

Speakers' Profile & Abstract

Day 2: 20 November 2024 (Wednesday)

Taming Sari 1 & 2

Panel Discussion

What Needs to Change to Enable Effective NRW Management in Malaysia

NRW in Malaysia has remained relatively constant over the past 20 years, despite investments from the Federal Government, State Governments and Private investors. The last series of Federal projects was aimed at establishing a baseline in NRW, enabling a second phase of projects to reduce NRW from these measured baseline levels. This discussion is aimed at determining whether anything has intrinsically changed in NRW Management over the past 20 years, what else needs to change to enable effective NRW reduction, and how low should Malaysia be aiming to reduce its NRW to.

The Panel will include senior utility staff, Government representatives, regulators and NRW experts.

Anuar Abdul Ghani

Chief Executive Officer,
Ranhill SAJ

Anuar Abd Ghani is the Chief Executive Officer of Ranhill SAJ, bringing over 30 years of dedicated service in the water supply industry. He holds a Bachelor degree in Civil Engineering (Hons) from UTM University of Technology Malaysia and a Diploma in Civil Engineering from UITM University Institute of Technology MARA.

Since taking on the CEO role in May 2024, Anuar has focused on fostering a culture of collaboration and innovation within the organization. His previous experience as Operations Director from January 2020 to December 2023 allowed him to work closely with various departments to streamline operations and enhance service delivery for the communities served by Ranhill SAJ. His extensive background includes pivotal roles such as Production and Distribution General Manager and Head of Departments for Production, Network & Distribution, and Non-Revenue Water (NRW).

Anuar is a long-standing member of both the International Water Association and the Malaysia Water Association, where he actively participates in initiatives to promote sustainable water management practices. His international experience includes meaningful contributions to operational audits in the Holy City of Mecca, Saudi Arabia, and capacity-building programs in the Philippines and Indonesia.

With a strong commitment to community service and environmental stewardship, Anuar Abd Ghani is respected for his strategic approach and unwavering dedication to improving water supply solutions, ensuring that Ranhill SAJ continues to meet the needs of its customers with humility and integrity.



Panelist

Kelvin Siew

Head of NRW Department,
Pengurusan Air Selangor Sdn. Bhd.

Kelvin Siew is the Head of NRW Department in Air Selangor, Malaysia's leading water operator serving a population of 9.2 million consumers in the state of Selangor, Federal Territories of Kuala Lumpur and Putrajaya. He has 21 years of experience in the water industry; particularly in the fields of water distribution and non-revenue water (NRW).

He is now overseeing non-revenue water reduction, customer billing services and enforcement in line with Air Selangor's strategic plan initiatives towards sustainable NRW reduction, improving operational efficiency and delivering the best experience to our customers.

Kelvin graduated with a BEng (Civil) and has been involved in many facets of the water industry including NRW reduction, water distribution, water quality, water supply planning, customer billing services, crisis management as well as management roles at both regional offices and headquarters.

He is passionate in seeking and applying new emerging technologies in continuous efforts to provide clean water supply to customers in a more efficient and sustainable way. He was previously appointed to Senior Utility Advisory Group of Smart Water Network Forum (SWAN), representing Asia Pacific region. Mr. Kelvin also recently presented a paper at IWA Water Loss 2024 held at San Sebastian, Spain in April 2024 as well as invited as a panelist for Vietwater 2024.



Panelist

Joe Lim

Director, Pipeline & Network Service Line
Stantec, Taiwan

Joe Lim has more than 20 years of experience in the water-related engineering industry, in a wide range of projects including hydraulic modelling, DMA (District Metered Area) planning, transmission water mains design, stormwater sewerage planning & design, wastewater sewerage planning, design & construction management, and alternate project delivery management. His international experiences include Malaysia, Singapore, India, China etc.

Before joining Stantec (legacy MWH) in 2003, he worked as a research assistant in the National Taiwan University (NTU). In the following years, Joe has been extensively involved in projects such as evaluating stormwater sewerage with the aid of hydraulic modelling software, proposing upgrade schemes, and carrying out the planning and design works for water-related pipeline system.

Joe specialises in network modelling, managing projects with multi-interface tasks and has good people and team management skills. He currently heads Pipeline & Network (PN) Service Line, and he also plays an important role in managing quality of project delivery.



Panelist

Uri Gutermann

CEO
Gutermann AG

Uri Gutermann is CEO at Gutermann, a leading manufacturer of acoustic leak detection technology and intelligent water loss solutions, based in Switzerland. Uri joined the family business in 2011. In his former career, he worked as consultant at the strategy consulting firms McKinsey & Company and KPMG and as a banker in the Leveraged Finance practice of CIBC World Markets and in the Agribusiness sector team of the European Bank for Reconstruction and Development (EBRD). Uri holds a Masters degree in international business from the University of St. Gallen, Switzerland, and an MBA from INSEAD in Fontainebleau, France.



Panelist

Gary Wyeth

Secretary
IWA Water Loss Specialist Group
Wyeth Water Consultants

Mr Wyeth graduated from Portsmouth University in 1991 with a Master of Engineering Degree in Civil Engineering.

He has 30 years experience in the water industry, with 26 of those years whilst working in South-East Asia. During this period Mr Wyeth has gained member status of the CIWEM (UK), is a Chartered Engineer, has gained a Graduate Diploma in International Operational Management and is the current Secretary of the IWA Water Loss Specialist Group

Mr Wyeth Started his career as a network modeling engineer for Bewater International and through this built up an expertise in how water supply systems operate. He then moved into NRW management, with Thames Water International and Ranhill Water Systems, gaining further expertise in leakage control, DMZ design & implementation, system monitoring, customer metering and production metering.

He also established the APAC regional office for i20 Water, specialists in advanced pressure management, where he was APAC managing director for 4 years. He further improved his experience of pressure management whilst managing the regional office for Singer Valves, a manufacturer of pressure control valves.

He is currently the Managing Director of Wyeth Water Consultants a Malaysian based NRW Management Company.



Moderator

Speakers' Profile & Abstract



Richard Taylor,
Principal Engineer- Water,
Thomas Consultant

Biography

Richard Taylor is a civil engineer with over 35 years experience in the operation and management of water supply networks. For 22 years he worked for a water supply network operator in Auckland, and for the last fourteen years Richard has been consulting in the area of water loss management and Non-Revenue Water for water suppliers around New Zealand. He has also completed several asset management assignments in the Pacific Islands.

Richard is now involved in training and organises national two-day water loss training events held every two years, and runs on-line water supply network training courses. He was also the lead author of the recently updated 'Water New Zealand Water Loss Guidelines'.

