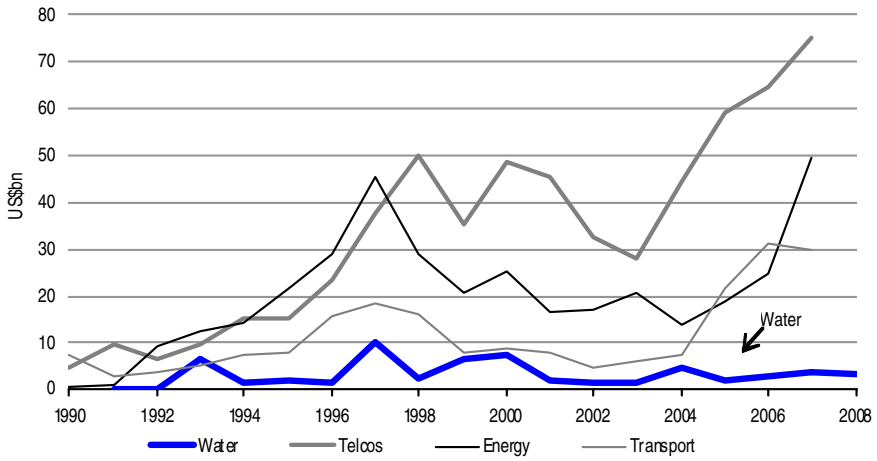
23 November 2009
Global
**Equity Research**
Investment Strategy (Strategy)

# Water: The pressure is rising

THEME

**Figure 1: Private sector investment in emerging markets in water, telcos, energy and transport (US$bn)**




*Source: World Bank PPI data, Credit Suisse research*

- **The cliché of 'blue gold' is becoming ever more relevant:** Since we first wrote in 2007 of an unsustainable picture of excess water demand and depleted supply, the problem has become no less worrying. We estimate that by 2020, 37% of the global population (or 2.8 billion people) will face absolute water stress. At the same time, water-related investment in the emerging world seems to be a low relative priority, judging by Figure 1 above.
- **Upward pricing pressure:** In an economic model of excess demand, prices should rise to encourage supply or moderate demand. To a degree, this is happening. However, in some emerging countries where the problem is most severe, the 'politics of water' is a major obstacle.
- **Whether financed through higher prices or not, we believe investment will rise**. Strong growth in spending in Australia and China should continue, with investment in MENA, the Mediterranean, Russia, the US and India also picking up, although in the case of the latter two, perhaps not enough.
- **We examine companies under four simple headings:** (1) activities and technologies that increase supply; (2) the building of the necessary water infrastructure; (3) processes that help reduce demand; and (4) water management. Names we highlight include Ashland, Energy Recovery, Flowserve, Hyflux, Alesco, IVRCL, Donaldson and United Utilities. Alternatively, the Credit Suisse Water Index built in conjunction with Credit Suisse HOLT® (Bloomberg: CSWTR) provides a portfolio approach to investing in the theme.

**Credit Suisse Research Institute**

Thought leadership from Credit Suisse Research and the world's foremost experts

**Product Co-ordinators**

**Mary Curtis**
44 20 7883 8885
mary.curtis@credit-suisse.com

**Richard Kersley**
44 20 7888 0313
richard.kersley@credit-suisse.com

**Research Analysts**

**Michael Bleakley**
44 20 7888 0336
michael.bleakley@credit-suisse.com

**Robert Chantry**
44 20 7888 0285
robert.chantry@credit-suisse.com

**Patrick Jobin**
212 325 0843
patrick.jobin@credit-suisse.com

**Adnan Kucukalic**
612 8205 4427
adnan.kucukalic@credit-suisse.com

**Andrew M. Kuske**
416 352 4561
andrew.kuske@credit-suisse.com

**Hamzah Mazari, CA**
212 538 7983
hamzah.mazari@credit-suisse.com

**Amish Shah, CFA**
9122 6777 3743
shah.amish@credit-suisse.com

**Elisenne Verdoja CFA**
44 207 888 5302
elisenne.verdoja@credit-suisse.com

# Analyst contact list


| | | |
|---|---|---|
| ***Global Head of Research*** | | |
| Stefano Natella | +1 212 325 4217 | stefano.natella@credit-suisse.com |
| ***Product Co-ordinators*** | | |
| Mary Curtis | +44 207 883 8885 | mary.curtis@credit-suisse.com |
| Richard Kersley | +44 207 888 0313 | richard.kersley@credit-suisse.com |
| ***Strategy*** | | |
| Andrew Garthwaite | +44 207 883 6477 | andrew.garthwaite@credit-suisse.com |
| Luca Paolini | +44 207 883 6480 | luca.paolini@credit-suisse.com |
| Marina Pronina | +44 207 883 6476 | marina.pronina@credit-suisse.com |
| Sebastian Raedler | +44 207 888 7554 | sebastian.raedler@credit-suisse.com |
| Mark Richards | +44 207 883 6484 | mark.richards@credit-suisse.com |
| Alex Redman | +44 207 888 6896 | alex.redman@credit-suisse.com |
| ***Australia*** | | |
| Adnan Kucukalic | +61 2 8205 4427 | adnan.kucukalic@credit-suisse.com |
| Damien Boey | +61 2 8205 4615 | damien.boey@credit-suisse.com |
| Chris Counihan | +612 8205 4012 | chris.counihan@credit-suisse.com |
| Larry Gandler | +613 9280 1855 | larry.gandler@credit-suisse.com |
| Paul Graham | +61 28205 4538 | paul.graham@credit-suisse.com |
| Michael Slifirski | +613 9280 1845 | michael.slifirski@credit-suisse.com |
| Darren Vincent | +612 8205 4054 | darren.vincent@credit-suisse.com |
| Neil Watson | +612 8205 4783 | neil.watson@credit-suisse.com |
| ***Europe*** | | |
| Elisenne Verdoja | +44 207 888 5302 | elisenne.verdoja@credit-suisse.com |
| Rob Chantry | +44 20 7888 0285 | rob.chantry@credit-suisse.com |
| Mark Freshney | +44 20 7888 0887 | mark.freshney@credit-suisse.com |
| Michael Bleakley | +44 20 7888 0336 | michael.bleakley@credit-suisse.com |
| Charlie Mills | +44 20 7888 0325 | charlie.mills@credit-suisse.com |
| Alex Molloy | +44 20 7888 0848 | alex.molloy@credit-suisse.com |
| Andre Kukhnin | +44 20 7888 0350 | andre.kukhnin@credit-suisse.com |
| Laia Izquierdo | +44 20 7883 2153 | laia.izquierdo@credit-suisse.com |
| Rhian Tucker | +44 20 7888 0300 | rhian.tucker@credit-suisse.com |
| Simon Smith | +44 20 7883 6893 | simon.smith@credit-suisse.com |
| Stuart Joyner | +44 20 7888 0868 | stuart.joyner@credit-suisse.com |
| Thomas Kalbermatten | +41 44 333 0548 | thomas.kalbermatten@credit-suisse.com |
| Ur-cheng Leong | +44 20 7883 4919 | ur-cheng.leong@credit-suisse.com |
| ***India*** | | |
| Amish Shah | +9122 6777 3743 | shah.amish@credit-suisse.com |
| Nilesh Jasani | +91 22 6777 3720 | nilesh.jasani@credit-suisse.com |
| Govindarajan Chellappa | +9122 6777 3715 | govindarajan.chellappa@credit-suisse.com |
| Anubhav Aggarwal | +9122 6777 3808 | anubhav.aggarwal@credit-suisse.com |
| Arya Sen | +91 22 6777 3807 | arya.sen@credit-suisse.com |
| ***Japan*** | | |
| Emiko Shinohara | +81 3 4550 9865 | emiko.shinohara@credit-suisse.com |
| Nick Robinson | +81 3 4550 9968 | nicholas.robinson.2@credit-suisse.com |
| Masami Sawato | +813 4550 9729 | masami.sawato@credit-suisse.com |
| Masashi Itaya | +813 4550 7366 | masashi.itaya@credit-suisse.com |
| Shinji Kuroda | +81 3 4550 9994 | shinji.kuroda@credit-suisse.com |
| ***Other Asia*** | | |
| Catherine Lim | +852 2101 6323 | catherine.lim@credit-suisse.com |
| Cusson Leung | +852 2101 6621 | cusson.leung@credit-suisse.com |
| Danny Goh | +603 2723 2083 | danny.goh@credit-suisse.com |
| Edwin Chen | +852 2101 6550 | edwin.chen@credit-suisse.com |
| Edwin Pang | +852 2101 6406 | edwin.pang@credit-suisse.com |
| Haider Ali | +65 6212 3064 | haider.ali@credit-suisse.com |
| Henry Kwon | +822 3707 3732 | henry.kwon@credit-suisse.com |
| Thaniya Kevalee | +662 614 6219 | thaniya.kevalee@credit-suisse.com |
| Tingmin Tan | +603 2723 2080 | tingmin.tan@credit-suisse.com |
| Victoria Li | +8621 3856 0326 | victoria.li@credit-suisse.com |
| ***Latin America*** | | |
| Vanessa Quiroga | +52 55 52 83 8939 | vanessa.quiroga@credit-suisse.com |
| Vinicius Canheu | +55 11 3841 6310 | vinicius.canheu@credit-suisse.com |
| ***North America*** | | |
| Andrew Kuske | +1 416 352 4561 | andrew.kuske@credit-suisse.com |
| Carlos Laboy | +1 212 538 4337 | carlos.laboy@credit-suisse.com |
| Gary Balter | +1 212 538 4228 | gary.balter@credit-suisse.com |
| Hamzah Mazari | +1 212 538 7983 | hamzah.mazari@credit-suisse.com |
| Jamie Cook | +1 212 538 6098 | jamie.cook@credit-suisse.com |
| John McNulty | +1 212 325 4385 | john.mcnulty@credit-suisse.com |


Previous Credit Suisse *New Perspectives* reports:

*Water*, 7 June 2007 – Garthwaite, Curtis, Kersley, Balter, et al.

*Higher Agricultural Prices: Opportunities and Risks,* 6 November 2007 – Garthwaite, Curtis, Moskow, Mills, et al.

*Embracing China's consumption boom,* 3 March 2008 – Chan, Tao, Xiao Jia Zhi.

*Africa – The Commodity Warrant,* 14 April, 2008 – Kersley, Curtis, Gray, Flannery, et al.

*Obesity and Investment Implications,* 26 June 2008 – Arnold, Rochon, et al.

*Intangible Infrastructure: Building on the Foundations,* 8 December 2008 – Kersley, Rochon, Curtis, et al.

*Agriculture: A structural story*, 10 June 2009 – Kersley, Garthwaite, Kjellberg, Mills, Curtis, et al.

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# Executive summary

## Introduction

Sharp falls in ground water illustrate the unsustainable nature of water consumption

Growing imbalances in global water supply and demand are well documented. We looked at the problem in some detail in our report *Water,* dated 7 June 2007. Since then, relatively little has changed in terms of the scale of the overall problem and the susceptibility of certain geographic regions. Sharp falls in groundwater levels (in India, Australia, China and parts of the US, in particular) and natural reservoirs (for example, the Aral Sea) illustrate the unsustainable nature of water consumption patterns. The bottom line is that demand is outstripping supply. We estimate that by 2020, based on UN population projections (and assuming current levels of supply prevail), that 37% of the global population (or 2.8 billion people) will face *absolute* water stress (a UN definition where supply is less than 1,700 cubic metres per annum per capita).

Supply-side pressures are building on the back of climate change

Problems get worse if IPCC forecasts on climate change are correct. This would have a significant negative impact on water supply. For example, in its 2007 report the IPCC controversially reiterated the forecast from the WWF that the Himalayan glaciers could have all but disappeared by 2035. Roughly 1.3 billion people live along the drainage basins of the seven major rivers fed by the Himalayan glaciers. During the dry season the glaciers are the main source of river flow (70% in the case of the Ganga).

There are signs that the market is responding to the issue: water prices have continued to outstrip headline inflation in the majority of developed countries. However investment levels in general have been surprisingly weak. This is clearly illustrated by World Bank data for the emerging markets, as portrayed in Figure 1 on the front cover of this report. Indeed, we find that public sector investment in key markets (such as the US) is probably some considerable way behind 'required' investment.

## Key conclusions

Investment may have been disappointing so far, but we expect it to pick up…

In our view, greater levels of investment (in the form of pipelines, desalination plants, recycling systems and other supply-side solutions) will be crucial in alleviating shortages and as such look likely to rise in importance. In other words, while investment growth in many regions may have been disappointing so far, we expect it to pick up substantially over the next 5–10 years. However, we have three caveats to accompany this forecast:

…particularly in markets where the problems are more acute but where the administration is sufficiently organised to meet targets

- Investment growth is likely to be stronger, in our opinion, in those markets where water shortages are relatively acute, financing is at least partly available from the federal or national budget (as opposed to the private sector or local municipalities) and the administration is sufficiently organised to deliver on targets. To us, this implies greater relative growth in water-related investment in **Australia, China, MENA, Mediterranean markets and Russia** (where ageing infrastructure requires substantial upgrades). Investment should continue to pick up in the **US and India** but relative to requirements, may well continue to disappoint.

It may make more sense to invest in the building, rather than the owning and operating

- Returns in water management can be high where infrastructure is well established and pricing is appropriate (for example, France or the UK). In less mature markets however, where water is seen as more of an 'entitlement' than a 'service', it may make more sense to **invest in the building, but not the owning and operating**. Our analysis of the experience of Veolia and Suez (see VII Water provision: A French case study) provides working examples of the nature of returns in water management.

Small is beautiful?

- Given the inherent corporate risks in providing water services, the trend towards smaller private sector contracts looks likely to persist. To some extent, this may improve the chances of smaller, local players (**Hyflux, Dongfang Electric, Harbin Power**) in competing for water-related contracts as opposed to the big multi-national companies (**Suez, Veolia, RWE**) that have traditionally dominated the industry.

We also note that greater efficiency in water usage appears to be rising in importance. To the extent that consumers (or governments through subsidy schemes) are faced with rising costs and/or supply interruptions, **the onus is shifting towards reducing overall demand for water**. This puts added emphasis on the importance of the contribution from companies proficient in demand-side efficiencies (ranging from drought-resistant crops, less water intense crops and more efficient irrigation systems, to low-use shower heads and water-efficient toilets).

Water efficiency is rising in importance

## Investment implications

**(1) Increasing water supply.** There are two obvious ways to augment the water supply: either through water recycling (re-use) or desalination. Growth in both has been strong over the past 5–10 years and we expect this trend to continue. Global Water Intelligence (GWI) forecasts a CAGR of 11% in water recycling to 2015 (taking re-use levels to just under 25% of global supply, up from 10% as of 2005) and a CAGR of 9.3% in desalination to 2016. Since much of the recycled water will not be clean enough to drink, it is much cheaper to produce than desalinated water: re-used water can be used for agricultural purposes with relatively little purification compared with desalinated water (where the salt has to be extracted), which requires extensive purification. However, this cost of treatment (if it is not up to potable standards) has to be weighed against the cost of building a secondary 'non-potable' network. Our top picks in the sector are **Ashland, Energy Recovery, Flowserve, Hyflux** and **Gamuda**.

Water recycling and desalination industries are on the rise

**(2) Water infrastructure.** We look at those sectors and stocks that are essentially concerned with storing and transferring water, be it on a large scale (in dams and pumped through pipelines) or on a small scale (and transported in a bottle). We consider four areas: (a) dams and reservoirs, (b) pipelines, (c) leaks and (d) packaged water.

- Dams: declining growth in the 1990s has been replaced with a resurgence in dam building since the turn of the twenty-first century. Companies include **Gammon India, Jaiprakesh Associates** and **Dongfang Electric**.

Renewed interest in dams

- Pipelines are in demand to replace ageing infrastructure, connect desalination and water recycling schemes to the end users and to pump water into areas of scarce resource. Our top pick in the sector is **IVRCL**.

Pipelines: the ultimate link between all aspects of water investment

- Leakages are less acceptable as the economic costs of water supply have risen. Companies in this space include **Halma**, **Homeserve** and **Insituform**.
- Demand for bottled water is on the wane in developed markets but is growing quickly in developing markets. **Grupo Continental** is one stock that offers reasonable exposure to water (31% of sales) in emerging markets.

**(3) Reducing water demand.** Much can be done to cut down on water demand. We consider ways to reduce water demand for the three main user groups: agricultural demand (which accounts for some 70% of total water demand), domestic demand (8%) and industrial demand (22%).

As prices and costs increase, the onus is shifting towards water conservation

- There are two main methods to cut agricultural demand for water: (a) drought-resistant crops (some of which are scheduled for commercial release by 2012) and (b) more efficient irrigation techniques. Companies in the space include **Monsanto, Syngenta, Jain Irrigation** and **Alesco**.
- There are a multitude of ways to cut domestic demand for water. We consider metering, tiered tariffs and better plumbing. Companies include **Itron, Badger Meter, Geberit** and **Watts Water Technologies**.
- Industrial water demand has been relatively stable for some time, despite much higher output levels. Solution providers in this space include **Alfa Laval, Aalberts Industries, Badger Meter** and **Flowserve**.

**(4) The listed water management sector**. This is a classically defensive sector reflecting the inelastic nature of water demand and the regulatory environment faced by most water utilities. Dividend yields are typically higher than the market average, as long-term growth potential is perceived to be lower. Underperformance YTD of 20% has meant the relative gap in the trailing dividend yield of water utilities (4.5%) versus global equities (2.6%) has opened up again. Our top pick in the sector is **United Utilities**. We rate **Suez Environnement** as Underperform and have recently upgraded **Veolia** from Underperform to Neutral (*Veolia Environnement: Ending our negative call*, 2 November 2009).

The water utility sector is classically defensive

An alternative way to play the theme is through the **Credit Suisse Water index (powered by Credit Suisse HOLT)**. Over the last year, this index has outperformed MSCI World by 23% and the S&P Global Water Index by 22%.

Appendix 1 illustrates the relative performance. We also include comparative charts on the related themes of agriculture and global warming. The Credit Suisse Agriculture index has outperformed MSCI World by 60% over the past year. The Credit Suisse Global Warming index has outperformed by 8% over the past year.

In Appendix 2, beverages analyst Michael Bleakley documents the rising concerns voiced by SABMiller (and other industrials) over the extent of their water footprint and the measures that are being undertaken to manage the risk.

In Appendix 3 we list the full universe of water-related stocks.

# Stock picks

## The Credit Suisse Water Selection

Below we highlight those stocks that we rate as either Outperform or Neutral and which have a reasonable proportion of sales related to the water industry.

**Figure 2: The Credit Suisse water selection**

| Ticker | Company | Description | Main listing | Mkt Cap (US$mn) | 2008 Sales (US$mn) | % sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|---|
| ALS.AX | Alesco | Irrigation & bore water systems, water tank systems, grey & waste water systems | AUS | 2,146 | 1,373 | 15-20% | O | 17.4 | 1.4 |
| ASH | Ashland | Water treatment chemicals for use in industrial applications | USA | 2,860 | 8,106 | 20% | O | 10.0 | 0.3 |
| KOFL | Coca-Cola Femsa SA DE CV | The second largest Coca-cola bottler based in Mexico City | MEX | 1,471 | 7,395 | 17% | O | 14.2 | 0.2 |
| DANO | Danone | Bottled water and other soft drinks and food production | FRA | 42,239 | 22,406 | 18% | O | 16.2 | 1.8 |
| DCI | Donaldson Company, Inc. | Manufacturer of filtration systems and replacement parts | USA | 2,927 | 1,869 | 15% | O | 24.4 | 1.6 |
| ERII.O | Energy Recovery Inc | Developing/manufacturing energy recovery devices in seawater desalination | USA | 279 | 53 | 100% | O | 37.3 | 4.8 |
| FLS | Flowserve Corp | Manufactures specialised pumps, valves, seals vital to water infrastructure projects | USA | 5,978 | 4,335 | 12% | O | 14.3 | 1.5 |
| GAMM.BO | Gammon India Ltd | Hydro plant construction | IND | 562 | 556 | N/A | O | 27.5 | 0.5 |
| GAM MK | Gamuda Berhad | Water treatment plant (although the sale of this asset is in progress) | MYS | 1,856 | 797 | 12% | O | 15.4 | 1.9 |
| CONTAL | Grupo Continental | Bottled water and soft drinks producer | MEX | 1,789 | 1,002 | 31% | O | 11.9 | 1.6 |
| 0270 HK | Guangdong Investment | Water distribution and electric power generation | HKG | 3,480 | 1,001 | 53% | O | 11.8 | 3.3 |
| HYF SP | Hyflux | Seawater desalination, drinking water treatment, wastewater reclamation, recycling | SGP | 1,157 | 415 | 30% | O | 20.5 | 2.5 |
| IPR.L | International Power | Principally concerned with power generation; also interests in desalination | GBR | 6,878 | 6,554 | 12% | O | 9.7 | 1.2 |
| IVRC.BO | IVRCL Infrastructures and Projects | Across value chain including water pipelines, irrigation projects, water desalination | IND | 1,154 | 1,053 | 65% | O | 16.9 | 0.7 |
| JAIA | Jaiprakash Associates Ltd | Dams, power stations and sewerage schemes | IND | 7,118 | 1,015 | N/A | O | 21.2 | 2.9 |
| UU | United Utilities | Water Utility | GBR | 5,390 | 4,042 | 92% | O | 11.7 | 1.3 |
| | | | | | | | | | |
| BRC_u.TO | Brookfield Renewable Power Fund | Owns and operates 42 hydroelectric and 1 wind power generator | CAN | 1,844 | 199 | 100% | N | 15.1 | 4.9 |
| KHD.TO | Canadian Hydro Developers | Developer, owner, operator of EcoPower stations, incl 12 hydroelectric operations | CAN | 736 | 85 | 29% | N | 17.3 | 4.4 |
| 1072.HK | Dongfang Electric | Hydro power equipment manufacturer in China | HKG | 5,110 | 4,445 | 10% | N | 21.1 | 0.9 |
| 6361 | Ebara | Manufactures transfer machinery for fluids for a range of industrial processes, including for use in waterworks and sewerage systems | JAP | 1,685 | 5,485 | 53% | N | 23.0 | 0.3 |
| EPUR SP | Epure International Ltd. | Water/wastewater treatment technology and projects construction | SGP | 559 | 161 | 100% | N | 11.8 | 2.5 |
| GUD | G.U.D. Holdings | Pumps and water purification | AUS | 508 | 427 | 30% | N | 12.4 | 1.1 |
| GEBN | Geberit AG | Domestic water saving devices | SWI | 7,167 | 2,101 | 100% | N | 17.7 | 3.5 |
| FIN | Georg Fischer | Plastic and metal pipes and fittings | SWI | 1,132 | 3,478 | 18-20% | N | 4.3 | 0.2 |
| GWT.AX | GWA International | Toilets, cisterns, taps, showerheads, hot water systems | AUS | 809 | 618 | 75% | N | 12.8 | 1.1 |
| JIND.BO | Jindal Saw Ltd | Water piping systems | IND | 953 | 1,093 | 40% | N | 9.7 | 0.7 |
| 6370 JP | Kurita Water Industries | Business in ultra-pure water, wastewater, water recycling, functional cleaning water (particularly for the nuclear industry) | JAP | 4,327 | 2,155 | 100% | N | 21.3 | 2.0 |
| NLC | Nalco Holding Co | Offers a full water treatment chemical package to the industrial arena | USA | 3,364 | 3,769 | 100% | N | 18.8 | 0.8 |
| PNN LN | Pennon Group | Water Utility | GBR | 2,733 | 1,582 | 72% | N | 14.1 | 1.5 |
| PNR | Pentair Inc | Pumps and filtration products | USA | 3,150 | 2,758 | 70% | N | 17.3 | 1.1 |
| SBSP3.SA | Sabesp | Water and wastewater services across the state of Sao Paulo | BRA | 4,679 | 3,695 | 100% | N | 6.2 | 1.1 |
| SVT | Severn Trent | Water Utility | GBR | 3,948 | 2,726 | 97% | N | 12.0 | 1.4 |
| 0322.HK | Tingyi | Largest instant noodle/non-carbonated soft-drinks supplier in China | HKG | 13,163 | 4,735 | 50% | N | 29.8 | 2.1 |
| TTW.BK | Thai Tap Water Supply Co | Production and distribution of potable water in Thailand | THA | 505 | 115 | 100% | N | 9.2 | 4.0 |
| VIE.PA | Veolia Environnement | Multi-Utilities | FRA | 17,072 | 52,915 | 44% | N | 16.2 | 0.3 |
| YTLP MK | YTL Power International Berhad | Water supply and wastewater treatment | MYS | 3,868 | 1,781 | 41% | N | 12.5 | 1.2 |

*Source: © 2009 Reuters Limited, IBES International for all P/E and P/sales estimates, Company data, Credit Suisse estimates*

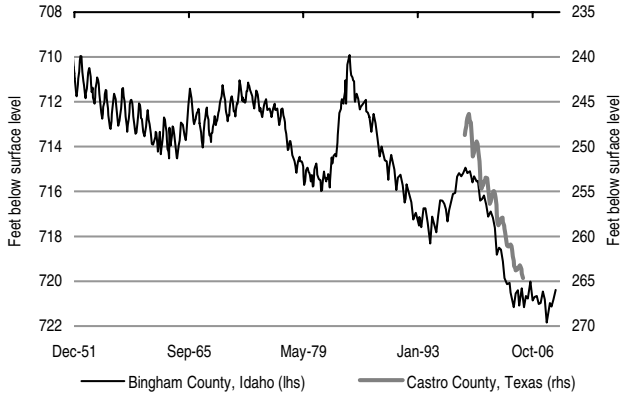
# (I) The status quo is unsustainable

***Sharp falls in groundwater levels (in India, Australia, China and parts of the US in particular) and natural reservoirs (for example, the Aral Sea) illustrate the unsustainable nature of water consumption patterns.***

***Water supply is typically fairly static but water demand is up sixfold over the last century, more than double the rate of population growth. Continued strong demand growth looks inevitable on the back of a growing world population, rising relative incomes in the emerging markets and the trend towards urbanisation. Potentially acute supply-side problems are presented by global warming (given the significant impact registered on inland glaciers) and pollution.***

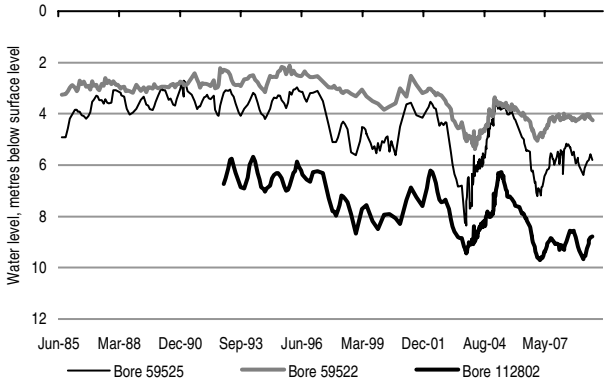
The impact of strong demand growth against relatively static supply is well illustrated by the rate of decline in ground water levels. Just over 20% of water used globally is from groundwater. Ground water (stored in aquifers) has typically taken tens of thousands of years to accumulate. Over-use of groundwater in some areas has meant reserves have plummeted *regardless* of prevailing rainfall patterns.

**Figure 3: US ground water levels**




*Source: US Geological Survey*

**Figure 4: Victoria, Australia: ground water levels**




*Source: Victorian water resources*

Even without further growth in demand for water, continued reliance on groundwater (at prevailing extraction rates) looks unsustainable as these reserves dry up:

Falling ground water levels are well documented in the US, China and India

- According to the US Geological Survey (USGS), North America's largest aquifer, the Ogallala, is being depleted at a rate of 26bn cubic metres (bcm) a year. Total depletion to date amounts to some 312bcm, or 9% of total water storage since substantial ground-water irrigation development began, in the 1950s.

- Data from the Geological Environmental Monitoring Institute (GEMI) in Beijing shows that the groundwater under the north China plain (an area that produces over half of the country's wheat and a third of its corn) has been falling by as much as 3 metres a year. According to the World Bank, wells around Beijing now have to reach as much as 1,000 metres in order to extract water, escalating the cost of supply.

*New Scientist* has reported that water tables in North Gujarat were falling at six metres a year

- In a survey of India's water situation, the *New Scientist* (July 2007) reported that the country's 21 million wells are lowering water tables in most of the country and that in North Gujarat, the water table was falling by six metres a year. According to a study published in *Nature* (August 2009), NASA scientists estimated that between 2002 and 2008, 109 cubic kilometres of water had been depleted from the aquifer covering North West India. This is equivalent to double the capacity of India's largest reservoir. Rainfall over the study period had been reasonably consistent, emphasising that the

fall in ground water was as a result of over-extraction rather than any drought conditions.

- In Pakistan, the drop in water tables appears similar to that in India. Observation wells near the cities of Islamabad and Rawalpindi show a fall in the water table between 1982 and 2000 of 1 to 2 metres a year.

Overuse has also severely depleted natural reservoirs

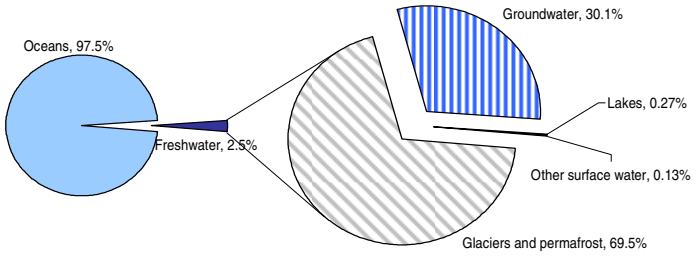
Of the total amount of water used globally, 65% is from surface water (rivers, streams and lakes). Again, demand has outstripped the rate of replenishment. The most vivid illustration of this is the decline in the Aral Sea. At one stage, the Aral Sea was the world's fourth biggest inland sea, and one of the world's most fertile regions, but overuse has meant that by 2007, the Aral Sea had lost 90% of its original volume and had split into three separate lakes, two of which are too saline to support most aquatic life.

## Water supply is relatively static

Only 2.5% of the world's water is fresh water—and most of that is frozen

Absolute water supply is the same now as it was 10,000 years ago. There is roughly 1.4bn cubic kilometres of water on Earth, but 97.5% of that is saltwater. Of the 2.5% that is freshwater, less than a third is easily accessible in groundwater, lakes and rivers. Glaciers and permafrost make up 69.5% of the freshwater.

**Figure 5: Global distribution of the world's water**




*Source: Shiklomanov and Rodda, 2003*

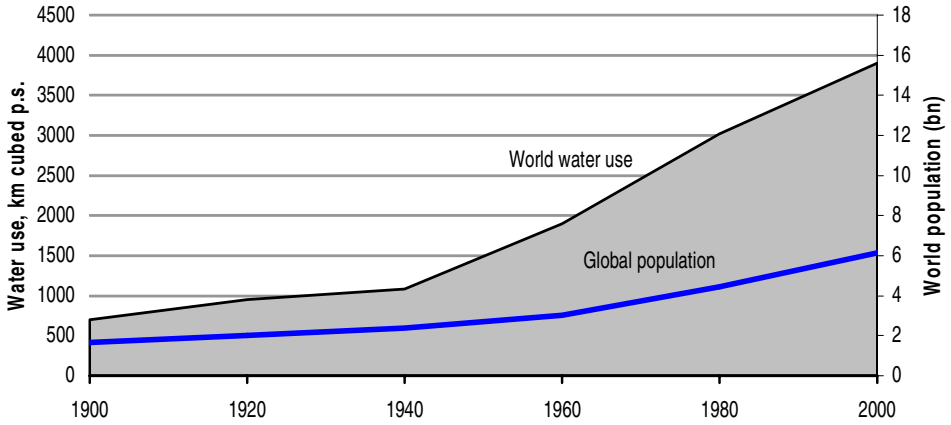
There is actually enough water to go round: it's just not all in the right place

In aggregate, there is sufficient fresh water to meet global demand. 10.5m cubic kilometres of freshwater is more than enough to supply the current 6.5 billion global population. As the UN put it (United Nations World Water Development Report, 2007), providing universal access to the basic minimum of 50 litres a day per person would mean re-distributing just 1% of the amount of water used currently. The problem is essentially a question of distribution of the freshwater resource given spatial and time variations in its natural delivery.

## Water demand has seen substantial growth

Annual world water use is up sixfold over the last century, more than double the rate of population growth, according to the Food and Agriculture Organisation (FAO).

**Figure 6: Global water use and population**




*Source: FAO Aquastat, UN*

Annual world water use is up sixfold over the last century

Growth in water usage has significantly outstripped population growth for three broad reasons:

(i) Rising real incomes have increased the demand for food and more water-intensive food groups (agriculture accounts for 70% of water demand, according to the FAO);

(ii) Advances in technology (water networks, pipelines) have brought water and sanitation into the home, making it more convenient to use in greater quantity (domestic water use accounts for 8% of water demand). Urbanisation has added to this factor.

(iii) Growth in industrial processes has added to greater demand for water.

## Trouble brewing: continued strong demand growth…

There are two measures of water deficiency as defined by the UN:

There are two measures of water deficiency: absolute and relative

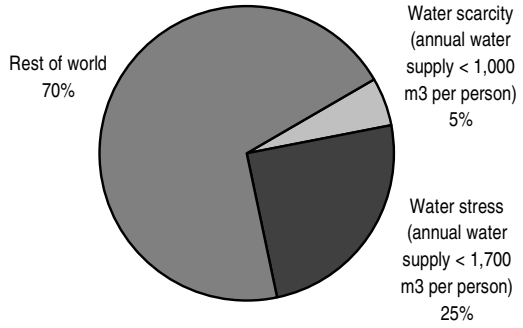
a) The absolute standard. The UN defines countries (or areas) as "water stressed" on an absolute basis when annual water supplies drop below 1,700 cubic metres per person. When supplies drop below 1,000 cubic metres per person, the UN defines the country as "water scarce".

b) The relative standard. This is determined by the ratio of water demand relative to supply. The UN defines a country as suffering high *relative* water stress if demand is greater than 40% of the renewable water supply. Medium-high water stress is defined as demand of between 20% and 40% of supply. On this measure, the US (as an example) is ranked as suffering "medium-high water stress" since annual water demand equated to 24% of supply in 2005. This may not sound particularly egregious but, given significant variations in water supply across any one country throughout the year, anywhere with demand running at greater than 20% of supply, on average, faces problems with water supply.

