

## The future of water

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Water supply shortages are becoming a problem of global proportion. In the past month, 2,000 farmers in India were arrested for stealing water; the regional government of the Spanish province of Catalonia said it was going to import water by boat and train beginning in May to provide summer supplies; the Queensland Water Commission in Australia put local residents on the toughest water restrictions; and in Atlanta, residents filed lawsuits against the municipal government in protest over faulty water pipes and failing sewer systems.

According to the World Water Institute, a mere 2.5 per cent of the earth's ground and surface water is accessible for human use. This finite resource, maintained by the earth's hydrologic cycle, is used for everything from drinking water to sanitation, agriculture and industrial processes. Undermined by overuse, pollution and inefficient infrastructure as well as natural occurrences like drought, humankind's water supply is nearing its limit.

In a report released last month, the investment bank JPMorgan addressed the risk looming water supply shortages pose to companies. It included data from the World Resources Institute that half the world already faced water stress, or the deterioration of fresh water resources in quantity or quality, if not outright shortage.

The bank, echoing numerous entities tracking the issue, cited three primary factors for the supply-demand imbalance, including population growth, urbanization and climate change.

According to Antoine Frerot, chief executive of Veolia Water in Paris, all the necessary technologies and processes are there to resolve the issue directly, transforming wastewater into potable water. "They are already in place," Frerot said. "And the wastewater is there where we need it, just downstream of the cities. This would prevent overuse of freshwater."

Municipalities are using highly treated reclaimed wastewater to supplement the water supply, in some cases even for drinking. Frerot said Veolia had built and was operating a wastewater plant in Singapore that recycled gray water into water pure enough to drink, but for use by local semiconductor makers. It has accomplished a similar feat in Windhoek, the capital of Namibia, where a wastewater recycling plant supplies about 250,000 residents with drinking water.

The problem, Frerot said, is not a lack of ability but a lack of interest. Until recently, public concern over the sustainability of water supplies has been relatively low in all but the most parched segments of the globe.

This could soon change. Based on present consumption levels, the Organisation for Economic Cooperation and Development projects that by 2030, about 47 per cent of the world's population will be living in areas with severe water stress. To the OECD, based in Paris, the situation represents, "one of the greatest human development challenges of the early 21st century."

Challenging, but rife with opportunity. Over the next 20 years, the United States is expected to spend about \$1.2 trillion on repairing and upgrading its water management infrastructure.

Steve Allbee of the U.S. Environmental Protection Agency said the money would go toward financing everything from wastewater reclamation and reuse plans to desalination plants and advanced filtration membranes. "This should be a period of dramatic change in how we accomplish the mission," Allbee said.

While desalination plants will be a part of the equation, Allbee said, reclamation and reuse plans like those being offered by Veolia are starting to "catch on in a big way" in cities like Las Vegas

and Los Angeles. Compared with desalination plants, water reuse facilities are less energy-intensive and require fewer investment dollars, Allbee said.

"We have been doing this for more than 30 years in Northern Virginia -- I know it can be done, successfully," he said.

The water industry's capacity for cost-effective innovation in the face of looming scarcity is also rising in the awareness of investors. Stephen Hoffmann, a water resource economist and co-founder of the Palisades water indexes, said that "visibility and interest in the water industry is mushrooming."

The modified equal-dollar weighted indexes track the performance of global water concerns. According to Hoffmann, one index has increased more than 145 percent from 2002 to the end of last year while leading to the creation of two exchange-traded funds, PowerShares Global Water and PowerShares Water Resources among them.

Why water-related funds like these have, since their high, declined by as much as 10 percent when demand for water is soaring may seem paradoxical, given water's rising value.

Hoffmann, a 25-year industry veteran who also runs a private equity firm, WaterTech Capital, attributed the lackluster performance to a broad-based decline in global equity markets that he said has temporarily interrupted an expected rise. This softness, he claimed, will be short-lived.

Generating an estimated annual revenue of \$400 billion, Hoffman estimated, water represents one of the largest industries on the planet.