Abstract

Fresh Thinking on Private Water Tanks

Household private water tanks are common in many countries around the world, including Asia. These were traditionally installed to provide a more reliable supply of water by having on-site storage available when the public water supply was intermittent or unreliable. Should this be reviewed? Is this still an optimal solution? Furthermore, the low flows which occur when tanks are filling are often not able to be recorded accurately resulting in high levels of commercial losses (i.e. water meter under-registration). Reverting to on-demand supply would help resolve this metering issue.

This presentation will take a fresh look at private water tank systems, asking questions such as:

- Is emergency storage still necessary? How reliable has the public water supply become?
- Would customers prefer (and possibly pay more) for an on-demand supply if showers and taps operated better, and higher flows were available?
- Would household water use (including leakage) increase, and by how much, if a household changed from private tank to on-demand supply?
- What would be involved operationally for a water supplier to convert a supply area (or even individual properties) from private tanks to direct on-line supply? Is there sufficient network capacity available?
- If private tanks are to be retained, is a new ultra-low flow meter needed to record tank flows very accurately, to reduce commercial losses to low levels?
- Could these 'ultra low-flow' meters also act as a restrictor and limit maximum flows with water supply operational benefits?
- This presentation will hopefully stimulate interest, discussion and debate regarding these issues.

Speakers' Profile & Abstract



Andy Ko Seng Yang,
Sales Manager,
Premier Water Services Sdn. Bhd.

Biography

Andy Ko Seng Yang is presently the Sales Manager for Premier Water Services (PWS), which is a fastgrowing company focused mainly on water solutions with core on smart data acquisition, innovation in metering solutions and automated pressure controllers.

Together with the company, he has continued to lead a change in the water supply industry including being a pioneer in Malaysia in educating the prerequisite for higher metrology, improved reliability metering and kick-start the successful movement of smart water metering in Malaysia.

A combination of >10 years of dedication and passion, and with the continuous input from meetings and discussions with water industry players continues to provide him with shared insights and ideas to continue to advice and lead the change for water digitalization and management.

While acknowledging that complacency in technology is a hurdle, understanding that every water operation has different difficulties and challenges to overcome is still his priority in providing the optimum solution and advice to each individual scenario.

Abstract

Customer Metering and Billing

With the escalating focus on water resource conversation, the landscape of water management is undergoing a profound transformation. As Non-Revenue Water (NRW) continues to reduce to lower percentages, the feasibility of further reduction via conventional methods diminishes and changes to digitalization of the water network is becoming necessary. Leading this change are smart water meters serving a new era characterized by efficiency, sustainability, and intelligent resource allocation. At the core of this innovation are drive-by accurate water meters with reliable lifespan, while utilizing automated meter reading/ automated meter infrastructure (AMR/AMI) technology. This in turn reduces conventional metering challenges; while optimizing capital and operational expenditure. Representing a significant leap forward in water management technology, these devices harness cutting-edge modules with wired/wireless communication, and data analytics to capture data and alarms into water consumption pattern. Smart water meters empower both consumers and utility providers with a wealth of information, fostering a more informed and sustainable approach to water consumption; thus, becoming a recent popular topic in the water segment.

However, the major question is, what is the priority on metering to each individual water operation and the various different scenarios met? What is deemed important and how do we decide what should be focused on and to be considered? Is it commercially and technically sensible at the current moment and sustainable in the long run? The topic will take into the account the cores of smart metering, from the water meter itself to the smart modules and its subsequent online informative platforms.



Nur Amira Murad,

Special Projects Manager | Non-Revenue Water, Deca Solutions Sdn. Bhd.
IWA MWA Young Water Professionals Malaysia

Biography

Nur Amira Murad is a registered engineer with the Board of Engineers Malaysia (BEM) and holds a Bachelor's in Engineering (Hons) Civil from Universiti Tun Hussein Onn Malaysia, Batu Pahat, Johor. She currently serves as the Special Projects Manager at Deca Solutions Sdn Bhd, specializing in Non-Revenue Water (NRW) management and advanced water solutions. Her focus is on implementing innovative technologies for pressure management and leakage detection to optimize Malaysia's water distribution systems. Amira's career in NRW management began with comprehensive training, where she focused specifically on NRW reduction projects. She has successfully led numerous initiatives to reduce NRW through advanced pressure management and leak detection techniques, significantly improving the operational efficiency of water utilities.

Beyond her technical expertise, Amira is passionate about promoting youth involvement in the water industry. As an active member of the MWA IWA Young Water Professional Malaysia, she has led initiatives that emphasize the role of young people in addressing Malaysia's water challenges, including organizing events and fostering discussions on water loss and sustainable practices. Her contributions have played a significant role in advancing Malaysia's water sector, particularly in reducing NRW and optimizing water systems, while also mentoring the next generation of water professionals.

Abstract

Managing Non-Revenue Water in a Youth Perspective

Begin by framing NRW as more than just a technical problem; it is a critical issue for future generations and a pressing environmental and social challenge. Emphasize that youth today are coming of age in an era of climate crisis, where every resource is increasingly precious. NRW affects community resilience, economic development, and environmental sustainability which is key values held by the youth.

Young people see NRW management as a means to secure a more sustainable world. With growing urban populations and climate volatility, reducing NRW is essential not only for current infrastructure efficiency but also for safeguarding future water supplies. Youth recognize that poor NRW management is a missed opportunity to preserve resources, fight climate change, and build equitable access to clean water. This presentation delves into the critical issue of Non-Revenue Water (NRW) in Malaysia, emphasizing the transformative role that youth can play in pioneering advanced technological solutions to mitigate water loss and enhance system efficacy.

The presentation outlines several state-of-the-art strategies where youth can drive significant innovation. A key focus is the deployment of the Internet of Things (IoT) to enable smart metering systems, which facilitate real-time monitoring, automated leak detection, and precise consumption analytics, empowering utilities to adopt proactive, data-driven strategies for optimizing water distribution and minimizing waste. The application of Geographic Information Systems (GIS) for sophisticated hydraulic network modeling enables the identification of high-risk zones prone to leakage. By integrating predictive analytics and machine learning algorithms, the youth can significantly enhance the power to forecast system failures and optimize maintenance schedules, thereby mitigating operational downtime.

