

Energy costs put focus on innovation

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By Dan Ilett

Published: December 16 2008 02:00 | Last updated: December 16 2008 02:00

It is often forgotten how energy-intensive the water industry is. Little wonder, therefore, that finding ways to reduce energy costs is one of the key technology thrusts in the industry.

"It will be interesting to see how energy and water plays out," says Daniel McCarthy, president and chief executive of B&V Water, part of the Kansas-based Black & Veatch engineering group. "One of the largest costs is moving water around and using energy to do it.

"There's been a feeling that water is free, but it's starting to become more obvious that it isn't. Cost is a real driver for sustainable solutions." Mr McCarthy sees renewable energy taking a prominent role as water companies seek to reduce their energy costs.

Scottish Water, Scotland's largest consumer of power with an annual bill of up to £50m, is one utility that has got the message. The company recently set up Scottish Water Horizons, a new stand-alone business, whose aim is to build several wind turbines on its treatment centres and use renewable energy to transport its water.

One of the problems for the water industry is that some technologies designed to address water scarcity are heavy consumers of energy. Water scarcity presents one of the biggest resourcing problems people face today. According to the WWF environmental organisation, 97.5 per cent of the world's water is salty and of the remaining but mainly frozen freshwater, just 1 per cent is available for human use.

"Despite the grey skies, there is less water per person in the UK than there is in the Mediterranean," says Ian Barker, head of water resources for the UK's Environment Agency. "That's because we have such a dense population in England and Wales. There's not much water to go around and we're putting more pressure on the environment."

Desalination, which makes seawater drinkable, is one tried and tested solution. Malta, for example, sources some 60 per cent of its fresh water from seawater through a process called reverse osmosis, which purifies water by pushing it through a membrane at high pressure. Although effective and widely used, however, it is also very energy hungry.

"We need to understand how we can look more at conservation of water," says David Klanecky, director of research and development for Dow Water Solutions. "There's the same amount of water there was 2000 years ago but it's just in different places. The two areas that can help to address that are reverse osmosis and desalination.

"We're developing a membrane bioreactor, which is one of the up and coming technologies. There is energy required to drive the pump. That's the biggest criticism of desalination - it uses a lot of energy.

"We've employed reverse osmosis to recycle water. In Beijing [at the Olympics], it was water from stadiums, parks etc, and using it for other purposes."

Singapore, too, reuses a lot of its water. NEWater, the name of its toilet-to-tap water system, works through microfiltration, ultraviolet light disinfection and, again, reverse osmosis.

Another approach to the scarcity problem is to harvest rainwater. Aquaco, a company active in this field, has a number of waste-water collection and treatment projects running in London. It uses a process that shoots an electrical charge into sludge, causing the suspended solids in the water to stick together.

A UK government scheme called the Water Technology List outlines a number of water-saving products that qualify for up-front tax relief. Some of these, such as efficient plumbing and bathroom equipment, are fairly obvious - whereas leakage detection, water meters, rainwater-harvesting and sludge and water management systems are a little less "off the shelf".

However, some of the really impressive technology is made in Sweden - already known for its advances in "clean", alternative energy sources.

Malmö-based Watreco, for example, makes a product called a Vortex generator, which alters the amount of gas in water. Degassed water moves more easily, which improves the efficiency of irrigation systems.

"It's very clever in that it mimics the way fish move water through their gills," says Henrik Frijs, business development manager for Invest in Skåne, the investment agency for Sweden's southernmost region. "With this, you can use less water and be more efficient in things like watering plants. The water trickles down the stalk much faster, evaporates more easily and the plant can take more water in.

"Watreco also uses this system backwards to put air into water. This is for when you want to put water into dams for controlling algae.

"In Sweden we have been early adopters of these basic clean technologies for some time. There has never been a political debate over whether that's a good or bad thing, so they have been able to develop."

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