DISCOVER
Science, Technology, and The Future

Environment / Ocean

06.11.2008

Water, Water Everywhere, So Let's All Have a Drink

Offshore desalination could turn the oceans into an inexhaustible water supply.

by Patrick Huyghe

With a recent government study projecting that at least 36 states will face water shortages within the next five years, some states are looking to tap our oceans for more than a trickle of our freshwater needs. The only significant seawater desalination, or desal, facility in operation in the United States is the Tampa Bay Seawater Desalination Plant, which after a problem-plagued start is finally producing 25 million gallons of water a day, or about 10 percent of the region's water supply. California, Texas, Massachusetts, and Georgia are all cautiously considering similar saltwater desal plants. But critics say

(pdf) these plants are energy hogs that have a hugely detrimental impact on coastal marine life.

One potential alternative that's getting a lot of attention these days, not just in the United States but around the world, is the idea of *offshore* desalination platforms or vessels. "There are so many obstacles and hurdles to overcome in building and running a desal plant onshore," says Charles "Skip" Griffin, a senior vice president with PBS&J Engineers who has been designing water-treatment plants for 40 years, "that going off-land is kind of a no-brainer."

Offshore, the water can be extracted from an optimal depth where sea life density is low and where the water is cleaner, reducing the extensive pretreatment that onshore plants must perform. Furthermore, the concentrated saltwater left over after processing can be more thoroughly diluted in the deep ocean rather than being dumped near shore, where marine life is plentiful. And the cost of powering an offshore plant is expected to be less than for land-based plants; while land-based plants end up having to buy third-party power, an offshore plant could produce its own without the markup.

The notion of offshore desal platforms is not entirely new—India has built a test plant, and a Spanish company wants to construct a wind-powered one—but most such approaches are geared toward small productions of 5 million gallons or less per day. Far more ambitious is a plan from Water Standard Company, a Houston-based water-treatment outfit that intends to build a Seawater Desalination Vessel (SDV) that could output up to 15 times that much—up to three times the production of the Tampa Bay desal plant. The SDV, moored a mile or more offshore, would generate its own power with efficient gas turbines, which could use biofuels if sufficient supplies are available. The SDV would use the same desal method the Tampa plant uses, reverse osmosis, in which seawater is pumped at high pressure through dense membranes to remove the salt. It's basically the same process that cruise ships (80,000 gallons per day) and military ships (aircraft carrier: 300,000 gallons per day) have used to convert seawater to freshwater for decades.

"It looks like it's feasible," says Mark S. Williamson, an engineer who evaluated the Water Standard Company's SDV proposal on behalf the Monterey Peninsula Water Management District in California. "But it has never been done before on this scale and so, in our assessment, we think the proponents have probably underestimated the cost and the regulatory difficulty. And the harm or lack of harm to the marine life has not been established in my judgment."

Water Standard says it's well aware of the costs and regulatory hurdles; to lessen the regulatory burden, the company expects the first ship will probably be built for Israel, Australia, China, or the Middle East—areas where there is a great demand for water and an easier path to government approval. The company hopes to have the first SDV up and running within two years. "There are no untried processes here," says spokesperson Gayle Collins. "This is proven technology."