GPBULLHOUND

INDEPENDENT TECHNOLOGY RESEARCH
SECTOR INITIATION | **NOVEMBER 2011** | CLEANTECH

INNOVATION IN THE WATER SECTOR – **TIME TO DIVE IN?**

The Last Frontier

The Water Sector is increasingly referred to by investors and new entrants as the "Last Frontier" or the "Next Big Thing". As a sector, it is one of the largest with over $400 billion in annual spend but one of the smallest at 3% in terms of VC investment in Cleantech. Why this is so and how the evolving water sector will open up investment opportunities is the subject of this report.

New technologies are the answer to challenges and these will need growth capital. As an industry, Water is complex, fragmented and political and can be treacherous for the unprepared.

Market is Transitioning… At Last

Long held resistance to change is crumbling in the face of mounting drivers of growing demand, the need for efficiencies, and increased quality demands. Acceptance of realistic pricing is taking root in parts and will assist in a "freer" market. A new mindset is taking hold along with fresh interest from diversified corporates.

Required capital is already there for infrastructure, and has even increased recently. In addition, growth capital for technology players is available and at an accelerating pace.

Network management, energy and water recovery from waste and desalination stand out as key attractions.

Expertise is of the Essence

Water technology companies need to secure doable "go to market" strategies, reference sites, intelligent capital and change oriented management. Investors should make sure they pick their targets carefully, share expertise, and have patience.

ANDRE SHORTELL
Andre.Shortell@gpbullhound.com
London: +44 207 101 7598

FLORENT ROULET
Florent.Roulet@gpbullhound.com
London: +44 207 101 7592

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UNDERSTANDING THE STRUCTURE OF THE WATER INDUSTRY

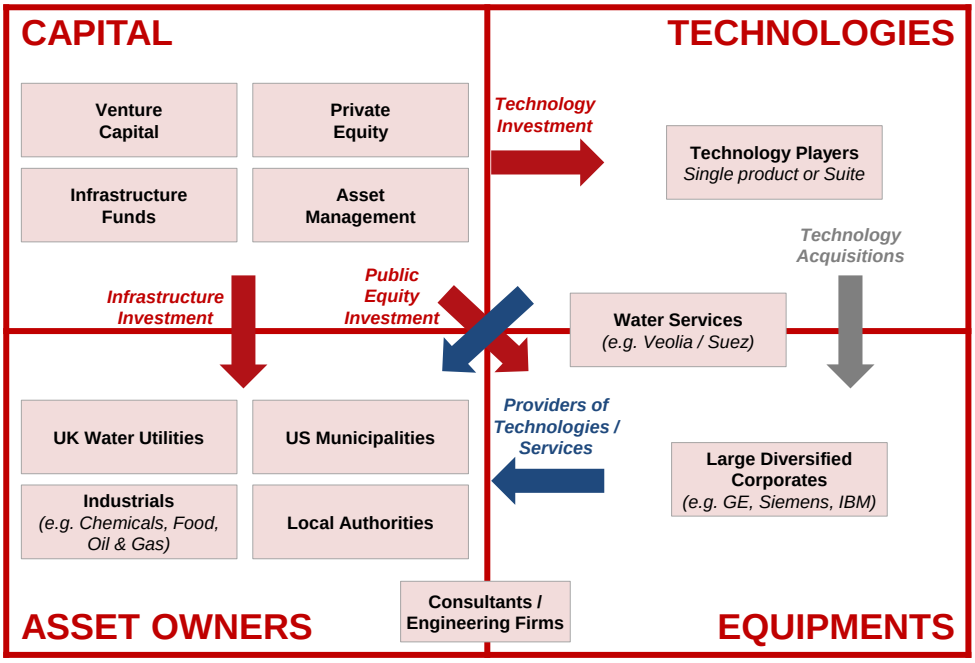
The Water Sector is increasingly referred to by investors and new entrants as the "Last Frontier" or the "Next Big Thing". As a sector, it is one of the largest with over $400 billion in annual spend but one of the smallest at 3% in terms of VC investment in Cleantech in 2010. Why this is so and how the evolving water sector will open up investment opportunities is the subject of this report. Having an accurate and detailed view of the structure of the Water industry is essential as it reveals where the paths for innovation and major hurdles lie.

