customs officials of seven ICD located in Haryana under Patparganj Commissionerate. Under the project, each school was provided with one RO filter and one water cooler.

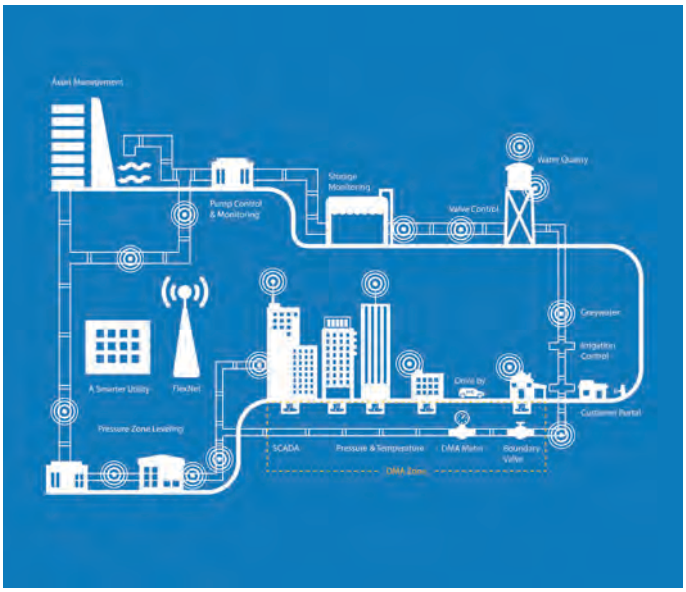
The project was dedicated to all 20 schools on April 26, 2022, during a digital launch at ICD Sonepat by Chief Commissioner Customs Delhi Zone, Surjit Bhujabal in the presence of Commissioner, ICD Patparganj Manish Saxena, and other senior officials. The principals of all 20 schools participated in the virtual launch along with school children.

Chief Commissioner Surjit Bhujabal while addressing the gathering emphasized that it is every citizen's right to have access to clean water. As we are celebrating Azadi Ka Amrit Mahotsav it is our responsibility to undertake such projects aimed at the betterment of society. This project would definitely provide better conditions for education and nurture an environment conducive to growth for students who are torchbearers of new India.

In Haryana, Central Ground Water Board, Department of Water Resources, Ministry of Jal Shakti, Government of India, in its report in October 2021 on the state of groundwater in Haryana, has highlighted that the groundwater offerings in different districts of Haryana are mostly saline, and not suitable for drinking purposes. The report also highlighted that the water has a low potable rating as chemical parameters were much higher than permissible limits.

The permissible pH limit of drinking water as per BIS is 6.5 to 8.5. However, the pH limit has exceeded 8.5 in most districts.

Smart Water Distribution Network Inaugurated at Cheran Nagar in Coimbatore



A smart water distribution system the civic body had set up at Cheran Nagar, Kavundampalayam was inaugurated by Mayor Kalpana Anandakumar.

Smint TIQ Pvt. Ltd. had installed the system that was developed by the PSG College of Technology under a Water Technology Initiative project funded by the Department of Science and Technology, Government of India.

The Government had sanctioned INR 2.50 crore for the project.

After the Corporation suggested Cheran Nagar as the area for testing the project, the College began working on a technology to ensure that residents in the chosen area got an adequate quantity of good water and that the water distribution was managed using the Internet of Things (IoT) technology, said sources.

After mapping the area that received water from the six–lakh–liter Cheran Nagar overhead tank, the College divided it into five district metering areas and each district metering area into sub–district metering areas.
As a part of the project, the College with help from the Smint TIQ Pvt. Ltd. replaced the pipeline used for water distribution and installed automated valves and smart meters to monitor water flow from end to end – from the overhead tank to each of the 400 houses.

The College also developed software that would not only collect readings from the valves and meters but also monitor water flow and its quality. It designed the software in such a way that every drop of water flowing through the pipeline to the 400 houses was accounted for, each house could also buy an additional quantity of water if required and the Corporation could close water in case of a leak in the system.

As a part of the project, the College also developed a web and mobile application to monitor water flow and generate bills based on water consumption, the sources said and added that after monitoring the system for a while, the company would transfer the assets to the Corporation.

The sources further said that one of the highlights of the smart water distribution system was that all the 400 residents would get the available water with equal pressure – meaning that they all would get the assured quantity of water within a specified time.

The Corporation sources said that it would supply water at 135 liters per capita a day (lpcd) to each of the 400 houses.

Water from RDS Project in 6 Months, Assures Telangana BJP Chief Sanjay Kumar

Claiming that the Centre will resolve the Rajolibanda Diversion Scheme (RDS) row between Andhra Pradesh and Telangana, BJP state Chief Bandi Sanjay Kumar said water will be released through the project to Jogulamba Gadwal district within the next six months.

Addressing a public meeting on the eighth day of his Praja Sangrama padyatra in Gadwal, he said: “Union minister for water resources Gajendra Singh Shekhawat has agreed to resolve the project issues and works will be launched with the approval of Krishna River Management Board. The TRS has failed to fulfill its promises whereas the BJP has succeeded. Credit goes to our leader DK Aruna who fought on the issue.”

About Contacts Pricing Partners

ABOUT US

WaterAge monthly magazine provide an established audience of corporate deal makers with the most up-to-date information on technologies, trends, and the updates of water & wastewater industry.

Try it now

BANNER ADS ON
WEBSITE

Be seen where it really matter!!
Create the buzz in water market.

Advertise with us on our website:

www.waterage.in

and reach out to 1500 quality readers daily!

Find us on:

SHUDH JAL FOUNDATION
JAL AAJ AUR KAL

605, Bhikaji Cama Bhawan, Bhikaji Cama Place, New Delhi – 110 066
M.: +91 98759 06502, E-mail: enquiry@waterage.in, Web.: www.waterage.in

KPCL Ash Water Treatment Plant, Bellary, Karnataka

HOW ARE INDIAN COMPANIES MANAGING WATER RECLAMATION AND REUSE?

Dharmendra Pratap Singh
Head of Infrastructure Solutions & Senior Vice President, Voltas Limited

Dharmendra Pratap Singh took over as the Head of Infrastructure Solutions and Senior Vice President at Voltas Limited in January 2019. Under his leadership, the company has strategically increased its focus on Government funded projects emphasizing inclusive growth. Prior to Voltas, he has been associated with Repono Warehousing Private Limited for two years as a Managing Partner. He has also been a Chief Executive Officer at Eway Consultancy LLP.

Need for Water Management for Indian Industries

Water is one of the most widely used natural resources by every industry. This increasing and unmonitored use of the depleting resource has led to worldwide water scarcity. Besides industrialization, rising population and rapid urbanization have also led to increased use of water resources. Water is utilized in the manufacturing industry along with the production processes in other industries to create products or to cool equipment used in the manufacturing process. Industrial water is utilized for fabricating, processing, cleaning, diluting, chilling, or

www.voltaswater.com / it.ly/dharmendrapratap

India's Central Pollution Control Board (CPCB), industries use roughly 500 billion cubic meters of the total available freshwater each year.

transporting a product. The water produced by industrial or commercial activities is known as industrial water and wastewater. Water is essential for practically every step of manufacturing in a variety of businesses, whether it's the food we eat, machines we use, or appliances we buy. The wastewater that results from these processes must be carefully controlled. According to the Ministry of Water Resources, around 40 billion cubic meters of water are utilized in the country's industrial zones, accounting for about 6% of total water availability. According to India's Central Pollution Control Board (CPCB), industries use roughly 500 billion cubic meters of the total available freshwater each year.

Methods of Water Management

Water reclamation can be defined as the processing or treatment of the wastewater generated by the industries to make it reusable with definable treatment reliability and meeting appropriate quality of water. On the other hand, water reuse refers to the use of reclaimed water for beneficial purposes. Furthermore, the terms "water reclamation" and "water reuse" typically imply the presence of a pipe or other water conveyance facility for transporting the reclaimed water. In addition, an increasing population necessitates the acquisition of alternative water resources. Water reuse is conducted with due regard to sanitation, public health, and environmental protection in cities and regions where there are industries and where wastewater collection and treatment is a normal practice. Reusing cleaned wastewater saves both money and benefits the environment. There is enough reclaimed water available to meet human needs if it is adequately treated. Agricultural irrigation, groundwater recharge, and industrial processes are just a few of the applications for reclaimed water.

Water management and treatment project at Uttar Pradesh Jal Nigam (UPJN) site low

Challenges

India is home to a variety of industries and some of them are water–intensive industries including tanneries, paper, and pulp industries, textile industries, dairy and dairy products, breweries and soft drinks production, and

steel mills. The amount of wastewater released by Indian tanneries is approximately between 3008 and 3324 liters per 100 kg of hides treated. Although it does not show in the end product, water is one of the most important raw resources used in the production of pulp and paper. The amount of water required per ton of paper produced is estimated to be between 273 and 455 M3, with nearly all of it returning as effluent requiring treatment. Sizing, de–sizing, bleaching, mercerizing, fancy dyeing, screen printing, khaki dyeing, yarn dyeing, and finishing are only some of the techniques used in textiles that require intensive use of water. The factory's combined wastewater is vast in volume and has a wide range of color, pH, total dissolved solids, and other characteristics. This has necessitated that water is recycled and reused, instead of over–utilization of groundwater, which will lead to water scarcity in the near future.

Even though there are several benefits of water reclamation and reuse, companies are faced with certain challenges during the water reclamation process. Technology advancements have begun to streamline these operations more than ever before. However, these advancements do not negate the fact that there are still obstacles to solve in terms of managing the water reclamation process. One of the major challenges faced by a water reclamation plant is the use of energy. The filtration process of the wastewater can consume energy of 3% to 15% of electricity annually.

Secondly, finding skilled plant operators has become a challenge. There is a huge requirement for employees who are skilled and effectively trained in the water reclamation and treatment process but there is a shortage in the supply of such workers.

Another facet of this problem is that administration of treatment facilities can account for a significant portion of annual operating expenditures. The next challenge is the disposal of sludge which is the residue that is generated during the treatment of wastewater. Although wastewater treatment plants are designed to filter water and make it environmentally viable, the treatment process can leave an environmental footprint. The organic debris that is taken from the water must be disposed of. There have been significant advancements in green technology that have improved the treatment of water. These advancements aid in reducing the environmental impact of water treatment facilities and their disposal of wastewater after clean water has been discharged.

Solutions available

A corporate should be careful in choosing a partner to help with their water management project. The partner should understand the numerous challenges that local governments and industries face when it comes to wastewater management. Rapid urbanization increased consumer demand, and developing digital technologies have resulted in high–class water management technologies developed by engineering companies.

The rate of technological adoption in wastewater service management has sped up. ULBs are introducing advanced treatment technologies for water and waste treatment, as well as automation and control tools for operating and monitoring facilities, and offering online municipal services. The government is also taking several initiatives to ensure that private companies have easy access to land acquisition and permissions. Furthermore, big–budget allocations and on–the–ground project execution are optimistic for the construction industry.

We at Voltas continue to innovate and contribute to nation–building through our expertise in water and wastewater treatment solutions

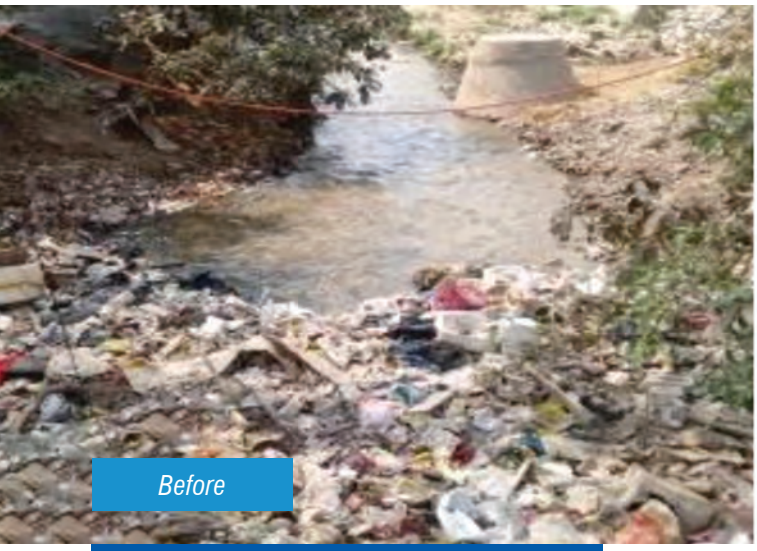
across various industrial, infrastructure, and built environment segments, covering both government and private sectors, as one of the leading providers of integrated end–to–end solutions for projects. Satellite remote sensing–based irrigation monitoring and decision–making platforms for governments are some of the technologies that will rule in the next era of the Water Environment. Water and wastewater utilities will benefit from operational information to reduce losses, assess network health, and increase income. Satellite images, in–situ sensors, and predictive analytics are already being used to create a water management and forecasting platform for state government agencies.