Absolute water stress looks set to affect 37% of the global population by 2020E

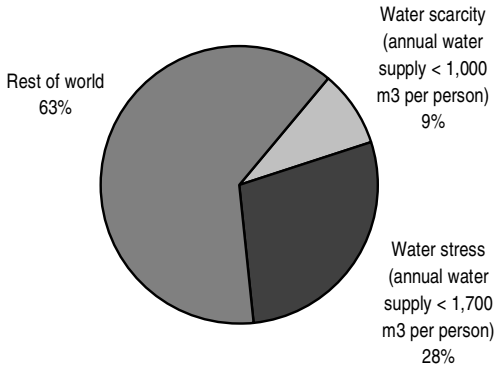
Using population data from the UN and the latest numbers available on water supply and demand from the World Resources Institute, we calculate that 30% of the global population will be suffering absolute water stress or scarcity by 2010E. By 2020, based on UN population projections (and assuming current levels of supply prevail), we estimate this will have increased to 37% (or 2.8 billion people) with various ramifications for political stability, health and economic growth.

**Figure 7: Percentage of the global population suffering*absolute* water stress, 2010E**




*Source: World Resources Institute, UN, Credit Suisse estimates*

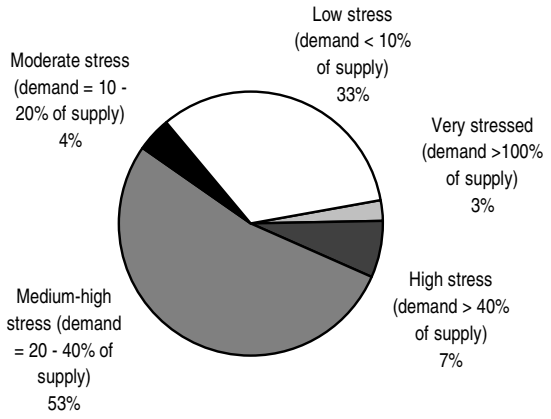
**Figure 8: Percentage of the global population suffering *absolute* water stress, 2020E**




*Source: World Resources Institute, UN, Credit Suisse estimates*

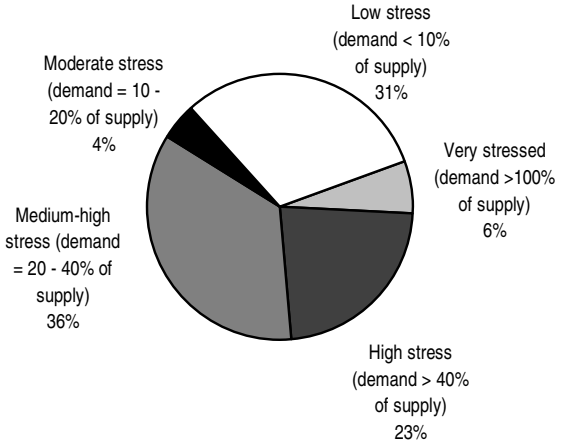
On the UN's relative measure, we estimate that 63% of the global population in 2010 will live in countries where water demand is greater than 20% of their water supply and 10% of the global population will live in countries where water demand is greater than 40% of their water supply. With continued growth in the global population (plus increasing levels of water consumption as average real incomes across developing markets improve) these numbers are set to worsen. By 2020, we estimate 65% of the global population will live in countries where water demand is greater than 20% of their water supply but 29% will live in countries where water demand is greater than 40% of water supply.

**Figure 9: Percentage of the global population suffering *relative* water stress, 2010E**




*Source: World Resources Institute, UN, Credit Suisse estimates*

**Figure 10: Percentage of the global population suffering *relative* water stress, 2020E**




*Source: World Resources Institute, UN, Credit Suisse estimates*

Of the most populous countries, China, India and Pakistan are probably facing the most egregious problems on both absolute and relative measures of water stress. By next year, India and Pakistan are both expected (on the basis of UN forecasts) to be below the absolute stress level of 1,700 cubic metres per inhabitant per annum. China is also approaching this point. Demand relative to supply is likely to be running at 40% in India by 2010 and close to 100% in Pakistan. The US is water-rich in absolute terms but given consumption per head that is nearly three times that of Japan, for example, it is classified

by the UN as moderately water-stressed on a relative basis. In absolute and relative terms, Brazil and Canada are the two most water-rich countries.

**Figure 11: Water supply and demand for the six most populous countries, 2010E**

| | Population mn 2010E | Population mn 2020E | Water supply per inhabitant $m^3$/pa, 2010E | Water supply per inhabitant $m^3$/pa, 2020E | Water Demand/Supply 2010E | Water Demand/Supply 2020E |
|---|---|---|---|---|---|---|
| China | 1,354 | 1,431 | 2,089 | 1,977 | 24% | 28% |
| India | 1,214 | 1,367 | 1,562 | 1,387 | 40% | 49% |
| US | 318 | 346 | 6,520 | 5,983 | 26% | 31% |
| Indonesia | 233 | 254 | 12,206 | 11,164 | 3% | 4% |
| Brazil | 195 | 209 | 42,129 | 39,383 | 1% | 1% |
| Pakistan | 185 | 226 | 1,205 | 985 | 95% | 128% |

*Source: World Resources Institute, UN, Credit Suisse estimates*

## …plus urbanisation, global warming and pollution

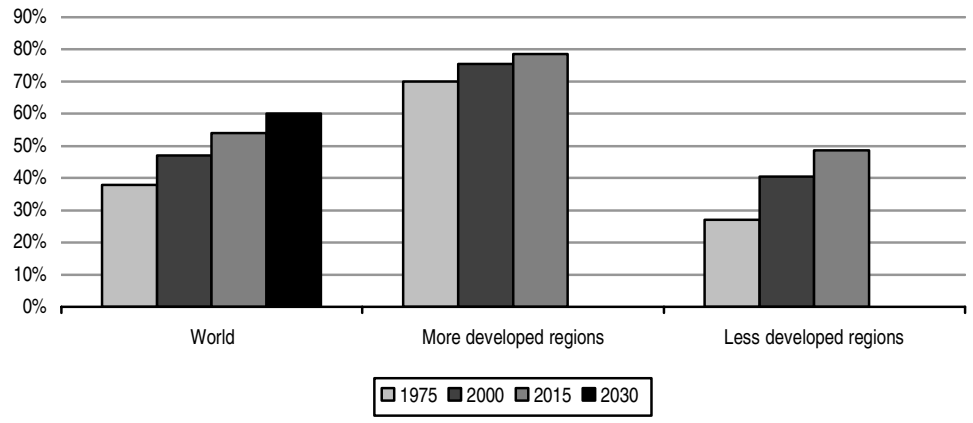
Three factors are exerting further stress on the global water supply and demand balance:

**1. Rural/urban migration**

Rural/urban migration is increasing the stress on the supply/demand balance for most utilities and particularly water for two reasons: (i) a greater proportion of urban dwellers are directly connected to the water network (which naturally facilitates increased domestic water use and adds to overall demand); and (ii) a greater concentration of consumers in a smaller geographical area typically places increased pressure on neighbouring water resources (i.e., local water tables).

The average population size of the world's 100 largest cities grew from around 0.2m in 1800, to 0.7m in 1900, to 6.2m in 2000. Currently, about half the world's population lives in urban centres, compared with less than 15% in 1900. By 2030, the UN forecasts that 60% of the world's population will live in urban areas.

**Figure 12: Proportion of the population living in urban settlements**




*Source: UNESCO-WWAP, 2006*

Growth in urban areas is adding to the stress on local water resources

The UN forecasts that by 2030, 60% of the world's population will live in urban areas

In order for the Millennium Development Goal on water (a UN target to reduce by half relative to 2000 the proportion of people without access to safe drinking water and basic sanitation) to be met by 2015, 961m urban dwellers would have to gain access to an improved water supply.

**2. Global warming**

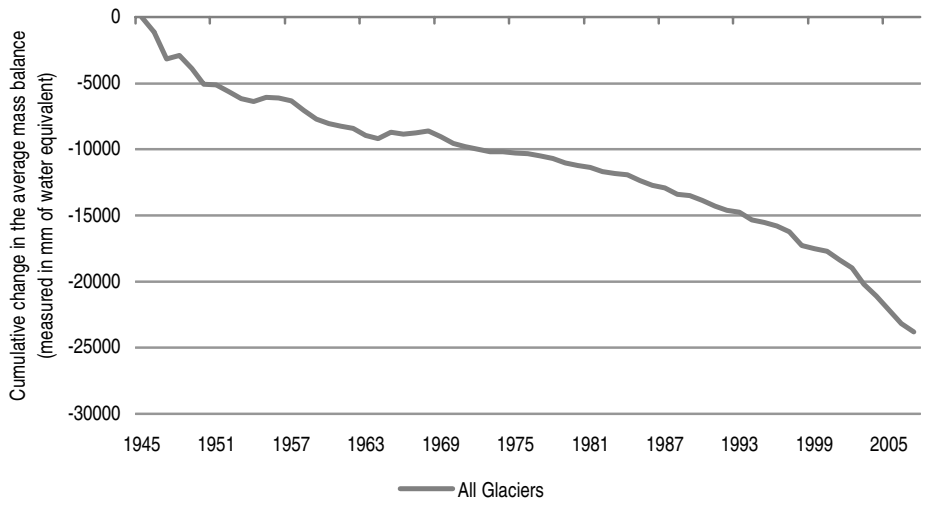
The Intergovernmental Panel on Climate Change (IPCC) points out that in different regions, climate change will affect where, when, how much and how water falls, increase the vulnerability of water supplies, increase the severity of droughts and flooding events and threaten coastal aquifers.

If the glacier disappears then so does the river

One of the main impacts of global warming is on glacial river flow. If the glacier disappears then so does the river (at least in the dry season). The World Glacier Monitoring Service shows an acceleration in the rate of glacier melt across the world. According to its most recent study of global glaciers (published in March 2008), glacier thickness declined by an average of 0.3 metres a year between 1980 and 1999, but since 2000 the average annual ice loss has increased to about 0.5 metres.

**Figure 13: Cumulative change in the average mass balance of global glaciers**

The speed at which of glaciers are shrinking appears to have accelerated since 2000




*Source: World Glacier Monitoring Service (www.wgms.ch): WGMS (2008a): Global Glacier Changes: facts and figures.*

The Himalayan glaciers are the origin of seven of the world's largest rivers—the Ganges in India, the Yangtze and Yellow Rivers of China, the Brahmaputra that flows through Bangladesh, the Mekong that descends through Southeast Asia, the Irrawaddy in Burma and the Indus that flows through Pakistan—and are the main source of flow during the dry season. The combined drainage basin of these rivers is home to approximately 1.3 billion people. China and India recently announced (August 2009) that they would co-operate in scientific research to monitor the state of the Himalayan glaciers since they are of such clear strategic importance to both countries.

The Himalayan glaciers are rapidly shrinking

The Gangotri glacier supplies 70% of the Ganga flow during the dry season. A study carried out by India's Department of Science and Technology has found the Gangotri glacier is shrinking by 17 metres a year, which it attributes to global warming and climate change. On the basis of work done by the WWF in 2005, the IPCC warned in its Working Group II report of 2007 (chapter 10 on Asia) that the Himalayan glaciers could all but vanish within the next three decades.

Forecasts vary: the WWF has projected the glacier will be gone by 2035…

The report states: "Glaciers in the Himalayas are receding faster than in any other part of the world and, if the present rate continues, the likelihood of them disappearing by the year 2035 and perhaps sooner is very high if the Earth keeps getting warmer at the current rate". The IPCC forecasts the total area of glaciers in the Himalayas is likely to shrink, from 193,051 square miles to 38,600 square miles by 2035.

However, this forecast appears to be particularly controversial. Many other specialists in the area are nowhere near as pessimistic. The China-based Institute of Tibetan Plateau Research projected (in August 2009) a 43% decrease in glacial area by 2070.

…but others are less pessimistic

Global warming impacts are also likely to be felt (according to the IPCC) in the form of changing weather patterns. Dry continental areas, such as central Asia and the African Sahel, are likely to become even drier and hotter (in places), whereas increased rains might boost crop productivity in temperate regions.

In Australia the shift in rainfall patterns (attributed to climate change) has meant inflows into dams have decreased by between 30% and 70%, according to the Australian Water Services Association. Brisbane came close to running out of water before rain late last year, according to the Australian Water Association.

**3. Pollution**

Finally, pollution has further reduced the available resource. Water pollution derives from a wide variety of sources: failure to clean industrial waste, surface water run-off from agriculture, inappropriate discharge of sewerage and over-extraction of groundwater to depths whereby naturally occurring poisons (such as arsenic) contaminate supplies (which is a well documented problem in India and Bangladesh). Levels of pollution are arguably worse in developing markets, where preventative legislation is not yet in place (for example, in China, where according to the World Health Organisation, 90% of rivers are polluted).

According to the WHO, 90% of the rivers in China are polluted

As one measure of river pollution, we can look at the Biological Oxygen Demand (BOD) of water. This is a chemical procedure for determining the rate of uptake of dissolved oxygen by the biological organisms in water. The higher the BOD reading, the worse the level of pollution. Most pristine rivers will have a BOD below 1 mg of Oxygen per litre (mg O2/L). Moderately polluted rivers may have a BOD value in the range of 2 to 8 mg/L. Municipal sewerage that is efficiently treated by a three-stage process would have a value of about 20 mg/L or less. Untreated sewerage varies, but averages around 600 mg/L in Europe.

Data from GEMStat (a division of the United Nations Environment Program) is available for comparative purposes for some countries. It typically shows that emerging markets record higher levels of water pollution (on this measure) and that the trend has been worsening (note the numbers for China and India).

**Figure 14: Biological Oxygen Demand (mg O2 per litre)**

BOD: the higher the number the worse the pollution. Note the worsening trends in China and India

| | 1980 | 1990 | 2000 | 2005 |
|---|---|---|---|---|
| UK | 2.7 | 2.7 | 2.1 | 1.6 |
| Germany | 4.2 | 3.2 | 2.3 | - |
| Poland | 7.8 | 6.5 | 5.0 | - |
| Australia | 2.0 | 2.2 | 2.8 | 3.2 |
| China | 1.1 | 2.1 | 3.5 | 5.0 |
| India | 5.0 | 4.6 | 6.0 | 7.5 |
| Japan | 1.5 | 1.3 | 1.1 | 1.0 |
| Korea | 1.5 | 1.2 | 1.4 | 0.6 |

*Source: www.gemstat.org, UNEP, Credit Suisse research*

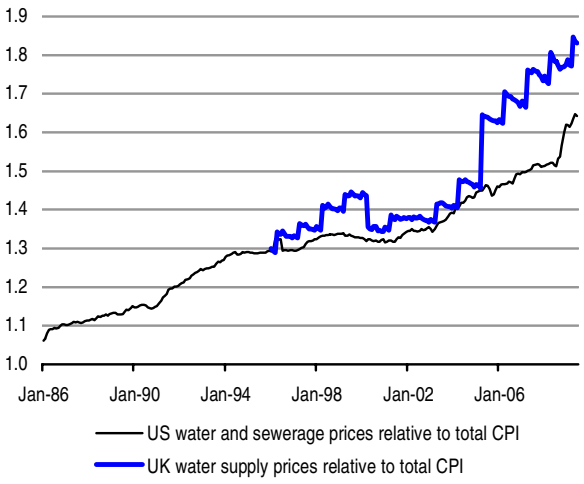
# (II) Water prices: beating inflation

***Water prices have typically outstripped inflation for much of the past 20 years across the majority of the developed markets. This is not necessarily a sign of higher profitability for the water utilities; it is more the case that higher prices are required to maintain margins given rising costs of production. Generally, we expect this trend in pricing to continue.***

***In many emerging markets, water supplied to consumers remains heavily subsidised: in India water is free to consumers, in China it is very cheap, in Brazil tariffs are anchored to inflation. This is fostering over-extraction of water resources—a situation that we think is unlikely to be allowed to persist in the long term.***

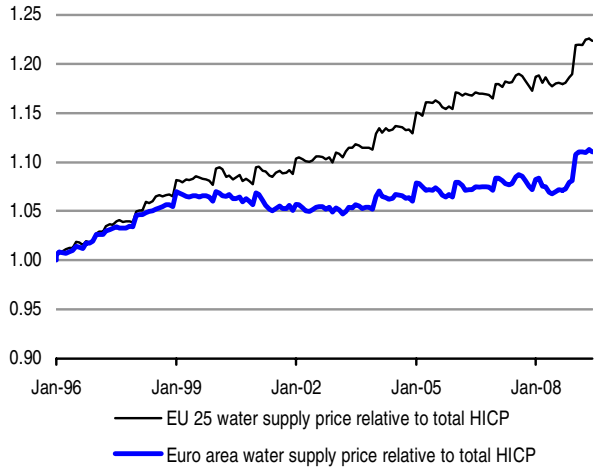
The price of water has increased significantly over recent years. Looking at the breakdown of national inflation data shows the extent to which this is the case. In the US and UK water prices have outstripped headline inflation by 18% and 27% respectively over the past five years. The same statistics for Europe, Canada and Australia show outperformance of 9%, 35% and 22% respectively in water prices over and above headline inflation in the past five years.

**Figure 15: US and UK water prices relative to headline inflation**



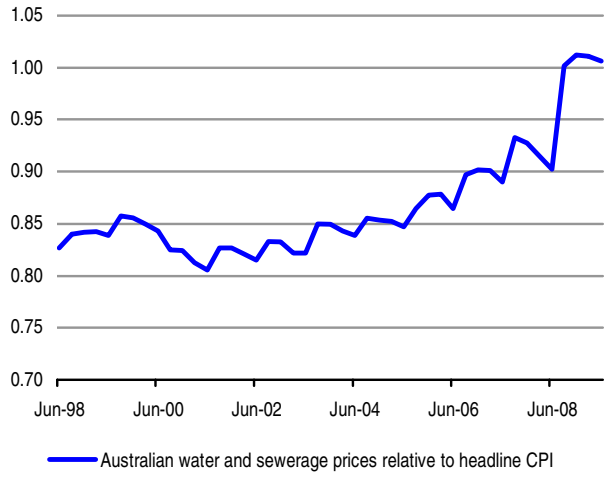

*Source: Bureau of Labor Statistics, Office of National Statistics, Credit Suisse research*

**Figure 16: European water prices relative to headline inflation**



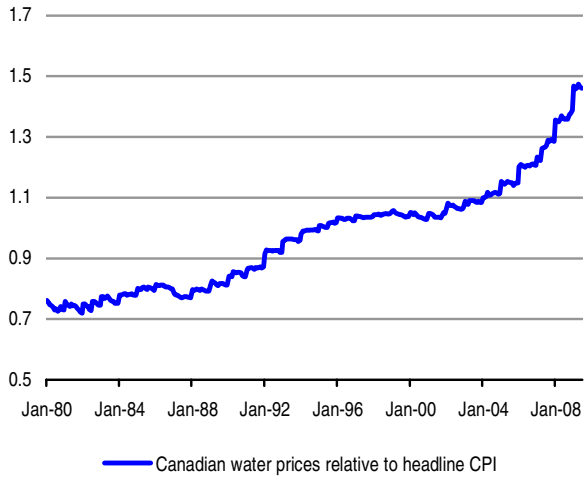

*Source: Eurostat, Credit Suisse research*

**Figure 17: Australian water prices relative to headline inflation**




*Source: Australian Bureau of Statistics, Credit Suisse research*

**Figure 18: Canadian water prices relative to headline inflation**




*Source: Credit Suisse research*

Data from the NUS Consulting Group in its International Report and Cost Survey shows similar trends. The data shows that over the past five years, municipal water rates have increased by an average 7.6% per annum, which is 5.2% ahead of the average rate of inflation (of the thirteen countries in its sample).

**Figure 19: 2008 water cost comparison**

| | Cost (US¢)/m³ 2008 | % Chg 2008/2007 | 5 yr avg % chg | 5 yr avg CPI rate |
|---|---|---|---|---|
| Germany | 301.0 | 1.6% | 0.9% | 1.9% |
| Belgium | 291.7 | 13.2% | 16.0% | 2.4% |
| UK | 237.0 | 6.5% | 9.6% | 2.1% |
| France | 199.6 | 0.2% | 2.8% | 2.0% |
| Netherlands | 183.4 | -0.4% | -0.2% | 1.5% |
| Australia | 181.5 | 18.5% | 17.3% | 3.0% |
| Italy | 157.8 | 4.7% | 7.1% | 2.1% |
| Spain | 130.8 | 9.8% | 2.2% | 3.0% |
| Sweden | 128.0 | 0.0% | 6.8% | 1.5% |
| Finland | 127.2 | 0.0% | 4.8% | 1.3% |
| Canada | 102.2 | 6.7% | 10.9% | 2.2% |
| South Africa | 102.0 | 9.2% | 14.0% | 5.6% |
| US | 74.1 | 7.2% | 6.0% | 3.0% |
| **Unweighted avg** | **170.5** | **5.9%** | **7.6%** | **2.4%** |

*Source: NUS Consulting Group, IMF, Credit Suisse research. The survey is based on prices as of 1 July 2008 for an organisation with an annual usage of 10,000 cubic metres. All prices are in US cents per cubic metre and exclude VAT. Where there is more than a single supplier, an unweighted average of available prices was used. The percentage change is calculated using the local currency in order to eliminate currency movement distortion.*

Data from NUS Consulting Group corroborates the inflation statistics

However, the data also shows that there is still considerable disparity in water prices between countries. The price of a cubic metre of water in France (which is relatively water-rich) is over 50% higher than the price of a cubic metre of water in Spain (which is considered to be water-poor). Similarly, average prices in the US are some 27% below those in Canada (which ranks as one of the two most water-rich countries in the world along with Brazil).

Mind the gap!

We believe the upward trend in water prices is set to continue. There are two reasons why. Firstly, costs of production are rising. The need to upgrade or build installations is rapidly

unfolding at the same time as demand for higher water standards has intensified. Significant capital requirements, in conjunction with fiscal constraints limiting central government expenditure, imply higher prices. The Australian Water Association, for example, predicts prices will double in Australia over the next five years to meet the rising costs of production and to fund investment, and this follows a 38% increase in average water prices over the past two years. It also follows, therefore, that rising water prices are not necessarily driving higher profitability for the water utilities. It is more the case that higher prices are, in the first instance, necessary to maintain margins. The second factor driving prices higher is to deter waste and inefficiency. In some places this has taken the form of a tiered pricing system whereby water consumption costs move beyond a certain threshold. This enables water provision at very cheap prices to cover 'basic needs' but acts as a deterrent to over-use. Tiered pricing schemes have been successfully implemented in Australia, Israel and parts of the US.

Generally, we expect water prices charged to consumers to continue to rise…

However, while basic economics may dictate that an increasingly scarce resource should command higher prices, government subsidies are a major component of this industry. Many regions use water as a political tool and do not demand that consumers pay an economic price. This is particularly the case in many of the emerging markets: in India water is free to consumers, in China it is very cheap. Interestingly in Malaysia, the government is in the process of nationalising water concessions in order to lower prices charged to consumers. In general, we believe that it is highly unlikely that radical changes will be introduced to water pricing mechanisms in these less developed markets where cheap water is entrenched in public perception. To do so would probably be at the risk igniting disruptive economic and political forces. As such, in places where water has been provided at very little or no cost for centuries we would not expect it to change. However, this is clearly fostering an environment of over-extraction of water resources. Take China as an example. Water prices are fixed by economic planners and although rate hikes have intensified recently, it is still relatively cheap. As a result, farmers have little incentive to conserve water and have honeycombed water-scarce northern China with ever-deeper wells to tap a falling water table. In India, the water supply is not charged (even to farmers) which gives no incentive to conserve or optimise its use. As water scarcity generally increases over the next 10 to 20 years, it seems unlikely that either (1) significant price disparities in costs of water supply and the cost to consumers will be allowed to persist, or (2) that overuse of water will be ignored.

….although radical changes in water prices in the emerging markets are unlikely

France and the UK have perhaps set the precedent as to what we can expect in the future. Both countries can be considered as relatively mature water markets (in the UK and France the private sector owns and operates 88% and 74% respectively of the water network, according to infrastructure legal specialist Pinsent Masons). On the pricing front, the regulator in these markets acts to protect the interests of consumers but also to ensure reasonable profitability for the private sector managers. The net result is an alignment of economic and consumer costs. On the volume front, government-set regulations such as water efficiency standards (gradually being rolled out in the UK) help to prevent unnecessary water waste.

In the emerging regions, the onus is on curbing over-extraction and greater investment in supply

In general, we expect most OECD markets will continue to increase water prices relative to inflation to similarly align the economic cost of water production with costs charged to consumers. With much more limited scope for increasing water prices in many of the emerging markets the onus is on (1) tighter regulations to prevent over-use, (2) ensuring best practice in water management and (3) greater (publicly funded) investment in water supply. No wonder then that in both India and China, the respective authorities have rolled out an extensive investment programme in efficient irrigation techniques; and in the latter, that water-related investment is up 213% in the past five years.

# (III) Trends in investment

***To date, private sector growth in water-related investment has generally been very weak. This is clearly illustrated by World Bank data for the emerging markets as portrayed on the front cover of this report. Indeed, we find that public sector investment in key markets (such as the US) is probably some considerable way behind "required" investment.***

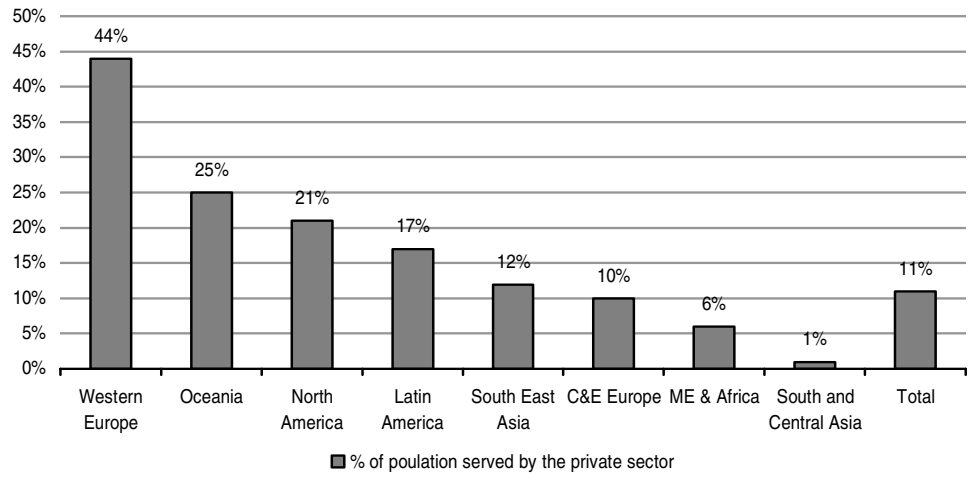
***However, in places where the problems in water supply are particularly acute (and the administration is sufficiently organised) there has been a considerable increase in water-related investment spend. China and Australia provide two such examples.***

***Ultimately, we expect other countries and regions will follow their lead. We expect to see a substantial rise in water-related investment (in the form of pipelines, desalination plants, recycling systems and other supply-side solutions) over the next 5–10 years.***

## Ownership: private sector participation increasing

For the most part, water supply and sewerage services globally are still provided by public sector bodies. In Europe, 44% is provided by the private sector but in North America it is only 21%. In Latin America the private sector now provides around 17% after substantial political efforts in the 1990s.

**Figure 20: Water supply: proportion of population served by the private sector, 2008**



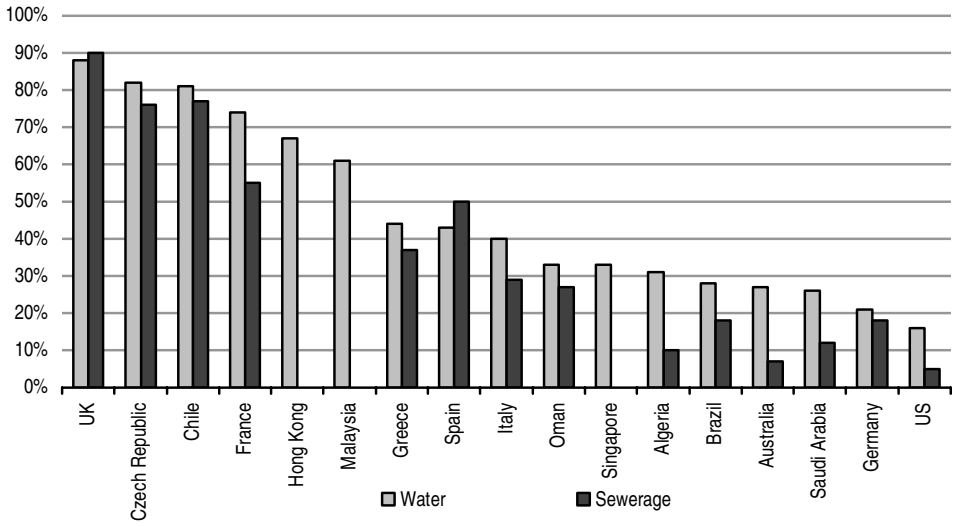

*Source: Pinsent Masons Water Yearbook 2008-2009, Credit Suisse research*

For the most part, water supply and sewerage services are still provided by public sector bodies

At the market level there is as much dispersion in ownership within regions as there is between regions:

- Among the industrialised countries, only the UK, France and Spain have resolutely chosen to open up this activity to the private sector, at rates of more than 40% in both water and waste. Conversely, the Netherlands, Sweden, Switzerland and Japan have maintained 100% municipal management.
- In emerging markets, the Czech Republic, Chile and Malaysia have a delegation rate of more than 50%. We would note that in these countries and emerging markets more generally, *water-supply* activities are typically more open to the private sector than are sewerage services.

**Figure 21: Proportion of water and sewerage systems owned by the private sector, 2008**




Among industrialised countries, only the UK, France and Spain have resolutely chosen to open up this activity to the private sector, at rates of more than 40% in both water and waste

*Source: Pinsent Masons Water Yearbook 2008-2009, Credit Suisse research*

**We expect the role of the private sector to increase**

This is for two main reasons:

(1) Municipal/public utilities often lack the resources to maintain their water networks.

(2) Municipal/public utilities often lack the technical expertise to cope with increasing environmental standards or to manage existing water networks efficiently.

The private sector needs to be sufficiently incentivised to provide water services

One significant caveat here is that although the public sector may struggle to deliver increased levels of high-quality water supply, the private sector needs to be sufficiently incentivised to fill the void. Greater private sector investment in water relies on strong, predictable regulation and the existence of enforceable property rights. Without this there can be no certainty of future cash flows, which is an obvious deterrent to would-be investors. Ultimately, we would expect bottlenecks in water supply to force the authorities to establish and support the necessary legal framework.

Public/private partnerships have been popular in recent years. A private operator can sign a contract with a government agency to supply services (water delivery, waste water treatment, sewerage or construction work) and a regulator sets the standard for price and quality. Subject to this safeguard, we think it makes sense for countries (or cities) to use private operators, especially where municipalities have failed.

Infrastructure legal specialist, Pinsent Masons, forecasts an increase in private participation in water and sewerage systems—from coverage of 11% of the global population in 2008, to 16% by 2015 and 19% by 2025.

**Financing requirements: mind the gap**

*Required* investment in water looks significant…

In 2006, economists at the OECD projected average annual expenditure on water infrastructure and maintenance would *require* a three-fold increase (in real terms) over the following 20 years. This was equivalent to a real growth rate in water-related expenditure of 6.7% per annum. A lot has happened since the OECD put those estimates together. We have touched upon some of this in the discussion above but to summarise:

(i) ground water levels have fallen quicker than anticipated;

(ii) global warming projections have intensified;

(iii) the world went into recession and project financing dried up.

On balance, the first two factors are likely to drive higher levels of *required* investment in water infrastructure, and the third has probably undermined that investment, at least in the short term.

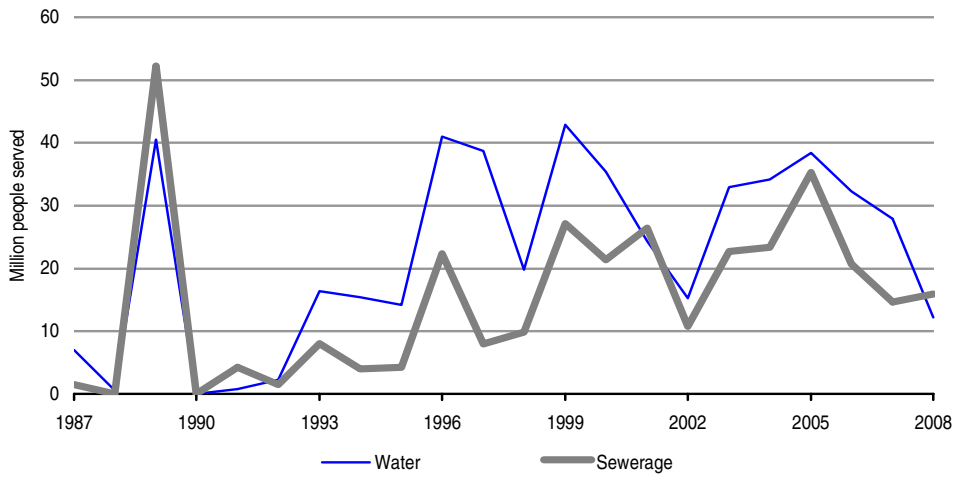
However, required investment is far from equal to *actual* investment. Various data sources illustrate that global growth in investment in the water industry has been lacklustre despite the worsening trend in the supply/demand balance:

…but *required* investment is far from equal to *actual* investment

(1) Pinsent Masons' data on global private sector investment in water shows a cyclical trend (investment levels dipping in 2001/2002 and again in 2008) but otherwise limited evidence of 'structural' growth.