A Fragmented Industry

The Water industry is large, complex, political, and fragmented. According to Helge Daebel, water sector specialist at Cleantech Venture Capital ("VC") firm Emerald Technology Ventures, "one of the major challenges for this industry and therefore also for investors is its fragmentation, in all dimensions: regulation, supply chains, channels, customers and even value proposition - a single technology often shows a strongly differing value proposition from one region or customer to another."

The industry is essentially local and is divided by geography, by ownership (public and private), regulated and non-regulated, by position in the value chain and by size.

EXHIBIT 1: MARKET LANDSCAPE MATRIX



Source: GP Bullhound

A Different Landscape in Every Geography

According to Lydia Whyatt, Managing Director of the Aqua Resources Fund, “three main landscape models can be identified by different strategies in terms of managing and organizing the Water industry: the North American model based on municipalities, the UK model based on a number of separate Water utilities and the rest-of-the-world model.”

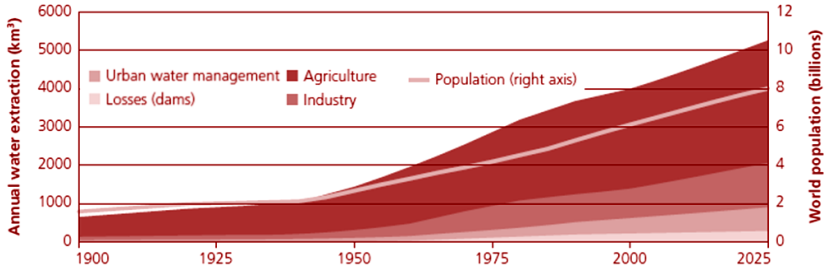
In **North America**, municipalities organize tender processes for their water requirements, but are correctly assumed to have limited knowledge internally. As a consequence, they rely heavily on the expertise of the main independent engineering groups such as CH2M HILL, Black & Veatch or Mott MacDonald. Any new solutions will need to be “approved” first by these engineering groups that act as consultants and gatekeepers to the municipalities. The size of municipalities varies greatly given that it is simply in line with the size of the towns. The fact that there are approximately 55,000 separate municipal water facilities in the US is a good indication of the scale of the market.

In the **UK**, the Water industry is organized under a number of large water and wastewater services firms such as Thames Water, Severn Trent or United Utilities and a second tier of smaller players. They operate under an agreed-in-advance 5-year plan, which sets the total amount of Capex for the period. In terms of Opex, UK water utilities are partially incentivized to improve operating efficiency in comparison to what the plan was originally assumed thanks to innovative technologies. In France as well there is a greater history and acceptance of private companies running water but other European countries such as Germany follow the US model. Privatizations in some cases have even been reversed.

For the **rest of the world** generally, the Water industry is mainly organized around long-term concession agreements with requirements being outsourced to international giants such as France’s Suez Environnement and Veolia Environnement or to local municipal water companies. These firms agree tariffs in advance with their customers, and they are relied upon to make the entire Water value chain and infrastructure run seamlessly.

In the developing economies, for Professor Alexander Zehnder, “there is a tremendous growth and even the larger municipalities are running into problems keeping up with the requirements presented by rapid urbanization and industrialization. Infrastructure costs can be as low as $10,000 per capita but this is still a huge number given the populations and the relative per capita income”. The rush is being led by the global majors. Smaller companies also benefit as they ally with local incumbents to bid on projects with new technologies.

EXHIBIT 2: WATER USE AND GLOBAL POPULATION 1900-2025



Source: Aquastat, UN Population Prospects, SAM 2010 « Water, a market for the future »

The Public Sector: Blocking Innovation

The public sector is conservative and likely to remain so for some time because of some fundamental factors. Firstly, municipal water is for general public use. It must be dependable in terms of availability and certainly quality. As a result no one can afford a failure in quality levels that would lead to illnesses, deaths and in turn, law suits and a loss of voters' support. (Interestingly all municipal water distributed is of drinking quality regardless of the fact that less that 4% is used for drinking or food.) Secondly, public utilities are managed through their capital expenditure budgets and not on the operating costs that make up the water rates the public pays. Hence there is little incentive to cut operating costs by employing new technologies. Furthermore the public is only charged the operating costs and rarely the fully loaded costs (including the amortized fixed costs) as this would not be politically expedient; hence little room for investment. Fourthly, numerous water treatment facilities are controlled by individual municipalities and do not benefit from any economies of scale. Lastly, when public utilities do buy, (and this can often be as a result of a blow out or another urgent need) decisions are based on what is readily at hand, reputation, historical performance and long standing relationships.