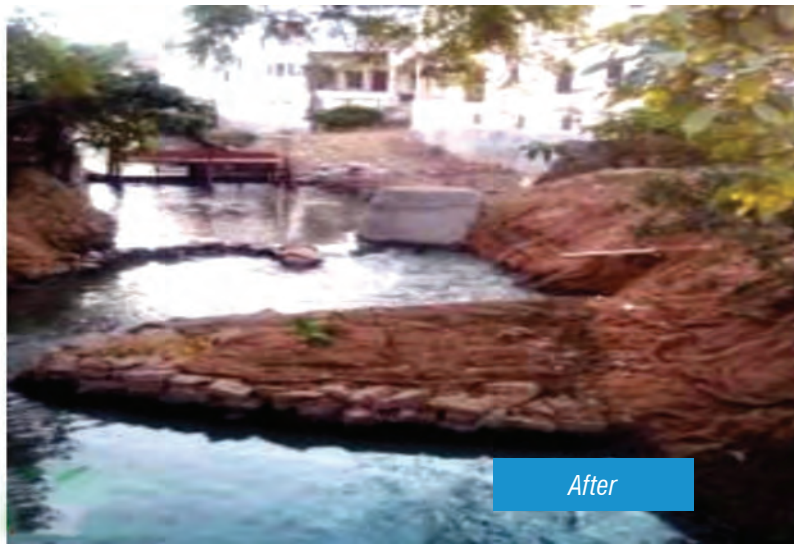
Decentralized wastewater treatment systems have recently acquired popularity due to their lower energy requirements, allowing for off–grid operations using alternate energy sources. Furthermore, these plants can be tailored to fit specific needs. Membrane bioreactors are another technology that is gaining popularity (MBR). MBR effluent is ideal for the reuse of treated wastewater, and it can be used for urban landscaping and toilet flushing without further treatment. Companies use everything from MBBR (Moving Bed Biofilm Reactor), SBR (Sequencing Batch Reactor), and ZLD (Zero Liquid Discharge) to additional industrial wastewater treatment technologies including UF (Ultrafiltration), and RO (Reverse Osmosis).

By applying the signature smart engineering solutions, we can address the challenges faced during the water reclamation process. Many efficient water treatment plants minimize waste and maximize reuse. We have conceptualized and commissioned a raw water treatment plant for industrial use, which meets all the latest international standards and is capable of handling 60 ML of water per day. The purified water from ultrafiltration can be used for low–end industrial purposes such as cooling. Nanofiltration, on the other hand, is mostly used in steps of the drinking water purification process, such as water softening, decoloring, and micro–pollutant removal.

Perspectives for the Future

India's wastewater treatment sector is starting to reach its full potential. This expansion is being aided by several causes. Private companies are taking considerable measures that will provide significant potential for various stakeholders. Indian companies can establish and ensure water sustainability through simple adjustments such as implementing efficient water management methods and systems within properties that assure water sustainability throughout the project's lifespan. Recognizing their environmental responsibilities, it is past time for individuals and businesses to step up their efforts to conserve water and leave a greener tomorrow for future generations.





Before & After: Assi River ecorestoration using Green Bridges and J Hook, Varanasi Awarded ISAC 2020, 1st prize in Water Projects category by MOHUA, GOI.

Yeshwant Kulkarni
Founder and Managing Director,
Green Water–Revolution Pvt Ltd.

Yeshwant Kulkarni is an experienced Founder with a demonstrated history of working in the environmental services industry. A visionary and a leader in designing and implementing in–Situ Bioremediation treatment of rivers, and lakes, as well as a strong business development professional.

ECOTECHNOLOGY FOR WASTEWATER MANAGEMENT IN INDIA:

FOR NONPOINT AND POINT SOURCES

In the wastewater industry, both nonpoint sources (NPS) and point sources (PS) are currently the domains of immediate attention. As per reports from United Nations and NITI Ayog, it is discernible that more than 75% of wastewater is discharged into natural water bodies without effective treatment. Rivers and drains with fresh water are known to have been natural carbon sinks, however, polluted rivers and drain negatively contribute to carbon emissions and thereby global warming. We are perhaps, as a community, in a dilemma of how to mitigate CO_2 emissions from polluted water while making existing wastewater treatment technologies energy–efficient. This article aims to lay weight upon the use of eco–technologies for abatement of water pollution as well as reduction of greenhouse gasses.

The only two sources of water on earth are rainwater and recycled wastewater; creating water from the atmosphere is yet under exploration. While nonpoint sources (NPS) pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage, hydrologic modification, etc., point sources (PS) pollution refers to any water pollution where input conditions are fixed. PS examples include gray and black water generated in residential townships, educational institutes, or effluent wastewater produced in industrial sectors. As opposed to conventional technologies

www.gwrpl.com | https://bit.ly/Yeshwant

50 KLD SSF: Water from adjoining drain (Ambil Odha which confluences with Mutha River, Pune) is treated using SSF technology and treated water is used for gardening inside Pune Municipal Corporation's environment wing–Indradhanushya.

used for the treatment of water pollution as well recycling water for reuse, which require consistent energy supply, eco–technologies are designed to work on zero electrical, mechanical, and chemical energies to treat wastewater. Ecological engineering can facilitate the restoration and preservation of the environment's health for the survival, development, and economy of society through the integration of engineering and ecological principles with modernizing trends of market and development. An ecologically resounding approach to engineering considers that nature responds comprehensively, persistently, and cumulatively. Ecotechnology operates within the boundaries of the ecosystem rather than flouting, disregarding, overcoming, and/or overpowering it.

GWRPL has strived towards making eco–technologies energy–efficient and heavy–duty compliant, for example, Green Bridges technology installed at Buddha Nala in Punjab treated 600 MLD flow of wastewater carrying domestic and industrial wastewater. More recently, the in–situ bioremediation of Assi River was awarded ISAC 2020 by the Ministry of Housing and Urban Affairs, in a smart city contest held nationally. Furthermore, the installation of Soil Scape Filter (SSF) for PS treatment has benefitted the government, industries, and individual bungalow owners to recycle and reuse wastewater (black, gray, and effluent – separate and combined). In April 2021, SSF technology was enlisted by the Ministry of Jal Shakti as innovative technology and has been proposed under Jal Jeevan and Swachh Bharat missions pan–India. In addition, GWRPL is the only company in India to have achieved:

- India's largest in–situ bioremediation of 600 MLD using Green Bridges eco–technology
- Only company in India to reduce 3,00,000 ppm COD to 173 ppm using SSF eco–technology

What is Green Bridge technology?

Green bridge technology is an in–situ treatment

Yeshwant Kulkarni,
Founder and Managing Director, Green Water–Revolution Pvt Ltd. He is an experienced Founder with a demonstrated history of working in the environmental services industry. A visionary and a leader in designing and implementing in–Situ Bioremediation treatment of rivers, and lakes, as well as a strong business development professional.

60 KLD SSF is constructed in available space around the children's playground at Oriental Marvel residential complex.

applicable to rivers and drains of all sizes. It uses the processes of bioremediation and phytoremediation, and does not require electrical, mechanical, and chemical energies to treat wastewater. The technology is based on filtration, biodegradation and biosorption mechanisms done by microbes and plants. A special microbial consortium called Ecofert helps degrade organic and inorganic pollutants while simultaneously optimizing the dissolved oxygen in the water. The stones/boulders act as a filtering material and prevent the solids from passing through the bridges. Green Bridge technology is often accompanied by three tier green pitching on the banks of the river / drain (as per requirement).

In short, Green Bridge technology was developed keeping in mind the principles of Mother Nature, where one's waste is another's food, thereby creating a symbiotic food chain. Such a food chain helps in restoring the water's self–purification capacity.

Application of Green Bridges at Assi River Ecorestoration:
The treatment of Assi River was done by removing municipal solid

SSF for a Textile Unit in Amer, Jaipur

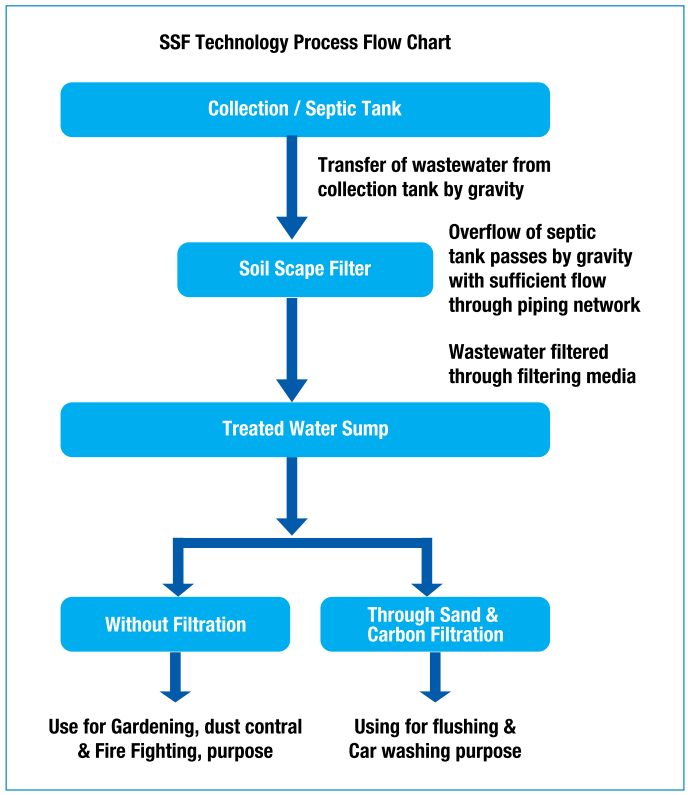
25 KLD SSF technology along the periphery of the parking area of Parvasakshi residential society

waste (MSW), cleaning and desludging of stretch, stream watershed development (removal of hurdles in the waterways, training of streams, silt control and erosion control measures), in–situ treatment – engrafting ecosystem (bioremediation and phytoremediation), and habitat development for ecological and recreational purposes. To avoid changing the natural contours of the river to control flowing water velocity, J Hook technology was installed.

		Before Treatment	After Treatment
Sr. No.	Parameters	Observed Values (mg/l except pH)	Observed Values (mg/l except pH)
1	pH	6.75	6.63
2	TSS	178	30
3	BOD	140	25
4	COD	651	131.91
5	Oil & Grease	6	2
6	Nitrate	0.65	0.51
7	Phosphate	11.66	5.90
8	Alkalinity	384.62	192.31

Upon treatment, it was observed that:

- Cleaning of the whole stretch by removing more than 100 dumpers of MSW has resulted in decreased anaerobic condition by removing anaerobic pockets created by the MSW
- Occurance of phytoplankton, zooplankton, and four to five types of fishes, water snakes, tortoises, and ducks.
- An increase in Avifauna and birds like Kingfisher feeding on aquatic species are observed throughout the stretch of the Assi River



1 KLD SSF technology for individual bungalow owner: (L) Recycled black and grey water is used for organic farming. (R) Owner seated atop functional SSF Technology = 100% odor free and noise free.

- There is a lot of improvement in the physical parameters like color, odor, and turbidity. All the adjacent residents and commercial settlements were very happy with the change.

Other Green Bridges installations include, Buddha Nallah (600MLD) Punjab, Ahar River (____MLD) Rajasthan, Omkareshwar and Dharampuri drains which confluence with Narmada River in Madhya Pradesh, several drains in Rasoolabad Uttar Pradesh, etc. In all the case studies, apart from restoring water ecologically, a reduction in greenhouse gasses along with flourishing biodiversity was also observed.

Soil Scape Filter technology for the treatment of black, gray, and effluent wastewater – SSF is a vertical eco–filtration system of wastewater done through the layers of bio–active soil, using ORGANOTREAT® supported by sand and gravel. It harnesses the process of ecological principles of biodegradation, biotransformation, and bioconversion at various trophic levels occurring in the detritus food chain by treating, transforming, and detoxifying the pollutants using solar energy.

The bio–fertilizer and treated water are the products of this process. The SSF process is developed through the rigorous activity of soil organisms like bacteria, actinomycetes, fungi, protozoa, earthworms, nematodes, arthropods, mollusks, etc. This soil environment is influenced by the growth of algae and macrophytes.

As the wastewater passes through the layers of biologically activated filtration medium, the pollutants are absorbed and degraded. This biodegradation process releases nutrients in simple forms which can be absorbed by plants for their growth. Hence there is no production of any kind of sludge in this treatment system. In SSF, the combination of green plants and bacterial culture is used to remove organic matter and pollution.

DATA ANALYTICS IN INDUSTRIAL WATER TREATMENT PLANTS

Pinaki Bhadury
Advisor and Consultant, Solutions Lead - Industrial, Chistats Solutions Pvt. Ltd.

***Pinaki Bhadury** is a Mechanical Engineer with a Post Graduate Degree in Managerial Science. He has over 38 years of experience working in various companies in diverse roles. His domain knowledge and expertise include energy, water, and wastewater. Pinaki has led the water businesses at Doshion Veolia and Wipro. Prior to that, he has held different positions, including Corporate Strategy Head, in Thermax Limited. He is very close to issues related to energy and water having worked with various Indian and global bodies, like CII, FICCI, WADE, IEA Paris, and the European Association of Energy Managers. He is now a freelance advisor and consultant to companies in the cleantech sector. He helps start-up companies with their growth plans, organizational structuring, investor pitch including partnerships and technology tie-ups. He is also the Industrial Solutions Lead at Chistats Solutions Pvt. Ltd., a Data Analytics company.*

Introduction

A water or wastewater treatment plant consists of several processes like separation, filtration, flocculation and clarification, aeration, and biological reactions. The performance of the complete plant depends upon the performance of each of the individual processes working at their optimum level. Besides these processes, there are several critical components in the plant like pumps, blowers, mixers, evaporators, and dosing systems whose operation is critical to the entire plant performance. All these processes and components generate lot of data that is captured either in a PLC, DCS or SCADA central system control platform.