**Figure 22: Global aggregate: contracts awarded to the private sector by year (million people served)**

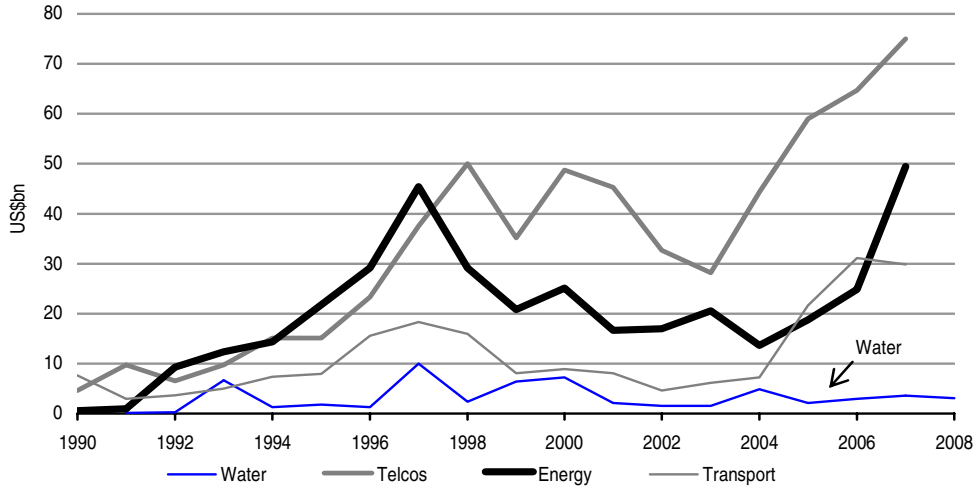
Global private sector investment in water shows limited signs of 'structural' growth




*Source: Pinsent Masons Water Yearbook 2008-2009*

(2) The World Bank PPI (Private Participation in Infrastructure) dataset shows similar trends: private sector growth in water-related investment in the emerging markets has been very weak, particularly when compared to other areas of strategic economic interest.

**Figure 23: Private sector investment in emerging markets in water, telcos, energy and transport (US$bn)**



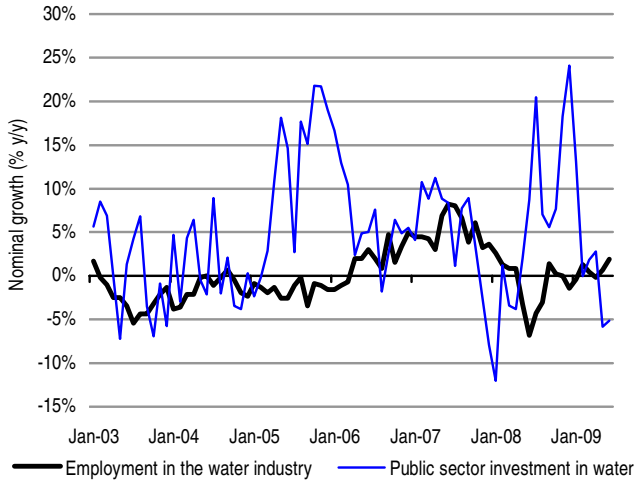

*Source: World Bank PPI data, Credit Suisse research*

(3) Public sector investment also displays limited growth in water investment in some of the key markets. In the US, public sector expenditure on the water supply has averaged nominal growth of just 5.0% over the past six years. Relative to total public sector expenditure, the proportion spent on water fell from 5.7% in June 2003 to 5.1% as of June 2009. In January 2007, the US Environment Protection Agency (EPA) estimated US$334.8bn in expenditure would be needed over the next 20 years for pipe, treatment, storage, source, and other infrastructure. In real terms, we estimate an average annual shortfall of 11% in actual expenditure versus the EPA estimate of required expenditure.

Private sector growth in water-related investment in the emerging markets has been very weak, particularly when compared to other areas of strategic economic interest

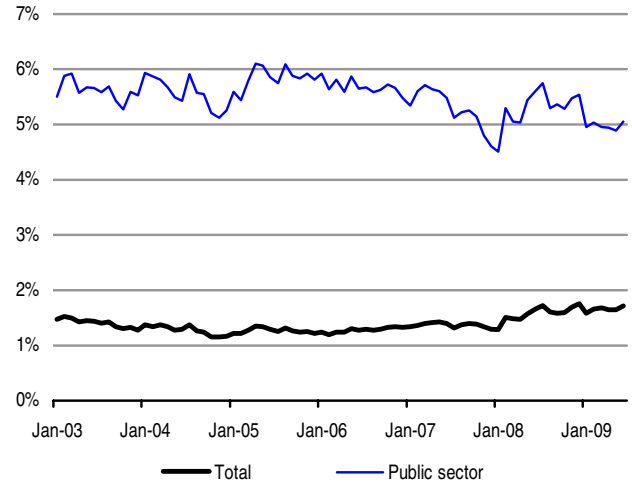
A key problem in the US is the decentralised nature of the water network: the onus is on relatively small municipalities to ensure supply rather than plans being formulated at a Federal level. This lack of a 'national plan' puts pressure on large-scale project financing and leads to inefficiencies between neighbouring regions.

**Figure 24: US public sector spending on water supply (% y/y, in nominal terms)**




*Source: Department of Commerce, Credit Suisse research*

**Figure 25: Total and public sector construction expenditure on the water supply as % of overall expenditure**




*Source: Department of Commerce, Credit Suisse research*

In Japan, where the public sector still owns 100% of the water and sewerage network, average annual investment has been close to ¥2trn over the past seven years. According to government data, the stock of water and sewerage-related assets in Japan comes to roughly ¥120trn and a significant proportion of this infrastructure has already existed for around 50 years. If we assume a replacement cycle (from now) of a further 50 years, then the public sector faces annual maintenance costs alone of ¥2.4trn, even before accounting for the necessary supply-side increases.

**Figure 26: Japan: Budget relevant to water and sewerage development and protection**
*¥ in millions*

| | FY2003 | FY2004 | FY2005 | FY2006 | FY2007 | FY2008 | FY2009 |
|---|---|---|---|---|---|---|---|
| Domestic Water Supply | 147,520 | 133,138 | 123,286 | 115,963 | 107,417 | 100,848 | 95,805 |
| Industrial Water | 6,384 | 5,621 | 4,806 | 3,506 | 3,420 | 3,340 | 3,097 |
| Irrigation | 222,338 | 228,475 | 234,936 | 238,978 | 240,561 | 236,556 | 217,499 |
| Water Development | 275,489 | 271,047 | 723,913 | 698,785 | 674,175 | 648,038 | 624,705 |
| Water Reuse | 28 | 28 | 21 | 13 | 12 | 10 | 8 |
| Water Protection and Sewerage works | 1,355,173 | 1,282,984 | 1,201,117 | 1,144,113 | 1,098,590 | 1,107,307 | 1,081,823 |
| Underground Water Protection | 221 | 218 | 169 | 160 | 146 | 124 | 68 |
| Water Source Area | 115 | 110 | 107 | 100 | 96 | 80 | 50 |
| **Total** | **2,007,268** | **1,921,621** | **2,288,355** | **2,201,618** | **2,124,417** | **2,096,303** | **2,023,055** |

*Source: Ministry of Land, Infrastructure, Transport and Tourism*

**Why has global investment in water been so weak?**

We can think of four reasons:

(i) **Insufficient returns.** The primary factor is that returns across much of the water industry are perceived to be insufficient to cover risks and secure the necessary financing. From a utilities point of view, companies tend only to invest substantially in infrastructure assets if the regulation has a stable history, the regulator has immunity from direct political manipulation and it is perceived as providing solid returns.

(ii) **Lack of trust in the regulator.** The problem tends to be exaggerated in developing countries where regulatory history is limited and so contract fulfilment essentially relies on trust between the investor and the state. There have been various high-profile failures of private sector contracts across the emerging markets (in Buenos Aires and Jakarta to name a couple).

(iii) **Technical expertise.** Lack of private sector involvement may hold back public sector investment due to the limited technical expertise of the latter.

(iv) **Budgetary constraints.** Public sector investment is also limited by the usual budgetary constraints, which is likely to have dampened expenditure this year and last.

The failure rate of private sector operations in water and sewerage provision is very high.

**Figure 27: Private sector projects in emerging markets: cancelled or under distress projects and investment, 1990 to 2008**

| | Number | % total investment |
|---|---|---|
| Water | 60 | 34% |
| Telcos | 42 | 4% |
| Energy | 90 | 8% |
| Transport | 62 | 8% |

*Source: World Bank PPI data, Credit Suisse research*

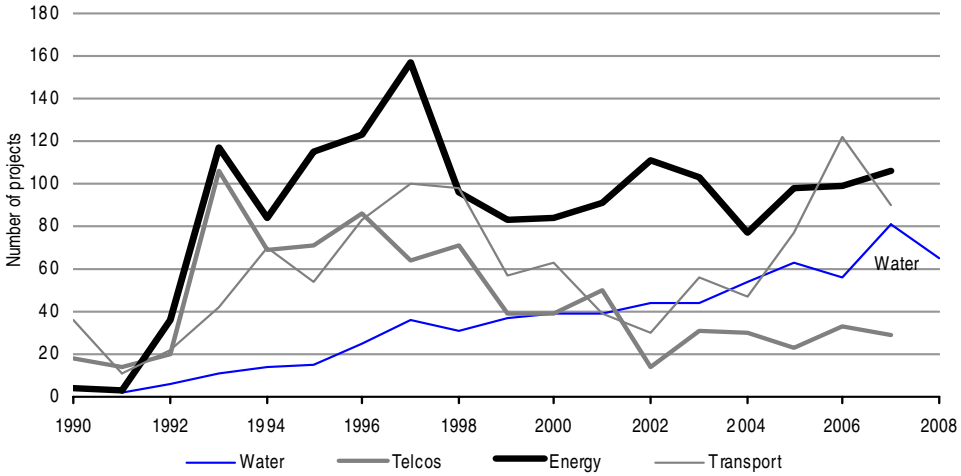
The failure rate of private sector operations between 1990 and 2008 in water and sewerage, at 34%, is very high

The distress level shown in Figure 27 of 34% compares very poorly with Telcos (4%), Energy (8%) and Transport (8%). Ironically, it is water's role as a basic necessity that makes it more vulnerable to dispute and hence breakdowns in agreement between supplier and consumer. For example, in awarding a concession, a governing body will often seek provision to extend services in water and sewerage to the poorest region, regardless of ability to pay. Telco and electricity concessions are far less likely to include such clauses, hence reducing their inherent operational risks.

Interestingly, the volume of contracts awarded to the private sector in the water and sewerage industry has eased upwards and is commensurate with the number of projects awarded to other strategic industries. However, as is implied by flat investment levels (Figure 23) and a rising number of projects (Figure 28), average project size has clearly declined. The private sector has appeared to have moved away from large-scale (and perhaps more complicated and contentious) projects to smaller, local projects that are easier to manage and deliver.

The private sector has been involved in an increasing number of smaller water projects

**Figure 28: Private sector involvement in emerging markets in water, telcos, energy and transport: number of projects by year of financial closure**




*Source: World Bank PPI data, Credit Suisse research*

**Areas of more acute water stress have seen greater investment**

Where problems in water are more acute there has been a marked increase in investment

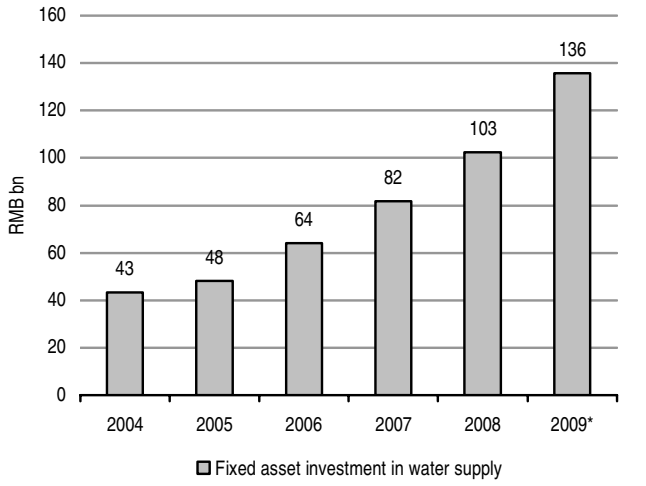
However, in regions where problems in water supply are arguably more acute (and the administration is sufficiently organised to direct and execute expenditure plans) there has been a marked increase in water-related investment spend.

China and Australia are two such examples.

In China, rising real incomes and substantial industrial growth has led to a significant increase in the demand for water—on aggregate water demand relative to supply is running at some 24% on our estimates (which the UN classifies as medium-high stress). Water shortages are much more acute in some parts of the country than in others: According to the Beijing Water Bureau, water resources per capita in Beijing have dropped from 1000 cubic metres in 1949 to less than 230 cubic metres as of 2008 (less than an eighth of the national average). The Government has clearly taken the situation very seriously, with annual fixed asset investment in the water supply more than doubling in the past three years, according to the National Bureau of Statistics. World Bank data shows that private sector investment in China's water supply has nearly tripled over the past three years. The latest data points show that these levels of investment are commensurate with private sector involvement in the energy supply.

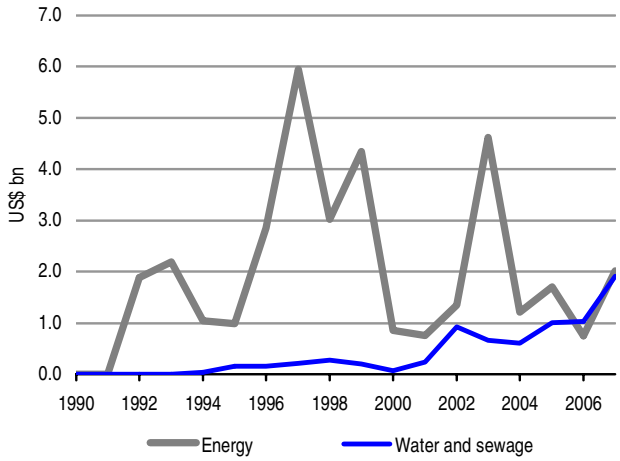
In its eleventh Five Year Plan, the Chinese Government has set a target of 1.35% of GDP to be invested in "environmental protection", i.e., water security, by 2010. On our projections this is equivalent to Rmb5.049bn in expenditure in 2010, equal to a CAGR of 14.2% between 2007 and 2010E.

**Figure 29: China: fixed asset investment in water supply (RMB bn)**




*Source: National Bureau of Statistics, Credit Suisse research*
** 2009 data is the YTD annualised number*

**Figure 30: China: private sector investment in energy and water supply (US$ bn)**

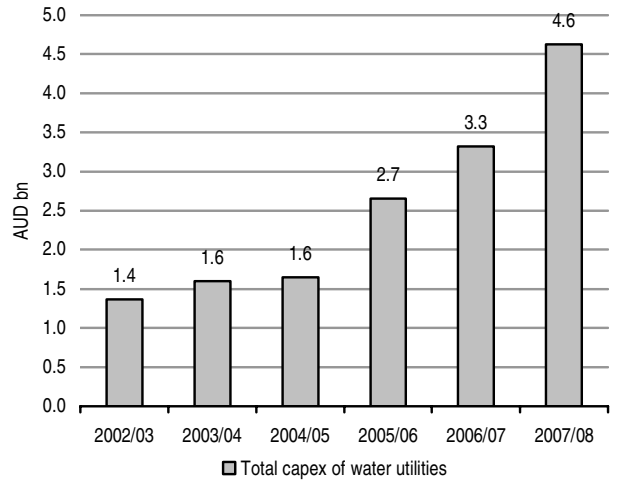



*Source: World Bank PPI data*

In Australia, problems are concentrated in the south. According to the Murray Darling Basin Authority (MDBA), water flow into the Murray and its main tributary, the Darling, is now at a 117-year low. The MDBA has warned that there may not be sufficient water flow to meet the "basic human needs" of the 1 million population of Adelaide by as early as next year (since the city's reservoirs dried up Adelaide has relied on the Murray for 90% of its water supply).

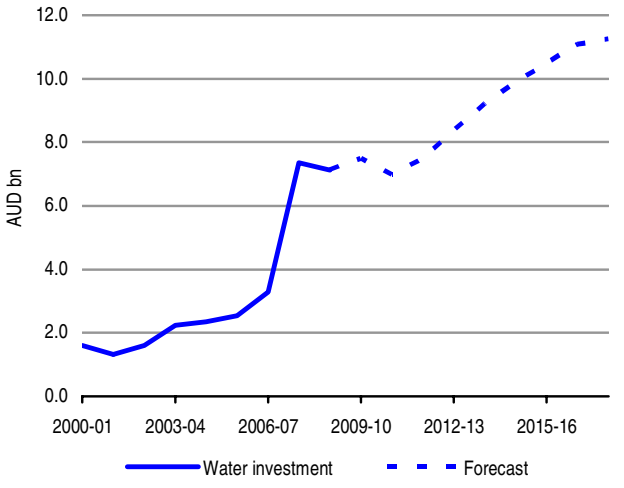
Total annual capital expenditure by the Australian water utilities has nearly tripled over the past three years. Driven by a government-led programme, total water and sewerage capital expenditure is projected by the Construction Forecasting Council to increase a further 60% over the next nine years. Southern Australia clearly has more of a problem with its water resource than with its network; hence the construction of desalination and recycling plants is absorbing the bulk of the capital expenditure.

**Figure 31: Australia: total annual capital expenditure of the water utilities (AUD bn)**




*Source: Water Services Association of Australia, Credit Suisse research*

**Figure 32: Australia: total water and sewerage capital expenditure (AUD bn)**




*Source: Construction Forecasting Council 2009, Credit Suisse research*

# Conclusions

- Imbalances between water supply and demand globally are already apparent.
- Water prices are for the most part outstripping inflation as governments, regulators and service providers pass on the rising costs of water supply.
- Investment in water-related infrastructure is surprisingly weak for all the rhetoric surrounding the issue.

**What next?**

We expect investment growth in water to pick up

Investment levels may have been generally disappointing so far, but it seems clear to us that investment growth will have to pick up to alleviate worsening water shortages over the coming years. We expect much of the investment will focus on measures to increase water supply such as water re-cycling and desalination and methods to store and regulate the supply, such as reservoirs, dams and pipelines. Three caveats accompany this forecast:

Australia, China, MENA, Mediterranean markets and Russia look likely candidates for substantial water investment

(1) We expect growth in water-related investment to continue to be strong in China and Australia. We expect water-related investment growth in the Middle East and North Africa, the Mediterranean markets and Russia (where ageing infrastructure requires substantial upgrades) will pick up as the authorities have both the means (financially) and the incentive (given the scale of the problem) to respond. Water-related investment in the US and India also looks set to grow, however actual investment relative to requirements may well continue to disappoint. In the former this reflects the problems faced by small municipalities in trying to deliver the appropriate large-scale solutions and in the latter it is a reflection of a relatively complicated bureaucratic system.

(2) Given the inherent difficulties in the provision of water to a public that often sees it as an entitlement rather than a service, it is probably less risky (from a shareholders' perspective) to invest in companies focused on 'building' water infrastructure rather than those that 'own and operate' the facilities. This is particularly the case in many of the emerging markets where regulation has yet to establish a track-record.

Smaller local players can in our view compete effectively with the multinationals

(3) Similarly, the trend towards awarding smaller private sector contracts looks likely to persist. For the most part this may well be led by the corporates themselves as they have reacted to the relatively high failure rate of private sector contracts in the sector and have shied away from larger (and hence, more risky) contracts. Arguably, this levels the playing field for some of the smaller, local operators in competing for business against the large multi-nationals that have traditionally dominated the sector.

Finally, we note that as much as we believe greater supply-side investment is on the cards, the onus to reduce demand for water is equally rising in importance. Higher consumer prices for water, supply interruptions and footing the bill for large-scale infrastructure projects all raise the incentive to improve water efficiency. More and more legislation is creeping in aimed at capping overall water demand. Much of this is aimed at the industrial sector (for instance, the Best Available Technology mandate in Europe) but domestic water users are also being targeted (for instance the US sets maximum water-use standards for plumbing fixtures in new buildings). Various (listed) corporates provide solutions to greater water efficiency ranging from drought-resistant crops to low-flow taps. Ultimately, as the debate and the problems in this space escalate, we expect the majority of the global population will have to consider water-efficiency measures in most aspects of everyday life.

# (IV) Increasing water supply

***There are two ways to augment the water supply: through water recycling (re-use) and through desalination. Growth in both has been strong in the past 5–10 years and we expect this trend to continue. Global Water Intelligence (GWI) forecasts a CAGR of 11% in water recycling out to 2015 and a CAGR of 9.3% in desalination to 2016.***

***Since much of the recycled water will not comply with standards for potable water, it is much cheaper to produce than desalinated water: re-used water can be used for agricultural purposes with relatively little purification compared with desalinated water (where the salt has to be extracted), which requires extensive purification. However, this cost of treatment (if it is not up to potable standards) has to be weighed against the cost of building a secondary 'non-potable' network.***

***Our top picks in the sector are Energy Recovery, Flowserve, Hyflux and Gamuda.***

In this section, we consider two avenues for augmenting the water supply: recycling water and desalination.

## (a) Water recycling

There are two types of water that can be re-used:

(1) Grey water is non-industrial wastewater generated from domestic processes. The US EPA defines grey water as non-drinkable water that can be reused for irrigation, flushing toilets, and other purposes. Grey water can be used immediately or treated and stored. It is distinct from black water, which contains more polluting chemical and biological contaminants.

(2) Reclaimed (or recycled) water is former wastewater that has been treated to remove solids and certain impurities. It is often only intended for non-potable uses (e.g., irrigation, dust control, fire suppression); but with more advanced treatment, it can be for potable reuse.

The combination of growing water demand, limited availability of water supply, greater affordability due to falling costs for membrane technologies and public policy (for example, stringent standards for wastewater discharge in Europe) are all incentives for increasing water reuse.

Reused water is already put to a variety of uses throughout the world:

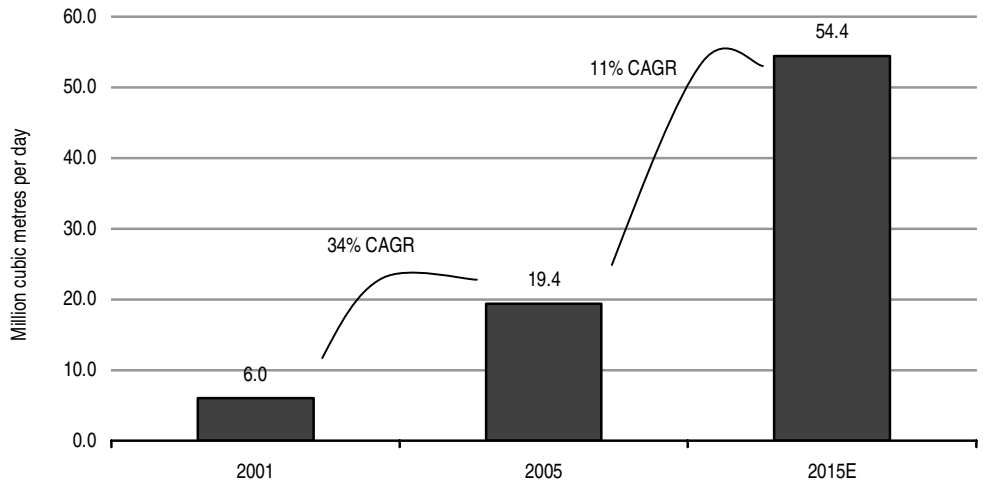
- For irrigation in Southern Europe, Australia, the Middle East, the US and Canada and for municipal purposes in Asia (e.g., in Korea and Singapore) for activities requiring low-quality water.
- In Australia, recycled water has gone from making up 5–8% of the water supply a decade ago to 20–25% now, according to the International Water Association of Australia. Australia's recycled water is being used for industrial and agricultural uses or third-pipe systems for watering gardens. Recycled water is also added to the dams servicing Brisbane and Adelaide.
- In China, according to data issued by the Beijing Water Bureau, a total of 110 million cubic metres of water was injected into Beijing's urban rivers and lakes in the first six months of 2009—an increase of 28 million cubic metres compared with 2008. Of this, 75% came from recycled water.
- Several countries also reuse water as part of the potable supply. Singapore has developed the NEWater reuse programme, which relies on advanced microfiltration, reverse osmosis and ultraviolet exposure to clean and treat wastewater for potable

consumption. Water is also reused to meet potable demand in Windhoek Namibia and in California's Orange County. Japan promotes the recycling of industrial water (approximately 80% of it is recovered).

The market for reused water is potentially very significant. According to data from the World Bank, annual reclaimed (or re-used) water volumes equated to roughly 6 million cubic metres per day in 2001, equivalent to just under 4% of total global supply. By 2005, this had tripled to 19.4 million cubic metres per day (just short of 10% of global supply). Global Water Intelligence (GWI) forecasts a CAGR of 11% in water re-use capacity around the world to 2015.

**Figure 33: Global water reuse capacity ($m^3$/day)**

Growth in recycled water has been, and looks likely to continue to be, extremely strong




*Source: World Bank, Global Water Intelligence, Credit Suisse research*

GWI notes that a large proportion of this capacity will involve only secondary water treatment, and thus will not be clean enough to drink.

Recycled water can be much cheaper than desalinated water (if it is not refined to potable standards)

It is in this respect that water recycling can be much cheaper than desalination: re-used water can be used for agricultural purposes with relatively little purification compared with desalinated water, which requires relatively extensive purification before it can be used for agriculture. The Spanish Ministry of Environment and Agriculture has calculated (September 2008) that wastewater can be treated to sufficient quality for agricultural use for around €0.12/$m^3$, much cheaper than the €0.33/$m^3$ that the Spanish government is currently charging for desalinated water used for irrigation in the south east of the country. In addition, the Ministry estimates that per cubic metre, regenerating wastewater requires a quarter of the energy input and produces a quarter of the $CO_2$ emissions of desalinated water.

However, non-potable recycled water will probably require a secondary 'non-potable' network

However, this cost of treatment (if it is not up to potable standards) has to be weighed against the cost of building a secondary 'non-potable' network. Needless to say, the costs of pipelines and pumping have a dominating influence in the equation, where water needs to be transported over a relatively long distance. In these instances, it may make sense to utilise the existing infrastructure and refine the water to potable standards. Australia, in several instances, has adopted a non-potable network, delivering reclaimed water direct to agriculture. In the UK, where the cost of replicating infrastructure would be relatively high, it is unlikely that reclaimed water could be piped directly to consumers unless it was cleaned to potable standards.

The markets where we expect a major increase in the volume of re-used water include Mexico, Saudi Arabia, China, Peru, the US (California, Florida), China and Spain:

- In Mexico, the government has announced plans to treat and reuse 100% of the capital city's wastewater by 2012. Less than 10% of Mexico City's 3.5 million $m^3$/d wastewater flows are currently treated.

In Mexico City, the government is targeting 100% water re-use by 2012

- Peru is planning two major wastewater treatment projects: the Taboada project in northern Lima and another plant at La Chira which is intended to treat over 1.8 $m^3$/d. In the initial proposal for these plants, it was intended that the wastewater would simply be processed before being pumped out to sea. However, more recently, the government has decided that the treated water should be re-used. This has been a source of contention with Spanish operator ACS (which has been awarded the 25-year concession to design, build and operate La Taboada), as the quality of the water required for re-use is significantly higher than that required for pumping back out to sea. Nevertheless, work on the plant looks set to start in May next year.

**Figure 34: Planned global water re-use projects**

Mexico, Saudi Arabia and China top the list for planned new capacity in water re-use

| Country | Planned New Capacity ($m^3$/d) | No of planned new plants or existing plant extensions |
|---|---|---|
| Mexico | 3,213,920 | 6 |
| Saudi Arabia | 3,108,000 | 4 |
| China | 1,765,000 | 11 |
| Peru | 1,728,000 | 2 |
| US | 1,125,321 | 29 |
| UAE | 918,000 | 8 |
| Morocco | 630,000 | 21 |
| Bahrain | 630,000 | 2 |
| Spain | 526,875 | 27 |
| India | 396,000 | 6 |
| Tunisia | 362,000 | 1 |
| Jordan | 276,000 | 2 |
| Qatar | 220,500 | 3 |
| Israel | 161,425 | 6 |
| Australia | 156,200 | 10 |
| Other | 214,950 | 7 |
| **Total** | **15,432,191** | **145** |

*Source: Global Water Intelligence, Credit Suisse research*

- The US has plans for 29 water recycling plants, with capacity of over 1.1 million cubic metres per day. In capacity terms, this is only half of what is proposed on the desalination front, but the chances of success are much higher, in our opinion. The relatively lower cost of water recycling as opposed to desalination (in financial and economic terms) has meant recycling has generally been seen as a much more acceptable solution to water shortages.

Recycling looks to be far more acceptable to the US public than desalination

- Spain plans to triple the volume of wastewater reuse by 2015; up to 1.5 cubic km of wastewater could be reused annually within the next few years.

- In Australia, Goulbourn, Canberra, Newcastle and Regional Victoria are considering building reclaimed effluent processes.

- China is also likely to be a major market with the development of wastewater treatment capacity and continued water shortages in the north east. Beijing already recycles 60% of its wastewater but recently announced (April 2009) a three-point plan that includes RMB 35bn (US$5.13bn) of investment in water and wastewater infrastructure between 2009 and 2013. The plan includes increasing charges for recycled water (these have remained unchanged since being fixed at $0.15/$m^3$ in 2003) and specific goals to ensure that 100% of wastewater is eventually recycled. It is now required, for example, that newly developed residential buildings in Beijing with construction areas over 30,000 $m^2$ build on-site wastewater reuse facilities.

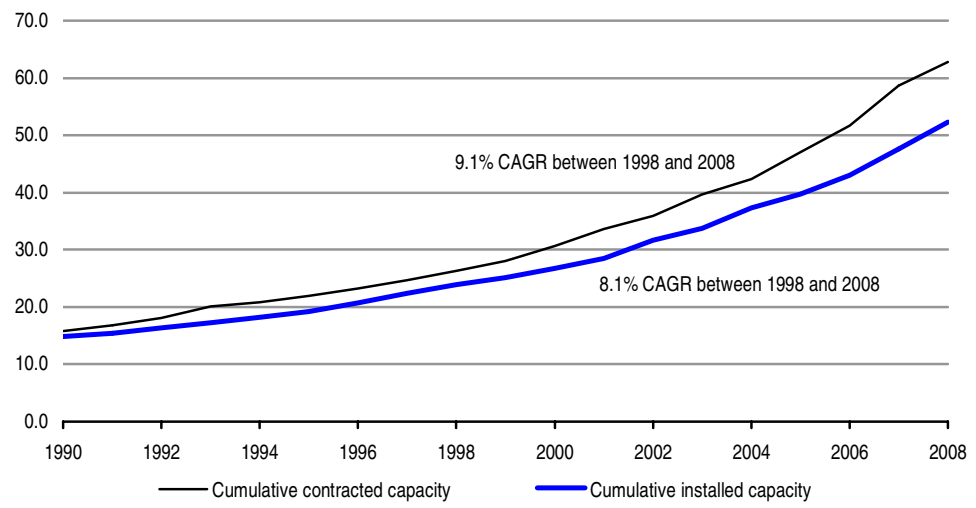
In common with Mexico City, Beijing is targeting 100% waste water recycling

# (b) Desalination

Total global desalination capacity has grown by 55% over the past five years. By the end of 2008, installed capacity had reached 52 million $m^3$/d.

**Figure 35: Global desalination capacity (millions of cubic metres per day)**

Growth in installed desalination capacity has averaged 8.1% over the past ten years

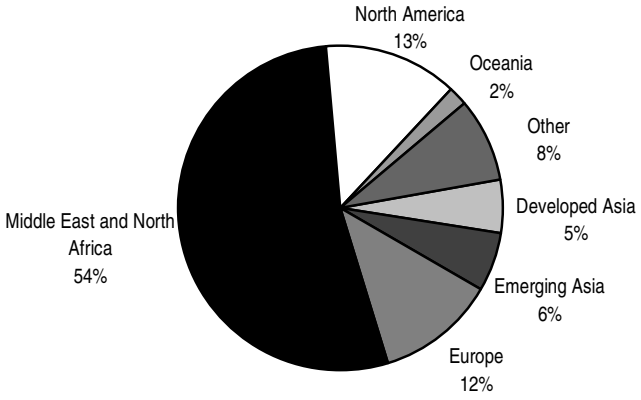



*Source: International Desalination Association*

According to the International Desalination Association, 14,380 desalination plants operate across the world, producing over 12 billion gallons of water a day. The bulk of these plants are located in the Arabian Gulf.

**Figure 36: Global desalination capacity by region (2008)**

The bulk of desalination plants are located around the Arabian Gulf




*Source: Global Water Intelligence, Credit Suisse research*

Growth in desalination capacity is likely to remain very strong. Global Water Intelligence forecasts installed capacity of 64.3 million $m^3$/d by 2010 and 107 million $m^3$/d by 2016. This implies a CAGR of 9.3% to 2016, similar to the growth rate delivered over the past ten years. We estimate the cost of this expansion at roughly US$70bn.

There are two major issues in desalination: the type of technology and the cost of production.

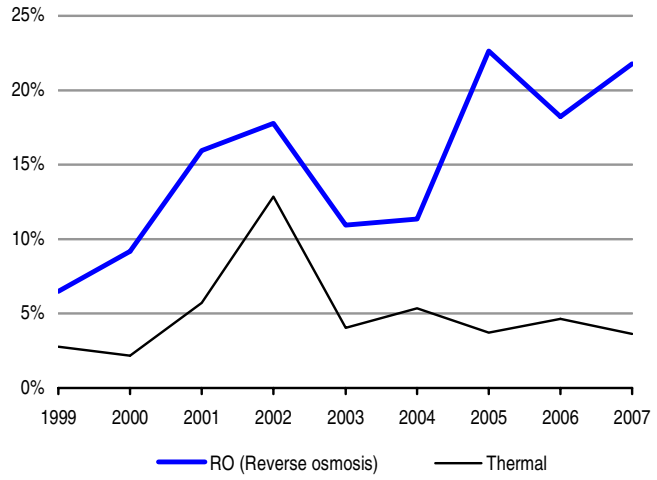
- Traditionally, thermal desalination or distillation has been the most commonly used technology for producing large quantities of freshwater from seawater. Historically, this has been an expensive process, given the significant input of energy required. The economic efficiency of desalination plants has improved by combining the purposes of power and water production. Most of the desalination plants operating in the Middle East and elsewhere are dual-purpose multi-stage flash distillation plants that produce both water and electricity, using oil as the energy source. However, oil price rises undermine the economic performance of these plants, even in the Arabian Gulf region. As a result, nuclear power is increasingly being considered a viable energy source for thermal desalination plants.