A common mistake, Hoffman said, is that some beginning investors see water as a commodity like oil. While both are natural resources, there is no standardised pricing mechanism for a cubic meter of water, unlike a barrel of crude oil. As a result, the asset's market value is often capped and varies based more on political will than scarcity, he said.

Factors that affect pricing include demand, transport and treatment costs as well as price subsidies -- sometimes as large as 40 per cent to 50 per cent of the unit's total cost.

"If water were a true commodity like oil," Hoffmann said, "the price of water in a given consumptive use would equate more with the marginal cost of providing it, including scarcity and ecological considerations."

While water may someday trade like oil, for the time being, experts agree it is most appropriately viewed as an infrastructure investment. From that standpoint, investors have a lot of options to choose from that will offer varying degrees of exposure to global water demand.

This money gets funneled through a vast pipeline of water concerns, including such traditional public-water utilities as United Utilities in Britain Suez in France and Companhia de Saneamento Basico do Estado de Sao Paulo in Brazil as well as diversified multinationals like General Electric and Dow Chemical, both based in the United States.

Investors who wade in still deeper will find infrastructure equipment manufacturers like Kurita Water Industries in Tokyo and Geberit in Switzerland, as well as lesser known technical innovators. In this tier are such companies as Halma of Britain, which develops infrastructure sensors capable of detecting leaks in failing water and sanitation pipes; Aqua Dyne of Australia, which is commercialising a water purification system recently acquired from Global Power & Water of the United States; and H2O Innovation of Canada, a developer of activated sludge and membrane bio-reactor technologies for water and wastewater treatment.

And then there are integrated companies like Veolia or Hyflux that make money at various points along the service chain. Hyflux, based in Singapore, not only builds and operates water plants but also develops technologies, including filtration membranes vital to desalination and waste treatment processes.

According to Sam Ong, deputy chief executive and chief financial officer of Hyflux, it is already a major player in China with about 40 plants. The company announced last week that it had won a \$500 million reverse osmosis seawater desalination project in Algeria.

To maximise the returns generated from such multiyear concessions, the company went a step further in December, taking public Hyflux Water Trust, a water real estate investment trust traded on the Singapore Exchange with a yield of 8 percent, Ong said.

The value and availability of concessions like those being pursued by Hyflux could grow exponentially because of two developments: stricter regulatory measures and a pricing overhaul.

On the former, industry executives like Ong welcome the increasingly strict regulatory environment for water and sanitation. He cited China, where 70 percent of all water must now be treated and 60 percent of water recycled -- developments that he said were spurring concessions for new plants.

As for pricing changes, after years of heavily subsidizing water consumption across the board, municipalities from Osaka to Los Angeles are considering tiered-pricing plans for water and sanitation. While there is a general trend to maintain universal access to basic water services at little or no cost, all other levels of service -- be it a homeowner's sprinkler system or a semiconductor maker's water-processing system -- will be subject to fees based on the amount of water consumed.

A report published in March 2007 by the Earth Policy Institute showed municipal water rates increasing over a five-year period by an average of 27 percent in the United States, 32 percent in Britain, 45 percent in Australia, 50 percent in South Africa and 58 percent in Canada.

Publicly held companies like Groupe Danone of France began deploying advanced wastewater treatment processes a few years ago as a means of reducing consumption levels and therefore limiting their risk exposure to expensive and potentially disruptive water shortages, while bolstering their corporate image.

According to Jean-Pierre Rennaud, environment director at Danone, all its factories now treat their wastewater. The company, a leading producer of dairy products and bottled water, has already reduced its water consumption by 30 percent.

Meena Palaniappan, a senior research associate and project director at the Pacific Institute, a research group in Oakland, California, contends that pricing overhauls -- though complicated to enact -- are garnering broad-based support among policy makers, municipalities and industrial players. They help cover infrastructure costs and foster greater private-sector involvement, while raising public awareness about the value of water.

Citing a recent water main rupture in Chicago, Palaniappan said: "Unless a water main erupts, people don't think about water. It's easy to ignore, because right now you can turn on your tap."