

BEYOND EXPECTATIONS

VOL. 1 NO. 23 PAGES 80
NOVEMBER-DECEMBER 2021, Rs. 100

SMART WATER & WASTE WORLD

BE SMART WITH WATER

www.smartwww.in

INNOVATIONS IN MUNICIPAL MARKET & UTILITIES



THE BIG PICTURE:
WASTEWATER, SUBHASH SETHI

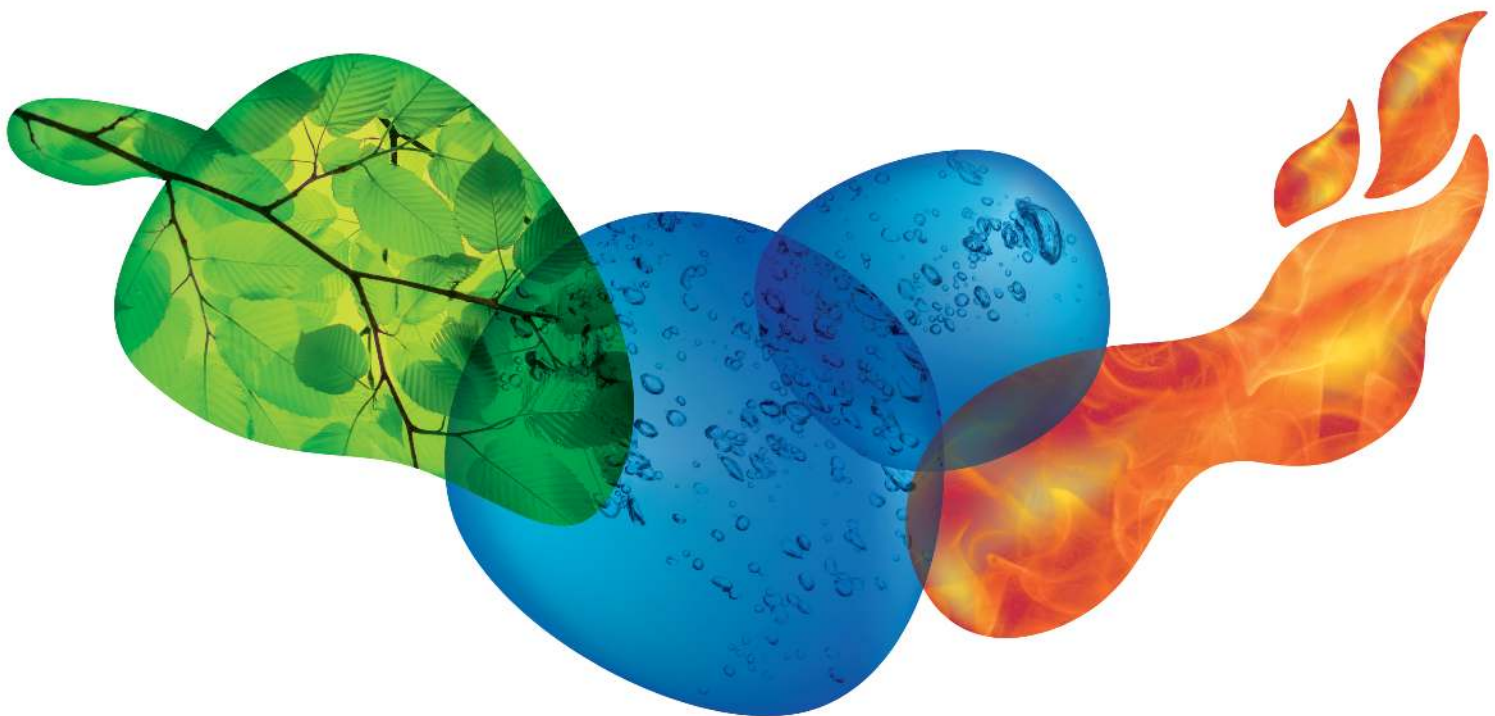
OUT OF THE BOX:
OCEAN DATA

CASE STUDY:
INDUSTRIAL WASTEWATER

Pioneering. Passionate. Powerful. Your solutions at IFAT India

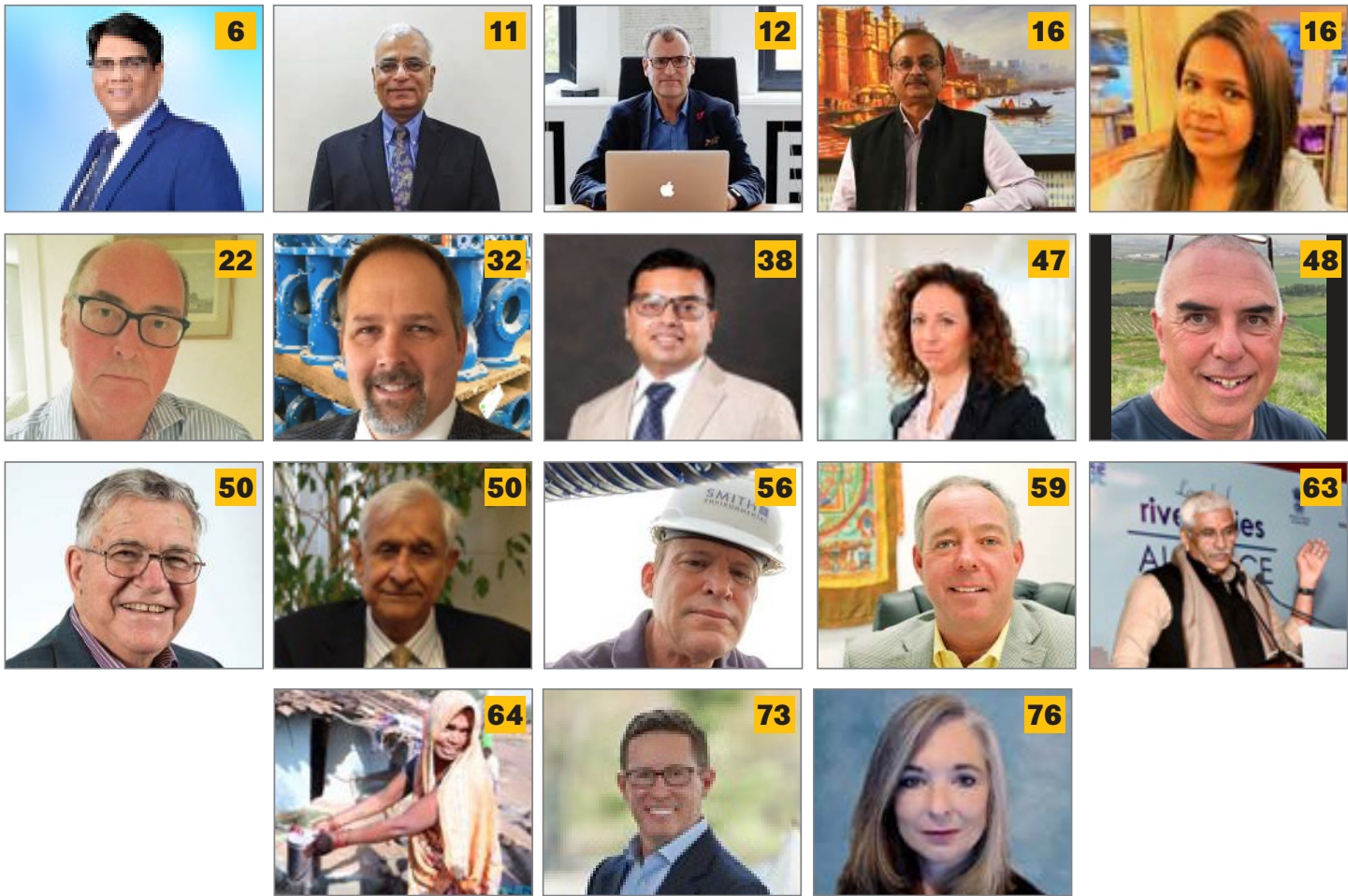
September 28-30, 2022

Hall 1, Bombay Exhibition Centre, Mumbai, India



India's Leading Trade Fair for Water,
Sewage, Solid Waste and Recycling

IFAT
India



COVER STORY

INNOVATIONS IN MUNICIPAL MARKET & UTILITIES

15

INSIDE

- 04 EDITOR'S NOTE
- 06 THE BIG PICTURE: WASTEWATER
- 10 PRODUCTS
- 11 GUEST COLUMN: DRINKING WATER
- 12 FEATURE: LIMESCALE TREATMENT
- 50 CASE STUDY: INDUSTRIAL WASTEWATER
- 59 GUEST COLUMN: PIPES
- 60 IN THE NEWS
- 78 SUBSCRIPTION FORM

MAYUR SHARMA | EDITOR
mayur@smartwww.in 
@SmartWWW_IN 

“A drop of water, if it could write out its own history, would explain the universe to us.”
- Lucy Larcom



MUNICIPAL WATER COMMUNITY: TOWARDS RESILIENT AND INCLUSIVE DEVELOPMENT

The municipal water usually refers to domestic water and domestic wastewater in the city. Because of the increasing focus on water quality and public health in recent times, municipal application commands the largest share of the overall water and wastewater treatment market.

As per Bluefield Research the 'capital investment forecast' over the next decade for municipal water, globally, exceeds USD 3 trillion. Their team counts three critical factors which are currently influencing global municipal water the most. First is political, regulatory environment, federal funding landscape, and investment in infrastructure. Second is utilities facing a growing list of challenges. And third is enhanced asset management for utilities and vendors.

The local municipal governance in developing countries like India has shown a renewed resilience and vigor in their project planning and in the adaption of new ways to manage their complex civil works and water and sewerage networks. India is now the second-largest green bond market among emerging countries. Ghaziabad Nagar Nigam raised India's first Green Municipal bond issue of Rs. 150 crores earlier this year. These funds will be used to recycle wastewater into drinking water.

According to Fortune Business Insights, the key market driver of the municipal water market is the rising demand for water in sectors like residential, commercial, and industrial sectors. The infrastructure segment has received a boost and water supply stands as a major criterion for attracting investments. This, coupled with cost benefits over other water supply resources is expected to drive the market for municipal water in the coming years.

The analysts from ResearchAndMarkets.com emphasize the fact that the COVID-19 pandemic has revitalized the importance of resilient and future-ready water and wastewater infrastructure. Municipalities across the globe have begun adopting net-zero, decarbonization, and circularity goals to become sustainable, resilient, and future-ready. IoT-based solutions have become a vital cog in helping end-users achieve their net-zero targets. Utilities have significantly increased their investments into adopting smart online sensors for real-time monitoring of assets and advanced AI-based data analytics platforms to optimize the system on a real-time basis.

These are perhaps the most exciting times to bring in innovative changes in the deep-rooted structures of municipal water & wastewater networks and implement new cutting-edge technologies which actually mean something when it comes to 'sustainability' and 'long-term results' and not just a latest buzz-word to be used in the glittering water events and award ceremonies.

In our current magazine issue, we are presenting write-ups and case studies from the global experts of municipal water industry wherein they have shared detailed discussions on the problems & challenges as well as innovative solutions being implemented on the ground in various municipal and government projects around the world.

I have two exclusive stories for you in this issue – penned by two water stalwarts from India...

In the 'Cover Story' section, Mr. Rajiv Ranjan Mishra - Director General of National Mission for Clean Ganga (NMCG) and Jyoti Verma (Civil Engineer) present an informative and detailed case study of Kanpur city and the ongoing river Ganga projects under the Namami Gange program.

In 'The Big Picture' section, Mr. Subhash Sethi, Chairman of SPML Infra explains how 'wastewater' is arguably the most significant economic resource of our times.

Our next issue (January-February 2022) will be an Annual Edition. The theme is "Top 50 Global Case Studies: Water, Wastewater & Solid Waste". From all the entries received, we will select and publish some of the best national and international case studies from the municipal and industrial plants & projects. Keep sharing your editorial contributions with me.

Beyond Expectations
Smart Water and Waste World™

PRINTER AND PUBLISHER
Shailer Ramaswamy Iyer

FOUNDER & CEO
Kailash Shirodkar

EDITOR
Mayur Sharma

MARKETING
Bhaskar Chivukula

PRINT PRODUCTION
Printcom

Printed and Published by Shailesh Ramaswamy Iyer, Beyond Expectations Off # B-305, Goddeo, Bhayander (East), Dist - Thane - 401105, on behalf of Beyond Expectations, Printed at M/s. Supriya Print Art, 143, Pragati Industrial Estate, 316 N.M. Joshi Marg, Delisle Road, Mumbai - 400 011. and Published by Beyond Expectations Off # B-305, Goddeo, Bhayander (East), Dist. - Thane - 401105, Maharashtra, India

DESIGN & LAYOUT
D Square Grafix

For subscription, write to us:
info@smartwww.in

Vol. 01, No. 23, November - December
2021

Copyright © 2018

Beyond Expectations
All rights reserved throughout the world. Reproduction in any manner, electronic or otherwise, in whole or in part, without prior written permission is prohibited. *Responsible for selection of news under PRB Act.

LinkedIn.com/company/smartwww
Twitter.com/smartwww_in
Facebook.com/smartwww
Instagram.com/smartwww_in

www.smartwww.in

BEYOND EXPECTATIONS
SMART
WATER & WASTE WORLD

Important: Whilst care is taken prior to acceptance of advertising copy, it is not possible to verify its contents. Beyond Expectations cannot be held responsible for such contents, nor for any loss or damages incurred as a result of transactions with companies, associations or individuals advertising in its publications. We therefore recommend that readers make necessary inquiries before sending any monies or entering into any agreements with advertisers or otherwise acting on an advertisement in any manner, whatsoever.

India's Leading Antiscalant

DOZER[®] GOLD

Reverse Osmosis Antiscalant



AQUAPOT RO TECHNOLOGIES

5-2-291/1, Opp. Mahaveer Complex, Hyderbasti, Sec'bad - 03, **040 66493648**
info@aquapot.in | www.aquapot.in | www.ionoi.in | Toll Free No. 1800-425-3648

HYDERABAD | BANGALORE | CHENNAI | VIJAYAWADA | TIRUPATI | NAGPUR | MADURAI | GOA | HUBLI

WASTEWATER: THE ECONOMIC RESOURCE

By Subhash Sethi



42 MLD Sewage Treatment Plant, Kanpur

Water is becoming scarce and it is not far away that it may be treated as the new oil of future with serious economic, social, political and environmental considerations. Being world's fastest growing economy and home to 18% of the world population with just a fraction of fresh water sources, India is being confronted with a serious resource challenge. The available water sources

have reduced over the years whereas the demand keeps on escalating. The country's water demand is projected to very soon overtake the availability. With rapidly changing urban face of India and increasing demand for more quality water and better sanitation services, the most important issue we are facing is to deal effectively with our wastewater. Reuse of treated wastewater is still at the nascent stage in India. We

must treat wastewater as economic resource and promote the use of treated wastewater on a sustainable basis with integrated plan to maximize the collection and treatment to reduce our dependence on fresh water sources. Globally, many countries are using the treated wastewater for potable and non-potable purposes.

The Population Division of the Department of Economic and Social Affairs of the United

Nations have been issuing revised estimates and projections of the urban and rural

“ *Rapidly changing urban face of India and increasing demand for more quality water and better sanitation services, the most important issue we are facing is to deal effectively with our wastewater.*



70 MLD STP, Nasik, Maharashtra

populations of all countries in the world. It suggests that in the year 2020 about 56.2% of the world's population was urban and half of these peo-

” Singapore smart wastewater management systems help in meeting 40% of water demands of the country including drinking water.

ple lived in towns of less than 500,000 inhabitants. The urban population of the world has grown rapidly from 751 million in 1950 to 4.38 billion in 2020. This urbanization trend will continue to rise and 68% of the world population, almost 6.62 billion people is projected to live in urban areas by 2050. World's urban population is growing by 60 million persons per year, about three times the increase in the rural population. The movement of people towards cities due to economic activity and employment opportunities, particularly in the less-developed regions has accelerated the demand for water, while the volume of generating wastewater both from the domestic and industrial activities have increased multifold.

Water Conundrum

The major challenge in urban India is that estimated 80% of water supplied to household is coming back as wastewater to be treated and reuse. But in reality, only a fraction of it is treated due to insufficient treatment facilities and not being reused due to lack of infrastructure support. This leaves a big gap of generated waste-

water is not being treated and untreated it is released to water bodies thus contaminating the already depleting groundwater sources. From the public health perspective, impact of water borne diseases in the country affects almost 40 million people annually including the death of 1.5 million children from diarrhoea alone. There is an ardent need to think deep-

ly and adopt new perspective towards wastewater to counter the water scarcity and other challenges and work towards an enduring solution.

Wastewater Scenario

India is grappling with the massive challenge of shrinking water sources and increasing demand. Currently, about 94% of the population have access to some form of drinking water while only about 40% population have access to organized wastewater management services.

Almost 80% of domestic water supply flows back as wastewater and estimated 63% of municipal and 40% of industrial wastewater is left untreated and discharged into water bodies, a critical environmental and health hazard. India which has the inbuilt capacity to treat approximately 37% of its municipal wastewater, around 23 billion liters per day against a daily sewage generation of approximately 72 billion liters according to a report. Similarly,



12.5 MLD Effluent Treatment Plant, Bahadurgarh Industrial Area, Haryana



35 MLD CETP at Bawana, Delhi

about 60% or around 8 billion liters of industrial wastewater is receiving any form of treatment against the generated about 14 billion liters every day. The wide disparity has dire consequences on public health as water borne diseases affect almost 40 million people annually with nearly 7 lakh premature deaths are attributed to contaminated water alone.

It is calculated that if all available sewage generated by the entire world is collected and treated, it may potentially generate around 210–300 TWh of energy which can meet the needs of 27–38 million people. Meanwhile, if all available food waste are also collected and recycled along with wastewater, there is a potential to generate 880 to 1,100 TWh of energy, which can meet the electricity needs of 112–135 million people around the world. Although, it is easier to calculate than implement at the global level. If India is able to manage collecting and treating all generated

municipal and industrial wastewater to reuse it for irrigation and industrial purposes only, the water scarcity issues will be meticulously managed to a greater extent.

With rapidly changing urban face of India and growing industrial activities, demand for more water and better sanitation services are continuously increasing. The most important challenge before us is how to deal effectively with our wastewater to create economic resource as world over the wastewater is being treated to create the 'new water'.

Learning from the World

Globally, the wastewater management concept endorses utilization of wastes as a by-product to the extent possible i.e. Recycle, Reclaim, Re-use and Recharge. Fundamentally, wastewater reuse have to take into consideration rapidly depleting water sources, water contamination, environmental

degradation, rigorous policies, and health risks to people. The potential for wastewater treatment and reuse is dependent on a variety of factors and differs from one region to another. Industries consuming large volume of water apparently have greater potential for internal reuse.

Singapore has successfully adopted smart wastewater management system to meet 40% of their fresh water demand which they have planned to increase to 50% by the year 2030. It is also doing experiment with co-digesting the food waste and used water sludge to enhance the process that can provide triple biogas yield, compared to the treatment of used water sludge alone. Singapore's Public Utilities Board (PUB) and the National Environment Agency (NEA) have commissioned the collection and transportation of source-segregated food waste to the Water Reclamation Plant for co-digestion with used

water sludge to produce energy. It is not only augmenting the water source but also making economic benefits with generated energy.

In Netherlands, a water utility that provides drinking water to 2.5 million consumers and businesses offers treated or process water that is customized for specific requirements and preferences of each customer. It focuses on providing process water to the chemical industry, petrochemicals, and food industry with an overall emphasis on tailoring water to the needs of the customers. The utility delivers different process water based on a design, build, finance, and operate project.

The Flanders in Belgium provides tailored water for industry and service business customers. The water utility's Industry and Services Business Unit charts the company's internal water streams, analyses sources of available water, including groundwater, surface water as well as wastewater or reusable



process water, and seeks ways of optimizing water consumption. The quality of treated water supplied depends on the customer's requirements. They usually carry out industrial water projects according to the concept of design, build, finance and operate contracts enabling large industrial units to make informed decisions on investments and suitable technique.

In Australia, Queensland Urban Utilities supports the sustainable use of recycled water across its service territory with numerous environmental benefits including conservation of water resources, reducing pollutants being released into waterways, and improved quality of public assets and supporting agriculture where sources of water are insufficient. A key aspect of the utility's recycled water program is that recycled water must be fit for purpose. It provides various qualities or classes of recycled water treated to meet the customers' spe-

cific requirements for industrial process, irrigation, processing of food crops, manufacturing facilities and others.

Worldwide, such examples are becoming common as water source is depleting with high level of contamination. To ensure industry has access to adequate supplies of good quality water and maintains productivity, utilities have been researching and developing 'non-conventional' sources for large-scale customers. Treated water is used as the main source of potable water in Namibia. China has developed wastewater reuse network across Beijing and almost 22% of total water supplied in the city is reclaimed water.

Our Contribution

Through our efforts in SPML Infra Limited, we have designed and constructed a large number of wastewater treatment plants for both sewage and effluents and have contributed immensely for environmental sustain-

ability by effectively managing municipal and industrial wastewater and not allowing it to harm our ecosystem. Recycling wastewater further enhances reuse and social responsibility conforming pollution control norms. SPML Infra has built plants which are fully equipped with automation system and reliable treatment technology for efficient operation and maintenance. It has proven domain expertise of over four decades in water and wastewater management across the country.

The Way Forward

Wastewater recycling offers an intelligent solution for controlling water scarcity that could benefit all parties involved. The government should provide a clear regulatory framework, tariff regime and risk mitigation instruments, and all water utilities and municipalities in the country can be convinced to create robust and technologically advanced wastewater treatment infra-

structure to fully utilize the reclaimed water. A market for treated water can be created to maximize the circular use of water with unclaimed economic benefits. There can be a differentiated tariff structure for select consumer categories such as agricultural and industrial users and freshwater conservation can be encouraged.

India needs to push for greater efficiency, effective control, management and reduction of wastewater through a comprehensive and well-planned strategy. At the current rate of water consumption, we will only have half the water we require by the year 2030.

It is crucial that all stakeholders in water segment must work together to find the solution to growing water demand with wastewater reuse at greater level and make this waste an economic resource.

About the Author

Subhash Sethi is the Chairman of SPML Infra Limited.

AUSSIE PUMPS



Aussie has come up with a Honda Engine Drive Pump (Called Aussie **Genius**) that will handle up to 1350 LPM flow and achieve maximum heads as high as 24 meters. It is suitable for agricultural chemicals, including urea, but will also handle saltwater without issues. The 3" pump self primes from a vertical lift of 6 meters and offers unique and super smart

features. The material of construction is 30% glass-filled polyester with EPDM seals. It has a stainless steel belly band that holds both parts of pump (back and front) together. Being a self-priming pump, its priming is easy.

FLUID MOTION SOLUTIONS



FMS' new **Maxdigital** ecosystem significantly extends lifetime of equipment such as pumps and mixers; increasing maintenance awareness of asset health and performance,

thus reducing maintenance costs and unplanned downtime. Hosted on Max software, its **GoConnect** real-time condition monitoring application seamlessly connects office and field personnel, allowing data to be captured, aggregated, visualized, and analyzed in real-time; both on Edge and in Cloud to improve operational efficiency. Its user-friendly interface provides access anytime, anywhere to current and historical data.

LANXESS



LANXESS is increasingly using bio-based or recycled raw materials in its plastics production. Its new variant of composite **Tepex** is 100% based on biological raw materials flax and polylactic

acid. The extremely strong material can be recycled completely. After its use, it can be shredded and easily processed into new plastic. 92% of its raw materials have been replaced by sustainable alternatives. In production of high-performance plastic, LANXESS uses "green" cyclohexane from sustainable sources such as rapeseed oil or other biomass as raw material.

DUPONT WATER SOLUTIONS



DWS has launched DuPont™ **TapTec™** LC HF-4040 Reverse Osmosis (RO) membrane filter. Compact, affordable, highly reliable, and effective, it combines features such as high flow rates, with reliability and ease of use. The membrane elements are spiral-wound from a polyamide thin-film composite. They perform at an average flow rate of 2,800 gallons per day (10.6 m³/d) and have a minimum salt rejection of 98.5%. These are suited to provide affordable drinking quality water on site as part of an engineered system that can be designed.

KIRLOSKAR BROTHERS



KBL is offering **Self-Priming (SP)** Coupled Pump-Set with new and indigenously developed KBL make IE5 motor having ultra-premium efficiency. It is most suitable for handling light chemicals, effluents, sewage, handling

rain or flood water, pumping water from docks, ports, and vessels. It consumes up to 16.5% less energy for pumping same amount of fluid. Its cast-iron motor body makes it easy to operate, maintain, and service. The pump is self-priming, thus resulting in a quicker start time. It offers a lower life cycle (LLC) and operating costs.

VEOLIA WATER TECHNOLOGIES



SENSA™, a double-pass RO system, produces demineralized water with low conductivity and bacteria for cosmetics industry. It complements Veolia's

existing range of water treatment solutions for pharmaceutical industry and also addresses needs of cosmetics industry. Capable of producing different kinds of water outlet qualities for applications such as ultrapure water production, industrial process water production, and utility water, SENSA meets all the requirements of cosmetics industry. SENSA is a RO system, where water gets purified through a membrane. This purification process is repeated twice in its double-pass RO configuration to achieve higher water quality - removing more than 99% of salts and producing water with conductivity as low as 5 µS/cm.

SAFE WATER FOR ALL IN INDIA FOR ACHIEVING UN SDG GOAL 6.1

By Ravindra Sewak

United Nation's Sustainability Development Goal 6.1 puts safe drinking water atop the global water agenda. However, what does "safe" and "sustainable" mean, and how do we deliver it, prove it? India, 163 million people, face a daily struggle to access clean water close at home, and 70% of surface water is contaminated. India ranks 120th out of 122 nations in water quality, according to a NITI Aayog report leaving people no choice but to drink unclean water. India is a water-stressed country. And the average per capita water availability is projected to reduce further to 1341 m³ by 2025 and 1140 m³ by 2050. Providing adequate water and safe drinking water to the 1.35 Billion people in urban and rural India is a huge challenge. Though there is a major thrust by the Jal Jeevan Mission in rural and Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and the 100 Smart Cities program in urban India, sustainable, safe drinking water access and availability remain elusive. The situation is significantly exacerbated currently due to global pandemic COVID-19, increasing urbanization and climate change leading to floods, droughts and cyclone. Every day, more than 800 children under the age of five years die from Diarrhoea - the lack of water, poor sanitation and hygiene cause 400,000 deaths in India annually. The health costs estimates are INR 470-610 billion per year owing to the quality of water.

While nearly 70% of water in the country is contaminated

due to pollutants, toxic metals and inappropriate water treatment solutions as per CIWMI. The Central Pollution Control Board admits that major cities treat only about a third of its sewage. Even the quality of surface water has deteriorated due to agriculture and livestock waste runoffs while ground-water has worsened due to excessive extraction. Whereas in urban areas, 96% people have access to an improved water source, in the rural areas, which account for 72% of India's population, only 84% of people have access to safe water.

Recently, Safe Water Network recently participated in the Stockholm World Water Week session, "Safe" Drinking Water: Too Much to Ask? supported by Honeywell-India. The session highlighted the current regulatory regime in India and the relevance of the SWEs in meeting the Sustainable Development Goal 6.1 for safe drinking water access for all. Since it is difficult to treat the entire water supply to meet the IS 10500: 2012, the current standards of drinking water, for 1.35 billion people, it is far easier to treat only the water for drinking and cooking through a CWTP or an SWE. The Bureau of Indian Standards is currently working to mandate the current drinking water standards for municipalities as well. This standard might force higher accountability for the quality in the public supply system.

Currently, Safe Water Network expands opportunities for the district's women self-help groups with other SWE implementers under the project



SEWAH Sustainable Enterprises for Women and Health supported by USAID and SWE Alliance. The SWEs provide the drinking water round the clock, meeting the national standards at a very affordable Rs 5 for 20 Liters of water and help reduce the plastic waste. Currently, there are over 50,000 SWEs in the country, mainly set up by the state government, cities, railways, philanthropic organizations, or the social entrepreneurs. The total potential is of 2,20,000 SWEs in the country to serve safe, affordable water to the underserved. It is all the more critical for those who cannot afford to invest in a Point of Use (POU) filter at their homes.

Besides, the water dispensed by the Water Vending Machines now falls under the Food Safety and Standards Authority of India (FSSAI). FSSAI may therefore also regulate the water quality supplied by the Municipalities in future.

There are two more regulations in the offing for efficient water management in the country. The Ministry of Environment, Forest and Climate Change (MoEF&CC) is likely to introduce new regulations to

mandate lower water wastage in the Membrane Based Purification Systems to reduce environmental impact. This regulation will cover both the domestic as well as the commercial membrane-based treatment systems. The domestic or Point of Use (POU) Reverse Osmosis (RO) systems typically have high water wastage of 3 to 4 liters of water versus 1 liter of treated water produced. This regulation aims to control the wastage, especially that of municipal water which is low on dissolved solids and need not necessarily require an RO.

The Bureau of Indian Standards is currently drafting a detailed standard for the Community Water Treatment Plants (or SWEs, or Water ATMs or Water Vending Machines) to standardize elements of the treatment system as well as quality compliance.

The SWE sector is therefore bracing itself to meet these challenges collectively under the SWE Alliance. This organization works to facilitate the sector's scale-up, build its eco-system and to enable them to deliver safe drinking water sustainably to their consumers.

The SWE sector is, therefore, bracing itself to meet these challenges collectively under the SWE Alliance, an organization that works to facilitate the sector's scale up and building its eco-system, to enable them deliver safe drinking water uninterruptedly to their consumers.

About the Author

Ravindra Sewak is India Country Director for **Safe Water Network**.

30 YEARS OF CHEMICAL-FREE WATER TREATMENT!

Learn how a patented water treatment system called AQUABION® makes aggressive limescale deposits in pipelines look old-fashioned.

By Mayur Sharma

"It is harder to crack prejudice than an atom," Albert Einstein is said to have once said. It is similarly difficult to tame stubborn limescale in water pipes. Because in this case too, you first have to crack preconceived ideas. The Düsseldorf entrepreneur Marc A. Flettner has been doing this for 30 years now with strong arguments.



A Real Stroke Of Genius: The Rotating Flettner Cylinder As A Ship's Propulsion, Explained By Albert Einstein, Anno 1925. The Chimney-Shaped Sail Masts Are Used Today, For Example, On Jaques Cousteau's Research Ship Alcyon And The E-Ship And Some Other International Freighters (Photo Credit: Aquabion)

When you visit Marc Flettner in the picturesque Gründerzeit villa in Grafenberger Wald where he resides with his companies ION Deutschland GmbH and Aquabion GmbH, you are greeted by none other than the discoverer of the theory of relativity. Not with a handshake, but by handwriting. These adorn Flettner's hallway and study as framed pictures. It comes from letters that Albert Einstein wrote to Anton Flettner in 1925. This is Marc Flettner's great uncle. Both have worked together on projects.

A Life Going Round

Anton Flettner, born in 1885,

drew physical formulae on the bathroom tiles as a child, to the horror of his father, before he invented the Flettner rudder in



My product has always been environmentally friendly. I have never sold chemical products with ION. And I never actually want to sell the chemical products.

- Marc A. Flettner, ION Deutschland GmbH

1918, the Flettner ship in 1922, and the Flettner helicopter in 1936, emigrated to the USA in

1947, worked on the American space program and founded the Flettner Aircraft Corporation in 1958. Between 1912 and 1960, Anton Flettner reported over 1,000 patents, many of which are still in use today. They all use innovative rotation principles to move up, forward - and, in retrospect, into the history books. No wonder Albert Einstein attested to him in his letter that he was "at present astonishing all the world".

Like Uncle Like Nephew

The inventor gene seems to be inherited in a dominant way. Even if Anton Flettner's great-nephew Marc A. Flettner - who is really tall at 1.96 meters - appears

somewhat more modest. He is content with a patent. But even that amazes anyone today who wants to do something chemical-free against "aggressive limescale deposits". In contrast to classic softeners and dosing units, AQUABION® does not require any chemical additives or supplied energy. It could be called an alternative medicine for advanced "piping sclerosis".

