

# TAPPING A MARKET

The world is waking up to water shortages and private sector solutions, *Richard Lofthouse* and *Barry Mansfield* report. Additional research by *Flemmich Webb* and *Robert Pomfret*



You can pay 20 times more for water than petrol in some capitals these days: in Doha, you'll part with a handful of euro cents for a litre of unleaded and a fistful of dollars for the equivalent Perrier. And, as demand increases and supplies dwindle, we soon may be paying similar tabs for the stuff that comes out of taps, while the water industry, currently worth €300bn a year, will double in size over the next decade.

Remote though it might seem from a western European perspective, water has already run dry for billions of people. The UN estimates that around 1.1 billion have poor access to drinking water, while 2.6 billion have inadequate water for sanitation. Governments in the Persian Gulf are turning to desalination – which purifies seawater either through evaporation or filtering – not as a supplement to aquifer water, but as the main source.

Philippe Rohner, senior investment manager for water and clean energy funds at Pictet & Cie, a Swiss private bank that pioneered the first and currently largest pure-play water mutual fund, notes that when he opened the water fund eight years ago, it was due to the prompting of concerned, ethically minded

private clients. “But it was very difficult to get people to see it [water] as an investible theme – yet since then awareness has increased enormously.”

Not only is water the ultimate sustainability theme, but like clean tech and alternative energy, it's one of the great emerging markets of the 21st-century. Pictet's investment manager for theme funds, Arnaud Bisschop, describes desalination as a “boiling market.” He says. “For 40 years we've had talk, but now it's really happening. Huge contracts are being won for desalination plants, while there are a host of opportunities for smaller, specialist companies offering specific solutions within this emerging universe. There's a spectrum of opportunities.”

## WATER IN NUMBERS

# 70

Price in euros of the most expensive bottled water, per litre, at London's Claridge's hotel

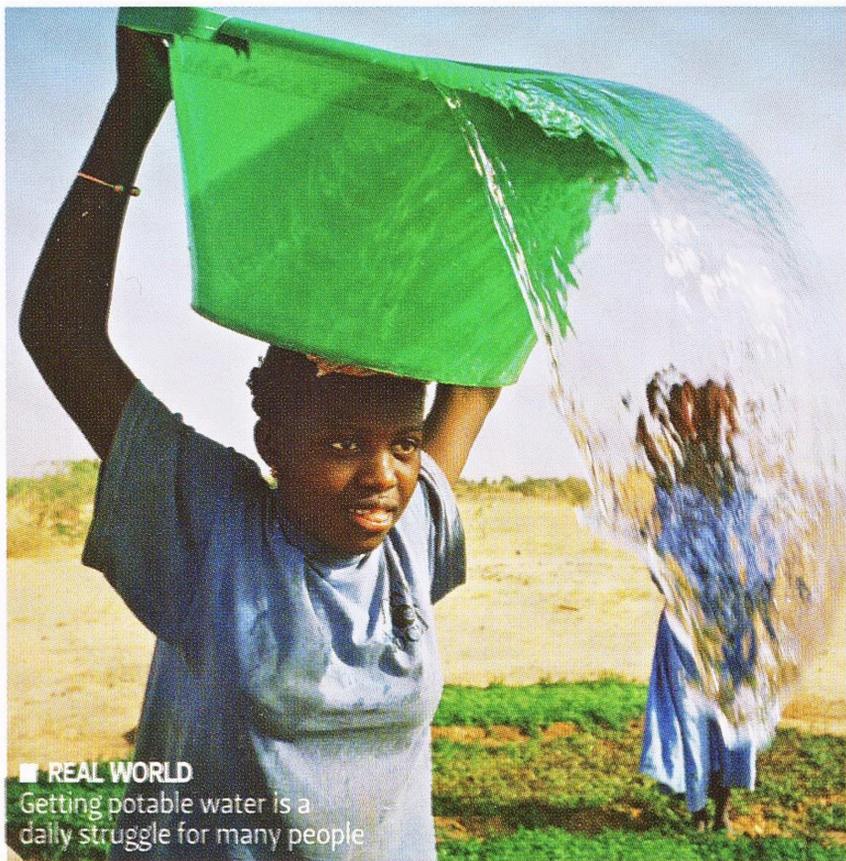
# 17

Millions of barrels of oil used by the US bottled water industry each year (Earth Policy Institute)