Traditional control systems only display the health of the plant through instantaneous charts, trends, and reports. It is difficult for supervisors to analyse these data samples online and come out with interpretation that can help users, O&M operators, or plant designers.

Remote monitoring using IoT, and data analytics can give very useful insights into performance of these plants as compared to its design condition, its operations, carrying out predictive maintenance, process optimisation, and residual life estimations.

Types of Data Monitored

There are two types of data that are monitored in a water or wastewater treatment plant:

- Performance Parameters
- Operations Parameters
- Performance Parameters: These are the parameters that determine the performance of the plant with respect to its designed parameters and forms an important part of its evaluation. Some of the parameters collected are:
  - TDS or conductivity
  - pH
  - Total silica
  - TSS
  - Dissolved Oxygen
  - ORP
  - Temperature
  - Flow – Feed as well as treated water
  - Pressure

There could be many more depending upon the level of instrumentation.

- **Operational Parameters:** These are the parameters related to the operation of the plant, like:
  - Power consumption
  - No of hours of operation
  - Plant Breakdown or Shutdown details
  - Maintenance details

There could be larger number of parameters depending upon the level of instrumentation.

Source: www.htt.io

LinkedIn: https://bit.ly/PiankiB

The source of data generation could be many, some are continuous, and others are discreet. For example, through various sensors, information is continuously captured and fed into a PLC, DCS or a SCADA system like:

- Flow – Feed as well as treated water
- TDS or conductivity
- pH
- Total silica
- TSS
- Dissolved Oxygen
- ORP
- Pressure
- Temperature
- Power consumption
- Current & Voltage
- No of hours of operation

Some other data is captured physically in logbooks or stand–alone tables for events that cannot be automatically recorded, for example:

- Daily Water Analysis
- COD / BOD Parameter
- Component failures like pumps, motors, etc.
- Consumables replacement or refill instances like membrane replacement, CIP, dosing chemicals, etc.
- Plant stoppages

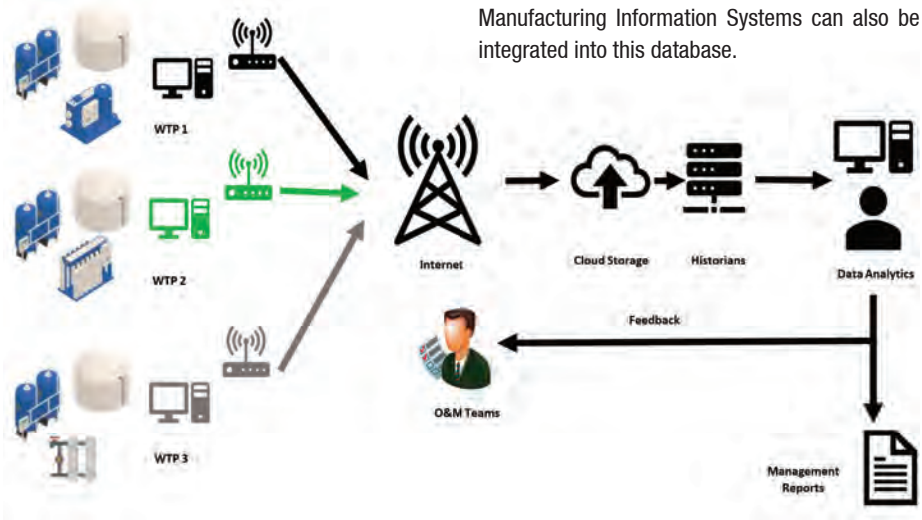
Conventional Supervision and Control System

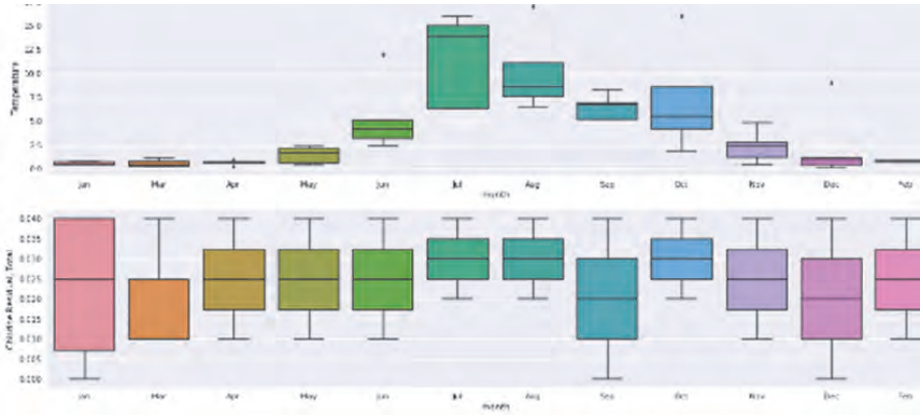
The conventional supervision and control system consists of a DCS or a SCADA platform where all the inputs from various water or wastewater treatment plants are fed to display instantaneous values and the trends of various parameters. Depending upon the user's choice, predefined charts and reports display the operation data and its trends. However, it is difficult to analyse the streaming data or the humongous data bank manually to derive meaningful inferences for predictive performance or condition monitoring of the plant. Almost all water and wastewater treatment plants operate on such platforms with few adopting advanced database platforms with limited analytical capability.

These control and supervisory systems are located at each site and are not connected to other plants. The information of one plant remains private to that site and is not shared or aggregated with other sites. Aggregation of data from various locations and its analysis helps in learning and improving plant performance and build models for predictive maintenance and condition monitoring.

IoT based Supervision, Monitoring and Data Analytics

The data generated by various sensors of water or wastewater treatment plants can instead be aggregated in a data base called Historian that stores the information in a structured way and allows its scientific analysis using statistical techniques. This Historian can be located either on premises of an individual plant or in the cloud if multiple plants are being connected. Information from various sources like organisation's ERP or Manufacturing Information Systems can also be integrated into this database.





Using this rich data source and running a Data Analysis Algorithm on it will create various analytical models that will give reports for intelligent Condition Monitoring, Predictive Maintenance, and Process Optimisation of the plants. These help in optimum operation of the plant intelligently without the intervention of any human operators or management personnel.

The model allows large users or O&M operators to predict the performance of any plant under various site conditions like different water qualities, ambient temperatures, and user demands.

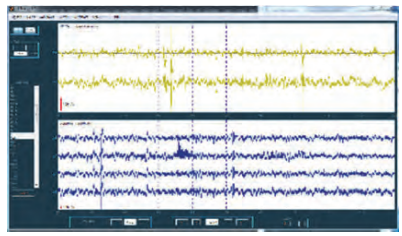
Using Internet Gateways, each of the PLCs, DCS or SCADAs are connected to a common data centre housing the Historian in a cloud or on premises server. Here, the information is scrubbed for its noise, time synchronised and stored in a structured database that allows its scientific analysis. The analytical algorithm then throws up various scenarios and chooses the most appropriate one for reporting and generating alerts.

Steps involved in Data Analytics

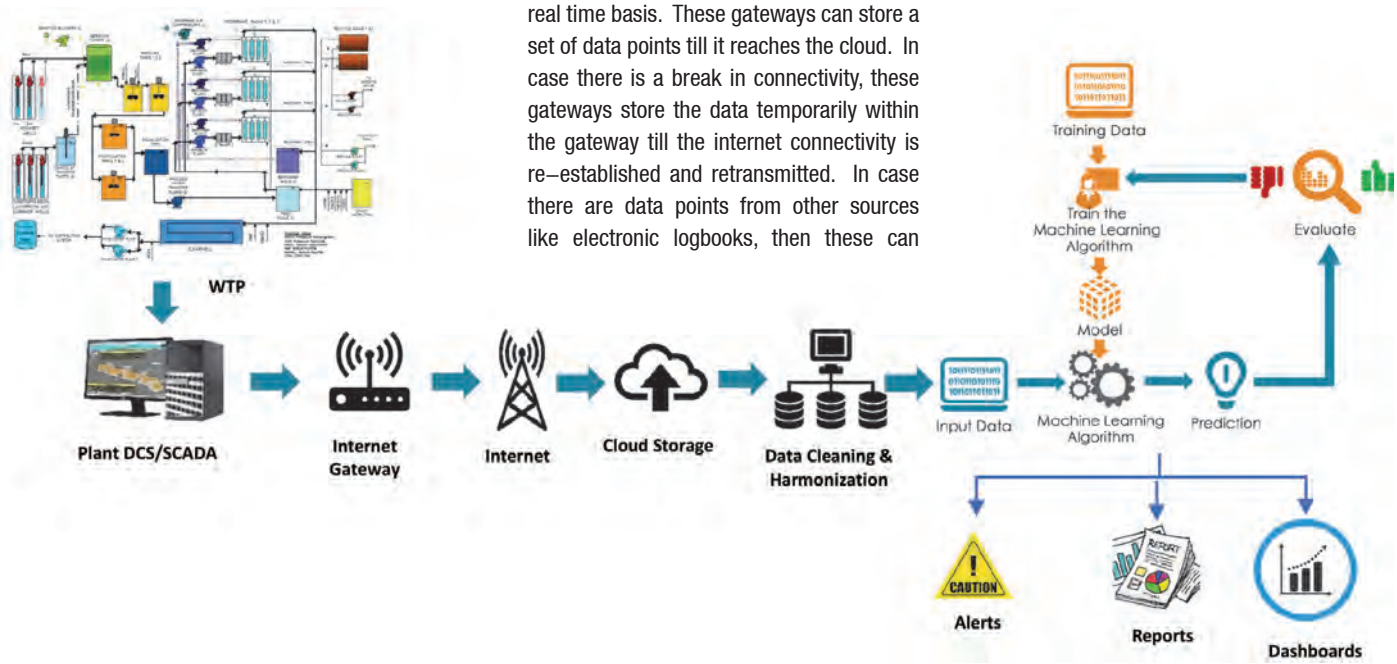
To make an existing PLC, DCS or SCADA based Water or Wastewater Treatment Plant monitoring and control intelligent using Internet of Things (IoT) and Data Analytics, following are the steps involved:

- **Implement IoT:** Transform the present DCS or SCADA into an IoT enabled controlled system by connecting an Internet Gateway that transmits the information to the cloud on real time basis. These gateways can store a set of data points till it reaches the cloud. In case there is a break in connectivity, these gateways store the data temporarily within the gateway till the internet connectivity is re–established and retransmitted. In case there are data points from other sources like electronic logbooks, then these can be independently connected to gateways and information transmitted to the cloud. Proper selection of these critical gateways is important. Check for their data storage capabilities, latency, and its ability to take additional inputs from independent devices. Some of these devices can easily be housed inside the main DCS or SCADA panels.

- Data Cleansing: Once the data has been received and stored in the data server either in a cloud or 'on–premises', it needs to be scrubbed, and cleaned, because the data arrives with lot of signal noise that give misleading interpretation when analysed. These signal noises are associated with the type of sensors and are always present. Using special IT based signal processing techniques, the unwanted noises are scrubbed out of the data set.



- **Data Harmonisation:** All the data points are not recorded at the same time due to lag in sampling from different sensors that



WEE
WORLD ENVIRONMENT EXPO 2022
EXHIBITION • CONFERENCE • AWARDS

WEE 2022

World Environment Expo

04th-06th JUNE, 2022
Pragati Maidan, New Delhi, India

MAJOR EXHIBITOR PROFILES

- Pollution Control Equipment's & Technology
- Air Purifier Equipment's
- Renewable & Solar Energy
- Recycling Machines (Plastic, Metal Electronic Devices, Wood, Glass, Cloth & Textile, Bricks & Inert Waste, Water Recycling Machines)
- Water Conservation Technologies & Products
- Waste Management Technologies & Equipment's
- Eco-friendly Products
- Green Building Products & Technology

EVENT HIGHLIGHTS & CONCURRENT EVENTS

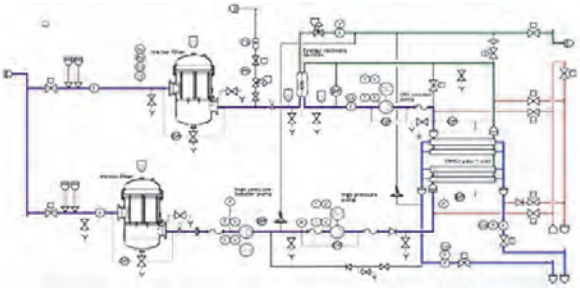
- Greenovation 2022- International Green Building Technology Expo
- Celebrating World Environment Day
- World Environment Conference (WEC 22)
- All India Mayor's & RWAs Summit 2022
- National Seminar on Green Building – GRIHA Council
- Green India Awards 2022
- Clean Air Competition

Indian Exhibition Services
8th Floor, Tower-B Noida One IT Park, B-820, Sushil Marg, Sector 62, Noida, Uttar Pradesh 201309
Mob. : +91-7042245907, E-mail : radhika@worldenvironment.in, event@ies-india.com
Web : www.worldenvironment.in

ORGANIZERS

GREEN SOCIETY OF INDIA

INDIAN IES EXHIBITION SERVICES



collects data at different times. There is also the phenomena of latency, delay in a signal reaching the cloud or on–site server. Hence, they must be synched for the same time stamp otherwise they cannot be used for analysis. Using special software tools, all signals are harmonized for the same time stamp. This is an important and first step in data analysis.