A Chemical Reaction - Without Any Chemical Additives

From the outside, the water treatment system looks quite inconspicuous: a short piece of metal that can be inserted quite easily into water pipes of



Looking Into The Pipes: If These Have Become As Clogged As The Pipe Cross-Section On The Left, The Patented Water Treatment From ION May Be Able To Help. (Photo Credit: Aquabion)



Ingeniously Simple, Doubly Ingenious: The AQUABION® Water Treatment Unit Combines A Zinc Sacrificial Anode With A Flettner Turbulence Principle. This Is Intended To Precipitate Limescale In Cold Water Before It Settles On Pipelines And Reduce Deposits On The Anode Itself. (Photo Credit: Aquabion)

any thickness. In it, a sacrificial zinc anode and a special swirling device somewhat reminiscent of Anton Flettner's rotor principle. This is to get to the bottom of the limescale. "We trigger a chemical reaction. Only without chemical additives", says Marc Flettner. His patented limescale converter works galvanically, i.e. electrolytically. You can compare this to a car battery that uses mineral-rich hard water instead of distilled water. "My technique is to trick the limescale. It is already precipitated in the cold water so that he cannot precipitate later in the hot water." The ionization stimulates certain minerals to bind to themselves. The newly formed enlarged crystals should no longer attach to the pipelines. On the contrary, they even "bombard" already existing incrustations and reduce them from the pipes in the long term. Similar to sandblasting, but much gentler. The bound ions then flow off and can be drunk without any health risks.

When a Good Technology

Comes Home

"Such a combination of a zinc anode and a certain vortex swirl is only available from us in this special form," says Marc Flettner. Accordingly, it is produced in Germany and used worldwide, in private households as well as in commercial and industrial plants, over 250,000 times to date. Incidentally, also in the home of Anton Flettner in Eddersheim near Frankfurt. In a ceremonial act by the mayor, the limescale converter of his great-grandnephew was officially inaugurated in the Flettner Villa. The circle is closed. Everything flows, back and forth.

A Missionary Who Preaches Water

But Marc Flettner is not only a seller of chemical-free water treatment, he is also an aquasophist. He calls himself a "water missionary without a long beard". His sermon sometimes pours as a torrent over encrusted ideas, which he washes away with clear words. For example, he dispels the prejudice that hard water is bad water: "This subdivision into

out the devil with Beelzebub. Flettner even sees himself as an extension of the municipal utility. In Germany, these provide some of the best water in the world. But often there are dilapidated, corroded pipelines after the water meter, especially in many older houses. "I try to ensure that the water reaches the end-user as unchanged as possible, just as it is supplied by the municipal utilities." Flettner sees homeowners and landlords as having a clear obligation in this regard. "The municipal utilities are only responsible up to the water meter. After that, it's the homeowner's turn. But they often get no help in the final meters. This is where my water treatment comes in."

The Proof of the Pudding

Interested parties can see the result a few streets away in a large housing complex in Grafenberg. Their owners faced a water GSA more than 15 years ago. Many pipes were broken, others barely had enough water to take a shower. And if they did, it was often a rusty brown broth. The Fricke family had been hit particularly hard, they were left high and dry. Dietmar Knoch, former technical supervisor and chairman of the advisory board of

hard and soft water is not useful. Water is actually just wet. For him, reducing hardness means breaking down valuable minerals, even the good ones. You can't fall for Aunt Tilly from the dishwasher commercials!" His patented technique even uses the hardness of the water, i.e. the minerals, to bind these minerals with his own means. In a sense, he is casting



Marc Flettner In His Office On Hirschburgweg In The Middle Of Grafenberg Forest. He Describes Himself As A Purist And Has Been "Loyal To Apple, AQUABION® And His Wife For Many Years". (Photo Credit: Aquabion)



The Small Intermediate Piece Could Not Only Improve Hot Water Comfort Here, But Also Reduce Energy Consumption And Save On Expensive Renovation Costs. (Photo Credit: Aquabion)

the housing complex, first went to the health department, then to an expert. Findings: Heavy incrustation of pipes. Recommendation: renovation as soon as possible. Cost estimate: approx. 1.5 million Deutschmarks, today a good 770,000 Euros. Since a roof renovation for three million DM

had just been completed and an equally expensive terrace renovation was pending, the owners were as little "liquid" as their water pipes. In this bottleneck, an employee of the Stadtwerke Düsseldorf public utility company at the time - Axel König, who has since passed away - drew Knoch's

attention to the water treatment system from ION. A system was installed in a house on a trial basis for one year, under the watchful eye of the property management. Afterward, the residents "looked down the pipes" in the most positive sense: The deposits were shown to have regressed by up to

50 percent in just 280 days. The water flowed again crystal clear and in sufficient quantity from all pipes. "That was my 'Aha' effect," says Knoch.

Limescale Treatment with Calculus

Flettner's limescale converters were immediately installed in all 13 houses in the community. Even during the initial installation, the owners saved over 460,000 Euros compared to alternative methods. In addition, the energy costs for heating water could be reduced by a whopping 40 percent in this residential complex. Since then, the limescale converters have only been replaced twice with the new AQUABION®. But even after more than 15 years of continuous use,

“ I am a purist and don't change so quickly. I have stuck with Apple, AQUABION®, and my wife for many years. - Marc A. Flettner

the total investment is far below that of any other process. By the way, the replaced devices are fully recycled by ION at the factory and partly reused, so there is little waste. This means the environment is sustainably relieved. And emphatically strengthened cooperation. Flettner himself was presented with the coveted international European Enterprise Network Award by the EEN in 2016.

So, if you ever find yourself standing in front of a rusty brown dripping tap and are thinking of renovating your piping system, think of Marc Flettner first. It could be worthwhile!

By the way...

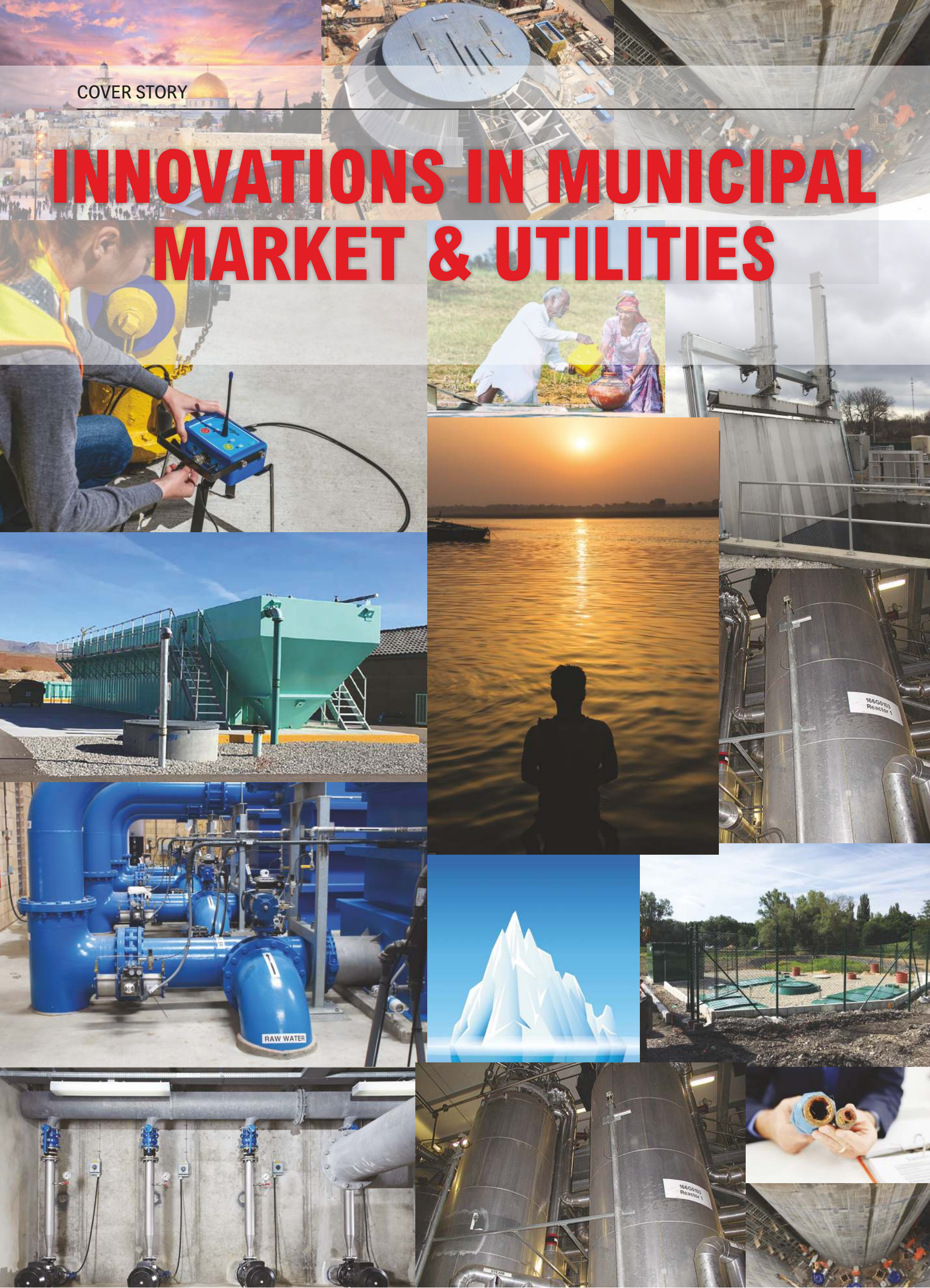
What good is the cleanest water if the bathroom is ugly?



Marc A. Flettner Has Been Working For 30 Years To Ensure That Clean And Mineral-Rich Water Bubbles Out Of The Taps (Photo Credit: Aquabion)

COVER STORY

INNOVATIONS IN MUNICIPAL MARKET & UTILITIES



TOWARDS A CLEANER GANGA: CASE OF KANPUR

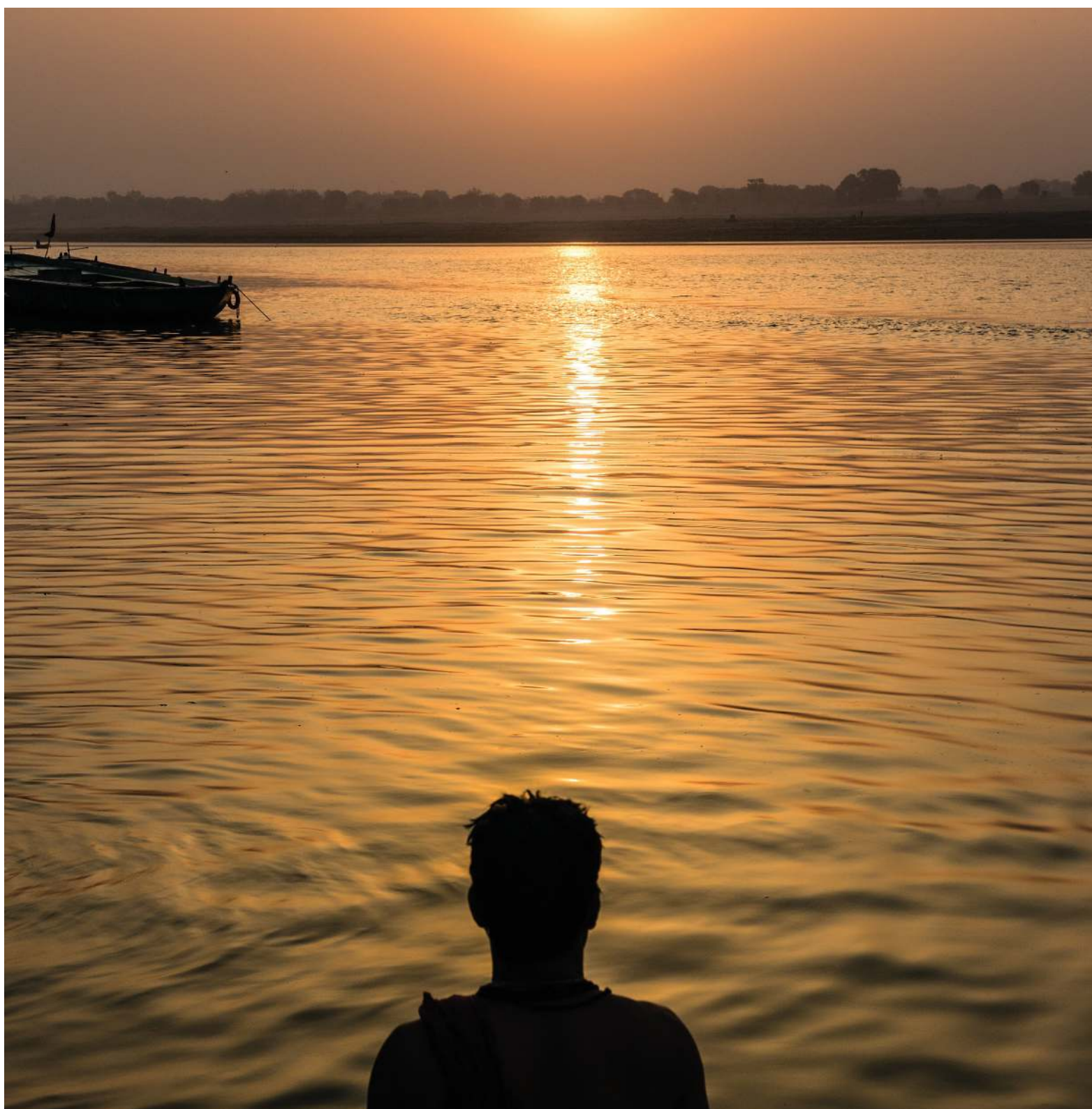
By Rajiv Ranjan Mishra and Jyoti Verma

Ganga has been part of the collective consciousness of our country and is also

the most revered river. The Ganga River basin is one of the largest River Basin in the world and flows

through the Indo-Gangetic plains of the country before merging in the Bay of Bengal through Sund-

arbans, the largest Delta. River Ganga is essential for millions of people for their livelihood and



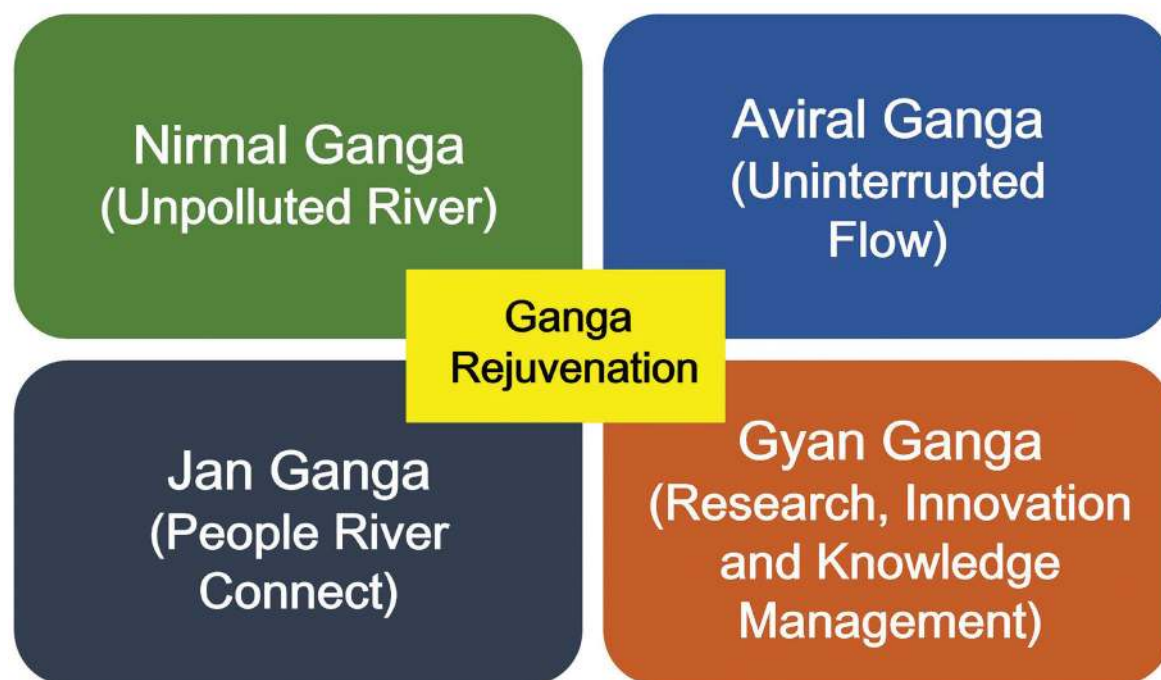
economy. With the increased anthropogenic footprint due to developmental activities and the possible climate change, the River faces critical challenges of pollution and water availability.

Namami Gange is a flagship programme of the Government of India for rejuvenation of Ganga and its tributaries. National Mission for Clean Ganga (NMCG) is the implementing authority of this program. An integrated programme was launched at a monumental scale of Rs. 20,000 crores with assured funding consisting of multi sectoral, multi-agency and multi-level interventions. The program can be placed into four categories i.e. Nirmal Ganga, Aviral Ganga, Jan Ganga and Gyan Ganga.

A total of 315 projects have been sanctioned under Namami Gange programme at a cost of Rs. 28,854 crores. 130 projects have been completed and the remaining are at various stages of execution. Pace of execution and consequently the expenditure has also increased many folds with the expenditure for FY 2019-20 being Rs. 2673.09 crores as compared to Rs. 170.99 crores in FY 2014-15.

Under Namami Gange, a total of 151 sewerage infrastructure projects have been sanctioned to create/ rehabilitate 4874 MLD treatment capacity in the Ganga basin. In Uttar Pradesh, under Namami Gange, the National Mission for Clean Ganga (NMCG) has sanctioned a total of 86 projects at the cost of more than Rs. 12,000 crore. Of these, 49 projects are in sewerage infrastructure sector, of which, 20 projects have already been completed and others are under various stages of implementation.

Kanpur which happens to be the industrial capital of Uttar Pradesh and is famous for its thriving leather industry that heavily pollutes river Ganga. Not only its industry, but also the huge population of around



3 million, significantly contributes to the river pollution. The River Ganga flows nearby Kanpur and aerially covers about 16km distance along the Kanpur city. A comprehensive approach has been adopted under the mission for the Kanpur city to address the issues related to pollution abatement, conserving ecology, biodiversity and to connect people with the river.

Pollution Abatement

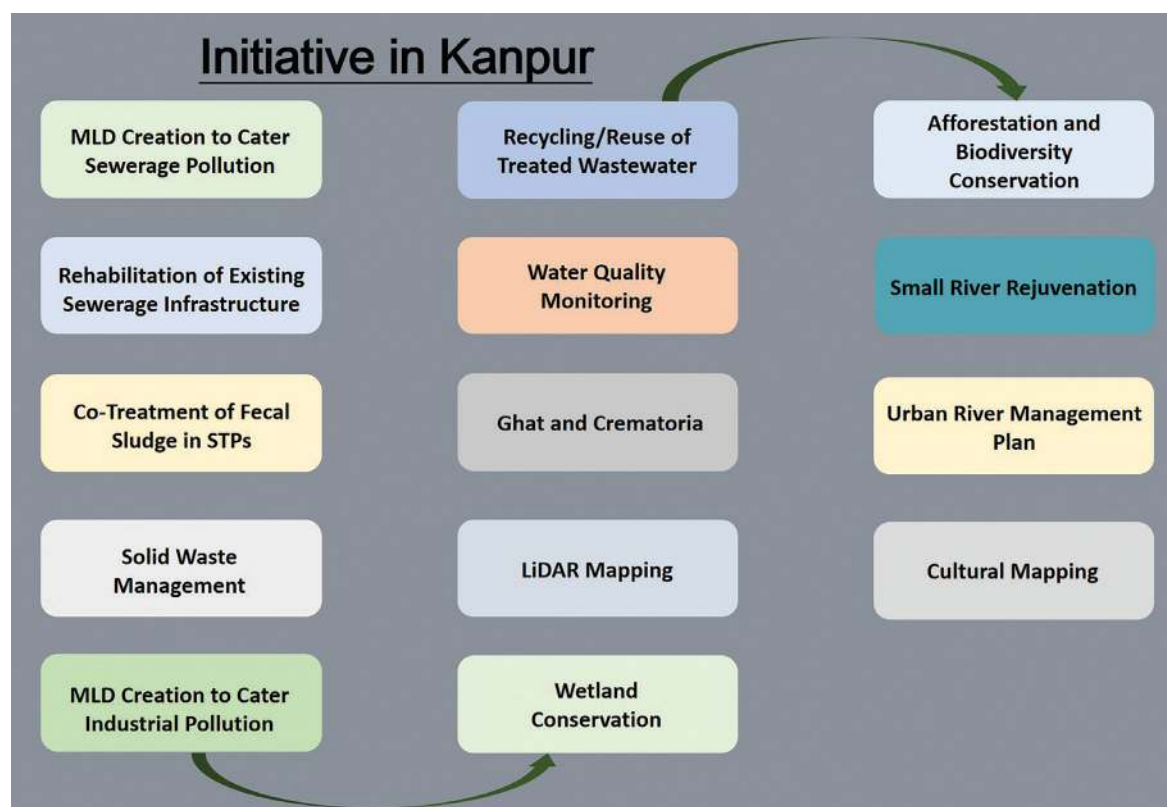
To tackle the pollution load in river Ganga from Kanpur, NMCG in close association with State Government has prepared a comprehensive scheme rationalizing the available sewerage infrastructure for better utilization, development of new sewerage infrastructure, rehabilitation of existing infrastructure, industrial pollution abatement and their

operation and maintenance.

Also, to improve the people-river connect, development of river front and several public outreach activities have also been taken up.

Sewerage Infrastructure

Rising population of Kanpur have significantly contributed to rise in the flow of untreated sewage discharging directly into the



river Ganga. The current sewage generation of Kanpur is about 375 MLD which is projected to increase to 460 MLD by 2035.

To address the issue of sewerage pollution in Kanpur, thorough assessment with respect to city profile, its master plan, the existing infrastructure and the deficit has been done. The assessment has indicated that most of the sewerage infrastructure that were created earlier are not operational and are poorly maintained and significant gap between sewage generation and treatment capacity in the city. To address these issues, comprehensive scheme has been sanctioned for the rehabilitation of the existing infrastructure and to create new

infrastructure so as to bridge the treatment gap. The sanctioned scheme also includes nearby cities of Unnao and Gangaghat (Shuklaganj). A separate scheme has also been implemented in Bithoor which is the suburban town of Kanpur.

For the first time in Namami Gange mission, a PPP approach of Hybrid Annuity Mode (HAM) and Performance Linked Payments, 15 years long term Infrastructure Operation & Maintenance (O&M) is included for sewerage projects. The 'One City One Operator' approach merging rehabilitation of old and creation of new treatment capacity, recycle and reuse of wastewater to improve governance has been introduced.

The treatment capacity of the existing 6 Sewage Treatment Plants (STPs) in Kanpur is 457 MLD and Unnao, Shuklaganj and Bithoor generate about 18 MLD of sewage. Under 'One City - One Operator' concept, through HAM, development of 3 STPs at Unnao (15 MLD), Shukla Ganj (5 MLD) and Pankha (30 MLD) have been taken up. Under this scheme single operator has been entrusted with the development of new STPs, rehabilitation of the existing sewage treatment infrastructure and O&M of all assets for 15 years under hybrid annuity based PPP mode. This will ensure single point accountability, desired performance, and long-term sustenance.

In Kanpur, only 30% of the households have the sewer network connection, the waste from other household were disposed in Ganga through different drains. For better utilization of the existing STPs and to connect the core city of Kanpur with the sewer network, a project on laying 301 kms branch sewerage network, rehabilitation of old trunk sewer along with 10 years of O&M at a cost of Rs. 430.49 crore is under implementation. In Bithoor, a project to treat 2 MLD through

constructed wetland technology at an estimated cost of Rs. 13.40 crore has been completed this year and is working efficiently.

In Kanpur, there are almost 92,200 households in the city connected to the septic tanks, which forms almost 20% of total households in the city which is connected to on-site system. To minimize the pollution through indiscriminate disposal of Fecal Sludge and Septage (FSS), treatment options like creation of FSTP or co-treatment were explored. Currently FSS is co-treated at 210 MLD Binagawan STP in Kanpur having significant unutilized capacity. Daily about 15 de-sludgers with 3-4 KLD capacity are received at the STP for the co-treatment. NMCG is also working with CSE to spread the FSS management and to create necessary technical capacity in the state agencies for expeditious implementation.

NMCG also focused on the poor capacity utilization of the existing STPs and the untreated sewage being spewed in river Ganga through numerous drains including 120-year-old Sisamaunala. Earlier STPs at Bingawan and Jajmau were getting only 55 and 65 MLD flow against installed capacities of 210 and 135 MLD respectively while 140 MLD sewage was discharged to river Ganga by Sisamaunala. A project on interception and diversion of Sisamaunala and 5 other drains was taken up by which 80 MLD sewage was diverted to Bingawan STP and 60 MLD to Jajmau STP. This led to improving capacity utilization of Bingawan and Jajmau STPs and getting river Ganga free from the largest Nala.

The impact of the program is reflected in the improving trend of water quality which is targeted to achieve bathing standard. The important parameter of Dissolved Oxygen (DO) to be more than 5mg/liter is now achieved throughout the 2525 km long river including the stretch of

Kanpur. There is also significant improvement in the Biological Oxygen demand (BOD) standard. CPCB monitors water quality of River Ganga through 97 manual water quality stations and 36 Real Time Water Quality Monitoring Stations (RTWQMS), installed throughout the stretch of river. Two of such stations are installed in the upstream and downstream of Kanpur. Graph 01 in this article shows the improved BOD and DO level at these two stations.

Reuse/ Recycle of Treated Wastewater

Under Namami Gange, the focus has now been enhanced to address recycle and reuse of the treated waste water for industrial, agriculture and other use at municipal level. An MoU has been signed with the Ministry of Power for reuse of treated effluent from STPs located within 50 Km radius of thermal power plants. Initiative for recycling and reuse has been taken up in Kanpur also as the treated effluent from Bingawan STP (210 MLD) is planned to be reused in Panaki Thermal Power Plant. 166 MLD of treated wastewater from STP Jajmau, Kanpur is used for irrigation.

Industrial Pollution Abatement

The city accounts for almost 80-90% of leather exports of India. Presently, about 400 tanneries (90% SSIs) are situated in the cluster and has been a major environmental concern for last few decades due to its poor management of wastewater and perceptively acknowledged as a major polluter in River Ganga Basin.

Inventory of all the Grossly Polluting Industries has been done under the mission and annual inspection of GPIs carried out through technical institutions. Regular surveillance and enforcement through SPCBs and District Administration are also carried out.

A project for integrated industrial wastewater management

Salient Features of Project

- **20 MLD** capacity Common Effluent Treatment Plant (CETP) based on primary assessment of existing production capacity and infrastructure of tanneries
- **First time** odor control and management measures adopted in wastewater management system for Tannery sector
- **SCADA-based** online qualitative and quantitative assessment of water requirements and wastewater management
- **Chrome liquor** to be treated separately and chrome cakes to be sold back to the industry
- **200 KLD** state-of-the-art ZLD based demonstrative plant for recovery of marketable salt and reusable water from wastewater
- **900 KLD** capacity Common Chrome Recovery (CCR) facility to recover usable chrome chemical for reuse in the process, thereby reducing its consumption and pollution load

Sisamau Nala



Before



After

system comprising of collection and conveyance system, adoption of clean technology and incorporating an institutional framework for comprehensive waste management has been approved by NMCG at an estimated cost of Rs. 617 crores.

Co-operation and assistance from national (CLRI, NEERI, ITRC, IIT-BHU, IIT-Kanpur and MNNIT) and international expert orga-

nization (UNIDO, Solidaridad, BASF) is extending technological and financial assistance for product and process improvement.

Solid Waste Management

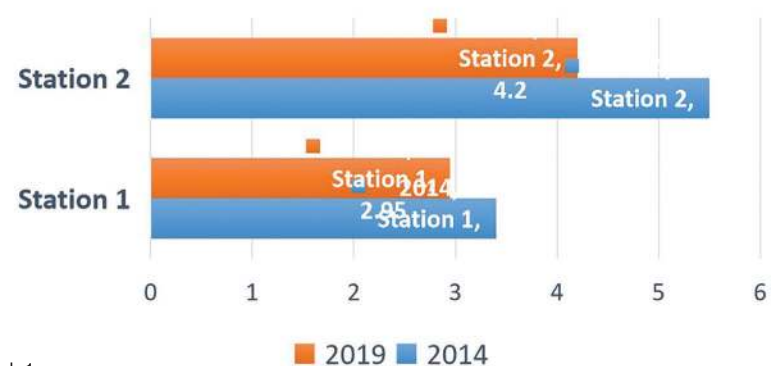
A trash skimmer was deployed at a strategic location in Kanpur for 3 years (2016-2019) duration to clean the river from floating garbage. Apart from this, projects for regular cleaning of ghats in Varanasi, Bithoor, Kanpur, Prayagraj, and Mathura-Vrindavan have been taken up. 39 ghats in Kanpur and Bithoor are being cleaned daily. As of November 2018, Kanpur had 10 open garbage dumps and 7 Garbage Vulnerable Points all of those have been closed/rehabilitated. There are 16 drains in Kanpur which have outfall in river Ganga out of which 12 have been tapped and screens have

been provided in the remaining 4 (with regular cleaning) to prevent garbage from entering into the river. Regular follow-up has also resulted in improvement in the capacity utilization of municipal solid waste processing facility from around 30% to 80%. These initiatives have led to Kanpur securing the 2nd position in the Swachh Survey 2020 in the category of Cleanest Ganga Towns

Dissolved Oxygen



Biological Oxygen Demand



Graph 1

Research, Policy and Knowledge Management

URBAN RIVER MANAGEMENT PLAN

To mainstream river health in urban planning, Urban River Management Plan (URMP) template is being prepared with help of NIUA. A template for URMP is being prepared for Kanpur city to integrate the river into the master plan.

AQUIFER MAPPING

Namami Ganga is working with National Geophysical Research Institute (NGRI), Hyderabad to delineate the subsurface aquifers with focus on Paleochannels from Kausambi to Kanpur to provide newer insights into disposition of the aquifers, extent and characteristics of the paleochannel and possible interaction of the aquifers with Ganga and Yamuna rivers.

LIDAR MAPPING

NMCG has also initiated a landmark project along with Survey of India (SoI) on "Generation of high-resolution DEM and GIS ready database for part of River Ganga" using LiDAR Mapping. Through this project, Kanpur and surrounding areas will also be mapped out, which will help in further planning and monitoring of different aspects of Ganga cleaning and rejuvenation.

CULTURAL MAPPING

The Ganga river is a cultural stream embedded in the very soul of India. NMCG in partnership with INTACH is carrying out the cultural mapping of natural, built and intangible heritage along the main stem of the Ganga from origin to Ganga Sagar. Through this mapping, the cultural and built heritage of the Kanpur city is being documented.

(Population > 1 Lakh).

Ecology and Flow

Biodiversity Conservation

A comprehensive project is under implementation in partnership with Wildlife Institute of India (WII) to map biodiversity hotspot for the entire length of Ganga and scientific improvement of habitat, species. The biodiversity along Kanpur stretch is also being covered in this project, which will help in conserving the ecology and biodiversity of the city. An interpretation center "Anubhuti" has been developed by the WII, NMCG and UP Forest Department at the heritage building of Allen Forest situated at Kanpur Zoological Park. The center gives visitors an experience of Ganga and aims to improve the image of river Ganga from a highly polluted river to a river that is appreciated for its aesthetic value.

Wetland Conservation

A project has been undertaken for development of an integrated management plan for 226 wetlands situated in 27 districts of UP including Kanpur, up to 10 kms on either side of the river.

Small River Rejuvenation

A GIS-based inventory of small rivers have been created along with district wise list of small rivers. The rejuvenation of these rivers will help in making Ganga Aviral and Nirmal. The rivers of Kanpur districts have been identified, mapped and a plan is being prepared for rejuvenation of river Pandu among other priority small rivers in the district. Recently this item has been got included as priority under MGNREGA.

People River Connect

To reconnect people of the town with Ganga, a project funded by NMCG has been completed the construction and rehabilitation of 24 ghats and 3 crematoria at an estimated cost of Rs 47.39

crore. This initiative has helped in improving the connect of people of Kanpur with river Ganga. Namami Gange has also taken up interventions for community outreach, through Ganga Vichar Manch, Ganga Praharis, NYK Ganga Doots, Ganga Mitras, Ganga Task Force with ex-service-man, Ganga Utsav, Ganga Run, Ganga Rafting expeditions, Treks with a social message and several activities has been taken up. In October 2019, Namami Gange launched Ganga Aamantran - to connect with the people. NMCG undertook the 35-day rafting expedition from Devprayag to Ganga Sagar comprising people from the NDRF, IITR, Lucknow and WII Dehradun. The rafting team halted in Kanpur and had organized various public awareness activities.

National Ganga Council meeting under the chairmanship of Hon'ble Prime Minister was held at Kanpur in view of its critical importance and to give further momentum to these efforts.