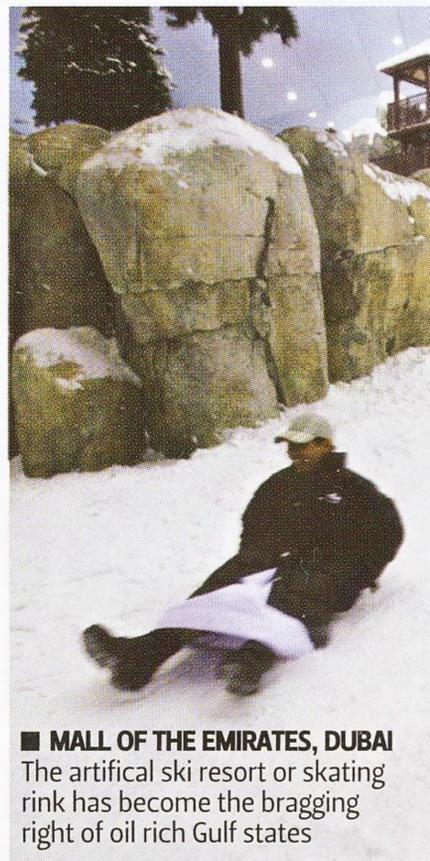
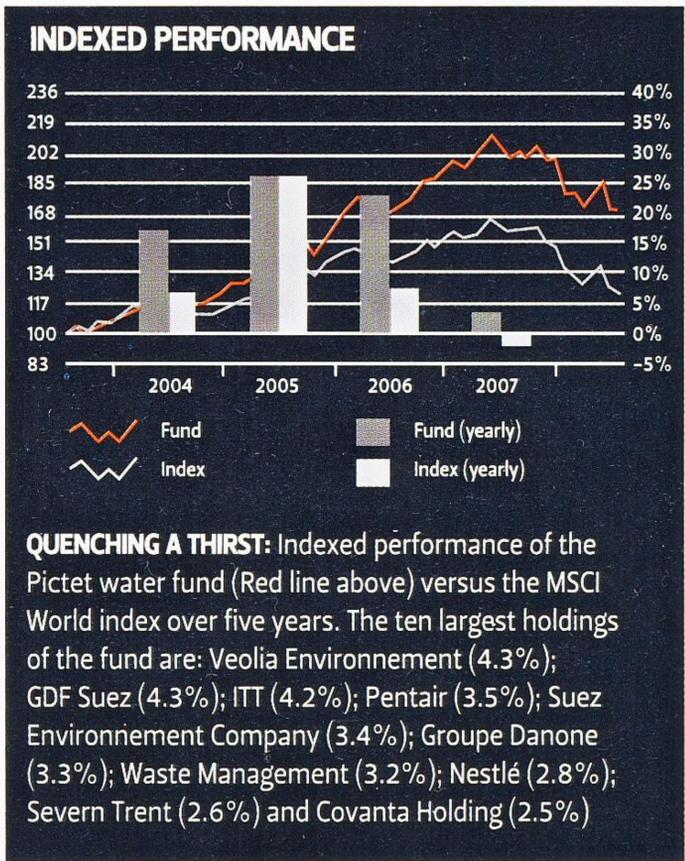
# 4,000

The multiple of a bottle of water's cost versus the same volume drawn from the tap in Europe





**REAL WORLD**  
Getting potable water is a daily struggle for many people



**MALL OF THE EMIRATES, DUBAI**  
The artificial ski resort or skating rink has become the bragging right of oil rich Gulf states

This spectrum is truly global. And while there is a fault line dividing oil-rich Gulf states buying in desalination solutions from poorer, heavily populated emerging states for whom such expensive solutions are nigh impossible, governments everywhere are desperate for water management competence, new irrigation technologies and various aquaculture techniques (fish farming) to feed their booming populations.

In this broad sense the provision of potable water and the purification of waste water – historically the mainstay of a utility business with low profit margins – is today a visible crisis for food production as well. Fully 70% of the world's water consumption is for agriculture, 20% is by industry and just 10% is domestic.

As if population growth wasn't enough of a concern, climate change is heaping additional problems into the water equation by plunging some parts of the world into drought while others suffer from flooding and storms.

Key rivers and lakes are drying up or becoming seasonal, swamped by rocketing human populations and over-extraction. Lake Chad, which used to be a landmark for astronauts circling the earth, has shrunk 96%

in four decades, while water tables virtually everywhere are falling, precipitously so in places such as the North China Plain where they aren't being replenished.