Thermal desalination has been the traditional method of extracting salt from water

- Reverse osmosis (RO) (membrane desalination) is an electrically driven process that uses special membranes through which water molecules may pass under pressure, leaving behind larger molecules, including salt. The capital cost of reverse osmosis units is dropping, and they are now the most common choice for new desalination plants.

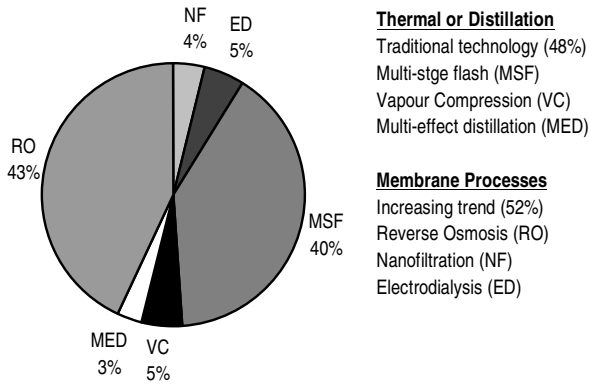
Membrane desalination is now the most common choice for new desalination plants

**Figure 37: Capacity growth in desalination technologies (% y/y)**




*Source: Global Water Intelligence, Credit Suisse research*

**Figure 38: Global desalination capacity by technology (2005)**




*Source: Aqua Resources International*

Forty years ago it cost as much as US$10 to produce a cubic metre of water. Newer plants have brought costs down to well below US$1 per cubic metre (at the Askelon plant in Israel, costs are US$0.47/$m^3$ compared with typical water costs of US$0.45). Still, desalinated water is generally much more expensive than reservoir water. OSMOFLO, a supplier of reverse osmosis desalination plants in Australia, estimates that water out of a desalination plant in Australia—including all input costs, finance charges, operations and maintenance—would be about A$0.96 per cubic metre. This compares with a cost of A$0.32 per cubic metre from a reservoir and a water treatment facility.

Desalinated water is roughly three times the price of reservoir water

There is a limit to how much further costs can fall in the RO process. According to the US-based National Academy of Sciences, the practical upper limit of energy savings that can still be realised through improvements in RO membranes is around 15% over current RO systems. Since energy equates to roughly half of total variable costs in desalination, this equates to a 7–8% fall in total costs. However, other costs (e.g., membrane replacement, maintenance, chemicals) could decline further. In addition, many of the SWRO plants have faced additional costs in overcoming initial environmental concerns, which are reduced as the effects are more clearly understood (for example, Australia's Perth Plant and California's Carlsbad plant).

There is a limit to how much further costs can fall in the RO process

Growth in desalination plants is likely to be strongest in the Middle East, North Africa, Australia, Spain and China.

**Figure 39: Desalination capacity: Existing and planned, cubic metres per day**

| | Contracted desalination capacity (2008, $m^3$/d) | Planned New Desalination capacity ($m^3$/d) | Contribution to global growth |
|---|---|---|---|
| Saudi Arabia | 11,147,035 | 5,183,770 | 15.2% |
| Israel | 987,750 | 4,974,886 | 14.6% |
| UAE | 8,733,189 | 4,882,714 | 14.3% |
| US | 8,275,193 | 2,623,001 | 7.7% |
| Algeria | 2,728,755 | 2,470,500 | 7.2% |
| Australia | 1,344,811 | 2,169,500 | 6.3% |
| Kuwait | 2,992,059 | 1,909,060 | 5.6% |
| Spain | 5,414,346 | 1,888,800 | 5.5% |
| China | 2,306,332 | 1,401,000 | 4.1% |
| Libya | 1,191,848 | 1,305,000 | 3.8% |
| Trinidad & Tobago | 130,000 | 1,016,000 | 3.0% |
| India | 1,115,153 | 742,822 | 2.2% |
| Qatar | 1,764,199 | 566,372 | 1.7% |
| Chile | 269,906 | 449,300 | 1.3% |
| Pakistan | 256,162 | 440,997 | 1.3% |
| Bahrain | 886,600 | 374,500 | 1.1% |
| Oman | 999,255 | 322,733 | 0.9% |
| Turkey | 22,600 | 310,000 | 0.9% |
| Tunisia | 122,105 | 254,900 | 0.7% |
| Iran | 731,192 | 200,260 | 0.6% |
| Cyprus | 224,517 | 155,290 | 0.5% |
| UK | NA | 150,000 | 0.4% |
| Mexico | 384,873 | 142,310 | 0.4% |
| Morocco | 85,997 | 135,600 | 0.4% |
| South Africa | 70,000 | 114,200 | 0.3% |
| Egypt | 629,110 | NA | NA |
| Iraq | 476,601 | NA | NA |
| Italy | 863,550 | NA | NA |
| Japan | 1,513,158 | NA | NA |
| Korea | 1,032,296 | NA | NA |
| Russia | 926,383 | NA | NA |
| Singapore | 835,492 | NA | NA |
| Other | 4,289,753 | NA | NA |
| Total | 62,750,220 | 34,183,515 | 100.0% |

*Source: Global Water Intelligence, Credit Suisse research*

Growth in desalination plants is likely to be strongest in the Middle East, North Africa, Australia, Spain and China

- Saudi Arabia is already the world's largest producer of desalinated water (with 28 plants meeting over 70% of the country's water requirement). Plans are under way to build (or extend) a further 32 plants and increase capacity by 47%, according to GWI. These projects include a 1,000,000 $m^3$/d plant at Ras Azzour (with an estimated cost of US$5bn). Saudi Arabia has focused, and looks set to continue to focus, on thermal distribution rather than membrane technology. 63% of planned new capacity is scheduled to use either MSF or MED technology, rather than RO.

Saudi Arabia produces more desalinated water than any other country and capacity is set to increase further

- Israel continues to expand its desalination and water recycling programmes. Planned projects include the Red-Dead Sea Canal. The proposal is for a 180km conduit, consisting of tunnel and canal sections, which would carry 1.8 billion $m^3$/year of seawater from the Red Sea to the Dead Sea area and the site of associated power and RO desalination projects. Of this, 800 million $m^3$ would be desalinated to use as drinking water for Israel, Jordan and the Palestinian Authority, and one billion cubic metres a year would be pumped into the Dead Sea, which has been rapidly drying up in recent decades. In addition, earlier this year, Israel announced plans to expand capacity of all of its existing desalination plants by 30%.

- Algeria is in the process of building the world's largest desalination plant: a 500,000 $m^3$/d reverse osmosis plant at Magtaa (450km west of Algiers). This project is part of a five-year development programme that aims to supply 2.3 million $m^3$/d of desalinated water. The project is scheduled for completion in Q3 2011. The BOO contract, the EPC, Operation & Maintenance (O&M) contracts, and the Water Sale & Purchase Agreement have all been awarded to Hyflux. 70% of the US$468m project cost is being financed by Banque Nationale d'Algerie, with the remaining 30% coming from equity. Hyflux is taking a 47% equity stake in the project (c. US$50m) with Algerian government agencies taking the 51% majority.

Algeria is in the process of building the world's largest desalination plant

- Australia had no large desalination plants prior to 2006. By 2015, government projections suggest desalination will account for 15% of Australia's urban water supply and produce 430,000 megalitres of water. Perth has recently completed construction of one desalination plant and plans for another have recently been approved. Construction of two further desalination plants is under way in Sydney and the Gold Coast. Melbourne and Adelaide are also planning desalination plants.

- Spain built its first desalination plant in 1965 and was one of the first countries in the Mediterranean region to consider desalination as a viable solution for water shortage issues in large urban areas. Under the PROGRAMA A.G.U.A., Spain has earmarked an investment of roughly US$5.5bn for the 2004–2015 period in desalination treatment plants.

- The Chinese government plans to invest RMB3.1 bn in desalination projects under the 11th Five Year Plan (2006–10). By the end of 2010, it aims to have capacity of 0.8–1.0 million tonnes per day and to directly utilise 55 billion tonnes of seawater pa. By 2020, the target is to reach a seawater desalination capacity of 2.5–3 million tonnes per day and to directly utilise 100 billion tonnes of seawater per annum. The main regions designated for investment are Tianjin, Hebei, Liaoning, Shanghai, Fujian, Shandong, Guangdong, Guangxi, Hainan, Dalian, Ningbo, Xiamen, Qingdao and Shenzhen. Since 1 January 2008, desalination projects have been exempt from income tax.

Various US municipalities have long-proposed a substantial increase in desalination plants, but have struggled to gain project approval. In California for example, 24 desalination projects have been proposed but only one has been approved so far. Objections have been raised by various local groups who have voiced environmental and financial concerns over the energy costs of desalination projects, among other issues. Given the decentralised nature of the US water network (the onus to ensure supply is on relatively small municipalities, rather than plans being formulated at a Federal level), it seems likely to us that growth in desalination capacity in the US will remain very slow. That said, the Carlsbad plant has set a precedent, potentially paving the way for additional plants, and Governor Schwarzenegger is also trying to put through a bill to fund an overhaul of California's water system.

Desalination plans in the US have met substantial resistance

## Water treatment technology

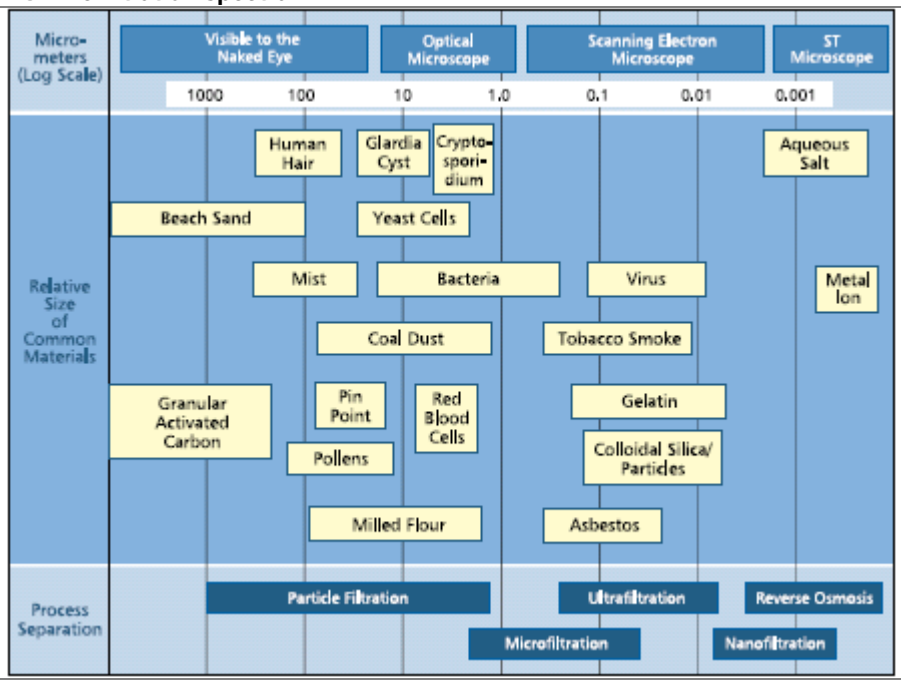
Water treatment technology is gradually shifting from the traditional processes of high-speed filtration using sand and other filter media, to membrane processing.

Traditional processes have cleaned water by using beds of sand through which the water is allowed to percolate, usually preceded by coagulation, flocculation and settlement stages to reduce the load of impurities requiring filtration and to enhance the removal of very fine particles. Other types of media can be used in place of (or in combination with) sand to address specific impurities, an example being the use of activated carbon to absorb chemical contaminants.

Water processing membranes are resin membranes with tiny perforations that range in size between micrometres (or millionths of a metre) to nanometres (billionths of a metre). The dimensions of the perforations allow them to filter out impurities under pressure, and

increase the purity of the water. There are four main types of membrane, which are used in response to different applications: RO (reverse osmosis, used in the desalination process), NF (nano filtration), UF (ultra filtration) and MF (microporous filtration).

**Figure 40: The filtration spectrum**




*Source: ITT*

After potable water has been filtered (either via the traditional sand processing or membrane technology), it then typically goes through a stage of disinfection.

After filtering, water (for potable use) requires disinfection

There are three methods of disinfection used in the potable water industry: ozonation, ultraviolet and chlorination:

- Ozonation is a water disinfection method first used in Nice, France, in the early twentieth century to improve drinking water taste and odour. Ozonation is literally a process of adding ozone to the water supply, whereby disease-causing microbes, including Giardia and Cryptosporidium, are deactivated.
- Ultraviolet disinfection is a very effective method of eradicating the effects of micro-organisms. The process takes place as water flows through an irradiation chamber. Micro-organisms in the water are inactivated when the UV light is absorbed. This damages their nucleic acid, thereby preventing the microbe from replicating and infecting a host.
- Chlorine is a disinfectant added to drinking water to reduce or eliminate micro-organisms, such as bacteria and viruses. Chlorine, in common with ozone, is an oxidant that kills the micro-organisms or renders them incapable of reproduction. Chlorine remains the most commonly used drinking water disinfectant, used in more than 90% of the world's drinking water either as the primary source of disinfection or as a secondary disinfection after an ozone or ultraviolet primary disinfection.

# Corporate solutions: Companies exposed to waste-water treatment, recycling and desalination

In the following tables we present some of the larger companies within each region offering exposure to water and wastewater treatment, including desalination. We have divided this universe into two broad categories: (1) companies involved in the membrane and filtration processes and (2) other companies involved in the water and wastewater treatment chain, including construction, equipment manufacturing and maintenance and operations.

**(1) Membranes, filtration equipment and water treatment chemicals**

We highlight three points with respect to this group of stocks:

(a) **Growth:** Providers have typically traded at the higher end of the valuation spectrum (compared with the water utilities or water-related construction stocks) owing to their superior growth prospects and the non-commodity nature of their product.

(b) **Resilience:** The higher the proportion of sales related to the water industry, the more resilient the EPS has tended to be in the recent downturn. EPS growth for Calgon Carbon, Nalco and Pentair (all with water-related sales in excess of 50% of the total) was 81%, 6.3% and 5.8%, respectively, over the last reported financial year.

(c) **Consolidation:** There has been a reasonable amount of corporate activity in this space: Ashland acquired its competitor Hercules in November 2008, and Dow acquired Rohm and Haas in a deal that was finally closed in April this year.

**Figure 41: Membranes, filtration equipment and water treatment chemicals**

| Ticker | Company | Description | Main listing | Mkt Cap (US$mn) | Total revenue (2008, US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|---|
| MMM | 3M | Membrane water filtration systems | USA | 55,235 | 22,510 | 2% | N | 15.9 | 2.3 |
| ASH | Ashland | Water treatment chemicals for use in industrial applications | USA | 2,860 | 8,106 | 20% | O | 10.0 | 0.3 |
| BWTV.VI | BWT Aktiengesellschaft | Filtration, limescale protection, softening, dosing, disinfection and membrane technology. Also offers materials for the removal of heavy metals. | AUT | 524 | 587 | N/A | N/A | 18.1 | 0.8 |
| CCC | Calgon Carbon | Active Carbon water filtration systems | USA | 777 | 404 | 55% | N/A | 17.2 | 1.6 |
| DCI | Donaldson Company | Manufacturer of filtration systems and replacement parts | USA | 2,927 | 1,869 | 15% | O | 24.4 | 1.6 |
| MIL | Millipore | Membrane water filtration systems | USA | 3,812 | 1,608 | 15% | N/A | 15.5 | 2.2 |
| NLC | Nalco Holding Co | Offers a full water treatment chemical package to the industrial arena | USA | 3,364 | 3,769 | 100% | N | 18.8 | 0.8 |
| 6988 JP | Nitto Denko | RO membranes, on a par with DOW. | JAP | 5,467 | 5,854 | 4% | O | 13.9 | 0.8 |
| NZYMb.CO | Novozymes A/S | A biotechnology company, engaged in the production and sale of industrial enzymes and microorganisms including for wastewater treatment. | DNK | 5,461 | 1,662 | N/A | N/A | 23.6 | 3.0 |
| PLL | Pall Corp | Filtration products | USA | 4,077 | 2,329 | 17% | N | 15.0 | 1.5 |
| PNR | Pentair Inc | Pumps and filtration products | USA | 3,150 | 2,758 | 70% | N | 17.3 | 1.1 |
| SIEGN.DE | Siemens | Filtration products plus hydro power equipment manufacturer | GER | 90,172 | 117,007 | N/A | O | 14.0 | 0.8 |
| 3402 | Toray | World no. 3 in the production of water treatment membranes; aims for ¥67.0bn sales in FY3/11, ¥100.0bn in FY3/16 | JAP | 7,375 | 15,044 | 4% | U | 46.7 | 0.5 |
| 3101 JP | Toyobo | Membrane and filtration products | JAP | 1,160 | 3,786 | 1% | N/A | 24.9 | 0.3 |

*Source: © 2009 Reuters Limited, IBES International for all P/E and P/sales numbers, Company data, Credit Suisse estimates*

Focusing on the Credit Suisse coverage universe, we note:

- **Nitto Denko:** At present, water segment sales are marginal, at around ¥20bn or 4% of total FY 2009 sales. However, the company aims to expand the water business alongside its mainstay LCD film division The water business was previously proving a bottleneck in terms of production capacity, but Nitto completed construction of a new plant in FY3/09. An increase in capacity at 1.6 times of RO membranes roughly equates to ¥32bn sales annually. With further expansion of this plant in due course, the company says it aims to boost sales in its water segment to ¥100bn over the next ten years by strengthening RO-peripheral technologies and the repair/maintenance business. We expect strong growth in the desalination and waste water recovery industry on the back of increasing water shortages. Excluding the irregular growth this year on the back of the recovery from global recession in FY3/09, we expect EPS growth of over 10% pa for the next few years. Our current estimates are for 20% growth in FY3/11, followed by 11% in FY3/12. We rate the stock Outperform.

- **Ashland**'s water treatment is focused on water treatment chemicals for use in industrial applications (including waste water treatment, water purification to reduce scaling in industrial systems and chemicals that reduce water consumption—particularly in the paper industry). Following ASH's acquisition of Hercules, its water treatment platform has jumped to roughly 20% of ASH's total sales and slightly less of its earnings. With ASH's CEO putting the Hercules management team in place to run the entire platform, the hope is that profitability can move from operating margins of c.5% in 2009E to double-digit levels in the next 1–2 years, driven by more effective pricing as well as better efficiency measures. Additionally, with the new management team in place we believe ASH will be able to grow this business more effectively going forward. With all of this, a cheap stock at 4.6x 2010E EBITDA and some of ASH's other businesses (such as Valvoline) seeing strength, we believe ASH will be one of the better performing chemical stocks in the space.

- **Nalco** (NLC) is a pure play water treatment company that offers a full water treatment chemical package to the industrial arena, targeting waste water treatment, water purification to reduce scaling in industrial applications and chemicals that reduce water consumption. The company targets the energy industry (both upstream and downstream), paper industry (a significant user of water in its processes) and general industrial users and is the largest supplier of water treatment chemicals globally. The company should enjoy 5–6% top-line growth on a normalised basis and more robust growth coming out of the global recession. We currently have NLC rated Neutral owing strictly to valuation (at 8.1x 2010E EBITDA, we believe the stock is fairly valued) but would be more positive on the name with a pull back.

- **Donaldson** is a manufacturer of filtration systems and replacement parts. The company's product mix includes air and liquid filtration systems, and exhaust and emission control products. Donaldson is a mini blue chip company that has grown earnings for 19 years in a row and achieved consistently high capital returns. The company has about 15% focused on hydrocarbon liquid filtration. We believe the long-term growth opportunity in the aftermarket capture rate is underappreciated by the market. In addition, we expect the stock to benefit from the cyclical rebound in the economy. We rate DCI as Outperform.

- **Pentair** is a play on North American residential markets, in our view, since 40% of its business is in pool pumps, residential filtration and related equipment, which is clearly tied to the residential cycle. For those that believe the North American residential markets will recover quickly, combined with structural cost reduction which the company is working through, the stock could look interesting. In our opinion, greater value in Pentair could be realised if the company focused on becoming a pure water-related business rather than a mini industrial conglomerate. Since this transformation

does not seem likely, and given little visibility on the impact of growth initiatives on the filtration side, we rate the stock Neutral.

**(2) Water and wastewater treatment**

In Figure 42 on page 38, we list some other companies (aside from the membrane, filtration and chemical specialists) involved in the water and wastewater treatment chain (see Appendix 3 for a more complete list).

This is a fairly varied group and is reasonably difficult to compartmentalise further given the overlapping nature of the services provided in the water space.

We highlight seven companies that have a significant proportion of sales related to water, where we forecast a reasonable long-term outlook:

- **Ebara**: The pump business is Ebara's core business segment and it has historically delivered a very stable revenue stream. We expect growth in this division to be reasonably strong on the back of increasing demand for pumps (and related equipment) for desalination and water supply processes. The environment-related business at Ebara also offers significant exposure to the water theme. The company operates on the basis of EPC and O&M for water and sewerage facilities and drainage treatment facilities, including pure water supply business and wastewater treatment. 64% of Ebara's business is focused on Japan, 13% on Non-Japan Asia, 7% on North America, and the rest for the other parts of the world, based on FY3/09 results. The business environment in 2009 is proving to be fairly tough. However, sales are underpinned by replacement demand. We expect 125% EPS growth for the next two forecast years (FY3/12), and we rate the stock Neutral.
- **Energy Recovery** remains one of our top long-term picks for gaining exposure to the growing water desalination industry. The company provides a critical energy recovery component used within seawater reverse osmosis desalination plants. The company generates all of its revenue from desalination plants and has a pipeline of more than 160 plants. The balance sheet also looks healthy (US$80m in cash as of the end of 2008). We rate the stock Outperform.
- **Epure** is a water and water-treatment EPC company predominantly operating in China. The company also owns Beijing Hi Standard, a manufacturer of waste-water treatment equipment. Epure has said it is looking to diversify its earnings stream further by acquiring BOT and BOO projects in China, as well as expanding into the Middle Eastern EPC market. To this end, Epure has acquired seven BOT water and waste treatment plants in China. Epure also signed a Letter of Intent to design and build a 72,000 tpd waste water treatment facility in Saudi Arabia, the company's first venture outside China. Epure should in our view be a key beneficiary of the growing demand for water in China. We maintain a Neutral rating on the stock.
- **Flowserve** is one of the leading industrial producers of specialised pumps, valves and seals that go into infrastructure projects in oil and gas, chemical, water, mining, and power generation markets. About 30% of its portfolio is tied to emerging markets and c.12% is derived from water. About 40% of the company's business is aftermarket service, which offers a higher-margin recurring revenue stream. Flowserve has a competitive advantage in this area, as it is the only company that can service all three product lines—namely pumps, valves and seals (its competitors only operate in one or a maximum of two product lines). Flowserve also owns Caldor—a competitor to Energy Recovery. We believe 2010 earnings guidance will likely surprise to the upside, as end markets are beginning to see sequential improvement in bookings. The balance sheet is underlevered (less than 15% net debt to market cap as of end 2008). On our estimates, there is close to US$5 per share on the balance sheet that we think the company could leverage to create shareowner value. We rate Flowserve Outperform.

- **Gamuda:** Water accounted for 12% of revenue in 2008, but 25% of PBT. In 2009E, we expect water to account for 11% of revenue but 39% of PBT. We like the stock as it looks set to benefit from the Malaysian government's plans to increase infrastructure spending. The group holds the concession for the largest water treatment plant (held by associate, SPLASH) in Malaysia, but is finalising the sale of this asset for RM632m (31sen per Gamuda share) by end 2009. Management has said it intends to return a substantial portion of the proceeds as special dividends if the deal is successfully completed and the group could also realise a RM100m–150m exceptional gain on the divestment. Potential price catalysts in the coming two quarters include: (1) positive newsflow on the implementation of public sector mega projects; and (2) the outcome of the SPLASH sale, which would have positive implications for profits and dividends. We rate Gamuda Outperform.

- A pure play on the water sector, **Hyflux** develops and operates membrane-based water treatment, recycling, waste water treatment and seawater desalination plants. The company has extended its geographical footprint from China (38% of 2008 revenues) to the Middle East and North Africa (MENA) (60% of 2008 revenues). Hyflux is looking to build on its success on RO desalination plant wins in Algeria (200,000 $m^3$/day at Souk Tleta and 500,000 $m^3$/day at Magtaa) by targeting further projects in MENA. In June 2009, the company signed a Memorandum of Agreement with the commercial arm of the Libyan Ministry of Utilities to develop two desalination plants with a combined capacity of 900,000 $m^3$/day. We rate Hyflux Outperform on the strength of its existing portfolio of BOT projects in China and its growth potential through RO desalination projects and new geographical markets.

- **Kurita Water Industries:** Business is focused on the sale of ultra pure water production systems (used for cleaning in the semiconductor and FPD manufacturing processes) and water treatment systems for industrial uses. Kurita also operates maintenance/service divisions to support these systems. Growth in equipment sales may slow (it has averaged annual growth of 17% over the past five years), but we expect the service businesses (which account for 70% of total FY 2009 revenue) to bounce back when facility operation rates and capex in semiconductor/FPD manufacturing-related companies recover. Growing demand for desalination plants, water recycling and water treatment systems and chemicals should continue to support Kurita's business. We rate the stock Neutral.

- **Leighton Holdings** (10% of 2008 sales in water) is an Australian project development and contracting company operating in infrastructure, resources and property markets. We upgraded the stock to Neutral from Underperform on 1 October 2009 (*Leighton Holdings—Aussie Infrastructure: Jewel in King's Crown*) on the back of the improving Australian infrastructure outlook. Leighton is exposed to water infrastructure expenditure through its Australian Infrastructure business. Thiess, its fully owned subsidiary, recently won the AU$3.5bn contract to construct the Melbourne Desalination plant. We expect Leighton to continue to bid on major water infrastructure projects.

**Figure 42: Water and wastewater treatment and technology companies**

| Ticker | Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|---|
| DHR | Danaher Corp | Water testing – manufactures and markets a range of analytical instruments, related consumables and associated services that detect and measure chemical, physical and microbiological parameters in water. | USA | 23,476 | 11,229 | 8% | N/A | 18.7 | 1.9 |
| 6361 | Ebara | Manufactures transfer machinery for fluids and gaseous substances for a wide range of industrial and chemical processes, including for use in waterworks systems, sewerage systems and industrial water/wastewater treatment plants. | JAP | 1,685 | 5,485 | 53% | N | 23.0 | 0.3 |
| ERII.O | Energy Recovery Inc | Engaged in developing and manufacturing energy recovery devices in the seawater desalination industry | USA | 279 | 53 | 100% | O | 37.3 | 4.8 |
| EPUR SP | Epure International Ltd. | Water and wastewater treatment technology and projects construction | SGP | 559 | 161 | 100% | N | 11.8 | 2.5 |
| FLS | Flowserve Corp | Manufacturer of specialised pumps, valves and seals that are essential to water infrastructure projects (mostly desalination) | USA | 5,978 | 4,335 | 12% | O | 14.3 | 1.5 |
| GUD | G.U.D. Holdings | Pumps, purification | AUS | 508 | 427 | 30% | N | 12.4 | 1.1 |
| GAM MK | Gamuda Berhad | Water treatment | MYS | 1,856 | 797 | 12% | O | 15.4 | 1.9 |
| 0003.HK | Hongkong & China Gas | Water supply and wastewater treatment | HKG | 15,544 | 1,558 | 3% | N | 26.3 | 8.8 |
| HYF SP | Hyflux | Seawater desalination, wastewater reclamation, water recycling, and raw water purification | SGP | 1,157 | 415 | 30% | O | 20.5 | 2.5 |
| IPR.L | International Power | Principally concerned with power generation but also has interests in desalination | GBR | 6,878 | 6,554 | 12% | O | 9.7 | 1.2 |
| ITT | ITT Corp | Water and wastewater treatment systems, pumps and related technologies, and other water and fluid control products with residential, commercial and industrial applications | USA | 9,818 | 10,980 | 40% | N/A | 13.3 | 0.9 |
| JEC | Jacobs Engineering Group | Engineering, R&D services; process plant maintenance services, wastewater plant construction | USA | 5,637 | 12,111 | 5% | O | 15.5 | 0.5 |
| 6326 | Kubota | As well as farm equipment, Kubota also produces pipes and related equipment for water supply. More recently the company has been developing products for overseas markets and has established a sales promotion project for water treatment in Asia. | JAP | 11,317 | 11,490 | 20% | N | 18.3 | 0.9 |
| 6370 JP | Kurita Water Industries | Expanding business in China and Southeast Asia; developing business in ultra-pure water, wastewater, water recycling and functional cleaning water, particularly for customers in the nuclear industry. | JAP | 4,327 | 2,155 | 100% | N | 21.3 | 2.0 |
| LEI | Leighton Holdings | Engineering construction | AUS | 10,658 | 12,055 | 10% | N | 16.6 | 0.6 |
| QEWS QD | Qatar Electricity & Water | Owns and operates power generation and water desalination plants. | QTR | 2,643 | 695 | 35% | N/A | 8.4 | 3.0 |
| 600649 CH | Shanghai Municipal Raw Water | Raw water and tap water supply, wastewater transfer and pipeline construction | CHN | 4,639 | 575 | 100% | N/A | 27.1 | 5.9 |

*Source: © 2009 Reuters Limited, IBES International for all P/E and P/sales numbers, Company data, Credit Suisse estimates*

# (V) Water infrastructure and water transfers

***In this section, we look at those sectors and stocks that are essentially concerned with storing and transferring water, be it on a large scale (in dams and pumped through pipelines) or on a small scale (and transported in a bottle). We consider four areas: (a) dams and reservoirs, (b) pipelines, (c) leaks and (d) packaged water.***

***Dams: declining growth in the 1990s has been replaced with a resurgence in dam building since the turn of the century. Gammon India, Jaiprakesh Associates and Dongfang Electric are three ways to play the theme.***

***Pipelines are in demand to replace ageing infrastructure, connect desalination and water recycling schemes to the end users and to pump water into areas of scarce resource. Our top pick in the sector is IVRCL.***

***Leakages are less acceptable as the economic costs of water supply have risen. Companies in the space include Halma, Homeserve and Insituform.***

***Demand for bottled water is on the wane in developed markets but growing quickly in developing markets. Grupo Continental is one stock that offers reasonable exposure to water (31% of sales) in emerging markets.***

## (a) Dams and reservoirs

Dams and reservoirs have been given renewed priority as water supplies have dwindled

As regional water supplies have dwindled and climate change has induced more erratic weather patterns, the necessity for dams and reservoirs has been given renewed priority. Dams serve a dual purpose in the battle against climate change: (i) as storage facilities, they smooth the impact of significant variation in rainfall; and (ii) through hydropower, they provide an alternative to fossil fuels.

In 1994, 2,000 NGOs signed the Manibeli declaration, which called for a moratorium on dam building by the World Bank, which was a major financier for dam construction at the time. In 1997, the World Commission on Dams was established to set standards for dam construction and ultimately to impose constraints on dam-builders. Data from the International Commission on Large Dams (ICOLD) shows the number of dams completed annually fell by more than half between 1980 and 2000, to just over 200 per annum.

However, dams are back on the agenda. ICOLD data shows the number of finished dams has risen to an average 250 per annum since 2000, and some of these projects are even being undertaken with the support of environmental groups. The World Wide Fund for Nature (WWF) has an agreement with the Mekong River Commission and the Asian Development Bank to advise on the optimal location for dams on the Mekong and how to minimise their drawbacks.

A major indicator of water resources development is the ratio between the available storage reservoir capacity and the volume of the annual renewable water resources. The ratio in the Asian and Pacific region is only 13%, less than the global average of 16% and far behind North America (30%) and Europe (20%).

Thus, if, for example, the capacity of dams relative to water resources in Asia were to rise to European levels, Asia would need to increase reservoir capacity by 51%, resulting in c.US$100bn of incremental investment.

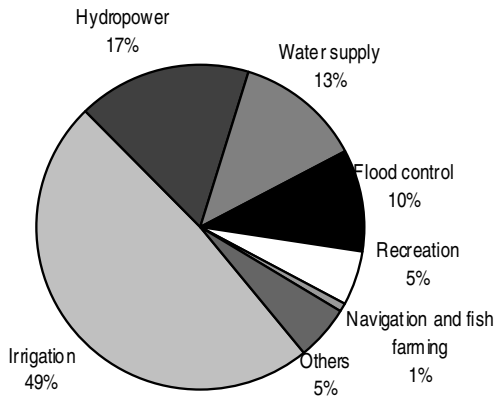
**Figure 43: Water resources and reservoir storage by region**

| | Population m, 2009E* | Internal renewable water resources $Km^3$/year | IRWR per capita $M^3$/year | Total reservoir storage $Km^3$ | Total reservoir storage/IRWR % | Total reservoir storage per capita $M^3$ per person |
|---|---|---|---|---|---|---|
| Asia | 3,748 | 11,126 | 2,969 | 1,476 | 13 | 394 |
| Europe | 807 | 6,604 | 8,184 | 1,321 | 20 | 1,637 |
| Middle East and North Africa | 444 | 517 | 1,164 | 412 | 80 | 928 |
| Sub-Saharan Africa | 825 | 3,891 | 4,717 | 575 | 15 | 697 |
| North America | 340 | 6,253 | 18,392 | 1,845 | 30 | 5,427 |
| Central America and Caribbean | 193 | 1,190 | 6,160 | 148 | 12 | 766 |
| South America | 393 | 12,380 | 31,465 | 891 | 7 | 2,265 |
| Oceania | 37 | 1,703 | 46,520 | 107 | 6 | 2,922 |
| WORLD | 6,787 | 43,664 | 6,434 | 6,775 | 16 | 998 |

**UNSD estimate; Source: www.fwr.org, World Resources Institute, UNSD, Credit Suisse research*

Most of these dams in the ICOLD register (71.7%) are single-purpose dams, but there is a growing number (28.3%) of multipurpose dams (reflecting the trend towards irrigation and power generation). Of the single-purpose dams, irrigation is the most common function of the dams in the ICOLD register.