About the Authors

Rajiv Ranjan Mishra, is presently working as Director General of National Mission for Clean Ganga (NMCG). He is also in-charge of National River Conservation Directorate. He has held several important positions in the Govt and states with rich experience in area such as river basin management, irrigation, environment, water and sanitation, housing, and urban development. Spearheading the Namami Gange, he has taken up several innovative steps to develop a comprehensive set of intervention and a model for river rejuvenation in India. He has been developing a framework for mainstreaming river conservation into urban planning and has richly contributed earlier as Additional Secretary, Housing and Urban Affairs for enactment and implementation of Real Estate (Regulation and Development) Act, Policies for



Affordable housing including PPP models and New Urban agenda. Mr. Mishra is a Mechanical Engineer from IIT, Kanpur.

Jyoti Verma is a Civil Engineer – Environmental Planner and currently working as a Support Engineer in National Mission for Clean Ganga (PMC - Tata Consulting Engineering). Presently, she is working on monitoring and evaluation of sewerage infrastructure projects, Urban River Management Plan and planning perspective of river rejuvenation under the Namami Gange project. Previously, she worked in WSUP Advisory India, where she got to contribute in the country's most ambitious program Swachh Bharat Mission Urban under the project "Capacity Building for Swachh Bharat Mission (U), Technical Support to USAID – Govt Knowledge Partnership". She has received her bachelor's degree in "Civil Engineering" from Gujarat University and master's degree in "Environmental Planning" fromCEPT University, Ahmedabad.

24x7 WATER SUPPLY TO JHUNJHUNU DISTRICT IN RAJASTHAN

By Grundfos India



The Scenario

Rajasthan is a semi-arid region with severe water resource constraints: while being India's largest state by land size with a population of 80.7 million as of 2021, it has only 1% of the country's estimated water resources. For drinking and irrigation, 90 percent of Rajasthan's population is reliant on groundwater.

Jhunjhunu, an ancient town in the state of Rajasthan, is located in the northeastern part of the state. The town of Jhunjhunu is the district headquarters. Currently, the water supply service in Jhunjhunu is unreliable coupled with quality issues and huge distribution losses. The Government of Rajasthan has joined hands with a leading EPC contractor.

To Overcome the Challenges

Rajasthan government has introduced a scheme under



RUSDP (Rajasthan Urban sector development Programme) to invest in water distribution and sewage network to cover 100 percent of the city's area/road length, while sewerage works will be conned to the smaller area considering ongoing sewerage.

Highlights

- Designed a water supply network to reduce NRW by up to 7% within the District Metering area
- Includes overall 12% and pressurized water of 12m at the consumer end
- Service level improvement from 75 to 135 Liters Per Person (capita) Per Day (LPCD)
- The project is funded by the Asian Development bank

Our Supply

For 24*7 water supply applications after the water intake and treatment process, Grundfos has supplied 34 number of NK pumps model for an uninterrupted water supply to the city.

Outcome

The customer was delighted with Grundfos solutions and pumps' performance. Moreover, the EPC contractor holds the key to 10-year O&M of the project, where 30% of the operation fee will be linked to

very best from Grundfos within energy-efficient motor technology.

Reliability

Backed by comprehensive pump know-how and carefully selected materials, the Grundfos end-suction range is renowned for its outstanding reliability.

Complete Range

The range comprises a full series of close-coupled and long-coupled end-suction pumps in both cast iron and stainless steel.

Flexibility

Grundfos end-suction pumps can be configured and optimized for seamless operation in any application.

Demanding Environments

Grundfos end-suction pumps handle even the most demanding liquids and environments. Reliable, efficient - a pump you can trust.

The Global Reach

As a truly global supplier, Grundfos offers delivery, service, and commissioning expertise on every continent, and always in the local language.

About the Contributor

Grundfos Pumps India Pvt. Ltd. (Grundfos India) is a wholly-owned subsidiary of Grundfos Holdings A/S. It is responsible for sales of Grundfos products in India, Bangladesh, Bhutan, Nepal and Maldives. Grundfos India provides energy-efficient pumps and smart pumping solutions for various applications.

Benefits Arising from This Project

- Individual metered connections to 100% of households
- Uninterrupted continuous water supply
- Efficiency improvement in water supply

the fulfillment of performance indicators. The customer is witnessing the desired pumps' performance and energy savings at the site and content that our solution will be helping them meet performance indicators.

Benefits of the Pump

Energy-Efficiency

All Grundfos end-suction pumps can be equipped with motors that carry the Grundfos Blueflux label, representing the

Pumping Solutions

Grundfos has engaged with an EPC contractor and designed the pumping solution for the water supply scheme for the project. Since, the project involves extreme weather conditions, unequal elevation in water supply networks, and uninterrupted water supply at all distribution points along with optimization of energy and maintenance costs.

SEWATEC PUMPS CONTRIBUTE TO LAKE ONTARIO CLEAN-UP

By Bryan Orchard



Figure 1: The New Raw Sewage Pumping Station at Woodward Avenue (Image Courtesy of Reimar Construction)

The 45-kilometer long shoreline of Hamilton Harbour on Canada's Lake Ontario has been at the heart of its surrounding communities for many centuries.

Once a pristine source of fresh fish and a place of leisure for the local population, industrialization and the growth of the City of Hamilton have had a detrimental effect on the life of

the harbor.

By the middle of the twentieth century, decades of toxic sediment, stormwater runoff, habitat loss, water quality deterioration and other factors had

caused severe damage to the Hamilton Harbour ecosystem.

In 1987, the International Joint Commission (IJC) – the organization overseeing the Canada-United States Great

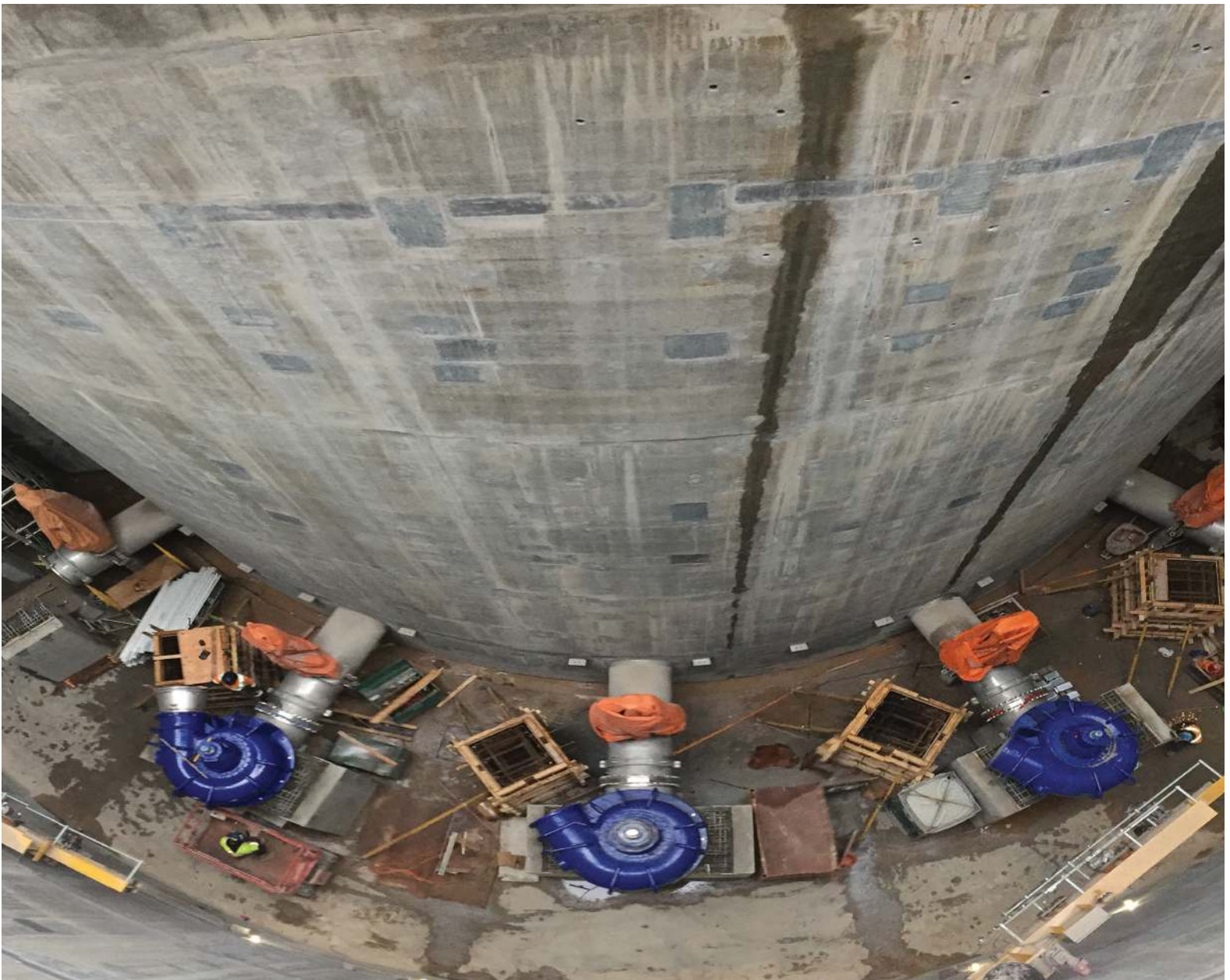


Figure 2: The Pumping Station Contains a Circular Split Wet Well Located Inside a Circular Dry Well Where 12 KSB Sewatec K700-950 G1 VGW Vertical Dry Pit Solid Handling Pump Sets are Installed (Image Courtesy of Reimar Construction)

Lakes Water Quality Agreement – identified the 500-square km Hamilton Harbour as one of 43 areas of concern (AOC).

Being on a list of locations where environmental degradation seriously impaired the use and environmental health of the Great Lakes was a wake-up call for the city.

Over the past few years significant environmental engineering programs have been implemented, the largest of which being the multiphase Clean Harbour program.

Wastewater Treatment Project

In 2008, the City completed the Woodward Avenue Wastewater Treatment Plant (WWTP) Service Area Environmental Study Report to determine a plan for upgrades to the plant.

This recommended investment to manage wet weather flows, provide treatment capacity, and meet treatment objectives defined by the Hamilton Harbour Remedial Action Plan, the Ministry of Environment, Conservation and Parks and the Federal Environmental Protection Act.

Located near the southeast corner of the harbor, it is the

largest wastewater treatment plant in the Hamilton Harbour watershed and amongst the largest in Ontario.

The Harbour also contains one of the largest toxic sediment sites on the Canadian side of the Great Lakes.

Because the plant is the largest single source of water flowing into Hamilton Harbor, the quality of that effluent has a direct and powerful impact on the harbour's water quality and environmental health.

The Woodward upgrade project is a multi-phase, multi-year process that includes a number

of sub-projects, each of which has its own specification and timelines.

Costing \$340 million, the upgrades include elevating the plant's final treatment process from the secondary level to the tertiary (third) level.

This increases the processing of the plant's treated wastewater and will allow the plant to reach strict discharge limits described by the Hamilton Harbour Remedial Action Plan for phosphorus, ammonia and suspended solids.

A significant sub-project is the construction of a new raw



Figure 3: The First of the Pumps Being Installed and Anchored to Their Mountings (Image Courtesy of KSB Canada)

sewage pumping station (Figure 1) and collection system control to support wet weather and flooding control initiatives.

Having an effective pumping station capable of handling current and projected flows is essential to the functioning of wastewater treatment and the prevention of overflows in the harbor.

Construction on the upgrade began in May 2017 and is projected to be complete in July 2021.

Woodward Avenue Pumping Station

Now approaching 60 years of age, the existing wastewater treatment plant has a rated average capacity of 409 million liters per day (MLD) and the peak rated capacity of 614 MLD.

If this is exceeded, the excess water, being a mix of industrial and domestic waste and run-

off from the land, is discharged into the harbor.

To comply with the long-term projected processing requirements, the plant will have a maximum receiving capacity of 1,700 MLD.

In order to meet this requirement, considerable effort had to be put into designing a highly efficient pumping station containing pumps with a proven track record in handling high volumes of untreated wastewater.

After due consideration of the various pump options available, Maple Reinders, contractors for the pump station, together with the City of Hamilton selected KSB Pumps Inc., Canada as its pump supplier on the basis of KSB's technology and knowledge of pump station design.

The design of the existing pump house at Woodward Avenue is rather unusual in that it is

a circular construction.

Clearly, this has proved to have its advantages and benefits, for the new pump house now under construction is also circular, containing a circular split wet well located inside a circular dry well where 12 KSB Sewatec K700-950 G1 VGW vertical dry pit solid handling pump sets are installed (Figure 2).

The pump house has a total elevation of 81m above sea level, and at almost 30m the subterranean wet well is much deeper than its predecessor.

This larger and deeper wet well prevents system flooding and provides increased system storage.

There are several benefits of the wet well inside the dry well configuration.

Firstly, dry well pumps, as opposed to wet well pumps, enable easy access to all pump

parts for in-situ maintenance and repair.

When components need to be removed from the dry well, they can be easily craned to the surface.

The split wet well design, with six pumps allocated to either side, allows one side to be taken off-stream for cleaning without there being any adverse impact on the efficiency of the pump house.

The Challenge

With the pump house being of a rather unconventional design, KSB had to address a number of design challenges imposed on the configuration of the pump mountings.

Formulating a layout for the pumps around the exterior of the wet well was the first issue to contend with.

The answer was differing installation angles of pressure for

the connection piece/inlet pipe. This in turn meant coming up with mountings peculiar to the configuration.

For this KSB provided a tailor-made volute casing for each pump with an integrated mounting flange foot, which allows the pumps to be anchored directly to the cast-in-place foundation blocks is, a concept unique to KSB.

In order to handle the optimum flow of wastewater through the plant, 10 pumps would be required for full-time availability and a further two for standby demands.

In addition, collectively the pumps had to be capable of handling up to 23,600l/s and a potential solids content size of 190mm.

The third significant issue to address was varying flows. At times when the effluent level is low cavitation has to be avoided, and when storm conditions arise high flows have to be accommodated.

By installing four Variable Frequency Drives (VFDs), all the pumps automatically respond to the incoming flow. Finally, the pumps had to deliver high levels of efficiency.

Being able to handle large solids and control flow velocity gives the treatment plant the opportunity to drain the interceptors for cleaning through the manipulation and control of the interceptor.

On the existing plant, it is not possible to lower the level in the wet well to control the velocity in the interceptors.

Thus, when storms occur, extra inflow and increased velocity result in the interceptors losing the ability to contain accumulated sediment and this passes directly to the headworks creating an overload condition.

With the new pump house design, it will be possible to drain the interceptors as necessary and remove the extra grit load

to the plant.

The KSB Pumps

All the vertically mounted Sewatec pumps are supplied with a 15m long carbon fiber drive shaft, 700hp motor, split mechanical seal, long 1050 x 750mm radius suction elbow and vibration monitoring system.

The smooth finish reducing suction elbows contain a 200mm clean-out port.

The motors are at an elevated level in the dry well so cannot be affected by the possibility of flooding from the wet well.

Whilst the pump is designed to operate in a dry environment, there is an external clean water flushing line for the mechanical seal.

The provision of redundant seal technology adds an extra layer of protection that prevents wastewater from getting out of the pump.

With a variety of impeller options and mounting methods, the Sewatec provides the perfect answer for transporting raw wastewater as well as thicker mediums such as bio-solids/sludge.

"This contract required a combination of high pumping efficiency, good NPSH performance and the ability to deal with solid materials in the un-screened wastewater and storm run-off", comments Marcus Henderson, KSB Pumps Canada Regional Sales Manager.

Each of the pumps contains an 898mm non-clog multi-vane radial flow K design impeller giving a free passage of 190mm, and has the capacity to pump 1968L/s at 21m.w.c. TDH.

The upper end of the normal operating range is 26.25m.w.c. TDH and the lower end is 16m.w.c. TDH.

"KSB's Sewatec pumps are an excellent choice for this job, with an excellent track record of providing reliable service

in sewage treatment plants around the world," says Marcus Henderson.

"This dry-installed pump is fitted with variable-frequency drives, IE4 motors and the optimized hydraulic system yields high efficiency, thereby helping to reduce energy consumption and minimize operating costs. The brief required a hydraulic efficiency of 86%, with KSB guaranteeing 86.97% at the design duty condition, but when submitted to witness testing conditions at the KSB factory in Halle, Germany, the pumps de-

cluding the cast-in-place foundation blocks for the pumps, had been completed (Figure 3) and work on the service areas at and above ground level were underway.

The first of the pumps had been craned into position and anchored to the mountings and complete installation of the pumps, drives and shafts is expected in early 2021.

About the Author

Bryan Orchard is an independent technical author and journalist who has been working



livered 89.1%, some 2.1% more efficiency than we guaranteed."

For the mechanical seals, KSB worked with the local seal supplier on a special configuration to accommodate the pump installation and shaft.

Split mechanical seals were selected and positioned above the bearing housing, thereby allowing them to be accessed and replaced in situ.

The dry well design gives the advantage of allowing easy access to both the seals and the bearings for maintenance.

By spring of 2020, construction of the dry and wet wells, in-

in the global pumps and valves industry for over three decades.

Pumps, valves and services are KSB's business. From standard products for applications in building services and industry, custom-made units for the mining and energy sectors to special solutions for transporting water or chemicals, it provides highest-quality pumps and valves. KSB employs over 15,000 people in development, production, sales and service around the globe. The long, reliable operation of its pumps and valves is safeguarded by dependability of its products.

OLD CITY OF JERUSALEM PRESENTS UNIQUE CHALLENGES FOR LEAK DETECTION

By TaKaDu



Every single TaKaDu customer has a unique story – varied types of service areas, different regulatory environments, and specific challenges. But perhaps one of the most unique is the story of Hagihon, the water and wastewater utility for the Jerusalem area of Israel.

Some water utilities cover historical areas, where there are protected structures that may be several hundred years old. Managing a water network in

such a place can be challenging. But imagine what it's like managing water infrastructure in a city where every single inch of ground is historical, where there are structures that are thousands of years old and sacred sites for several religions, and where the buildings are so densely packed that no heavy machinery can be brought in.

The Hagihon water utility is named after the Gihon Spring, which long ago provided drinking water for Jerusalem's

residents.

It's where King David's son Solomon became King: The king said to them, "Take my servants with you, have my son Solomon ride on my own mule, and take him down to Gihon. There, Zadok the priest and Nathan the prophet are to anoint him as king over Israel. You are to blow the ram's horn and say, 'Long live King Solomon!' (1 Kings, 1: 33-34)."

That's what Hagihon has to deal with, and it makes for

some very challenging situations. In this article, we describe a few examples that demonstrate the unique challenges facing Hagihon when it comes to detecting and fixing leaks in the Old City of Jerusalem.

The Old City is a UNESCO World Heritage Site and is divided into the Christian, Muslim, Jewish, and Armenian quarters. At any time, HaGihon could find itself having to deal with a leak under the Temple Mount, the most holy place for

the Jewish world; or under the third-holiest place for Islam, the Al Aqsa Compound; or beneath the two of the most holy sites to Christianity, the Golgotha and Jesus's empty tomb.

Amongst the Hagihon water utility's customers are the Dome of the Rock and Al-Aqsa Mosque, the Temple Mount, and the Church of the Holy Sepulcher.

A Small Section in a Huge Water Network

Each day Hagihon provides more than 220,000 cubic meters of drinking water, through a total pipeline length of 1,300 km (808 mi) that runs throughout Jerusalem and surrounding areas. The utility serves around a million people, about 10% of the Israel's population.

The Old City is a small part of Hagihon's service area, but it is the most complex. A 0.9 km² (0.35 mi²) walled area in the middle of the modern city, it is home to some 40,000 residents, and is very crowded, with houses and other buildings built around very narrow alleys.

Hagihon provides ~220,000 cubic meters of drinking water each day, through a total pipeline length of 1,300 km.

Water is delivered to the Old City through pipelines that pass through four of the nine open entrance gates in the Old City wall. These are also the entrances to the four DMAs (district metered areas) that the Old City is divided into. A fifth pipeline has been laid through another gateway and will be metered soon.

Complex Leak Detection and Repair

Most of the pipeline under the Old City was laid during the 1970s and is made of either galvanized iron or steel. The water loss in the Old City DMAs ranges from 9.5% to 19% depending on the DMA.

The Old City of Jerusalem was conquered, destroyed, and rebuilt many times in its history, creating soil made of layers of ruins built up over the course of 3,000 years. As a result, water from leaks infiltrates through the layers for a very long time, and across a long distance, before it reaches the surface. This means that leaks can last a very long time before they are detected and it is very difficult to locate the source.

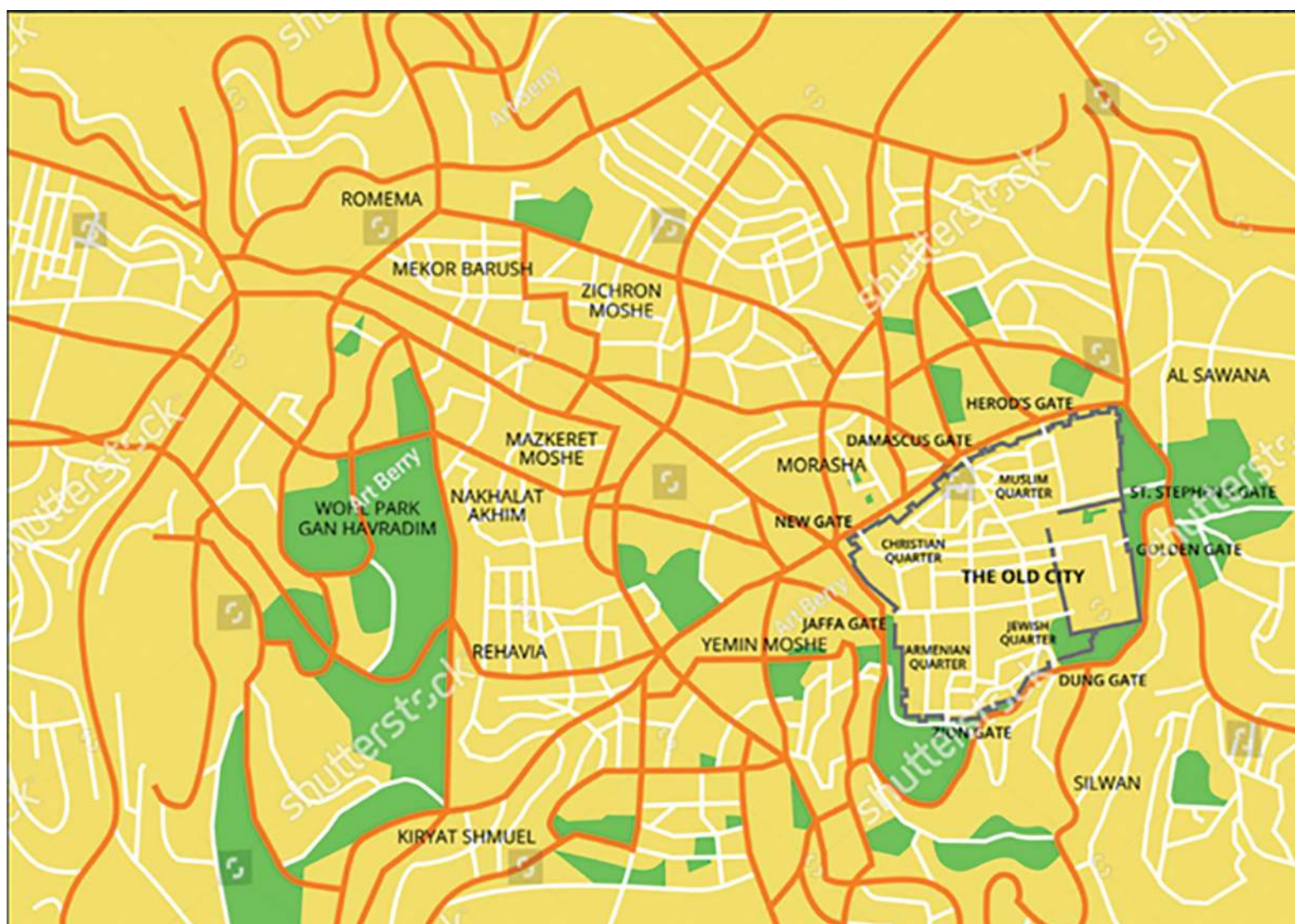
The soil in the Old City of Je-

rusalem is made of 3,000 years of layers of ruins. Leaked water infiltrates through the layers for a long time and across long distances, making detection extremely difficult.

For Hagihon, the biggest threat is not non-revenue-water, but rather that an ongoing leak could seriously damage old buildings, which have no iron foundations, or worse, cause them to collapse.

But, using fixed acoustic meters to detect the location of the leak is possible only on a very small scale, as there is strong resistance from residents, who don't like seeing suspicious equipment within the walls of the Old City – there are many politically and religiously sensitive issues.

Even once leaks have been



Map Of Jerusalem, The Old City Is On The Right; Its Borders Are Marked In Grey.



The Old City is filled with narrow alleys

discovered, repairing them can be very difficult. Due to the density of the Old City, and the small alleys, it is impossible to bring in heavy machinery. All repairs must be done manually.

HaGihon faces many other operational complexities in the Old City. For example, if a new

pipeline needs to be constructed to replace an old one, the utility must first place a temporary line aboveground because there is simply no space to put a new permanent pipe next to the old one.

Only then can Hagihon remove the old pipeline and install a new one.

With the many historical and religiously important sites in the Old City, Hagihon must act with extra sensitivity when construction, maintenance or repair work is needed. In addition to obtaining permission from the police and city council, Hagihon must also get authorization from many other



organizations before moving even a single stone in the Old City – among them, the Israel Antiquities Authority, the East Jerusalem Development Company, and the Committee for the Preservation of Gravesites.

Due to these unique challenges, leaks typically run for a long time before they are fixed and faulty connections are replaced less frequently. As a result, the water network within the Old City is older than in the rest of the city.

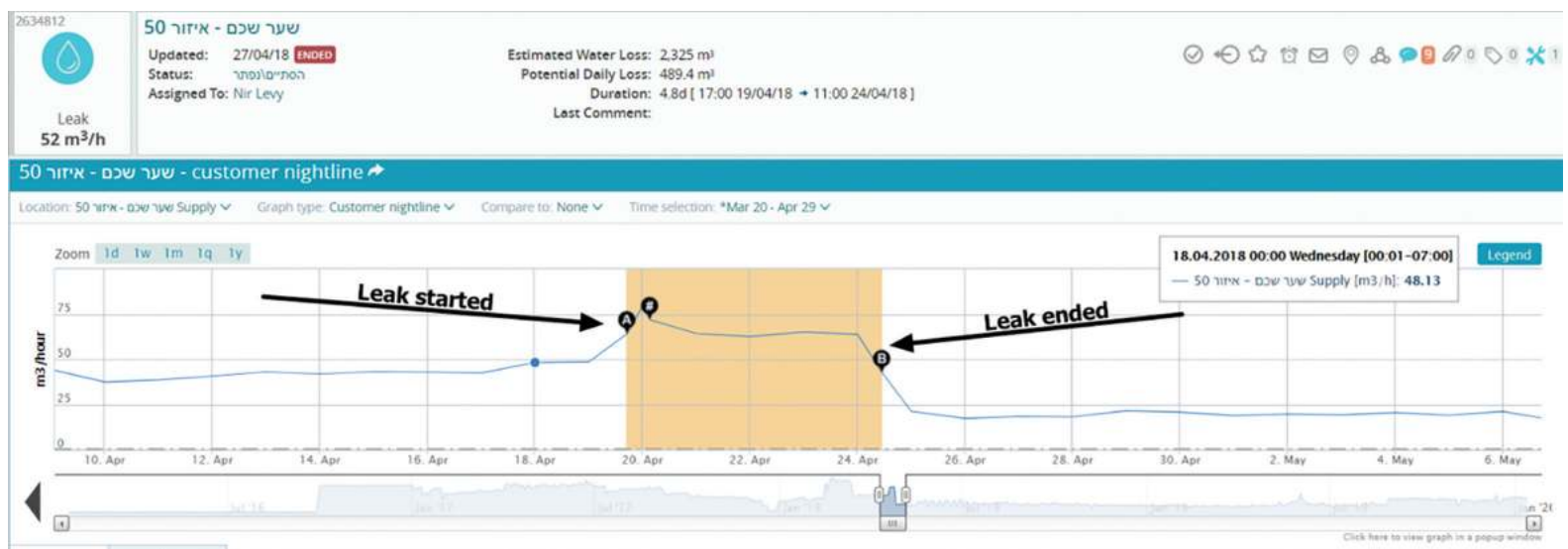
A Chance Event Uncovers a Major Leak

A good case study to demonstrate some of the challenges Hagihon faces is this leak event from April 2018.

Broken paving stones reveal the leak. Over the previous few months, Hagihon's water loss engineer and the TaKaDu soft-



The TaKaDu Event Graph Shows Water Supply For The DMA. When The Leak Started It Is Easy To See The Wide Deviation Between The Predicted Behavior (Green) And The Actual Water Flow (Blue).



The Night Line During The Event



The Sudden Flow Increase Graph Shows The Difference Between The Predicted Flow (Green) And Actual Flow (Blue). After The Leak Is Fixed, The Flow Returns To Normal, As Shown Where The Predicted Flow And Actual Flow Graph Lines Overlap.

were had both identified an increase in water loss, but had no way to determine exact source. Then, water that penetrated the floor of one of the houses in the Muslim quarter was reported by the homeowners, initiating a suspected-leak event in the area close to the Damascus Gate in Old City walls.

With no acoustic loggers in the area, and all the other challenges noted above, it was impossible to properly investigate to locate the source of the leak, and it could have continued for a long time.

But soon after, a police jeep driving in the area accidentally broke a paving stone, and by

chance that small accident revealed the location of the leak. A team from the water loss contractor that happened to be scanning the area arrived and began marking and repairing the leak.

Based on TaKaDu monitoring, Hagihon estimated that about 2,325 m³ of water was lost due to the leak.

Early Leak Detection Helps Major Customer

Elsewhere in Jerusalem, where the water utility can use modern equipment and processes, the TaKaDu system is able to do far more than identify the existence and extent of a leak.

For example, in one case, the system alerted Hagihon about a sudden flow increase event that began on the evening of September 8.

The water loss was measured at about 11 m³/hr. Hagihon was able to quickly find the source of the leak in one of the service pipes and by 9:00 a.m. on September 11 it was fixed. The total estimated water that was lost was about 600 m³.

The early detection saved a lot of money for the customer, a large consumer, that, had not been detected so quickly, would have ended up paying for far more water than it actually consumed.

About the Contributor

TaKaDu is a software provider of Central Event Management solutions for the water industry. Its automated cloud-based service enables utilities to DETECT, ANALYZE and MANAGE network events and incidents such as leaks, bursts, faulty assets, telemetry and data issues, operational failures, and more.

Converting raw data into knowledge, TaKaDu provides visibility and actionable insights for increased operational efficiency and reduced non-revenue water (NRW) loss.

FAST SOLUTION ENSURES RECYCLING & WATER QUALITY COMPLIANCE IN REMOTE & REGIONAL AUSTRALIA

By CST Wastewater Solutions



The FAST System, Which Can Also Be Housed In A Container. Bolt-On Additions Can Cope With Hundreds Of Extra Workers Or Visitors.

The latest Smith and Loveless FAST water quality and recycling solution is being introduced to Australia by CST Wastewater Solutions to manage groundwater impacts and comply with increasingly stringent sustainability requirements for developments in remote areas.

The easily installed FAST (Fixed

Activated Sludge Treatment) system produces an Australian effluent water quality from Class C to Class A, which means the water produced by large remote mining, oil and gas, tourism, education, commercial and industrial communities, for example, can be recycled for processes around the site.

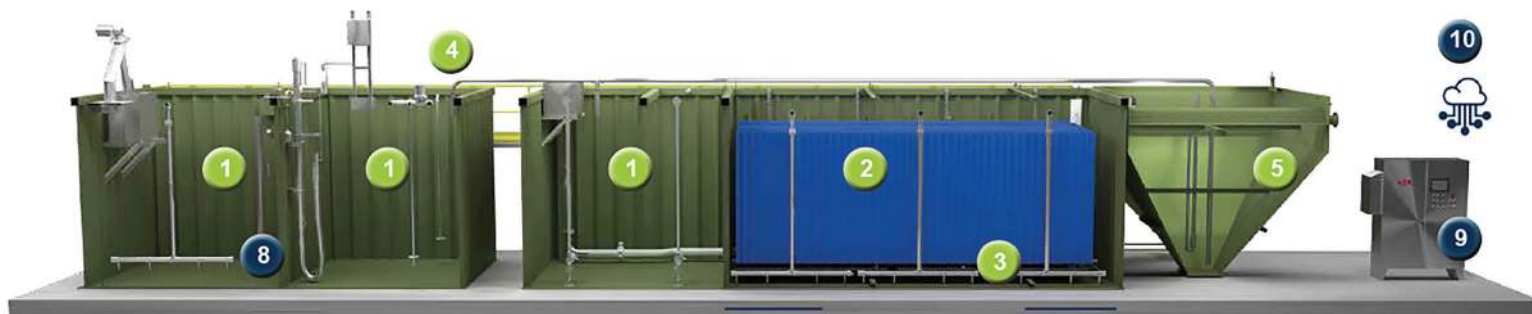
The latest FAST systems available in flow capacities of 24-4000 cubic meters a day are the most recent developments of technology proven throughout Australian major mining operations, smaller municipal councils, schools, tourist facilities, commercial developers and private industry.