Nor is this just an emerging market problem. Never mind the watery catastrophe wrought by ever more destructive hurricanes, the US



**“ THE PINCHPOINTS ARE WHERE HIGH POPULATION, LOW NATURAL WATER AVAILABILITY AND POOR MANAGEMENT MEET ”**

**ROB SHORE**

has other issues. US water consumption has tripled in the past 30 years despite its population rising just 50%; and its enormous, seemingly inexhaustible Ogallala aquifer, stretching from Texas to South Dakota, is being drained by agricultural demands that grow exponentially as western US states suffer from higher temperatures and less certain rainfall.

In May, drought-hit Barcelona, Spain received its first supertanker of freshwater, shipped across the Mediterranean from Mar-

seilles, France, while in the UK, Germany and parts of central Europe, citizens have been buffeted alternately by decimating floods and drought over the past two years.

Such widespread problems explain why “smart metering, grid deployment, resource and infrastructure management” are a second tier spectrum of commercial opportunities after desalination, filtration and purification according to Rohner.

A third tier rests on infrastructure upgrading in Europe and the US, where a vast renewal programme for pipes and sewage dating back to the Victorian era will occupy municipal authorities for years to come.

Although the investor perspective is broadly attractive, not all parts of the water business are equally profitable. Less attractive is the gritty, infrastructure end of the water chute, where the cheap manufacture of hardware such as pumps, valves and pipes is no more enticing than trying to compete with Guangdong on the price of a T-shirt.

Confirming the approach of investors like Pictet, a recent report by investment bank Goldman Sachs included a ‘water technology valuation continuum’ that placed desalination at the very top, while nearby the other hot

**5**

number of attempts it took former president of Perrier Group USA Bruce Nevins to correctly select Perrier from a choice of seven carbonated water samples, on a live radio show

**13,000**  
NUMBER OF litres of water needed to grow 1kg of beef (World Water Council)

**2.4bn**

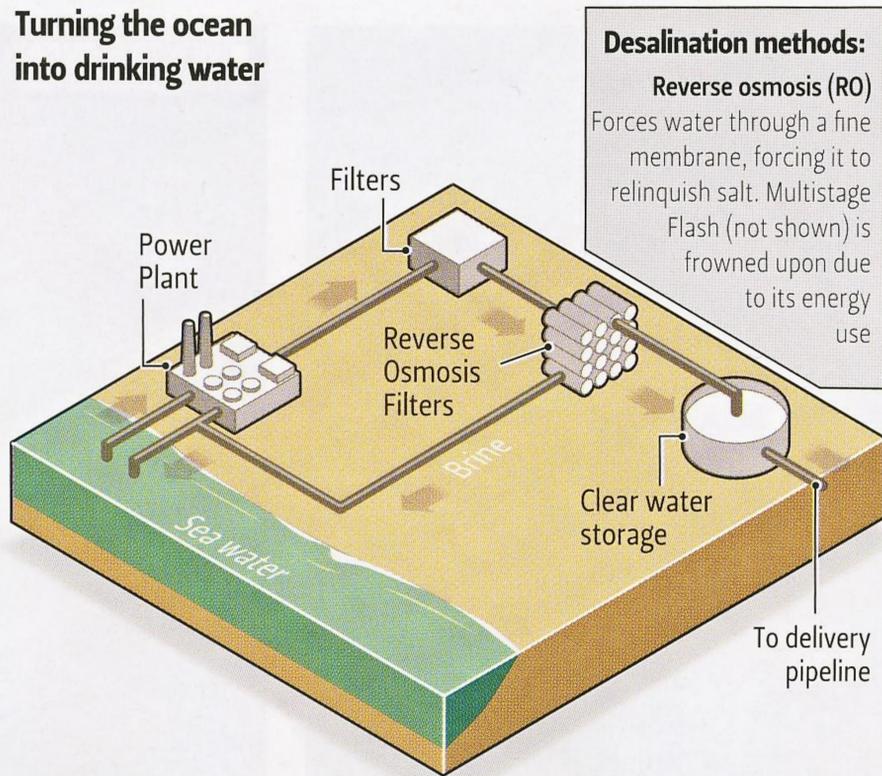
number of people globally with inadequate access to water for drinking and sanitation (UN General Assembly)

**17**

the frequency in seconds that a child dies somewhere in the world because of water shortages (Water Aid)



**Turning the ocean into drinking water**



sectors consist of filtration technologies, new types of waste water treatment and sophisticated new types of testing equipment.