Regulated and Non-Regulated Markets have Different Agendas

The municipal market is regulated regardless of ownership. For example in the UK, when the water privatizations took place under Margaret Thatcher in 1989, strict regulation was put in place. The Water Services Regulation Authority ("OFWAT") was set up to limit prices subject to a 5-year review cycle. The UK water companies are also regulated by the Environmental Agency and The Drinking Water Inspectorate that impose increasingly demanding energy and quality requirements which interestingly is opening the door to new innovations.

Growth opportunities for larger players in the regulated markets is also about buying and consolidating and improving the efficiency of very small plants. According to Piers Clark, Commercial Director at UK's utility Thames Water, "the UK market is always looking for improved efficiencies and these could come from consolidation among the smaller players". OFWAT however prefers to keep a large enough number of players in the market in order to assess companies on a comparative basis. Growth via acquisition in regulated water can be more profitable in the US where there is a much higher availability of small players as well as cheap municipal bond funding and higher P/E ("price to earnings") multiples. The potential consolidation of municipal water in the regulated market will happen but at an unpredictable pace. As this does happen, private owners will be open to new technologies that can help reduce operating costs and hence improve investment returns.

Non-regulated water generally includes services firms and industrial customers. Main players here tend to be vertically integrated with any given industry such as food, pharmaceutical or oil and gas. Successful companies really understand their verticals and the customer needs and have tailored their solutions accordingly. This sector is private and has a different sales process. Much of the business is dual-branded with the customer and is done on long-term contracts. It is here that we see the most willingness for the application of new innovations. What matters of course is the ability to develop relationships with customers.

Size Matters for Technology Players

- *Systems vs. Components*

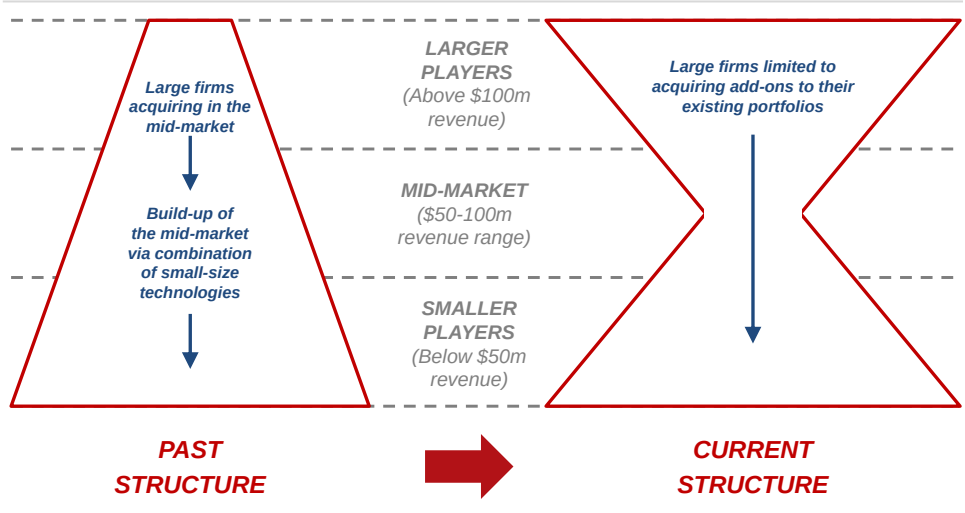
Large technology companies tend to have a suite of products that they can bring to bear to provide seemingly tailor made solutions for industrial verticals. The major players like Suez Environnement and Veolia Environnement see their core strength being their knowledge of how to integrate different component technologies together. Because they see and understand the entire flow, they are best positioned to see the impact of individual technologies on the whole process. This ability to deliver tailor made solutions with standardized components gives them a competitive advantage to smaller niche or single-technology providers. According to Joe Mangion, founder and CEO of Tovatna Associates and ex-CFO of Veolia UK, "design choice is all about the quality of the input and output versus the criticality of the process."

The Water Sector is not specifically driven by new IP at the component or unit level but evolves by combining together the different unit processes such as filtration, sedimentation and biological processes. The skill is to combine them in an intelligent way. The effectiveness generally lies in the innovative ways of using already existing technologies. According to Professor Alexander Zehnder, "Zenon is a good example in filtration. There was nothing really new they could patent but to run a better process. Once they got ahead of the game, they were able to claim top spot and stay there".