CST Wastewater Solutions Managing Director Michael Bambridge says that the systems are ideal for public and private organizations seeking to optimize their achievement of high water quality standards within a high-efficiency, low-maintenance system that accommodates shock loads, variable flows and seasonal operations.

FAST achieves outstanding Biological Nutrient Removal (BNR) for applications containing high levels of nitrogen, the water pollutant that has increased significantly in Australian industrial, commercial and municipal applications and which is an environmental concern, particularly to resources, engineering, construction, hospitality, marine, agribusiness and public facility and water and wastewater infrastructure organizations.

Complete, Easily Operated System

The plant arrives on-site essentially as a plug and play system requiring only a concrete pad and some relatively minor mechanical



Key: 1: Flexible Process Zones, Configured, 2: Efficient & Robust Aeration/ Circulation, 3: Media Air Scouring (Automatic), 4: Smart Wire Management System, 5: Clarifier Selection, 6: Safe & Easy O&M Access (Factory-Supplied) Clarifier Selection, 7: No Plant Reseeding, 8: Influent Transfer Eliminates Pump O&M, 9: QUICKSMART™ PLC Touchscreen Ease, 10: RemoteView™ Cloud Remote Monitoring Also Available.



A FAST Installation In Australasia. Systems In This Format Can Be Readily Expanded To Cope With Hundreds More Workers On Sensitive Sites.

and electrical works. Class A effluent is achieved by the addition of a filter and UV sterilization after the FAST system, says Mr. Bambridge. The latest versions of the fixed biofilm process, with enhanced nutrient removal, achieves Biological Nutrient Removal (BOD and TSS) down to 10mg/l; Total Nitrogen (TN) removal to 8mg and Ammonia (NH₃) and Total Phosphorous (TP) removal down to 1mg/l.

Proven in thousands of installations worldwide, FAST consists of tankage packed with completely submerged media. The FAST media creates a high surface area-to-volume ratio, which, combined with internal settling zones, maintains constant bacterial growth during low-flow and peak usage periods typical of many remote installations. This results in stable operation on a daily basis.

"Simple operation and maintenance mean no daily operator requirements and very little annual plant maintenance," says

Mr. Bambridge, whose company's installations of the FAST system have been proven in Australian applications including Alcoa, BHP-Billiton, South 32, Tahmoor Colliery, Cadia Gold, Anglo American and many more in the mining industry. Further installations have been completed for the Central Coast Grammar School, CSIRO, Hunter District Water Kiama Municipal Council, Lakeside Leisure Park and Berowra Waters Marina.

The QUICKSMART™ PLC touchscreen controls available on the latest FAST systems provide outstanding ability to monitor and adjust treatment system functions with a highly intuitive, easy-to-navigate touchscreen PLC interface. Cloud-based RemoteView motorising services are available.

FAST system features and benefits include:

- Modular design and construction

- Low sludge production
- No moving parts, except for an air blower that provides oxygen while circulating the liquid.
- Requires little maintenance, with no daily operator requirements and very little annual plant maintenance.
- The latest QUICKSMART™ TLC touchscreen controls make automation and data monitoring even easier.
- Robust and reliable performance, in terms of the process. The fixed media through which the wastewater circulates provides a high surface area-to-volume ratio, protecting against hydraulic shock loads.
- Longer sludge age than typical biological systems, increasing water quality efficiency
- Higher loading rates, giving a smaller plant footprint
- Lower solids to clarifier, to improve settling
- No bacterial washouts

- No biocarrier cog replacements or related clogging

"The FAST system is the perfect solution for remote projects because it can be built into standard shipping containers," said Mr. Bambridge. "The modular format of the FAST System also allows an easy bolt-on for any expansion in workforce."

For any future proposed increase of workers, it is a simple matter of adding another FAST 20 foot Module. This could be incorporated in the design, he said.

Not only does the system achieve higher loading rates within a smaller footprint, but effluent produced can be recycled into suitable industrial, public facility and commercial re-use processes.

"The FAST system in mining projects allows the ecologically responsible operator to reuse the effluent water for dust suppression and lubrication water, for example, which helps with their environmental footprint," says Mr. Bambridge.

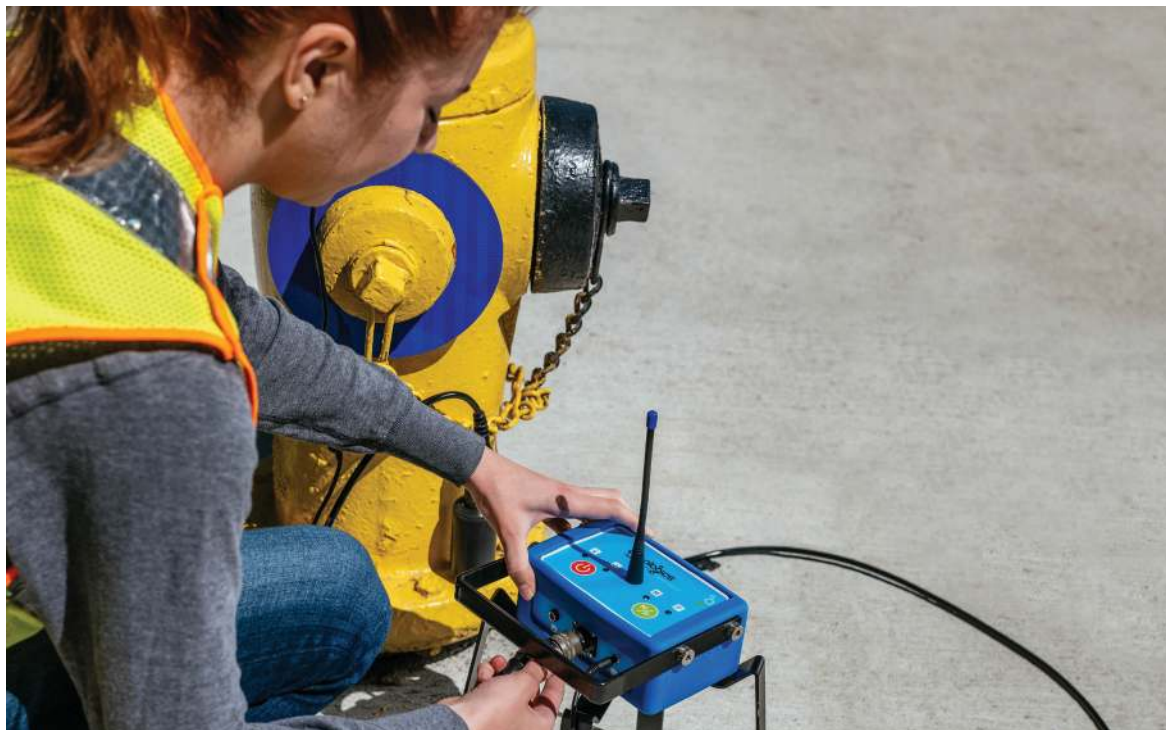
"The FAST System has been proven in Australasia and globally as being a very robust and simple system to operate. It is very reliable because its stable process withstands hydraulic shocks and the bacteria involved are not washed out. It is simple to operate and requires no daily operator maintenance, which results in low annual maintenance costs. Low maintenance is a great advantage in that the need for costly and often distant engineering support is radically curtailed."

About the Contributor

CST Wastewater Solutions specializes in the design, construction and provision of wastewater solutions for the treatment and recycling of industrial wastewater. Its equipment is generally manufactured in Australia and Europe to ISO 9001 and EEC standards of safety and design.

THE LAS VEGAS VALLEY WATER DISTRICT WORKS AROUND THE CLOCK TO PROTECT ITS COMMUNITY

By Ken Malone



A Technician Prepares To Use The LeakFinder-ST

To ensure ongoing water service reliability, the Las Vegas Valley Water District is charging forward with its 10-year Capital Improvement Plan (CIP), focusing on infrastructure renewal to repair or replace aging facilities and pipelines. With the use of Echologics® LeakFinderST®, an acoustic leak detection technology, the Water District witnessed success in its effort to detect leaks on underground pipes, without disrupting service, and keeping large-scale pipeline failures and breaks at bay.

The Las Vegas Valley Water District (LVVWD) is responsible for providing a safe drinking water supply to more than 1.5 million residents from a sizable

water system that includes more than 6,500 miles of transmission and distribution pipeline.

For the town that never sleeps, neither do the crew at the LVVWD – as they relentlessly protect the community's underground water distribution network from water main failures and breaks. This long-standing commitment toward continuous improvement and self-assessment helps the utility maintain some of the lowest water loss rates in the nation with eight times fewer main breaks than a typical water utility.

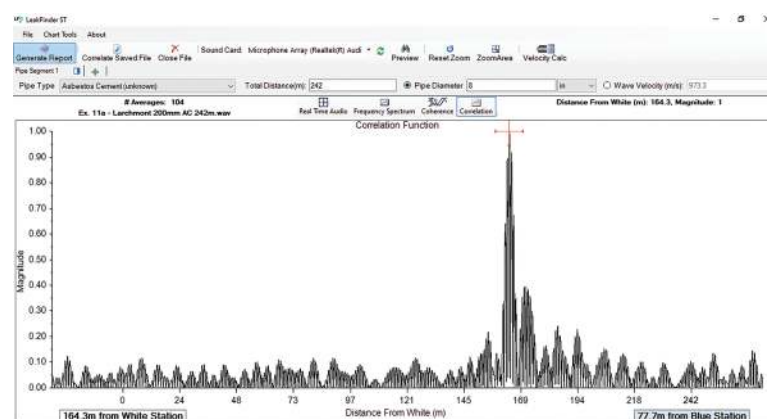
To ensure ongoing water service reliability, the LVVWD is implementing its 10-year, USD 616 million Capital Improve-

ment Plan (CIP), which came into effect in 2017. The plan focuses on infrastructure renewal and many other efforts, includ-

in the nation and one of the fastest-growing. Water conservation is also undeniably top-of-mind.

"When it comes to water conservation, our customers are already playing a tremendous role in reducing water waste. From a utility standpoint, we're constantly looking at maximizing our system and providing reliable water service. Over the years, we've been successful at detecting leaks, assessing our critical infrastructure, and repairing pipes before they reach the end of their remaining useful life. So, our goal here is to continue to drive non-revenue water level to as low as possible," explains Bronson Mack, District spokesman at the Las Vegas Valley Water District.

To help track leaks down before they become a problem, apart from other proven technologies, the LVVWD uses an



Data From The Leak Correlation Helps Crews Pinpoint The Leak Location

ing the repair and replacement of facilities and aging pipes with an expansion initiative to increase system capacity.

Nevada is the driest state

acoustic leak detection system that listens for water leaking underground and pinpoints where leaks are occurring. As a 24/7 town, the Water Dis-



Excavation Activity Confirmed The Location Of The Leak After It Was Identified And Correlated Using LeakFinderST

trict understands that shutting down any water infrastructure may affect service to its customers. To ensure that impacts on any businesses or households are kept to a minimum, the Water District uses the LeakFinderST for its non-invasive approach toward leak detection.

As an advanced Windows-based leak noise correlator, the LeakFinderST works off an acoustic-based technique using cross-correlation to measure leak noise signals and

determine the difference in the time delay between vibration signals measured on either side of a water leak. Together with the velocity of noise propagation, leak locations can be determined, if not pinpointed.

"This technology allowed for a hassle-free deployment. We did not need to shut down the system temporarily to get inside the pipe. Instead, all we had to do was to connect the sensors above ground to existing connection points of the infrastructure. When

correlating, we were able to get the reading between those two points which helps us to focus our effort on the leak location – preventing us from having to do any exploratory digging," said Mack.

One notable achievement was the successful detection of a 1" leak on the South Valley Lateral, the backbone transmission pipeline serving the city of Henderson and other areas throughout the valley's southern region. The LeakFinderST was set up on the 108" mortar-lined and coated steel pipeline, surveying a distance of 1,789 ft. To access the sensor location and subsequently perform leak correlation, the field crew set up traffic control and the work began.

Using the LeakFinderST and magnetic-based surface-mounted sensors, crews identified the location of a 300 gallon-per-minute leak and completed repairs without interrupting water services to the community. What the LVVWD had achieved here was the ability to minimize the amount

of evacuation work needed and efficiently put rate payers' dollars to work.

For a water system that has over 60% of its pipeline infrastructure still relatively new, the Water District's leak detection efforts focus on mature and critical segments of the water system with historical records of leaks. The CIP program aims to ensure that those areas of the water system remain just as reliable as the newer areas and provide equity across the entire customer base. Hard work did not go unnoticed. In 2018, the LVVWD was honored by the Association of Metropolitan Water Agencies with a sustainable water utility management award. This success came at a time when changing economic and climatic conditions pose a threat to the sustainability of existing water supplies.

Critical to its water conservation efforts, to date, the LVVWD's leak detection system has led to the discovery of more than 2,500 underground leaks and saved more than 665 million gallons of water since 2004.

About the Author



Ken Malone is a Regional Manager for **Mueller** in water management solutions and has been in the water industry for over 25 years. He is a long-time AWWA member and current Chair of the Manufacturers and Associates Council of the California/ Nevada Section.



A One-Inch Hole Was Found To Be The Source Of The Leak On The 30-Inch Stub Out

HELPING DELIVER BIG UPSWING IN BIOGAS PRODUCTION FOR WATER INDUSTRY

By Landia A/S

Just south of Aberdeen, improvements continue to be made at Scottish Water's Sludge Treatment Centre (STC) in Nigg – but at a site still approaching its full potential, 0.9~1.0 MW per tonne of Dry Solids is already being consistently produced.

Part of its trailblazing route-map to lead the water industry to net-zero emissions and beyond by 2040 (five years ahead of the Scottish Government's ambitious plan to become carbon neutral by 2045), Scottish Water's go ahead STC at Nigg is becoming a showpiece energy generation center.

In recognizing some sweeping transformations that would have to happen over the next 25 years to achieve its target, Scottish Water's refurbishment at Nigg has seen an upgrade of Cambi's Thermal Hydrolysis Process (THP) – and the introduction of a new Digester Mixing System – from Landia.

Scottish Water was a pioneer in 2001 when it commissioned the fifth ever Cambi THP plant. Over the past two years, Cambi has modernized outdated control and measurement systems – and is currently upgrading the heat exchangers. The plant can treat up to 60 tonnes of dry solids per day, but further improvements could increase this considerably.

A Quarter to One-Third More Biogas

Simon Wrigglesworth of Scottish Water Services, Grampian,



The Externally Mounted Landia GasMix At Sludge Treatment Centre (STC) In Nigg

said: "We've still got work to do, to deliver the full suite of improvements – and will keep fine-tuning – but since the re-

furbishment, taking everything into consideration, we are producing approximately a quarter to one third more biogas than

we were previously".

He added: "We've come a long way since the old compressor mixing system at Nigg, which failed regularly. This resulted in the effective digester volume being reduced because the fouling up of vessels with an accumulation of solids lessened the amount of gas that we could produce".

When the two 4,000 m³ digesters at Nigg were cleaned out during the center's refurbishment, it was revealed that

“Post-refurbishment, we have now had a decent period of stabilization, with no major hiccups in the performance or reliability of the Cambi and Landia equipment.

- Simon Wrigglesworth

45% of the volume had been lost due to grit and heavily compacted sludge. Central to the need to help make this STC electrically self-sufficient and significantly reduce its carbon footprint was the important choice of a new mixing system.

"We looked at various options", continued Simon Wrigglesworth, "but as has been proven, Landia, who were confident that their system could handle the thickness of the sludge, did exactly what they said they were going to do. There was nothing showy; they gave us a good feeling right from the start and provided



For Scottish Water, Landia's GasMix Digester Mixing System Has Helped Bring About A 25% To 30% Increase In Gas Production

an impressive whole life cost analysis. They were clearly very determined to bring about the benefits we required".

Both digesters at Nigg are now fitted with two diametrically-opposite Landia Chopper Pumps, which draw thick liquid from the bottom of the tank, where solids are chopped to accelerate the digestion process and prevent clogging of pipes and nozzles.

A 25% to 30% Increase in Our Gas Production

In the first stage of the mixing process, the liquid is injected into the upper half of the tank, whilst biogas is aspirated from the top of the tank and mixed into the liquid. This not only has the benefit of reducing buoyancy at the surface of the liquid but also sees the rising gas bubbles continue to mix after the pumps are switched off. With two 30 kW systems on each digester, the installed power of the Landia mixing system equates to a very economical

15 watts per cubic meter. When factoring in reduced running times, as low as 20 minutes in the hour, energy savings are substantial. Reduced the running times also means that pump-wear components last significantly longer.

Cambi's proven Thermal Hydrolysis Process (THP) exposes sewage sludge at Nigg to high temperatures (160°C to 180°C) and pressures (about 6 bars), typically for 20 to 30 minutes for each batch to ensure pathogen kill. Sterilized and hydrolyzed sludge is passed to the flash tank, which operates at atmospheric pressure. The sudden pressure drop leads to substantial cell destruction of the organic matter in the sewage sludge, which is then cooled to its optimum temperature before it is fed to the digesters.

"Post-refurbishment", concluded Simon Wrigglesworth, "we've now had a decent period of stabilization, with no major hiccups in the performance or reliability of the Cambi and Landia equipment.

"With a 25% to 30% increase in our gas production, we're in such a better place".

About the Contributor

Landia uses its nearly 90 years of experience to continue to develop new and efficient products and solutions.

Landia had supplied the first mixers for sewage treatment plants in the late 1980s. Many of these have passed the age of 25 – some even 30. And they are still in operation every day. Landia was established in Lem Stationsby in 1933, and here you will still find its entire production and head office.

Landia also has subsidiaries in the United Kingdom, Germany, Norway and the USA, as well as its own sales office in China.



Cambi THP At Nigg

CZECH TOWN WELCOMES WASTEWATER TREATMENT INSTALLATION

By WPL Ltd



WPL's Hybrid-SAF Biological System Comprises Modular Units Controlling Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD) Suspended Solids, And Ammonia.

A new wastewater treatment system installed in a town in the Czech Republic will protect valued fishing ponds and raise the quality to required EU environmental standards.

Packaged wastewater treatment plant provider WPL installed a below-ground system in Klimkovice, in the country's Moravian-Silesian region, as part of a municipality-led project to construct a first-time sewerage network to serve 340 of the town's residents.

Some 110 properties will connect to the new system,

replacing ageing septic tanks that had been seeping into streams which flowed into the popular fishing ponds, impacting the quality of the waters, which have protections under the EU's Water Framework Directive. The project was welcomed by the local community and its successful completion marked with an opening ceremony.

Frantisek Lindovsky, WPL's manager for central Europe, said: "It was the municipality's aim to protect the ponds and provide a clean and healthy environment for the fish, which is why the decision was taken to invest in a

“It was the municipality's aim to protect the ponds and provide a clean and healthy environment for the fish, which is why the decision was taken to invest in a new sewer network and sewage treatment plant. WPL's technology was considered the most suitable because our treatment units are modular, compact and ready-to-use.

- Frantisek Lindovsky, Manager Central Europe, WPL

new sewer network and sewage treatment plant. WPL's technology was considered the most suitable because our treatment units are modular, compact and ready-to-use.

"The completed system, which will be fed by the town's new sewer network, will significantly improve the quality of the local streams and fishing ponds and ensure they meet the environmental standards set out by the EU."

The project team had to overcome significant challenges caused by high groundwater levels, which hindered installation of



The Below-Ground Treatment Plant Will Improve The Quality Of Local Water Sources And Ensure They Meet Water Framework Directive Requirements.

the treatment tanks. To manage this, engineers built a temporary well so that water could be continually pumped out and levels kept down throughout construction.

The installed treatment plant – WPL's Hybrid-SAF biological system – comprises units designed to control chemical oxygen demand (COD), biochemical oxygen

demand (BOD) suspended solids, and ammonia. A remote monitoring system was also installed. The high environmental standards required included 30mg/l BOD, 110mg/l COD, 40mg/l suspended solids and 20mg/l ammonia.

To protect the below-ground units from excess groundwater the excavation was fully backfilled with water-resistant

concrete. A small biological pond was also constructed by a municipality-sourced supplier to provide tertiary treatment and



The area's fishing ponds are used for fish farming as well as leisure, so it was important to protect them. Installation of the project was executed without any problems and WPL worked with us very proactively. We're happy they will assist us in the first few months of operation.

- Jaroslav Varga, Mayor - Klimkovic

extra capacity was built into the system to cater for population growth.

The scheme was financed by the EU Cohesion Fund, which aims to promote sustainable development, and the Ministry

of the Environment of the Czech Republic.

The mayor of Klimkovic, Jaroslav Varga, said: "The area's fishing ponds are used for fish farming as well as leisure, so it was important to protect them. Installation of the project was executed without any problems and WPL worked with us very proactively. We're happy they will assist us in the first few months of operation."

Lindovsky said: "The mayor considered this to be a very successful project because it was on time and within budget and they wanted to celebrate completion with drinks and a speech. As wastewater treatment specialists it is very satisfying to see the pride taken in the new system and the level of appreciation for the environmental benefits it will bring."

The site will be managed by the municipality with WPL providing supervision and support.

About the Contributor

WPL has been designing, building and installing compliant custom wastewater treatment technology for 30 years. It has a wide variety of clients that include water and wastewater utilities, municipalities, the industrial and commercial sectors, as well as domestic homeowners. Its UK-patented biological technology provides a robust and cost-effective treatment that ensures full environmental compliance even on the most challenging of sites. WPL has now joined WCS Environmental Engineering division (WCS Group), which forms part of Marlowe's grouping of water and air industry, in January 2021. This development means that across the group, the in-house skills and expertise are in place to deliver from a single point of hire to full turnkey solutions, from influent to effluent, with the capability to close the loop with water reuse.



An Opening Ceremony Marked Successful Completion Of The Klimkovic Project

EFFICIENCY OF IMPLEMENTING GOVERNMENT GUIDELINES FOR THE WATER SECTOR

By Dennis Abraham Tazhamon



Water is a natural resource, fundamental to life, livelihood, food security and sustainable development. It is also a scarce resource. In India, water problems are man-made and have become very complex. I hope with the help of the national water policy, such problems will come to rest.

People's health conditions in

any region can be directly related to the quality of water. Hence it is very important to state the availability of "safe drinking water to all". This must be included in the national water policy.

Focusing on water utility services, the dominant policy trend has been from direct service delivery by the government towards the provision of services

by corporate entities operating as local monopolies, whether publicly or privately owned. In recent years, water utilities in many countries have been restructured as state-owned enterprises subject to financial and managerial separation from the government in a process known as corporatization.

Alongside corporatization,

economic regulation has gained prominence as a policy instrument in the water sector.

Regulatory agencies for the water sector have been established in more than 30 countries since the 1990s, including transition and developing countries. In some countries, agencies established to regulate electricity or other utility services have had their remit ex-

tended to cover water services.

The majority of these regulators are responsible for tariff regulation and monitoring operational and financial performance and setting incentives for efficient investment. Some are tasked with promoting innovation, sustainability or water security, and play a role in shaping the structure of the sector (for example, promoting consolidation) and defining competition rules.

Regulators may also play a role in building the capacity of the regulated entities in areas like accounting and business planning, allocation of finance.

The trend to establish economic regulation in the water sector is viewed positively by many analysts, who argue that these institutions improve transparency, accountability and drive improvements in the efficiency in the sector while balancing the interests of utilities, consumers and taxpayers. However, progress towards the effective use of regulatory instruments in developing countries has been slow. Some empirical work suggests that they may contribute to improved sector outcomes. For example, there is evidence that regulation improves welfare outcomes when water services are provided under Public-Private Partnership (PPP).

Policies that are Helping India to Take the Leap Towards Water Safety

In India, water is a state-run subject. This means that each state has the sovereign authority to discuss and solve issues around water supply, distribution, storage, and infrastructure in their own way. For inter-state rivers and channels, the center holds the power to assist these respective states with water infrastructure and management. Thus, the absence of a concrete and centralized policy around water has hindered the conservation and management of water resources in India. But it looks like

there is a silver lining. India is now planning to have a new National Water Policy, which will, for the first time, aim to conserve water resources through Public-Private Partnership mode and work on modalities to implement ongoing programs.

The policy is set to propagate 'Water use efficiency' as an element that is as important as 'energy use efficiency' and will also take care of the basic concerns of water-stressed states. Further, it is also set to redefine water usage in rural areas by helping them with water-efficient means of agricultural practices.

2019, which saw India reeling under big water scarcity issues, also saw some positives on the policy front. One of them is the creation of the Jal Shakti Ministry that consolidates every government water-related ministry under it- like surface water, groundwater, pollution control, river rejuvenation, and irrigation, among others. The creation of the Jal Shakti Ministry can go a long way in easing the implementation of larger water-related programs by bringing them under the purview of one framework.

Managing a Country's Complex Water Resources - One Solution at a Time

While the government is envisioning mega projects to strengthen the country's water infrastructure, the mooted question still is 'How good will infrastructure be if there is no water?' To attain a balance, there has to be a clear connection between water, society, and infrastructure policy. A recovery-based approach is, therefore, what is needed to assuage the water crisis in India.



Practices like rain-water harvesting, efficient use of water resources, recharging local water bodies, preventing leakage losses, checking groundwater depletion, channelizing water access to rain-fed lands, working on dam safety, and checking floods and droughts, among others are some of the practices that can support the country's water infrastructure.

Also, the change in water practices has to happen across domestic, industrial, and agricultural use. The poor management of water in India is well evident from the fact that there is hardly any practice of treating and reusing wastewater in the country whether in households or across industries. There are many water-intensive industries that are, in fact, using freshwater. It is pertinent for the industrial sector to figure out a way in which they can transport, treat, and recycle sewage water for industrial purposes. Similarly, the agriculture sector, which faces the wrath of the water crisis every year has to redevelop its irrigation mechanism with canals and channels that do not let rainwater runoff. Open canals should be replaced with a steel pipe distribution system that can prevent water loss through seepage and evaporation and can be easily maintained.

Also, the drip and sprinkler irrigation system has to be the preferred form of irrigation to ensure optimum water conservation.

Make India Water Positive

India gets a decent amount of freshwater supply from rains and rivers. This means that the water crisis situation can be managed and mitigated by tapping, conserving, cleaning, and channelizing the available water through a proper infrastructure of canals, reservoirs, dams, drainage systems, water supply systems, etc. This can go a long way in meeting state-specific and national water demands. There are many places in the country that experience surplus water at some point in the year, while some other places experience acute shortages during the same time. Also, the water that is available often gets polluted or wasted due to mismanagement and lack of good infrastructure. Much larger potential for water conservation thus lies in conserving water from the source and storing/ channelizing it effectively for efficient usage for domestic, industrial, and agricultural use.

About the Author

Dennis Abraham Tazhamon is the Managing Director of Josab India.

T-SCREEN IS A SUCCESS IN THE WWTP AT CITY OF WASHINGTON

By Lakeside Equipment Corporation

Before a series of upgrades (totaling USD 27M over 5 years), at the City of Washington's wastewater treatment plant in Indiana, even the smallest amount of rainfall would cause an overflow.

USD 27M is a significant sum of money of course, but as any municipal works superintendent will tell you, funding is (and this will be an extremely polite way of putting it), a long and complicated process.

Prior to the installation in 2012 of a fixed bar screen, Superintendent Scott Rainey and his team at the City of Washington's Wastewater Treatment plant could be forgiven for any choice

words uttered as they painstakingly pulled out large debris from a fixed overflow weir (installed in 1988), that was overwhelmed during storm events.

With a collection system comprising of combined sanitary and



Lakeside Hydronic T Screen at the City of Washington, Indiana



Lakeside's Hydronic T Rake System

storm sewers with four Combined Sewer Overflows (CSOs), treatment has sometimes been as complicated as funding (!) - but again, learning to be patient, resilient and resourceful is very much part of responsible wastewater treatment plant life.

"Our old screen just kept on

blinding", said Scott Rainey, who has served the City of Washington's WWTP for the past 16 years.

"Back-ups were all too regular. We knew - and we wanted to take action - as of course did the State's Department of Environmental Management, but our hands were tied until we had

funding in place. In the meantime, we simply had to get on with it. With talk of a fine hanging over our heads, this wasn't always easy."

Finally, when approval was given to go ahead with a new screen, to the tune of up to USD 1M to USD 1.2M, Scott set about

researching the best possible solution, speaking to operators all over the USA. He also sought advice from his trusted contact, Ken Sobbe at FACO Waterworks in Indianapolis, who had helped supply the plant (which opened in 1952) with equipment on many occasions.

"Serving a small community (12,000), we all have several hats to wear", added Scott, "so getting away isn't easy - but I attended trade shows - and trust me, I listened to all sorts of solutions that were put forward. I knew that while we certainly needed something robust and of good quality to cope with heavy debris, we didn't necessarily need a full-blown mechanical screen, just for the sake of it. We're not trying to reinvent the wheel."

A key factor in the decision-making process was the possibility for retrofit. During the previous upgrades, a forward-thinking approach saw the main storage tank designed so that it could be retrofitted if required - with only slight modifications. Scott also consulted with the treatment plant's engineer of record Midwestern Engineers, who came up with the idea of integrating an automated rake system to clean and clear the bar screen during storm events.

"Attending the WEFTEC show was well worth the time in the end", continued Scott, "and when I showed my engineers the Hydronic T Screening System from Lakeside Equipment Corporation, they liked it immediately. Seeing a video of the Hydronic T pull a log out of a creek was very impressive - and when I spoke to other operators, they, like Ken Sobbe, confirmed what high quality and precisely engineered equipment it is. We all agreed that we could have gone bigger and therefore more expensive, but we knew we could make use of our existing structure - so long as the mechanical transition could be as simple as possible. To be honest, we didn't realize that there was anything out there on the market quite like the Hydronic T Screen."

As those saddled with funding issues or ultimately benefiting from it know, the next obstacle to negotiate when all has been agreed upon, is timing. Twelve

months may at first sound like a long time - but achieving everything from scratch - research and design, culminating in just three months to complete all the engineering was a considerable feat. Together with a very skilled contractor, the goal-oriented and product delivery-driven team is what enabled the project to stay on budget and finish ahead of the EPA mandate.

The contractor in this case was Bowen Engineering Corp. (established 1967, Indianapolis IN), who was confident that this joint effort would deliver the right results - as well as stick to the original cost estimates for the project.

Sam Hill, Project Manager at Bowen Engineering, takes up the story: "We wanted to deliver a really high-quality product while always challenging ourselves as to how can we do something better for less money", he said. "The City of Washington is a long-time customer of ours, so by knowing and understanding their needs, we feel that we are working with them as a team rather than as separate entities."

"The Stormwater Combined Sewer Overflow Tank is intended to be a storage tank during major rain events to prevent sewage from discharging into local waterways - but with a clogged screen, the sewer/storm water is diverted into the waterway, in effect making the tank totally ineffective. Retrofitting the existing system with Lakeside's Hydronic T Rake brings the tank into play as it should - and in doing so, cleans up the area's waterways. Most importantly, it helps to prevent the City from being fined large sums of money by government environmental agencies for diverting flow."

A hydraulically operated telescoping boom and rake mechanism, the Lakeside Hydronic T utilizes hydraulic cylinders to pivot the boom and to extend and retract the boom and rake

for depths up to 50-ft. A hydraulic power pack provides greater lifting capacities as compared to other screens, and it has all of its components accessible above the channel for ease of maintenance. The Hydronic T Screen's flexible design saves money when designing indoor headworks systems with deep channels, low headroom or retrofit needs. At the City of Washington, the system features a double 12-ft -wide telescoping design to rapidly remove the anticipated debris from storm events. Unlike the previous operation, a level sensor in the channel will intelligently switch the screen on until the water elevation returns to the required level.

"We weren't trying to cut any corners", continued Scott Rainey, "but from a potential outlay of up to USD 1.2M, the big plus of having a retrofit was that we spent USD 750,000 instead. We do want our bang for the buck".

The very nature of retrofitting existing equipment and integrating it with new can often present many unforeseen challenges and issues, but according to Sam Hill at Bowen Engineering, apart from a couple of very minor points, the installation of the new Lakeside rake went very smooth.

"The equipment was delivered just as it should have been, and the Lakeside engineers were always available on the phone without delay."

"Perhaps it seems a petty and maybe obvious thing to say, but the equipment that was shipped matched the drawings! Often this is a challenge when modifications to equipment don't match current drawings. Hugely frustrating and time-consuming."