The presentation also emphasizes the utility of non-invasive leak detection technologies, such as acoustic emission (AET) and pressure transient analysis, which enable precise, real-time identification of hidden leaks within the distribution network. Additionally, the integration of pressure optimization systems, including variable frequency drives (VFDs) and pressure-reducing valves (PRVs), ensures the stabilization of system pressure, preventing over-pressurization and minimizing burst risks. In conclusion, youth-driven engineering innovations, underpinned by these cutting-edge technologies, are poised to play a pivotal role in reducing NRW, optimizing water resource management, and securing Malaysia's long-term water sustainability.



Ts. Zaulkarnain bin Abd Manap,

Head Division Of Network & NRW,
Ranhill SAJ

Biography

Ts. Zaulkarnain Abd Manap has been working in the water industry for more than 30 years. Following his graduation from Universiti Teknologi Malaysia (UTM) with a Bachelor of Science in Civil Engineering, he has developed a noteworthy career, beginning as a technical assistant and rising to the position of division leader for the preceding five years.

Zaulkarnain's proficiency in water asset management and non-revenue water (NRW) control is acknowledged by the Malaysia Board of Technologist (MBOT) and the Board of Engineers Malaysia (BEM), where he is a registered member. He participates actively in the Malaysia Water Association (MWA) as well.

His extensive knowledge and managerial skills make him a valuable asset in the water management sector, and he is dedicated to advancing sustainable practices within the industry.

Abstract

Case Study on the Efficiency of Pipe Rehab Program 2018/2019

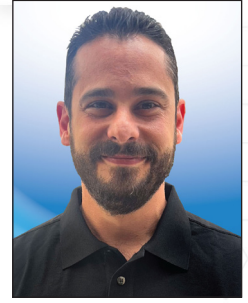
Pipe rehabilitation is one of the major activities in NRW reduction program. However, it has to be executed diligently in order to achieve the desired objectives. Generally, a pipe rehabilitation program can benefit in more than just leakage reduction. It could result in better service level and reduced maintenance cost.

To ensure an effective long term investment, RSAJ has embarked on a small scale pipe rehabilitation program to study the dos and the don'ts, and to find out the best methodology in order to achieve the objectives.

These findings are then planned to be implemented in the big scale pipe rehabilitation program. However, as the size of contracts got bigger with limited time frame, the execution proved to be more challenging than expected with less than desired results.

This paper will discuss the comparison between the two pipe rehabilitation approaches with the associated challenges.

Speakers' Profile & Abstract



Albert Carmenate,

Chief Geoscientist and Global Sales Manager,
Terra 15 Technologies Pty. Ltd.

Biography

Albert Carmenate is the Chief Geoscientist and Sales Manager at Terra15, a leader in distributed acoustic sensing technology for infrastructure monitoring. With a robust background spanning over eight years in geophysics, structural geology, and business development, Albert has made significant strides in applying fiber optic technology for urban water management and leak detection. At Terra15, he manages a global sales team and deployment of the Treble interrogators, which detect vibroacoustic signals on fiber optic cables to monitor infrastructure integrity.

As a passionate professional he enjoys sharing insights gained from deploying fiber optic technology across large urban networks, focusing on the successes, challenges, and critical considerations for implementing such systems at scale. His expertise in integrating advanced geophysical solutions has positioned him as a key figure in sustainable infrastructure monitoring, helping cities manage water resources more effectively and reduce water loss.

Abstract

City Scale Fiber Optic Leak Detection - Lessons Learned

Since November 2019, Terra15 has been utilizing Distributed Acoustic Sensing (DAS) technology to detect pipeline leaks. This approach involves using a single fiber optic cable, often tens of kilometers long, as a "listening array" that can pinpoint sounds and vibrations at specific locations along the pipeline to within several meters.

One of the key advantages of DAS is its suitability for monitoring long linear lengths, making it an ideal solution for pipelines. Additionally, existing fiber optic cables are often already in place near many pipelines, providing a convenient opportunity to deploy DAS without additional infrastructure costs. Installing new fiber optic cables with new pipelines can also be done at a very low cost.

Proactive leak detection enabled by DAS allows utilities to extend the lifespan of aging assets, respond quickly to hidden leaks, and prioritize pipeline renewal programs. A case study in one central business district has shown promising results. Terra15 is currently monitoring approximately 60% of the pipelines in this area and has detected a wide range of water usage patterns and leaks, including non-visible leaks that eventually developed into bursts. Other notable detections include high-rise building leaks, broken valves, and hydrant usage during fires.

DAS's real-time detection capabilities are particularly notable, as it can identify leaks that account for less than 1% of the pipe's flow. Recently, Terra15's technology successfully directed crews to a leak in a newly commissioned water pipeline, allowing for fast repairs. Large pipes are ideal candidates for DAS due to the limited number of suitable technologies available for sensitive leak detection.



Mark Nicol,

Director,
Nicol Consulting Services Pte. Ltd.

Biography

Mark has 22-years of experience in the water industry, crossing multiple geographies, cultures, and levels of development. Having worked as a Network Engineer for Thames Water in the UK, Mark relocated to Malaysia in 2007 to join Ranhill Water Services as Network Modelling Manager, where he was responsible for establishing and leading the modelling department and delivering projects in Malaysia, India and Indonesia.

In 2011 Mark joined Mueller Water Products to lead the expansion of the recently acquired Echologics, initially in the Asia Pacific region and later also in the European and Latin American regions

In September 2023 Mark established Nicol Consulting Services which provides bespoke consulting services to connect innovative technology companies with end clients in the Asia Pacific region.

Mark has a BSc in Geography and a MCs in Surface Water Modelling and Management from the University of Reading, and an Executive MBA from Henley Business School.

Abstract

Utilising Pipe Condition Technologies to Assess Remaining Asset Life and Prioritising Pipe Replacement Works

Keywords: Water network asset management, data-driven insights, emerging technologies, cost optimization, service reliability, smart networks, condition assessment

Aging infrastructure, budgetary constraints, climate change, and ever-evolving customer demands have converged to create a pressing need for transformation in water network management. Across Asia, this has been exacerbated by rapidly growing populations and increased demand for water due to significant commercial and domestic development, to a point where in many places the existing infrastructure is no longer fit for purpose. At the same time, we are witnessing substantial levels of water loss in most networks.

Significant investments have been made and continue to be made to address these problems, which are due in part to aging infrastructure. However, the problem persists, and it is widely acknowledged that to address the root cause, more pipe replacement is needed. While funding is being made available for this in some countries, it is still insufficient to replace entire networks, and it is not always feasible to do so.

This presentation will address two main questions:

1. Do we need to replace all our pipes, or can we focus on those that need to be replaced today?
2. How do we decide which pipes to replace, and in what order should we replace these assets to achieve the best return on investment?

