

# City West Water - Digital Water Metering Program

Internet of Things Alliance Australia – Water Workstream  
In partnership with Water Services Association of Australia

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## Background

In order to secure the supply of water for the Melbourne metropolitan region's future generations, a joint program between City West Water, South East Water and Yarra Valley Water is undertaking a milestone program of digital water metering.

City West Water has built on this joint program to establish a comprehensive Digital Metering Proof of Concept (PoC) to gain unique insights into the performance of new technologies, implementation challenges across diverse communities, and to share learnings for the Australian water industry.

## Challenge

With Melbourne's population set to double, with Victoria projected to reach a population of 10 million by 2051, and scientists forecasting a warming climate with reduced streamflow, we need to find new ways to improve the efficiency of our water supply network and conserve our precious resource.

Without significant innovation, there is risk of demand overtaking the availability of the water supply. Options to increase supply such as additional storage or desalination require major capital and operating expenditure to deliver.

Water utilities and customers lack detailed information on where and when water is used. The legacy of mechanical water meters being read quarterly has resulted in a limited understanding of water use, limited customer empowerment, undetected leaks that can run for months, and typically >9% of potable water being unaccounted for.

## Drivers and enablers

The three water retailers in Melbourne; City West Water, South East Water and Yarra Valley Water are collaborating on digital metering through a joint program in order to achieve a similar experience for customers across the city regardless of which utility services their area.

Low Power Wide Area Network (LPWAN) wireless technologies are coming to maturity and are perfectly suited to remote monitoring applications in the water industry where devices must operate on batteries for long periods of time. LPWAN is optimised for long range, penetration, and low energy consumption in small data packet transmission applications such as meter readings. Many of these technologies are open standard or at least can be deployed and managed by a multitude of vendors or utilities themselves which relieves vendor-lock issues, opens up the range of compatible devices and device vendors, and enables new business and network operating models.

An increasing number of digital meter products with integrated wireless communications are coming onto the market. This increasing competition is expected to result in improved reliability and reduced costs of hardware.

### **Solution**

Digital meters are being installed in two distinctly different complex urban areas for the purpose of gaining understanding of a wide range of implementation challenges:

- Docklands – a new precinct bordering the CBD, with multi-level residential and commercial buildings and shared water consumption meters (450 residential properties, 75 non-residential properties). Data will also be captured from 1,650 existing digital meters.
- Richmond – an older suburb with medium density residential and commercial buildings. Older infrastructure means a high probability of leaks and difficult to access meters (e.g. in basements, metal cabinets, concealed) (900 residential properties, 270 non-residential properties). Data will also be captured from 40 existing digital meters.

Three types of LPWAN communications for digital meters; LoRaWAN, NB-IoT, and Wize were selected for new installations due to their open standard nature, multi-vendor ecosystems, bi-directional communications, capability to transmit hourly or more frequently recorded meter readings and other data, and ability to achieve operating lives of over 10 years on a single battery. These three technologies are being assessed to determine which will be the best fit for a full-scale deployment.

8,400 existing Itron (Temetra) digital meters, predominantly in high-rise apartments across the City West Water network will also be used as a comparison for technical performance and some of these will be used to provide data to customers to track behaviour change.

Customers receive either a digital meter or a digital plug-in device that connects into the existing mechanical meter. Both plug-ins and integrated digital meters are being deployed in order to understand the implementation and cost requirements and performance of each option.

Data analytics is undertaken to identify potential leaks and other abnormalities. Customers are notified of the data-driven insights by personal phone call and push notifications to mobile devices.

A customer portal is being launched to provide customers access to data on their water usage behaviour to improve customer awareness and empower behavioural change to reduce consumption.

Performance of the technologies, customer water use, and non-revenue water are tracked with various customised dashboards and reported on weekly.

