Photo courtesy of TaKaDu

How the water industry is going digital to boost efficiency

Water scarcity is a problem worldwide—but improved water-supply networks are starting to make a dent in the problem.

Amir Peleg

Founder and CEO,
TaKaDu

Water scarcity is undoubtedly one of the key issues facing the world today. Research published last year in Science Advances[1] concluded that four billion people worldwide (two-thirds of the global population) are affected by severe water scarcity for at least one month of the year. What does this mean? Nearly a billion people currently have no access to clean, safe drinking water. And this shortage doesn't only affect rural areas. While urban areas are more likely to have water-supply networks, increasing urbanization in both emerging and advanced nations is straining water supply. And the problem is likely to worsen: a United Nations report predicted that by 2030, global water demand will outstrip supply by 40 percent.[2]

Several factors contribute to a rising demand for water, including population growth, climate change, and changes in global lifestyles such as increased consumption of grain, meat, and cotton clothing, all of which have a high "water cost." Furthermore, there's evidence to suggest that vast quantities of water are wasted. The World Bank estimates that utilities worldwide lose about 25 to 35 percent of their water due to leaks and bursts.[3] And Bluefield Research estimates that in Europe alone, utilities lose more than $10 billion annually to this nonrevenue water (NRW).[4]

The good news is that new technologies can help utilities and cities to better manage both demand for, and supplies of, clean water.

The benefits of connecting the water grid to smart-city infrastructure

A smart city is often described as a "system of systems," where the Internet of Things (IoT) and analytics converge with traditional infrastructure, buildings, and 24/7 operations. Smart cities use IoT and analytics capabilities to reach operational efficiency and improve service levels, sustainability, and economic vitality. In other words, in a smart city, previously siloed sectors such as power, transport, emergency management, and water all work in sync.

While cities around the world have made significant strides in digitizing other areas of infrastructure, including transport and energy, most have yet to connect their water supplies to their smart-city strategies and systems. But the existing threat of scarcity—and the knowledge that it will get worse—should push more cities toward smart water–management systems. In many cases, such digital technologies have real potential to transform the way cities manage water by reducing water loss and improving efficiency, water conservation, and customer service.

Smart water–management systems accomplish these goals by increasing network visibility, facilitating predictive maintenance, and ensuring faster response times for

1 Mesfin M. Mekonnen and Arjen Y. Hoekstra, "Four billion people facing severe water scarcity," Science Advances, February 2016, Volume 2, Number 2, advances.sciencemag.org.

2 Policy options for decoupling economic growth from water use and water pollution, United Nations Environment Programme, March 2016.

3 Tony Freyberg, "Water leakage? Look to the clouds," Water and Wastewater International, Volume 27, Issue 2, www.waterworld.com.

4 Leakage management in Europe: Water utilities develop multi-vendor strategies, Bluefield Research, April 2017, bluefieldresearch.com.

events such as leaks, bursts, operational failures, quality incidents, and changes in water pressure. Bluefield Research forecasts that the US municipal water sector will spend more than $20 billion on software, data, and analytics solutions over the next decade, with similar spending levels in Europe.[5]

Israel is an example of how water technology can revolutionize the sector. The country's developments in this area were highlighted in a recent study by the World Bank Group, which noted, "In recent years, with the advent of information and communications technologies, many high-technology concepts have penetrated the [Israeli] water sector, such as algorithm-based leak detection and cloud-based fixed leak detection."[6] Israel used to be one of the world's most water-stressed countries, but as a direct result of technology-enabled water management, it is now actually selling water to its neighbors.

Case studies: Transforming data into knowledge

An Australian water and sewage utility set out to establish a smart water grid in 2013, with the goals of improving network visibility and efficiency, reducing water loss, and saving energy costs. It created district metered areas, or closed-supply zones, and deployed real-time sensors such as flow meters, water-quality sensors, and pressure gauges, which record regular measurements and constantly transmit the data to a central server. It also implemented cloud-based event management, using big-data analytics and predictive algorithms to help translate that data into insights. With increased transparency and enhanced capacity to prioritize, the utility established a dedicated team to collect information on events, such as bursts, faulty assets, and hidden leakage, to improve early leak detection and repair cycles.

This strategy helped the utility achieve more than US $14 million in annual savings by plugging underground leaks and preventing 6.8 billion liters of water loss. In addition, they improved their customer service through faster response rates to incidents and increased network uptime.

US utilities are also looking at data-driven solutions for water efficiency; for example, in early 2017 the Knoxville Utilities Board (KUB) in Tennessee took steps to improve customer service and reduce NRW. KUB created district metered areas within its water distribution system to partition the network and added sensors and meters to monitor pressure and flow. This process allowed KUB to gain near-real-time analysis and alerts for network incidents. As the number of sensors grew, KUB switched to TaKaDu's cloud-based solution to manage an increasing volume of data, yielding greater levels of network visibility.

The digital future for water

When it comes to operational changes, the water industry is known to be conservative, slow, and risk averse. This reluctance partly stems from the noncompetitive nature of the water

5 U.S. smart water: Defining the opportunity, competitive landscape, and market outlook, Bluefield Research, bluefieldresearch.com.
6 Phillippe Marin, Shimon Tal, and Joshua Yeres, Water management in Israel: Key innovations and lessons learned for water scarce countries, The World Bank working paper, Number 119309, August 2017, documents.worldbank.org.

industry, among other factors. Too often, utilities only address shortages when a crisis hits. And although some regulators are beginning to push utilities toward improved customer-service practices, many still fail to put the customer and efficiency at the center.

However, digital water-management tools represent a paradigm shift for the water industry from being reactive to being proactive and optimized. This shift is analogous to the adoption of customer relationship management (CRM) technology within retail industries such as banking and mobile phones—which completely revolutionized the way those companies deal with customers.

Water utilities recognize that water is a crucial commodity and are beginning to harness the vast quantity of network data available to improve customer service, reduce water loss, and improve water efficiency. Looking forward, utilities can more efficiently serve their customers through better business decisions influenced by this data and uncover ways to connect to other systems—traffic, energy, and so forth—that are sprouting up in increasingly smarter cities.