- **Development of Machine Learning Algorithm:** From the cleaned and synchronized data bank, representative samples are taken to develop the Data Analysis Algorithm. It starts with a set of hypotheses and prediction models and using statistical analysis, an algorithm is made that tests out these hypotheses.
- Out of various models that gets developed, the one that is closest to the hypothesis is taken and further trained for improvement in prediction analysis till a satisfactory level is achieved. This model is rerun using actual streaming data and checked for accuracy in prediction or various types of reports that gets generated. Once there is consistency amongst various results obtained to an acceptable limit, the Data Algorithm is commercialised and launched on the server to run online data analytics for a project.

Few uses of IoT and Data Analysis

- RO Plants – estimation of membrane failures: In Reverse Osmosis plants, one of the critical components in its operation is its membranes, whose residual life depends upon the duty conditions – quality of feedwater, its constituents, and plant operation. There are two ways the residual life can be estimated:
  - Using experience and data from logbooks, visual observations of critical parameters. This is a purely skill–based estimation and depends upon the individual operator or supervisor. Often, the replacement of a membrane is done once it has completely fouled, and it can no longer perform even after its chemical cleaning.
  - Following the OEMs recommendation of replacing the membranes after its warranty period is over, after fixed number of years. This is a more planned activity but expensive and followed only for the most critical plants.

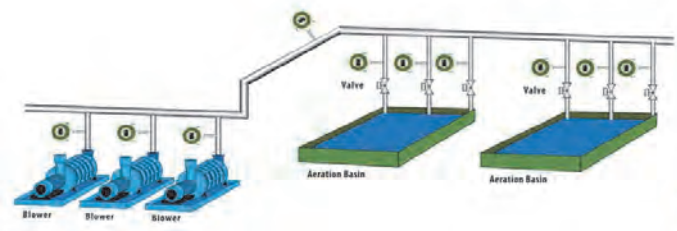
Sudden membrane failures can often disrupt the plant's operations. Besides the availability of spare membranes, its replacement takes time. Some plants for critical operation, have few extra membranes so that they can be used under such failure conditions while the failed membranes are replaced. But this is an expensive option.

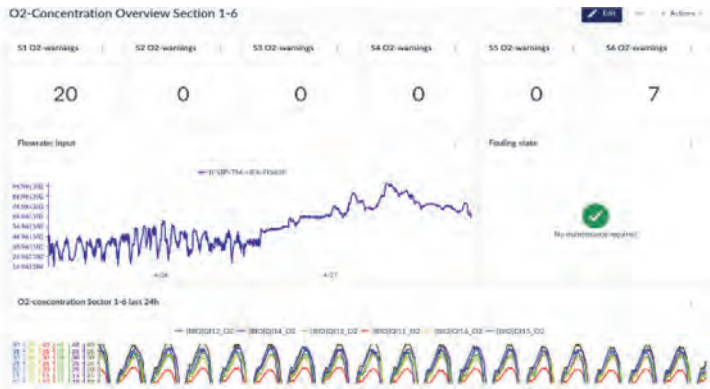
Failure of membranes can be predicted using data analysis. In that case, membrane replacements can be planned with minimum disruption without the need for standby membranes. Last minute membrane replacements can be very expensive it they are not available in stock. Data analytics will help prevent these sudden unplanned membrane replacements.

Data analysis can also help in optimising the cleaning operations thereby extend the life of the membranes beyond its usual life. This will mean lower replacement cost and hence lower operating cost for plants owners and O&M operators. Membrane cleaning chemicals and anti–fouling dosing chemicals are expensive. These dosages can be optimised based on the data analytics results that will help in lower plant operating costs.

Using data analytics, the feedwater pump operations can also be optimised resulting in lower power consumption and therefore operating expenses. The feedwater pump failures can be predicted using data analytics of the pump parameters like power, current and voltage.

- Air blowers for Aerators: Air blowers in aerators are one of the large power





consumers in water and wastewater treatment plants. The amount of air that needs to be pumped depends upon the oxygen demand. Accordingly, if the air blower operating point is changed to the correct setting, it can result in large power savings.Using the blower operating parameters like power consumption, voltage, and current, predictive maintenance of these expensive assets can be done that will result in higher plant availability.

- Cooling Towers: Cooling Towers are large consumers of power in cooling water pumps and fans. Large amount of dosing chemicals, fouling inhibitors, are used in cooling water basins. Use of these can be optimised to lower the consumptions and operate the cooling towers at the most optimum point depending upon the plant load, and this can be done using data analytics for a cooling tower. All the operating data will be fed to Data Analytical Engine which will give the recommendations of the optimum operating points and right amount of chemical consumption for the cooling tower at any given point.

Benefits of using Data Analytics in Water Treatment Plants

Users and operators of water and wastewater treatment plants can immensely benefit from the use of data analytics in the following ways:

- **Intelligent Alerts:** The output from the analytical engine can give alerts and intelligent alerts like:

- Pressure drop has reached 80% of the recommended value, CIP due in 15 days

Warnings:

Silica levels consistently high for 80% of the time in last 2 months, will result in membrane failure in 10 days' time

Advice:

- Operating equipment efficiency low due to high feedwater TDS
- CIP to be carried out in next 5 days
- Change the pump pressure, TDS is lower than set limit
- Membrane replacement required in February 2022, check inventory stock
- Design optimisation of the product and its controls

Lower Maintenance and Operating Costs:

- Less membrane replacements
- Lower power consumption
- Lower chemical consumption
- Optimised manpower deployment

ZERO LIQUID DISCHARGE TECHNOLOGY TO RECOVER, RECYCLE & REUSE WASTEWATER

Vikram Karunakaram
Managing Director, DeltaPure Water India Ltd.

***Vikram Karunakaram** has been an entrepreneur since 1997 in the water and wastewater treatment equipment. Design, assembly and operations. Amongst the earliest in India to delve into the RO membrane usage for desalination, he set up thousands of equipment Pan India and abroad through his company DeltaPure Water India Ltd, for various commercial and industrial organizations. He along with his partner set up the 1st RO membrane Casting and Coating facility in India at Pune with a technology transfer from CSMCRI Bhavnagar. He has recently made investments in a smart water meter manufacturing start up in Hyderabad and also a milk processing and whey protein manufacturing nutraceuticals company in Pune.*

High costs and declining reserves make water a valuable resource globally. Aiming to eliminate wasteful liquid discharge and control water pollution, stringent government regulations have been enforced to curtail wastewater discharge. Non–compliance of the stipulated regulations for violation of environmental norms and rules can result in heavy penalties or closure of operations because of sealing the polluting premises. Wastewater discharge leads to destabilization of the ecosystem and hampers water bodies.

The traditional methods of wastewater treatment become increasingly challenged with the identification of more and more contaminants, rapid population growth, increasing industrial activities, and ever shrinking fresh water sources. Conventional process has been proven in removing many chemical and microbial contaminants from wastewater. However, new emerging technologies such as **advanced oxidation processes (AOPs), ion exchange, ultra and nano filtration, adsorption/biosorption, advanced biological**

www.deltapureindia.com

treatment using algae, bacteria, fungi in combination are emerging today which promise safe and clean treated water. Zero Liquid Discharge (ZLD) technologies perform a vital role to achieve the recycling, recovering, and reuse of industrial wastewater. One of the main reasons for untreated wastewater is the disperse generation and high infrastructure cost involved in centralized treatment systems. Thus, there is a growing interest in advanced decentralized treatment systems that can provide treated water of good enough quality making on–site reuse possible.

The government is focusing on the public–private partnership model for water infra projects. This includes BOT (build, operate and transfer), DBOT (design, build, operate and transfer) and the hybrid annuity model (HAM), looking at projects in sewage treatment, bulk water transmission and seawater desalination, either under the HAM or EPC model.

Innovation in Advanced Wastewater Treatment

The Government of India is committed to the conservation of water, minimizing wastage, and ensuring more equitable distribution both across and within states through integrated water resources development and management.

Zero liquid discharge system aim at removing all liquid and solid waste from a system and produce clean water that is suitable for reuse. The solid waste captured can be reused in various industrial processes. Rising population is pushing government authorities to provide other alternatives for satisfying the increasing water demand, Recycling the wastewater generated from power plants & industries and reusing the recycled water for various industrial processes serves this purpose. ZLD (Zero liquid discharge) water treatment systems are specialized in providing these services.

A Zero liquid discharge facility (ZLD) is an industrial plant without discharge of waste waters. Target ZLD is normally reached by:

- Wastewater strong recovery
- Separation by evaporation or boiling of water part of wastewater not reusable, in evaporators, crystallizers and condensate recovery. ZLD plants produce solid waste.

ZLD discharge system overview ZLD technology includes pre–treatment and evaporation of the industrial effluent until the dissolved solids precipitate as crystals. These crystals are removed and dewatered. The water vapor from evaporation is condensed and returned to the process.

Deltapure, has recently successfully executed a project of Zero Liquid Discharge Technology Plant based on ETP, STP, ETP–Recycling, EDI & MVR, using the latest technology and membranes, for JBM Agri Pvt Ltd at their upcoming EV Bus manufacturing facility in Pithampur, Indore.

By using MVR evaporators, waste effluent can be concentrated efficiently and easily as much as required, up to zero discharge if required. This technology can treat effluents that are not effective or viable to treat by the most conventional techniques due to their nature.

As the demand for water rises, recycling of water with efficient techniques has become an important factor in sufficing the water needs. ZLD systems are efficient in working and result in 70%–90% of wastewater reuse. As per the economics of water, recycled water becomes more affordable as compared to water supply from conventional sources. Also, zero liquid discharge can act as a more accessible and economical solution in cases where waste needs to be transported in huge volumes over long distances.

Environmental Analytics and Solutions

DEFINE ▸ MEASURE ▸ APPLY

Powered by

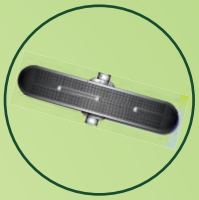
LAB SYSTEMS AND BIOTECH INDIA PVT. LTD.

LAB SYSTEMS AND BIOTECH INDIA PVT. LTD. is more than 24 years rich in experience Organization in the field of Measurement Analytics. With couple of Business Units as Business Verticals, the Organization has always delivered Quality and Sustainable Solutions to their Customer Partners.

ENVIRONMENTAL ANALYTICS AND SOLUTIONS is one of the business units that is Powered by the rich technical expertise in the field of measurement analytics catering to **WATER** and **AIR.**

MEMBRANE
HOLLOW FIBER MEMBRANE

PRESSURIZED ULTRA FILTRATION MEMBRANE 0.03 MICRON



PATENTED PLATE DIFFUSERS

Atlantium Israel: Medium Pressure UV Process Water Disinfection System (USEPA and USFDA Validated) for Microbial Deactivation Model Hydroptic with more than 62 Patents

Supratec Germany:

- Fine Bubble Diffusers (Disc Diffusers, Tube Diffusers, and Patented Plate Diffusers)
- Ultra Filtration based Hallow Fibre and Flat Sheer MBR Membranes.
- Ultra Filteration Based MBR STP Plants.

IN-EKO Czech Repulic: ● Micron Drum Filtration ● Micro Disc Filtration

Genesis Water Tech USA: ● NSF-60 Certified Bio- Flocculent
● Specialized Electro-Coagulation ● Centrifugal Filtration

DRUM AND DISC FILTRATION

Supratec Atlantium Illuminating Water Technologies GENESIS WATER TECHNOLOGIES IN-EKO TEAM

329, Master Mind IV, Royal Palms, Aaraey Milk Colony, Goregaon East, Mumbai – 400 065
Your Business Contact: reepal@labsystems.in
Tel.: +91 22 2879 4636 / +91 22 2879 4637,
Website: www.environmentalanalyticsandsolutions.com

Contributing to स्वच्छ भारत एक कदम स्वच्छता की ओर

WATER TREATMENT SOLUTIONS THAT ARE BEST–IN–CLASS AND COST–EFFECTIVE

Amarjit Panigrahi
CEO, Aquadax South Asia Pvt Ltd

Water shortage, according to the United Nations, is having a devastating effect on worldwide water use, with roughly 1.2 billion people living in areas where physical water scarcity and other drinking water–related difficulties exist. In addition, 1.6 billion people have a lack of financial means to get freshwater from diverse water sources. Because declining water supplies and water quality is a big concern in some densely populated nations, it is critical to preserve water and not squander it unnecessarily. This is where the equipment and solutions for water and wastewater treatment come into play. These pieces of equipment are made by water and wastewater treatment equipment companies that employ innovative technology to make alternative water resources, such as water obtained through desalination, fit for use.

The water and wastewater treatment equipment market is expected to reach USD 33,224.8 million by 2022, according to Markets and Markets Research. The spike in demand for

www.aquadaxinst.com / linkedin.com/in/amarjit–panigrahi–27692b6b

AQUADAX offers a comprehensive range of services, including design, installation, and commissioning, as well as operation and maintenance.

water and wastewater treatment equipment in municipal and industrial applications is one of the primary reasons driving this market's growth. Due to the rising usage of water and wastewater treatment equipment in both residential and non–residential applications, the municipal application sector is expected to lead this market over the forecast period. The market for water and wastewater treatment equipment is growing due to the rising demand for treated water from municipal uses and various government rules controlling industrial wastewater discharge.