"From main structural members to the smaller items like hydraulic tubing, all of the prefabricated parts came together very well. The shipping package from Lakeside was engineered so the equipment was preassembled to the maximum allowable prior to

shipping, which always helps the owner cut down on site cost. The Lakeside Hydronic T is a great rake system - a very high-quality product that was delivered on time and ready to install. Top quality equipment and proper planning makes a big positive difference."

Ken Sobbe at FACO Waterworks agrees: "We all knew that it would be a tight call, but I have to say that it came together very nicely indeed, with the new screen doing everything we said it would". Ken who is a veteran of no fewer than 41 WEFTECs (!) added: "I've seen the Hydronic T put through its paces and it's a great example of quality engineering".

Scott Rainey concluded: "We had to slightly change the angle of elevation and tweak the hydraulic pressures a little for heavier debris, but as with all installations, you have to expect a bit of fine tuning for the specific needs of your own plant. Overall, everyone is very pleased with it. Throughout the process Lakeside did a very good job. They turned things round quickly but always with quality. And despite the delay in getting the project released, which initially would have meant project completion after the deadline for crucial compliance purposes, the tenacity of Bowen Engineering, together with us all as a team, saw construction completed ahead of schedule - at no extra cost to the City. The option to retrofit has proved an excellent fit for what we needed here".

About the Contributor
Lakeside Equipment Corporation is an engineering and manufacturing company concentrating on helping to improve the quality of our water resources. Lakeside started in the Spring of 1928 to engineer, develop, and provide water purification systems to municipalities and companies throughout North America.

FINDING A STABLE LONG-TERM BIOSOLIDS DISPOSAL SOLUTION

The 1,300 Mile Journey: The City and Bureau of Juneau implements a belt drying system to reduce risks associated with hauling dewatered biosolids and to provide multiple options for the end-use.

By Veolia Water Technologies

The City and Bureau of Juneau (CBJ) operates 3 wastewater treatment plants in the Southeast Alaska area that produce approximately 7,000 wet tons of dewatered biosolids each year. These solids are hauled 1,300 miles via truck, barge, and train to the Columbia Ridge Landfill in Arlington, Oregon.

Historically, CBJ has incinerated the biosolids generated at each plant. Since the fluidized-bed incinerator at the Juneau-Douglas WWTP was decommissioned in 2011, CBJ has been landfilling all of its dewatered biosolids.

The transport of biosolids from CBJ poses multiple risks and costs. CBJ faces uncertainty over environmental regulations and acceptance by the landfills and haulers, had



historical complaints of odors from neighbors near the Capital Disposal landfill in Juneau, leaking shipping containers, annual hauling costs of more than \$2,000,000, and continued exposure to fuel price volatility risks.

The Juneau area poses some unique geographical challenges that point toward a general need for more established and reliable technologies. These challenges include a relatively remote location, limited transportation options that may

result in delayed shipments for equipment, an unpredictable climate, and a lack of specialized support services.

Considering these factors, CBJ project team members agreed to find a stable long-term biosolids disposal solution. The solution must also adhere to the EPA guidelines for established or innovative technologies.

CBJ has been operating a medium-temperature belt dryer since the summer of 2019.

The Class A EQ designation provides pathogen reduction and in turn diversifies the range of end uses. The permissible end-uses can range from simple reuse as cover material at the landfill to fertilizer on community-wide sites and parks to erosion control and topsoil replacement, all of which are ultimately aimed to benefit the community.

These options also offer the potential for a significantly lower cost end to end compared with shipping wet solids a significant distance to landfill them.

CBJ biosolids are well under both the EPA ceiling and EQ limits for metals. In order to be eligible for public distribution as lawn and garden fertilizer and be declared EQ, biosolids must meet additional criteria for pathogen elimination, vector attraction reduction and total solids content. The dryer will enable CBJ biosolids to meet

Belt dryer has met the four guiding principles of selecting this technology which are as following:

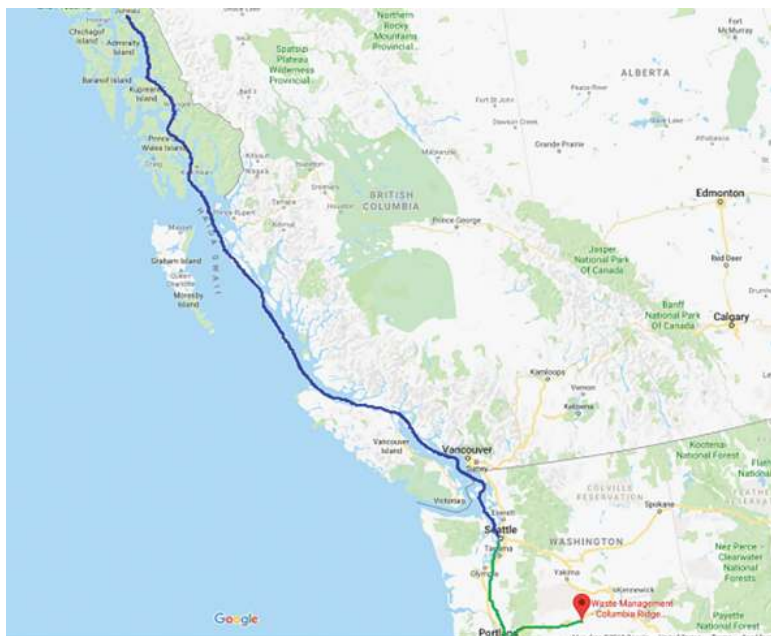
- Class A pathogen reduction to create an "exceptional quality biosolid" (EQ)
- Multiple options for end-use to minimize the risk of disposal
- Maximize volume/ weight reduction
- Established and reliable technology

the criteria for such public use.

The dryer is designed for 36 wet tons per day and will produce 5.5 tons of dried product. That equates to an 85% reduction in volume and weight. This reduction will have a positive impact on the community with less truck traffic, emissions, noise, and costs.

About the Contributor

Veolia Water Technologies specializes in water and wastewater treatment solutions for industrial clients and public authorities. Veolia's 169,000 employees are tasked with contributing directly to the sustainability performance of customers in the public and private sectors, allowing them to pursue development while protecting the environment. To this end, the company designs and deploys specialist solutions to provide, protect and replenish resources while increasing their efficiency from an environmental, economic and social standpoint.



ENSURING THAT A UTILITY GETS THE MOST OUT OF ITS WATER DATA

The City of Riverside forges ahead on water quality with an integrated software platform that streamlines compliance and protects data integrity.

By John Yap



John W. North Water Treatment Plant - Membrane Filtration That Can Treat Upto 10 MGD (Million Gallons Per Day)

Riverside Public Utilities (RPU) has been providing water and electricity to the City of Riverside, CA in the USA since 1895.

As an innovative public utility

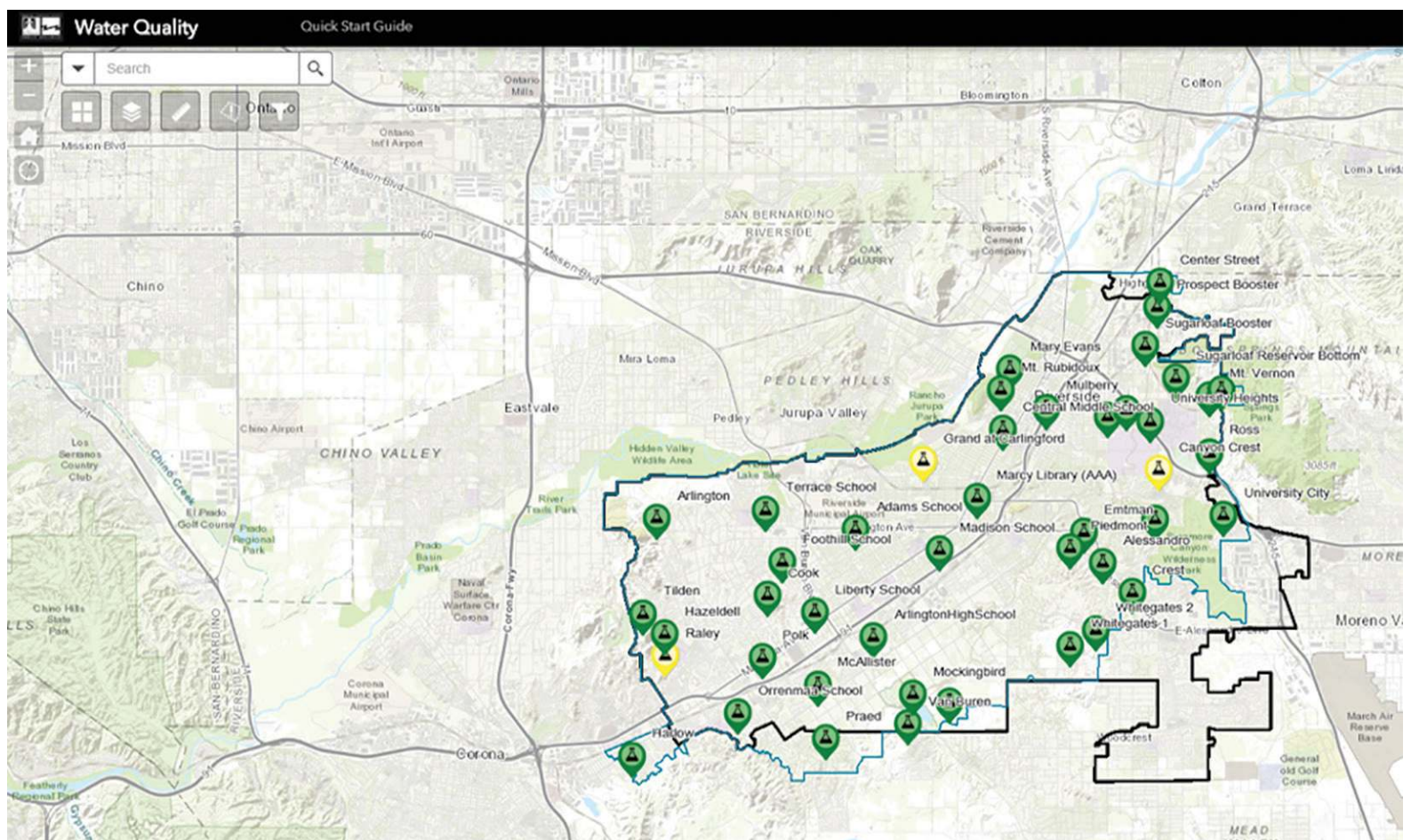
serving 70,000 customers, RPU has developed a new initiative - Utility 2.0, a strategic plan that addresses big challenges that all utilities are facing today.

Some of these challenges

that affect the delivery of safe drinking water include ageing infrastructure, climate change, new government regulations, aging workforce, and of course technology.

Technology has a role to play in all these areas and Riverside is known for keeping ahead of the curve.

In 2007, when most municipalities relied on spreadsheets and



Map Of Water Quality Sites

pen and paper reporting, RPU implemented WaterTrax to consolidate and automate water quality sample data transfers from the laboratories.

Included in the implementation was a thorough import and migration of historical data.

Having State Certified Environmental Laboratories upload results they produce directly into WaterTrax, allows RPU to utilize WaterTrax as its secure database of record.

There is no ability for the end user to edit an analytical result or accidentally make a typo as with a spreadsheet.

WaterTrax's user-friendly interface gives RPU immediate access to the information in an organized useful format.

Out of the box report generating, archiving and trend analysis tools are utilized on a daily basis to fulfill data requests and to monitor treatment plant processes and raw water trends.

WaterTrax streamlines regulatory compliance and provides alert notifications when parameters are under or over the set range, which allows the utility to geographically pinpoint trouble spots and enact corrective measures when needed.

In 2018 WaterTrax released a free API to existing customers, as a means to seamlessly integrate WaterTrax with 3rd party systems (e.g. BI tools, CMMS, GIS, etc.), in a secure and automated manner.

As expected RPU was quick to jump on board and see how they could further improve efficiencies in operations and what improvements, if any, could be made with deeper data analytics.

Robin Glenney, Water Quality Administrator at Riverside Public Utilities, spearheaded the API adoption, along with the PI team.

With a unique API key having been issued by WaterTrax to securely access the API, the utility was able to begin configuring the

tool to appropriately map and subsequently trigger the transfer of hundreds of thousands of data points from a multitude of analytes associated with hundreds of sampling locations from Water-Trax into their internal OSISoft PI System.

The entire process of integrating WaterTrax with the PI System, which included a stringent quality assurance testing process to ensure accuracy of data, was completed in less than six months.

The API function enabled the transfer and ingestion of water quality data from WaterTrax into Riverside's internal business intelligence tool, OSISoft PI System - a vehicle used for centralizing data sourced from other business units including SCADA, Esri GIS and Asset Management/ Work Order System (UWAM).

The integration enables RPU to view current data from systems that were previously siloed and isolated.

This integration has provided the utility with a more holistic view of their distribution system samples, treatment plant process control samples and groundwater well samples.

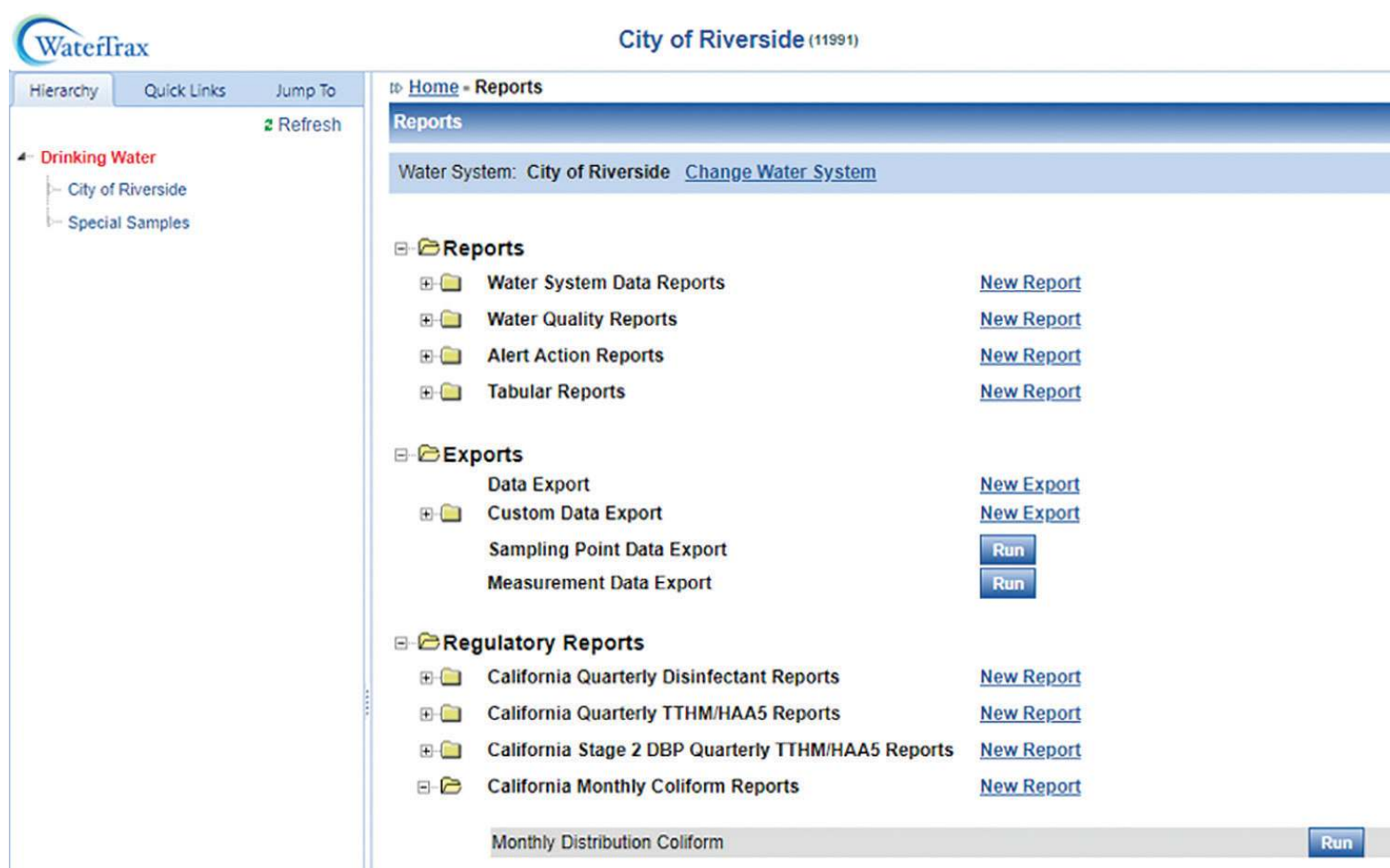
Having all the data automatically funnel into a centralized system as it becomes available means staff no longer needs to manually extract data separately from WaterTrax, SCADA, and UWAM before performing subsequent data manipulation.

This has made the process of data compilation and report generation much more efficient.

The integration of the OSIsoft PI and WaterTrax has yielded other benefits to the utility and its key users.

Visual displays can now be created and automatically updated as new data is made available.

Moreover, dashboards are displayed on a secure site for operators and management to see in real time.



Screenshot Of Regulatory Reports

This has had a significant impact on the operations team with respect to improving the efficiency of water quality management.

RPUs groundwater wells and treatment facility effluents blend prior to entering the distribution system.

Real time data from SCADA and WaterTrax are integrated in a Blend Model dashboard, where over 500 calculations run real time and show operators the blend at each transmission main, as well as entering the distribution system.

If there is a change to the blend that exceeds the established set-points, the water quality team gets an email or text message alert.

This allows the operational team to make timely and appropriate decisions.

Water quality data from WaterTrax and service requests from UWAM are plotted on a

map in ESRI GIS and displayed on a dashboard allowing staff to visualize location of service calls alongside chlorine residuals and other water quality data.

"The API integration has really improved our ability to quickly make decisions based on real time data", said Robin Glenney.

"The advantage of combining information from SCADA, UWAM, and WaterTrax gives us the big picture in one place and allows us to improve performance and operational efficiency", Glenney concluded.

Aquatic Informatics, the producers of WaterTrax, provide ongoing support and training for newly released features through regular software updates, ensuring that utilities get the most out of their data with the constant evolution of technology.

About the Author

John Yap is the WaterTrax Senior

Product Manager for **Aquatic Informatics**.

John works with municipal water professionals to design and deliver a robust suite of water and wastewater data management software solutions with a focus on industry best practices and regulatory standards.

As leader of the WaterTrax product team, John continues to enhance the features and functionality to optimize user experience.

Aquatic Informatics provides software solutions that address critical water data management, analytics, and compliance challenges for the rapidly growing water industry.

It is a trusted provider of water management solutions to over 1,000 organizations around the world that collect, manage, and process large volumes of water data.

Unlike any other organization

in its space, Aquatic Informatics manages data from source water through to the receiving environment.

Its interconnected data management platforms drive the efficient management of water information across the entire water cycle to protect human health and reduce environmental impact.

Aquatic Informatics is unique in that it provides information technology solutions for all water: source water, drinking water, municipal and industrial wastewater, and the receiving environment.

Aquatic Informatics is guided by its "3P" core values which balance Planet, People, and Prosperity.

These values run through the entire business and can be seen in decision making, employee support, software donations, volunteer work, and commitment to customers.

IDENTIFYING THE RIGHT CIRCULAR VOCABULARY AND STAKEHOLDERS

Circular economy developments often focus on the technology. Yet, to be successful, we need to define a common vocabulary and involve the right stakeholders.

By Stefania Munaretto



While not entirely new in concept, the circular economy, in relation to water, is still in its infancy. Scientists, governments, water utilities and environmental professionals around the world are still figuring out what it means from a technical perspective.

As a result, we lack a common framing and related vocabulary when talking about the water in the circular economy. Many existing developments focus on the technologies as resulting products. However, water in a circular context is more than a product – it is a vector of energy, resources, and materials; it is an enabler. Because of these many functions granted by its unique properties, water is also difficult, if not sometimes impossible, to replace. Yet, the role of water is often misunderstood.

Instead, several environmental initiatives are being reframed and labelled with a circular badge as part of the anticipated “Great Reset”, or “Green Recovery” from the COVID-19 pandemic. We need to be careful here: just because we assign fancy labels or buzzwords, it does not mean all

activities are truly circular.

Identifying a Common Vocabulary

So, what needs to happen? With any collaboration, it is important to identify a common vocabulary and a shared understanding of the problems at hand. For example, for the EU Horizon 2020 B-WaterSmart project (grant ID: 869171), we are spending a lot of time building the concept of “water smartness”.

The project is highly transdisciplinary. It brings together different backgrounds, knowledge, cultures, social structures through a wide range of stakeholders in different European countries. As a result, it is important that we co-create a common concept. All stakeholders can then recognise their own perspectives in the central collaboration. From this foundation, we can work together, each one contributing with their own expertise across the four-year project.

This project, as other H2020 projects like ULTIMATE and Water Mining, offers an opportunity for water utilities to be involved at the very beginning in the co-design of circular economy solutions together with all relevant stakeholders, rather than simply implementing decisions made by others.

An understanding of the history and cultures where we aim to embed new, circular water solutions is also vital. For example, in some locations, effects from past events may continue to erode the

trust of the local communities today. This, in turn, may affect the understanding and acceptance of new technologies and solutions, thus making it difficult for stakeholders to come to a shared vision and plan of actions.

The key is understanding your audience first, by listening. Who are you talking to? What are you trying to communicate in that location? What are their problems? And what is the background and a history of the people you are talking to? Once that has been established, you can build a shared understanding and related language to communicate effectively.

Stakeholders and Citizen Engagement

As well as defining the common vocabulary and language, it is equally important to identify the right people to involve. After all, these stakeholders will accompany you on the journey for four years, in the context of the H2020 projects! There is a risk that if you do not engage with the relevant individuals from different sectors and societal domains (public organizations, businesses, scientific community, resource management professionals, NGOs, etc.) from the start, you may end up with the wrong final product, or taking the wrong path, or seeing the project products being rejected by those for which they were created in the first place.

An important stakeholder group is the public. Engagement

with the public on circular water problems and solutions is still at an early stage. For communities, a key concern remains access to reliable, safe, and clean water from their taps. Energy and cost improvements or technological development, often associated with the circular economy, do not resonate with the public so much, at least not just yet. To connect with the public, you need to demonstrate that new opportunities provided by the circular economy are underpinned by robust science and safe processes.

Storytelling is one of the most effective ways to communicate with the public, together with being empathetic. Once you know your audience, understand the fears or the doubts or the needs of the public, and then build a narrative and a story that connects. Use short videos and engaging infographics, which can be well received.

Of course, benefits from a circular approach go beyond safety and have wider advantages for the environment. So, who is speaking for nature? These stakeholders, including non-governmental officials (NGOs) also need to have a voice at the table.

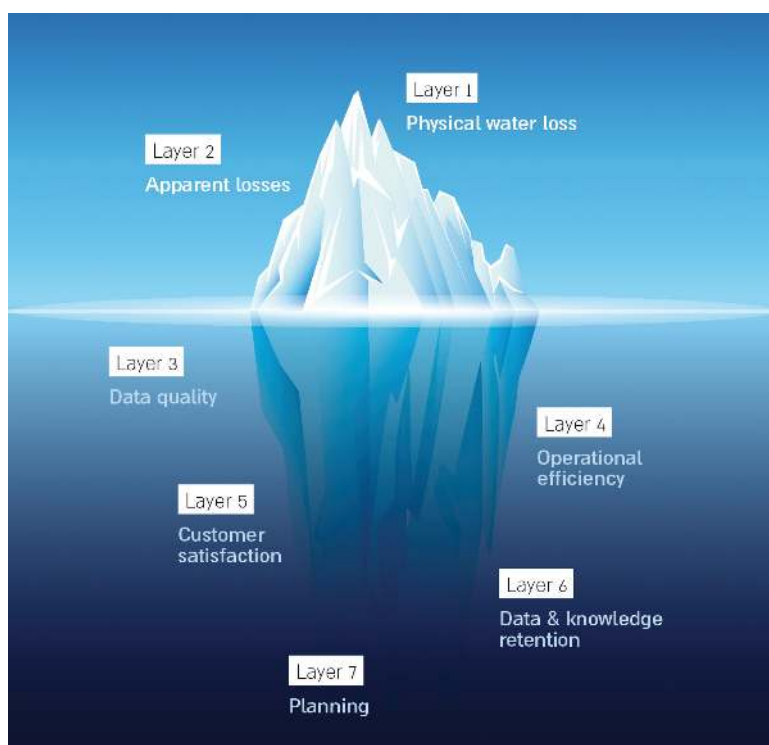
We are at the start of a circular journey. Let us ensure that as we are putting together the scientific and technical puzzles, we are not ignoring the equally important vocabulary, people, and environmental pieces as well.

About the Author

Stefania Munaretto, PhD, is a Scientific Researcher at KWR.

5 HIDDEN CHALLENGES FOR WATER UTILITIES - INSIGHTS FROM THE FIELD

By Amir Peleg



In more than a decade of working with water utilities around the globe on Central Event Management (CEM) system implementations, I've repeatedly seen that the network management challenges that managers think they're facing are (almost literally) only the tip of the iceberg. The issues that lie underneath are far less obvious, or even invisible, becoming apparent only after the CEM system has been working for some time.

The Most-Recognized Challenges

Minimizing non-revenue water is at the top of most water utilities' priorities, and it's often first on the agenda when we speak with utilities about their network challenges.

Layer 1: Physical Water Losses

Sometimes called real losses, physical water losses are made up of leakage from transmission and distribution mains, leakage and overflows at storage tanks, and leakage on service connections up to the point of the individual customer meter. As the most visible challenge, the value of centralized water management for reducing physical water loss is likewise easy to see.

Early detection, quantification of water loss and identification of hidden and slow-developing leaks can significantly reduce physical water loss, potentially saving millions of dollars, especially if energy wastage is included.

Layer 2: Apparent Water Losses

Unauthorized consumption and

inaccurate customer meters, including at large industrial customers, are common and costly. However, the visibility in meter degradation at large consumers' sites and the automatic water balance calculations provided by a CEM system can yield savings fairly quickly.

For example, a large Australian water utility was suffering from significant NRW losses. With the very first alert generated by the CEM system, it discovered a leaking pipe that it then acknowledged might have been leaking for more than two years. As it continued working with the system, the utility began to look at proactive ways to identify areas with high unmetered consumption, identifying points of apparent water loss that it was

then able to rectify. They told us that the CEM system prevented about 6.5 billion liters of water loss based on an annualized calculation.

5 Less-Visible Layers of Challenges

Layer 3: Data Quality

Having invested in sensors across their network, many utilities assume that they're getting all the data that they should. But problems in the collection and transmission of data are not uncommon, whether caused during deployment or by faults that develop over time. Such problems often go unnoticed until a CEM system is up and running. One customer said they were surprised to discover that 30% of





sensors in their network were not working correctly, even though the sensors were relatively new. It was the first they knew of a gap in their data. Another data-related problem that afflicts many

utilities is the “data tsunami”. They struggle to cope with all the data generated across the network, and as time goes on and their network grows, they can’t scale up to handle even larger volumes of data. By providing a single platform that analyzes data from large numbers and multiple types of sensors, a CEM system turns a flood of incomprehensible data into meaningful, easily understood information.

Layer 4: Operational Efficiency
Many utilities struggle to manage and prioritize allocation of resources. Until they are well into deployment of the CEM, they often cannot see where their greatest costs lie. A CEM system can make it easy to make informed decisions about where best to direct limited resources to achieve the greatest savings.

For example, at a South American utility that had a high rate of false alarms from sensors and was struggling with analyzing meter data, readings that indicated unresolved problems were being ignored. As a result, detection efforts were very inefficient – every 100 leak detection jobs would yield 40 dry holes. However, once the utility had a single view of all

relevant information via its CEM system, which also defined the DMA-based geographic boundary of each leak and provided a platform for easy communication across departments, the dry hole rate dropped by 50%.

Layer 5: Customer Satisfaction and Quality of Service

Many utilities tell us they struggle with low customer satisfaction and poor service quality. They want to improve their customers’ experience and better comply with regulations, but the underlying issues are difficult to see. Over time, as a CEM system “learns” their network, they gain pinpoint visibility into hidden and slow-developing leaks, water quality events, and water pressure events. As a result, they can respond quicker and more effectively, leading to shorter repair cycles, less service downtime and more consistent water pressure, often solving issues before they are noticed by consumers. The experience of a regional utility in Spain, which halved the repair time for invisible leaks that otherwise would have gone undetected, is not uncommon.

Layer 6: Data and Knowledge Retention

Recruiting new expert employees to replace their aging workforce is a challenge for many utilities around the globe. And even when you can find skilled employees, how do you replace the in-depth network knowledge that key employees have accumulated over decades? Utilities whose legacy team is still largely intact might not have thought much about this, but it’s a challenge that will come soon for many of them.

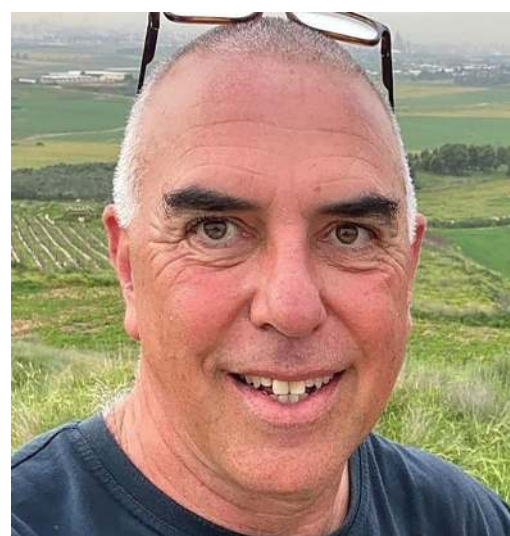
We’re already worked with several utilities that discovered that with the automatic detection of

events, user-friendly, single dashboard to manage multi-source information, and historical log of events and activities provided by their CEM system, they are able to cover shortfalls in employee skills and knowledge.

Layer 7: Planning Challenges

Limited ability to proactively plan maintenance of assets is an ongoing issue that lies behind many of the challenges already mentioned.

By providing insight into multiple aspects of network performance, a CEM system enables utilities to make strategic decisions around prioritizing investments and scheduling maintenance, enabling them to proactively prevent many problems and reducing the need for reactive actions.



7 Layers of Challenges - From Visible to Obscured

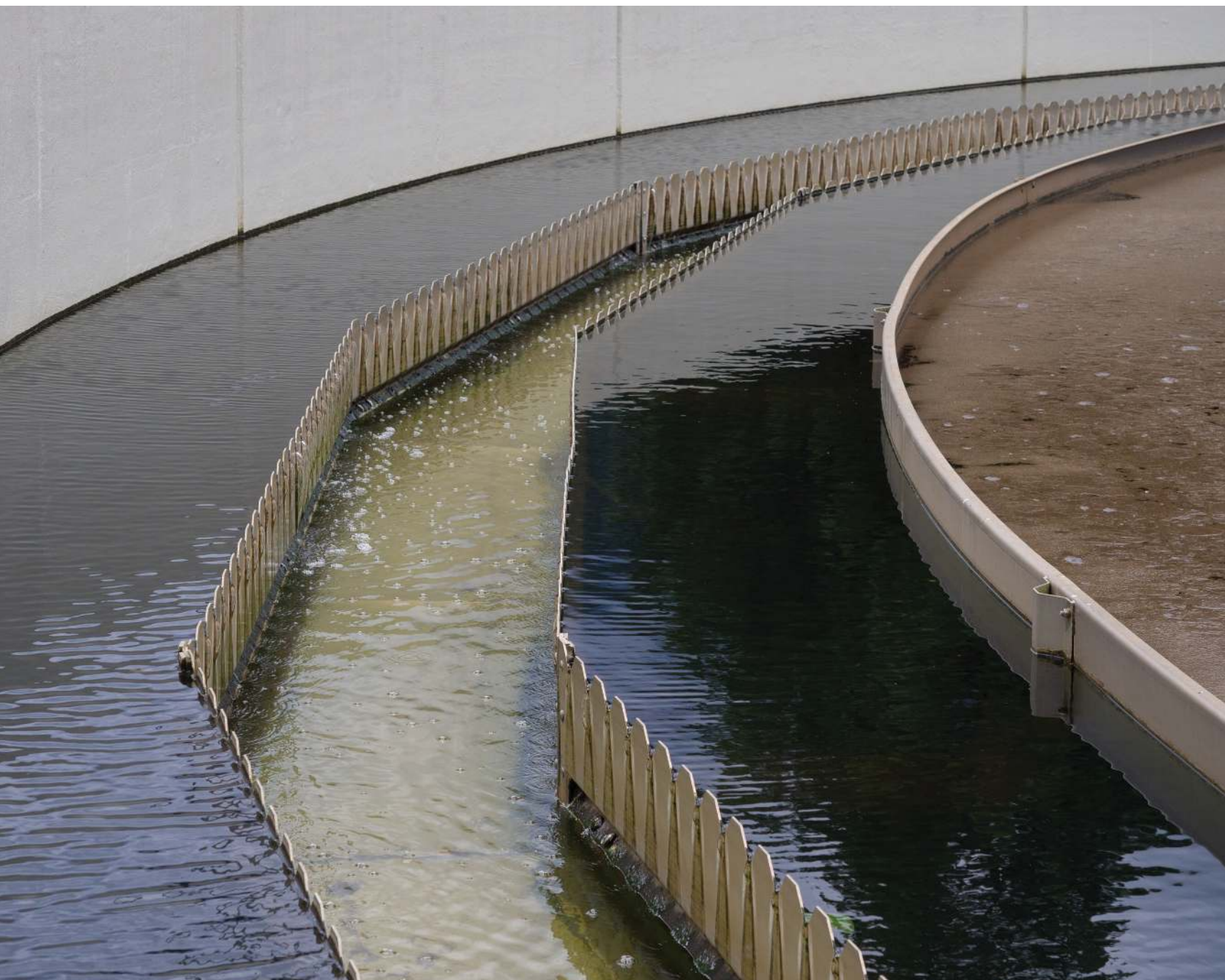
Water network management challenges manifest in seven layers. The top two, being non-revenue water (NRW) challenges, are highly visible. It is the first of these – physical water losses, and often the associated energy wastage – that typically prompts most utilities to embark on a Central Event Management project. But later, the process of implementing and working with the CEM often reveals other challenges. In some cases, our customers have found hidden issues that may have existed for a long time but became visible only after beginning to use the CEM system. At other utilities, managers were aware of an additional challenge, but they didn’t realize the extent of it or how to address it.