### **Benefits (to utility and customers)**

The PoC and subsequent deployment are intended to provide the following benefits:

- Empowering customers to manage their water use through access to data and insights
- Automated identification and notification of potential leaks within customer properties
- Transition to more proactive and preventative maintenance
- Transition to automation of meter reading reduced WHS risks
- Near real-time tracking of non-revenue water including network losses

- Defining the guiding principles for future deployment of digital metering
- Shaping the customer and technical requirements for a full-scale solution
- Quantification of the reduction in customer water use through behaviour change
- Quantification of the reduction in non-revenue water
- Quantification of fixed leaks within customer properties
- Quantification of money savings from reduced customer leak rebates
- Understanding customer call centre impact from digital metering
- Understanding correlation between customer portal use and water use behaviour
- Quantification of accuracy improvements of ultrasonic meters over mechanical

Example of a direct customer benefit achieved through the PoC:

The digital metering system identified continuous usage at a residential property and an SMS message was sent out to the customer. The customer called CWW 10 minutes later stating that they don't have a leak, questioned accuracy of the meter, and raised that the stop tap at the meter was faulty and did not close completely. A CWW representative was dispatched to inspect the meter and the stop tap. While on site, a leak was identified on the customers hot water system and the supply was isolated. The leak was causing 2,400L per day in water loss which would equate to \$580 in additional water charges per quarter. The total time from customer notification to the leak being identified and isolated was around 3 hours.

### Learnings

Early learning outcomes from the PoC trial include:

- Quantifying key metrics towards the business case of a full-scale deployment
- A maximum of 18.5% of total daily water use identified as suspected leakage
- A maximum of 15% of total daily water use verified as leaks within customer properties
- Almost 50,000 litres/day lost through leakage in customer properties with over 40,000 litres/day already saved through leak detection and rectification
- 38 customers with abnormal high usage (suspected leak) identified
- 79% of incidents of abnormal high usage (30 total) have been confirmed as leaks within customer properties and fixed
- 9.5 days average time from customers being notified of a leak to the time the leak is fixed
- Customer feedback on their experiences are generally positive
- Meters have been installed at an average rate of 20 per day in an older inner-suburb area, and an average rate of 80 per day in an inner-city high-rise area
- 30 business processes transformed with hundreds more needed to transform to 'go digital'
- 99% of expected data has been received from commissioned devices via LPWAN networks
- 13.3% of installations in Richmond and 7.9% in Docklands could not be completed in the first attempt due to access, physical space limitations, and plumbing issues, equating to an average of 12% of installations
- Digital meters are physically larger than mechanical meters which makes installation more challenging, particularly in older areas
- 44 unique models of existing mechanical meters were present in the PoC areas. This requires significantly more labour to source unique pulse sensors, install, check data for accuracy, and

manage in order to deploy plug-in devices instead of replacing mechanical meters with new digital meters

- Less than 0.1% of customers have opted out of the digital metering PoC

Further learnings will include:

- The effects of customer empowerment through data sharing and data-driven insights to achieve behaviour change and reduced water consumption
- Understanding the cost and complexity of deploying and operating LPWAN digital meters in older urban areas as well as new high rise

Next steps

- Continued operation of the PoC deployment, delivery of customer usage data, and driving actionable insights from data
- Launch of customer portal to further behaviour change and analytical comparison of customers with portal access to control group customers without portal access
- Quantifying the key metrics to inform a business case for potential full-scale deployment across Melbourne

#### Partners

**Iota Services:** devices and software services

**Itron (Temetra):** existing devices, communications, and software

**Mondo:** meter installation

**Optus:** NB-IoT communications and management platform

**Programmed Facilities Management:** radio installation

**Reliance Worldwide Corporation:** devices

**Service Stream:** meter reading

**Suez:** devices, Wize communications, and management platform

**Taggle:** customer interface software

**Telstra:** devices, NB-IoT communications, and management platform

**Ventia:** devices, LoRaWAN communications, and management platform

#### References

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