

If our taps run dry – just imagine

A close-up photograph of a hand held palm up, positioned directly under a chrome tap. A single, large, clear drop of water is suspended in mid-air, about to fall into the hand. The background is a soft, out-of-focus blue.

A glimpse of the future by **Mike Axton** (left) and **Brian Horton** from Aurecon and the company's new blog called Just Imagine.

In the developed world, expectation is nothing less than a right. We open the tap, and we expect clean drinking water to flow. We switch on the lights, and bulbs must illuminate. We swim in waterways that must be safe and free from bacteria.

It's often said that we don't realise what we have until it's gone. This is perhaps how some of the 1.7 million residents of South Australia felt the evening of 29 September 2016, when severe storms toppled power transmission towers and left their state in darkness. The infrastructure that ensured the steady provision and flow of electricity went largely unnoticed and unappreciated, until it was no longer doing its job.

The resource supply systems undergirding our cities are currently pressed from numerous sides.

Many cities are facing the real possibility of a perfect storm that will push their infrastructure close to breaking point unless a radical shift in thinking is embraced. The confluence

of our insatiable appetite for urbanisation coupled with an unpredictable climate, all superimposed on infrastructure that is decades old, is demanding new thinking.

Ongoing demands for upkeep and expansion have an eye-watering price tag. Water infrastructure is a multibillion-dollar asset that, if we were currently to overhaul and redo, would likely drain an entire city budget. Sydney alone will spend \$2.2 billion on water infrastructure in the next four years.

As the tidal wave of urbanisation increases in the coming 20 years, how can governments and water authorities manage the compounding pressures on limited resources, coupled with the adverse effects of adverse climate change? The public purse and taxpayer pool will have to somehow satisfy the living standards and expectations to which communities have become accustomed.

About 40 percent of the world's population currently lives in water-stressed areas. With three billion more people added to the planet by 2050, water scarcity will soon become a matter of life or death. We face lower and lower tides on our water supplies.

The world of water in a decade's time will see people expect exactly the same level of service (if not better), yet the problem will have grown in complexity. More pipelines are only a part solution. It's a paradigm shift that's called for: the utility authorities will need to change people's behaviour through better digital interaction with water.

If we fail to address the social mind-sets driving city planning up until now, our problems will only get worse. But if we can use the digital world to sidestep this static analogue problem, we can turn crisis into opportunity.

Digital technology allows us to step back and 'smart up' around the current cycle of water consumption and wastage. We can begin to see the grim reality of limited supply as the 'dark room' of innovation, whereby bold new ideas can be born to secure societal welfare in future uncertain times.

Moving from point A to point B

Up until now, we have lived in an analogue-based society. Our infrastructure is essentially 'dumb', marked by physical variables that function independently of one another. But as digitalisation and mobile technology continue to evolve at pace, the systems and spaces we inhabit will begin to catch up.

The flow of water through a city's network of steel and copper waterways will someday be analysed and controlled by smart grids. Our analogue world will become digitised; we will cross over. But where does this leave our clients today, when we stand on the precipice of change and don't see a bridge in sight?

Our job is to build that bridge through digital transformation. Our current 'unintelligent' analogue systems must be progressively transformed if we are going to change user behaviours through their enhanced interaction with the precious resource they are consuming.

Real-time predictive analytics can draw the best out of our limited water supply by offering simple, intuitive, and meaningful insight into unique infrastructure. This, in

turn, can be transferred into optimal and cost-effective management strategies that keep the water cycles healthy.

Getting one step ahead

Installing predictive maintenance applications can feel at times like a Herculean task. But statistics alone present a convincing argument that motivates a speedy change of gears into digital integration.

While the demand for freshwater is increasing by 64 billion cubic metres annually, the US alone loses 2.1 trillion gallons of treated water every year due to pipe breaks, leakages and mismanagement. This economic loss amounts to trillions, with a downward chain reaction on food prices, health and sanitation.

Connecting these assets into a real-time monitoring network will reduce the time it takes to discover and solve problems that historically appear only when they literally surface. That same data can be applied as red alerts to motivate preventative maintenance and mitigated risk into the future.

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Smart meters, high-tech leak detection devices and water data software are starting to offer sophisticated and granular information on how to maximise profit, impact and environmental sustainability within water management and distribution systems. The municipalities who are taking heed are gaining traction in the future-ready race.

Contextualising the issue

The 'magnifying glass' or micro approach to problem solving is no longer viable within the context of our interconnected digital world. If we don't contextualise the water crisis under the bigger themes of climate change and urbanisation, we could solve a water problem, while unintentionally creating an economic one.

Our water problems will not ultimately be solved by throwing water solutions at them. Water cannot be seen as an isolated utility, but an integrated variable in the quest to solve societies' major problems. If we are to ensure this precious commodity's sufficient supply into the future, we have to adopt new ways of thinking around our capability and responsibility to steward the resource. Smart cities are the only solutions with shoulders broad enough to buffer the oncoming high tide of overpopulation. **WNZ**