**Figure 44: Main function of global large dams**




Nearly half of dams exist for irrigation purposes, but there is a trend towards multi-purpose dams (for both irrigation and power generation)

*Source: ICOLD, Credit Suisse research*

Major dams in the pipeline include the Jirau project and the Santo Antonio dams which are part of a plan to dam one of the Amazon river's biggest tributaries. The two dams, which together form the $13bn, 6,450 megawatt Madeira River Hydroelectric Complex, will also create a waterway that would reduce shipping costs for Brazil's agriculture exports. Suez is the lead partner in a consortium developing Jirau, which also includes Brazilian state companies Eletrosul, Chesf and construction company Camargo Correa.

In Figure 45, we list some of the major players involved in dam construction and hydro-electric power generation (for a more complete list see Appendix 3).

**Figure 45: Dams and hydro power generation**

| Ticker | Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|---|
| ALSO.PA | Alstom | Hydro-electric power generation equipment and services | FRA | 20,811 | 27,900 | 5% | N | 12.6 | 0.7 |
| ANDR | Andritz AG | Services include supplying turnkey electromechanical equipment and services for hydro power plants. | AUT | 3,267 | 5,261 | N/A | N/A | 16.4 | 0.7 |
| BBY.L | Balfour Beatty Plc | Building water infrastructure | GBR | 3,176 | 14,711 | <5% | N/A | 7.9 | 0.2 |
| KHD.TO | Canadian Hydro Developers | Developer, owner and operator of EcoPower stations, including 12 run of river hydroelectric operations. | CAN | 736 | 85 | 29% | N | 17.3 | 4.4 |
| 1072.HK | Dongfang Electric | Hydro power equipment manufacturer in China | HKG | 5,110 | 4,445 | 10% | N | 21.1 | 0.9 |
| FTS.TO | Fortis Inc. | Fortis owns non-regulated generation assets, primarily hydroelectric, across Canada, and in Belize and Upper New York State. | CAN | 4,340 | 3,639 | N/A | N | 16.5 | 1.1 |
| FUGRc | Fugro NV | Geological data used in dam positioning | NLD | 4,820 | 3,271 | N/A | N/A | 13.8 | 1.5 |
| GAMM.BO | Gammon India Ltd | Hydro plant construction | IND | 562 | 556 | N/A | O | 27.5 | 0.5 |
| GEPH | Generale de Geophysique | Geological data used in dam positioning | FRA | 3,421 | 3,990 | N/A | U | 30.0 | 1.0 |
| 0270 HK | Guangdong Investment | Water distribution and electric power generation | HKG | 3,480 | 1,001 | 53% | O | 11.8 | 3.3 |
| 7013 | Ishikawajima-Harima Heavy Industries | Dam construction, plus desalination plat construction | JAP | 2,727 | 14,855 | N/A | O | 17.2 | 0.2 |
| JAIA | Jaiprakash Associates Ltd | Dams, power stations and sewerage schemes | IND | 7,118 | 1,015 | N/A | O | 21.2 | 2.9 |
| 7012 | Kawasaki Heavy Industries | Dam construction | JAP | 3,870 | 14,271 | N/A | U | 20.8 | 0.3 |
| 7011 | Mitsubishi Heavy Industries | Dam and desalination construction | JAP | 11,408 | 36,214 | N/A | O | 37.9 | 0.3 |
| UGL | United Group Ltd | Project design, construction management, operations and Maintenance | AUS | 2,153 | 4,330 | 13% | O | 13.8 | 0.5 |

*Source: © 2009 Reuters Limited, IBES International for all P/E and P/sales numbers, Company data, Credit Suisse estimates*

We note:

- **Dongfang Electric** (DEC) is one of the major three thermal power equipment manufacturers and one of the top two hydro power equipment suppliers in China (just under 10% of 2008 group sales are water-related). In addition, DEC looks well positioned to benefit from China's investments in nuclear and wind power markets, with its number-one and number-three positions in the nuclear and wind power equipment markets, respectively. In 1H09, DEC received Rmb34bn of new orders with a diversified mix—31% from thermal, 30% from nuclear, 31% from wind and 8% from hydro. The new order inflow in 1H09 was already 36% higher than the Rmb25bn received in 2H08. Total order backlog exceeded Rmb130bn by 1H09, equivalent to an order-to-bill ratio in excess of 4x. We recently cut our rating on the stock from Outperform to Neutral to reflect the run-up in valuations (*Asian Daily: Dongfang Electric 3Q09 results review—slightly disappointing: downgrade to Neutral on valuation*, 29 October 2009). On the back of a strong performance since mid-July the stock is trading above historical average premiums against the market and the peer group.
- **Brookfield Renewable Power Fund** owns and operates 42 hydroelectric and 1 wind power generator in Canada (Quebec, Ontario and British Columbia) and the US (New England). It has a combined installed capacity of roughly 1,647MW, of which 89% is hydroelectric. The Fund's power has largely been contracted out on long-term deals to quality counterparties. Contracts of this nature provide stability to the fund's cash flows

and distribution. We continue to see steady growth with the Fund, but this is skewed more towards wind power generation than hydroelectric from here. We rate the stock Neutral.

- **Brookfield Asset Management,** through its wholly owned subsidiary Brookfield Renewable Power Inc., has interests in gross installed capacity of 4,156MW of renewable power, of which 3,752MW (90%) is hydroelectric. The company is one of the largest private owners/operators of hydroelectric facilities in the Americas. We expect it to continue to invest in the development of renewable energy in the US as well as in Brazil, where it has been operating for over 100 years. We rate the stock Neutral.
- **Canadian Hydro Developers** owns and operates eight wind EcoPower® centres, 12 hydro electric EcoPower® centres and one biomass facility. The company has a total capacity of 694MW, with 160MW of projects that are under or nearing construction and another 1,660MW of prospects under development. It also recently acquired 4,400MW of offshore wind prospects. The company's board of directors recently agreed to a new TransAlta takeover bid of C$5.25/share, which was increased from the previous offer of C$4.55. We do not believe a higher bid will materialise at this point. We rate the stock Neutral.
- In Japan, there are several construction stocks that have had a part to play in the water industry, but (a) the contribution to overall sales has been relatively low, and (b) under the leadership of new government (led by the DPJ) all dam construction plans will likely be put on hold. The focus of public works is no longer on water-related infrastructure investment but on the improvement of transportation infrastructure and metropolitan functions.

## (b) Pipelines

Ageing infrastructure as well as dwindling groundwater supplies and growth in desalination and water recycling schemes is boosting demand for new and replacement water pipelines and related products, such as pumps, valves and automation and control instruments.

Major long-distance pipelines exist in many countries and new ones are in development:

- In the US, a plan to pipe water from north east Nevada into Las Vegas has recently (August 2009) been approved by the Southern Nevada Water Authority Board. The US$3.5bn proposed project involves some 300 miles of pipeline and, once completed, should have sufficient capacity to supply 270,000 homes. The project has proven to be particularly contentious among the rural population in the region. A draft agreement is in place to wait until 2019 to start pumping.
- In China, a major project is the large-scale south-to-north basin transfer. The plan was first conceived in the 1950s, but is only planned for completion in 2050. It will eventually divert 44.8 billion $m^3$ of water annually to the population centres of the drier north. The plan involves linking China's four main rivers—the Yangtze, Yellow River, Huaihe and Haihe—and requires the construction of three diversion routes, stretching south-to-north across the eastern, central and western parts of the country. The authorities project total cost of US$62bn—more than twice as much as the Three Gorges Dam.
- In Australia, the Victorian Government has approved plans for the Sugarloaf project: a 75km pipeline to pump water from the north of the state to Melbourne in the south. However, the Queensland Government has scrapped plans to transfer water through a 1,200km pipeline from rivers in Northern New South Wales to South-East Queensland as it is too expensive.

In Figure 46, we summarise the main listed providers of water pipeline construction and maintenance.

**Figure 46: Pipeline construction and maintenance**

| Ticker | Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|---|
| CR | Crane Co | Valves, pumps | USA | 1,737 | 2,241 | 44% | N/A | 13.0 | 0.8 |
| CRG | Crane Group | PVC pipes | AUS | 648 | 1,916 | 35% | U | 11.5 | 0.3 |
| EMR | Emerson | Automation, valves, pumps, instruments | USA | 31,867 | 20,915 | N/A | N/A | 16.5 | 1.4 |
| FIN | Georg Fischer | Plastic and metal pipes and fittings. | SWI | 1,132 | 3,478 | 18-20% | N | 4.3 | 0.2 |
| IEX | Idex Corp | Pump products | USA | 2,526 | 1,342 | 38% | N/A | 17.7 | 1.8 |
| 5602 | Kurimoto | Steel pipe, ductile iron pipe and dam construction | JAP | 128 | 1,699 | 28% | N/A | 39.7 | 0.1 |
| MWA | Mueller Water Products | Valves, pipes | USA | 548 | 1,550 | 100% | N/A | 16.0 | 0.3 |
| NWPX.O | Northwest Pipe Co | Steel pipes used primarily in water infrastructure | USA | 245 | 390 | 70% | N/A | 11.7 | 0.7 |
| OST | Onesteel Ltd | Steel and tube piping | AUS | 3,908 | 6,596 | 5% | U | 10.7 | 0.5 |
| 600283 CH | Qianjiang Water Resources | Water supply and pipeline construction | CHN | 541 | 85 | 44% | N/A | N/A | N/A |
| ROR LN | Rotork | Manufacture/support of actuators to the valve indus | GBR | 1,837 | 591 | N/A | N/A | 18.0 | 3.0 |
| 2727 HK | Shanghai Electric Group Co Ltd | Wastewater treatment equipment, projects engineering and construction | HKG | 1,485 | 8,345 | 4% | R | 15.6 | 0.2 |
| TYC | Tyco | Valves, engineering and consulting | USA | 17,532 | 18,100 | N/A | N/A | 12.4 | 0.9 |

*Source: © 2009 Reuters Limited, IBES International for all P/E and P/sales numbers, Company data, Credit Suisse estimates*

We note:

- **IVRCL** (65% of 2008 sales in water) is one of the leaders in the water and irrigation segments in India. This sector provides substantial opportunities, with government plans to spend US$67bn during the XI plan (FY08–12E) and more states committing to investments in this area, compared with only a few South Indian states previously. The company has developed capabilities to provide end-to-end solutions in water. It has also constantly moved up the value chain in this area and now has the capabilities to execute the most complex water desalination projects. We also expect the company to continue to benefit from the significant step-up in planned investments in roads and power transmission. IVRCL's core construction business trades at 12.5x FY11E P/E, at about a 40–50% discount to the large E&C players in this space, on our numbers. We re-iterate our Outperform rating on the stock.

- **OneSteel** is Australia's only long-product steel manufacturer. Within this vertically integrated business, it operates five tube mills that convert externally purchased Hot Rolled Coil (HRC) into structural pipe, precision tube and rolled hollow sections with annual capacity to produce 650,000 tonnes of product. OneSteel operates Australia's largest diameter tube mill. OneSteel is well positioned to manufacture reinforcing and structural steel products to be used in the construction of physical infrastructure associated with water purification, storage and transmission. The impact of government stimulus spending should be evident in OST's late 2009/2010 order book, and recoveries in Mining and Engineering Construction have supported the ramp up in production through 1HFY10. However, with much of the good news already in the price, in our opinion, we rate the stock Underperform.

- **Crane Group** has exposure to the water segment through its Iplex Pipelines business, which manufactures and distributes plastic pipes and systems. One-third of Iplex 2008 earnings (20% of group) are driven by demand for water infrastructure and irrigation spending but residential housing is also an important component of demand. After a difficult time over FY09A (EPS down 16% on the year) and FY10E (we expect EPS

down 37% on the year), we expect recovery in FY11E (EPS growth of 36%). The main driver of the recovery would be stronger government water infrastructure spending. The Federal Government is progressing various programmes under its 5–10 year AU$13bn water initiative 'Water for the Future', which should start to benefit Iplex from FY11E. The risks to forecasts are that the housing recovery stalls and that the government water programmes, which have already been slow in coming, are deferred again. However, even after assuming a 36% increase in EPS for FY11E, the FY11E earnings multiple of 12.6x looks stretched, in our opinion. We rate the stock Underperform.

## (c) Leakages

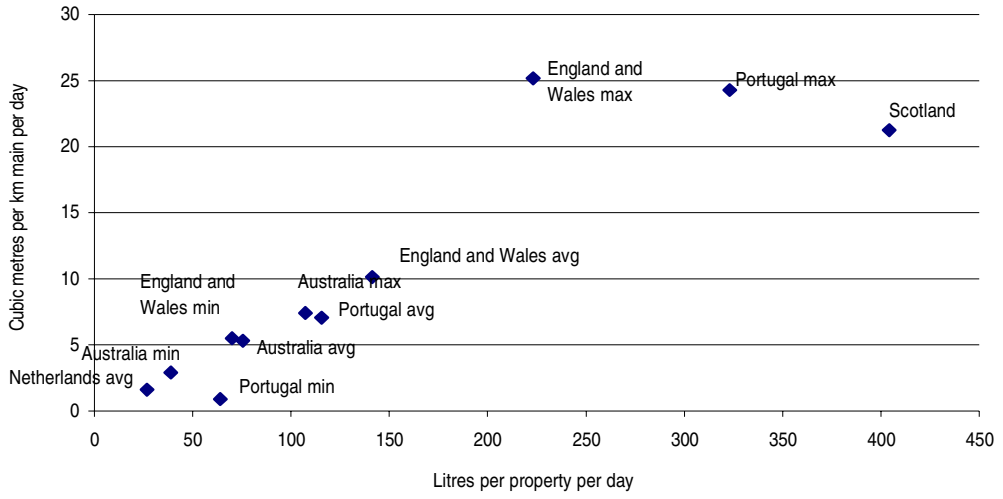
According to the World Bank, more than 32 billion cubic metres of treated water leaks from urban water supply systems around the world, while 16 billion cubic metres is delivered to customers for zero revenue (because of theft, employee corruption, and poor metering). The World Bank estimates that the total global cost of these losses is US$14.6bn pa.

Leakage rates vary from 0–5% in the Netherlands to 22% in the UK and over 30% in the Czech Republic

Average leakage rates for Public Water Supply (PWS) range from 0–5% in the Netherlands to 10% in Austria and Denmark and just over 30% in the Czech Republic. In the UK, leakage rates have been falling (from 30% in the 1980s), but are still running at 22%. Physical water loss in developing countries is around 21% on average, according to the World Bank. Total non-revenue water (including unbilled water) equates to some 36% of total supply.

Economic Level of Leakage (ELL) defines the 'breakeven leakage' rate. Above this rate, it is classed as economic to tackle the leak and save the water, and below this rate it would supposedly cost more to deal with than would be saved. As water supplies become more depleted and as above-inflation price rises have increased the opportunity cost, the economic level of leakage has fallen over time. In the UK, the typical agreed ELL is now in the order of 20%.

**Figure 47: Estimates of water leakage**




*Source: Ofwat*

Much of the leakage reduction comes via mains refurbishment and renewals. The main beneficiaries of these projects are the construction companies that benefit from capex.

Listed specialists in the arena include: **Halma** (12% of revenue is water-related), which is the market leader in water leak detection, and **Homeserve,** which focuses on fixing plumbing and drainage—both are UK listed. US-based **Insituform Technologies** has focused on processes to restore water pipes and reinstate water service connections from inside the mains and thereby avoid the cost of digging and disruption.

# (d) Packaged water

Packaged water can come in all shapes and sizes, sparkling or still, sourced, refined or spring water. We suggest there are two principal ways to segment the market: by source and by packaging.

By source, the market can be divided into three distinct sub-groups:

(a) source water, where the water comes from a specific spring or source, such as Evian, Vittel or Volvic;

(b) spring water, where the water comes from a spring, but not a specific or identified spring. Examples include Nestlé's Aquarel; and

(c) refined water, where municipal water is refined/processed, possibly with minerals added. Examples here include Dasani, Aquafina and Nestlé Pure Life.

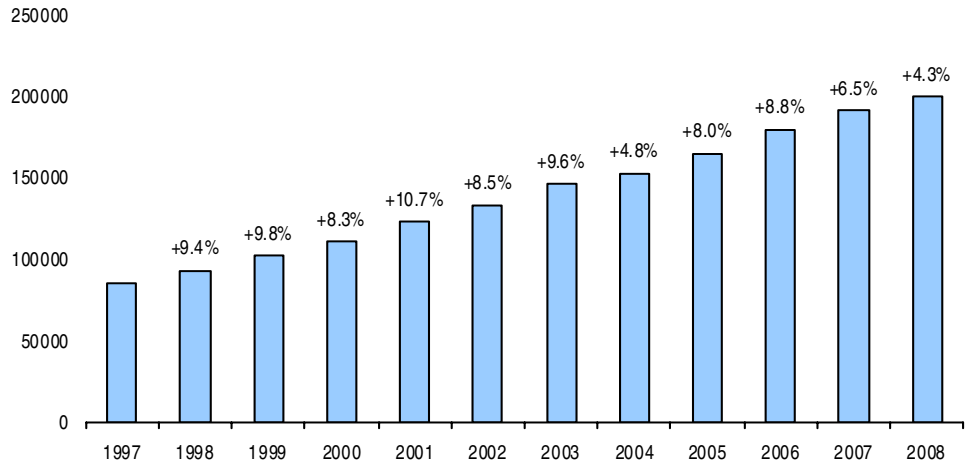
By packaging, there are two principal markets:

(i) HOD (home and office delivery), where water is supplied in large ten-gallon drums and consumers tap the water from it.

(ii) Bottled water, in all shapes and sizes.

What is clear is that growth in this industry has been very strong for many years now, averaging 8% by volume pa for the last decade, although the growth rate is now beginning to drop. In value terms, the industry is worth around $100bn annually (on our calculations).

**Figure 48: Global bottled water market (m litres)**




*Source: Nestlé*

The drivers of the market are different according to each region:

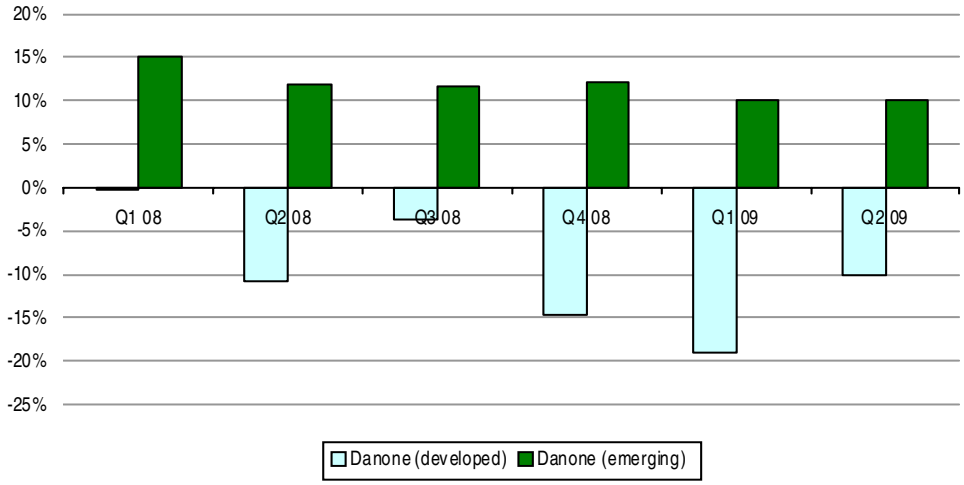
- Growth in the **developed markets** is driven by health issues, and the benefits that spring water allegedly brings (together with the minerals it contains). The developed world market is dominated by spring water.
- By contrast, the **emerging markets** have increasingly sought to buy water to avoid ill-health as local municipal supplies have fallen short of the quality required. These markets predominantly buy refined water, where it is the cleanliness of the water that is paramount, rather than the source.

The financial crisis and subsequent recession has had markedly contrasting impacts on the two regions, however. There has been some backlash in the developed world as consumers 'trade down' to tap water (as indicated by Danone's sales patterns Q108–Q209, illustrated in Figure 49). However, we believe there is a further underlying impact here

related to environmental concerns. Consumers appear to be increasingly conscious of their 'carbon footprint', and reluctant to support a market that ships water across the globe in PET bottles when tap water is generally considered drinkable.

Meanwhile, the emerging markets are continuing to see relatively strong demand for bottled water. The marked difference in water performance at Danone is illustrative of the divergent trends seen in the two regions.

**Figure 49: Danone organic growth by region in Bottled Water**




*Source: Company data*

The industry appears to be trying to respond to these trends in the developed world, highlighting both the benefits of mineral water (natural hydration, essential minerals), and sustainability, while trying to lower the PET costs. Quite how much the weakness in the developed world can be put down to the economic backdrop, the environmental issues, or just simply the weather is unclear, and is only likely to become apparent in the next two years, in our view. We suspect all three factors have a role to play, but that the environmental issues should not be ignored or overlooked. *Our working assumption is that there will not be much growth going forward.*

**Figure 50: Water profile of leading players in bottled water**

| Ticker | Company | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Water sales to developed mkts | Water sales to emerging mkts | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|---|---|
| CCL.AX | Coca-Cola Amital | AUS | 7,424 | 3,999 | 13% | 95% | 5% | N | 15.9 | 1.7 |
| KO | Coca-Cola Co | USA | 131,477 | 30,606 | 5-10% | 40% | 60% | O | 16.5 | 4.0 |
| KOFL | Coca-Cola Femsa SA DE CV | MEX | 1,471 | 7,219 | 17% | 5% | 95% | OP | 14.2 | 0.2 |
| HLB | Coca-Cola Hellenic | GRE | 9,327 | 10,321 | 21% | 60% | 40% | N | 13.7 | 0.9 |
| BCB | Cott Corp Que | CAN | 735 | 1,708 | 15% | 95% | 5% | N/A | 11.5 | 0.4 |
| DANO | Danone | FRA | 42,239 | 22,406 | 18% | 43% | 57% | O | 16.2 | 1.8 |
| AND_pb | Embotelladora Andina SA | CHL | 1,255 | 1,567 | 3% | - | 100% | N | 13.9 | 1.4 |
| ARCA | Embotelladoras Arca SA | MEX | 2,313 | 1,747 | 7% | - | 100% | N/A | 10.7 | 1.1 |
| FEMSAUBD | FEMSA | MEX | 9,448 | 14,101 | 15% | - | 100% | N/A | 16.8 | 0.6 |
| CONTAL | Grupo Continental | MEX | 1,789 | 1,002 | 31% | - | 100% | O | 11.9 | 1.6 |
| 005300 | Lotte Chilsung Beverage Co | KOR | 878 | 1,057 | NA | 5% | 95% | N/A | 14.2 | 0.8 |
| NESM | Nestle Malaysia Bhd | MYS | 2,272 | 1,101 | NA | 2% | 98% | N/A | 20.0 | 1.9 |
| NESN | Nestle SA | SWI | 173,505 | 107,490 | 8% | 93% | 7% | O | 15.2 | 1.6 |
| PEP | Pepsico Inc | USA | 97,419 | 42,664 | 5% | 20% | 80% | O | 14.8 | 1.9 |
| 0322.HK | Tingyi | HKG | 13,163 | 4,735 | 50% | - | 100% | N | 29.8 | 2.1 |

*Source: © 2009 Reuters Limited, IBES International for all P/E and P/sales numbers, Company data, Credit Suisse estimates*

# (VI) Reducing water demand

***We consider ways to reduce water demand for the three main user groups: agricultural demand (which accounts for some 70% of total water demand), domestic demand (8%) and industrial demand (22%).***

***There are two main methods to reduce agricultural demand for water: (a) drought-resistant crops and (b) more efficient irrigation techniques. Companies include Monsanto, Syngenta, Jain Irrigation and Alesco.***

***There are many ways to cut domestic demand for water. We consider metering, tiered tariffs and better plumbing. Companies in the space include Itron, Badger Meter, Geberit and Watts Water Technologies.***

***Industrial water demand has been relatively stable for some time, despite much higher output levels. Solution providers in this space include Alfa Laval, Aalberts Industries, Badger Meter and Flowserve.***

***All these methods are likely to become more important as water prices rise. We note the success achieved by China in Tianjin, which has been set up as a pilot project in water conservation. Through effective irrigation, appropriate crop planting, industrial and domestic efficiencies and extensive water recycling, the city has markedly reduced its water footprint.***

## Agricultural efficiencies

Agriculture accounts for roughly 70% of world water usage and an estimated 31% is wasted (according to the UNEP World Water Development Report, 2007). Given the sheer size of the market, measures to improve efficiency could make a significant difference to aggregate world water demand.

There are two major avenues to increase the efficiency of water in agricultural processes:

**(a) Drought-resistant plants**

Monsanto is working on the development of drought-tolerant corn and cotton. Testing of the company's drought-tolerant corn trait has now moved into Phase 4, the last phase before commercialisation, and has been submitted to the FDA for review. This phase includes the development and testing of best-trait and germplasm combinations for commercial launch. According to the company, in field trials last year in the Western Great Plains in the US, drought-tolerant corn showed a 6–10% yield enhancement—a gain of 7–10 bushels on an average of 70–130 bushels per acre. The company expects drought-tolerant corn to be commercialised by 2012. Management estimates a potential 55 million acreage opportunity in the US, equivalent to gross sales of US$300m–500m by 2020.

Syngenta's research on drought-tolerant corn is aimed at recovering some yield loss caused by drought, having functionality across various stress levels, and reducing the water input on irrigated acres. The research is dual-based; focusing on breeding (non-genetically modified) and transgenic (genetically modified or GM) products. According to the company, the breeding approach is on track for a 2011 launch and should deliver a 5–10 bushel yield increase in the more water-deficient areas. A GM product launch is likely to come later.

Pioneer, the seed division of DuPont, also has a drought-tolerant corn in field trials. However, since this is not a genetically modified seed, it does not need regulatory approval and should be commercially available over 2010–2011, according to the company.

### (b) Irrigation

Drip irrigation can significantly cut the amount of water required for effective irrigation

There are a couple of methods that can materially reduce the amount of water needed to irrigate a crop effectively. One of the most efficient irrigation systems is drip irrigation. This method applies water slowly to the roots of plants by depositing it either on the soil surface or directly to the roots through a network of valves, pipes, tubing and emitters. Drip irrigation may also use devices called micro-spray heads, which spray water in a small area, instead of dripping emitters. These are generally used on tree and vine crops that have wider roots. Subsurface drip irrigation or SDI uses permanently or temporarily buried dripperline or drip tape located at or below the plant roots.

Drip irrigation typically gives higher crop yields and requires less water (depending on the crop and location). For example, in Himachal Pradesh in India, drip irrigation of apple trees has been found to increase fruit yields by 10–45%, and water saving by 25%. In Punjab, drip irrigation has increased yields on sugarcane by 30% and cut water consumption roughly by half.

Other studies have shown that drip irrigation can also reduce the amount of fertiliser required (as less of it is washed away) as well as increase the rate of nutrient absorption. This method of so-called fertigation (whereby fertiliser is fed to plants through the dripperline) has been shown to significantly increase crop yields (for certain crops) for much lower levels of fertiliser application. Examples include tea production in Japan where fertigation increased yields by 20% and cut nitrogen leaching by 30–40% and Chardonnay grapes in Hungary, where fertigation has shown yield increases of 20–25%.

However, many crops (those sown annually for instance) are not suited to drip irrigation. The alternative is sprinkler irrigation. Centre pivot irrigation is a form of sprinkler irrigation consisting of several segments of pipe joined together and supported by trusses, mounted on wheeled towers with sprinklers positioned along its length. The system moves in a circular pattern and is fed with water from the pivot point at the centre of the arc. Most centre pivot systems now have drops hanging from a U-shaped pipe called a gooseneck attached at the top of the pipe with sprinkler heads that are positioned a few feet (at most) above the crop, thus limiting evaporative losses. Drops can also be used with drag hoses or bubblers that deposit the water directly on the ground between crops. The crops are planted in a circle to conform to the centre pivot. These systems are common in parts of the US and South Africa where terrain is flat and for cereal crops where replanting and ploughing take place at least annually.

The use of irrigation varies widely between countries. India and China still have significant potential to increase crop yields with more and better-quality irrigation.

**Figure 51: Sprinkler and drip irrigation in selected countries (2005)**

| Country | Total irrigated area (million ha) | Sprinkler and micro irrigated area (million ha) | As % total irrigated area |
|---|---|---|---|
| China * | 57.8 | 3.3 | 6 |
| France | 1.6 | 1.5 | 94 |
| Germany | 0.5 | 0.5 | 100 |
| India | 57.0 | 2.2 | 4 |
| Italy | 2.5 | 1.4 | 56 |
| Mexico | 6.2 | 0.6 | 10 |
| South Africa | 1.5 | 0.5 | 32 |
| Spain | 3.6 | 1.8 | 51 |
| US | 21.3 | 12.1 | 57 |

** Data for China as of 2008*

*Source: ICID (International Commission on Irrigation and Drainage), FAO, China Ministry of Water Resources, Credit Suisse research*

In China, sprinkler and drip irrigation makes up close to 6% of the total irrigated acreage. This is still relatively low by international standards but is nevertheless a marked increase on the start of the decade. The growth in irrigation reflects a concerted government-backed effort to improve agricultural productivity. At the Fifth World Water Forum in March this year, China's Minister of Water Resources reiterated plans to increase the irrigated area by a further 10% (5.54 million hectares) by 2020 and rehabilitate 260 large-scale irrigation and drainage pumping stations over the course of the next 3–5 years.

India has an absolute level of irrigated area that is similar to that of China (57 million hectares, on 2005 numbers). The ultimate irrigation potential is estimated as 139 million hectares without the 'River linking project' and 174 million hectares upon its implementation, according to data from the ICID (International Commission on Irrigation and Drainage). Recent growth in irrigation has been substantial: according to the National Committee on Plasticulture Application in Horticulture (NCPAH), the sprinkler and drip irrigated area has increased from 0.7 million ha in 2000 to 3.5 million ha as of 2008. Still, the rate of adoption is far from its potential. The Ministry of Agriculture has estimated an ultimate potential area for micro and sprinkler irrigation of 27 million ha and 42.5 million ha, respectively. The Ministry has proposed to bring 17 million ha under pressurised irrigation in the country, comprising 12 million hectares under micro irrigation and 5 million hectares under sprinkler irrigation by the end of the 11th Five Year Plan period (2007–2012). India's Planning Commission estimates that water supply and irrigation capex will amount to US$103bn under its 11th Plan, representing a 19% CAGR over the 10th Plan and 21% of total planned infrastructure investments during the period. Irrigation capex in India is state government dominated—states are expected to implement 89% of the planned investments under the 11th Plan. Until recently, only a few states—including Andhra Pradesh, Gujarat and Maharashtra—were deploying irrigation capex in a big way. However, more states, such as Tamil Nadu, Rajasthan, Madhya Pradesh and Karnataka, have recently started to deploy capex in this segment.

**Figure 52: Listed irrigation providers**

| Ticker | Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|
| ALS.AX | Alesco | Irrigation systems, bore water systems, water tank systems, grey water and wastewater systems | AUS | 2,146 | 1,373 | 17.4 | 1.4 |
| EDPr.AT | Eurodrip Irrigation Systems | Drip irrigation provider | GRE | 52 | 93 | N/A | N/A |
| JAIR IN | Jain Irrigation | Drip irrigation provider | IND | 1,428 | 598 | 18.7 | 1.4 |
| LNN | Lindsay Corp | Manufacturer of centre pivot/lateral move irrigation equipment | USA | 451 | 336 | 20.6 | 1.1 |
| TRMB | Trimble Navigation Ltd | Electronic products including field levelling equipment to improve water efficiency | USA | 2,889 | 1,117 | 18.0 | 2.3 |
| 0840.HK | Xinjiang Tianye Water Saving Systems | Drip irrigation provider | HKG | 25 | 97 | N/A | N/A |

*Source: © 2009 Reuters Limited, IBES International for all P/E and P/sales numbers, Company data*

**Jain Irrigation** (Not Rated) is the leading manufacturer of micro-irrigation systems (MIS) in India with a market share of 50% in drip and 35% in sprinkler irrigation. Management expects the company to retain these market shares going forward and benefit from the rising implementation of MIS. It expects the micro-irrigation business to be the key growth driver and account for more than 50% of the company's revenue (by 2012) (from 40% currently). According to management, a higher contribution from micro-irrigation would also boost margins, as this is the most profitable segment (EBITDA margins of 25–30%).

Australia-listed **Alesco's** water products division makes up c15–20% of group 2008 revenues. This division distributes irrigation systems, bore water systems, water tank systems, and grey water and wastewater systems. The primary end-market exposure for Alesco is the Australian housing sector. We expect a material lift in group earnings in FY11E given the strong increases seen in leading housing market indicators over the past 6–9 months. ALS continues to trade at a 40% discount to its peer group with an FY11E P/E of 8.7x, on our estimates. We rate the stock Outperform.

# Domestic efficiencies

The UNEP estimates (World Water Development Report, 2007) that domestic water use makes up 8% of global use but that 85% of that water extraction is wasted. There are three approaches to reducing this waste:

An estimated (by UNEP) 85% of domestic water usage ends up wasted

(1) Raise public awareness through advertising and marketing campaigns: The Israeli government's campaign to reduce household water consumption cut consumption by 13.5% yoy in 2008. In Australia, the average annual residential water supplied per property fell by 12% in 2008 compared with the previous year, owing to higher prices and campaigns to reduce consumption.

(2) Introduce a tiered pricing system, whereby water consumption costs more beyond a certain threshold. This enables water provision at very cheap prices to cover 'basic needs' but acts as a deterrent to over-use. Tiered pricing schemes have been successfully implemented in Australia, Israel and parts of the US.

(3) Install more water-efficient devices.