Gaining exposure to exciting, pure-play water companies is not easy because the big desalination players are companies such as General Electric, for whom the water business remains a relatively small part of overall income. Pictet recently launched a new fund to allow institutions access to private equity situations, since "80% of the [water] industry is not listed," according to Rohner.

European companies lead the high-tech end of the water business, and desalination in particular. Ranked by 2007 revenues, four of the five top global companies in water are European. The largest is France's Veolia Environnement with over \$15bn in water revenues, just over a third of sales. Ranked second is France's Suez, third is Spain's Grupo Ferrovial, and fifth is the UK's Severn Trent.

Other notable European companies are Germany's RWE and Siemens, ranked sixth and 11th respectively; Spain's Acciona; Austria's BWT and Christ Water Technology; and Sweden's Cardo.

Globally, there are a dozen familiar US corporations, such as Rockwell Automation and

Honeywell, whose water technology businesses represent less than 1% of revenues yet are still worth north of \$100m a year.

Looking ahead, the multiple authors of the Goldman report predict that there will be extensive, ongoing consolidation of the sector plus the emergence of massive, pure-play



**“ EUROPEAN COMPANIES LEAD THE HIGH-TECH END OF THE WATER BUSINESS. FOUR OF THE FIVE TOP GLOBAL COMPANIES ARE EUROPEAN ”**

Asian players currently still in their infancy, such as China's Tianjin Capital, Beijing Capital and Shanghai Raw Water.

The other obstacle for investors is that water companies are already highly priced – Goldman's water sector index having outperformed the S&P 500 by over 20% since 2000. Other than buying into a growing number of water-themed Exchange Traded Funds, Goldman notes the availability of mutual funds offered by PowerShares, Claymore, First

**NOTABLE MOVERS AND SHAKERS IN WATER**



**Veolia** Paris utility, and desalination plant builder and membrane supplier, has a €702m contract to design and build a plant in Saudi Arabia

**Suez Environnement** Paris subsidiary of GDF Suez has won contracts worth €55m to expand and run the Gabal El Asfar wastewater treatment plant near Cairo

**Impregio** In May 2007 the Italian construction giant won a €292m contract for a plant in Qatar, taking its deals for the year to around €765m.

**Abengoa** Spanish firm has orders for a €54m plant in China, a €294m expansion project in Algeria and a €91m joint venture in India

**Christ Water Technology** Austrian firm has the contract for a new €53m plant in the UAE that will produce 91,000m<sup>3</sup> of water a day from 2010

**Kurita Water Industries** The Tokyo firm builds plants and sells water purification equipment. Revenue from its water business is €1.28bn

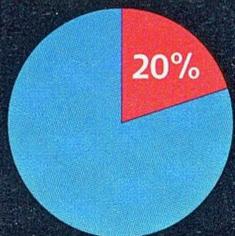
**Hyflux** The Singapore firm founded by Olivia Lum is building 40 water treatment plants in China, where it makes 81% of its revenue.

**General Electric** Joined the top tier of desalination suppliers in 2004 when it paid €702m for Ionics, which builds plants and makes filter membranes.

**Acwa Power Projects** Arabian firm is building several projects in the Gulf, aiming for an output of 2,230,000m<sup>3</sup>/day by 2010.

**€10<sub>bn</sub>**

The minimum investment needed by 2015 to halve the number of people without access to fresh drinking water (OECD)



