



**DIGITAL SOLUTIONS:**

# INTELLIGENT WATER MANAGEMENT SYSTEMS USING AI AND IOT

ENABLING NEW APPROACHES TO PLANNING AND MANAGEMENT OF WATER SUPPLY SYSTEMS

## OPPORTUNITY

As cities continue to grow, so does the demand for clean water. This presents a huge challenge for water utilities in developing countries, who are already dealing with aging water network infrastructure and other maintenance issues. This emphasizes the need to invest in and implement a sustainable water management system to optimize the operational efficiency of water utilities while raising revenue and enhancing service delivery to customers.

Data-driven intelligent applications such as the Internet of Things (IoT) and Artificial Intelligence (AI) can help accelerate the development of more sustainable solutions for water management. The deployment of smart meters, sensors, supervisory control and data acquisition (SCADA) systems, and geographic information systems (GIS) can make water utility operations systems more efficient. AI also has the potential to create new methods for analyzing big data from real-time monitoring, while enabling predictive maintenance and forecasting of water management system operations to preserve and extend the service life of infrastructure assets and maintaining the quality of life in society and efficiency in the economy.

## BENEFITS

- Unleash new operational efficiencies that allow water utilities to meet increasing spending needs and moderate rate changes;
- Optimize monitoring and control networks to provide a more resilient and efficient water supply system and better prepare for future stresses caused by climate change and extreme weather events;
- Reduce significant financial burden due to physical (leakages) and apparent (water theft or meter inaccuracies) water losses;
- Reduce operational energy consumption and associated costs.

## PRECONDITIONS

- AI algorithms and big data analytics depend on the availability of data from sensors and GIS, as well as video footage and

- pictures, among other data sources;
- Technological capacity assessment and a realistic ICT road map for water utilities;
- Adequate staff competency to support and operate the system.



[bit.ly/2IRuud0](http://bit.ly/2IRuud0)

## KEY TAKEAWAYS ON SMART WATER MANAGEMENT

From the ASEAN Australia Smart Cities Webinar Series Part 4: Intelligent Water Management Systems Using AI and IOT

- Smart water is emblematic of the opportunity that ICT presents to water service providers to improve service delivery, strengthen water security, and build resilience against the impacts of climate change.
- Data-driven and intelligent solutions are transforming water management systems from doing reactive maintenance to preventive maintenance.
- Among the drivers in adopting intelligent water management systems are increasing water demands, rising costs, an aging workforce, and higher public expectations of water service delivery.
- Data sources that can be used to analyze water management systems using machine learning and AI include public data, weather and climate data, and the previous day's consumption.
- Cybersecurity and backup systems are crucial when deploying digital solutions to critical infrastructures, such as water management systems, to avoid system crashes or virus attacks that might compromise service delivery.

SCAN  
CODE FOR  
DIGITAL  
VERSION



[bit.ly/3dLpqNq](http://bit.ly/3dLpqNq)

## USE CASES



Photo attribution: PUB, Singapore's National Water Agency



Photo attribution: Sergey Ryzhov/Shutterstock.com



### A roadmap towards an intelligent water management system

[bit.ly/3jiMePg](https://bit.ly/3jiMePg)

SINGAPORE

#### AGENCIES INVOLVED

- [PUB, Singapore's National Water Agency](#)

Singapore took the first step towards digitalizing their water system through the unveiling of the Smart PUB Roadmap, which outlines the agency's vision to achieve a more intelligent water quality and resource management and meet the city-state's future water needs.

The Roadmap serves as a blueprint for the development and deployment of key innovations that aid in remote water quality monitoring. This include the Remote Micro-Invertebrate Detector, which provides real-time detection and identification of the presence of micro-invertebrates in the water using AI. They are also testing the Autonomous Boat, which can collect water samples and perform real-time water quality monitoring through onboard sensors.

The Roadmap hopes to strengthen PUB's operational resilience and improve network reliability, while providing consumers with better service through various value-added services, such as real-time water usage tracking and water conservation goal-setting through a mobile app.

#### ABOUT THE ASEAN AUSTRALIA SMART CITIES TRUST FUND

The ASEAN Australia Smart Cities Trust Fund (AASCTF) assists ASEAN cities in enhancing their planning systems, service delivery, and financial management by developing and testing appropriate digital solutions and systems. Digital solutions address vital cross-cutting themes such as social inclusiveness, gender equity & women's empowerment, climate change & environmental sustainability, and public-private partnerships. By working with cities, AASCTF facilitates their transformation to become more livable, resilient, and inclusive, while in the process identifying scalable best practices to be replicated across cities in Asia and the Pacific.



### Optimizing pump systems to reduce energy costs in water treatment operations

[bit.ly/2Hrhxk2](https://bit.ly/2Hrhxk2)

AUSTRALIA

#### AGENCIES INVOLVED

- [Melbourne Water](#)

AI and machine learning is being utilized by Melbourne Water to lower electricity use in its water treatment operations. Their Winneke treatment plant, one of Melbourne's major water treatment facilities, maintains a daily targeted flow rate for water production to ensure sufficient amount of drinking water is available. To efficiently operate their water pumps while still ensuring sufficient water supply for their customers, Melbourne Water uses a customized AI program developed using the Python programming language, which mines historical pump data to 'learn' the most efficient pump configuration at any given time.

The project is anticipated to decrease Melbourne Water's energy costs at the Winneke plant by around 20% annually, and is being tested at other locations.



[AASCTF](#)



[bit.ly/30zLuo0](https://bit.ly/30zLuo0)



[@aasctf](#)



[@aasctf](#)