Clients in this industry are now looking for solution providers that can deliver the greatest solutions at the most affordable pricing since the price is one of the most important criteria for them. AQUADAX, based in Bhubaneswar, understands the aforementioned needs and supplies clients with best–in–class cost–effective water treatment equipment and water quality monitoring services. AQUADAX is a prominent System Integrator of Water Treatment Plants and Equipment in India, as well as a provider of water analysis services. Municipal water, drinking water, rural supply, IoT and automation, industrial, bio–pharma, drinks, residential and commercial complexes, hospitals, hotels and resorts, and aquaculture industries are all served by the company across South Asia.

Optimizing capital & operational investments

While AQUADAX provides lucrative and cost–effective solutions, all of the company's products are designed to optimize capital and operational investments, resulting in lower asset ownership costs.

Because pricing and product quality are important to clients, during the requirement specification phase, AQUADAX discusses the importance of product quality and how much money it would need to provide the best products.

AQUADAX provides best–in–class technologies for efficient water and wastewater consultancy, treatment, and management through a combination of industry expertise and advanced engineering led by veterans from the water industry and a strong team of experienced professionals, engineers, and partners located across South Asia.

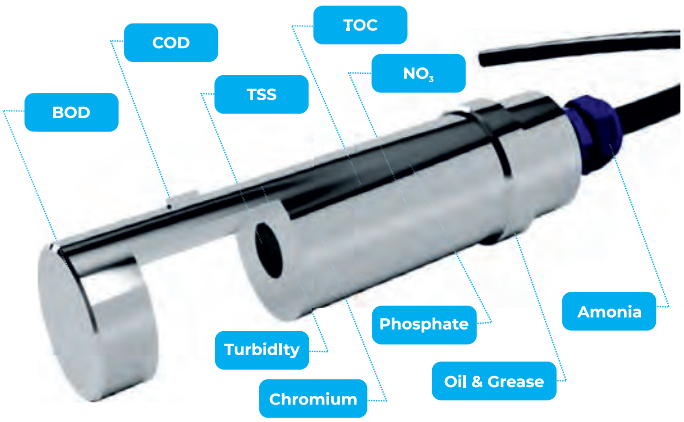
ONLINE WATER QUALITY ANALYSER

ONLINE CHLORINE & pH ANALYSER

ONLINE TURBIDITY

"Our range is simple and automated, which means less maintenance and more ease for our customers.", says

Amarjit Panigrahi, CEO, AQUADAX.



Online Water Quality Sensors

UV VIS Spectral Sensor / Analyser

Quicker delivery and ready–to–use systems

AQUADAX brings in the best–in–class technologies linked to clients' unique requirements and applications, based on over a decade of experience in the Indian water business. Furthermore, AQUADAX's products are superior engineering packaged and ready–to–use systems, providing speedy delivery.

Customer Satisfaction

Services play a critical role in system longevity and life cycle costs; AQUADAX offers a variety of service solutions that improve plant and machinery reliability. Plants with a long and trouble–free existence have higher output and efficiency.

AQUADAX is backed by highly–skilled led technical team that ensures the company's products are well–engineered to help clients decrease operating costs. As a committed player in the water sector, AQUADAX strives to establish a long–term connection with its clients by offering long–term services for their treatment plants to ensure that all discharge regulations are continually met.

Online Water Quality Sensors

AQUADAX provides solutions that are simple to obtain, install, and operate. "Our range is simple and automated, which means less maintenance and more ease for our customers.", says Amarjit Panigrahi, CEO, AQUADAX.

What makes AQUADAX stand out is that during the commissioning of a process in a project, the company always shoots a video and shares it with clients. This is because clients who have questions can get them answered by watching these films. AQUADAX's engineers are also customer–focused, so they assist clients and resolve their issues via Zoom meetings and WhatsApp video conversations. As a result, clients' lives are made easier.

Plants that are in line with and compatible with the most recent environmental protection standards

Despite the fact that AQUADAX competes with other market competitors, it assures that clients receive the best–in–class goods at a fair price that fulfill the exact application requirements. AQUADAX not only ensures that it fulfills quality requirements and norms.

AQUADAX also undertakes retrofit projects for clients' non–functional or non–compliant STP, ETP, RO, and UF plants to return them to operational mode with adequate Automation that is up to date with the latest technology on a budget–friendly scale, ensuring that the plant is in line and compliant with the latest environmental protection norms as per the Central and State Pollution Board norms.

AQUADAX offers a comprehensive range of services, including design, installation, and commissioning, as well as operation and maintenance. The corporation guarantees that all equipment and treatment plants it supplies, installs, and maintains conform with the environment agency's consent to discharge regulations.

Digital Communication Technology

Two 4–20 mA Outputs, Two Relay Output

Modbus RTU Output

Excels at monitoring the treated water's quality

Although the first part of AQUADAX's business or service is manufacturing sewage treatment plants, effluent treatment plants, RO plants, and ultra–filtration systems, as well as carrying out projects for water treatment plants, demineralized plants, the company excels in providing service in monitoring the quality of the treated water. It also provides services such as inline monitoring, process monitoring sensors, and IoT automation.

AQUADAX assures that the treated water is of high quality. As a result, this not only assists in meeting consumer needs, but also in adhering to CPCB, MOEF, and other agents' guidelines for the Indian sector.

Amarjit has worked with various firms in the sensor monitoring industry and has nearly two decades of experience in the process monitoring sensors area.

As a result of their experience, the CEO and his staff make sure that all of the treatment plants they work with have the best–in–class sensors to check the water quality at every step. As a result, the IoT Automation gateway assists in attaining the best outcomes, which leads to customer satisfaction via the IoT Automation gateway, which also allows customers to have first–hand real–time data on their mobile phones and computers.

The Journey Ahead

"Our short–term goal is to win as many projects as possible, big or little," says Amarjit, "since we give the best goods and solutions to our clients, regardless of project size."

The company is now working on Jal Jeevan projects with a number of contractors and system integrators. It is also working on Smart Water Monitoring in the IoT arena for Smart City Projects, as well as a variety of other projects involving Online Monitoring of Sensors in Sewage and Industrial Effluent with Data Linking to CPCB through IoT Platform.

"Because I work in the water quality monitoring and sensors industry, my aim is to open a plant in India that can produce water quality sensors like pH, Conductivity or TDS sensors, DO, ORP, Chlorine, Turbidity, TSS, BOD, COD, Ammonium sensors, and so on." We want to deliver all of these solutions at a reasonable cost while maintaining high quality, as per international standards," says Amarjit.

Moving forward, the firm also intends to produce Flow Meters (Woltman or Electromagnetic), as this is an important component of AQUADAX's business, and the company resells flow meters from several international and Indian manufacturers. As a result, the firm intends to enter this market in the future in order to supply clients with high–quality flow meters at reasonable costs.

AWARENESS OF **NSF** STANDARDS IS RAPIDLY

INCREASING IN DEVELOPING MARKETS LIKE INDIA

Uday Thakkar
Director Sales – APAC
(Global Food & Water Division)
NSF International

Uday Thakkar has 32 years of industry experience managing start–ups as well as developing and executing growth strategies for leading Indian and global businesses. He is a seasoned business leader with hands–on management experience in challenging business environments. He has also worked with reputable Indian and multinational corporations (MNC) including Godrej, Kodak, J & J, Ecolab, and ISS. His strong techno–commercial background has been key to his success while managing a large spectrum of businesses in industries including food safety & hygiene, capital equipment, industrial & engineering products, and services.

Q. You recently joined NSF. Could you please tell us about your background and the companies you have worked with?

A. Yes, I joined NSF in December of 2021. Over the last three decades, I was fortunate to work at various Indian and global organizations including Godrej, Kodak, J&J, Ecolab, and ISS, developing and managing their businesses in various capacities. I believe my techno–commercial educational background has helped me throughout my career to successfully manage a broad spectrum of opportunities and challenges.

Q. What will be your role at NSF and how excited are you with the new responsibilities?

A. I am the Sales Manager for the Global Food and Water Divisions in the APAC and Middle East regions. I feel very fortunate to be a part of NSF and am super excited about my new role.

website: www.nsf.org

> I am looking forward to helping fulfill NSF's mission of protecting and improving global human health.

Q. Could you please brief our readers about NSF and its journey?

Q. NSF was founded in 1944 as the National Sanitation Foundation. We have more than 75 currently active public health and safety American National Standards and 95 published protocols for appliances, food equipment, drinking water filters, and other products. The NSF mark assures consumers, retailers, and regulators that certified products have been rigorously tested to comply with all standard requirements. Separately, we offer customized training and education, risk management, and consulting solutions.

I would encourage people to visit www.nsf.org for much more exciting information about how NSF can help your business.

Q. What services does/will NSF offer to the water & wastewater industry?

A. NSF's Water Division provides testing, inspection, and certification services for the water industry from source to tap. Some of the water areas we work in include municipal water systems, plumbing products, water treatment products, and pools and spas to name a few.

Q. How do you see the current certification norms and standards in the water industry in India?

A. Many countries, including India, are in various stages of their evolution with regard to standards and certifications. NSF certification benefits manufacturers in many ways, including those who are trying to export their products to other countries and gain market share. Awareness of NSF standards is rapidly increasing in developing markets like India. Many Indian exporters of PVC pipes, rubber components, valves, pumps, etc., have benefitted by achieving certification to NSF standards as this opens the USA and European export opportunities for these manufacturers as well as differentiates them from their local competitors in India.

Q. What role can the government play in increasing awareness of quality assurance in the water industry?

A. Water is an ever–depleting natural resource that provides an opportunity for governments across the globe to refine, recycle and reserve water. NSF certifications provide end–users

confidence that the certified products used in the water treatment and distribution process have been tested and meet main regulatory requirements used around the world.

Q. What personal goals do you want to achieve in the next 5 years with respect to NSF?

Through working in Sales, my goal is to increase the number of companies that test and certify to globally recognized standards to help provide more consumers' confidence in their water products. Over the next five years, I am looking forward to helping fulfill NSF's mission of protecting and improving global human health.

Q. Please tell us about the training you provide for the water industry professionals.

A. As public health and safety standards are dynamic, companies must ensure their employees receive essential education and training to stay ahead of the curve. At NSF, we understand business challenges in such rapidly changing market conditions. We support and provide timely and pertinent training in all our global markets to water and wastewater standards. NSF provides training in–person, online, and through virtual means. To learn more, visit https://www.nsf.org/training/area/water–wastewater

VIRTUAL WATER: THE INVISIBLE COMPONENT OF WATER USE

Col. Bhaskar Tatwawadi
Director, Double Shotz Pte. Ltd.

Col. Bhaskar Tatwawadi (Retd), *an army veteran and a Civil Engineer from VNIT Nagpur with a Master's degree in Environmental Engineering (Gold Medallist with Honours, 1984.) from IIT Roorkee has over 47 years of professional experience. His 23 years stint in the Army, Corps of Engineers, included construction of water treatment plants and design of several sewerage and sewage treatment projects for military, naval and air stations. Later, he has worked on many projects in water and wastewater management including design and execution of rural and urban water supply and sanitation schemes, the Visakhapatnam Industrial Water Supply Project (1998), construction of the BWSSB Water Treatment Plant of 300 MLD (2000 -01) and the first Chennai Metro-water Seawater Reverse Osmosis Plant of 100 MLD (2005).*

Inherent in global trade and commerce is an invisible component of water use – **The Virtual Water.**

In agriculture and other businesses, corporatization, mass production for exports and bottom lines rule. Weak and toothless regulations often create space for predatory organizations to indulge in unethical and abhorrent trade practices. Better awareness among the local population and citizens about the purpose for which their local water resources are being used could result in such practices being resisted and challenged. Even in the most water–stressed countries like India, water consumption for agriculture has reached unsustainable levels. The numbers published by the FAO in 2016 for India showed that out of the gross water

Countries with the Largest Agricultureal Water Withdrawals

Country	Agricultural Water Withdrawals (billion m^3)	Total Water Withdrawals (billion m^3)	Agricultural Water Withdrawals as percent of Total Water withdrawal	Area Equipped for Irrigation (m ha)	Area Equipped for Irrigation as percent of Agricultural Area (%)	Agricultural Water Withdrawals per area Equipped for Irrigation (m)
India	688	761	90	67	37	1.0
China	358	554	65	69	13	0.5
United States	175	486	40	26	6	0.7
Pakistan	172	184	94	20	75	0.9
Indonesia	93	113	82	7	12	1.3
Iran, Islamic Rep.	86	93	92	10	19	0.9
Vietnam	78	82	95	5	42	1.6
Philippines	67	82	82	2	13	3.4
Egypt. Arab Rep.	67	78	86	4	100	1.5
Mexico	62	80	77	7	6	0.9

Source: Scheieering and Tregure 2016b, based on FAO 2016a. 2016b.

withdrawals of 761 Billion cubic meters the agricultural water withdrawals were 688 Billion cubic meters or 90%.

According to Dr. Vibha Dhawan, Distinguished Fellow and Senior Director New Initiatives and Programmes, The Energy and Resources Institute (TERI), who wrote in her "Water and Agriculture in India Background Paper" for the South Asia; which was presented by the expert panel during the Global Forum for Food and Agriculture (GFFA) 2017 the following findings were recorded.