**THE PERCENTAGE OF** water lost in the developed west due to pipe leaks (Goldman Sachs)

**77**  
Number of litres of water consumed by the average African daily (Environmental Protection Agency (EPA))

**600**  
Number of litres consumed by the average American daily (EPA)



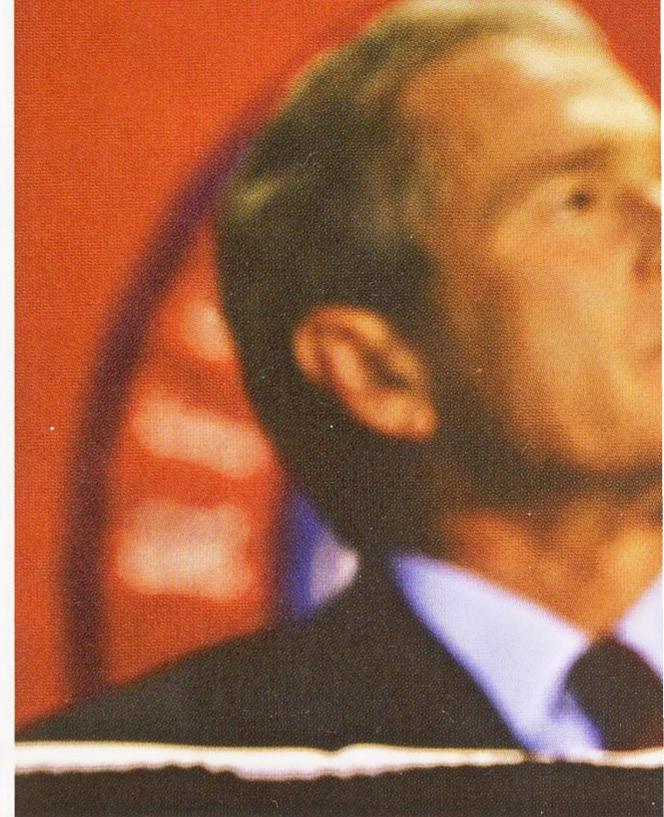
■ **TURNING OIL INTO WATER**

Middle Eastern countries can fund costly desalination plants with oil revenues



■ **VIEW TO EXPANSION**

American household are some of the world's biggest consumers of water



Trust and Summit, although the Pictet Global Water Fund is the largest, with \$5bn (€3.4bn) in managed assets.

But can desalination really be a panacea? This partly depends on what technology it uses, and how the desalination plant is powered. Desalination takes seawater or brackish, semi-saline water, purifying it via two main methods: multi-stage flash (MSF) which turns the water into steam, which is then condensed; and reverse osmosis (RO), which forces the water through a very fine membrane, forcing it to relinquish its salt.

In one obvious sense, using either method is preferable to a future of potential water shortages, but is large-scale desalination really the solution? The energy consumed is so considerable that the resulting water is both expensive and highly carbon intensive.

According to a recent report by the WWF, RO is the best technology, emitting 1.78kg of CO<sub>2</sub> per m<sup>3</sup> of water compared to 23.41kg CO<sub>2</sub> per m<sup>3</sup> for MSF. But the comparatively 'green' reverse osmosis process is still only

as green as the energy powering it. Sydney's proposed, 500,000m<sup>3</sup>/day RO plant would be coal-fired, producing nearly a million tonnes of CO<sub>2</sub> per year, the equivalent of putting another 220,000 cars on the road.

Environmentalists want desalination to be

“ENVIRONMENTALISTS WANT DESALINATION TO BE A LAST RESORT AFTER CONSERVATION”

a last resort once conservation measures have been rigorously implemented to cut consumption, while end consumers and politicians are wary of rapid price hikes implicit in high-tech solutions.

Rob Shore, a freshwater programme manager for the World Wildlife Fund (WWF) in Latin America, says: “The pinchpoints in the

world are where there is a combination of three factors: high population, low natural water availability and poor water management.” The greatest of those is often poor management, and while the WWF recognises that desalination is part of a range of measures to defeat water shortages, it notes that in many cases it can actually confuse the need for good management, becoming a technical bandage for an open sore that could be easily healed by other means.

A change in public habits wouldn't hurt either. According to the US Environmental Protection Agency (EPA), an average US household uses 100–150 gallons of water per day, Europeans use 74, Africans use 17 and the Chinese 23. The Swiss are the most water-conscious Europeans, cutting average consumption to 35 gallons daily.

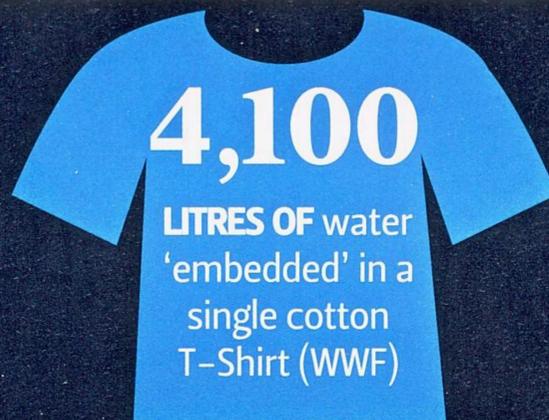
There is already evidence of changes in consumer behaviour in the wealthy West, where there is a backlash against the extravagance of expensively packaged water. It has become fashionable to insist on tap water in restau-

12

Barrels of water needed to produce one barrel of oil (OPEC)