About the Author

Amir Peleg is the Founder & CEO of **TaKaDu**. A serial entrepreneur, he founded TaKaDu in 2008. Previously, Amir founded YaData in 2005, serving as CEO until the company’s acquisition by Microsoft in 2008. In 1999, he founded Cash-U (later named Unipier). Amir holds a B.Sc. degree in Mathematics, Physics, and Computer Science from the Hebrew University of Jerusalem (via the TALPIOT program) and an MBA from INSEAD, Fontainebleau, France.

CASE STUDY: AN INDUSTRIAL WASTEWATER TREATMENT PLANT FROM CONCEPTION TO OPERATION

By James C. Young and Madan Arora



Introduction

Tulare's Industrial Wastewater Treatment Plant (IWWTP) in 2006 received 26,000 m³/d (6.9 MGD) of low pH wastewater, primarily from industries that

processed milk for various purposes. The raw industrial wastewater had the following anticipated characteristics: COD = 2,500 to 4,000 mg/L, NH₃-N = 50 mg/L, TSS = 435

mg/L, VSS = 390 mg/L, FOG = 200 mg/L, EC = 694 µS/cm, pH 3-5. Further review of chemical use records for each contributing industry revealed releases of chemicals,

specifically quaternary ammonium compounds and peroxyacetic acid, that can be toxic to methanogens in anaerobic pretreatment processes and nitrification

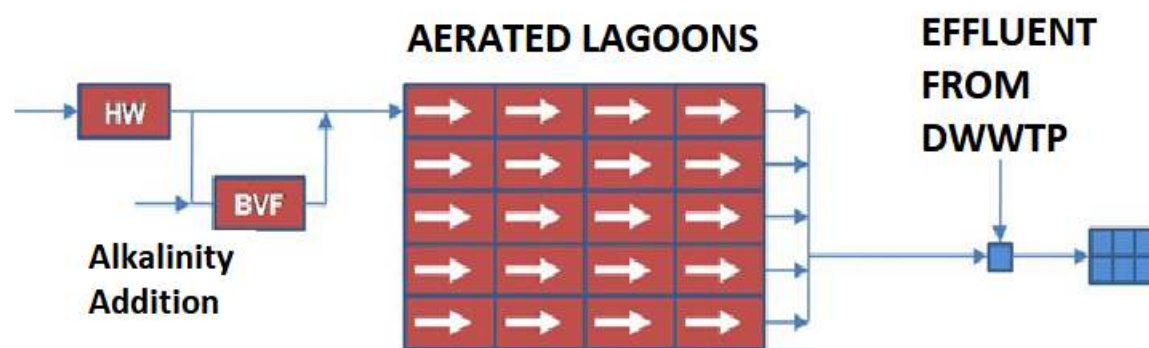


Figure 1: Simplified Schematic Diagram Of Existing Plant (Solids Handling Facilities Are Not Shown For Simplicity)

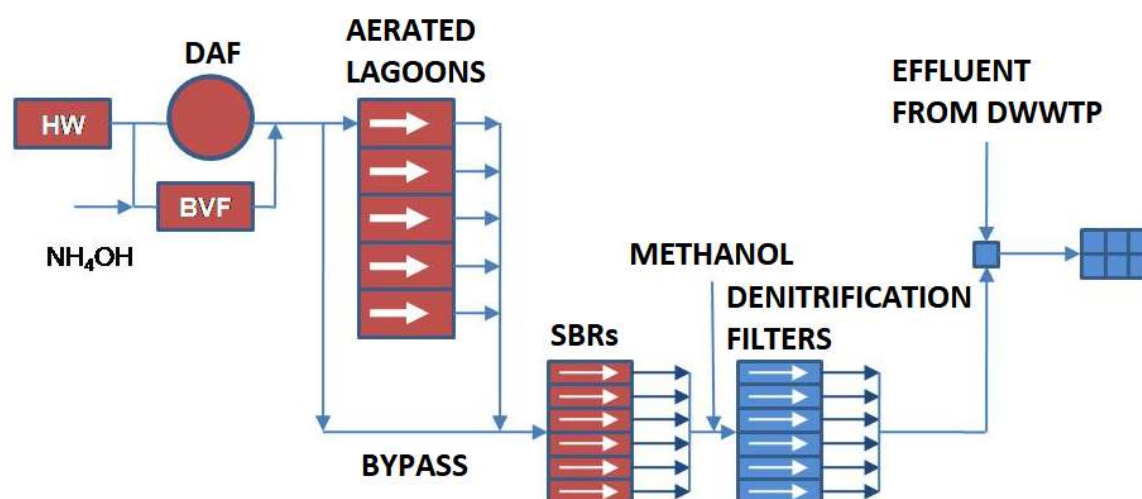


Figure 2: Schematic Diagram Of Tulare's New Industrial Wastewater Treatment Plant (Solids Handling Facilities Are Not Shown For Simplicity)

in aerobic processes. The industries were encouraged to eliminate the use of these chemicals and change to hypochlorite or chlorine that

could be neutralized with reducing agents such as sodium sulfite.

The system existing at the time of the design review

consisted in part of a low-rate anaerobic Bulk Volume Fermenter (BVF, EVOQUA/ADI Systems Inc, Fredericton, NB Canada) that was used to

pretreat 15,000 m³/d (4 MGD) of wastewater (Figure 1). The effluent from this anaerobic reactor was combined with the remainder of the raw industrial wastewater, and the mixture was treated further by using a four-stage aerobic/facultative lagoon system that was aerated using mechanical electric-driven surface aerators. Effluent from the aerobic lagoons was blended with 22,300 m³/d (5.9 MGD) of secondary effluent from the co-located Domestic Wastewater Treatment Plant (DWWTP) before it was discharged to ponds that were used for percolation and as a source of irrigation water for local farmers.

Discharge limits for the upgraded municipal/industrial effluent were: BOD <40 mg/L; Electrical Conductivity (EC) <710 µS/cm and Total Inorganic Nitrogen (TIN) < 10 mg/L. These limits were dictated in large part by use of the blended effluent for irrigation in water-short Tulare and in part because the percolated flow enters local aquifers. Lack of compliance with these standards was threatened because high organic loads stressed the existing treatment system and the facilities that existed in 2006 were not designed for nitrogen removal. Additionally, magnesium and sodium hydroxide chemicals added for pH control in the anaerobic pretreatment reactor contributed significantly to the EC so that the final effluent was approaching compliance limits at the time this study was initiated.

New Plant Design

After consideration of potential growth and economic factors, the City decided to upgrade and expand the plant capacity to 45,400 m³/day (12 MGD) and 180,000 kg COD/day (400,000 lb/day). After intensive review

Parameter	Symbol	Units	IWW Raw	BVF Effluent	50%/50% IWW/BVF Effl
Total COD	tCOD	mg/L	2,270	363	1,317
Soluble COD	sCOD	mg/L	1,500	107	804
Total suspended solids	TSS	mg/L	329	367	348
Volatile suspended solids		mg/L	270	243	257
Sulfate	SO ₄	mg/L	<10	<10	<10
Fats/Oil/Grease	FOG	mg/L	105	8	57
Alkalinity	Alk	mg/L as CaCO ₃	130	825	478
Conductivity (EC)	EC	µS/cm	650	1770	1,210
pH	pH	s.u.	6.41	7.38	7.00
Total Kjeldahl nitrogen	TKN	mg/L as N	90	140	115
Ammonia nitrogen	NH ₃ -N	mg/L as N	25	140	83
Nitrate nitrogen	NO ₃ -N	mg/L as N	35	3	19
Total Nitrogen	TN	mg/L as N	125	143	134

Table 1: Characteristics Of Wastewater Samples

Parameter	Units	Pre-Treatment	SBR Reactor
tCOD in feed	mg/L	1,317	962 ^a
sCOD in feed	mg/L	804	425 ^a
tCOD in effluent	mg/L	646	~ 40
sCOD in effluent	mg/L	47	20
COD removal ^b	%	96.4	97.9
Total N in feed	mg/L as N	134	134
Total N in effluent	mg/L as N	134	21
MLVSS ^c	mg/L	446	973
MLSS ^c	mg/L	585	1,290
^a Based on feeding 50% Pre-treatment effluent + 25% BVF effluent + 25% IWW			
^b Based on effluent soluble COD vs. Influent total COD			
^c MLVSS and MLSS require scaling to full-scale conditions using appropriate design models.			

Table 2: Performance of Bench-Scale Test Reactors After 77 Days Of Operation

of the existing facilities and expansion objectives, the decision was made to upgrade the existing system using a Sequencing Batch Reactor (SBR) type activated sludge process as shown schematically in Figure 2.

The decision to use SBRs was based in large part on the limited site area available for expansion and the fact that SBRs do not need clarifiers or sludge recycle pumps. The existing low-rate anaerobic BVF reactor would continue to pre-treat about 15,000 m³/d (4 MGD) of industrial wastewater, thereby removing approximately 45,000 kg COD/day (100,000 lb/d) and produce

14,000 m³/day (500,000 ft³/d) of biogas that would be used for power production. A Dissolved Air Flotation (DAF) unit was included to remove Fats, Oil and Grease (FOG) along with some of the suspended solids and COD in the part of the industrial wastewater that is not pre-treated anaerobically. The DAF unit was expected to give around 75% removal of FOG and 40% reduction in COD. The first-stage cells of the existing lagoon system, with existing aerators, were used for aerobic pretreatment of the blended raw IWW/anaerobic effluent. Provisions were included to use only the number of lagoon cells needed to optimize overall

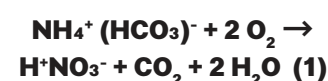
treatment performance.

The pre-treatment lagoons were expected to remove 50% of the COD load. Aerobic SBR reactors would treat the effluent from the aerobic cells to remove additional COD and to achieve nitrification and partial denitrification. Denitrification filters were included to reduce the residual nitrate nitrogen to below 5 mg/L.

Electrical Conductivity (EC) was an important factor in selecting the above wastewater treatment train. In California's Central Valley, the State had set an electrical conductivity (EC) limit for wastewater discharges of 500 µS/cm

(µmhos/cm) above a local groundwater background value, which in 2007 averaged around 210 µS/cm. Because EC is the combined effect of all dissolved ionized chemicals in the wastewater, any addition of chemicals by industrial contributors to the treatment plant would increase the EC. Chemicals used for pH control in the anaerobic pretreatment reactor also would contribute significantly to the EC of the final effluent.

The existing anaerobic pretreatment process used either magnesium hydroxide [Mg(OH)₂] or sodium hydroxide [NaOH] for pH control, but these chemicals significantly increased the EC. About the only option for EC control when using these chemicals was Reverse Osmosis (RO), but the cost for RO treatment was found to be prohibitive primarily because of the cost of transporting the reject brine to a disposal location. Ammonium hydroxide [NH₄OH] can be used for pH control and offered the potential for achieving EC reduction if the downstream aerobic process provided complete nitrification and denitrification. In this case, the ammonium hydroxide converts to ammonium bicarbonate in the anaerobic reactor. The ammonium bicarbonate leaving the anaerobic system will nitrify to form nitric acid in the downstream aerobic SBR process. This reaction proceeds, in simplified form, as follows:

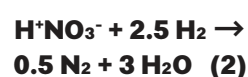


The nitric acid (HNO₃) and carbon dioxide produced during nitrification will consume alkalinity and lead to pH reduction. One of the requirements for the planned mode of operation was that no chemicals be added to control

Bypass Option	Denitrification Rates, mg NO ₃ -N/g VSS/hr	
	Minimum	Average
Endogenous	0.54	0.54
No bypass (100% pretreated effluent)	0.75	0.92
25% bypass of BVF/IWW mix	0.79	1.29
50% bypass of BVF/IWW mix	1.50	3.87
100% bypass of BVF/IWW mix	5.63	14.4
Acetic acid	21.3	21.3
Methanol	8.46	8.46

Table 3: Rates Of Denitrification For Various Pre-treatment And Bypass Options

pH in the aerobic SBR process. Denitrification of the nitrate produced in the aerobic process removes the nitric acid as follows, again in simplified form:



where H₂ represents electron donors such as organic compounds. This reaction produces an increase in alkalinity and pH.

The above analysis shows that little change in the EC of the treated wastewater would occur with nitrification alone. But complete nitrification and denitrification would remove cations (NH₄⁺) and the anions (NO₃⁻) from solution and thereby reduce EC in the treated effluent.

Test Program

Because of the complexity of the proposed treatment system, a laboratory-scale study was conducted to verify that the anticipated reduction in EC would occur through nitrification and denitrification. This system was designed to simulate operation of the new full-scale plant when operating at 15,000 m³/d (8 MGD). This is a conservative condition; EC would decrease as raw wastewater flow increases

due to a smaller fraction of the industrial wastewater being pre-treated in the BVF reactor. A twelve-day Solids Retention Time (SRT) was selected by the design team as the lowest practical SRT for achieving nitrification with the industrial wastewater at Tulare. The primary objective of the authors' study was to verify that the anaerobic/ aerobic/ anoxic biological system proposed for treating the industrial wastewater at Tulare would provide an effluent meeting the EC discharge limit in addition to limits for conventional parameters such as BOD₅, TSS and nitrogen. The laboratory-scale system consisted of a 1-L aerobic pretreatment reactor followed by a 1-L aerobic SBR reactor. The pretreatment reactor received a blend of raw industrial wastewater and BVF reactor effluent and was operated at a 3-d Hydraulic Retention Time (HRT). Table 1 lists the characteristics of these two samples. The aerobic Sequencing Batch Reactor (SBR) was operated at a Solids Retention Times (SRT) of 12 days and was fed pretreated industrial wastewater. Trace minerals were added to ensure that adequate amounts were present to support biological growth.

The Results

Bench-Scale Pre-treatment Reactor

The batch test reactors were operated for 77 days with measurement of sCOD, NH₃-N, NO₃-N, NO₂-N, MLSS, and MLVSS at approximately 7-day intervals. The feedstock COD to the pre-treatment reactor was 1,317 mg/L. Total COD concentrations in the effluent from the pretreatment reactor averaged 646 mg/L (data not shown). The pre-treatment reactor also showed almost complete nitrification after 13 days of operation with complete conversion to nitrate after 25 days of operation.

Bench-Scale SBR Reactor

The bench-scale SBR reactor received a mixture of 50% pre-treated effluent plus 50% BVF/IWW mixture using the samples described in Table 1. Because denitrification was incomplete when operating with an anoxic time of 4 hours, the anoxic time was increased to 6 hours on day 30 and eventually to 12 hours on day 40. Thereafter, the sCOD in the SBR reactor remained at concentrations around 20 mg/L with nitrate concentrations stabilizing at 21 mg/L through the 77th day of operation (Table

2).

Nitrification

Nitrification of the ammonia-N added with the blended feed wastewater was completed easily in the SBR reactor in less than six hours of aeration so that TKN and ammonia nitrogen conversion exceeded 99% for the total system (Table 2). One characteristic of SBR systems is that some nitrate is discharged with the effluent during decanting at the end of the aeration phase of the operating cycle. The SBR mode of operation resulted in an effluent nitrate-N concentration of 21 mg/L. Additional removal was achieved in the full-scale treatment system by using denitrification filters with methanol serving as a carbon source to give an effluent nitrate concentration averaging 5 mg/L.

Denitrification Rates

Respirometers were used to measure denitrification rates. In this case, the wastewater fed to the respirometer vessels was varied to evaluate the impact of bypassing some of the raw IWW mixture around the first-stage pre-treatment cells. Test results showed that the denitrification rate was lowest when using

Parameter	EC μS/cm	Alkalinity, mg/L CaCO ₃	pH, s.u.
EC in 50% BVF/50% IWW feed	1,210	478	7.0
EC in Effluent from Pre-treatment Reactor	1,001	---	5.8
EC in SBR Reactor after Feeding ¹	1,003	293	7.3
EC in SBR at End of Nitrification Phase ²	852	268	7.7
1. After feeding 50% pre-treated effluent + 25% BVF effluent + 25% IWW			
2. Based on 100% nitrification and denitrification			

Table 4: EC And Alkalinity Measurements At Various Points Through The Treatment Process

100% first-stage effluent and improved as the amount of raw IWW was increased (Table 3). These rates were within the range normally seen in full-scale denitrification systems, and clearly showed the benefit of bypassing some of the raw IWW around the first-stage aerobic pre-treatment reactor. The optimum amount of bypass needed for the full-scale system will depend on several operating factors, including soluble COD, amount of nitrate to be denitrified, temperature, and SBR cycle time. Therefore, the capability to bypass raw IWW to the SBR process was incorporated into the design of the full-scale treatment system.

Overall Cycle Time

The best cycle time in the laboratory tests, when using a 50% BVF/IWW bypass, included an anoxic denitrification time of twelve hours and a nitrification time of six hours. Under these conditions and at steady-state operation, the MLVSS concentration in the lab-scale reactors averaged 973 mg/L (Table 2). Scaling the cycle time to full-scale conditions of 3,000 mg VSS/L by using a constant

F/M ratio gave a denitrification time of 3.9 hr and a nitrification time of 1.9 hr. These reaction times, especially when considering that denitrification can occur during the filling operation, supported the use of an eight-hour total cycle time for sizing the full-scale SBR system.

Electrical Conductivity

As stated above, one objective of the test program was to verify the anticipated change in EC as the ammonia nitrogen was degraded through nitrification and denitrification. Measurements of Electrical Conductivity (EC) were made at various points throughout the bench-scale treatment system with the results listed in Table 4. The 852 μS/cm EC associated with this residual nitrate will be reduced an additional 24 μS/cm by the downstream denitrification filters. The low pH in the effluent from the pre-treatment reactor, as shown in Table 4, reflects the impact of almost complete nitrification in that reactor. The pH increased through the SBR process because of alkalinity release during denitrification

and stripping of carbon dioxide during aeration.

Unique Design Features of New Treatment System

The upgraded full-scale system described in this article has been in operation since November 2009. Unique design features for this project include:

- Continued use of the original first-stage lagoons for additional pretreatment with options to using the number of cells needed for optimization of performance.
- Continued use of the existing anaerobic BVF reactor for partial removal of 25% to 30% of the total COD load with production of biogas for co-generation with fuel cells.
- Provision for bypassing a portion of the raw industrial wastewater flow around the pretreatment lagoons to provide carbon needed to support denitrification, and thereby reduce the amount of methanol consumption.
- Use of ammonium hydroxide for pH control

in the anaerobic BVF reactor with subsequent nitrification and denitrification in the SBR system to eliminate the associated EC.

- Return of filtrate from the sludge drying process to the BVF reactor influent to reduce the amount of ammonium hydroxide needed for pH control (not discussed in this article).

Conclusions

- A laboratory-scale model of the two-stage pre-treatment/SBR system proposed for Tulare's IWWTP provided 98.5% COD removal and 99.5% nitrification when operating at a solids retention time of 12 days in the SBR unit. The resulting average effluent COD concentration was 20 mg/L.
- Adjusting laboratory-scale nitrification and denitrification times to full-scale conditions indicated that total SBR cycle should be around eight hours when operating with a MLVSS concentration of 3,000 mg/L and using the fill time



- for denitrification.
- The nitrate-N concentration in the decanted SBR effluent averaged 21 mg/L. This nitrate-N concentration was reduced to less than 5 mg/L after further treatment in denitrification filters.
- Nitrification and denitrification in the SBR system reduced the Electrical Conductivity (EC) from 1,210 to 852 $\mu\text{S}/\text{cm}$. Completion of denitrification in the downstream denitrification filters was expected to reduce the effluent EC to around 828 $\mu\text{S}/\text{cm}$.
- Blending 8 MGD of industrial effluent at an EC of 828 $\mu\text{S}/\text{cm}$ with 6 MGD of domestic effluent at an EC of 530 $\mu\text{S}/\text{cm}$ would give an anticipated blended effluent EC of 700 $\mu\text{S}/\text{cm}$. Operating at 12 MGD would give lower ECs because the fraction of raw wastewater pretreated by the BVF reactor would be lower. Therefore, the use of ammonium hydroxide for pH control in the BVF reactor followed by nitrification and denitrification of the mixed BVF effluent and residual raw industrial wastewater in the SBR system would allow Tulare to meet an EC discharge standard of 710 $\mu\text{S}/\text{cm}$.
- Construction of a full-scale industrial treatment plant capable of treating 45,400 m^3/d (12 MGD) began in 2007 with completion in November of 2009. Startup challenges have

been documented in other publications.

About the Authors

James Young Ph.D., P.E., BCEE received his BS in civil engineering and his MS in environmental engineering from New Mexico State University; and his PhD in environmental engineering from Stanford University. He was professor and researcher for 41 years and recently retired from the University of Arkansas, where he taught courses in industrial wastewater treatment and conducted research on biological treatment processes. He has served as a consultant on projects involving industrial wastewater treatment and has published numerous papers on this topic in journals and conference proceedings. Dr. Young is the 2015 recipient of the W.W. Eckenfelder Industrial Water

Quality Lifetime Achievement Award from the Water Environment Federation.

Madan Arora, Ph.D., P.E., BCEE, a Technical Director at Parsons (a global engineering and construction company with its corporate offices in Centreville, Virginia, USA) has over 50 years of experience in wastewater treatment and water reuse. Dr. Arora has M.S. and Ph.D. degrees in Environmental Engineering from Iowa State University in Ames, Iowa and is a registered engineer in the State of California and a life member of the Academy of Environmental Engineers and Scientists. He is also a life member of the Water Environment Federation (WE&F). Dr. Arora has published extensively in national and international journals and spoken at conferences on water reclamation and reuse.

NO MORE FOG, AS MAJOR CRUST PROBLEM CAUSED BY FATS, OILS AND GREASES IS DEFEATED

By Smith Environmental



The Landia AeriGator, Which Has Solved A Major Wastewater Odor Problem At A Meat Processing Plant.

Throughout Ohio, there is a large number of meat/food processing plants and municipal sites whose wastewater system is plagued by Fats, Oils, Greases (FOG) and debris.

Many of these may already have some sort of pump/mixer - perhaps sold on the basis of it being supposedly

'non-clog' - but staring down at a tank crusted over so badly that you might not be able to see any wastewater, tells you immediately that this isn't the case. Chances are that the odor from the tank/ collection system is so bad that even a new visitor to site - blindfolded - could locate it in seconds.

A classic example of this

came to light just recently, when a leading meat processor, bogged down by reoccurring costs, foul odors and poor performance of its

“ As bubbles began to emerge and the crust slowly began to break up, we could see that it was working. The Facilities Manager was suitably amazed at what this set-up could do. And despite what I've said about trying to lower it down, installation of the AeriGator is actually very easy; an operator could set up themselves in an afternoon.

- Paul Matrka



The Landia AeriGator Comprises A Venturi Nozzle And The Acclaimed Chopper Pump, Invented By Landia In 1950.

wastewater treatment system, looked for a cost-effective, long-term solution.

The problem at this particular site was so bad that you could (not that anyone in their right mind would) walk on or jump up and down on the layer of the tank's crust because it was so thick!

To combat the ongoing

crust, odor problem and loss of capacity in its 300,000-gallon equalization tank, the meat processor was considering the use of chemicals to tackle the 'wastewater' - and was also trying to get things moving in the tank by hiring a contractor four times a year to blast the crust apart with a basic portable pump. This rather primitive,

nasty job not only caused a temporary major increase in odors, but also cost \$5000 per visit.

As with all meat/food processors, wash-down of the plant at the end of the work day presents a test for the onsite wastewater treatment system - in this case two DAF (Dissolved Air Floatation) units

as they suddenly have to deal with bringing a large volume of particles to the surface. Fat removal is essential for discharge consent, to protect the local water courses enroute to the local municipal wastewater treatment facility - and to keep effluent costs as low as possible. At this Ohio plant, removed fat also provides a revenue stream as it is sold on for use in other manufacturing industries.

Finally, with the odor-generating permanent presence of fat in the equalization tank and a lack of capacity adversely affecting the whole treatment process, the meat plant's Facilities Manager,

Never Seen a Tank So Crusted Up

"Over the years we've seen some very clogged up lift stations", said Smith's Paul Matrka. "Every municipality across America seems to have at least one very labor-intensive sewage lift station that causes major problems, but while all meat processors have the same issue with waste fat to deal with, I have to admit that in this case, in my over 25 years' experience in the industry, I've never seen a tank so crusted up".

Representing a carefully selected range of equipment from top-line manufacturers, Smith Environmental had experienced positive outcomes with a chopper pump that not only has an external knife system to prevent solids from entering its casing, but one that when fitted with a venturi nozzle, acts as an effective mixer to distribute air throughout the tank.

In keeping with its policy of designs driven with what is the best long-term solution for community, Smith Environmental proposed a trial of AeriGator from Landia to demonstrate its capabilities.

who described the situation as 'extremely troublesome; especially the odors', sought help via his chemical vendor.

An inquiry was made to Smith Environmental, initially for a propeller mixer, but upon learning more about the tough application, the Columbus-based wastewater consultancy knew immediately that a far more robust solution would be required.

Bubbles Began to Emerge and the Crust Slowly Began to Break Up

"We were confident", added Paul Matrka, "but with the crust being so thick at the time, we had to try almost 20 times for more than 15 minutes to get the AeriGator in low enough though the thick layer – and to

make sure that we were all out of harm's way. When the scum began to blow out of the nozzle, it was really disgusting – unless you happen to have a liking for thick brown toothpaste! As bubbles began to emerge and the crust slowly began to break up, we could see that it was working. The Facilities Manager was suitably amazed at what this set-up could do. And despite what I've said about trying to lower it down, installation of the AeriGator is actually very easy; an operator could set up themselves in an afternoon".

Such was the speed and efficiency of the new equipment that wisely, Smith Environmental held back on clearing all of the tank's crust at once, so as not to overwhelm the DAF plants, with



Paul Matrka From Smith Environmental



The Landia AeriGator Begins To Break Up The Thick Crust Of Fat At A Meat & Food Processor In Ohio.

what would have been a long continuous slug of fat.

Some fine-tuning of the operation is still in progress, but now that the crust is no longer present, the meat processor's DAFs receive a far more consistent flow from the now blended equalization tank.

This allows discharge consent for final effluent to be met without the previous variations – also caused by the fluctuations of the chemicals that were being added to combat the bad odors.

"The acquisition of just this one pump will make a big positive difference to the bottom line at the meat processor", continued Paul Matrka.

"The Landia AeriGator will easily pay for itself in just two years".

He added: "This site was unique, as there weren't any

significant complaints about the foul smell, but at a location with near neighbors, an odor problem is a serious issue, with no end of negative publicity. The AeriGator now runs 24/7, with no fuss, making those odors a thing of the past. Our Facilities Manager customer is now such a champion of this product that every time I see or talk with him, he's selling its benefits to me. It's made a huge difference to the plant".

About the Contributor

Smith Environmental is a team of professionals representing the manufacturers of water and wastewater process equipment in the State of Ohio, USA. It provides cost-effective, sound solutions to the increasingly demanding regulations placed on the water and wastewater treatment plants of the local communities.

7 STEPS YOU NEED TO TAKE NOW..TO WINTERIZE PIPES

By Klaus Reichardt



Many parks and recreation facilities and schools will be closing soon due to the holidays and as colder weather approaches.

Whether for a short or long period, managers must winterize the fixtures in these facilities before closing.

Here's why:

- Winterizing fixtures helps prevent plumbing leaks and breaks. When water freezes, it expands, producing enough pressure to cause damage to fixtures.
- Winterizing helps prevent "P" traps and drains from drying out. When they do, sewer odors filled with hydrogen sulfide can be released into the facility. So can methane gas, which

can cause serious health risks.

Aware of this, Klaus Reichardt, Founder and CEO of Waterless Co., manufacturers of no-water urinals and other restroom products, provides the following winterizing tips "to prevent nasty surprises when these

facilities reopen."

Among his suggestions are the following before facility closing:

- Create a plumbing fixture checklist. Include drain valves, taps, and all water-using kitchen and restroom fixtures through-

out the facility. Mark off the following steps as they are completed.

- Shut off the main water valve to the facility (if allowed), turn off the water pump, and water heater.
- Open all drain valves, taps, faucets, and showers. These should remain open during the winter months, as long as the facility is closed.
- Drain the water heater and any hot water storage tanks. This will protect heating elements in the tanks from being damaged.
- Flush all toilets and water using urinals. If water remains in the bowl, add antifreeze to prevent pipes from cracking.
- Waterless urinals need no special winterizing steps unless they use water on a scheduled frequency.
- Pour liquid "ever prime" into all drains. This helps prevent the P traps mentioned earlier from drying and releasing foul odors. Two or three ounces per drain should do.

"Also, be sure and maintain a heating source in the facility," adds Reichardt. "Setting the thermostat at 40 to 50 degrees (F) helps protect pipes from the cold."

About the Author

Klaus Reichardt is the Founder & CEO of Waterless Co. Inc. **Waterless** has established a well-respected reputation as being an innovative manufacturer of no-water urinal systems.



Klaus Reichardt

GANGA CONNECT CONCLUDES IN LONDON: HIGH LEVEL OF ENGAGEMENT WITH TANGIBLE OUTCOMES EXPECTED

- Ganga Connect Chapters Set Up in London, Scotland, Wales & Midlands, UK
- Scotland - India Water Partnership Established
- Ganga Finance and Investments Forum Set Up

SWWW Staff, UK

The Ganga Connect exhibition, that has been running across the UK from 8th November concluded in London on 25th November 2021. This has been a major effort of the National Mission for Clean Ganga, the High Commission of India and cGanga to engage with the international community of scientists, technology companies, policy makers, industry, investors and finance professionals.

In the concluding session, Gajendra Singh Shekhawat, Minister of Jal Shakti, and Rajiv Ranjan Mishra, Director General, National Mission for Clean Ganga, hosted a virtual roundtable with eminent members of the Indian community who gathered in person at the Indian High Commission in London, UK and others via a digital bridge from elsewhere in the UK. The Minister of Jal Shakti interacted with the community members who asked questions and offered numerous suggestions on how they might be able to engage and support the Namami Gange programme.

Both the Minister and Director General accepted the community members' requests to carry the exhibition across various community centers across the UK. Several other developments were reported to the Hon'ble Minister as decisions taken which were later announced during the reception.

The exhibition started in Glasgow and moved to Cardiff, Birmingham, Oxford before concluding in London. Ashok Kumar Singh, Executive Director - Projects, NMCG was present at the Ganga Connect in Cardiff and D.P. Mathuria, Executive Director - Technical represented NMCG at the exhibition in Birmingham. The end of the exhibition was marked by an evening reception

hosted by H.E. Gaitrilssar Kumar, Indian High Commissioner to the UK and Rozy Agarwal, Executive Director - Finance, NMCG. Prof. Vinod Tare and Sanmit Ahuja of cGanga also participated.

Welcoming the guests, the High Commissioner said that the Namami Gange programme is a flagship initiative of Prime Minister Narendra Modi and that India places top priority towards climate change and cleaning up its environment.