As per the assessment of the Central Ground Water Board (CGWB) in 2011, India's total annual replineshable groundwater resource was around 433 billion cubic meters (BCM) and net annual ground water availability was 398 BCM. Of this India withdraws 245 BCM (62%) annually. As of 2017, irrigation consumed about 84 %of total available water. The Industrial and domestic sectors consumed about 12 and 4 %of total available water, respectively.

The total irrigation potential created (IPC) from major, medium and minor irrigation schemes of surface water increased from 22.6 million hectares during pre–plan period to 113 million hectares at the end of the 11th Plan. Because this irrigation potential represents 81% of India's ultimate irrigation potential estimated at 140 million hectares, the scope for further expansion of irrigation infrastructure on a large scale is limited. The share of canals in net irrigated area has declined from 39.8 % in 1950–51 to 23.6 % in 2012–13. On the other hand, the share of groundwater has increased from 28.7 % to a whopping 62.4 % during the same period. This expansion reflects the reliability and higher irrigation efficiency of 70–80% in groundwater irrigation compared with 25–45% in canal irrigation. (GFFA Paper).

India produced 241 million tons of foodgrains in 2011. This rose to 305 million tons in 2020.

According to the FAO's website, agriculture, with its allied sectors, is the largest source of livelihoods in India. 70 percent of its rural households still depend primarily on agriculture for their livelihood, with 82 percent of farmers being small and marginal. In 2017–18, total food grain production was estimated at 275 million tonnes (MT). India is the largest producer (25% of global production), consumer (27% of world consumption) and importer (14%) of pulses in the world.

India's annual milk production was 165 MT (2017–18), making India the largest producer of milk, jute and pulses, and with world's second–largest cattle population 190 million in 2012. It is the second–largest producer of

rice, wheat, sugarcane, cotton and groundnuts, as well as the second–largest fruit and vegetable producer, accounting for 10.9% and 8.6% of the world fruit and vegetable production, respectively.

The India Brand Equity Foundation (IBEF) – www.ibef.org has the following details (Last Updated: May, 2021) on its website about the agriculture sector exports from India.

"India's agrarian culture and varied regional climate have significantly contributed to the global food basket. Indian curries, spices, snacks, and mangoes are known for their excellent quality across the globe. Indian agricultural/horticultural and processed foods are exported to more than 100 countries/regions, chief among them being the Middle East, Southeast Asia, SAARC countries, the EU, and the US. Ministry of Commerce and Industry introduced Agriculture Export Policy, 2018 with an aim to double farmers' income by 2022 by doubling agricultural exports from the country and integrating Indian farmers and agricultural products to the global value chain. The export of agriculture is targeted at USD 60 billion by 2022".

Globally, India leads the following food segments:

- The total agriculture commodities export was US$ 3.50 billion in March–June 2020 with sharp increase of 23.24% during the same period in 2019.
- During April–December 2020, grapes export amounted to USD 49.79 million.
- India exported pulses worth USD 216.76 million and dairy products worth USD 138.93 million from April– December 2020.
- During April–September 2020, natural honey export amounted to USD 62.29 million.
- India is the largest milk producer in the world. Milk production in the country is expected to reach 330 million tonnes (MT) by 2024.
- India has the world's largest population of buffalos (109.8 million in 2020).
- Among vegetables, India ranks second in the world with 188 MMT production in FY20*; it is number one in producing Okras with 6.44 MMT production in FY20*.

During FY20 (till February 2020), India exported basmati rice worth USD 3.88 billion, buffalo meat worth USD 3.01 billion, non–basmati rice worth USD 1.84 billion and other processed foods worth USD 2.71 billion. During FY21 (till December 2020), India exported basmati rice worth US$ 3.27 billion, non–basmati rice worth USD 3.51 billion, and buffalo meat worth USD 2.62 billion. (IBEF).

As the exports zoom, it is worth pondering over the implications on Virtual Water Balance.

The virtual water flow from Northern India raises questions on water sustainability. Continuation with the current irrigation practices; ground water depletion by 2050 may increase to 75%. India exports water intensive crops

such as rice. It was estimated that in 2010, India exported about 25 km3 of water embedded in its agricultural exports. This is equivalent to the demand of nearly 13 million people. India was a 'net importer' of virtual water until around the 1980s, but with the increase in grain exports, India has now become a net exporter of virtual water – about 1% of total available water every year.19 The ratio of export to import of virtual water is about four for India and 0.1 for China.

China is a net importer of water. This is seen in China and India's trade patterns. China imports water intensive soybeans, cotton, meat and cereal grains, while exporting vegetables, fruits and processed food. India, exports water intensive rice, cotton, sugar, and soybean. Crops such as rice, which use as much as 3,000 to 3,500 litres for production of 1 kg of grain, may actually be produced at far off locations which are water rich resulting in virtual water transfer from areas with plenty of water to water deficient areas. Most state governments in India provide subsidized or free electricity to farmers. This has resulted in water overuse and in declining groundwater tables. It is estimated that Indian farmers use 2 to 4 times more water to produce a unit of major food crop than in China or Brazil (GFFA Paper cited above).

A report from "Grist" by Diana Cruzman on 5th June 2021 was about Virtual Water and its clandestine export, all perfectly valid legally. She wrote:

Foreign corporations are increasingly purchasing land in the U.S.; in the Southwest, thanks to longstanding laws on water rights, these purchases often come with unlimited access to the valuable water underneath the soil. Combined with nearly year–round sunshine, this has made the area a magnet for companies looking to grow water–intensive crops and raise livestock. Over the last 20 years, foreign companies have purchased more than 250,000 acres of land in six South–western states to raise cattle and pigs, as well as to grow everything from almonds to alfalfa, according to an analysis of purchase data that Undark obtained from the U.S. Department of Agriculture. On its face, foreign ownership of farmland has not proved significantly different from American ownership for large–scale production of crops like alfalfa. Domestic farmers have long shipped food overseas, and companies like Almarai, as well as independent researchers, have suggested the outsized focus on foreign companies may be xenophobic. American farmers and companies also control millions of acres overseas, mainly in Africa, Asia, and South America. But with their implications for food and water security – that ultimately, the U.S. is not in control of its own farmland – the purchases are drawing attention to the larger trend of industrial agriculture in the U.S. and the problems that come with it.

Corporate farms, researchers and policymakers warn, drain aquifers and threaten access to water for drinking and future crop production. The export of crops and the water used to grow them, known as VIRTUAL WATER, has been accelerating for decades, despite concerns that in drought–stricken areas such as the Southwest, this system is unsustainable in the long term. Although virtual water itself is not inherently problematic – and can even reduce water usage in some cases – its extraction from water–stressed communities is sounding the alarm as water crises become more urgent. Even as the Colorado River Basin enters its 21st year of sustained drought

and climate change threatens to further exacerbate water scarcity, virtual water trading is expected to triple globally by 2100, with a large share moving from the U.S. to other countries.

"It's basically exporting water in the form of alfalfa to countries that are water scarce," said Alida Cantor, an assistant professor at Portland State University in Oregon who researches water management and sustainability. "But it's exporting it from a region that is also water scarce."

Virtual Water is a relatively recent concept. First introduced by British geographer John Anthony Allan in 1993, the term signifies the water that is embedded in the production of commodities, from food to fibers to energy. Allan, who won the Stockholm Water Prize in 2008 for his work, framed it as a solution to global conflicts over natural resources and a helpful tool for water–scarce countries to feed growing populations. He suggested that countries lacking domestic water resources could simply import food and other commodities containing embedded water, and thus avoid having to deal with water crises directly.

The western states of the USA namely Colorado, Utah, Nevada, Arizona and California are facing unprecedented drought according to the daily news reports. On the other hand there seems to be no decline in the virtual water usage and export! Any restrictions on water usage would result into the rights of the landowners and legal wrangles would ensue!

Virtual Water is therefore a very potent strategic weapon in the context of the current dynamics of trade and commerce! It has the potential to rebalance the fragile economies and also to rewrite contemporary history. With the water availability in India touching the stressed level of about 1200 cubic meters per capita in the recent past, our virtual water export to other countries may have serious repercussions for our agri–business in the short and the long term. Serious doubts about its sustainability are already being raised by the planners. Are we poised to use this weapon to our advantage? Will our strength in production prove to be a weakness? What will be the geo–political and commercial implications for us?

But more about that in the next part……..
It is all About Virtual Water!

CURRENT CHALLENGES FOR WATER, WASTEWATER PROJECTS

Sandip Patil, *Project Manager*

Sandip Patil *is Project Manager at Leading Water Treatment Company. Having over 15 years of experience in the Water Industry, Sandip has executed various prestigious Water & Waste Water projects. He has rich experience in EPC Project Management. He is a Mechanical Engineer from Sardar Patel College of Engineering and has completed his MBA (Operations) from NMIMS Mumbai.*

India contributes 18 percent of the global population but has only 4 percent of the global water resources. India's per capita water availability is around 1,100 cubic meters (m^3), well below the internationally recognized threshold of water stress of 1,700 m^3 per person. It is also dangerously close to the threshold for water scarcity of 1,000 m^3 per person.

Population growth and economic development put further pressure on water resources. Climate change is expected to increase variability and to bring more extreme weather events. With respect to India despite of good conditions for monsoon, we land up into too little (Sparse Rain) or too much water (Heavy Rain) conditions.

For wastewater treatment, situation is extremely alarming. Majority of wastewater treatment plants are out of order due to lack of maintenance. The untreated wastewater also pollutes the existing water sources, only to add to the problem even more. Considering the population of India, the wastewater treatment issues cannot be ignored anymore now.

The government understands the need to overhaul, augment, and revamp the current infrastructure with greatly investing in this sector. There are many more projects are going on with Government as well as industrial sector which shows deep involvement and concern from government side.

Such EPC contracts for water sector has many challenges such as:

Low Importance to Water Projects

Water / Waste Treatment plants falls under utility categories. Obviously, many clients focus more

on main process units. Hence utility section has always been the last priorities and given lower importance.

Customer Dependency

Success of such project depends on progress of clients' main plants. Engineering / procurement / construction inputs delay is inevitable because of main plant progress. Majority of the cases commissioning got delayed for want of input feed from customers.

Regulatory Requirements

Industrial sites have nowadays very stringent wastewater discharge permits that include flow and quality restrictions. Moreover, CPCB/SPCB Industrial Effluent Guidelines are to be followed with more demands and regulatory focus on industrial units.

Power Costs

In many industries, electricity cost is quite significant and they put efforts to enhance the power consumption efficiencies by utilizing various options of 'Waste to Energy' technologies.

Land Scarcity

In today's urban India, land availability is a major concern and always drives the companies for modern space saving technologies for their water / wastewater solutions.

Presence of Small–Scale Players

The unorganized and small–scale business operations have allowed levels of awareness and motives to properly treat the water / wastewater. Such firms come up with short term goals which eventually create negative competition.

Demand of Complete Packages

Many clients demand complete scope of work including civil works. Because of poor estimation, many companies suffer in civil fronts. However, various water players have strengthened their civil capabilities to gain market advantage.

Lack of Skilled Manpower

Due to current economic conditions, majority skilled and experienced resources opt to change jobs and retaining the same workforce is bit challenging for organizations. In this process, ongoing projects & organization do suffer.

Crashed Schedules

Majority projects having optimistic timelines with challenging where in organization suffer to complete these timelines.

Issues with Consultant–Based Projects & Contracts

This is extremely challenging to complete reputed consultants–based projects with kind of infrastructure available with water organizations.

Poor Operations & Maintenance

Customer always prefer lower Opex because of the lower cost plant operations have many challenges in this process and plants are not operated as per requirements.

Subscribe

to our Magazine

To get all updates about the happenings in the Water World, you can now subscrib our monthly magazine "WaterAge" which finds its readership among thousands of leading industries, government bodies, consultants and contractors based worldwide.

Find us on:

SHUDH JAL FOUNDATION
JAL AAJ AUR KAL

605, Bhikaji Cama Bhawan, Bhikaji Cama Place, New Delhi – 110 066
M.: +91 98759 06502, E-mail: enquiry@waterage.in, Web.: www.waterage.in

BRINGING CLEAN DRINKING WATER TO REMOTE **KASHMIRI VILLAGES**

Solar pumping stations improve lives in remote Kashmir Valley.

Local children at one of the solar powered water pump systems in Kashmir Valley

"...now, with the installation of the solar pump, we are back in 10 minutes. We have more time to spend with our families..."

Hujjat Qayoom, Resident of Kashmir Valley

About Organization

Grundfos delivers efficient, reliable, and sustainable solutions all over the globe. Grundfos Pumps India Pct. Ltd. is a wholly–owned subsidiary of Grundfos Holdings was established in 1998. It provides energy–efficient pumps and smart pumping solutions for various applications – heating and hot water service systems, cooling and air–conditioning systems, industrial applications, pressure boosting and liquid transfer, groundwater supply, domestic water supply, sewage and wastewater, dosing, chlorination systems, disinfection systems and pumps running on renewable energy.

www.grundfos.com/in

Solar dual water pumping system

Life in Pummel, a remote village in the Kashmiri Mountains 5,600 feet above sea level, can be nothing short of idyllic. Situated on the north–western stretch of the Himalayan Mountains, its breathtaking landscape speaks for itself. But for villagers like Hujjat Qayoom, its beauty also brings arduous challenges.