In developed markets, there is an increasing degree of regulation to ensure the installation of efficient water (as well as energy) appliances. We review some of the measures below:

**(a) Meters**

Fitting water meters raises public awareness and reduces the amount of water wasted. An analysis of 8,000 UK households between 1996 and 2001 calculated that metering resulted in an average reduction of 9% in consumption (Baker and Toft, 2003).

Metering is fairly universal across Europe, Japan, the US and Australia. Within the developed markets, the UK is the major exception. The Environment Agency is encouraging metering (about one in three homes currently has a meter fitted) and is targeting 75% of households by 2025. Metering is much less prevalent across the emerging markets but penetration rates are gradually creeping up. In total, according to IMS, there are c957 million water meters across the world as of end-2007.

Africa, India, Russia and the UK rank among the lowest ratios of metered properties in the world

**Figure 53: Water metering around the world**

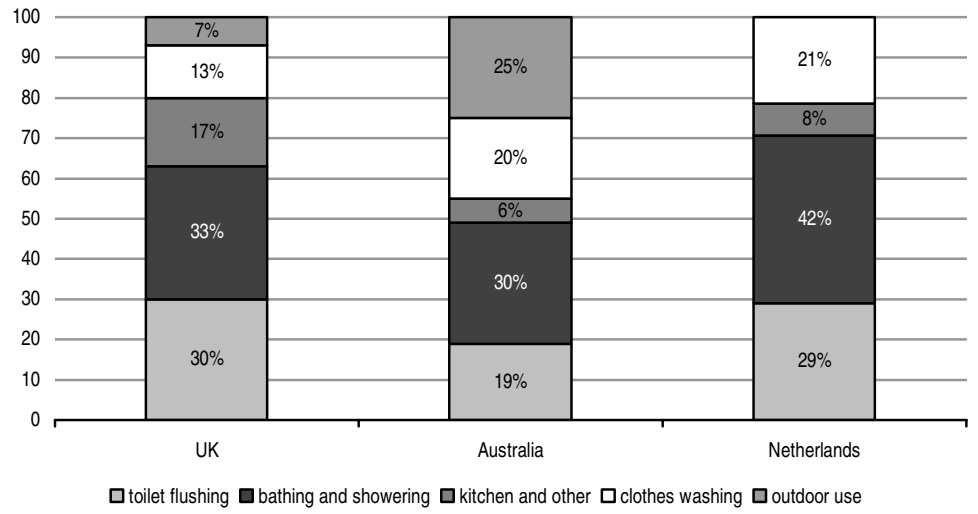
| Region | Installed base ('000) | % of buildings with piped water that are metered |
|---|---|---|
| Africa | 34,931 | 16% |
| Asia | 502,080 | 56% |
| *China* | *324,277* | *78%* |
| *India* | *49,704* | *22%* |
| Emerging Europe | 93,854 | 54% |
| *Russia* | *44,397* | *44%* |
| Europe | 136,989 | 81% |
| *UK and Ireland* | *9,331* | *32%* |
| Latin America | 60,627 | 42% |
| Middle East | 32,815 | 60% |
| North America | 86,017 | 62% |
| Oceania | 9,521 | 95% |

*Source: IMS, Credit Suisse research*

According to Itron, meter replacements are running at a steady 3–5% pa around the world. However, increased efficiency targets and legislation, plus environmental concerns, are underpinning higher metering penetration rates. Global water meter suppliers include **Itron** (30% of 2008 sales are water-related), **Badger Meter** (80%) and **Techem** (20%).

### (b) Household plumbing

**Figure 54: Average household water demand**




*Source: Ofwat, Credit Suisse research*

According to Ofwat (the UK water regulator), 30–40% of water is used in the bathroom, 19–30% is flushed down the toilet and 13–21% is used for washing clothes. Water-saving potential is significant (some studies have reported up to 60% water saving). Figure 55 describes some of the water-saving devices available.

**Figure 55: Household water-saving devices**

| Solution | Description |
|---|---|
| Spray taps or fix spray nozzles to existing taps | Reduces volume of water flow from the tap. |
| High-efficiency shower heads | Mixes air with the water to halve water consumption without any noticeable reduction in effect. |
| Supply-restricting valves | Keeps water flow constant despite pressure fluctuations. May prevent and detect leaks. |
| Urinal controls | Cistern only flushes after use. |
| Tap controls | Switches taps off after certain time. |
| Water-saving device (Cistern Dams) in standard toilets | Reduces the volume of water used during flush. |
| Low-flush toilets | Reduces the volume of water used during flush. |

*Source: Credit Suisse research*

In the US, domestic water-efficient devices are mandatory for new builds

The US and Australia are generally ahead of many countries with respect to legislation on water-efficient devices.

In the US, domestic water-efficient devices are mandatory for new builds and regulations define maximum water-use standards for plumbing fixtures. In January 2008, Congress enacted new laws to limit the water use of dish-washers and clothes-washers. Standard-sized dishwashers manufactured after 1 January 2010, will be limited to 6.5 gallons per cycle, and compact dishwashers will be limited to 4.5 gallons per cycle. Residential clothes washers manufactured after 1 January 2011 must meet a maximum water factor of 9.5.

Beyond this, many manufacturers have sought approval from the WaterSense programme. This is a US EPA *voluntary* programme designed to encourage water efficiency in the country through the use of a special label on consumer products. It was launched in June, 2006. The US DOE predicts that by 2026, water use for the average American family should be reduced by up to a half of the pre-1994 levels (when Congress passed the Energy Policy Act, which mandated the use of water-efficient fixtures).

In Australia, regulation is state-based and thus somewhat inconsistent, but all states have had regulations for more than a decade relating to dual-flush/low-volume toilets for new houses and replacement products and the same for aerators and flow regulators for showerheads and kitchen taps. The pressure on suppliers is now to adopt a subsidised retrofit scheme for the installed base of old-style single-flush toilets, as in various US states and cities. In 2004, New South Wales introduced a new house-building code, which required a 40% reduction in household water usage for new homes and renovations (achieved through low-flush toilets, diffusers in taps, water-efficient appliances, water tanks). Victoria has an environmentally driven code that allows a choice between water saving (e.g., a water tank) or greenhouse gas saving (e.g., a solar hot water system) to generate the required Five Star environmental approval, on top of existing low-flush/diffuser requirements. In Queensland, Australia, new legislation designed to meet water-saving targets in new buildings came into effect across the whole state (rather than just part of it) on 1 July 2007.

In the UK, legislation on domestic water efficiency is catching up with the global trend and there are signs that European legislation is also likely to take a more pro-active stance on water efficiency. In the UK, following amendments to Part G of Building Regulations, from 6 April 2010, all new homes will have to meet a water efficiency standard of 125 litres of water per person per day. There are still no mandatory specifications for water efficiency in new builds in Europe but the European Parliament has voted (April this year) to extend the range of products bound by efficiency standards under the Eco-design regulations (including showers, taps, windows and insulation materials). The standards, exact products and timescale for regulation have yet to be determined.

In China, there are no federal laws that set standards for plumbing equipment, but Beijing, Tianjin and Shanghai have taken measures to promote domestic water saving, including subsidising water-saving taps or toilets and rolling-out education programmes.

Tianjin has, in fact, been used as a pilot project in water conservation. According to the Ministry of Water Resources, Tianjin is the first provincial water-conservation pilot city on the east-middle line of the South-North water transfer project. The government in Tianjin has taken various measures to ensure that water withdrawal rates in the city are sustainable in the long term. Measures have included: (i) greater water reuse: currently, 170,000 tons of recycled water can be treated in depth everyday. The city has laid 238 kilometres of pipes for recycling water in downtown areas, with about 27 million square metres of inhabited areas equipped with two pipes in their houses (one pipe for common water and the other for recycled water); (ii) elimination of inefficient water usage in industry, as well as water pollution; (iii) controlled planting of water-consuming crops; (iv) effective irrigation—60% of irrigated areas adopt water-saving measures and technologies; (v) greater industrial efficiencies: Tianjin has upgraded the techniques of the water-cooling circulation systems of 200 enterprises; and (vi) Tianjin has established a flood management system: in 2007, retained rain and flood water accounted for c.8% of the total water supply in the city, effectively replacing water transfers from the Luanhe River.

Israel's Water Authority has announced further measures to reduce water consumption, including the distribution of 1.2 million household devices to reduce the flow of water from taps. Water Authority officials predict that the point-of-use devices have the potential to reduce tap flows by 30–50%, and there are plans to issue a tender for the purchase and distribution of the devices, which are currently mandatory only in new buildings.

There are limited ways to gain exposure to this theme in the market as (a) many products are supplied by unlisted manufacturers or (b) they make up only a tiny proportion of sales of listed corporates. We would highlight **Geberit** (100% of 2008 sales from sanitary ware and plumbing supplies), **GWA International** (75% of sales). **Watts Water Technologies** has 13% of 2008 sales of plumbing equipment to DIY centres, 100% of sales related to water.

# Industrial efficiencies

Industry accounts for 22% of end water demand according to the UNEP World Water Development Report, 2007. Water is used by industry in myriad ways: for cleaning, heating and cooling; for generating steam; for transporting dissolved substances or particulates; as a raw material; as a solvent; and as a constituent part of the product itself (e.g., in the beverage industry).

Industry accounts for 22% of water demand. Demand growth from this sector has been more muted in recent years

Following major growth between 1960 and 1980, water withdrawal for use by industry worldwide has more or less stabilised. In Japan, industrial water use has dropped by some 25% since the 1970s in spite of increasing industrial output. The pattern is similar in Europe. In Asia, the growth in industrial water withdrawal was rapid up until 1990 and has since been growing much more slowly, despite the region's high growth in manufacturing output.

According to the UN (in its World Water Development Report No. 2, 22 March 2006), "Given proper incentives, it is generally found that industry can cut its water demand by 40 to 90%, even with existing techniques and practices".

There is a 'carrot and stick' approach to implementation as has been generally observed. In the US, various states and municipalities offer grants and other financial incentives to industrial and commercial water users to improve efficiency.

In Europe, Best Available Technology (BAT) is mandatory as part of the Integrated Pollution Prevention and Control (IPPC) Directive of 1996 (updated and re-issued in 2008). Since 30 October 2007, all industrial installations in the EU (old and new) have been subject to the IPPC Directive. In Germany and the Netherlands, groundwater taxes are increasingly being used as a fundraising and demand-management tool. The UK may look to emulate this: the Environment Agency's 2009 water resources strategy for England and Wales raises the possibility of charging for water resources beyond raising funds to cover its own costs. There are some 4,000 industrial abstraction licence holders in England and Wales, and one proposal would be to switch charges from being based on the licensed quantity allowed, to the actual volume abstracted and to have seasonal tariffs.

From the corporate perspective, many companies are signing up to voluntary environmental codes to demonstrate their commitment to preserving scarce resources, such as water. So many companies have signed up to ISO 14001 eco-audit standard that the International Organisation for Standardisation (ISO) has stopped publishing the number. The UN CEO Water Mandate has signed up 57 companies since its inception in July 2007.

Water can be saved either by cutting down on water input or through water recycling and reuse (see section 3). There are several other solutions available:

- **Alfa Laval** produces, among other things, spray nozzles designed to reduce the volume of water coming out of the tap without detracting from industrial cleaning processes, as well as systems designed to recycle water-based fluids in metalworking applications.
- **Aalberts Industries** (25% of 2008 sales are water related), **Badger Meter** (80%), **Ebara** (53%), **Flowserve** (12%) and **ITT Corp** (40%) provide flow equipment to monitor and regulate the flow of water and minimise its use in industrial processes.
- **ABB** markets itself as a solution provider to the EU IPPC Directive (which was been replaced in the UK with the Environmental Permitting Regulation in 2008) and BAT implementation.

# (VII) Water provision: A French case study

***We believe there are two reasons the French water sector can be considered as a guide for water provision elsewhere: (1) France represents a mature market with a well-established regulator and an adequate service; and (2) the main water providers (Veolia and Suez) have looked to export their services to the rest of the world with varying degrees of success.***

***Suez has chosen to focus on investments in Europe. Veolia has been more willing to explore markets outside of Europe, highlighting Middle East, Australia, North Asia and Eastern Europe as its priorities in the short term and North America in the medium term.***

***Returns in water management can be very high where infrastructure is well established and pricing is appropriate. However, in less mature markets, where water is seen as more of an 'entitlement' than a 'service', it may make more sense to invest in the building and critical components companies rather than those that own and operate the services.***

In Europe, France and the UK have set the precedent for private water supply

Europe is at the forefront of the privatisation of water management services. The majority of services for two countries in particular, the UK and France, are handled by private operators. We believe France in particular offers a good illustration of what the global water management industry could look like in the future as investment and regulatory pressures drive governments to delegate those services to specialist companies.

In France, municipalities have made the decision to outsource water provision to the private sector

In France, privatisation has been happening since the end of the nineteenth century, very much on a case-by-case basis. Water contracts are the responsibility of municipalities, which have the option of either running them themselves or delegating the responsibility to an external service provider. The historical presence of two large and well-established private operators—Lyonnaise des Eaux (part of Suez Environnement) and Générale des Eaux (part of Veolia Environnement)—has led many municipalities to outsource their water services. There is no centralised regulatory or political body to control the terms of water management contracts. Instead they are privately agreed between the municipality and the operator. The only external mechanisms of control are the obligation to put contract renewals through a public bidding procedure (Spanish law, 1993); and the 20-year limit on contract lives (Barnier law, 1995).

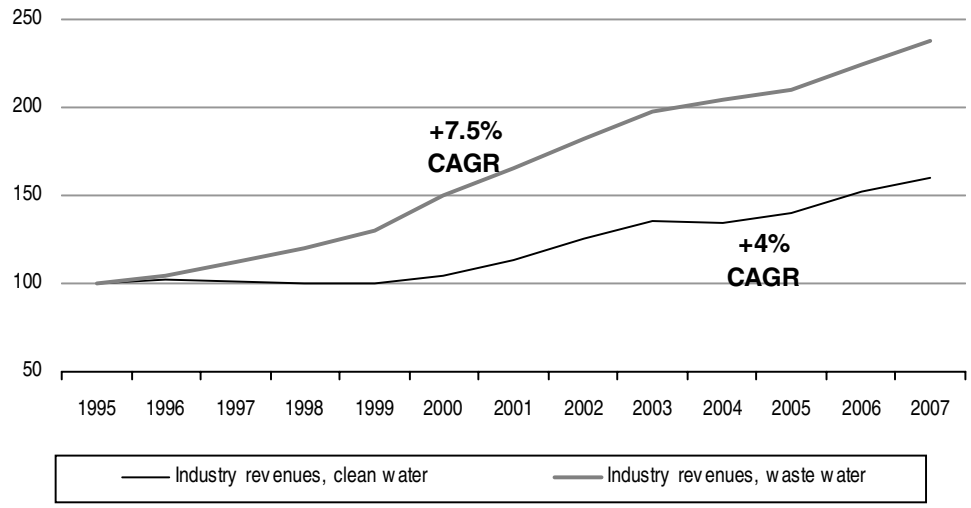
**France: A mature market generating high returns**

France still represents the core of Veolia's and Suez's business, accounting for 53% and 61% of their respective water divisions' 2008 EBITDA (and therefore 23% and 22% of the respective groups' EBITDA), on our estimates. France represents a highly attractive water market in our view, where Veolia and Suez enjoy reasonably high growth thanks to privatisation and pricing trends and where returns remain high, partly as a result of the oligopolistic structure of the market.

France is a mature water market but the private sector has still experienced healthy revenue growth

France is a mature water market, with a relatively high proportion of the population connected to the public water supply network (99.4% in 2000 according to Eurostat) and to wastewater treatment plants (80% in 2004 according to Eurostat). Investment requirements to develop the water infrastructure—both clean and waste—are therefore limited. That said, the private sector has experienced very healthy revenue growth, with a 1995–2007 CAGR of 4% for clean water and 7.5% for waste water services since 1995.

**Figure 56: Healthy revenue growth in the French water industry**

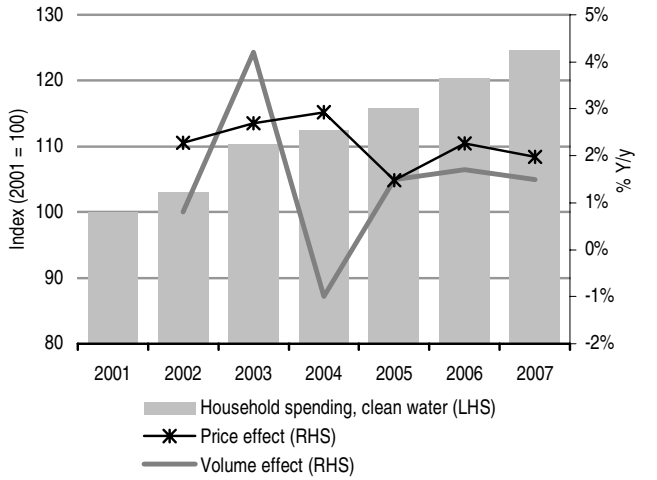



*Source: XEFRI, Credit Suisse research*

We see two main reasons for this growth: increased household spending on water services driven by rising prices and increased privatisation of water contracts on the waste water side in particular.

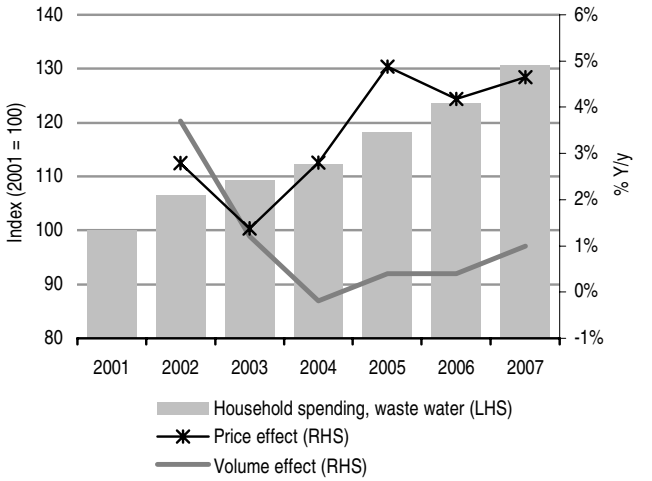
Household spending on clean water and waste water services has been rising at a CAGR of 3.7% and 4.5% respectively over the past 15 years. Although volume growth has been limited, prices have increased consistently (c. 2% pa), as a result, in our view, of more stringent demands for water cleanliness and quality and waste water treatment norms.

**Figure 57: Higher prices for clean water…**




*Source: XEFRI, Credit Suisse research*

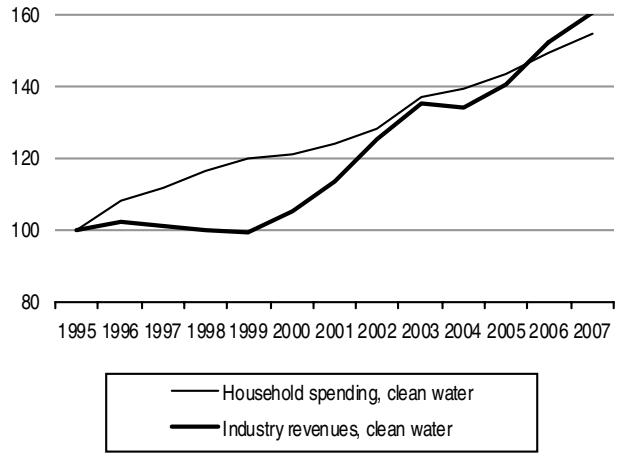
**Figure 58: …and waste water services**




*Source: XEFRI, Credit Suisse research*

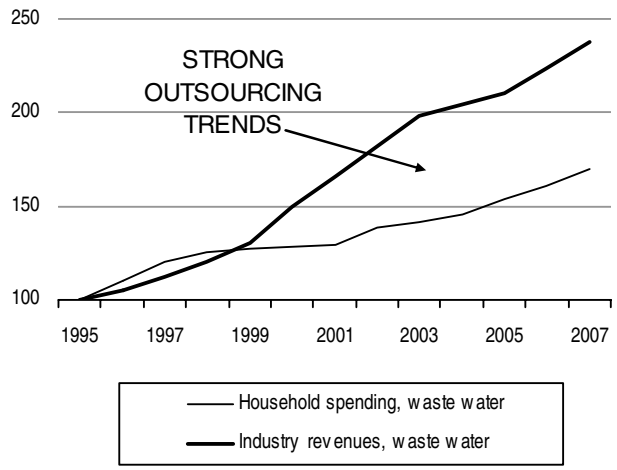
Outsourcing has also created incremental growth for the French water industry, in particular in waste water. The 1991 Urban Waste Water Treatment Directive (91/271/EEC) required all sewerage treatment to conform to EU standards by 2005. For France this meant a required investment of €16bn according to estimates from BIPE (Bureau d'Information et de Prévisions Economiques). The rate of outsourcing in France now stands around 80% for clean water and c50% for waste water, versus 60% and 40% respectively in the early 1980s.

**Figure 59: Outsourcing trends for clean water (€, indexed to 100 as at 1995)**




*Source: XEFRI, Credit Suisse research*

**Figure 60: Outsourcing trends for waste water (€, indexed to 100 as at 1995)**

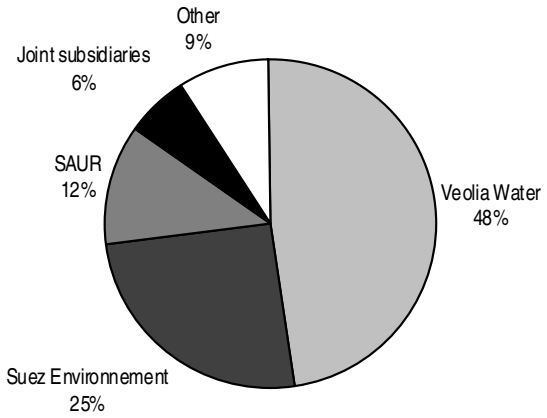



*Source: XEFRI, Credit Suisse research*

Looking at the profitability of contracts, very little information is available from the companies. The latest data released from Veolia on its French water business dates from 2003. From the information released by the company we can estimate a post-tax ROCE of around c12% in 2003, well above that achieved in the other geographic areas where the group operates.

Since 2003, no detailed information has been released but the structure of the French water market has not changed. It is still an oligopoly, with three players controlling, directly or through joint subsidiaries, more than 90% of the market. We would therefore expect the achieved returns to have remained high.

**Figure 61: The French water market is dominated by three players, 2008**




*Source: XEFRI, Credit Suisse research*

**Growth opportunities: Taking the J-curve risk?**

Can the attractions of the French market be replicated? Veolia and Suez have been very active in exporting their water business models abroad. Even if the growth opportunities that come from the progressive privatisation of water management contracts look compelling, the profitability of contracts in their early stages is far from obvious, in our view.

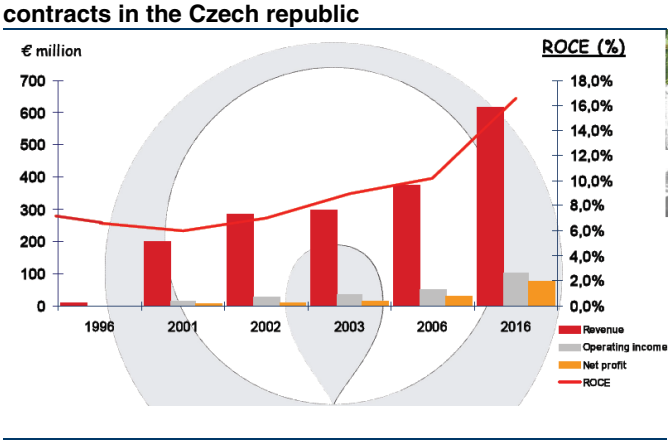
Veolia and Suez have positioned themselves slightly differently for their international expansion: Suez's focus is clearly on Europe; while Veolia has been more willing to explore markets outside of Europe, highlighting Middle East, Australia, North Asia and Eastern Europe as its short-term priorities and North America in the medium term.

The companies release very limited information regarding the profitability of contracts on an individual basis. However, Veolia has tended, over the years, to explain returns (ROCE) on the basis of the J-curve, with:

- low returns in the early years of the contract when initial investments need to be made and the contract is not yet optimally run; and
- rising returns over the life of the contracts. Investments become limited to maintenance, costs are cut and the efficiency of assets improves.

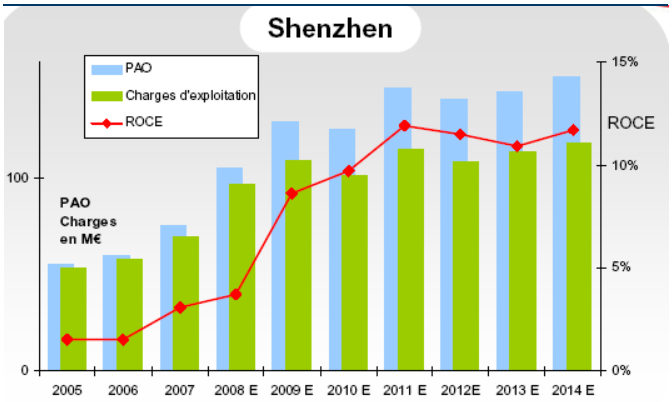
To illustrate this point we show Veolia's profitability and ROCE expectations for specific water contracts in the Czech Republic (at the time of the FY05 results) and in Shenzhen (at the time of the October 2008 Investor Day).

**Figure 62: Veolia: Profitability expectations for water contracts in the Czech republic**




*Source: Veolia FY05 Results presentation (March 2006)*

**Figure 63: Veolia: Profitability expectations for the Shenzhen water contract**




*Source: Veolia Investor Day Presentation (October 2008)*

Although the overall ROCE line illustrates the J-curve argument, the contracts are actually quite different from inception. In the Czech Republic, Figure 62 is based on a group of operating contracts with limited investments (initial entry + contractual investments) and the return improvement is mainly derived from the ability to retain productivity gains. In Shenzhen (Figure 63), the initial investment required is higher (hence a lower initial ROCE) but the potential for optimisation of the contract is also greater.

At its October 2008 Investor Day, Veolia stated the following project selection criteria:

- Average length of contracts: 15–30 years for projects with significant investment; 8–12 years for projects with little investment;
- Project IRR: > WACC + 3%;
- ROCE > WACC in year 2 for short contracts and in year 5 for long contracts.

Overall, what is interesting from both charts is that at the time they were released—early 2006 for the first and end of 2008 for the second—Veolia was not yet earning an ROCE of 10% (c.WACC + 3%).

As is typical for almost any large capital investment, returns are below the cost of capital in the early stages of the investment life and herein lies the inherent risk for investors in the water sector. Visibility of returns would be much greater, in our view, if regulation were clear, well established and (ultimately) supported by the government. The extent to which this is not the case simply raises the risk for the investor and, in many cases, could be

dissuading the private sector from participating. There have been instances in the past where the French companies have started projects and subsequently pulled out as projected long-term returns have dwindled in the face of insufficient regulatory support and local opposition to pricing—Suez's exit from Argentina after the currency crisis is a notable example.

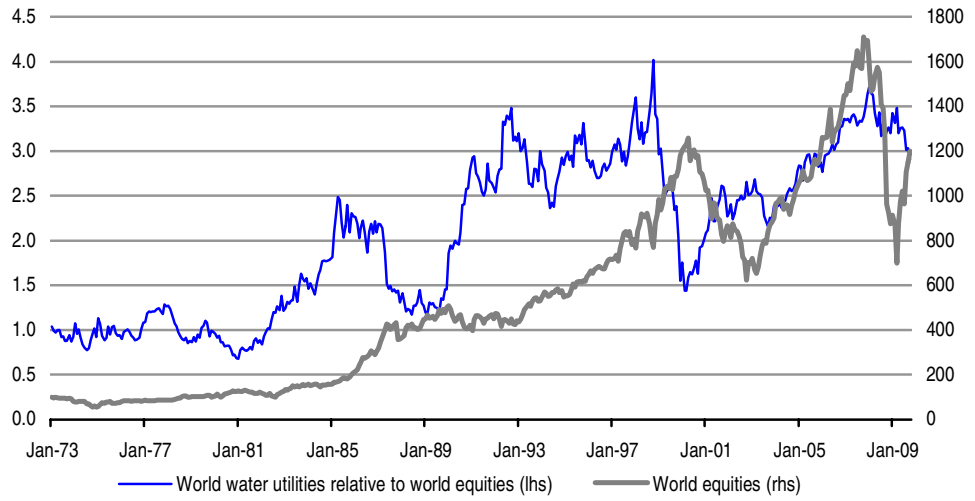
To conclude, returns in water management can be very high where infrastructure is well established and pricing is appropriate (as illustrated by the experiences of Suez and Veolia in their home market). However, in less mature markets, where water is still seen more as an 'entitlement' rather than as a 'service', building and managing a water investment project looks like a much riskier business. From an equity perspective, until these markets mature, it may make more sense to invest in the building and critical components companies rather than those that own and operate the services.

# (VIII) Listed water managers

***Water utilities is a classically defensive sector reflecting the inelastic nature of water demand and the regulatory environment faced by most water utilities. Dividend yields are typically higher than the market average, reflecting the perceived low long-term growth potential of many of the stocks in the sector. Underperformance YTD of 20% has meant the relative gap in the trailing dividend yield of water utilities (4.5%) versus global equities (2.6%) has opened up again.***
***Our top pick in the sector is United Utilities. We rate Suez as Underperform and have recently (2 November) upgraded Veolia from Underperform to Neutral.***

Water utilities represent a classically defensive, low beta sector: the sector tends to underperform in bull markets and outperform in bear markets.

**Figure 64: Water utility sector performance relative to world equities**

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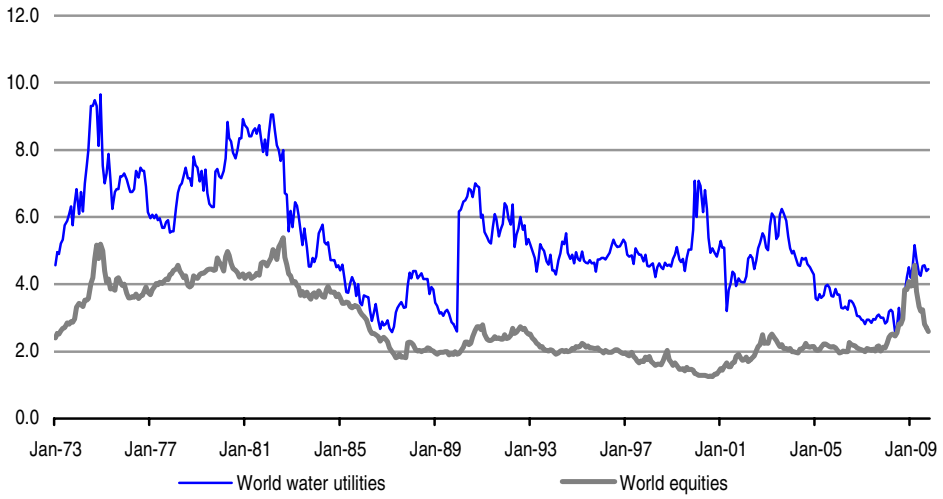
This relative performance is easy to understand: most of the listed water utilities offer predictable long-term returns that are generally very stable throughout the economic cycle given the inelastic demand and regulated nature of most water utilities. Growth prospects are typically perceived by investors to be relatively low since they are defined by the geographic area in which the utility operates and profitability is, to some extent, effectively capped by the regulator. In the UK, the regulator sets virtually all components of the companies' operating models—capex, opex levels, allowed revenue increases, pensions recovery, allowances for energy costs and most importantly, the cost of capital. The only way UK water utilities can create value is by outperforming the regulators' assumptions: having a lower cost of capital than the regulator assumes or by spending less capex than the regulator allows but achieving the same outcome. UK water utilities have augmented their growth historically by having water-related 'growth' businesses, such as contracting for other companies, or waste treatment.

YTD the sector has underperformed the aggregate global index by 20% as world markets have recovered and defensive names have taken a back seat. Dividends are typically a key component of the decision-making process regarding an equity investment in water utilities. Yields are usually higher than average, reflecting the low long-term growth potential of many of the stocks in the sector. We note that with the underperformance YTD, the relative gap in the trailing dividend yield of water utilities (4.5%) versus global equities (2.6%) has opened up again (see Figure 65).

**Figure 65: Water utility dividend yield versus Global equity dividend yield**

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The global sector is dominated by Veolia and Suez and the UK water utilities. US water utilities account for a reasonable proportion of the universe (10.5% on our numbers). In Figure 66, we summarise some of the major listed water utilities around the world (see Appendix 3 for a more complete list). While it is easy to surmise overall trends in the sector, the vagaries of regulation and performance on costs can lead to meaningful divergence in returns. We note:

- **United Utilities**: the combination of weak inflation and a Regulatory Review in UK Water has overshadowed the sector throughout 2009, but particularly since the regulator's Draft Determinations in July. Even against this weak background, UU has performed poorly versus its peers, primarily owing to concerns over the sustainability of its dividend. We believe the market is being overly pessimistic in assuming the dividend will be cut by 35%. We assume only a nominal 10% cut in our numbers based on cash support from its sizeable non-regulated business and its low cost of embedded debt. While we agree that the short-term sector performance will likely continue to be dominated by regulatory and dividend concerns, we believe 2010 offers several rays of light in the form of a falling cost of capital and a rise in inflation, as well as better regulatory visibility. On a relative basis, we believe UU provides the best way to play these themes in the UK Water sector. We rate UU Outperform.
- **Severn Trent** remains our least preferred water stock on fundamentals. We believe it is most at risk of a dividend cut, offers very limited real RAB growth over the next review and shows little scalable differentiation in non-water activities. As with UU, we believe dividend yields are currently the principal driver of SVT's valuation. Once we factor in our estimate for a 25% cut in FY Mar 11E dividends, the current yield premium versus the rest of the utilities sector disappears and valuations look less attractive. However, the market appears to have priced in much of this bad news. We rate SVT Neutral.
- **Pennon Group** has performed relatively well versus its peers since the Draft Determinations, principally owing to the lack of dividend concerns and the increase in valuation of its waste business, Viridor. We believe short-term share price movements will continue to be driven by the market's valuation of Viridor, which in turn is largely driven by read-across from Viridor's waste peers Veolia and Suez Environnement. Although we continue to see the business as the quality player in the UK waste market, with a focus on strategic and high-value waste infrastructure, we believe much of the value of Viridor is now priced in. We rate Pennon Neutral.

