**Desalination - pros and cons of a typically thorny issue.**

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**The argument for desalination plants isn't won yet, reports Mark Anslow**

We live in a thirsty world. Our demand for water grew six fold during the 20th century, and in the UK we use 70 percent more water than we did 40 years ago. Predictions suggest that over the next 20 years our water use will increase by another 40 percent, in the face of depleted aquifers and reduced melt waters as climate change affects the formation of winter ice.

One thing we still have plenty of, however, is ocean. This has led a growing number of policymakers and investors to take a fresh look at desalination, the process of removing salt from sea or brackish water to create drinking water.

Designs for desalination equipment have been around since the late 18th century, but it was only in the 1960s that the process received significant attention through the creation of the US Office of Saline Water. Today, the technology’s heartland is the Arabian Gulf, where 50 percent of all the world’s desalination capacity is installed, followed by the US with 16 percent. Even the UK is scheduled to receive a desalination plant in the Thames Estuary by the end of 2009.

Creating pure water from saltwater comensata price, however, and the biggest cost is in terms of energy. Twenty years ago plants used between 5kWh and 10kWh of energy to create one cubic metre (m3) of drinking water – roughly equivalent to the energy used by five to 10 washing machine cycles. Modern plants can do the same with only 2kWh, but even so most of the power demand for desalination is met through the use of fossil fuels.

The second cost is one of pollution. Removal of pure water from a salty source creates a concentrated waste stream called brine. Up to twice as salty as sea water, and often containing process chemicals such as chlorine, anti-scaling and anti-caking agents, this discharge can have a significant effect on marine life.

Sabine Lattemann, a marine scientist now employed by the German Federal Environmental Agency, has studied the effects of brine discharge extensively. Her work has shown that even though significant rates of mortality (around 50 percent) occur in marine organisms at saltiness levels of 45PSU (Practical Salinity Units), he discharge from even modern desalination plants can hit 80PSU. She told a conference hosted by the International Desalination Association (IDA) in London that sea urchins and starfish were particularly susceptible to changes in levels of salinity, and that the discharge of brine streams in to sea-grass meadows should be strictly avoided. She questioned whether a move to increased desalination would simply shift water problems from the freshwater to the marine environment.

Her views were countered at the same conference by Australian engineer and desalination expert Gary Crisp, the brains behind what is regarded as one of the world’s most sustainable desalination plants in Perth, Western Australia. Crisp pointed to extensive under water monitoring work that his team has carried out in assessing the environmental impact of the plant. As well as fitting special filters to the desalination equipment in order to remove chlorine and other contaminants, Crisp designed the water in take and outlets to minimize the effect on underwater organisms. He played underwater footage clearly showing fish and sea-horses using the inlet pipes as habitat, and plants growing around the brine outlet.

Clean water and dirty money
Others are not convinced, including Phil Dickie, a consultant for WWF and the author of a 2007 report on desalination. He argues that desalination plants are almost never built where they are needed the most – such as in sub-Saharan Africa to deal with chronic shortages, or in Asia, where the same technology can be used to help remove arsenic and fluoride from drinking sources. There is also growing evidence that this technology could be especially useful in removing common water-borne contaminants such as drugs, residues of cosmetic and endocrine disruptors. Instead, new plants are built where they offer a healthy financial return, often facilitating inappropriate developments such as golf courses in arid countries. He also maintains that desalination is fast emerging as a distraction to better water-use policies.

In Perth’s case, Crisp points out, desalination was a last resort after dealing with leaks and reducing public water consumption by some 30 percent.

‘At a certain point you encounter “demand-hardening”, after which people will not willingly reduce their usage any further, ’he said. ‘After that point, you need to employ desalination.’

He argues that desalination can be a less destructive water technology than long pipelines or large-scale dams.

Both experts are passionate about the use of renewable energy to power the plants. Crisp’s plant meets most of its energy demands from a purpose-built a purpose-built that any future desalination plant should be ‘climate-neutral’. He also says desalination plants should be free from government subsidies and that every effort should be taken to mitigate their environmental impact. He is clear that the technology should not be seen as a quick-fix solution:

‘Governments that once said “let’s build a dam!” are now saying “let’s build a desalination plant!” ‘he warns. ‘Desalination should happen only after sustainable water, marine environment and land-use strategies have been tried to maintain the natural functioning of landscapes to provide water.’

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http://www.theecologist.org/News/news\_analysis/269784/desalination\_pros\_and\_cons\_of\_a\_typically\_thorny\_issue.html