- *"Skinny in the Middle"*

Twenty years ago the industry structure was thin at the top with only a few players. There was quite a broad middle market with many independent companies in the $50-100 million revenues range like Zenon that started to get bought up in the 1990s with the GEs, Siemens and ITTs doing most of the acquiring. Today the digestion of those is done and the top of the market is looking for more.

EXHIBIT 3: EVOLUTION IN THE STRUCTURE OF THE WATER INDUSTRY



Source: GP Bullhound

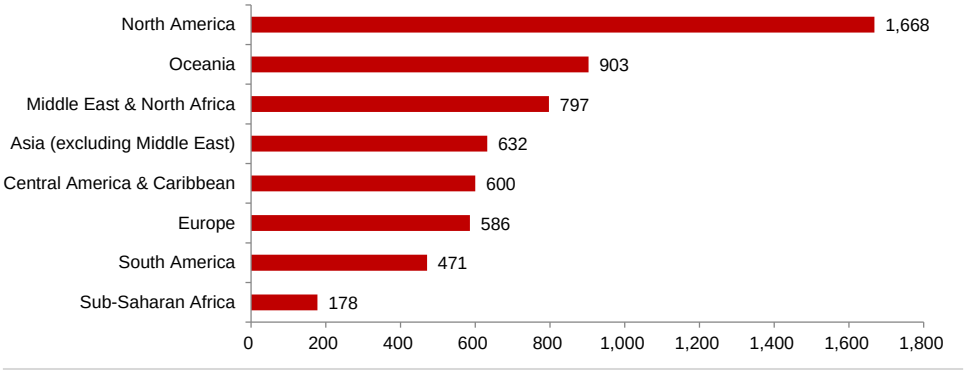
According to David Henderson, Managing Director at XPV Capital, “the industry now looks like an hour-glass with more big companies at the top and lots of small ones at the bottom. The mid-market has become very skinny. Right now it has become very hard to find an independent technology player in the $100 million revenue range”. There are now thousands of sub $10 million technology companies that are emerging that will make up the next wave of mid-market players. Industry attention has increasingly shifted to the smaller players.

The business thesis of several specialist VCs such as Canada’s XPV Capital is built on getting the “winner” smaller companies up to the $100 million mark. They see their main challenge in picking the right companies to rebuild the middle market segment. “If technology companies are able to reach that level, they will ultimately be bought by one of the major players as the market is very liquid once you hit the $100 million mark”, according to David Henderson.

ATTRIBUTING A PRICE TO WATER

Water itself has no price. We see water as free as if we are going down to a stream and drinking. There is in fact a perception among people that water is and should be free. It is seen by the UN as a human right rather than a human need. Water is an asset that mankind and the rest of our planet need to survive. The dilemma indeed comes when we have to pay for something that is freely available in nature. Hence, attributing a price to water becomes an emotional and political issue.

EXHIBIT 4: WATER USE PER CAPITA (IN M^3 PER PERSON) AND PER ANNUM



Source: Earth Trends, World Resources Institute

Pricing the Service

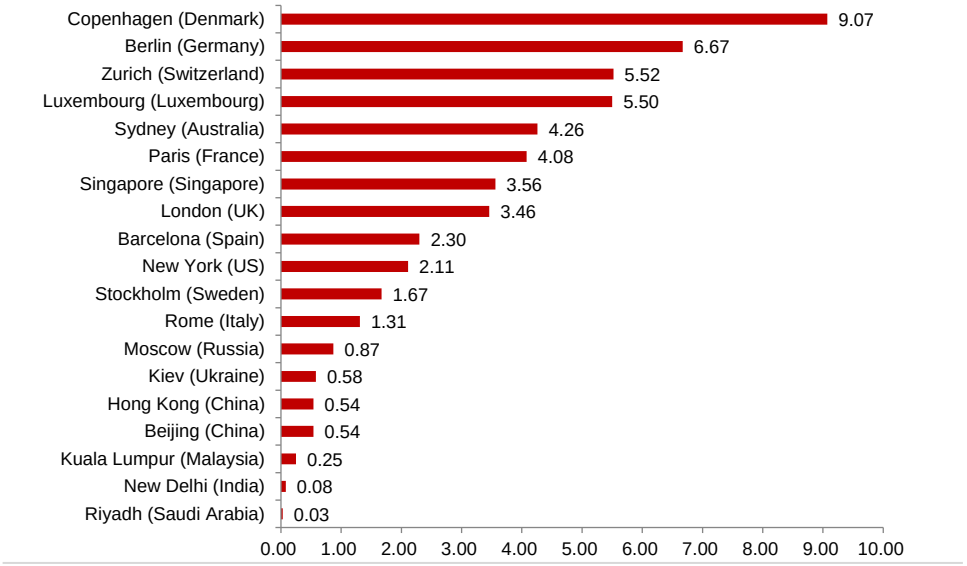
Pricing water is also a way to solve the water crisis in poorer countries. As Asit Biswas, Founder of the Third World Centre for Water Management, explains, “the problem we have is not scarcity but mismanagement. Water must have a price. Anything that is free won’t be used prudently… The poor are willing to pay for water. They already pay the street vendors who bring water in trucks. A connection to a house in the slums of Mexico City would represent an 85% saving”.