The presentation will provide a proven methodology that can be followed by water utilities, asset owners, regulators, and other stakeholders to gain better insights into the condition of our water networks. This approach will enable more informed decisions, justify capital and operational investments, and ultimately ensure the long-term sustainability of water supply networks by addressing leakage while also meeting current and future demands.



Iznul Muazim,
APAC Sales Manager – Technologies,
Mueller Water Products, Inc

Biography

Iznul Muazim has extensive experience in the water, wastewater, stormwater, and environmental sectors, with a proven track record in strategic business development and project management. His collaboration with utilities, engineering consultants, system integrators, technology companies, solution providers, and industry interest groups—both locally and internationally—enables him to understand client needs and support data-driven decision-making through the adoption of smart water technologies and solutions.

Abstract

Optimizing Pipe Renewal through Identification of Degraded Sections and Benefits of Formalized Condition Assessment Programs for Water Utilities

Buried pipelines are crucial for the transport of drinking water, providing an essential service to society. Water-main breaks can cause significant economic losses, catastrophic failures, and contribute to NonRevenue Water (NRW) rates. Consequently, continuous maintenance and renewal of pipelines are necessary to mitigate these risks. Current practices often lead to the premature replacement of large pipe segments still in good condition, resulting in considerable resource waste. Efficient pipeline replacement requires the identification of the most deteriorated and 'at risk' pipelines.

Pipeline condition monitoring offers opportunities to reduce costs and enhance efficiency in the renewal process. However, many condition assessment methods are invasive and disrupt service. Acoustic condition assessment emerges as a vital non-invasive and non-disruptive solution.

This paper presents a method for identifying structural defects in pipes using acoustic measurements. A validation study compared acoustic measurements to ground truth data, revealing that high-resolution acoustic assessments measure pipeline condition with less than 10% error. This method provides a crucial tool for water utilities to develop effective asset management strategies proactively.

Understanding the health and performance of assets is fundamental to effective planning for their management and renewal, but it presents significant challenges. Monitoring and inspecting assets is expensive, and proactive condition assessment programs are often underfunded. Water utilities, typically possessing limited information on asset condition, face the challenge of prioritizing renewals and assessing the confidence in available data. Given limited funding, a risk-based approach is essential, prioritizing the inspection and assessment of critical pipes. These inspections improve assurance that renewal and maintenance expenditures are appropriately allocated.

This paper outlines the benefits of formalized condition assessment programs based on lessons learned from planning and implementing a Condition Assessment Project. The discussion includes:

- The essential role of condition assessment as a major toolbox item.
- Processes and strategies adapted over the program's lifecycle in response to funding and priority changes.
- Insights into the importance of detailed planning for inspection programs.

KEYWORDS

Asset Management, Condition Assessment, Pipe Replacement, Asset Investment

Speakers' Profile & Abstract



Johnson Damian,
Project Coordinator,
Aqua Analytics

Biography

Johnson Damian is the Project Coordinator and GIS Specialist at Aqua Analytics, a consultant for water loss management in Australia and New Zealand.

With over 10 years of experience in Geography and GIS, Johnson handles various geospatial aspects of water network asset management, leak detection, pipeline condition assessment, and water network optimisation performed by Aqua Analytics.

Johnson is passionate about data science and communicating information through cartography. He also previously taught Geography at the University of the Philippines.

Abstract

Why Spatial Reporting Matters: GIS-based Identification of Leaks in Water Distribution Networks

Spatial reporting of leakages and asset defects is essential for the sustainable management of Water Distribution Networks (WDNs). This paper highlights how a GIS-based framework for locating, reporting, and documenting leakage in WDNs benefits water utilities and government agencies.

A scalable methodology with a Geographic Information System (GIS) at its core has been developed by Aqua Analytics to meet the requirements of various water utilities in Australia and New Zealand. Most of these have unique systems for managing Non-Revenue Water (NRW) and mapping their network assets. An online map of water assets is created within a digital spatial environment using client data in the form of GIS files or georeferenced drawings. Then, water network technicians use digital survey solutions that are integrated with the spatial tools, so that all leaks found are linked to asset IDs, geographic coordinates, or street addresses as the minimum.

Leakage reports can then be seamlessly integrated into the Enterprise Asset Management (EAM) environment of clients. This will help them address leakage within target response times, accuracy, and location identification. For utilities with assets in remote areas and lacking extensive mapping, the photos and maps on the reports can help them locate the issues with ease.

GIS-based documentation of leaks also presents opportunities for data analysis and determining further action to improve WDN efficiency such as transient pressure monitoring. Moreover, the spatial reporting provides advanced insight to the operations on asset risks and helps stakeholders develop strategies to mitigate their impacts.



Igor Dundović,

Independent Water Specialist | NRW Advisor,
HIDROMODEL

Biography

Water specialist with more than 15 years of experience in hydraulic modelling, master planning, water loss and NRW analysis and design/supervising for water supply distribution systems in Europe, Asia and Africa, working on 200 projects with 50 different water supply service providers. Main specialties in Water loss reduction projects are current state analysis, due-diligence and preparation of pre-implementation documents for NRW projects including GIS preparation, DMA zoning and design, hydraulic modelling, staff training and master planning of short- and long-term development program for water supply distribution systems including Project Management of Water loss reduction project implementation.

Igor's education includes Master engineering degree in Civil Engineering in a field of Hydrotechnic, Post-graduate University specialisation in Environmental protection with focus on Water losses and currently finishing Doctorate (PhD) in field of Hydrotechnic with focus on Water Losses. Igor is member of Croatian and European chamber of Civil Engineers.

Professionally, Igor is currently engaged in Water loss projects in European Union and East Africa. and currently serving under four-year appointment as an International Water Association Water Loss Specialist Group Management Committee member.

Abstract

Virtual DMA and Hydraulic Model as Main Tools for Starting Water Loss Project

This presentation is a result of 15 years of intense work performed in more than 50 Water Distribution Systems (WDS) in developing countries of Africa and Middle east, European Union (EU) and Eastern Europe. Best practices shows that Water Loss reduction (WLR) project should implement Soft Tools before starting DMA construction, Pressure management installations and Pipe replacement works. Soft tools include designing of GIS, implementation of Virtual (temporary) DMAs and establishing Calibrated Hydraulic Model with a result in a form of a detailed Master Plan or NRW Reduction Programme.

Main goal of this presentation is to raise the awareness that every step to successful WDS management and WLR starts with easiest and most affordable step and that is implementation of Soft Tools with development of NRW Reduction Programme. During this process, all included parties work together in solving basic problems like network layout, object interdependence and flow and pressure values, apparent losses status, etc. Case studies show how several big and small problems were solved even during this inception phase as it includes intensive field investigation and pressure/flow measurement with establishment of virtual DMAs and Hydraulic assessment.