2.5

PERCENTAGE OF the world's water accessible for human use (World Water Institute)

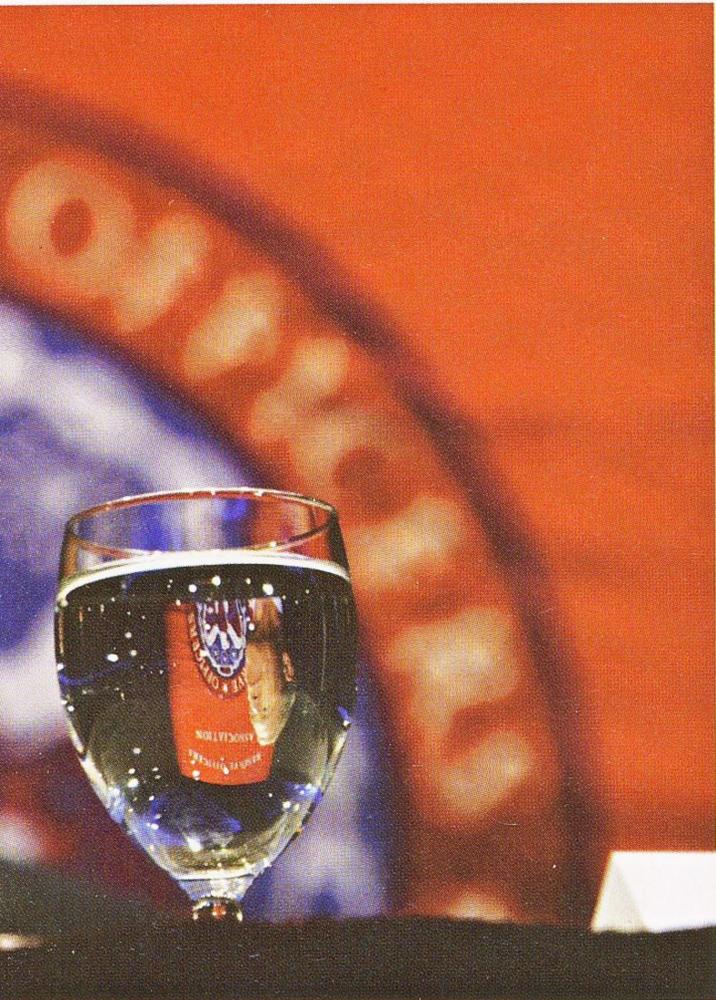


4,100

LITRES OF water 'embedded' in a single cotton T-Shirt (WWF)

13,000

Number of desalination plants already operating globally (Water-Technology.net)



rants, with customers citing the environmental crimes of bottled water, which mainly revolve around unsustainable transportation and packaging practices resulting in a massive carbon footprint. Significantly, sales of Nestle's nine bottled water brands (of which one is Perrier) fell 9% in Europe and the US in the first quarter of the year.

But Nestle's travails are a mere drop in an ocean of problems mounting up around the one commodity whose commercial potential may resemble oil. Indeed, one massive stumbling block facing desalination advocates is actually the rocketing cost of fuel.

Global Water Intelligence estimates that the market is growing at 20% a year in the core markets of the US, China, India and Australia, but the central curb on growth will be the price of energy, according to the International Desalination Association, which notes that the rising price of fuel has made water production much more expensive.

Not surprisingly, then, the future lies with innovative corporations with the size and

### THE TRILLION LITRE COCA COLA QUESTION

For industries that rely on water to make and manufacture their product, the predicted water shortages pose a huge challenge.

Take the soft drinks industry. Its fruit juices, carbonates, bottled water and other non-alcoholic beverages require millions of litres of water a year. In 2007, for instance, The Coca Cola Company (TCCC) alone used about 300 billion litres in its drinks and in their manufacture.

When bottling plants are situated in regions where water is abundant, this level of use isn't a problem, but becomes one when manufacturing is carried out in water-stressed areas. TCCC's Kaladera bottling plant in Rajasthan, India is a case in point. After years of complaints from farmers that the plant was polluting watercourses and depleting the water table, and calls from local NGO India Resource Center to shut down the facility, TCCC commissioned a report from India's Energy and Resources Institute to assess whether the accusations were true here, and at five other plants across India. The report found that "... continuous daily extraction by the Coca-Cola plant in the successive months of March, April, May, and June [2007] has added to the stress on the localized state of the aquifer, that is, in addition to irrigation withdrawals". The report recommended that TCCC reevaluate its operations in Kaladera and consider: transporting water from the nearest aquifer that may not be stressed; storing water from low-stress seasons; relocating the plant to a water-surplus area; and shutting it down.