According to Professor Alexander Zehnder, “with an increasing urban population, we need to realize that we should pay for the service of having clean water supplied and transported to homes and industry as well as being taken away and treated and then recycled on a 24/7 basis”. But delivering water needs to be sustainable and priced to reflect the full cost of providing that service. This should also include the cost of the infrastructure and its maintenance. This concept needs to be accepted by people and governments in order for the Water industry to evolve and meet the underlying requirements.

However, regulators unsurprisingly want to keep the price of water low. In addition, given that water is publicly owned in many areas makes it a political issue. “When politicians start to buy into the need for change and innovation, a real difference can actually be made. Singapore is a great example of this” says Professor Alexander Zehnder.

The pricing of water is determined therefore by political and local availability issues. As the chart below illustrates, the price has a wide variance and does not reflect the true costs in many cases. Furthermore there is a trend in the US and in Europe to allow prices to increase. There are many examples of prices rises of more than 20-30% in the last few years.

EXHIBIT 5: WATER AND WASTEWATER TARIFFS (TOTAL COSTS IN USD/M^3 OF WATER)



Source: GWI, Global Water Market 2011

In the UK, the price of water is regulated to cover the operating costs and does not include the amortized cost of the infrastructure investment. This helps explain why it has not been replaced at the pace it should have been. "Badly needed refurbishments cannot be done because no one is paid to do it. Hence, water needs to have its economic value" according to Joe Mangion. If there are increasing standards and regulations for quality there has to be a higher price. According to Piers Clark, "at the moment, investment in innovation comes out of the net profits of a UK water company. If prices are regulated, there is a natural limit to how much can actually be spent on innovation".

Increased water prices would undoubtedly help improve return-on-investment ("ROI") for water companies and incentivize efficiencies for their customers (especially industrial ones). For the water companies, it will increase the pressure on management to minimize distribution losses which are currently at 25-30% in London. For customers, there is the incentive to be more efficient with the water they use. For example, companies such as Intel in 2010 reclaimed 3 billion gallons (out of a total of 8 billion) of ultrapure water from their manufacturing process.

As the price of water increases, it impacts the end costs in manufacturers. The Chairman of Nestle now poses 3 questions to plant operators around the world: i) what is your water use per dollar of sale? ii) what is your carbon footprint per dollar of sale? iii) what is your P&L? The increased water tariffs (as well as regulations on waste) on industrial users which make up more than half of water usage in the much of the developed economies, will drive innovation in water reuse, energy from waste and efficiency.

The confluence of regulated prices, network losses, high operating costs and falling consumption (through efficiency) has led to a different sort of problems. A key question for leading players such as Veolia is emerging: How do you continue to grow your revenues and market value by selling less water?

Water and Energy Prices are Perceived Differently

Energy and water have always been (and are likely to remain) intricately and inextricably linked. Water is used to produce energy in hydroelectric power, in oil and now shale gas production as well as for the cultivation of corn and sugar cane for ethanol. Energy is used all along the water value chain; pumping, treating wastewater, desalination and distribution. While the cost of energy is in the operating cost of water (not necessarily in the rates charged), the cost of water is not always reflected in the production of energy. As an extreme example, it is estimated that of the 410 billion gallons of water drawn each day in the US, nearly half are used for thermoelectric power generation.

The cost component of energy in water production and treatment can vary between 10-60% of total cost. Factors (in ascending order) such as local rainwater, rivers, groundwater, water treatment facilities or seawater are the main determinants.

Energy (particularly oil) has normally been freely priced and hence companies could see how they could make investments. Similarly because energy is deregulated it is more open to investment. According to Peter Williams (CTO of Big Green Innovations as part of IBM's Smarter Planet Initiative), "when water prices will start to bite, people will throw some serious money at the problem".