Villagers spent sometimes hours a day fetching water from local wells operated by hand pumps in the Kashmir Valley in northern India

Clean drinking water is scarce. "We don't have drinking water supplied to our homes. We need to go and get it ourselves," says Hujjat. "Every day, we need to queue to manually hand–pump clean water into our empty containers. The whole process can take hours. It is tiring work, and being away for hours at a time means someone else has to look after our children and families."

Hujjat's story is not unique. It is a daily struggle for the 50,000 other villagers living in the region. But last year, a team of engineers from Grundfos, in association with channel partner M/s SIAB Surgiments, were asked to come up with a solution. At first, electric water pumps seem like the obvious answer, but the erratic local electricity supply makes them all but useless.

The team had a more sustainable answer in mind: a solar–powered pumping station, delivering a reliable, low–maintenance solution that helps residents reclaim several hours a day.

"Now, with the installation of the solar pump, we are back in just 10 minutes," says Hujjat. "We have more time to spend with our families, to teach our children, and more time to work and earn money."

A CUSTOM WEST GRAPHICAL USER INTERFACE FOR OPERATOR TRAINING

THE WASTEWATER TREATMENT PLANT OF NÎMES

By DHI India

The client SAUR provides a variety of services to the community, including the exploitation and treatment of water. In this capacity, SAUR manages several wastewater treatment facilities in France. A modeling study of the plant of Nîmes was conducted by the French National Research Institute for Agriculture and Environment (IRSTEA) and was aimed at assessing the effectiveness of a novel aeration control logic developed by SAUR. A customized, dashboard–like Graphical User Interface (GUI) was eventually implemented by DHI to exploit the potential of the WEST model as a tool for training the plant operators.

This 230,000 PE plant is located in Nîmes, France, and consists of two parallel activated sludge lines, each comprised of a circular activated sludge tank (with anaerobic, non–aerated, and aerated stages) followed by a secondary clarifier.

Client Feedback

"We are going to use this tool to explore a variety of operational scenarios in order to best combine the two co–existent aeration control systems on the plant. The tool will ultimately enable us to transfer the Ammonair logic on more of our installations"

– Fabrice Nauleau, Director – R&D, SAUR.

FAST FACTS

Challenges

- Create an ad–hoc operator training GUI for the WEST model of an existing treatment plant
- The GUI is to hide the complexity of the underlying model while exposing the essential control and evaluation elements in a straightforward way

Solution

A dashboard–like GUI that utilizes the WEST NET API and standard graphical WEST modules.

Value

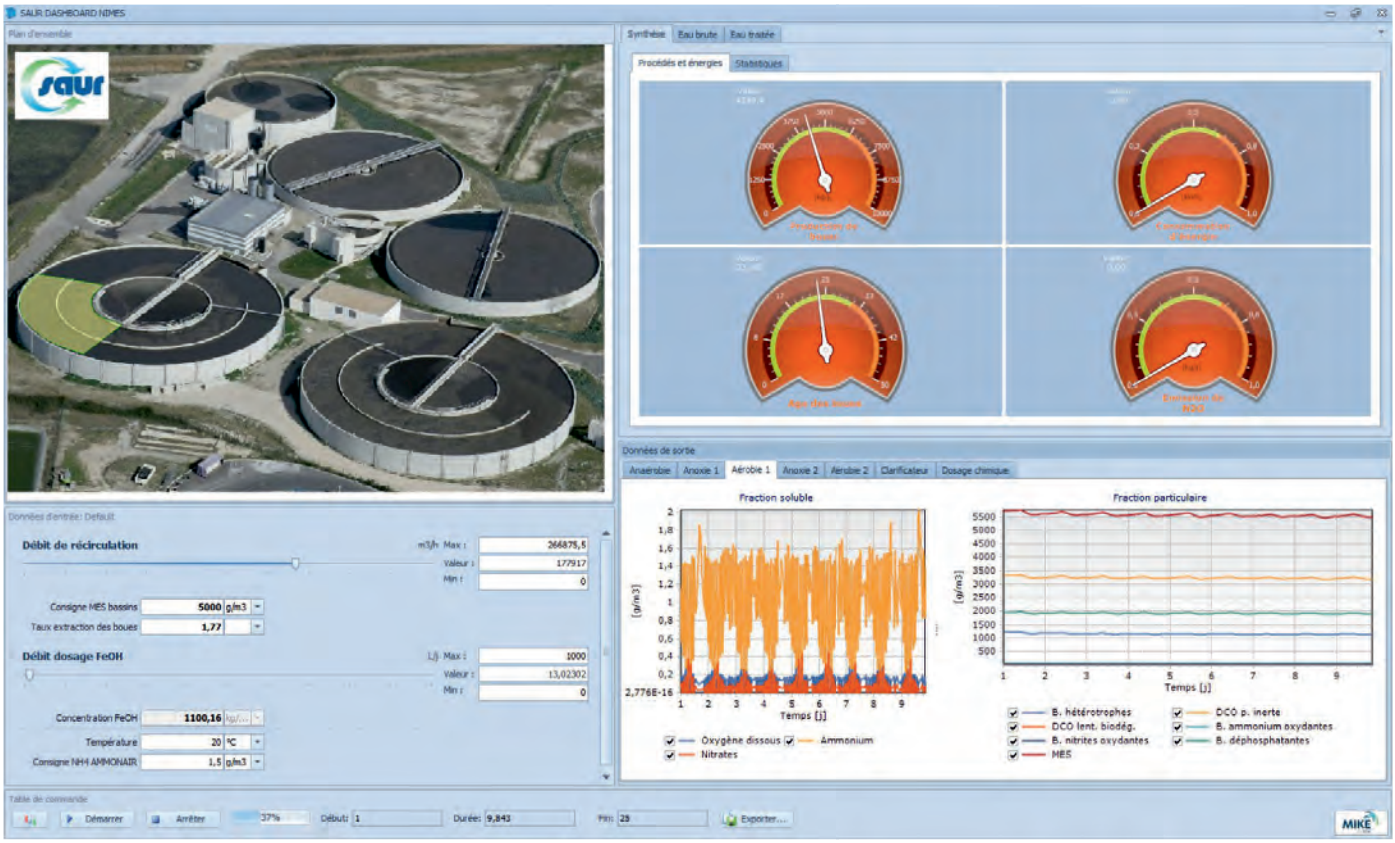
The custom GUI:

- Offers a very intuitive means to interact with the complex mathematical model of the plant
- Presents the essential operating parameters that an operator is familiar with and is likely to use in the daily operation
- Allows for evaluating scenarios in a very intuitive way – scenarios can be saved (stored) and reloaded

Location / Country:

Nîmes, France
Software Used: WEST

www.dhigroup.com

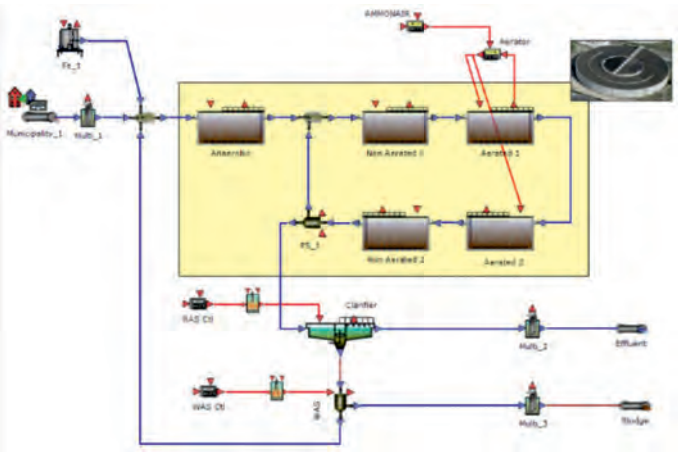


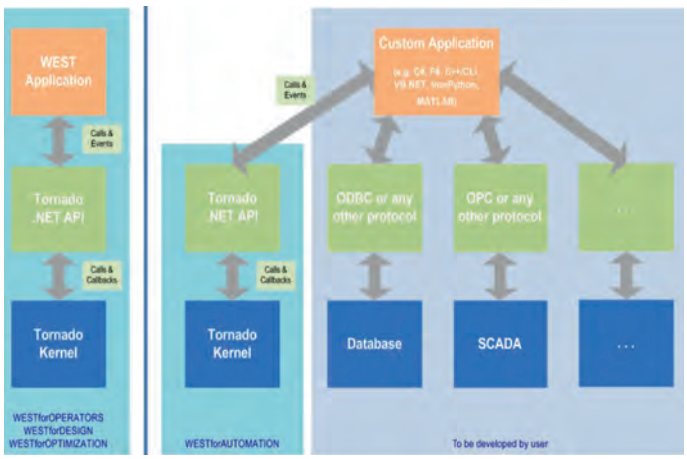
Two different strategies are used to control aeration: a conventional ORP/DO logic in the first line, and an NH4/DO logic (developed by SAUR and named 'Ammonair') in the second line. The Ammonair controller was implemented and tested on this site to reduce energy consumption while ensuring the required effluent quality as well as low nitrous oxide (N2O) emissions.

The Approach

There are two common approaches to developing custom user interfaces on top of a WEST model. The first is to set up a custom dashboard within WEST itself in a point–and–click fashion, using the graphical widget toolbox that the latter provides. The second concerns developing a fully customized user interface using a general–purpose programming language (typically C#) on top of WEST for AUTOMATION (WfA), which is a software development kit (SDK) for .NET that provides access to the WEST engine. The first approach does not require any programming skills but is constrained in terms of flexibility; the second offers full flexibility but requires a non–negligible programming effort.

For the Nîmes wastewater treatment plant (WWTP), a slightly different approach was followed. Apart from the WfA SDK, a number of graphical modules from the WEST source code base were also re–used in order to





speed up the development process while still maintaining full flexibility. The WfA SDK adheres to the object–oriented paradigm and follows a number of well–known software design principles, such as the singleton, factory, façade, and observer patterns. An important reason for adopting. NET's C# language for developing the Nîmes dashboard is precisely its support for events and event handlers, which is. NET's implementation of the observer pattern. Events fired by the WEST engine allow for easily acting upon the simulation advancement in terms of progress indication and visualization of output.

The Nîmes Dashboard

The GUI proposed for the operator training dashboard consists of four areas:

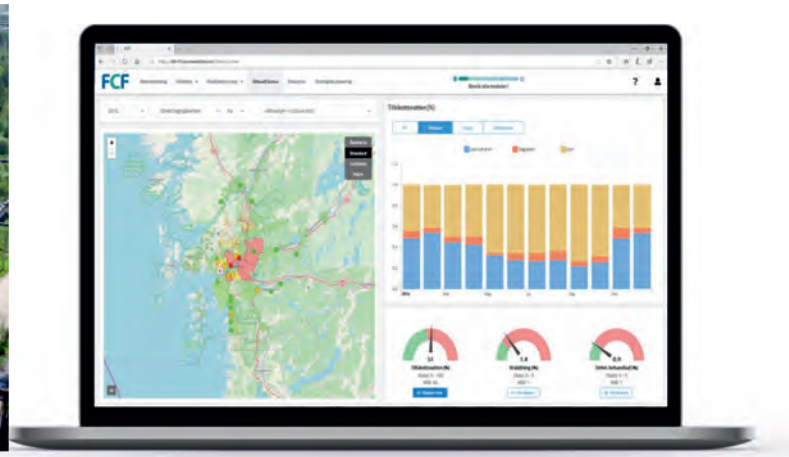
- An aerial view of the plant with clickable regions
- A control pane below it displays the process parameters that the operator can act upon
- An output pane (on the right) is further subdivided into two regions: the top comprises three tab pages with summary information for the plant and process; the bottom contains a tab page for each clickable region of the aerial view of the plant showing the concentrations of key–components
- A taskbar (at the bottom) that allows for launching a simulation and loading/storing scenarios

The process parameters are:

- The recirculation and excess sludge flow rates
- The mixed liquor suspended solids (MLSS) concentration in the tank
- The ammonia set–point of the Ammonair controller
- The quantity of iron chloride dosed
- The operating temperature

The influent specs (that is, flow rate and concentrations) can be changed by selecting pre–configured influent files. The summary information – which the operator is supposed to monitor to evaluate the performance of the process, are:

- Sludge age (d), Excess sludge production (kg/d), Energy consumption for aeration (kWh), N2O emission (kg/d)
- The effluent quality: average, 95%– and 98%–ile (mg/l) of COD, BOD, ammonia, total nitrogen, and total phosphorus



TOSHIBA WATER APPOINTS HIROAKI KOBAYASHI AS THE CHAIRPERSON & MANAGING DIRECTOR

Toshiba Water Solutions Private Limited (Toshiba Water) has announced the appointment of Hiroaki Kobayashi as the Chairperson and Managing Director. Kobayashi will lead Toshiba Water to the path of the next level of growth across the company's water & wastewater businesses in India and overseas.

A commerce graduate from Doshisha University in Japan, Mr. Kobayashi brings a rich and extensive experience of over two decades in business development and strategic planning in the wastewater management industry. He specializes in managing EPC[1] contracts for large water and wastewater plants in India as well as abroad.