In further engagement with the guests, Mr. Agarwal made the 10 key strategic announcements that summarized the highlights of the two weeks long exhibition. These are:

1. Ganga Connect UK Community Engagement Chapters

The primary objective of the Ganga Connect exhibition was to engage with the UK community and major support has been received from community members from all across the UK. The community leaders are forming chapters across the

country that will establish a link between members and the Namami Gange programme. The chapters established are: Scotland - Ganga Connect, Wales - Ganga Connect, Midlands - Ganga Connect, London - Ganga Connect.

Each chapter will have convenors who will connect various interest groups with the Namami Gange programme including scientists, technology companies, investors and community members. The chapters will host workshops and outreach programmes throughout the year to raise awareness about the Namami Gange programme. Nearly 100 members have joined the four different chapters already.

2. Twinning of Rivers

Twinning of rivers to share knowledge, best practices and experiences of river basin management including community engagement programmes.

3. Scotland-India Water Partnership

This partnership builds upon the MOU of National Mission for Clean Ganga and Government of Scotland MOU of 2017. This



collaboration will support in channel the high level of interest amongst Scottish entities specializing in water into entering the Indian market and the Namami Gange programme will act as a major platform for Scottish entities to enter the Indian market.

4. Impact Project using Arth Ganga Framework

A major impact project has been conceived to generate major economic activity of a select region along the banks of river Ganga. This initiative will create significant livelihood opportunities and bring new economic activities but in a manner that creates a model approach of environmentally sustainable development. The initiative will include many aspects such as sustainable tourism, river front development, sustainable transport and other activities. The project will be developed on the model of rejuvenation and economic development of the River Clyde in Glasgow. It will be led by the City of Glasgow College and Strathclyde University.

5. Ganga Finance and Investments Forum

A number of investors and finance companies have come together to establish the Ganga Finance and Investments Forum (GFIF). The group will develop state of the art financial instruments such as river bonds, blue bonds, impact and outcome bonds, credit enhancement and guarantee instruments. They will go on to establish specialist vehicles to channel investments from around the world into the Namami Gange programme. The group has agreed to develop the first of its kind River biodiversity and conservation bond to channel long-term investments into ecosystem conservation. It will also provide ongoing support to NMCG and the Namami Gange programme for continuous funding and project finance for various initiatives.

6. Technologies enrolled into the Environment Technology Verification (ETV) Programme

In continuous expansion of the ETV programme, three innovative technology companies were selected and on-boarded onto the ETV programme:

- Technology 1: **Floating Water Treatment Systems**, Company: SmartOps
- Technology 2: **Forward Osmosis**, Company: Forward Water Technologies
- Technology 3: **Odor Control**, Company: OSIL

This takes the total number of companies in the ETV programme to over 40 of which 14 are from the UK.

7. Tech & Innovation Financing

The Environment Technology Verification (ETV) programme has now started to graduate companies successfully that are ready to scale up. In doing so they need venture funding to start rolling out the projects across the country. To support the successful candidates a partnership with OPG Power Ventures, a company listed on the AIM segment of the London Stock Exchange, is being established that will create upto a GBP 3mn (INR 30 crore) facility to fund technologies and innovations.

8. UK-India Scientific Collaboration

A number of scientists and research institutions have agreed to come together to form a knowledge pool for exchange of scientific and technological ideas leading to development of collaborative research. The scientists agreed to focus the collaboration towards applied innovation for rejuvenation of rivers systems, conservation of biodiversity, measures to combat the impact of climate change on ecosystems and create sustainable models for economic development.

Scientists and academics from the following institutions have agreed to establish a collaboration bridge between India and the UK: James Hutton Institute, City of Glasgow College, Strathclyde University, Cardiff University, Birmingham City University, Oxford University, University College London and University of Surrey and Queen Mary University.

9. Global Youth for Ganga

The Global Youth for Ganga will be an association of youth from India and other countries on a common mission to exchange knowledge and expertise, through advocacy for a clean Ganga, and all rivers at large. The association will engage in interdisciplinary discussions, raising worldwide awareness, and encouraging engagement in the Clean Ganga Mission, bringing together young students, researchers and professionals across the globe. The aim is to make Clean Ganga a reality and also to inspire the rest of the world to take similar initiatives in their states down to the very grassroots level. A mission empowered by the youth, is a mission which can keep thriving for future generations to come, constantly gaining momentum. The youth today are more aware about climate change than ever before, and it is their care and commitment that shall be supported for a more sustainable future ahead.

10. Finalization of Clean Ganga Charity in the UK

With the establishment of Community Engagement Chapters, the establishment of the Clean Ganga UK charity has received a lot of support from the grass-roots and activated the necessary enabling environment. The charity set up process has been expedited and it will be set up soon with a view to start mobilizing communities and friends of Ganga in the coming months.



INDIA'S UNION MINISTER FOR JAL SHAKTI LAUNCHES RIVER CITIES ALLIANCE

- This is a dedicated platform for river cities in India to ideate, discuss and exchange information for sustainable management of urban rivers.
- 30 members cities from across the country sign the alliance.

SWWW Staff, India



Union Minister for Jal Shakti Gajendra Singh Shekhawat has launched the River Cities Alliance, a dedicated platform for river cities in India to ideate, discuss and exchange information for sustainable management of urban rivers.

This first of its kind Alliance in the world symbolizes the successful partnership of the two Ministries i.e., Ministry of Jal Shakti and Ministry of Housing and Urban Affairs. The Alliance will focus on three broad themes- Networking, Capacity Building and Technical Support. The Secretariat of the Alliance will be set up at National Institute for Urban Affairs (NIUA), with NMCG's support.

The participating cities in the River Cities Alliance are Dehradun, Haridwar, Rishikesh, Srinagar, Begusarai, Bhagalpur, Munger, Patna, Berhampore, Hooghly-Chinsurah, Howrah, Jangipur, Maheshtala, Rajmahal, Sahibganj, Ayodhya, Bijnor, Farrukhabad, Kanpur, Mathura-Vrindavan, Mirzapur, Prayagraj, Varanasi, Aurangabad, Chennai, Bhubaneswar, Hyderabad, Pune, Udaipur and Vijayawada.

India's Prime Minister in the meeting of the National Ganga Council held at Kanpur in December 2019, had highlighted the need for a new river centric thinking in planning for cities on the banks of rivers. "Cities should be responsible for rejuvenating their rivers. It has to be done not just with a regulatory mindset but also with a developmental and facilitatory outlook" stated the Prime Minister.

Subsequently, the National Mission for Clean Ganga (NMCG) and National Institute for Urban Affairs (NIUA) have collaborated together to launch the River Cities Alliance (RCA).

Speaking on the occasion the Union Minister said that this is an excellent initiative which will enable cities to learn from each other's successes and failures as well as connect people with the rivers.

Durga Shankar Mishra, Secretary, Ministry of Housing and Urban Affairs stated, "The River Cities Alliance can play a crucial role in connecting cities with their rivers, and that it can be a model for all cities in the Basin and beyond to emulate".

Pankaj Kumar, Secretary, Ministry of Jal Shakti stated, "This Alliance will give an opportunity to municipal administrators and their teams to take path breaking initiatives and learn and inspire each other".

In his address, Rajiv Ranjan Mishra, Director General NMCG said, "Although the Alliance began with the Ganga basin cities, it was extended to include cities beyond the basin as well. Thus, the work and knowledge products which will be developed under this Alliance will help cities to learn from each other and be enriched by both national and international experiences".

Hitesh Vaidya, Director, NIUA said that "The River Cities Alliance is a culmination of 3 years of efforts for river sensitive development of our cities."

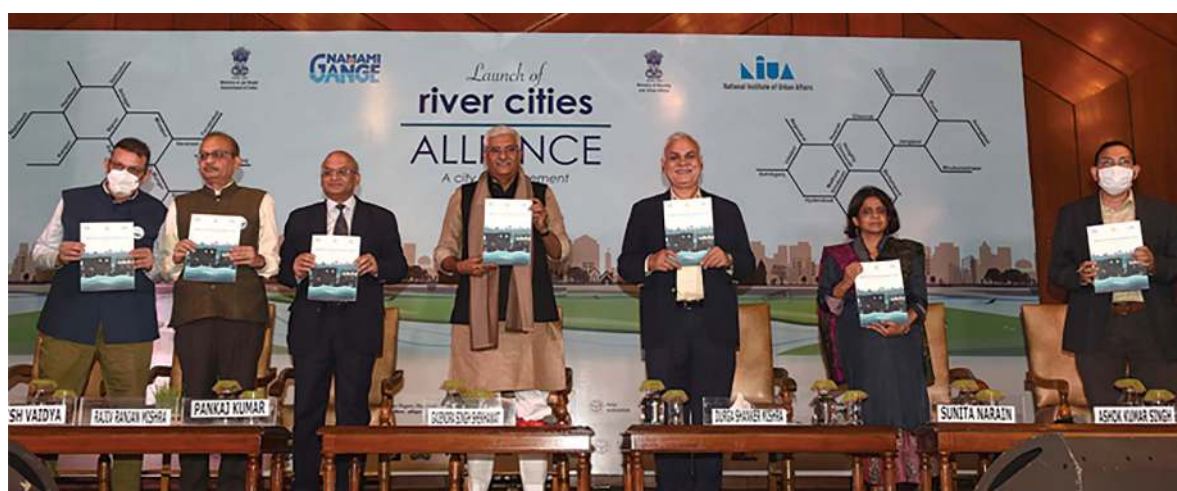
Ms. Sunita Narain, Director General, Center for Science and Environment was of the view that the idea of a River City Alliance is critical as rivers are crucial for cities.

During the session, Hon'ble Union Minister



Gajendra Singh Shekhawat, along with the other dignitaries launched the River Cities Alliance video and also unveiled the Urban River Management Plan for Kanpur City.

The primary objective of RCA is to provide the member cities with a platform to discuss and exchange information on aspects that are vital for sustainable management of urban rivers such as minimizing their water footprint, reducing impacts on river and water bodies, capitalizing on natural, intangible, architectural heritage and associated services and develop self-sufficient, self-sustainable water resources through recycle, reuse strategy. The Alliance cities will work towards adopting and localizing national policies and instruments with key river-related directions, prepare their Urban River Management Plans and develop city-specific sectoral strategies that are required for sustainable urban river management.



During the day, three sessions were also conducted. In the first session, discussion pertained to 'Operationalizing the River Cities Alliance' which included a presentation on Urban River Plan Management of Kanpur, that was followed by a moderated discussion with Commissioners/ Executive Officers of the 30 member cities.

The second session was a Roundtable Discussion on 'Holistic Urban River Management' between Dr. Suresh Rohilla, CSE; Suresh Babu, WWF; Dr. Madhu Verma, WRI-India; and Manu Bhatnagar, INTACH.

The third session focused on 'Forging Synergies for the River Cities Alliance' which comprised of a panel discussion with Sonia Chand Sandhu, ADB; Manasi Sachdev, UN-Habitat; Anitha Sharma, Embassy of Denmark; and Martina Burkard (GIZ). Anitha Sharma also shared about the recently signed Strategic Green Partnership between Denmark and India which focuses upon cities and rivers, amongst other key focus areas. With regards to the water sector, the Government of Denmark is working in collaboration with the Ministry of Jal Shakti and Ministry of Housing and Urban Affairs.



The alliance gives opportunities to these cities to strengthen governance aspects for river cities and improves their liveability to attract external economic investments, access state of the art knowledge and frameworks as well as an opportunity to serve as the site for unique demonstration projects which will be implemented by NIUA and NMCG. The 30 member cities include Haridwar, Rishikesh, Kanpur, Ayodhya, Patna, Howrah, Ayodhya, Varanasi, Prayagraj, etc. from Ganga basin states and Aurangabad, Chennai, Hyderabad, Bhubaneswar, Pune, Udaipur, Vijayawada, etc. from non-Ganga basin states.

735 DRINKING WATER SUPPLY SCHEMES WORTH RS. 1882 CR APPROVED FOR UTTAR PRADESH STATE

- The schemes will benefit 39 lakh people in 1,262 villages of Uttar Pradesh
- Uttar Pradesh plans to provide tap water connections to 78 lakh households by March 2022
- Rs. 10,870 Crore Central Allocation to Uttar Pradesh Under Jal Jeevan Mission For 2021-22

SWWW Staff, India



State Level Scheme Sanctioning Committee (SLSSC) of Uttar Pradesh has approved proposals submitted by the state worth Rs 1,882 Crore for making provision of tap water connections in rural areas. These schemes will cover a population of 39 lakh in 1,262 villages of 33 Districts. In the said meeting, 735 schemes were approved by the committee. As per the approval, tap water connections to be provided to 4.03 lakh rural households of the State.

As on date, 34 lakh (12.9%) rural households out of 2.64 Crore are getting tap water supply in their homes. In 2021-22, the State plans to provide tap water connections to 78 lakh households.

To translate Prime Minister Narendra Modi's vision of providing clean tap water to every household and freeing women and girls from the drudgery of fetching water from a distance, the National Jal Jeevan Mission, Ministry of Jal Shakti has already released Rs. 2,400 Crore grant-in-aid to Uttar Pradesh during 2021-22. In 2019-20, Central Government had allocated Rs. 1,206 Crore to Uttar Pradesh for

implementation of Jal Jeevan Mission, which was increased to Rs. 2,571 Crore in 2020-21. Union Minister, Jal Shakti, Gajendra Singh Shekhawat while approving this four-fold increase in allocation in 2021-22, assured full assistance to the State for making provision of tap water supply in every rural home by 2024.

In Uttar Pradesh, there are 2.64 Crore rural households in over 97 thousand villages, out of which now 34 lakh (12.87%) households have tap water supply in their homes. During the launch of Jal Jeevan Mission, only 5.16 lakh (2%) households had a tap water supply. In the last 26 months, despite disruptions faced during the Covid-19 pandemic and lockdowns, the State has provided tap water connection to 28.85 lakh (10.92%) households. The State aims to make 5 districts 'Har Ghar Jal' in the current financial year.

To accelerate the pace of JJM implementation, National Jal Jeevan Mission has urged the State to take necessary measures to provide tap water supply to 78 lakh rural households in the State this year, for which the State plans to start water supply works in more than 60 thousand villages by December, 2021. With this year's Central allocation of Rs. 10,870 Crore and with an opening balance of Rs. 466 Crore available with the State Government, the State's matching share of 2021-22 and shortfall in matching State share of previous years, the total assured fund available for the implementation of JJM in Uttar Pradesh is more than Rs. 23,500 Crore. Thus, the Government of India is ensuring that there is no paucity of funds for the implementation of this transformational mission in the State of Uttar Pradesh.

Further, Rs. 4,324 Crore have been allocated to Uttar Pradesh as 15th Finance Commission tied grant for water & sanitation to Rural Local Bodies/ PRIs in 2021-22. There is assured funding of Rs. 22,808 Crore tied grant for the next five years i.e. up to 2025-26. This huge investment in rural areas of Uttar Pradesh will accelerate economic activities and also boost the rural economy. It will create income-generating opportunities in villages.

Prime Minister had laid the foundation stone of piped water supply schemes for the rural areas of 7 districts viz. Jhansi, Mahoba, Lalitpur, Jalaun, Hamirpur, Banda and Chitrakoot in the Bundelkhand region in February 2019; and in November 2020, for rural drinking water supply projects for Mirzapur and Sonbhadra districts of Vindhyaachal region. These are water-stressed areas. These projects will benefit about 18.88 lakh households in 6,742 villages of the region. So far, the physical progress is about 50% in these schemes.

To take forward the mission's motto of 'Building partnership, changing lives', various reputed organizations have started working with the local community in the State to ensure drinking water security on a long-term basis. UN agency like UNOPS has already mobilized resources on the ground and actively working in about 140 villages of Bundelkhand, Vindhyaachal, Prayagraj and Kaushambi. Aga Khan Foundation is working in 40 villages of Lucknow and Sitapur. Similarly, Tata Trust is mobilizing its resources in 200 villages of 3 districts of Balarampur, Bahraich and Shravasti. With this type of participation, Jal Jeevan Mission is becoming a 'Jan Andolan'.

Under Jal Jeevan Mission (JJM), there is provision for constitution of State Level Scheme Sanctioning Committee (SLSSC) for consideration and approval of schemes to be taken up for making provision of tap water supply to rural households. The SLSSC acts as a State level Committee to consider water supply schemes/ projects, and a nominee of the National Jal Jeevan Mission (NJJM), Government of India is a member of the committee.

FROM SENSING TO SENSEMAKING

By Yokogawa



SENCOM™: Smart Liquid Analyzers

Our water future is our world's future - this is what Yokogawa believes in today's date.

Presently, if on the one hand, many technologies have emerged for water treatment useful to both the industries and the environment, on the other hand, the water industry is looking for sensing technologies that can be more reliable, efficient and optimize the total cost of ownership.

Considering the criticalities in measurements and uncertainties about the future of the installations and to ensure that the investments are justified, many users are going for additional liabilities from suppliers who have operational and maintenance responsibilities.

Here comes the role of analytical suppliers who can help customers with the latest technologies in sensing. Yokogawa with a rich experience of 100 plus years believes that co-innovating with customers is key to addressing such challenges for creating a better tomorrow.

The next generation digital sensor solutions like SENCOM™ Smart Digital Sensors ensure customers that they can have not only reliable sensing but in fact, goes beyond sensing to sensemaking to customers by providing valuable customized information. There was a time when users used to tell pH was nothing but a permanent headache.

The uncertainties on sensor healthiness, inventory planning, reading mismatches, repeat

calibrations, etc. all made many customers to in fact go back to laboratory measurements from online monitoring. SENCOM 4.0 solutions from Yokogawa touch all these minute areas and have given answers to these uncertainties.

When a customer buys an analytical product for a particular measurement, the expectation will be how best these measurements can give him insights about the water quality and the effect of water quality on process areas including process headers, piping, boilers, turbine, etc depending on where these are used. If a control action is taken like dosing ammonia and morpholine etc, or leakage to be predicted well in advance, user expectation is very high when they spend huge money in buying those analytical products. But in conventional solutions having a simple 3½ digital display and operation dependency on key buttons, we cannot expect beyond metering the process value.

Here, digital solutions play a very important role, and Yokogawa leads in this technology by providing a fullscreen and touch screen display right from the early 21st century in the analytical measurement world. This helped users to get information beyond process value including simple English worded instructions, errors, remedies, and warnings in turn eliminating the need to use instruction manuals at every juncture.

This also eliminated the need of having manual data logging, separate trend recording, or additional bar graph indications. Things become clearer and a step towards sensemaking was put forward. Yokogawa's decades of experience with customers has helped to understand these pain

points and challenges faced in day-to-day water industry life. Yokogawa's customer-centric mindset of co-innovating with them opened the door for creating solutions for these challenges.

When the user found reading mismatch issues between lab readings and online, the root cause of the issue was identified. These were application-specific, process-specific and many a time plant-specific. A flow change in the process line affecting reading variation was addressed providing inbuilt pressure compensation with Bellomatic sensors. A noise entering measurement circuit through the water created errors in measurements in the process line and when the same sensor was dipped in 4,7,9 buffers, the measurement was perfect.

This issue addressing the use of liquid earth which is having lesser resistance than the measurement and reference electrodes, helped the stray voltage to pass through the liquid earth. The issue of connecting 3 sensors to an operational amplifier having two arms was addressed with two-stage amplification eliminating the ground loop currents.

The use of additional electrodes, impedance monitoring between the electrodes helped to identify different developments in water including sensor poisoning, clogging, breakage of the sensor. Even when the sensor was not dipped in water, a message helped users to take quick action and save the sensor life. Service engineers need not depend on manuals since the smart display in HMI helps to convey what is happening with the sensors to users. Further, the addition of digital sensors in the portfolio helped to take this information on digital communication and hooked up the sensor

to options like DCS RTUs, PLCs, Recorders, HMIs, Converters, and Transmitters. Having a digital sensor, the same are connected in series to an HMI for up to 16 measurements resulted in eliminating the usage of multiple electronics or dry panels in water applications. Digitalization even helped optimization.

Yokogawa's SENCOM™ SMART Sensor Platform is an innovative analyzer platform that optimizes maintenance, reduces configuration time, and simplifies in-field maintenance and calibration.

SENCOM SMART digital sensor platform combines:

- SENCOM™ technology, which allows sensors to transmit and receive data when connected to a transmitter/ analyzer or any PC.
- Analyzer, which captures and stores calibration data
- SMART digital sensors to maintain specific measurement and calibration data on an integrated chip along that is an integral part of the sensor.
- Data management software to optimize the performance of pH/ORP and conductivity sensors for enhanced reliability and process safety.

A consistent customer-focused approach enabled co-innovation with our esteemed customers and helped to understand what exactly customers needed. The digital sensing technology helped Yokogawa from sensing to sensemaking.

Similarly, this trend continues in many solutions for smart water and wastewater applications for the industry, and Yokogawa is committed to working towards a better water future.

ULTRATECH WINS FICCI INDIAN CIRCULAR ECONOMY AWARD 2021

Efforts to accelerate its business towards a circular model recognized as most innovative and impactful

SWWW Staff, India



UltraTech Cement Limited, the largest manufacturer of grey cement, white cement and ready-mix concrete in India, has won Federation of Indian Chambers of Commerce and Industry's (FICCI) Indian Circular Economy Award (ICEA), 2021.

The Awards ceremony was held virtually on 25th November and the winners were announced in the presence of Amitabh Kant, Chief Executive Officer, National Institution for Transforming India (NITI Aayog).

UltraTech is driving sustainability across the value chain of its operations. Its focus areas are decarbonization, circular economy, biodiversity management, water positivity, safe operations and community development.

The circularity of materials is a priority for UltraTech in tackling the issue of

overutilization of natural resources and disposal of waste generated from its use. UltraTech focusses on using fewer natural resources across its value chain. The company follows a dual approach for efficient waste management: First, by generating less waste using raw materials judiciously so that waste can be managed effectively. Second, by substituting fossil fuels and raw materials with waste material generated not only from the Company's plants but also from other industries and municipal corporations thus helping to reduce the carbon footprint as well as preventing waste disposal as landfill.

UltraTech has developed systems at its unit locations to utilize waste materials safely and efficiently following the principles of circular economy.

UltraTech uses industrial waste and municipal solid waste as alternative fuel in its kilns through co-processing. Currently, UltraTech supports 80 municipal corporations across India by helping them reduce the waste headed for landfills. UltraTech also uses industrial waste such as fly ash, gypsum and slag as substitute for naturally occurring limestone in the cement manufacturing process

UltraTech's Circular Economy Highlights

- 10+ million tCO₂ annual savings due to utilization of waste material
- 18.36% of raw material consumed in FY21 was recycled material
- 120+ million tons of industrial waste repurposed in last decade
- 2.2 times Plastic Positive as of FY21

KBL RECEIVES PATENT FOR DOUBLE SUCTION CONCRETE VOLUTE PUMPING ASSEMBLY

- It is expected to help the company offer its Concrete Volute Pump with reduced submergence
- Concrete volute pump offers high reliability up to 99.95% and eliminates corrosion

SWWW Staff, India

Kirloskar Brothers Limited (KBL) which provides fluid management solutions, has successfully received a patent for its Concrete Volute Pumping Assembly. This patent is a significant milestone as it will help the company offer its Concrete Volute Pumps with reduced submergence leading to reduced excavation cost to the customer. The patent will further consolidate KBL as a leader in the designing and manufacturing of Concrete Volute Pumps worldwide, as per company sources.

The Concrete Volute Pump was a revolutionary development in the pump industry. Concrete Volute Pumps derive their name as the casting & suction draft tube is concrete, while the rotating parts are metallic. As the casing is constructed in concrete at the site, CVP is the most suitable pumping option from techno-economic consideration for handling large volumes of water. Concrete Volute Pumps guarantee strength and rigidity and virtually eliminate the problems of corrosion and erosion. It also ensures higher & consistent pump efficiencies over a sustained period of operation. Due to the simplicity of construction and ease of maintenance, the reliability achieved is 99.95%.

Concrete Volute Pumps by Kirloskar are widely used for Sea Water applications, applications like Circulating / Condenser Cooling Water for Power Plants, Lift Irrigation, Water Supply, Drainage and Flood Control, Dry Docks and Desalination. High Reliability, Design Simplicity and Superior Operating Performance make Kirloskar Concrete Volute Pumps a trusted choice.



EKKI LAUNCHES NEW WATER TECHNOLOGY CENTER AT KPR INSTITUTIONS

SWWW Staff, India



Pumps and Water Technology major EKKI has teamed up with KPR Institutions to launch "The EKKI-KPR International Water Technology Center (EIWTC)", the first of its kind in the Indian Pump & Water Industry.

EIWTC was inaugurated by German Consul General, Karin Stoll in Coimbatore, India in the presence of Dr. K. P. Ramasamy, Chairman and T.N. Arun, Executive Director, KPR Groups P. Arumugam, Chief Executive and Kanishka Arumugam, Co-CEO, EKKI Pumps, Dr. A.M. Natarajan, Chief Executive and Dr. M. Akila, Principal, KPRIET.

The EKKI-KPR International Water Technology Center (EIWTC) is a global center of excellence for pumps & water related technologies. The center will lead on the exchange of best practice in teaching and research for the pump industry and water related technologies. EIWTC brings together pumps and water related Research, Teaching, Consultancy, and Entrepreneurship.

Based at the KPR Institutions, the new Center will harness the combined expertise of 45+ researchers and academicians from KPR and 40+ engineers from EKKI. The new center will initially work on "SKE" - Skill Training, Knowledge transfer and Encourage Entrepreneurship in the water industry.

EKKI has set up such centers in India to bridge the gap between academia and industry. EIWTC is housed at KPR institutions as part of the Pump and Water Technology group's ongoing partnership with academic institutions across India. EKKI heavily invests in skills. EKKI's workers are all enrolled in academic and vocational training. The company's customer-training programs, employee training and other aspects of the company's wider skills projects will also be included in EIWTC.

Dr. M. Akila, Principal of KPRIET welcomed the gathering followed by presidential address of Dr. K.P. Ramaswamy, Chairman of KPR Group.

According to Dr. K.P. Ramaswamy, Chairman of KPR Group, "We are very proud that EKKI has established the center in our Institution. KPR students thrive on innovation and creative exploration. I admire EKKI's vision in providing this focus and governance for its learning and development. The center highlights the company's commitment to inspiring the next generation of students and academicians. The Center will provide excellent opportunities for students and academicians at KPR Institutions. Collaboration with academia and lifelong learning will be a crucial component to help achieve Industries growth plans", he said.

Co-CEO of EKKI Kanishka Arumugam said, "Today, about 1.1 billion people lack access to safe drinking water. By 2025, approximately 2.8 billion people will be living in water scarce areas".

"At EKKI we are working to ensure a sustainable water future for all. The company is investing in its future by employing and developing the highly skilled people that will help ensure its continued success in the water industry."

"At EKKI we have studied how academic institutions and industry can work together successfully on the lines of University-Industry Collaboration at Oxford, Fraunhofer in Germany and the Warwick Manufacturing Group in England."

"For me, our workforce is our most crucial asset and I see EIWTC critical to our organization success", "Through providing opportunities for continuous learning and research from recruitment to retirement, the center will ensure that we have the skills needed to compete globally." "EIWTC will work with other academic institutions and global water technology companies to build a new generation of water industry leaders that better society and put people and planet first."

"We will strengthen partnership between academia and industry to promote a more sustainable water future for all", said Kanishka Arumugam.

German Consul General, Karin Stoll said, "Happy to inaugurate KPRIET EIWTC today. Strengthening links between business and academia will improve training in the field of Engineering considerably. This will contribute not only to better employability but also to higher quality! Great Initiative by Ekki pumps, orientated at the German model: integrate theory and practice; highlight importance of water sector at the same time."



ALSTOM INAUGURATES NEW COMPONENTS MANUFACTURING FACILITY IN COIMBATORE

This site has undertaken several sustainability measures like - targeting 80% of regular activities to be run on green energy, utilize 100% of natural light during daytime, rainwater harvesting, reusing 100% of the sewage treated water, etc.

SWWW Staff, India

Alstom, active in sustainable and green mobility solutions, has inaugurated its new components manufacturing facility in Coimbatore, in the presence of Emmanuel LENAIN, Ambassador of France to India and Alain SPOHR, Managing Director, Alstom India & South Asia. This is the largest components manufacturing facility in Asia and is dedicated to improving industrial efficiency in manufacturing components for various prestigious national and international projects.

Alstom's industrial presence in Coimbatore has evolved across 3 sites since 1978. This new site is spread over a total area of 15 acres and has an installed capacity of 2.1 million hours, that will offer a higher degree of production diversity & complexity – integration & testing of tractions, auxiliary convertors, cubicles, driver desks and Rolling Stock looms. The site will create 10,000 direct & indirect jobs and currently has a gender diversity rate of 20%.

The Coimbatore site currently delivers not just to Alstom's Indian sites but also to major sites across 5 continents – Asia, Australia, Europe, North America and South America. Some of the key countries include – France, Canada, Italy, Belgium, Germany, Netherlands, Saudi Arabia, Vietnam, UAE etc.

Speaking at the inauguration, Alain SPOHR, Managing Director – Alstom India said, "Our presence in Coimbatore dates to the 1970s and since then we've grown multifold. The opening of this facility is a testament of our commitment to the government's flagship 'Make in India' & 'Atmanirbhar Bharat' initiative. With our enhanced capabilities and a team of talented and dedicated employees, we are proud to be a catalyst in India's manufacturing led growth story. We have been the preferred mobility partner on various Indian projects and are keenly looking forward to becoming a leading supplier of components across Alstom's sites globally."

Marveling at Alstom's commitment to India, at the inauguration of the large-scale setup with modern equipment and amenities, Emmanuel

LENAIN, Ambassador of France to India, said, "French companies are fully committed to 'Make in India' and speeding ahead on the back of strong bilateral relations between the two countries. It is heartening to see India's manufacturing prowess powering global mobility. I salute the efforts and investments made by Alstom over the years in India towards building a strong base of sustainable mobility solutions and high localization, while creating a positive impact on the people and communities"

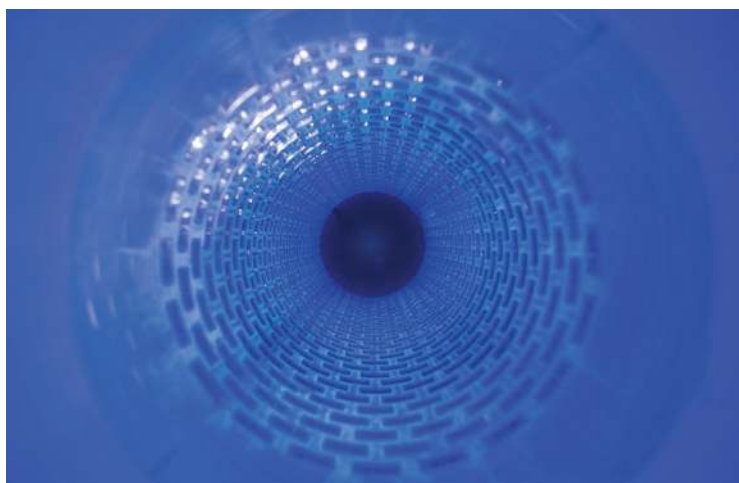
In line with Alstom's Sustainability Goals for 2025, this site has undertaken several sustainability measures like - targeting 80% of regular activities to be run on green energy, utilize 100% of natural light during daytime, rainwater harvesting, reusing 100% of the sewage treated water, etc. The factory also boasts of a stellar record in safety. Cumulatively, the factory has successfully achieved 10+ years of 'accident free' man days.



WINNERS OF AQUATECH INNOVATION AWARD ANNOUNCED

Autonomous robot wins the Overall Aquatech Innovation Award.

SWWW Staff, India



The category winners are:

- **Wastewater Treatment:** CLC for decentralized water provision - Nijhuis Saur Industries & Semilla Sanitation
- **Transport and Process & Control:** Live KEY - Hawle Service GmbH
- **Innovation (not yet to market):** Autonomic Inspection Robot - Submerge
- **Water Supply:** BIO-310 UV LED Reactor - Typhon Treatment Systems Ltd
- **Green Chemicals for Water:** Wasser 3.0 detect | remove | reuse - Wasser 3.0 gGmbH

An autonomous robot that can help utilities map infrastructure and detect faults in drinking water pipes has been crowned the Overall Winner of this year's Aquatech Innovation Award. The development by Submerge is a result of multiple stakeholders, including Vitens, Brabant Water and Evides.

Known as 'Autonomic Inspection Robot - Submerge', the robot can help to detect leaks, corruptions and even be used to map pipe networks to eventually help create a digital twin.

The Aquatech Innovation Awards recognizes world-class innovation and technologies that have the potential to move the global water market forward.

A total of 12 innovative technologies were nominated from over 50 entries by an expert jury. Category winners and the overall winner of the Aquatech Innovation Award 2021 were revealed at the opening ceremony of Aquatech Amsterdam (2-5 November, 2021).