Presentation will show proven approach in starting of WLR project with several case studies for immediate benefits of implementing Virtual DMAs and Calibrated Hydraulic model. As every WDS is different in size, consumption patterns and time under pressure (intermittent supply or 24/7 pressurized), this presentation will show scalability and flexibility in an approach that can be implemented anywhere in the World.

Speakers' Profile & Abstract



Bagyo Gunawan,

Manager of Customer Connection Compliance,
PDAM Surya Sembada Kota Surabaya

Biography

Mr. Bagyo Gunawan, having a formal education background in electronic engineering and geographic information system. Starting career as a customer relation in PDAM Surya Sembada Kota Surabaya. Now already 18 years experience in field of commercial area of water business. Align with company focus area in reducing NRW, my job is lead a unit to reduce NRW in commercial area, also assisting the NRW technical team. I am also specialist in detecting illegal connection, both in domestic and commercial area.



Nurlillah Satria Pratama,

Manager of Water Consumption Management,
PDAM Surya Sembada Kota Surabaya

Biography

With background formal education of Bachelor in Information Engineering. I am starting career in Information Technology Department. Specialized in water billing system. Now, with 18 years of experience, this last two years I lead a departement that the main role in generating corporate revunue from water. I focus to reduce NRW by maintain revenue water and increasing the accuracy of water meter. I also starting to digitalized water metering system with smart meter.

Abstract

Optimizing Leak Correlator Device for Creating Potential Leak Database Based on ESRI GIS to Reduce NRW in Surabaya City Indonesia

PDAM Surya Sembada Kota Surabaya, is a water company owned by the government of Surabaya City, Indonesia. Serving for water only in Surabaya City. With more than 625,000 customers, it has 6 water treatment plants, total production capacity of 12,000 lps. Distribution pipe network of 6300 km. The challenge currently faced is to reduce high NRW of 30%. The method reduction in physical NRW currently carried out is still reactive, by accelerating the time to repair of pipe leaks. Preventive method by replacing pipes that have expired service life. There is no active physical NRW reduction strategy yet.

Utilizing Gutterman Aquascan TM2 Leak Correlator and already owned ESRI Geographic Information System (GIS), can actively detect potential leaks in the pipe network. With the potential risk already shown in GIS. The development is adding a thematic spatial layer to GIS that shows the location of potential leaks. Field Engineers periodically detect potential leaks in the pipe section network by utilizing Aquascan TM2 Leak Correlator. The output of this active method of searching for potential leaks is spatial points on the pipe network shown in GIS. Followed by the Field Leakage Engineer to conduct detailed search at the indicated location and repair the leaks.

Within 1 month of implementation, 2 leak points have been found and repaired in 600 mm diameter pipe. We plan within 1 year of this implementation, will be able to significantly reduce NRW in the city of Surabaya. Details of this method will be presented in the presentation.

Speakers' Profile & Abstract



Dwiki Riantara,

Managing Director,
Perumda Air Minum Tirta Mayang, Jambi City

Biography

Dwiki Riantara is a former journalist, now the Managing Director of Perumda Air Minum Tirta Mayang, a public water utility of Jambi City in Sumatera, Indonesia. Prior to this, he worked with the Indonesian Water Supply Association (PERPAMSI) where he initiated, supervised and completed more than 50 Water Operators Partnerships (WOPs) projects in South East Asia since 2011, including the Indonesian national WOPs. Dwiki has more than 10 years of experience in facilitating international water partnership to build the capacity of water utilities. He holds a Master Degree in Environmental Studies from the University of Indonesia. He was invited to speak in a number of international water events, including the recent Korea International Water Week (Daegu, 2022), JICA Executive Forum (Yokohama, 2023), Water Loss Forum (Istanbul, 2023), and Malaysia International Water Convention (Kuala Lumpur, 2023).

Abstract

Smart Water Monitoring System Using IoT Water Leak Detection Sensor: Jambi City Pilot Project

Water loss in distribution has become a significant issue for Tirta Mayang Jambi City, leading to service disruptions, potential revenue loss, and increasing operational costs. To resolve this issue, the project "Smart Water Monitoring System Using IoT Water Leak Detection Sensor" in partnership with USOL Co., Ltd., Korea, has been developed to mitigate water loss by utilizing IoT-based leak detection sensors in District Metered Area (DMA) Remaja, Tirta Mayang Jambi City. This sensor system is connected through an IoT network for continuous monitoring and identification of leaks. Data from the sensors is transmitted in real-time to a platform that provides early warnings and detailed reports on the location and severity of leaks (Abebe, 2024). The sensors are installed in the DMA Remaja, established by Tirta Mayang, covering 1,444 house connections. DMA Remaja records 40% Non-Revenue Water in the last 12 months. The sensors work in order to effectively monitor and promptly identify the problems (Kumar and Jagadeep, 2022). The pilot project aims to significantly reduce water loss and accelerate response times to leaks. This project provides a practical solution to water loss while also advancing smart technology in water resource management and establishing a model for similar projects in other regions (Curry et al., 2018).

Keywords: water loss; water leak detection; IoT

Acknowledgement

This project is fully supported by USOL Co., Ltd. In the process of project delivery, we were also supported by the Korea Institute of Procurement. PT Telekomunikasi Selular provides us with NB-IoT services.



Julio Cesar Eniceo,

North Quezon City Business Area NRW Partner,
Maynilad Water Services Inc.

Biography

Julio Cesar Eniceo is an NRW Assistant Manager from Maynilad Water Services Inc., with over 14 years of experience in managing and reducing non-revenue water. He has been assigned to various positions within their Division. From being a Project Inspector to a Team Engineer and Planning and Analysis Officer, he is currently the Business Area NRW Partner of North Quezon City Business Area. In 2013, Julio Cesar presented to the Division's managers a paper on the study on the effects of small meter replacement using volumetric meters. And in 2018, he co-authored a study on the benefits of PRV optimization. He played an instrumental role in the company's NRW reduction in 2019. As a result he was awarded Best Supervisor during the "Dakilang Manggagawa Awards", a division-wide recognition, that year. He also became an Employee of the Year finalist at the "Golden Meter Awards", a company-wide recognition, the following year. His commitment to excellence is evident through his continuous desire to learn. He hopes to inspire other engineers to contribute to achieving the company's mission and vision.