Kobayashi has succeeded Koichi Matsui who was at the helm of Toshiba Water affairs for more than five years.

On his appointment, Kobayashi stated, "Toshiba Water has established India as the International Business Centre for its water & wastewater management business. Furthering our commitment to provide the latest technologies and solutions for India and the world, we are introducing and implementing IoT as a service for O&M of wastewater plants. As I take over this huge responsibility from Mr. Matsui, I reiterate Toshiba Water's commitment to India and other overseas territories and look forward to reinforcing our long–term partnership with customers and partners to turn on the promise of a new day for India and the World."

Across his over two decades of experience, Kobayashi has held various leadership roles in international operations, business development, sales, and other commercial functions in the water & wastewater management business across Asia. He spent seven years in Japan and two years in China as in–charge of their domestic municipal water & wastewater market. Also spent 3 years developing new market in Southeast Asia including Vietnam, Indonesia, Thailand, and so on.

His first association with India's wastewater industry dates back to 2010, where he was overseeing business development for Toshiba's wastewater management business in India. In addition to developing Toshiba Water's international business strategy, Mr. Kobayashi was instrumental in securing the JICA[2] funded projects like the Chandrawal Waste Treatment Plant (WTP) in Delhi, the TK Hali WTP in Karnataka.

Mr. Hiroaki Kobayashi,
Chairperson and Managing Director,
Toshiba Water Solutions Private Limited

ABOUT TOSHIBA WATER SOLUTIONS PRIVATE LIMITED

Toshiba Water Solutions Private Limited (Toshiba Water) is an international multi–disciplinary environmental services company, headquartered in India that specializes in providing turnkey services in water and wastewater collection, treatment and disposal, recovery and reuse plants.

A wholly owned subsidiary of Toshiba Group, Toshiba Water provides complete, single–source services from engineering, design to construction, installation and O&M of water, wastewater and domestic waste treatment facilities. Toshiba Water also offers IoT system as a service to the new and existing plants for remote monitoring and management.

Buyer/Seller:
Government of Chhattisgarh
Ref. Number: 49067314
Tender Number: 2022_JUADB_57837_1

Requirement: Construction and 5 years of o and m of water supply system in jhumri telaiya intake works rising main 35.50 mld water treatment plant clear water main elevated service reservoirs distribution network and house service connections

Document Fees: INR 25,000
EMD: INR 11,712,000
Tender Estimated Cost: INR 1,171,233,885
Closing Date: 25/05/2022
Document Sale To: 25/05/2022
Location: Ranchi – Jharkhand – India
Contact Details: Jurlip–adb Tenders

Buyer/Seller:
Directorate of Municipal Administration
Ref. Number: 49300470
Tender Number: DMA/2021–22/WT/WORK_INDENT128591

Requirement: Design and construction of faecal sludge treatment plant (fstp) at athani(12 kld), nipani (12 kld) & boragaon (3 kld) including operation and maintenance of constructed facilities for 5 years. package–09 (turnkey basis)

Tender Detail: Design and construction of faecal sludge treatment plant (FSTP) at athani(12 kld), nipani (12 kld) & boragaon (3 kld) including operation and maintenance of constructed facilities for 5 years. package–09 (turnkey basis) design and construction of faecal sludge treatment plant (fstp) at athani(12 kld), nipani (12 kld) & boragaon (3 kld) including operation and maintenance of constructed facilities for 5 years. package–09 (turnkey basis).

Document Fees: INR 5,000
EMD: INR 905,000
Tender Estimated Cost: INR 60,312,972
Closing Date: 26/05/2022
Location: Not Classified, Karnataka, India
Contact Details: Directorate of Municipal Administration

Buyer/Seller:
Jharkhand Urban Infrastructure Development Corporation Limited
Ref. Number: 49052398
Tender Number: JUIDCO/NIT/JTWSS/JUWSIP/2022/ 475

Requirement: Construction and five years of operation and maintenance of water supply system in jhumri telaiya (intake works, rising main, 35.50 mld water treatment plant, clear water main, elevated service reservoirs, distribution network and house service connections).

EMD: INR 11,712,000
Closing Date: 25/05/2022
Location: Ranchi – Jharkhand – India

Buyer/Seller:
Kerala Water Authority
Ref. Number: 49255278
Tender Number: 16/2022–23/SE/PHC/ALP

Requirement: Haripoad municipality and near by 10 panchayaths integrated drinking water project phase 2 – reach 1 – mannar intake well to pallipad water treatment plant (intake well to kotamuri junction) 800 mm spirally welded ms pipe (10mm) supply and installation work – malayalam
Document Fees: INR 17,700

EMD: INR 500,000
Closing Date: 25/05/2022
Location: Allappuzha – Kerala – India

Buyer/Seller:
Gujarat Water Supply and Sewerage Board
Ref. Number: 49308664
Tender Number: 1/2022–23

Requirement: Construction of WTP, DI and PVC pipe line, RCC E .S. R/ Sump, pump house, staff quarter, R. C. C. road, compound wall and supply and erecting pumping machinary.

Tender Estimated Cost: INR 129,644,446
Closing Date: 23/05/2022
Location: Multi Location – Gujarat – India

Buyer/Seller:
Public Works Department
Ref. Number: 48338275
Tender Number: 2022_PWD_3066_1

Requirement: Smart water supply management with IOT based monitoring and operations management system under National Jal Jeevan.
Document Fees: Rs. 30,000
EMD: Rs. 4,783,350
Tender Estimated Cost: Rs. 378,334,863
Closing Date: 23/05/2022
Document Sale To: 07/04/2022
Location: Goa – Goa – India
Contact Details: Public Works Department||circle – Viii– Fatorda–Margao||division – Ix– Margao State of Goa

Buyer/Seller:
Kerala Co–operative Milk Marketing Federation Limited
Ref. Number: 49340189
Tender Number: 2022_KCMMF_488034_1

Requirement: Supply, installation and commissioning of 40klph water treatment plant at dairy **Tender Detail:** Supply, installation and commissioning of 40klph water treatment plant at palakkad dairy.

Document Fees: INR 1,000
EMD: INR 10,000
Closing Date: 23/05/2022
Document Sale To: 23/05/2022
Location: Palakkad – Kerala – India
Contact Details: Kerala Co–Operative Milk Marketing Federation Ltd||malabar Regional Co–Operative Milk Producers Union Ltd||palakkad Dairy Kalleppully Palakkad palakkad Dairy

Buyer/Seller:
Punjab Water Supply and Sewerage Board
Ref. Number: 49394753
Tender Number: 2022_DLG_84919_1

Requirement: Construction, installation, commissioning of 3 mld stp at dhanaula

Document Fees: INR 6,000
EMD: INR 700,000

Closing Date: 23/05/2022
Document Sale To: 23/05/2022
Location: Barnala – Punjab – India
Contact Details: Barnala,pwssd Sangrur

Buyer/Seller:
Public Health Engineering Department
Ref. Number: 49357696
Tender Number: 2022_PHE_167919_9

Requirement: Construction of 10000 gallons per hour capacity rapid sand filtration plant, construction of pump room, construction of 0.20 lacs glns cap. sump tank, construction of intake well, compound wall under wss rajnagar lower (under JJM).

Document Fees: INR 1,000
EMD: INR 50,000
Tender Estimated Cost: INR 15,517,000
Closing Date: 20/05/2022
Document Sale To: 20/05/2022
Location: Rajouri – Jammu–kashmir – India
Contact Details: Phellce Phe Jammullhydraulic Circle Rajourilldivision Rajouri rajouri

Buyer/Seller:
Kolkata Metropolitan Development Authority
Ref. Number: 49303588
Tender Number: 2022_KMDA_377919_1

Requirement: Operation and maintenance of 6 mgd surface water treatment plant (both for civil and e&m component of works) including supply of coagulants (alum & pac), liquid chlorine, cleaning compound, sludge disposal and supply of required laboratory test reports etc. for 6 mgd wtp constructed under amrut scheme within the premises of kachrapara wtp, district 24 parganas (north), for a period of 36 months..

Tender Detail: Operation and maintenance of 6 mgd surface water.....district 24 parganas (north), for a period of 36 months.

EMD: INR 477,776
Tender Estimated Cost: INR 23,888,752
Closing Date: 20/05/2022
Document Sale To: 20/05/2022
Location: North 24 Parganas, West Bengal, India
Contact Details: Kolkata Metropolitan Development Authority WS Sector Kolkata

Water Intec
9–11 April, 2022
Venue: CODISSIA Trade Fair Complex, Coimbatore, Tamilnadu, India
Website: www.waterintec.codissia.com

SRW India Water Expo 2022
5–7 May, 2022
Venue: Trade Centre, Tamilnadu, India
Website: www.waterexpo.in

Water India – Water Expo Pune
14–16 April, 2022
Venue: Deccan College Ground, Yerwada, Pune
Website: www.waterindia.net

World Conference on Soil, Water, Energy and Air
26–27 May, 2022
Venue: Bordeaux, France
Website: www.eurasiaweb.com

World Environment Conference (WEC 22)
04–05 June, 2022
Venue: Pragati Maidan, New Delhi, India
Website: www.worldenvironment.in

Aquatech China
8–10 June, 2022
Venue: National Exhibition and Convention Center, Shanghai, China
Website: www.aquatechtrade.com

Water India Bangalore
9–11 June, 2022
Venue: Manpho Convention Centre, Nagware Ring Road, Bangalore, India
Website: www.waterindia.net

Indian Plumbing and Watertech Expo (IPW India)
7–8 July, 2022
Venue: Delhi, India
Website: www.ipwindia.in

International Water and Wastewater Technology Show
4–6 August, 2022
Venue: Sri Lanka Exhibition & Convention Centre, Paijanindia, Colombo, Sri Lanka

World Water Summit 2022
21–23 August, 2022
Venue: New Delhi, India
Website: www.worldwatersummit.in

Delhi Water Expo 2022
24–26 August, 2022
Venue: Pragati Maidan, New Delhi, India
Website: www.waterex.biz

Renewable Energy India Expo 2022
28–30 September, 2022
Venue: India Expo Centre, Greater Noida
Website: www.renewableenergyindiaexpo.com

India Water Week–2022
1–5 November, 2022
Venue: India Expo Centre, Greater Noida, India
Website: www.indiawaterweek.in

Company	Page No.	Telephone	E–mail	Website
Aadys Components Pvt. Ltd.	1	+91 11 4155 1444	sales@aadys.co.in	www.aadys.co.in
AKASH Blowers Pvt. Ltd.	7	+91–9999 56 4644	info@akashblowers.com	www.akashblowers.com
Aquanomics Systems Limited	5	99873 26262, 75062 44410, 93228 05318	amitkant@aquanomics.net, rehal@aquanomics.net	www.aquanomics.co.in
Duvera Water	39	+91 8595 1490, 87440 40406	sales@duverawater.com	wwwduverawater.com
Environmental Analytics and Solutions	31	+91 22 2879 4636, +91 22 2879 4637	reepal@labsystems.in	www. environmentalanalyticsandsolutions.com
Indus Waterways	Back Cover Inside	91 172 5275055, 91 11 4552 4715	induswaterways@gmail.com	–
Jai Maa Associates	19	+91 98111 88819, +91 11 2568 2346	jaimaaassociatesdelhi@gmail. com, jaimaa98gmail.com, info@jaimaaassociates.in	–
Messe Muenchen India Pvt. Ltd.	55	+91 99307 00292	bhola.mandal@mm–india.in	www.mm–india.in
Rysa Infratech Pvt. Ltd.	Back Cover	+91 11 4552 4715	info@rysainfratech.com	www.rysainfratech.com
Triveni Constructions	6	+91 98143 21749, +91 98141 32026, +91 172 4039 981	trivani_anand@yahoo.com, triveniconstructions.mohali@ gmail.com	–
WA_E–magazine	4	+91 99589 60470	enquiry@waterage.in	www.waterage.in
Indian Exhibition Services	25	+91 7042245907	radhika@worldenvironment.in event@ies–india.com	www.worldenvironment.in

Thank You for Advertising with Us!

This Index is published as a service. Although every effort is taken to make it accurate, **WaterAge** assumes no responsibility for errors or ommissions.

Indus Waterways

Water & Wastewater Solutions

Indus Waterways providing consultancy for total water management and treatment solutions for Water and Wastewater Treatment, started business in 2009 and since then provided services to hundred of clients in Industries, Municipal and Hospitality sector

SERVICES TO PROVIDED BY CONSULTANT

- Detailed survey of proposed network of sewar line.
- Preparation of sewer network showing GL/IL.
- Location type design of manholes, intermediate sump well/lift well.
- Calculation of sewage generation.
- Type of treatment of sewage.
- Specification of mechanical and electrical equipment of sewage network STP & ETP.
- Preparation of drawing.
- Preparation of bill of quantities, detailed estimates BOQ and estimate based on MES SSR – 2020 and market analysis for Non-SSR items for sewage network STP & ETP.

FIELD OF EXPERTISE

SEWAGE

WATER

INDUSTRIAL

H.O.: SCO 146-147, Sector-34A, Chandigarh-160022, T.: +91 172 5275055, 4012755
Corp. Office: 605, Bhikaji Cama Bhawan, Bhikaji Cama Place, New Delhi-110 066, Tel.: +91 11 41551444, 45524715
E-mail: induswaterways@gmail.com