TCCC admits it had not paid "significant enough attention" to water issues in India in the past, but is now rolling out its global plan, announced in conjunction with WWF last year, to become "water neutral" by setting specific water efficiency targets for global operations by 2008; returning all the water it uses for manufacturing processes to the environment clean enough to support aquatic life and agriculture by the end of 2010; and offsetting its global water use by supporting healthy watersheds and sustainable community water programmes such as rainwater harvesting, reforestation, and efficient agricultural water use.

"In a water-stressed area, because we are responsible corporate citizens we have to help the

community understand our water use and we have to understand theirs," says Greg Koch, TCCC's managing director of Global Water Stewardship, "Then we can resolve what we need to do together."

Other companies are tackling the issue, too. In Europe and Asia, PepsiCo harvests rainwater to help restore aquifers, while in water-stressed countries it builds community infrastructure to help meet local needs. In June this year, the British Soft Drinks Association (BSDA) launched its sustainability strategy, which included an ambition to reduce its waste water volumes (i.e. water not contained in the product) to contribute to a food and drink industry target to reduce water use by 20% by 2020 compared to 2007. Jill Ardagh, BSDA director-general says: "The government's Food Industry Sustainability Strategy has identified greater efficiency in water use as a key priority. The soft drinks industry's Sustainability Strategy fully supports this focus on water — we are already working towards the objectives set out by the government and we are committed to improving water efficiency in the production of our products." And in April this year, the beverage industry set up the Carbon Action Plan (CAP), a global sustainability standard for the measurement and independent verification of greenhouse gas emissions within the sector, which includes indicators for measuring and improving water efficiency.

But with worldwide consumption of all ready-to-drink beverages approaching one trillion litres a year according to Cap Partnership, the question for the soft drinks industry is whether it can ever be truly sustainable if pressure on global water supplies grows as predicted.



# 70

Percentage of Saudi Arabia's water needs met by desalination (Water-Technology.net)



Percentage of the world's freshwater fish that are threatened with extinction due to habitat destruction (People and Planet, 2008)

# 10,000

NUMBER OF families forced off their land in Australia as a result of drought since 2003