Abstract

Strategies and Outcomes in Maynilad's Non-Revenue Water Reduction: A Comprehensive Review

The growing demand for expertise in minimizing water losses has become a critical global issue in non-revenue water (NRW) management. Many water operators, particularly in middle- and low-income countries, face significant challenges in addressing the various factors contributing to NRW. High personnel turnover exacerbates these difficulties, leading to a loss of institutional knowledge and hindering effective management.

To effectively address NRW, water utilities must concentrate on four essential pillars designed to mitigate both physical and commercial losses. These pillars provide a framework for developing a comprehensive NRW Management and Reduction Plan tailored to the specific conditions of each distribution system. Equally important is the need to develop and empower employees to ensure sustainable NRW management.

This paper seeks to provide a comprehensive overview of Maynilad's NRW reduction initiatives. It will detail the specific programs implemented to tackle various NRW challenges, assess the outcomes of these strategies, and outline Maynilad's future plans for achieving its NRW reduction targets. Additionally, the paper will explore how Maynilad has educated and engaged both employees and consumers in water conservation efforts, highlighting their role in the overall success of NRW reduction strategies.



Andrew Yu,

Technical Lead,
Stantec Consulting Services Inc.,
Taiwan Branch

Biography

Menghsu (Andrew) has a wealth of experience in the water industry, with a particular focus on planning, design and project management of Non-Revenue Water (NRW) reduction. His expertise also extends to District Metering Area (DMA), trunk mains condition assessment, water supply network, data-driven analytics, and

hydraulic modelling.

Since joining Stantec (former MWH) in 2014, his team has assisted significant water utilities in Taiwan with developing an NRW reduction strategic plan for many cities, including Taipei, the capital. His team also managed two of the comprehensive NRW programs from the strategic plan for eight years since 2016 for the cities of Keelung and Taichung. Other selected project experiences include building an island-wide smart water network for Lienchiang County, planning for a resilient water supply system for Hsinchu City, which is known for the semiconductor industry, assessing risks and conditions of all trunk mains greater than 800mm across Taiwan and planning DMAs for several cities.

In addition to providing services locally, his team has worked with partners to export expertise to other geographies or assisted international companies with creating potential collaboration opportunities with the local authorities. His team is welcoming partners to explore possible water-related opportunities in different Asian countries.

Abstract

Looking Back to Move Forward: Two Decades Journey of Addressing Water Loss in Taipei City

The Taipei Water Department (TWD) is Taiwan's second-largest water-supplying business unit. Since 2006, TWD has been implementing the "Water Supply Network Improvement and Management Program" (The Long-term Program) to reduce pipe leakage to achieve a leakage percentage of 10% by 2025. The percentage of leakage has decreased from 26.99% in 2006 to 11.20% in 2022, marking a 15.79% reduction over the past 17 years. TWD has adopted four main strategies for leakage control: "Pipe replacement," "Pressure management," "Active leakage control," and "Speed and quality of repairs." For pipe replacement, TWD utilizes their 800+district metered area (DMA) and a web-based intelligent management system to target high NRW DMAs and replace all distribution pipes with ductile iron pipe (DIP) and all service pipes with corrugated stainless steel pipe (SSP) in DMAs. As part of active leakage control, TWD has installed noise loggers in DMAs for leakage detection since 2017, and assessment of DMA revenue water percentage is carried out at different frequencies based on the ranks of leak recurrence risk.

Regarding speed and quality, TWD has been committed to repairing 95% of reported leaks within one day and 100% within three days since 2017. Regarding pressure management, TWD has combined the variable speed driver (VSD) with an endpoint-pressure feedback control system to meet customer water demand with lower and more stable water pressure, aiming to simultaneously reduce energy consumption and potential leakage. In the future, TWD will look at more digital tools, including those powered by AI, to continue strengthening the long-term maintenance and management of the open network and go forward to meet the 7% leakage rate in the next decade.

Speakers' Profile & Abstract



Tony Gwynne,
Leakage Solutions Sales Director,
Ovarro

Biography

Tony Gwynne - Ovarro Global Leakage Solutions Director with 30 years of experience in Water Distribution, NRW, performance management and process improvements. Expertise in Non-revenue water projects across the UK and International markets. Tony has been with Ovarro since November 2020 bringing his knowledge into new solutions to reduce clients water losses through new technology and now the new Ovarro AI platforms to enhance our customer outputs.

Our aim at Ovarro is to support a sustainable future for the global water security through our innovation and technology.

Abstract

Utilising Cloud Automation to Rapidly Locate Leaks in Water Networks

A new solution from Ovarro marks a significant improvement in the identification of Points Of Interest (POIs) - locations in a water distribution network that are potentially leaks and are worth investigating. Correlation of pipeline audio samples has long been proven to be an effective method of identifying POIs. As interest in this solution grows, so to does the work required to deploy, collect and analyse the resulting data. Ovarro's new solution automates deployment planning, simplifies the deployment and data recovery processes, and automates the analysis of thousands of audio correlations to extract POI's where the confidence of a leak being found exceeds 85%. This extrapolates to a false positive rate less than half the industry standard, meaning that leaks are found faster, with less effort, and less time wasted in the field.

Speakers' Profile & Abstract



David Crotty,
Head of International Sales – East,
HWM Global

Biography

David (Dave) has 28 years experience in the water industry, with 20 of those years working in South-East Asia, residing in Hong Kong, Malaysia and Indonesia. Latterly as the International Sales and Business Development Manager for Halma Water Management, he has spent time in United States as the head of the HWM operation in the US, before taking up his current role as Head of International Sales – East.

Following graduation as an Electronics Engineer, he spent the early part of his career designing and developing electronic equipment for oil and gas, moving on to the UK Nuclear industry and finally into Water with HWM in a commercial role.

He moved to Southeast Asia to cement HWM's presence in the region. Establishing and maintaining an effective group of distributors in the region.

Over the past 28 years David has developed in-depth knowledge and experience in leak detection, pressure management and network monitoring.

Abstract

Machine Learning and Leak Detection

For over 30 years acoustic leak noise loggers have been used as a primary tool for leak detection. The ability to 'listen' for leaks at the optimal time with objective consistent results has undeniably assisted water utilities in finding more leaks more quickly. Early leak noise loggers offered limited information generally giving only an indication of how loud the leak was and how consistent the noise. While this information is extremely valuable even today, it took experience from the analyst and the unique abilities of leak detection technicians to get the best values from this data.

As technologies developed so did the sophistication of leak detection noise loggers, the most important of these was the ability to deliver the data to the user remotely and the facility to record and transmit audio recordings of the leak. There are some obvious benefits of these developments primarily the ability to remotely listen to leak noise and correlate. However, it still takes intervention from an analyst to identify real leaks from false positives.

