

Water Scarcity: A \$14 Billion Global Problem

By Anne-Marie McLnerney

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The data on water scarcity continues to be sobering, and shortages increasingly are linked to both natural and human-made causes. By 2025, the UN suggests 1.8 billion people will live in regions that face absolute water scarcity.

In Australia right now, many regions are in drought. The most affected state is Queensland, where a total of 35 councils and four part-council areas are drought declared, with 55 individual drought stricken properties in a further 11 council areas.

Some 330 million people are also affected by drought in India, with South Africa and Bolivia experiencing the worst droughts in 25 years. Many other countries such as Brazil, North Korea and the United States are also experiencing extreme drought. So it's little wonder that a new report by CDP launched last month at COP 22 in Marrakech declared that the financial impact of water risk has increased more than five times in the last 12 months.

In 2016 alone, companies around the world are facing \$14 billion worth of water-related impacts from drought, flooding, and increased water stress exacerbated by climate change, the cost of pollution, and increased environmental regulation, compared with \$2.6 billion in 2015.

In the US, General Motors spent \$8 million due to increased water rates from drought conditions and hydro-electric costs. United Technologies Corporations disclosed that they invested \$1.7 million in water-saving infrastructure in South California, now on the brink of what NASA warns could become a "decades-long megadrought."

According to the UN University Institute for Water, Environment and Health, stemming the losses is expected to cost governments almost \$1.8 trillion over the next 20 years.

The good news is that corporate investment in innovative technologies and processes is on the rise. These technologies will help in reducing the drain on aquifers, detecting leaky infrastructure, reusing wastewater and addressing the troublesome water-energy nexus.

In the US, water, gas and energy utility Southern California Edison (SCE) is trialing an array of water-energy nexus technologies. One such technology is the Vortex Process Technology (VPT) of Watreco from Sweden. Watreco have a biomimetic multi-application technology that harnesses the power of a tornado in industrial processes. The design enables a consistent and low energy method to achieve physical water treatment in a variety of end use applications. By changing the properties of water, it crystallizes lime particles, removes air bubbles, decreases viscosity and increases both electrical conductivity and heat capacity.

When used in cooling towers and evaporative condensers, VPT achieves higher efficiency and longer product lifespan because lime-scale deposits no longer build up around the cooling elements. In combination with UV light to prevent biological growth, the IVG-CT can achieve a 100 per cent non-chemical cooling plant.

The “blow down” water can be re-used without treatment a second time before being released. It also adds additional value by increasing the lifespan of the equipment, reducing environmental impacts, and enabling the water to be used for other purposes.

One installation at the City of Hope Hospital in California reduced water use by 42 per cent, energy use by 3.8 per cent and chemical use by 33 per cent.

Many cooling towers are decades old and so inefficient that they can consume as much water in a day as all the bathrooms, drinking fountains and kitchens in the buildings they cool, so it's no surprise SCE are keen to roll this technology out across the drought stricken state of California.

The amount of water being reused or recycled in a cooling tower is measured using a term called cycles of concentration (COC). COC essentially measures the ratio of the mineral concentrations of the condenser water in relation to the makeup water or how many times the water can be circulated before the concentration of minerals gets too high and affects cooling tower performance. Cooling towers represent a significant water use at commercial and industrial sites.

Companies across Europe such as brewer Heineken, dairy Friesland Campina, chemical manufacturer Huntsman Corp and cooling systems specialist Soest Cooling are achieving savings in the vicinity of \$150,000 a year by using the IVG system in their cooling towers. The average payback period for the VPT is two years.

An audit by Yarra Valley Water of cooling towers has estimated that there are 1,800 sites using a total of 35 million litres of water per day for cooling tower operation in Melbourne's CBD. If technology like VPT is to be introduced increasing the cycle of concentration (CoC) from two or three to up to 10, it could save around 14 million litres of water a day, or around 5 billion litres of water per annum – enough fresh water to quench the thirst of half the world's population for a day. As water prices rise and droughts increase, it makes adoption of this new disruptive technology very attractive.

Another VPT application being supported with government incentives in Europe, Canada and the US is that of REALice. In this application, the VPT removes micro-air bubbles from water that is used when laying and resurfacing the ice. This high precision de-aeration technology, in use in over 350 ice arenas worldwide, makes it possible to flood the ice with unheated water to create hard and resilient ice and lower utility costs. Facilities are reducing their carbon and energy by around 80 per cent, saving them on average between \$1,000 and \$1,200 per month, with an ROI between one to three years dependent upon incentives available from utility companies.

VPT is also used with great success in agriculture – increasing yields on average between 20 and 25 per cent with less water and less fertilizers.

When the technology is used in reverse, it provides high levels of oxygen and is used in aquaculture, to clean river systems, swimming pools, ponds and to aerate waste water in treatment plants.

Water can be a significant driver for innovative growth but can also be a source of substantial business failure. Given the complex nature of water risks, business-as-usual operational approaches to water management may no longer be fit for purpose. A growing number of companies are recognizing that they may need to transform their approaches if they are to meet the challenge of water security and remain competitive.

Every drop of clean, sustainable water will be essential for the emissions reduction activities countries and companies have planned. This is a wake-up call to companies everywhere to take water more seriously.

Unlike fossil fuels, there are no substitutes for water. If you would like to know more about water innovation that harnesses the power of a tornado in industrial process, check out the FREE [webinar](#)

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