- **Northumbrian Water** has performed relatively well versus its peers since the Draft Determinations. As a result, the stock trades on the highest premium to RAB in the sector—something we believe is justified. The dividend looks secure, financing comfortable, and NWG also looks to be the most levered among its peers to a return in inflation given its low index-linked debt exposure. However, we think NWG's valuation versus the rest of the sector is unlikely to broaden and we see more relative value in other names, notably UU. We rate NWG Underperform.

- **Sabesp** is one of the largest water and sewerage service providers globally in terms of number of customers. It provides water to 23.2m people and sewerage services to 19.3m people in São Paulo, Brazil. Sabesp also sells treated water on a wholesale basis to six municipalities, serving an additional 3.3m people. In our opinion, Sabesp's earnings growth outlook is largely contingent on the implementation of the new regulatory model, which is designed to establish profitability on an ROA basis. This looks set to be a very slow and gradual process. It is scheduled to be in place by 2011, but continued political wrangling is a significant risk given the sharp increase in water prices charged to consumers implied under this new system. At present, there is no regulation guiding Sabesp's returns, but since water tariffs are pegged to inflation and capex costs have been considerable (c.50% of its EBITDA), returns have been low. Volume growth has also been fairly sluggish (the company has historically reported volume growth of roughly 3–4%). Valuation multiples are relatively low compared to the market (reflecting low implied growth expectations). With regulatory reform still some way from effective implementation, we rate the stock Neutral.

We have been relatively downbeat on the prospects for Veolia and Suez. We have recently upgraded Veolia from Underperform to Neutral (see *Veolia Environnement: Ending our negative call*, 2 November 2009). Suez is still rated as Underperform:

- **Veolia** is one of the largest quoted companies for investors looking for exposure to the global water management sector, with a market capitalisation of close to €12bn and c90% free float. The company is involved in four distinct businesses: water management, waste management, energy services and transport (respectively 44%, 33%, 18% and 7% of 2008A EBITDA). Our concerns over the outlook for the stock have been on 1/ earnings recovery being slower than market expectations; 2/ the company coming back to a policy of acquisitive growth from 2010; and 3/ the risk of an earnings-dilutive capital increase. The shares' poor reaction to 1H09 results and the recent management changes have reduced (if not completely removed) our first two concerns. We still believe a capital increase is a possibility in Q1 (net debt/EBITDA is close to 4.0x). Based on our analysis of the ratios used by debt rating agencies, we foresee up to €3bn of capital required, which would be c15% dilutive to earnings. Veolia remains expensive versus utility peers in our view, trading at a double-digit P/E premium to the sector for the foreseeable future, while offering a <5% dividend yield. That said, Veolia is one of the very few cyclical earnings story in the utility sector and investors still appear ready to pay a substantial premium for this potential growth.

- **Suez Environnement** is the second largest global water management player after Veolia. The stock is a less liquid investment, with a c.€7.5bn market capitalisation but only a c50% free float. Our concerns on Suez Environnement revolve around the speed and shape of profits recovery—we believe the consensus is too optimistic. The shares have performed strongly since the 1H09 results due to their higher cyclical exposure than other utilities—profits were hit by the recession from the end of 2008 due to exposure to industrial waste volumes; and should recover as industrial production bounces back. However, we think the market tends to neglect the fact that profit recovery is highly dependent on where recycling material prices will go in the next 12 months—the exposure of Suez Environnement here is very similar to that of Veolia.

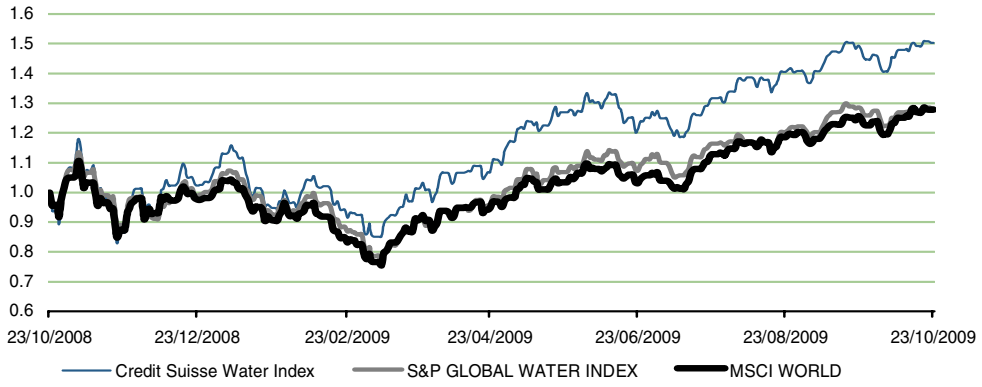
**Figure 66: Listed water utilities**

| Ticker | Company | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|
| ACE.MI | Acea Spa | ITA | 2,415 | 4,559 | 41% | N/A | 9.4 | 0.5 |
| AGUAa | Aguas Andinas | CHL | 1,502 | 650 | 100% | N/A | 12.4 | 1.0 |
| AGS | Aguas de Barcelona | ESP | 4,434 | 4,539 | 80% | N/A | 16.0 | 0.9 |
| AWR | American States Water Company | USA | 614 | 343 | 83% | N/A | 16.6 | 1.6 |
| WTR | Aqua America | USA | 2,194 | 662 | 100% | N/A | 17.6 | 2.9 |
| ARTNA.O | Artesian Resources | USA | 113 | 59 | 100% | N/A | 15.1 | 1.7 |
| CWT.N | California Water Service Co | USA | 751 | 435 | 100% | N/A | 16.7 | 1.5 |
| HOO.N | Cascal | USA | 174 | 130 | 100% | O | 9.2 | 0.9 |
| 855 HK | China Water Affairs | HKG | 447 | 133 | 63% | N/A | 10.6 | 1.9 |
| 1129.HK | China Water Industry Group Ltd. | HKG | 98 | 29 | 100% | N/A | N/A | N/A |
| CTWS.O | Connecticut Water | USA | 196 | 60 | 100% | N/A | 20.4 | 3.0 |
| CWCO | Consolidated Water | USA | 195 | 72 | 100% | N/A | 16.6 | 3.0 |
| CSMG3.SA | Copasa | BRA | 2,051 | 1,255 | 100% | N/A | 6.3 | 1.4 |
| IAM | Inversiones Aguas Metropolitanas | CHL | 1,251 | 650 | 100% | N/A | 11.6 | 1.8 |
| 600461 CH | Jiangxi Hongcheng Waterworks | CHN | 237 | 31 | 99% | N/A | N/A | N/A |
| MWC PM | Manila Water Company | PHIL | 689 | 185 | 100% | N/A | 10.8 | 3.0 |
| MSEX.O | Middlesex Water | USA | 222 | 91 | 100% | N/A | 19.5 | 2.2 |
| 600323 CH | Nanhai Development Co Ltd | CHN | 443 | 64 | 98% | N/A | 29.8 | 5.5 |
| NWG | Northumbrian Water Group | GBR | 2,101 | 1,152 | 97% | U | 11.8 | 1.8 |
| PBAH MK | PBA Holdings Berhad | MYS | 95 | 53 | 95% | N/A | 17.3 | 1.5 |
| PNNW.O | Pennichuck Water | USA | 101 | 32 | 100% | N/A | 30.9 | 2.8 |
| PNN LN | Pennon Group | GBR | 2,733 | 1,582 | 72% | N | 14.1 | 1.5 |
| SBSP3.SA | Sabesp | BRA | 4,679 | 3,695 | 100% | N | 6.2 | 1.1 |
| SVT | Severn Trent | GBR | 3,948 | 2,726 | 97% | N | 12.0 | 1.4 |
| SEVI.PA | Suez Environnement | FRA | 11,223 | 18,172 | 51% | U | 16.3 | 0.6 |
| TTW.BK | Thai Tap Water Supply Co | THA | 505 | 115 | 100% | N | 9.2 | 4.0 |
| 882 HK | Tianjin Development Holdings Ltd | HKG | 730 | 494 | 8% | N/A | 11.2 | 1.3 |
| TSE | Transfield Services | AUS | 1,628 | 3,084 | 8% | N/A | 13.4 | 0.5 |
| UU | United Utilities | GBR | 5,390 | 4,042 | 92% | O | 11.7 | 1.3 |
| VIE.PA | Veolia Environnement | FRA | 17,072 | 52,915 | 44% | N | 16.2 | 0.3 |
| 600168 CH | Wuhan Sanzhen Industry Holding Co | CHN | 516 | 34 | 57% | N/A | N/A | N/A |
| YORW.O | York Water | USA | 180 | 35 | 100% | N/A | 20.3 | 4.5 |
| YTLP MK | YTL Power International Berhad | MYS | 3,868 | 1,781 | 41% | N | 12.5 | 1.2 |

*Source: © 2009 Reuters Limited, I/B/E/S International for all P/E and P/sales numbers, Company data, Credit Suisse estimates*

# Appendix 1: Credit Suisse indices (Powered by HOLT)

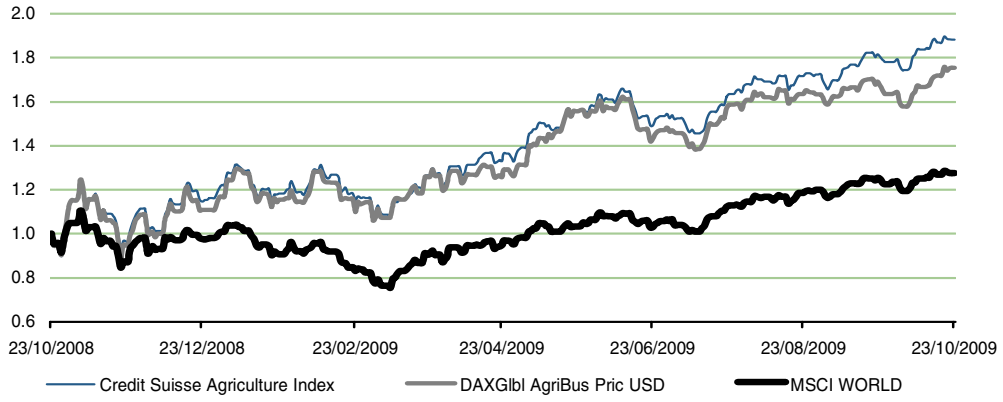
**Figure 67: Credit Suisse Water Index vs the S&P Global water index and MSCI World**




*Source: © Datastream International Limited ALL RIGHTS RESERVED, Credit Suisse research*

Over the last year the Credit Suisse Water Index has outperformed MSCI World by 23% and the S&P Global Water Index by 22%. The Credit Suisse water index can be found under Bloomberg CSWTR

**Figure 68: Credit Suisse Agriculture Index vs the DAX Global Agri-business index and MSCI World**

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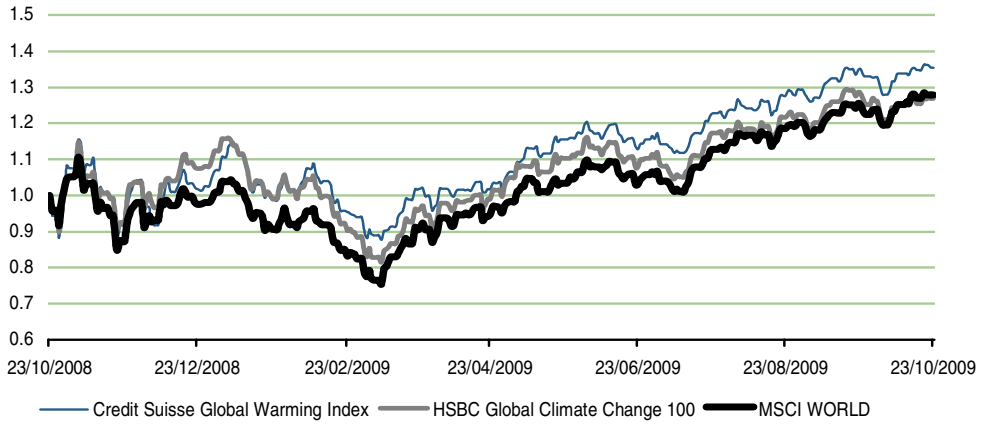
Over the last year the Credit Suisse Agriculture Index (Bloomberg: CSAGR) has outperformed MSCI World by 60% and the DAX Global Agri Index by 13%

**Figure 69: Credit Suisse Global Warming vs HSBC Global Climate Change 100 and MSCI World**

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Over the last year the Credit Suisse Global Warming Index (Bloomberg: CSGWM) has outperformed MSCI World by 8% and the HSBC Global Climate Change 100 by 9%

# Appendix 2: Lessons from the beverage sector

**Rhetoric from the brewing industry illustrates rising concerns**

In 2002, SABMiller did not rate water scarcity as a water constraint. All change by 2009

It is clear that water scarcity has become a more important issue over the past six years. SABMiller is a leader in the field of water management and we believe the group's commentary on water issues can be seen as representative of the industry as a whole. In 2003 water scarcity was not "at present" a business or environmental constraint. By 2007 the company was alerting investors to the risks of "a number of" production bases established in regions classified as facing water scarcity. By 2009 the company reported that 12 countries across all areas of the world would be facing water scarcity by 2025. As the issues have escalated, so have the group's efforts to manage the problems. SABMiller has set out to reduce its water consumption by 25%, engage with suppliers to understand water risk across the value chain, and form partnerships with NGOs to identify areas of water concern.

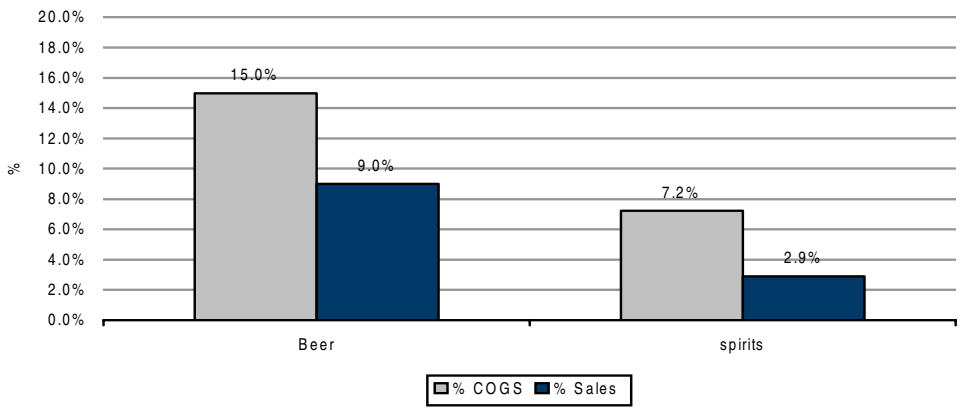
**According to SAB, it takes as much as 155L of water to produce 1L of beer**

Water scarcity poses a real problem for the alcoholic beverages industry. The direct cost of water is only 1% of net sales for the industry but the indirect costs of agricultural crop raw materials that rely on water account for up to 9% of net sales value. SABMiller's "Water footprint" analysis concludes that even though it takes 5L of direct water to make 1L of beer it takes 45–155L of water throughout the value chain to deliver that same litre of beer. This has important repercussions for the alcoholic beverages industry. The cost of "direct" and "indirect" water is likely to rise as water becomes more scarce, driving increases in the cost of base water and primary crops (grain, grape, sugar cane, etc), thus threatening margins.

The cost of malt represents 9% of net sales value for beer and c3% of net sales value for a spirits player (Figure 70). Malt costs doubled between 2006 and 2008, putting pressure on industry margins. Poor barley harvests were a short-term driver of the price increase but structural pressure also played a part. Demand for barley and other primary crops increased significantly as biofuels became popular. Increasing water prices also drove crop prices higher and increasing water scarcity can only put further upward pressure on prices in the medium term. Growth in world grain production is lagging the growth in demand largely because environmental trends, such as spreading deserts, falling water tables and rising temperatures are shrinking harvests in many countries. Against this backdrop, there is a likelihood that the industry will see a surge in grain price—again driven by water price increases.

Direct and indirect water costs are affecting the beverage companies

**Figure 70: Malt as a % of COGS and as % of net sales value (2008)**




*Source: Company data, Credit Suisse research*

### How will water scarcity affect individual players?

Water scarcity could affect companies differently depending on their product and geographic mix and on their environmental reputation, in our view.

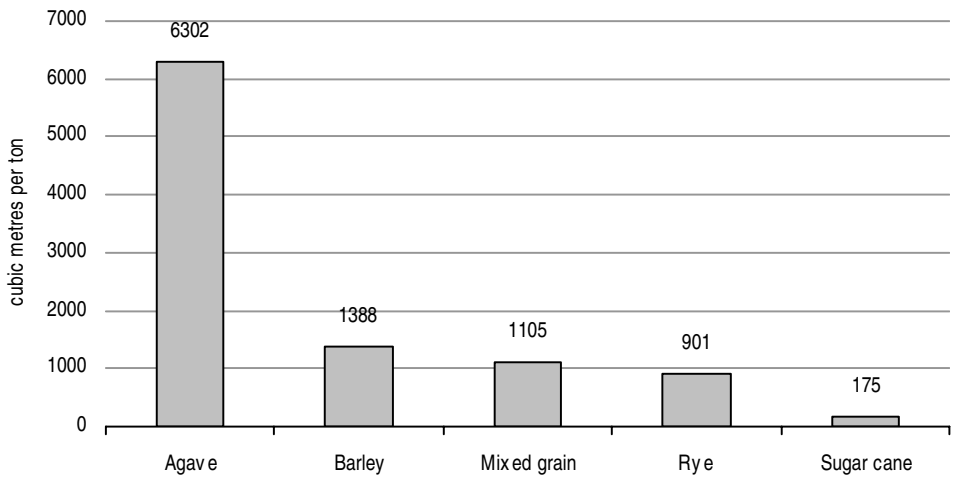
### (1) Product mix: Wine costs more than beer in water terms

Wine is much more water intensive than beer

A recent Pacific Institute research report (The World's Water 2008-2009) suggests that the water footprint for wine and apple juice is three times that of beer. Specifically, the report calculates that producing 1 litre of wine requires 960 litres of water while producing 1 litre of beer requires 300 litres of water, on an average global measure. The water footprints for spirits production are not as well documented but we believe the footprint is quite similar to that of beer. In common with beer, the production of many of the high-volume spirits categories (vodka, whisky and gin), which account for around 70% of total spirit consumption, involves mixing grain with water. The first stage of the production process for these categories produces the same mixture as the brewing process for beer but the mixture is then distilled in the case of spirits. Other spirits categories likely vary in terms of their water footprint. Agave used in the production of tequila has one of the highest virtual water contents of any primary crop, while sugar cane (used in the production of rum) has one of the lowest virtual water contents.

**Figure 71: Virtual water content of primary crops (2008, cubic metres per ton)**

Agave versus sugar cane: Tequila is much more water intensive than rum




*Source: Pacific Institute, Credit Suisse research*

Brandy is grape-based and should therefore have water footprints more akin to wine than beer.

Therefore it is the wine, champagne and brandy players that are likely to see the greatest pressure on costs from a product mix point of view.

### (2) Geographic mix: Water scarcity is set to affect a wide geographical area

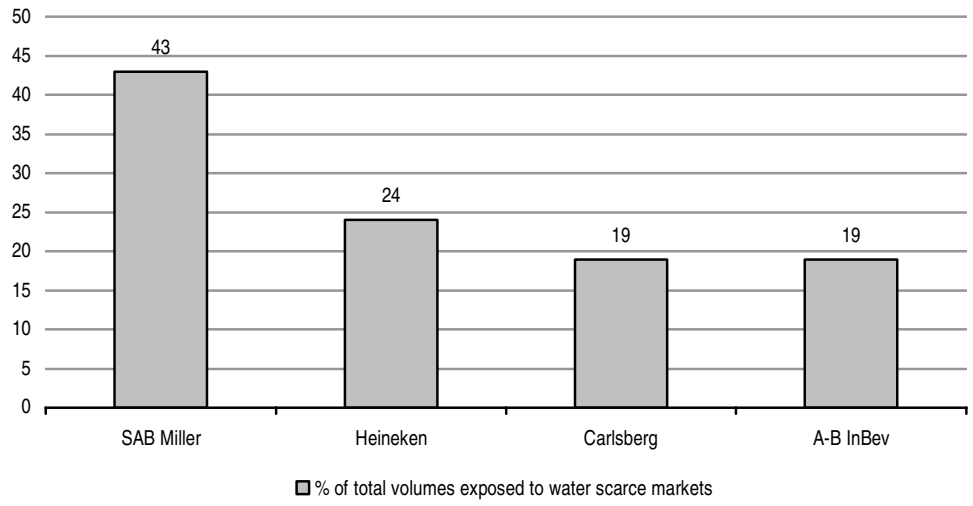
Water footprints vary markedly between countries. The need for crop irrigation in some countries means the water footprint can be much larger. In SABMiller's South African division crop cultivation accounts for 98% of the water footprint, while in the Czech Republic division crop cultivation accounts for 90% of the water footprint. In the Czech Republic only 5% of crops used are imported, whereas in South Africa 31% of crops used are imported.

To get an understanding of how water scarcity could affect each of the major brewers we have looked at where their operations are centred. If we add up volumes produced in water-scarce markets, we find that SABMiller is by far the most vulnerable of the brewers

to water issues. Heineken's focus on Spain (8% of total volumes) and Poland (9% of volumes) leaves it partially exposed to water-scarcity issues. Carlsberg's businesses in water-rich Russia and Scandinavia and its limited presence in the developing world mean that it is less likely to face water scarcity issues, in our view.

**Figure 72: Brewing companies: Volumes exposed to water scarce markets**

43% of SAB Miller volumes are produced in countries that are close to or already considered as water stressed




*Source: Canadean, Credit Suisse research*

For the major spirits companies the vast majority of product is sourced in developed markets. Scotch whisky, brandy, American whisky, and gin are in the main sourced from water-rich markets. Vodka can often be manufactured locally but does not tend to be a product drunk in countries facing water scarcity. The two major spirits companies (Diageo and Pernod) derive only one-third of their sales from emerging/developing markets where they are largely selling imported goods. As a result we believe that the major spirits companies probably score at the high end of the water availability scale (i.e., close to Carlsberg and A-B Inbev).

**Building reputations**

We think that three companies—Diageo, SABMiller and Unilever—have probably shown the greatest evidence of addressing the need to monitor, report on, and reduce their water footprint, according to ECCR (The Ecumenical Council for Corporate Responsibility).

In South Africa, SAB Ltd is working with barley farmers to improve irrigation and yields, and in conjunction with the WWF the company is now considering how to develop this further to protect the watersheds within which it operates. The group has said that it will build on its existing partnerships with WWF in South Africa, Colombia, and Honduras to create further local watershed protection projects to reduce risk while protecting the environment.

Diageo has developed a state-of-the-art renewable energy distillery. The bioenergy facility will generate renewable energy from 'spent wash'—a mixture of wheat, malted barley, yeast and water—produced during distillation. The spent wash is separated into liquid and dried solids. The liquid is then converted, via anaerobic digestion, into biogas and the dried solids form a biomass fuel source. Around 90,000 tonnes of co-products, which would have required transport off-site by road, will be turned into bioenergy in the form of electricity and steam for use at the distillery. The facility will also recover almost a third of the site's water requirements.

Since 1995 Unilever has reduced the amount of water used per tonne of production by 63% by minimising water use and maximising water recycling. During 2008 the group achieved a 3% reduction in water use compared with 2007—from 3.05m$^3$ to 2.96m$^3$ per

tonne of production and saved more than 1$m^3$ per tonne of production (from 5.27 to 4.23$m^3$/tonne) between 2003 and 2007 in its food manufacturing business. Unilever Canada launched a public education campaign—Go Blue—that has reached millions of people through television and print advertisements as well as displays in Wal-Mart stores. The campaign raises awareness of water conservation and encourages people to reduce water use by 50% in their homes and gardens.

**Conclusions**

The water footprint of alcoholic beverage companies is sufficiently large that a change in water pricing is likely to affect industry margin. The degree of that impact will depend on a company's product and geographic profile. Companies such as Pernod-Ricard and Remy Cointreau with exposure to wine-based products and those such as SAB Miller with local production in relatively water-scarce countries face the greatest potential margin pressure. Companies with the vast majority of their business and production in water-rich areas (for example, Carlsberg) should be the best placed in a water-stressed environment.

As heavy users of water, alcoholic beverage companies may face revenue risks, particularly in water-scarce countries, if they are not seen to be environmentally friendly. Some of the sector's players have already started investing in water-efficient practices and state-of-the-art production plants (e.g., SABMiller and Diageo), leaving the other major players to play catch-up.

# Appendix 3: The universe of water-related stocks

**Figure 73: Universe of water-related stocks**

| Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|
| 3i Infrastructure Limited | Water Utilities | GBR | 1,400 | NA | 100% | N/A | 7.6 | 0.7 |
| 3M | Membrane water filtration systems | USA | 55,235 | 22,510 | 2% | N | 15.9 | 2.3 |
| Aalberts Industries NV | Flow control systems | NLD | 1,520 | 2,291 | N/A | N/A | 11.9 | 0.7 |
| ABB | Equipment and services across the power transmission and distribution chain | SWI | 45,623 | 35,538 | N/A | U | 18.8 | 1.5 |
| Acciona | Construction and plant machinery | ESP | 8,657 | 14,246 | 6% | O | 21.9 | 0.8 |
| Acea Spa | The Group's principal activities are the generation, transmission, distribution and sale of electricity and heat. It owns and operates hydroelectric, thermoelectric and wind plants. The Group also extracts and distributes water for domestic, public and industrial use. | ITA | 2,415 | 4,559 | 41% | N/A | 9.4 | 0.5 |
| Aguas Andinas | Water distribution | CHL | 1,502 | 650 | N/A | N/A | 12.4 | 1.0 |
| Aguas de Barcelona | Water distribution | ESP | 4,434 | 4,539 | 80% | N/A | 16.0 | 0.9 |
| Alesco | Irrigation systems, bore water systems, water tank systems, grey water and wastewater systems | AUS | 2,146 | 1,373 | 15-20% | O | 17.4 | 1.4 |
| Alfa Laval | Systems and services for the heating, cooling, separation and transportation of such products as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals (including desalination). | SWE | 5,771 | 3,951 | 4% | N/A | 16.1 | 1.6 |
| Alstom | Hydro-electric power generation equipment and services | FRA | 20,811 | 27,900 | 5% | N | 12.6 | 0.7 |
| AMEC Plc | Building water infrastructure | GBR | 4,597 | 4,335 | <5% | N/A | 14.9 | 0.9 |
| American States Water Company | Water Utilities | USA | 614 | 343 | 83% | N/A | 16.6 | 1.6 |
| Andritz AG | Services include supplying turnkey electromechanical equipment and services for hydro power plants. | AUT | 3,267 | 5,261 | N/A | N/A | 16.4 | 0.7 |
| Aqua America | Water distribution | USA | 2,194 | 662 | 100% | N/A | 17.6 | 2.9 |
| Artesian Resources | Water and wastewater utility services across the US | USA | 113 | 59 | N/A | N/A | 15.1 | 1.7 |
| Ashland | Water treatment chemicals for use in industrial applications | USA | 2,860 | 8,106 | 20% | O | 10.0 | 0.3 |
| Asia Environment Holdings Ltd. | Water and wastewater treatment | SGP | 96 | 93 | 100% | N/A | 7.2 | 1.3 |
| Asia Water Technology Ltd. | Water purification and wastewater treatment systems | SGP | 28 | 59 | 100% | N/A | N/A | N/A |
| Badger Meter | Electronic flow measurement and control products | USA | 573 | 262 | 80% | N/A | 19.6 | 2.0 |
| Balfour Beatty Plc | Building water infrastructure | GBR | 3,176 | 14,711 | <5% | N/A | 7.9 | 0.2 |
| Beijing Capital | Urban water supply, wastewater treatment | CHN | 2,336 | 263 | 75% | N/A | 44.1 | 7.7 |
| Bio-Treat Technology Ltd | Water and wastewater treatment; operations mainly concentrated in China | SGP | 43 | 79 | 100% | N/A | N/A | N/A |
| Brite-Tech | Chemical products for water and wastewater treatment plus consultation, design, construction and installation of water purification, water recycling and wastewater treatment systems. | MAL | 8 | 5 | N/A | N/A | N/A | N/A |
| Brookfield Asset Management | One of the largest private owners/operators of hydroelectric facilities in the Americas | CAN | 12,274 | 12,742 | 8% | N | 33.2 | 1.0 |
| Brookfield Renewable Power Fund | Owns and operates 42 hydroelectric and 1 wind power generator. | CAN | 1,844 | 199 | 100% | N | 15.1 | 4.9 |

*Source: © 2009 Reuters Limited, I/B/E/S International for all P/E and P/sales estimates, Company data, Credit Suisse estimates*

**Figure 74: Universe of water-related stocks, continued**

| Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|
| BWT Aktiengesellschaft | Filtration, limescale protection, softening, dosing, disinfection and membrane technology. Also offers materials for the removal of heavy metals. | AUT | 524 | 587 | N/A | N/A | 18.1 | 0.8 |
| Calgon Carbon | Active Carbon water filtration systems | USA | 777 | 404 | 55% | N/A | 17.2 | 1.6 |
| California Water Service Co | Water and wastewater utility services mainly along the West coast states of the US and Haiwaii | USA | 751 | 435 | N/A | N/A | 16.7 | 1.5 |
| Canadian Hydro Developers | Developer, owner and operator of EcoPower stations, including 12 run of river hydroelectric operations. | CAN | 736 | 85 | 29% | N | 17.3 | 4.4 |
| Carillion Plc | Building water infrastructure | GBR | 2,083 | 7,589 | <5% | N/A | 8.1 | 0.3 |
| Cascal | Provides water and wastewater services to just over 4 million customers in seven countries: the United Kingdom, China, South Africa, Chile, Indonesia, Panama and The Philippines | USA | 174 | 130 | N/A | O | 9.2 | 0.9 |
| Chen Full International | Provides pipeline systems and system integration services, sewerage treatment services, water purification services, and trades in pipe fittings; amongst other activities. | TAI | 85 | 66 | N/A | N/A | N/A | N/A |
| China Water Affairs | Urban water supply, sewerage treatment, and water ecology preservation, as well as installing meters to industrial and residential users and undertaking water related construction projects | HKG | 447 | 133 | 63% | N/A | 10.6 | 1.9 |
| China Water Industry Group Ltd. | Involved in the production, supply, and sale of water; installation and modification of water meters and related services and construction of water supply and sewerage treatment infrastructures. | HKG | 98 | 29 | 100% | N/A | N/A | N/A |
| Coca-Cola Amital | Soft drinks | AUS | 7,424 | 3,999 | 13% | N | 15.9 | 1.7 |
| Coca-Cola Co | Soft drinks | USA | 131,477 | 30,606 | 5-10% | O | 16.5 | 4.0 |
| Coca-Cola Femsa | Bottling | MEX | 1,471 | 7,219 | 17% | OP | 14.2 | 0.2 |
| Coca-Cola Hellenic Bottling Co | Soft drinks bottling | GRE | 9,327 | 10,321 | 21% | N | 13.7 | 0.9 |
| Connecticut Water | Water and wastewater utility services for 54 towns in Connecticut, US | USA | 196 | 60 | N/A | N/A | 20.4 | 3.0 |
| Consolidated Water | Water production and distribution systems | USA | 195 | 72 | 100% | N/A | 16.6 | 3.0 |
| Copasa | Brazilian based water and wastewater utility | BRA | 2,051 | 1,255 | 100% | N/A | 6.3 | 1.4 |
| Costain Group Plc | Building water infrastructure | GBR | 293 | 1,588 | <5% | N/A | 12.6 | 0.2 |
| Cott Corp Que | Soft drinks | CAN | 735 | 1,708 | 15% | N/A | 11.5 | 0.4 |
| Crane Co | Valves, pumps | USA | 1,737 | 2,241 | 44% | N/A | 13.0 | 0.8 |
| Crane Group | PVC pipes | AUS | 648 | 1,916 | 35% | U | 11.5 | 0.3 |
| Danaher Corp | Water testing – manufactures and markets a range of analytical instruments, related consumables and associated services that detect and measure chemical, physical and microbiological parameters in water. | USA | 23,476 | 11,229 | 8% | N/A | 18.7 | 1.9 |
| Danone | Soft drinks | FRA | 42,239 | 22,406 | 18% | O | 16.2 | 1.8 |
| Darco Water Technologies Ltd. | Designs and builds water systems for industrial applications; services and maintains product water and wastewater systems and trades and supplies chemicals, electrical controls and related instruments used in water treatment systems. | SGP | 16 | 58 | 100% | N/A | N/A | N/A |
| Dayen Environmental Ltd. | Water and wastewater projects engineering, procurement and construction; plus water supply and wastewater treatment services | SGP | 15 | 21 | 94% | N/A | N/A | N/A |
| Donaldson Company | Manufacturer of filtration systems and replacement parts | USA | 2,927 | 1,869 | 15% | O | 24.4 | 1.6 |
| Dongfang Electric | Hydro power equipment manufacturer in China | HKG | 5,110 | 4,445 | 10% | N | 21.1 | 0.9 |

*Source: © 2009 Reuters Limited, I/B/E/S International for all P/E and P/sales estimates, Company data, Credit Suisse estimates*