With the recent introduction of machine learning there is an exciting opportunity to derive further insights from the data these audio files provide. The presentation will explore currently available automatic analysis techniques and potentially where these technologies can be taken.



Loga Sunthri Veeraiah,

Senior Executive, ESG Unit of Strategic Planning Department,
National Water Services Commission (SPAN)

Biography

Loga Sunthri Veeraiah is currently a Senior Executive at the Strategic Planning Division, within the National Water Services Commission (SPAN) Malaysia. SPAN is a technical and economic regulatory body taking care of the provision of the water supply and sewerage services in Peninsular Malaysia and Federal Territories of Putrajaya and Labuan. Loga is part of the team which pioneers ESG activities for SPAN and the water services industry in ensuring that we leverage and cooperate towards green transitioning. This includes identifying suitable decarbonization strategies and ESG goals across the sector and concurrently translating these towards amplifying innovative and transformative water services industry. Loga leads the GHG accounting program for SPAN and industry through MGTC's Low Carbon Operating System (LCOS). Loga's other endeavors include technical knowledge on water services, climate resilience of water industry, risk assessment related activities, preparation and implementation of SPAN Water Safety Plan, dam water level monitoring and reporting, providing input for the various studies policies and studies such as Integrated River Basin management (IRBM) and Total Daily Maximum Load (TMDL).

Loga has more than 20 years of experience, with the last 8.5 years with SPAN as a regulator of the water services industry. She brings to the table experience on ESG, climate change, risk assessment and management for the water industry in Malaysia. Loga is actively involved in the International Water Regulators Forum (IWRF) of IWA since 2021. Loga completed her Bachelor of Engineering (Civil & Environmental) in UTM Malaysia and completed her post graduate degree on MSc in Sustainable Water Management program from the Newcastle University, in the UK.

Abstract

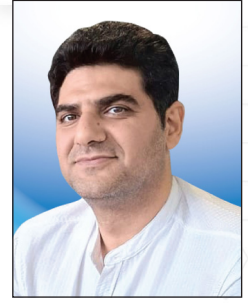
GHG Emission Management of Water Services Industry with LCOS

Water is both the frontline and the first casualty of the emerging climate crisis. As stewards of Malaysia's most essential resource, SPAN and the water industry are uniquely positioned and urgently obligated to lead the way in safeguarding our future. SPAN aspires to support and accelerate the Malaysian National Net Zero Carbon Aspirations by 2050 and to be an industry lead in proactively promoting ESG principles and GHG management. The journey towards decarbonizing the water services industry is a multi-faceted pursuit that is not seen as an easy road within the industry in Malaysia. The Water Services Industry is an 'energy intensive' industry and therefore appropriate measures must be taken. The enablers and challenges faced by the water and wastewater operators are more geo-specific, involving multi-level boundaries and thorough scoping, different local sources and conditions, variable in terms of geography and users.

Climate resilience is emerging as a critical lens for future business success. Understanding the carbon emissions associated with each activity is essential for driving towards carbon efficient operations and for stimulating innovation in technology and operational practices or even alternative nature based, lower carbon intensity materials. The presentation outline are;

- Overview about the impacts of Climate Change to the Water Sector – providing some understanding on the projected hydroclimatic studies as well as risks and hazards to the water services.
- Provide a deeper understanding of the SPAN and the Water Services Industry – the boundaries, scopes and landscape of the industry in terms of GHG Management
- Current Initiative of SPAN and the Industry on GHG accounting and management using the Low Carbon Operating System (LCOS) of MGTC
- Current Challenges on Water Services Industry in managing GHG Emission

Speakers' Profile & Abstract



Abolfazl Khalafi,
Engineering Manager,
Excel Pipes Sdn. Bhd.

Biography

Abolfazl Khalafi is currently serving as an Engineering Manager at Excel Pipes Sdn. Bhd. Previously, he held the position of Design Manager at Anhar Jonoob Consulting Engineering company in Iran. He holds a master's degree in Environmental Engineering from University Putra Malaysia (UPM) and a master's degree in Agricultural Engineering, specializing in hydraulics, from Shahid Chamran University in Iran. Additionally, he is pursuing a Ph.D. in Environmental Engineering at University Putra Malaysia (UPM)."

Mr. Khalafi brings a wealth of experience in design and implementation of some of the seminal projects in Iran. He has more than 14 years of design experience for irrigation and drainage, water, and wastewater projects in Iran and Malaysia. Some of his projects include design of the main sewerage treatment plant for city of Panj Shahr, design of Abadan City's main water pumping station with a capacity of 2 m³/s, and complete design of potable water system for Dezful, a city of 700,000 people including main water pipelines, water networks, pumping stations and reservoirs. Abolfazl has had experience designing with all pipe materials in variety of applications including high pressure lines up to 40 bars.

Abstract

Sustainable Water Management: Reducing Non-Revenue Water and Carbon Footprint through Strategic Infrastructure Planning

Non-Revenue Water (NRW) presents a substantial challenge for water utilities, affecting financial stability, operational efficiency, and environmental sustainability through increased energy consumption and carbon emissions. Key contributors to NRW include hydraulic design, construction practices, material selection, and maintenance strategies. This paper investigates the pivotal role of hydraulic design and transient flow dynamics in mitigating NRW while extending the lifespan of water infrastructure, such as pipelines and pumps. By prolonging the life of these assets, utilities can achieve significant reductions in both operational costs and carbon footprint.

The paper emphasizes the importance of selecting materials and designing systems that can withstand pressure surges, thereby reducing energy consumption and preventing undue stress on pumping systems. Using case studies, it demonstrates how strategically chosen materials with higher resistance to transient pressure surges can minimize pipeline fatigue, prevent bursts and leaks, and enhance pump efficiency. This holistic approach to managing transient flows and infrastructure stresses provides a pathway to more sustainable water management.

Furthermore, this study explores the impact of different pipe materials, particularly in terms of their energy consumption over time and carbon footprint, highlighting how material selection not only influences pipeline durability but also the long-term efficiency and sustainability of the water distribution network.

Speakers' Profile & Abstract



Moinak Banerjee,
Cofounder & CTO,
Solinas Integrity

Biography

Moinak Banerjee is a Cofounder and CTO at Solinas Integrity, a startup that creates robotic solutions for pipeline diagnostics and septic tank cleaning to reduce water losses and eliminate manual scavenging. He has a passion for Entrepreneurship that has propelled him to build a start-up that solves the existing problems in India by using futuristic technologies.