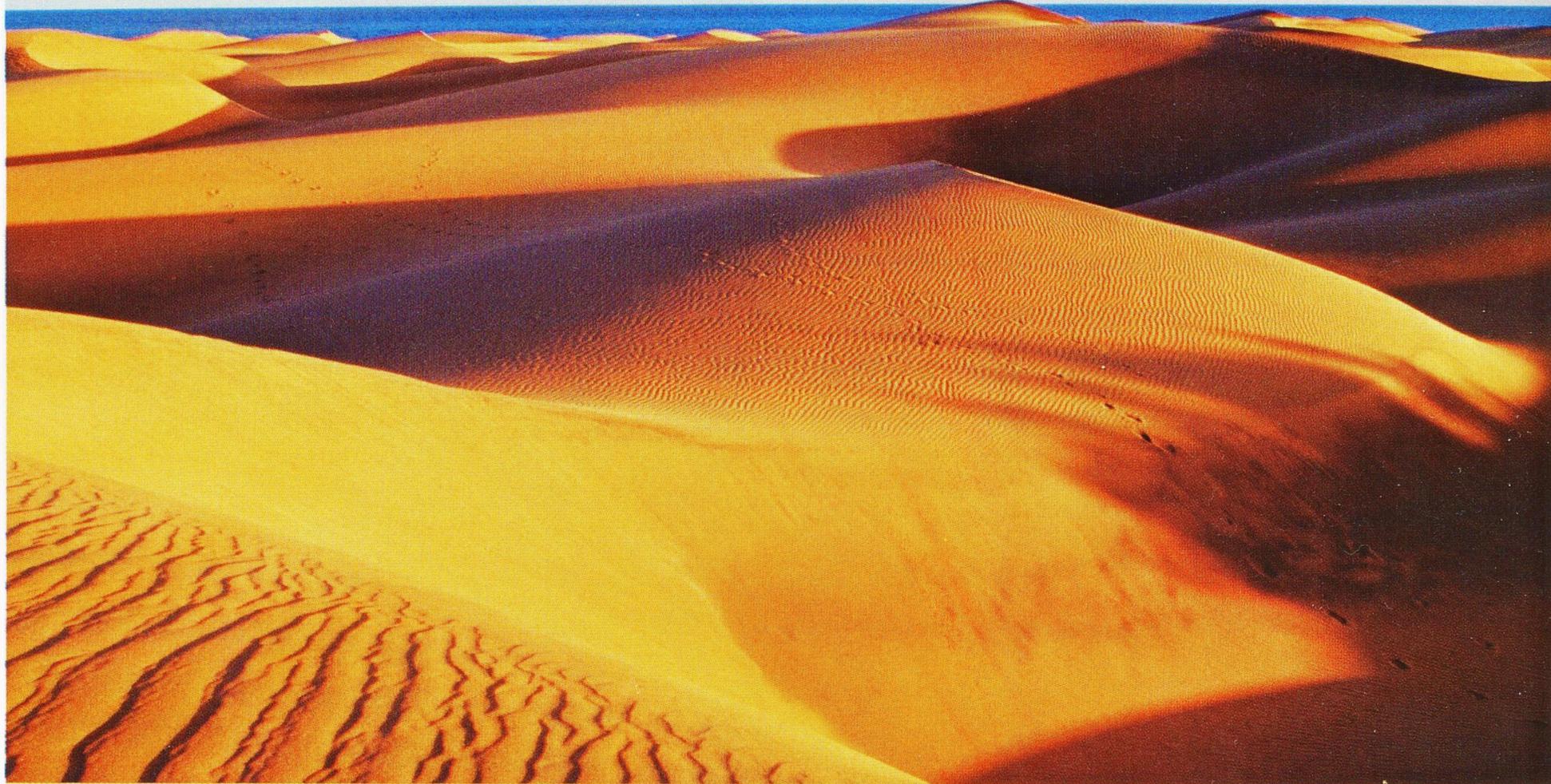
# 10

The percentage of the Aral Sea's surface area still remaining.



## ■ DRYING UP

An EU project in Gran Canaria failed due to cost



scale necessary to develop new technologies. Siemens' water division is currently working on technology that could halve energy consumption to 1.5kWh per m<sup>3</sup>.

Elsewhere, experimentation is proceeding apace; not all of it successful. The EU-backed project Sodesa, installed eight years ago on Gran Canaria, aimed to harness solar power to distill seawater into freshwater, but it was shelved due to cost.

Meanwhile, the WaterPyramid, designed by Martijn Nitzsche, founder of Dutch holding company Aqua-Aero WaterSystems, uses a tent structure to heat and distil seawater, but, once again, it is impeded by cost and longevity issues. Other start-ups examining the problem are Danish company AquaDania and dotcom millionaire Morten Lund.

In the larger scheme of things, no one is holding their breath. The barriers to entry are enormous and the direction the indus-

try is now taking is towards big solutions for big populations, with steep energy costs underwritten by desperate governments at the taxpayer's expense.

What the smaller companies, inventors and entrepreneurs may offer, however, is



“WATERSTILLER IS LOCAL, LOW-TECH AND AFFORDABLE. IT ELIMINATES THE NEED TO TRANSPORT WATER”

TOM JUUL ANDERSON

portable technology addressing small scale, local needs. AquaDania claims to have made a breakthrough with its patented WaterStiller unit, which uses a solar collector measuring two square metres, enabling it to distil between 40 and 60 litres a day, five times more

than conventional stills and enough for the daily requirements of each individual.

Chief executive Tom Juul Anderson says: “We’re not looking to challenge industrial-scale methods with this system. The point is that it’s local, low tech and affordable. It eliminates the need to transport water.”

This and other forms of rainwater harvesting represent a very large part of the solution for rural populations, who outnumber their urban counterparts by four to one according to a recent report by UNICEF.

In light of such needs, the traditional assumption of most people that water is both abundant and virtually free, is rapidly dying out. That means that even the utility end of the water business is set to become much, much more exciting to investors as bills rise inexorably and regulators roll over in the face of much-needed upgrades to existing infrastructure. ● EB

4

The percentage of Lake Chad's surface area still remaining

23

Millions of litres of freshwater carried by the tanker Sichem Defender to Barcelona in May, the first such shipment ever made

21

THE NUMBER OF armed conflicts over water supply in recent history (Third World Water Conference)

18

The number of armed conflicts over water supply in recent history involving Israel (Third World Water Conference)

240

Number of world water basins straddling national borders