**Figure 75: Universe of water-related stocks, continued**

| Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|
| Doosan Heavy Industries & Construction | Desalination plant construction, efforts have been concentrated in the Middle East | KOR | 5,639 | 16,304 | N/A | U | 17.2 | 0.8 |
| Dupont | Drought resistant crops | USA | 31,576 | 25,510 | N/A | O | 15.4 | 1.1 |
| Eastern Water Resources | Mainly involved in providing water pipelines along the East coast of Thailand | THA | 208 | 79 | N/A | N/A | 7.8 | 2.4 |
| Ebara | Manufactures transfer machinery for fluids and gaseous substances for a wide range of industrial and chemical processes, including for use in waterworks systems, sewerage systems and industrial water/wastewater treatment plants. | JAP | 1,685 | 5,485 | 53% | N | 23.0 | 0.3 |
| Embotelladora Andina SA | Bottling | CHL | 1,255 | 1,567 | 3% | N | 13.9 | 1.4 |
| Embotelladoras Arca SA | Bottling | MEX | 2,313 | 1,747 | 7% | N/A | 10.7 | 1.1 |
| Emera | Operates electricity generation (including hydro-electric) assets as well as transmission and distribution systems and natural gas pipelines. | CAN | 2,555 | 1,291 | N/A | N | 15.6 | 1.9 |
| Emerson | Automation, valves, pumps, instruments | USA | 31,867 | 20,915 | N/A | N/A | 16.5 | 1.4 |
| Energy Recovery Inc | Engaged in developing and manufacturing energy recovery devices in the seawater desalination industry | USA | 279 | 53 | 100% | O | 37.3 | 4.8 |
| Engtex Group Berhad | Water piping systems | MYS | 65 | 182 | N/A | N/A | 8.9 | 0.4 |
| Epure International Ltd. | Water and wastewater treatment technology and projects construction | SGP | 559 | 161 | 100% | N | 11.8 | 2.5 |
| Eurodrip Irrigation Systems | Drip irrigation provider | GRE | 52 | 93 | N/A | N/A | N/A | N/A |
| FEMSA | Soft drinks | MEX | 9,448 | 14,101 | 15% | N/A | 16.8 | 0.6 |
| Flowserve Corp | Manufacturer of specialised pumps, valves and seals that are essential to water infrastructure projects (mostly desalination) | USA | 5,978 | 4,335 | 12% | O | 14.3 | 1.5 |
| Fomento de Construcciones y Contratas SA | Construction | ESP | 5,637 | 19,325 | 6% | U | 12.2 | 0.3 |
| Fortis Inc. | Fortis owns non-regulated generation assets, primarily hydroelectric, across Canada, and in Belize and Upper New York State. | CAN | 4,340 | 3,639 | N/A | N | 16.5 | 1.1 |
| Fugro NV | Geological data used in dam positioning | NLD | 4,820 | 3,271 | N/A | N/A | 13.8 | 1.5 |
| G.U.D. Holdings | Pumps, purification | AUS | 508 | 427 | 30% | N | 12.4 | 1.1 |
| Gammon India Ltd | Hydro plant construction | IND | 562 | 556 | N/A | O | 27.5 | 0.5 |
| Gamuda Berhad | Water treatment | MYS | 1,856 | 797 | 12% | O | 15.4 | 1.9 |
| Geberit AG | Water saving devices | SWI | 7,167 | 2,101 | 100% | N | 17.7 | 3.5 |
| Generale de Geophysique | Geological data used in dam positioning | FRA | 3,421 | 3,990 | N/A | U | 30.0 | 1.0 |
| Georg Fischer | Plastic and metal pipes and fittings. | SWI | 1,132 | 3,478 | 18-20% | N | 4.3 | 0.2 |
| GLV | Operates in two segments: the Water Treatment Group, and Pulp and Paper Group. In water, the group specialises in treatment and recycling of wastewater and water used in various industrial processes. It also offers water-intake screening for power stations, refineries and desalination plants. | CAN | 255 | 534 | 49% | N/A | 16.0 | 0.4 |
| Grupo Continental | Soft drinks | MEX | 1,789 | 1,002 | 31% | O | 11.9 | 1.6 |
| Guangdong Investment | Water distribution and electric power generation | HKG | 3,480 | 1,001 | 53% | O | 11.8 | 3.3 |
| GWA International | Toilets, cisterns, taps, showerheads, hot water systems | AUS | 809 | 618 | 75% | N | 12.8 | 1.1 |
| H2O Innovation | Water treatment technology including membrane filtration | CAN | 31 | 29 | N/A | N/A | N/A | N/A |
| Halma Plc | Water leak detection systems | GBR | 1,529 | 757 | 9% | N/A | 14.5 | 2.0 |

*Source: © 2009 Reuters Limited, I/B/E/S International for all P/E and P/sales estimates, Company data, Credit Suisse estimates*

**Figure 76: Universe of water-related stocks, continued**

| Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|
| Harbin Power Equipment Co Ltd | Hydro turbines | HKG | 650 | 4,378 | 10% | U | 11.4 | 0.2 |
| Heijmans NV | Infrastructure including bridges and floodgates | NLD | 353 | 5,058 | N/A | N/A | 9.7 | 0.1 |
| Hindustan Construction Company | Hydro plant construction and irrigation schemes | IND | 943 | 757 | N/A | N/A | 28.2 | 0.9 |
| Homeserve Plc | Fixing plumbing and drainage | GBR | 1,755 | 859 | N/A | N/A | 13.1 | 2.4 |
| Honeywell | automation, instruments, valves, water test | USA | 30,415 | 31,548 | N/A | N/A | 15.3 | 0.9 |
| Hongkong & China Gas | Water supply and wastewater treatment | HKG | 15,544 | 1,558 | 3% | N | 26.3 | 8.8 |
| Hopewell Highway Infrastructure Ltd | Infrastructure in China | HKG | 1,758 | 390 | N/A | N/A | 12.5 | 6.0 |
| Horiba | In the past, water quality analysis equipment for regulatory compliance was the mainstream, but likely to expand in the direction of industrial process monitoring (including for water supply processes). | JAP | 1,022 | 1,309 | 4% | N/A | 25.2 | 0.8 |
| Hydro International | Research and development of systems for stormwater management and the removal of trash, oil and sediment from these flows | GBR | 24 | 54 | 100% | N/A | 8.0 | 0.4 |
| Hyflux | Seawater desalination, wastewater reclamation, water recycling, and raw water purification | SGP | 1,157 | 415 | 30% | O | 20.5 | 2.5 |
| Idex Corp | Pump products | USA | 2,526 | 1,342 | 38% | N/A | 17.7 | 1.8 |
| Impreglio | Hydroelectric plants | ITL | 1,492 | 4,431 | N/A | N/A | 10.9 | 0.4 |
| Insituform Technologies | Repairs sewers, tunnels, and pipelines | USA | 850 | 586 | 100% | N/A | 16.8 | 1.0 |
| International Power | Principally concerned with power generation but also has interests in desalination | GBR | 6,878 | 6,554 | 12% | O | 9.7 | 1.2 |
| Inversiones Aguas Metropolitanas | Water Utilities | CHL | 1,251 | 650 | N/A | N/A | 11.6 | 1.8 |
| Ion Exchange (India) Ltd. | Engaged in providing solutions that purify and recycle water and minimise the discharge of pollutants into seas, rivers and lakes. | IND | 34 | 105 | N/A | N/A | N/A | N/A |
| Ishikawajima-Harima Heavy Industries | Dam construction, plus desalination plant construction | JAP | 2,727 | 14,855 | N/A | O | 17.2 | 0.2 |
| Itron Inc | Water meters | USA | 2,564 | 1,643 | N/A | N/A | 21.3 | 1.4 |
| ITT Corp | Water and wastewater treatment systems, pumps and related technologies, and other water and fluid control products with residential, commercial and industrial applications | USA | 9,818 | 10,980 | 40% | N/A | 13.3 | 0.9 |
| IVRCL Infrastructures and Projects Ltd | Present across the value chain including water pipelines, irrigation projects, water desalination | IND | 1,154 | 1,053 | 65% | O | 16.9 | 0.7 |
| Jacobs Engineering Group | Engineering, R&D services; process plant maintenance services, wastewater plant construction | USA | 5,637 | 12,111 | 5% | O | 15.5 | 0.5 |
| Jain Irrigation | Drip irrigation provider | IND | 1,428 | 598 | N/A | N/A | 18.7 | 1.4 |
| Jaiprakash Associates Ltd | Dams, power stations and sewerage schemes | IND | 7,118 | 1,015 | N/A | O | 21.2 | 2.9 |
| JAKS Resources Berhad | Water piping systems | MYS | 102 | 73 | N/A | N/A | 20.1 | 1.0 |
| Jiangxi Hongcheng Waterworks | Potable water production and supply, plus wastewater treatment and meter installation | CHN | 237 | 31 | 99% | N/A | N/A | N/A |
| Jindal Saw Ltd | Water piping systems | IND | 953 | 1,093 | 40% | N | 9.7 | 0.7 |
| Kawasaki Heavy Industries | Dam construction | JAP | 3,870 | 14,271 | N/A | U | 20.8 | 0.3 |
| Kubota | As well as farm equipment, Kubota also produces pipes and related equipment for water supply. More recently the company has been developing products for overseas markets and has established a sales promotion project for water treatment in Asia. | JAP | 11,317 | 11,490 | 20% | N | 18.3 | 0.9 |
| Kurimoto | Steel pipe, ductile iron pipe and dam construction | JAP | 128 | 1,699 | 28% | N/A | 39.7 | 0.1 |

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**Figure 77: Universe of water-related stocks, continued**

| Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|
| Kurita Water Industries | Expanding business in China and Southeast Asia; developing business in ultra-pure water, wastewater, water recycling and functional cleaning water, particularly for customers in the nuclear industry. | JAP | 4,327 | 2,155 | 100% | N | 21.3 | 2.0 |
| Leighton Holdings | Engineering construction | AUS | 10,658 | 12,055 | 10% | N | 16.6 | 0.6 |
| Lindsay Corp | Manufacturer of centre pivot/lateral move irrigation equipment | USA | 451 | 336 | 86% | N/A | 20.6 | 1.1 |
| Lotte Chilsung Beverage Co | Soft drinks | KOR | 878 | 1,057 | N/A | N/A | 14.2 | 0.8 |
| Macquarie International Infrastructure Fund Limited | Water Utilities | SGP | 389 | 8 | N/A | N/A | 7.5 | 4.3 |
| Manila Water Company | Water Utilities | PHIL | 689 | 185 | N/A | N/A | 10.8 | 3.0 |
| Meidensha | Water and wastewater systems. | JAP | 1,037 | 2,022 | N/A | N/A | 56.7 | 0.5 |
| Middlesex Water | owns and operates regulated water utility and wastewater systems in New Jersey and Delaware. | USA | 222 | 91 | N/A | N/A | 19.5 | 2.2 |
| Millipore | Membrane water filtration systems | USA | 3,812 | 1,608 | 15% | N/A | 15.5 | 2.2 |
| Mitsubishi Heavy Industries | Dam and desalination construction | JAP | 11,408 | 36,214 | N/A | O | 37.9 | 0.3 |
| Mitsubishi Rayon | Plans to double FY3/10 production capacity for hollow fibre membranes used in sewerage treatment | JAP | 1,821 | 3,487 | 3% | R | 34.5 | 0.4 |
| Mitsui Engineering & Shipbuilding | Dam construction, plus water treatment and desalination | JAP | 2,196 | 8,052 | N/A | N/A | 12.1 | 0.3 |
| Modern Water | Developing and deploying technology-based solutions for fresh water and treatment of wastewater including desalination | GBR | 68 | - | 100% | N/A | N/A | N/A |
| Monsanto | Drought resistant crops | USA | 40,895 | 11,689 | N/A | N | 16.7 | 3.1 |
| Mueller Water Products | Valves, pipes | USA | 548 | 1,550 | 100% | N/A | 16.0 | 0.3 |
| Nalco Holding Co | Offers a full water treatment chemical package to the industrial arena | USA | 3,364 | 3,769 | 100% | N | 18.8 | 0.8 |
| Nanhai Development Co Ltd | Potable water production and supply, plus wastewater treatment. | CHN | 443 | 64 | 98% | N/A | 29.8 | 5.5 |
| Nestle Malaysia Bhd | soft drinks | MYS | 2,272 | 1,101 | N/A | N/A | 20.0 | 1.9 |
| Nestle SA | soft drinks | SWI | 173,505 | 107,490 | 8% | O | 15.2 | 1.6 |
| Nippon Chutetsukan | Steel and ductile iron pipe | JAP | 45 | 185 | 70% | N/A | N/A | N/A |
| Nitto Denko | RO membranes, on a par with DOW. | JAP | 5,467 | 5,854 | 4% | O | 13.9 | 0.8 |
| Northumbrian Water Group | Water Utilities | GBR | 2,101 | 1,152 | 97% | U | 11.8 | 1.8 |
| Northwest Pipe Co | Steel pipes used primarily in water infrastructure | USA | 245 | 390 | 70% | N/A | 11.7 | 0.7 |
| Novozymes A/S | A biotechnology company, engaged in the production and sale of industrial enzymes and micro-organisms including for wastewater treatment. | DNK | 5,461 | 1,662 | N/A | N/A | 23.6 | 3.0 |
| NWS Holdings | Water and wastewater treatment | HKG | 4,116 | 2,226 | 5% | N | 13.2 | 1.7 |
| Oman National Engineering and Investment Company SAOG | Operation and maintenance of desalination and wastewater treatment plants, plus pipeline constructions, meter reading and billing and collection for electricity and water services. The Company also manufactures desalination plants, pressure vessels, steel structures and electrical gears. | OMA | 57 | N/A | N/A | N/A | N/A | N/A |
| Onesteel Ltd | Steel and tube piping | AUS | 3,908 | 6,596 | 5% | U | 10.7 | 0.5 |
| Organo | Industrial wastewater treatment equipment, including pumping equipment and ground water and soil remediation systems. | JAP | 388 | 788 | N/A | N/A | N/A | N/A |
| Pall Corp | Filtration products | USA | 4,077 | 2,329 | 17% | N | 15.0 | 1.5 |

*Source: © 2009 Reuters Limited, I/B/E/S International for all P/E and P/sales estimates, Company data, Credit Suisse estimates*

**Figure 78: Universe of water-related stocks, continued**

| Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|
| Pan Asian Water Solutions | Water piping systems | SGP | 8 | 75 | 95% | N/A | N/A | N/A |
| Patel Engineering | Civil construction and engineering including hydro plant construction | IND | 689 | 507 | N/A | N/A | 14.1 | 0.9 |
| PBA Holdings Berhad | Water supply | MYS | 95 | 53 | 95% | N/A | 17.3 | 1.5 |
| Pennichuck Water | engaged primarily in the collection, storage, treatment and distribution of potable water in New Hampshire. | USA | 101 | 32 | N/A | N/A | 30.9 | 2.8 |
| Pennon Group | Water Utilities | GBR | 2,733 | 1,582 | 72% | N | 14.1 | 1.5 |
| Pentair Inc | Pumps and filtration products | USA | 3,150 | 2,758 | 70% | N | 17.3 | 1.1 |
| Pepsico Inc | soft drinks | USA | 97,419 | 42,664 | 5% | O | 14.8 | 1.9 |
| Puncak Niaga Holdings Berhad | Involved in the operation, maintenance, management, construction, rehabilitation and refurbishment of water treatment facilities, and the supply and distribution of treated water. | MYS | 397 | 481 | 94% | N/A | 8.2 | 0.6 |
| Qatar Electricity & Water | Owns and operates power generation and water desalination plants. | QTR | 2,643 | 695 | 35% | N/A | 8.4 | 3.0 |
| Qianjiang Water Resources | Water supply and pipeline construction | CHN | 541 | 85 | 44% | N/A | N/A | N/A |
| Ranhill Berhad | Raw water and water supply, wastewater treatment | MYS | 304 | 186 | 38% | N/A | N/A | N/A |
| Renishaw Plc | High technology precision measuring and calibration equipment | GBR | 711 | 284 | N/A | N/A | 26.2 | 2.4 |
| Roper Industries Inc | Industrial controls | USA | 4,917 | 2,072 | N/A | N/A | 18.9 | 2.2 |
| Rotork | Manufacture/support of actuators to the valve industry | GBR | 1,837 | 591 | N/A | N/A | 18.0 | 3.0 |
| Sabesp | Water and wastewater services across the state of Sao Paulo | BRA | 4,679 | 3,695 | 100% | N | 6.2 | 1.1 |
| Salcon | Water and wastewater treatment | MAL | 83 | 98 | N/A | N/A | 9.9 | 0.7 |
| Sany Heavy Industry Co | Construction machinery | CHN | 8,455 | 2,057 | N/A | O | 22.7 | 2.6 |
| Sasakura Engineering | Desalination equipment | JAP | 129 | 174 | 57% | N/A | N/A | N/A |
| Sasebo Heavy Industries | Dam construction | JAP | 354 | 803 | N/A | N/A | 12.5 | 0.5 |
| Saudi Industrial Services Company (Sisco) | Construction (including desalination plants) and plant machinery | SAU | 277 | 20 | N/A | N/A | N/A | N/A |
| Sembcorp Industries | Provides centralised utilities (energy and water) to industrial and other customers in Singapore, UK, Asia and the Middle East. | SGP | 4,473 | 7,006 | <5% | N | 11.1 | 0.6 |
| Severn Trent | Water Utilities | GBR | 3,948 | 2,726 | 97% | N | 12.0 | 1.4 |
| Shanghai Electric Group Co Ltd | Wastewater treatment equipment, projects engineering and construction | HKG | 1,485 | 8,345 | 4% | R | 15.6 | 0.2 |
| Shanghai Industrial Holdings | Raw water and tap water supply, wastewater treatment | HKG | 5,461 | 1,551 | 4% | N/A | 12.5 | 2.5 |
| Shanghai Municipal Raw Water | Raw water and tap water supply, wastewater transfer and pipeline construction | CHN | 4,639 | 575 | 100% | N/A | 27.1 | 5.9 |
| Shanghai Youngsun Investment | Principally engaged in wastewater treatment services in Southern and Eastern China | CHN | 76 | 28 | 93% | N/A | N/A | N/A |
| Siemens | Filtration products plus hydro power equipment manufacturer | GER | 90,172 | 117,007 | N/A | O | 14.0 | 0.8 |
| Sinomem Technology Ltd | Membrane technology, wastewater treatment/recycling | SGP | 214 | 77 | 70% | N/A | 7.9 | 1.9 |
| Suez Environnement | Water Treatment | FRA | 11,223 | 18,172 | 51% | U | 16.3 | 0.6 |
| Syngenta | Drought resistant crops | SWI | 24,419 | 11,878 | N/A | O | 14.2 | 2.1 |
| Techem Group | Manufactures energy and water measuring and billing devices | GER | 2,186 | 1,000 | N/A | N/A | N/A | N/A |
| Tetra Tech Inc | Consulting, resource management | USA | 1,642 | 2,362 | 85% | N/A | 16.8 | 0.9 |

*Source: © 2009 Reuters Limited, I/B/E/S International for all P/E and P/sales estimates, Company data, Credit Suisse estimates*

**Figure 79: Universe of water-related stocks, continued**

| Company | Description | Main listing | Mkt Cap (US$mn) | 2008 revenue (US$mn) | % 2008 sales related to water | Rating | P/E 2010E | P/Sales 2010E |
|---|---|---|---|---|---|---|---|---|
| Thai Tap Water Supply Co | Production and distribution of potable water in Thailand | THA | 505 | 115 | 100% | N | 9.2 | 4.0 |
| Therm Electron Corp | Water quality testing and monitoring | USA | 18,578 | 9,927 | N/A | N/A | 13.3 | 1.7 |
| Tianjin Capital Environmental Protection | Wastewater treatment and reclamation and potable water supply | CHN | 111 | 172 | 92% | N/A | 14.7 | 0.6 |
| Tianjin Development Holdings Ltd | Tap water supply | HKG | 730 | 494 | 8% | N/A | 11.2 | 1.3 |
| Tingyi | Bottled water and noodle supplier | HKG | 13,163 | 4,735 | 50% | N | 29.8 | 2.1 |
| Toray | World no. 3 in the production of water treatment membranes; aims for ¥67.0bn sales in FY3/11, ¥100.0bn in FY3/16 | JAP | 7,375 | 15,044 | 4% | U | 46.7 | 0.5 |
| Torishima Pump Mfg. | Seawater pumping equipment | JAP | 530 | 512 | 35% | N/A | 19.4 | 1.0 |
| Toyobo | Membrane and filtration products | JAP | 1,160 | 3,786 | 1% | N/A | 24.9 | 0.3 |
| TransAlta | Operates electricity generation (including hydro-electric) assets | CAN | 4,405 | 2,769 | N/A | N | 14.8 | 1.4 |
| TransCanada | An energy infrastructure company focused on pipelines and energy generation | CAN | 21,097 | 8,430 | N/A | N | 14.8 | 2.4 |
| Transfield Services | Ops and maintenance, asset ownership | AUS | 1,628 | 3,084 | 8% | N/A | 13.4 | 0.5 |
| Trimble Navigation Ltd | Electronic products including field levelling equipment to improve water efficiency | USA | 2,889 | 1,117 | N/A | N/A | 18.0 | 2.3 |
| Tyco | Valves, engineering and consulting | USA | 17,532 | 18,100 | N/A | N/A | 12.4 | 0.9 |
| United Envirotech Ltd. | Membrane systems, wastewater treatment | SGP | 104 | 27 | 14% | N/A | N/A | N/A |
| United Group Ltd | Project design, construction management, operations and Maintenance | AUS | 2,153 | 4,330 | 13% | O | 13.8 | 0.5 |
| United Utilities | Multi-Utilities | GBR | 5,390 | 4,042 | 92% | O | 11.7 | 1.3 |
| URS Corp | Construction management services and pollution control | USA | 3,789 | 10,115 | 5% | N | 13.7 | 0.4 |
| Veolia Environnement | Multi-Utilities | FRA | 17,072 | 52,915 | 44% | N | 16.2 | 0.3 |
| Washtec AG | Water efficient car washing systems | DEU | 147 | 397 | N/A | N/A | 9.3 | 0.4 |
| Watts Water Technologies | Instruments for water regulation and control | USA | 931 | 1,250 | 100% | N/A | 18.9 | 0.7 |
| Woongjin Coway Co Ltd | Develops and manufactures environment-related products, such as water purifiers, air cleaners, and water softeners. In addition, the company provides water testing services. | KOR | 2,613 | 1,886 | N/A | N/A | 16.0 | 1.9 |
| WS Atkins Plc | Engineering and advanced technology consultancy | GBR | 961 | 2,469 | N/A | N/A | 8.5 | 0.4 |
| Wuhan Sanzhen Industry Holding Co | Tap water production & supply and wastewater treatment | CHN | 516 | 34 | 57% | N/A | N/A | N/A |
| Xinjiang Tianye Water Saving Systems | Drip irrigation provider | HKG | 25 | 97 | N/A | N/A | N/A | N/A |
| YLI Holdings Berhad | Water piping systems, treatment equipments | MYS | 26 | 36 | N/A | N/A | N/A | N/A |
| York Water | which covers 39 municipalities within York County, Pennsylvania, and seven municipalities within Adams County, Pennsylvania | USA | 180 | 35 | N/A | N/A | 20.3 | 4.5 |
| YTL Power International Berhad | Water supply and wastewater treatment | MYS | 3,868 | 1,781 | 41% | N | 12.5 | 1.2 |

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**Companies Mentioned** *(Price as of 16 Nov 09)*
3M (MMM, $78.78, NEUTRAL, TP $90.00)
ABB (ABBN.VX, SFr19.41, UNDERPERFORM [V], TP SFr16.50, UNDERWEIGHT)
Acciona SA (ANA.MC, Eu90.50, OUTPERFORM [V], TP Eu107.00, MARKET WEIGHT)
Alesco Corporation (ALS.AX, A$4.99, OUTPERFORM [V], TP A$6.42)
Alstom (ALSO.PA, Eu48.58, NEUTRAL [V], TP Eu54.00, UNDERWEIGHT)
Anheuser-Busch InBev (ABI.BR, Eu34.10, OUTPERFORM, TP Eu38.00, OVERWEIGHT)
Ashland Inc. (ASH, $38.03, OUTPERFORM [V], TP $44.00)
Brookfield Asset Management (BAM, $21.37, NEUTRAL [V], TP $24.00)
Brookfield Renewable Power Fund (BRC_u.TO, C$18.75, NEUTRAL, TP C$18.00)
Canadian Hydro Developers (KHD.TO, C$5.24, NEUTRAL [V], TP C$5.25)
Carlsberg (CARLb.CO, DKr362.00, NEUTRAL [V], TP DKr400.00, OVERWEIGHT)
Cascal N.V. (HOO, $5.72, OUTPERFORM [V], TP $5.20, MARKET WEIGHT)
CGGVeritas (GEPH.PA, Eu15.16, UNDERPERFORM [V], TP Eu15.00, MARKET WEIGHT)
Coca-Cola Amatil (CCL.AX, A$10.54, NEUTRAL, TP A$10.85)
Coca-Cola Femsa SAB de CV (KOF, $56.36, OUTPERFORM, TP $59.00)
Coca-Cola Hellenic (HLB.AT, Eu17.05, NEUTRAL, TP Eu19.50, OVERWEIGHT)
Crane Group (CRG.AX, A$8.80, UNDERPERFORM, TP A$8.50)
Danone (DANO.PA, Eu43.42, OUTPERFORM, TP Eu46.00, MARKET WEIGHT)
Diageo (DGE.L, p1033.00, OUTPERFORM, TP p1050.00, OVERWEIGHT)
Donaldson Company, Inc. (DCI, $41.37, OUTPERFORM, TP $49.00)
Dongfang Electric Corp (1072.HK, HK$44.30, NEUTRAL [V], TP HK$37.00)
Doosan Heavy Industries & Construction (034020.KS, W62,900, UNDERPERFORM [V], TP W51,000)
Dow Chemical Company (DOW, $29.42, OUTPERFORM [V], TP $39.00)
E.I. du Pont de Nemours and Company (DD, $35.29, OUTPERFORM [V], TP $36.00)
Ebara (6361, ¥355, NEUTRAL [V], TP ¥450, OVERWEIGHT)
Embotelladora Andina (ANDINAB, $3.30, NEUTRAL, TP $3.30)
Emera Inc. (EMA.TO, C$23.70, NEUTRAL, TP C$24.00)
Energy Recovery Inc. (ERII, $5.55, OUTPERFORM [V], TP $7.00)
Epure International Ltd (EPIL.SI, S$.60, NEUTRAL [V], TP S$.27)
Flowserve Corp. (FLS, $106.48, OUTPERFORM [V], TP $120.00)
Fomento de Construcciones (FCC.MC, Eu29.32, UNDERPERFORM, TP Eu27.00, OVERWEIGHT)
Fortis Inc. (FTS.TO, C$26.90, NEUTRAL, TP C$27.50)
G.U.D. Holdings (GUD.AX, A$8.93, NEUTRAL [V], TP A$9.30)
Gammon India Ltd (GAMM.BO, Rs237.70, OUTPERFORM [V], TP Rs135.00)
Gamuda (GAMU.KL, RM3.11, OUTPERFORM [V], TP RM3.80)
Geberit (GEBN.VX, SFr175.10, NEUTRAL, TP SFr160.00, UNDERWEIGHT)
Georg Fischer (FIN.S, SFr280.75, NEUTRAL [V], TP SFr570.00, OVERWEIGHT)
Grupo Continental, SAB (CONTAL, $2.34, OUTPERFORM, TP $3.00)
Guangdong Investment (0270.HK, HK$4.37, OUTPERFORM, TP HK$4.47)
GWA International (GWT.AX, A$2.83, NEUTRAL [V], TP A$3.00)
Harbin Power Equipment (1133.HK, HK$7.54, UNDERPERFORM [V], TP HK$6.20)
Heineken (HEIN.AS, Eu31.48, NEUTRAL, TP Eu35.00, OVERWEIGHT)
Hong Kong and China Gas (0003.HK, HK$18.34, NEUTRAL, TP HK$13.90)
Hyflux Ltd (HYFL.SI, S$3.07, OUTPERFORM [V], TP S$4.10)
IHI Corporation (7013, ¥166, OUTPERFORM [V], TP ¥300)
International Power (IPR.L, p271.00, OUTPERFORM, TP p310.00, MARKET WEIGHT)
IVRCL Infrastructures and Projects Ltd (IVRC.BO, Rs386.15, OUTPERFORM [V], TP Rs371.00)
Jacobs Engineering (JEC, $38.88, OUTPERFORM [V], TP $45.00)
Jaiprakash Associates Ltd. (JAIA.BO, Rs234.75, OUTPERFORM [V], TP Rs281.00)
Jindal Saw Ltd (JIND.BO, Rs819.00, NEUTRAL [V], TP Rs715.00)
Kawasaki Heavy Industries (7012, ¥207, UNDERPERFORM [V], TP ¥230)
Kubota (6326, ¥777, NEUTRAL [V], TP ¥750, OVERWEIGHT)
Kurita Water Industries (6370, ¥2,870, NEUTRAL [V], TP ¥2,800)
Leighton Holdings (LEI.AX, A$37.14, NEUTRAL [V], TP A$38.00)
Mitsubishi Heavy Industries (7011, ¥302, OUTPERFORM, TP ¥600)
Mitsubishi Rayon (3404, ¥267, RESTRICTED)
Monsanto Company (MON, $77.33, NEUTRAL [V], TP $86.00)
Nalco Holding Company (NLC, $24.48, NEUTRAL [V], TP $25.00)
Nestle (NESN.VX, SFr48.22, OUTPERFORM, TP SFr55.00, MARKET WEIGHT)
Nitto Denko Corp (6988, ¥2,735, OUTPERFORM [V], TP ¥4,000, MARKET WEIGHT)
Northumbrian Water (NWG.L, p241.50, UNDERPERFORM, TP p256.00, MARKET WEIGHT)
NWS Holding Ltd (0659.HK, HK$15.52, NEUTRAL [V], TP HK$14.55)

OneSteel (OST.AX, A$3.03, UNDERPERFORM [V], TP A$3.26)
Pall Corporation (PLL, $34.62, NEUTRAL, TP $28.00)
Pennon Group (PNN.L, p474.00, NEUTRAL, TP p520.00, MARKET WEIGHT)
Pentair, Inc. (PNR, $31.80, NEUTRAL, TP $33.00)
PepsiCo, Inc. (PEP, $62.60, OUTPERFORM, TP $70.00)
Pernod-Ricard (PERP.PA, Eu58.37, UNDERPERFORM, TP Eu51.00, OVERWEIGHT)
RWE (RWEG.F, Eu62.40, UNDERPERFORM, TP Eu53.00, MARKET WEIGHT)
SAB Miller Plc (SAB.L, p1682.00, OUTPERFORM, TP p1900.00, OVERWEIGHT)
Sabesp (SBSP3, $19.67, NEUTRAL [V], TP $26.00)
Sany Heavy Industry (600031.SS, Rmb38.33, OUTPERFORM [V], TP Rmb43.99)
Sembcorp Industries Limited (SCIL.SI, S$3.47, NEUTRAL, TP S$3.50)
Severn Trent (SVT.L, p1005.00, NEUTRAL, TP p1045.00, MARKET WEIGHT)
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Siemens (SIEGn.DE, Eu64.95, OUTPERFORM, TP Eu76.00, UNDERWEIGHT)
Suez Environnement (SEVI.PA, Eu15.16, UNDERPERFORM, TP Eu12.40, MARKET WEIGHT)
Syngenta (SYNN.VX, SFr258.40, OUTPERFORM, TP SFr270.00, MARKET WEIGHT)
Thai Tap Water (TTW.BK, Bt4.20, NEUTRAL, TP Bt4.80)
The Coca-Cola Company (KO, $56.87, OUTPERFORM, TP $62.00)
Tingyi (0322.HK, HK$18.20, NEUTRAL, TP HK$18.40)
Toray Industries (3402, ¥463, UNDERPERFORM, TP ¥330, MARKET WEIGHT)
TransAlta Corporation (TA.TO, C$21.12, NEUTRAL, TP C$23.50)
TransCanada Corp. (TRP.TO, C$32.55, NEUTRAL, TP C$35.00)
UGL Limited (UGL.AX, A$13.65, OUTPERFORM, TP A$15.70)
Unilever PLC (ULVR.L, p1839.00, UNDERPERFORM, TP p1800.00, MARKET WEIGHT)
United Utilities (UU.L, p475.30, OUTPERFORM, TP p550.00, MARKET WEIGHT)
URS Corporation (URS, $44.82, NEUTRAL [V], TP $50.00)
Veolia Environnement (VIE.PA, Eu23.04, NEUTRAL [V], TP Eu20.70, MARKET WEIGHT)
YTL Power (YTLP.KL, RM2.18, NEUTRAL, TP RM1.86)

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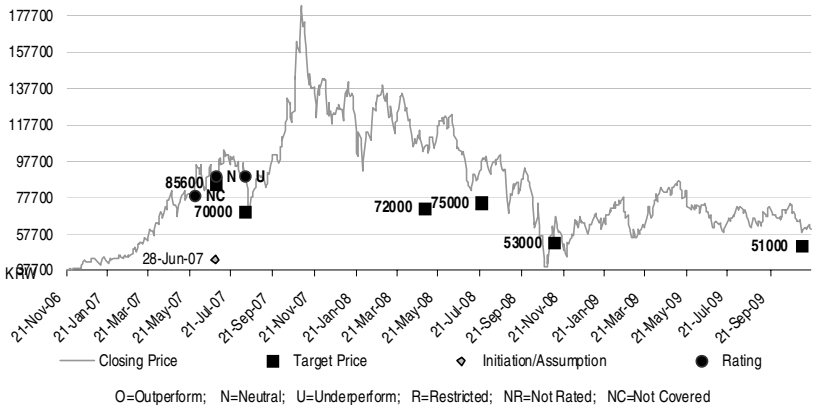
### 3-Year Price, Target Price and Rating Change History Chart for 034020.KS

| 034020.KS Date | Closing Price (KRW) | Target Price (KRW) | Rating | Initiation/ Assumption |
|---|---|---|---|---|
| 28-May-07 | 79000 | | NC | |
| 28-Jun-07 | 89300 | 85600 | N | X |
| 10-Aug-07 | 89500 | 70000 | U | |
| 30-Apr-08 | 105500 | 72000 | | |
| 23-Jul-08 | 97600 | 75000 | | |
| 06-Nov-08 | 52700 | 53000 | | |
| 05-Nov-09 | 59700 | 51000 | | |

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