He holds a master's degree in Machine Design from KTH Stockholm. He has been involved in several projects from European Space Agency, Scania AB, and a few start-ups where he developed various innovative design solutions and filed patents. He has also worked as a Design Engineer in Scania R&D, Stockholm. The Chief Minister of Tamil Nadu has awarded him for his work in Water sector and has also featured in popular newspapers and online magazines like The Hindu, Times of India, Shark Tank, Yourstory etc.

Abstract

Robotic Leak Detection and Conditional Assessment of Small Diameter Pipelines

The demand for pipeline monitoring systems can be attributed to the increasing number of leakages in water pipelines, especially in the distribution channels due to inefficient management of the water assets. Currently, reactive measures are opted for instead of preventive measures, as very few technology solutions are available in the water pipeline management sector, and even though they are available, there is no data-driven approach to solve the problems efficiently. The need for technological intervention to solve this problem is of unquestionable need. Solutions that could work in the segment can be indigenously developed to address the problem of water loss & contamination in pipelines via robotics and digitization. One solution, developed by Solinas, is a complete technology solution where a crawler robot collects internal pipeline data and an AI powered cloud based data analytics dashboard performs a conditional assessment of data, thereby helping the customers make data-driven decisions. The remotely operated, robotic vehicle carries several sensors and crawls inside the pipeline to conduct an endoscopy, identify various types of defects, and perform a conditional assessment of the pipeline. The smallest version of the crawler robot is named Endo 90 is Asia's 1st robot that can go into pipelines as small as 90mm. This has created a tremendous impact in several Indian cities and industries since water distribution networks are of sizes 90mm to 150mm.



Rafaelle Posadas,
Head, NRW Systems Management,
Maynilad Water Services Inc.

Biography

Rafaelle Quintos Posadas is a licensed civil engineer with 16 years of specialized experience in Non-Revenue Water (NRW) management. As the current Head of NRW Systems Management at Maynilad's Central NRW Management Division, he is pivotal in overseeing NRW software solutions and spearheading initiatives to reduce non-revenue water. His role encompasses managing and developing systems to enhance water network efficiency, evaluating NRW performance indicators, and integrating long-term NRW software solutions with Maynilad's existing infrastructure. Rafaelle also plays a crucial part in implementing Maynilad's NRW Program, ensuring that strategies align with the company's objectives for improved water management and sustainability. His extensive expertise and leadership are vital in advancing effective water resource management and optimizing performance.

Abstract

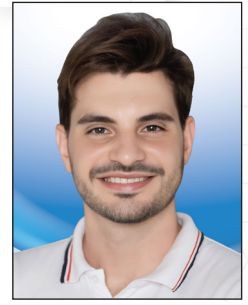
Enhancing Leak Detection Prioritization with Artificial Intelligence (AI): Maynilad's Experience in Using Artificial Intelligence for District Metered Area Diagnostics

Non-revenue water (NRW) represents a significant challenge in the water distribution sector, encompassing water that is produced but not billed to customers due to various factors such as leakage, theft, or administrative errors. Addressing NRW is crucial for optimizing resource utilization, reducing operational costs, and enhancing service delivery. Maynilad Water Services, Inc., a leading water utility in the Philippines, operates over 1600 District Metered Areas (DMAs), each representing a distinct segment of the distribution network where water loss must be meticulously managed.

To tackle the persistent issue of NRW, Maynilad has integrated advanced artificial intelligence (AI) technology into its diagnostic processes. This AI-driven software analyzes data from DMAs to identify and predict segments with a high likelihood of failure or leakage. By leveraging machine learning algorithms, the software enhances the precision of leak detection and localization, significantly improving operational efficiency. Based on Maynilad's experience with this technology, the average detection rate is approximately 2.0 leaks per kilometer, a notable improvement over conventional method.

The implementation of AI complements traditional diagnostic practices, providing a more granular and proactive approach to managing water loss. This advancement not only streamlines the detection process but also enables Maynilad to address issues more swiftly, thereby reducing NRW and optimizing the overall performance of the water distribution system.

Speakers' Profile & Abstract



Mathieu Peretti,

Asia Pacific Business Development Director,
LACROIX Group, Singapore

Biography

Mathieu Peretti is the Asia Pacific Business Development Director at LACROIX Environment, specializing in IoT and digital solutions for the water industry. Before LACROIX, he was the Asia Pacific Director at Win MS, an aeronautics and defense company. Mathieu also played a pivotal role at AKKA Technologies in Switzerland, where he was instrumental in developing a new business model and managing a team of over 50 international engineers.

Throughout his career, Mathieu has led transformative initiatives, significantly improving partner process management and enhancing the deployment of technological solutions across culturally diverse networks. Guided by his professional philosophy to "understand before being understood," Mathieu emphasizes listening to customer needs and market demands, which has been pivotal in his strategic planning and leadership of multicultural teams.

His extensive background in electronic and network engineering, combined with expertise in strategic business development and channel partner development, has positioned him as a key figure in the industry, known for his strategic insight and ability to drive results in complex environments.

Abstract

Smart Water Networks: The Next Frontier in Water Efficiency, Resilience, and Security

As water utilities face increasing challenges from rising water demand, resource scarcity, regulatory pressure, and cybersecurity risks, integrating digital technology is crucial for creating resilient and efficient water networks. This keynote will demonstrate how Smart Water Networks, driven by **advanced and essential-only technology** from LACROIX, are transforming traditional water infrastructure through digital innovation to create a **positive impact**.

We will explore the role of Smart dataloggers and advanced RTUs in providing real-time visibility across water networks. Attendees will gain insights into how these tools enable utilities to monitor and manage water distribution dynamically, optimize operations, reduce Non-Revenue Water (NRW), and improve resilience. Through practical case studies, we will show how utilities leveraging LACROIX Sofrel solutions achieve gains in efficiency, strengthen security, and meet rigorous compliance standards.

In today's rapidly changing landscape, cybersecurity and regulatory compliance are increasingly critical. This presentation will cover how LACROIX's secure, scalable solutions meet these needs, safeguarding sensitive data and supporting adherence to evolving regulatory frameworks.

Looking to the future, we'll discuss how Smart Water Networks are crucial in fostering sustainability and environmental stewardship. These networks reduce resource wastage and enhance environmental resilience by enabling utilities to respond proactively to issues and mitigate water loss. LACROIX **eco-designed solutions**, position utilities to build a sustainable, secure future for water management. Join us as we explore the next frontier in water technology, discovering how Smart Water Networks play an essential role in shaping a resilient, environmentally responsible water sector.