"One of the most important trends we witnessed in this year's Innovation Award entries was the availability and adoption of smart technologies," commented jury chairman Professor Cees Buisman, Scientific Director of Wetsus, the European center of excellence for sustainable water technology.

Buisman said the high level and the number of innovations provided real hope for the water sector.

"We've had almost two years of the coronavirus crisis, yet we still received more than 50 new entries," added Buisman. "This is a positive sign of how innovative the water sector continues to be. It's remarkable how engaged so many people are to keep innovating to solve water challenges."

Editha Hoogenberg-Derksen, Director Aquatech Amsterdam, concluded: "Innovation is always center stage at Aquatech Amsterdam and our Innovation Awards embody this. We're so proud of the number of entries this year. Congratulations to all of the winners!"



Aquatech Community Award

For the first time in the history of the Innovation Award, the Aquatech Community Award was organized. Next to the official jury, water tech professionals voted for their own favourite innovation – the popular vote. The nominee with the highest number of votes is Nijhuis Saur Industries & Semilla Sanitation for 'CLC for decentralized water provision', they are the winner of the Aquatech Innovation - Community Award.

SAPAL OF MEXICO SELECTS TAKADU'S CENTRAL EVENT MANAGEMENT (CEM)

The Leading Utility in Mexico, SAPAL will pilot TaKaDu to improve operational efficiency, enhance customer service and reduce water loss.

SWWW Staff, Mexico



SAPAL, one of the most progressive utilities in Mexico, will pilot the TaKaDu's Central Event Management (CEM) solution to improve efficiency and reduce water loss. Serving a population of 1.6M people with network size of 4,750 KM, SAPAL's aims to reduce its current NRW (Non-Revenue Water). By implementing TaKaDu's Central Event Management (CEM) solution and analyzing all their real time data, SAPAL expects to improve its efficiency and reduce water loss.

"TaKaDu is very active with leading satisfied customers in Latin America and around the globe. In Latin America alone we have customers in Colombia, Chile, Brazil, Peru, and Guyana. We are very excited to have SAPAL join our growing community of CEM users and become our first customer in Mexico" said Udi Geismar, TaKaDu's VP of Enterprise Solutions. "We are confident that by joining the digital journey with

TaKaDu, SAPAL will reduce water loss, improve operational efficiency and customer service".

GLOBAL WATER UTILITIES COULD CUT GHG EMISSIONS BY 50%, AT LOW TO NO COST

New Paper Outlines Steps to Accelerate Sector's Progress Toward Zero-Carbon Future.

SWWW Staff, World

Global water utilities account for approximately 2% of greenhouse gas (GHG) emissions – the equivalent of the world's shipping industry. And this figure is set to spiral as utilities work towards the UN's Sustainable Development Goal of universal access to water and sanitation by 2030. But water utilities could cut their emissions dramatically and quickly, according to a new paper from global water technology company, Xylem Inc. The paper outlines the sector's opportunity to reduce emissions quickly and affordably, with current, high-efficiency technologies. 'Water Utilities: Moving Fast Toward A Zero-Carbon Future' forms part of Xylem's contribution to COP26, where the company is joining water industry leaders and policy influencers to advance sustainable water management practices.

"Water operators have long been stewards of such an essential resource. Water infrastructure is a cornerstone of every community and local economy around the world," said Patrick Decker, Xylem's President and CEO. "But today's water systems are also major sources of global GHG emissions – which is why a growing number of utility operators are showing leadership by committing to 'net-zero' emissions targets." "Readily available technologies are an important and affordable part of the roadmap in utilities' 'race to zero,'" continued Decker. "Combined with changes in process, policy and practice, these solutions can get utilities well on their way to net-zero emissions."

Xylem's initial study of wastewater infrastructure, Powering the Wastewater Renaissance, found that 50% of electricity-related emissions from the wastewater sector can be abated with existing technologies, such as intelligent wastewater pumping systems, adaptive mixers with variable speed drives, and real-time decision support systems. ~95% of this impact is achievable at zero or negative cost. Likewise, in clean water, further analysis by Xylem indicates that readily deployable high-efficiency technologies such as advanced metering infrastructure (AMI) also have a material impact on emissions.

The paper emphasizes that deploying available high-efficiency technologies is one of several key steps leading utilities are taking as part of their wider strategies to reduce emissions:

- **Make firm commitments** to reduce emissions by joining the water sector's Race to Zero. Led by the UN's High-Level Climate Champions for Climate Action, the Race to Zero is a global initiative, rallying companies, cities, and regions to take immediate action to halve global emissions by 2030 and deliver a healthier, fairer zero carbon world in time.
- **Deploy affordable**, high-efficiency technologies to make meaningful, early progress. For example, intelligent wastewater pumping systems can cut energy use by up to 70% in wastewater pumping by reducing inefficiencies and emergency call-outs associated with clogging. On the clean water side, leak detection technologies can eliminate real water losses, saving energy consumed in the treatment and transport of water.
- **Define the supporting** processes, policies and practices to get all the way to net zero. Water UK's Net Zero 2030 Routemap details the broad range of approaches that are required to deliver on this commitment and provides specific actions to create accountability, reduce the costs and risks of the transition to net zero, and to unlock new benefits.



Water Intec 2022

Redefining Water Exhibition
(An Event of CODISSIA Intec Technology Centre)

Organised by
IN THE NEWS



CODISSIA
Intec Technology Centre

18th - 21st February 2022,
CODISSIA Trade Fair Complex, Coimbatore, India



When you refuse
to reuse, it's the
Earth you abuse.

If you can't REUSE it,
REFUSE it!

**Stall Bookings
Open**

Exhibitor Profile

- Automation Control Systems • Antiscalants • Analytical Instruments • Aeration Equipment • Activated Carbon
- Bottling Plant Manufacturers • Blowers • Bacteria Culture • Cooling Towers • Control Panels • Consultants • Coagulants & Flocculants • Clarifiers • Chlorinators • Chemicals • Disinfectants • Desalination Systems • DM Plants • Drinking Water Equipments • Evaporators • Effluent Treatment Plants • Fluoride Removal Systems • Flow Meters • Filtration Plants
- Filtration Media • Filter Press • Hydropneumatic Systems • Heat Exchangers • Iron Removal Systems • Laboratory Testing
- Level Controllers • Membranes • Membrane Diffuses • Misting Equipments • MBR Systems • MBBR Systems • Ozone Generators
- Pumps • Process Control Instruments • Pressure Gauges • Rain Water Harvesting • RO Plants • Sand Filters
- Sewage Treatment Plants • Swimming Pool Systems • Storage Tanks • Testing Equipments • Tubes • Ultraviolet Systems
- Valves • Water Treatment Plants • Water Meters • Wastewater Treatment Plants • Zero Liquid Discharge Systems.

Supported by



Knowledge Partner



Ph : 0422 - 2222396, 2222397

E-mail : waterintec@codissia.com

Mobile : 74025 88000 / 74026 15182

www.waterintec.codissia.com

VISIONARY WATER PROJECTS CELEBRATED BY LIGHTHOUSE AWARDS

- Carlsberg and Anglian Water among winners announced during Aquatech 2021
- Brave Blue World Foundation recognizes corporations and utilities
- Winners have developed new ways to reduce water impact and build resilience

SWWW Staff, Europe

Global organizations that have blazed a trail of innovation to conserve and enhance water resources and embed sustainable processes have been recognized for their pioneering work. Corporations including Carlsberg and Google, along with organisations such as utilities, have been named as recipients of the 2021 Lighthouse Awards. Now in their second year, the awards come from the Brave Blue World Foundation, a non-profit dedicated to scientific and educational water-inspired storytelling.

Brave Blue World Foundation founder Paul O'Callaghan said: "The Lighthouse Awards honour the pioneers who are embracing water innovation to make tangible changes within their organisation or community. It is also an opportunity for us to raise greater awareness of the remarkable work happening in the global water community." The recipients of the Lighthouse Awards 2021 are:

- **Anheuser-Busch InBev - Amunas:** Revaluing ancestral heritage to protect water in Peru
- **Anglian Water:** Low-carbon sustainable agriculture
- **Carlsberg:** The world's most water efficient brewery
- **CEPT Rayapuram and DuPont Water Solutions:** Zero liquid discharge at Tirupur textile factory, India
- **Google:** Seawater cooling system, Hamina Data Center, Finland

Honourable Mention:

- **Totem Games:** Water 2050 video game
- **Isla Urbana:** Rainwater harvesting in Mexico City's informal settlements

Some of the inspiring 2021 Lighthouse winners in these case examples:

Winner: CEPT Rayapuram and DuPont Water Solutions

Project: Zero Liquid Discharge at Tirupur Textile Factory, India

The city of Tirupur is known as India's leading cotton knitwear center and textiles capital, accounting for over 90% of the country's exports in this sector. In 2011, water issues reached a critical level in the region. The groundwater in the region was tainted and farmers were causing salinisation of the land from irrigation. CEPT Rayapuram partnered with 12 others and embarked on a long hard road to solve water issues from textile sector. They worked with DuPont Water Solutions to achieve ZLD to environment. Today, CEPT Rayapuram meets 90% of its water needs from recycled water, while salts are also recovered and reused in the dyeing process. This has led to savings on the volume of water used to wash and dye textiles and is relieving rivers of dye-polluted discharge, while protecting agricultural interests.

Winner: AB InBev [Project: Amunas - Revaluing Ancestral Heritage to Protect Water in Peru]

Over the past two years, multinational drink and brewing company AB InBev has begun the restoration of ancient water channels in Lima, Peru. These amunas, as the channels are called, are pre-hispanic water harvesting systems that may have been used by the Andean Wari culture as early as 700 AD. The company's ambition is to restore 67 km of amunas which have been mapped out across the Lima highlands, a region with high water stress. In 2020, AB InBev successfully restored more than 4 km; throughout 2021, they have completed restoration of another 10 km, which is currently generating more than 1 million cubic meters/year in Rimac basin, a critical potable water source for Lima and Callao regions.

Winner: Carlsberg [Project: The World's Most Water Efficient Brewery - Frederica, Denmark]

Carlsberg, the world-renowned brewer, has recently opened a water recycling plant which has made its Fredericia brewery in Denmark the most water efficient brewery in the world. In the Fredericia brewery, 90% of the process water is recycled, this will halve water use from 2.9hl per hl of beer to just 1.4 hl/hl, saving around 500 million liters of water a year.

Winner: Google [Project: Seawater Cooling System, Hamina Data Center, Finland]

Tech giant Google is using seawater in the cooling system of its Hamina Data Center to reduce potable water use. The Finnish site was originally a papermill, built in the early 1950s. For this initiative, raw seawater is taken directly from the Gulf of Finland and run through a repurposed seawater tunnel - built for the original papermill. It then goes through heat exchangers which use direct exchange to dissipate the server load heat from the data center. The seawater is then returned to a tempering building, which takes in fresh seawater, mixes it with the outgoing warmer water, returning it to the Gulf at a temperature similar to that at the inlet.

This process enables the site to use 100% natural seawater cooling, making it one of Google's most advanced and efficient data centers globally.

XYLEM REPORTS THIRD QUARTER 2021 RESULTS

Orders growth of 22% on a reported basis, 20% organically, from strong underlying demand across segments

SWWW Staff, USA



Xylem Inc has reported third quarter 2021 revenue of \$1.27 billion. Revenues grew 4 percent on a reported basis, and 2 percent organically. Strong global demand was moderated by supply constraints slowing order-to-revenue conversion.

Third quarter adjusted earnings before interest, tax, depreciation and amortization (EBITDA) margin decreased 30 basis points to 17.9 percent. Inflation and strategic investments were partially offset by productivity, price realization and cost containment. Xylem generated net income of \$114 million, or \$0.63 per share, and adjusted net income of \$116 million, or \$0.63 per share, which excludes the impact of restructuring, realignment and special charges.

Xylem now expects full-year organic revenue growth to be in the range of 3 to 4 percent, which would be approximately \$5.1 to \$5.2 billion on a reported basis.

Third Quarter Segment Results

Water Infrastructure:

Xylem's Water Infrastructure segment consists of its portfolio of businesses serving wastewater transport and treatment, clean water delivery, and dewatering.

Third quarter 2021 revenue was \$547 million, up 4 percent on a reported basis, and up 2 percent organically, compared with the same period in 2020. Strong growth in industrial end markets from broad pandemic recovery and demand in Emerging Markets offset some softness in the utility markets due to timing delays caused by supply chain disruptions.

Third quarter adjusted EBITDA margin was 21.2 percent, up 100 basis points versus the prior year period. Reported operating income for the segment was \$101 million and adjusted operating income, which excludes \$1 million of restructuring and realignment costs, was \$102 million.

The segment reported operating margin was 18.5 percent, up 150 basis points versus the prior year period. Adjusted operating margin rose 10 basis points to 18.6 percent. Strong productivity savings and price realization offset inflation and supply chain constraints.

Applied Water:

Xylem's Applied Water segment consists of its portfolio of businesses in industrial, commercial building, and residential applications.

Third quarter 2021 revenue was \$400 million, up 10 percent on a reported basis, and up 8 percent organically, compared with the same period in 2020. Broad reopening activity drove strong demand in industrial and commercial end markets compared to COVID-19 challenges in the prior year.

Third quarter adjusted EBITDA margin was 17.0 percent, down 60 basis points from the prior year period. Reported operating income for the segment was \$60 million and adjusted operating income, which excludes \$2 million of restructuring and realignment costs, was \$62 million. The segment reported operating margin was 15.0 percent, down 40 basis points versus the prior year period. Adjusted operating margin decreased 40 basis points to 15.5 percent. Inflation, supply chain disruption and investments more than offset productivity benefits and price realization.

Measurement & Control Solutions:

Xylem's Measurement & Control Solutions segment consists of its portfolio of businesses in smart metering, network technologies, advanced infrastructure analytics and analytic instrumentation.

Third quarter 2021 revenue was \$318 million, down 4 percent on a reported basis, and down 5 percent organically, compared with the same period in 2020. Soft performance in the business was driven by chip supply shortages impacting our smart metering business, partially offset by demand in water quality testing applications and pipeline assessment services businesses.

Third quarter adjusted EBITDA margin was 14.2 percent, down 60 basis points from the prior year period. Reported operating income for the segment was \$7 million and adjusted operating income, with \$1 million restructuring and realignment income in the quarter, was \$6 million. The segment reported operating margin was 2.2 percent, up 2,090 basis points versus the prior year period. Adjusted operating margin decreased 170 basis points to 1.9 percent. Volume declines from component shortages and higher inflation offset productivity and price realization.

“Global demand for water solutions continues to be robust, across our business”, said **Patrick Decker, Xylem's president and CEO. “The team capitalized on that broad-based underlying demand, delivering strong growth in new orders and backlog in all segments. This positions us well to achieve our 2025 growth and strategic milestones, which we outlined at our investor day, last month.”**

“The team has done an outstanding job managing inflationary effects with productivity and cost discipline, delivering solid margin and earnings performance. Nevertheless, we foresee the global supply challenges continuing – particularly the chip shortages being experienced across the technology sector.”

LANXESS ANNOUNCES RESULTS FOR THIRD QUARTER OF 2021

- Sales up 33.5 percent year-on-year at EUR 1.951 billion
- EBITDA pre exceptionals increase 44.0 percent to EUR 278 million
- Earnings increase in all segments – Specialty Additives and Engineering Materials particularly strong
- Increased raw material prices successfully passed on, but rising energy prices and high freight costs weigh on earnings
- EBITDA pre exceptionals for 2021 expected to be at the lower end of the guided range of EUR 1 billion to EUR 1.05 billion

SWWW Staff, Germany

EUR million	Q3 2020	Q3 2021	Change %	9M 2020	9M 2021	Change %
Sales	1,461	1,951	33.5	4,601	5,475	19.0
EBITDA pre exceptionals	193	278	44.0	662	797	20.4
EBITDA margin pre exceptionals	13.2%	14.2%		14.4%	14.6%	
Net income	26	74	>100	888	238	-73.2
from continuing operations	25	68	>100	891	208	-76.7
from discontinued operations	1	6	>100	-3	30	>100
Net financial liabilities				1,012*	2,343	>100
Employees**				14,309*	14,866	3.9

*As of December 31, 2020

**Employed in continuing operations as of the reporting date

Specialty chemicals company LANXESS holds its own also in a challenging environment: Despite a sharp rise in raw material, energy and freight costs, EBITDA pre exceptionals in the third quarter of 2021 increased by 44.0 percent to EUR 278 million, against EUR 193 million in the prior-year quarter.

The strong earnings were driven by all segments – especially Specialty Additives and Engineering Materials. LANXESS passed on the significantly increased raw material prices via higher selling prices. The three acquisitions completed in this fiscal year, especially that of Emerald Kalama Chemical, also contributed to the good results. Adverse exchange rates, mainly from the U.S. dollar, but especially higher energy and freight costs prevented a further increase in earnings. The EBITDA margin pre exceptionals increased to 14.2 percent in the third quarter, against 13.2 percent in the prior-year quarter.

With an increase of 33.5 percent year on year, LANXESS

generated sales of EUR 1.951 billion in the third quarter of 2021. At EUR 68 million, net income from continuing operations was higher than in the third quarter of 2020, in which LANXESS generated EUR 25 million. This was due to the good development of the operating businesses and the contribution of Emerald Kalama Chemical.

Increasing Demand and Prices Drive Earnings

Thanks to higher selling prices due to the passing on of increased raw material costs and continued good demand, the Advanced Intermediates segment posted higher sales in the third quarter of 2021. They rose by 28.7 percent from EUR 414 million to EUR 533 million. The segment's EBITDA pre exceptionals reached EUR 84 million, 18.3 percent higher than the prior-year figure of EUR 71 million, even though earnings were burdened by energy prices, which increased particularly in this segment, as well as higher freight costs and adverse exchange rate effects. The EBITDA margin pre exceptionals declined to 15.8 percent, against 17.1 percent in the prior-year quarter.

The Specialty Additives segment benefited from higher selling prices and improved demand in all business units. Sales in the third quarter of 2021 grew by 29.8 percent from EUR 466 million to EUR 605 million. Although earnings were burdened by increased freight costs and adverse exchange rate effects, EBITDA pre exceptionals was up 72.9 percent on the prior-year level of EUR 59 million. At EUR 102 million, the segment even achieved the best result in its history. The EBITDA margin pre exceptionals reached 16.9 percent, against 12.7 percent a year ago.

Due to higher selling prices and increased sales volumes, the Engineering Materials segment generated significantly higher sales; this was due in particular to the continued very good demand from the automotive industry. Sales increased by 53.0 percent from EUR 285 million in the third quarter of the previous year, which was heavily affected by the pandemic, to EUR 436 million. Although higher energy and freight costs had a negative effect on earnings, EBITDA pre exceptionals in this segment increased by 87.9 percent from EUR 33 million to EUR 62 million. The EBITDA margin pre exceptionals thus amounted to 14.2 percent, against 11.6 percent a year ago.

“The third quarter of this year was again characterized by growth. Our operating business continued to develop positively, and we successfully passed on the significantly increased raw material costs. With the announced acquisition of IFF Microbial Control, we will also be significantly expanding our Consumer Protection segment again in the future. This will make us more stable and more profitable,” said Matthias Zachert, Chairman of the Board of Management of LANXESS AG. “However, the unprecedented increase in energy, raw material and freight costs is not leaving us unscathed. We expect the cost pressure to even increase in the fourth quarter.”

GRADIANT RAISES OVER USD 100 MILLION IN NEW FUNDING

- Warburg Pincus and Schlumberger New Energy lead the funding round
- Funding will be used for strategic growth opportunities, project-level financing, technology deployment, and opportunistic acquisitions

SWWW Staff, USA

Gradiant, a global end-to-end cleantech water treatment solutions provider and projects developer, has announced that it has raised over \$100 million in Series C funding. The round was led by financial and strategic partners Warburg Pincus and Schlumberger New Energy and was oversubscribed from its initial target of \$65 million. The round brings Gradiant's total funding to date to over \$200 million since inception.

Gradiant develops and delivers advanced water and wastewater treatment facilities around the world. The company offers a broad portfolio of proprietary and patented technologies and services for end-to-end cleantech solutions that focus on water reuse, resource recovery, brine concentration for minimum and zero liquid discharge (MLD / ZLD), and digital solutions for plant performance optimization. Gradiant offers flexible models for the design-build, operate-maintain, and financing of projects based on customers' specific needs and situations.

"Gradiant is on an exciting growth trajectory, led by a strong management team with a deep understanding of the water solutions required for their customers to increase sustainability in the supply chain," said Roy Ben-Dor, Managing Director at Warburg Pincus.

"Gradiant's consistent success is a reflection of the progress the team has made in offering differentiated and effective cleantech water solutions to the top brands in the world," added Jeff Luse, a Principal at Warburg Pincus who will also join the company's Board of Directors.

"We look forward to collaborating with Gradiant's expertise in resource management & recovery and advanced wastewater treatment through synergies in technology and strategic markets," said Ashok Belani, Executive Vice President, Schlumberger New Energy. "Gradiant offers game-changing clean water solutions which we can leverage moving towards our shared vision for a sustainable future."

"Our customers are global Fortune 100 brand owners in core markets and industries," said Anurag Bajpayee, Co-Founder and CEO of Gradiant. "With the common theme that they consume and treat incredible amounts of water for mission-critical operations that make the world go round for their essential products and services. Our customers are increasingly facing financial and social pressures to lead sustainable development by maximizing water reuse & resource recovery and minimizing discharges to the environment and energy usage."

ENDRESS+HAUSER AND ISA COLLABORATE TO OFFER EXTENDED TRAINING SERVICES

Endress+Hauser's Process Training Units to host ISA certified training courses starting fall of 2021.

SWWW Staff, USA



Endress+Hauser and ISA (International Society of Automation), a non-profit professional association for leaders in industrial automation have announced their current and future collaboration efforts for training and certification. ISA will provide select certified training courses in conjunction with Endress+Hauser's instrumentation training courses, with these courses offered onsite at Endress+Hauser's process training units (PTUs) located across the U.S. "Combining a selection from the deep ISA training offering with the many choices of instrumentation training provided at Endress+Hauser's world-class PTUs provides a powerful set of options for instrument technicians who need help with their professional development," says Jerry Spindler, customer training manager, Endress+Hauser USA.

Combining Strengths for Advanced Offerings

With the goal of advancing training of process industry personnel, Endress+Hauser has designed and built 11 PTUs across the United States.

Additional Offerings for a Tailored Approach

To get the most out of training, it's important for learners to understand their specific needs because what strengthens one company's employees may not be necessary for another. To address this and other issues, Endress+Hauser and ISA have co-developed an online assessment tool for customized training. Designed for convenience and ease-of-use, the assessment generates a report highlighting personnel strengths and knowledge gaps for an organization.

"We are thrilled to collaborate with Endress+Hauser and leverage the strengths of our respective organizations," says Geri McGrath, Director of Global Education and Outreach at ISA. "The combination of Endress+Hauser's PTUs and ISA's training services offers increased workforce development opportunities for industrial automation and control professionals."

SEEQ APPOINTS DR. LISA J GRAHAM AS NEW CEO

Graham brings more than 20 years of process industry experience, along with demonstrated success driving growth and innovation at Seeq.

SWWW Staff, USA



Seeq Corporation which provides manufacturing and Industrial Internet of Things (IIoT) advanced analytics software has announced that the company's board of directors has appointed former Chief Operating Officer Dr. Lisa J. Graham, PE as Chief Executive Officer, effective immediately. Former CEO and co-founder Steve Sliwa will remain at Seeq in an advisory role as vice chairman and co-founder. Seeq also appointed Ashley Kramer to the company's board of directors.

Graham previously served as COO and VP of Analytics Engineering at Seeq, where she played an instrumental role in executing the company's vision to fuel the digital transformation of the process industries. This required empowering Seeq's customers to bridge the gap between their operational technology and information technology teams through the use of easy-to-use, advanced analytics applications.

"We recognize that this is a crucial time in Seeq's evolution, and the board of directors strongly believes that Lisa's combination of skills will take Seeq to the next level," says Pete Higgins, founding partner of Second Avenue Partners and chairman of Seeq's board of directors. "She has made supporting and growing this organization and its people her daily focus since coming to Seeq, and we look forward to supporting her passion and focus as we embark on this next chapter."

"I am honored to step into the role of CEO at such a pivotal time in our company's growth," says Dr. Graham. "I look forward to working with the Seeq team and its board of

directors to continue accelerating our business growth, while delivering great value to every one of our customers."

SOUTHERN NEVADA WATER AUTHORITY, WATERSTART PILOT INTELLIGENT WATER SYSTEM SOLUTION

Xylem solution to help optimize water system operations, water quality, energy and operating costs.

SWWW Staff, USA

Applying an emerging, innovative digital solution for water utilities, WaterStart and the Southern Nevada Water Authority (SNWA) have partnered with Xylem, a leading water technology company, to pilot test Xylem's Water Network Optimization solution, part of the Xylem Vue digital portfolio, aimed at helping increase efficiencies and optimize the operation of Southern Nevada's water systems. Through the joint test project, SNWA will evaluate the capabilities of the Water Network Optimization solution to improve energy management strategies, enhance system performance, and reduce operating and maintenance costs of Southern Nevada's regional water system.

Through this partnership, Xylem will develop a real-time, highly-accurate model of SNWA's water system that integrates operational data to help SNWA optimize operational processes, reduce energy use, assess water infrastructure condition, and/or address complex operational challenges in a safe and controlled environment. The Xylem system will help guide existing SNWA operations staff with timely recommendations.

"Xylem's Water Network Optimization solution uses operational systems, GIS, and sensor data combined with hydraulic modeling to study and manage the water system as a whole. Up until now, there hasn't been anything overarching for complex water systems like that operated by SNWA," said WaterStart Executive Director Nathan Allen. "If successful, this joint test project may help revolutionize how the water industry manages its operations."

"We are delivering an intelligent technology solution that helps water utilities like SNWA make informed decisions about their operations," said Rocio Echeverria, Vice President and General Manager at Xylem. "This provides water utilities with greater certainty about their system operations and increases the reliability of water service for customers."

The SNWA expects the intelligent water system joint test project to be completed in 2022.



"Southern Nevada's regional water system is multi-faceted and highly advanced with complex infrastructure networks and system

controls that help ensure safe and reliable distribution of high-quality water throughout our community," said Dave Johnson, SNWA Deputy General Manager of Operations. "While our system is quite efficient, this pilot project will enhance our operations through water system modeling, allowing us to increase operational efficiencies that benefit local water users and rate payers."

GRUNDFOS BRINGS EFFICIENT PUMPING SOLUTIONS TO NEREDA WASTEWATER CUSTOMERS

Company named as Royal HaskoningDHV's Preferred Supplier for pumping solutions.

SWWW Staff, Denmark



Grundfos, a leader in pumps and water solutions has announced that it has been selected by Royal HaskoningDHV as 'Preferred Supplier' to its award-winning Nereda wastewater treatment technology. This formal agreement will allow Grundfos to be listed as the Preferred Supplier of pumping solutions for Royal HaskoningDHV's Nereda Wastewater Technology offerings.

Nereda is the sustainable and cost-effective wastewater treatment technology that purifies water using the unique features of aerobic granular biomass. With over 90 projects completed or being delivered across the world, Nereda is a well-established technology for both municipal and industrial use. Through this partnership, Grundfos and Royal HaskoningDHV will be working closely together in bringing the highest quality and the newest innovation to the wastewater industry.

Commenting on this strategic alliance, Henrik Sonesson, Global Key Account Director - Water Utility, Grundfos, said "Reliability is key when it comes to collecting, transporting and treating

wastewater. Our products and solutions for wastewater transport and the wastewater treatment plant build on reliability, modularity and energy-efficiency from optimized pump systems and fully integrated solutions. Based on the successful implementation of Grundfos' solutions across various Nereda Wastewater Technology plants across South Africa, the UK and the Netherlands, we are happy to be selected as their Preferred Supplier for their projects globally."

Adding to this, René Noppeney, Global Director of Water Technology Products at Royal HaskoningDHV, said "Our goal is to continually improve the technology and services that Nereda Wastewater Technology provides to our customers. This is made possible through our Preferred Supplier program that establishes collaborations with industry leaders, such as Grundfos. By adding Grundfos to our Preferred Supplier program we are not only providing our customers with the option of reliable and efficient pumping solutions, but aim to promote inter-technology research and development, to enhance our joint offerings on Nereda projects."



RAFTELIS ACQUIRES WESTIN TECHNOLOGY SOLUTIONS

SWWW Staff, USA

Raftelis has acquired Westin Technology Solutions this month to enhance its consulting focus on the effective use of business technologies including utility billing and work and asset management optimization.

"Adding Westin's expertise in utility asset and customer management technologies complements what we already do and allows us to provide new services to our utility clients in a particularly difficult area - managing the planning, selection, and implementation of modern utility billing and maintenance management solutions to replace outdated, sub-optimal systems," said Raftelis President and CEO Peiffer Brandt. "Together we can better serve water and wastewater utilities that need to evaluate, upgrade, replace, or optimize their CIS (Customer Information System) or CMMS (Computerized Maintenance Management System) solutions."

SUBSCRIPTION FORM



Yes! I want to ☐ Subscribe

Payment Details:

Cheque No./DD No. _____
(in favor of "Beyond Expectations") _____ drawn
on (bank name) _____
dated _____ for Rs. _____
(payable at Mumbai/par)

Note:

- All payments to be made by DD/Cheque/NEFT/RTGS only, in favour of "Beyond Expectations"
- Account details: M/s. SWWW Media Private Limited
NKGSB Co-op Bank Ltd., New Matru Ashish CHS, Navghar Road, Bhayander (E), Dist - Thane 401105; Maharashtra | India
A/c No.: # 014111010002071,
IFSC Code: NKGS0000014, MICR: 400086014
- SWIFT Code: NKGSINBBXXX.
GST Regn. No.: 27AAAP10626E1ZB,
PAN: AAAP10626E, SAC: 998596.
- DDs should be payable at Mumbai.
- Please add Rs. 20/- for cheques from outside Mumbai.
- Kindly allow 4-5 weeks for delivery of first issue.

Mail this form to:

Subscription Cell- Beyond Expectations
Off # B-305, Gopinath Smruti CHS Ltd. Goddeo,
Bhayander (East),
Dist. Thane 401 105, Maharashtra
Email: info@smartwww.in

Tick Terms	News Stand Price	Subscription Offer	You save
1 Year (6 issues)	600/-	500/-	100/-
2 Year (12 issues)	1200/-	1000/-	200/-
3 Year (18 issues)	1800/-	1500/-	300/-
5 Year (30 issues)	3000/-	2500/-	500/-

International Subscription Rate for 1-year: US\$ 250

Mailing Address: _____

Name: _____

Company name: _____ Designation: _____

Address: _____

City: _____ State: _____ Pin: _____

Phone: _____ Fax: _____ Mobile no: _____ E-mail: _____

Payment enclosed Cheque/Demand Draft No: _____ Dated: _____

For Rs.: _____

For Official Use: _____

Bp No: _____ Order No: _____ Docket No.: _____ Period: _____

SUBSCRIBE

www.smartwww.in



BEYOND EXPECTATIONS
SMART
WATER & WASTE WORLD

BE SMART WITH WATER. GET ON THE SMART BANDWAGON

PARTNER WITH **SWWW**

REACH THE DECISION MAKERS IN WATER SECTOR



The Jal Sabha brings together the senior decision makers from the Water, Waste and Urban Development teams from across municipal corporations, nodal agencies and state governments at an offshore retreat in a hosted model.

i-WeT-Series Seminars (Industrial Water & Effluent Treatment)

A platform to present technology expertise and share case studies implementation to a target audience from industrial sectors



Print | Digital | Events

Enjoy the
3x
Advantage



www.smartwww.in

BEYOND EXPECTATIONS
SMART
WATER & WASTE
WORLD

FOR EDITORIAL
please contact Mayur at
mayur@smartwww.in
+91 93574 96034

FOR SALES
please contact Kailash at
kailash@smartwww.in
+91 90044 12910

FOR MARKETING
please contact Bhaskar at
bhaskar@smartwww.in
+91 99207 48268

SWWW
MEDIA

Office# B - 305, Gopinath Smruti CHS Ltd. Goddeo, Bhayander (E), Dist - Thane 401105. Maharashtra | India

Touching millions of lives every day through sustainable water solutions.

Our comprehensive solutions



90+ years of industry expertise | Indian multinational with presence in 4 continents |
More than 100 patents | 3 R&D centres | 6000+ industrial and municipal projects |
European technologies at affordable cost

VA TECH WABAG LIMITED

WABAG HOUSE

No. 17, 200 Feet Thoraipakkam - Pallavaram Main Road,
Sunnambu Kolathur, Chennai - 600117.



sustainable solutions. for a better life.



wabag@wabag.in



+91 44 6123 2323



www.wabag.com