Energy has normally been seen as the richer cousin to water and certainly gets higher priority. Energy is seen as a lot more critical. In California, when power was privatized and rates were held flat (regulated by politicians) there were a lot of black outs as a result. There had been no allowance for upgrades or capacity increases. Now there are. In the UK, OFGEM, the energy regulator, launched the Innovation Funding Incentive ("IFI") which gave financial assistance to the power companies. IFI was founded because the energy industry was not innovating and OFGEM was trying to force change. Water does not have this yet.

Up until now the public never really regarded the price of water in the same way they see their energy costs. At most it is 10% of their energy costs. Even if our water bill doubled it would probably not affect our behavior. This may be true on a consumer level but we are steadily seeing signs of changing behavior on an industrial level.

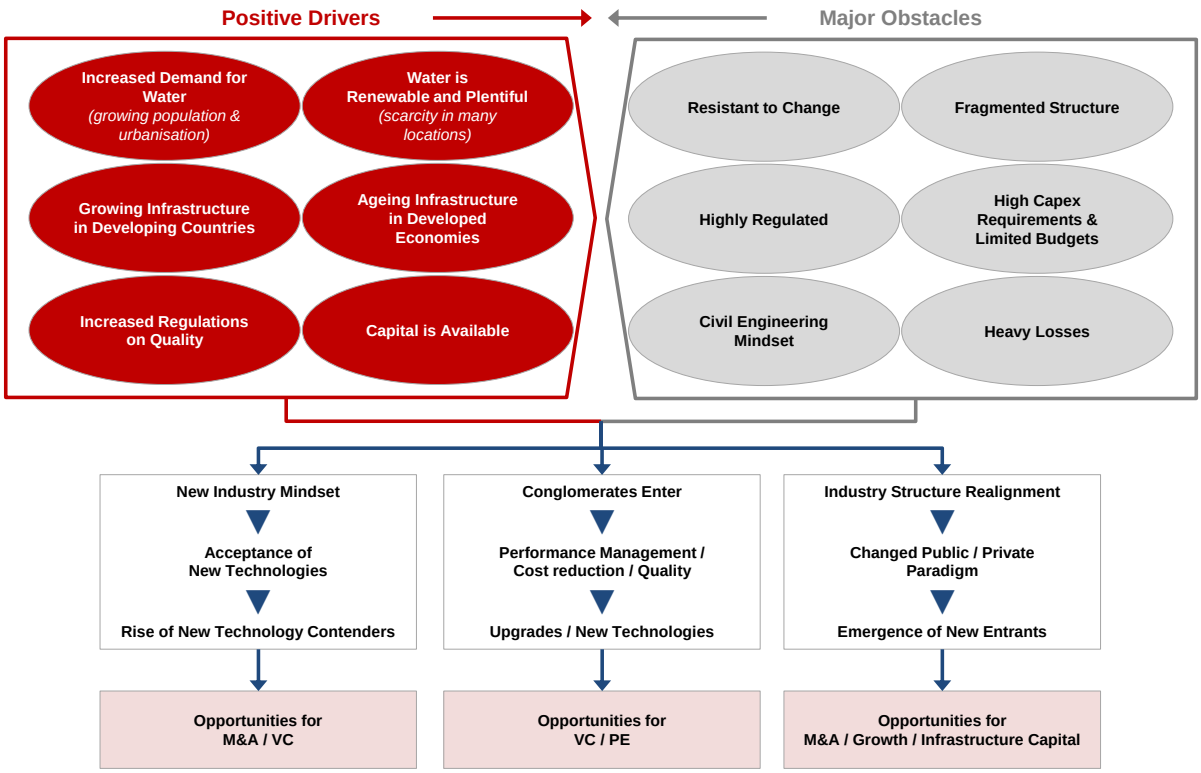
On another level, we have numerous supplies of energy from fossil fuels to renewables. With water there is no substitute.

IS THE WATER INDUSTRY FINALLY ON THE MOVE?

The Water sector has stayed much the same for the last 100 years. It hasn't changed much because it hasn't had to. We believe this is all about to change.

The Water industry is progressively evolving thanks to a series of significant realignments. Drivers of change are now afoot: the unstoppable increased demand, urbanization, an aging infrastructure, large losses and increased regulation for quality and the environment. These change drivers are colliding with an industry that is seen as immune to change, politicized in its decision making, with high capital costs, even higher operating costs, and a civil engineer mindset. Add to the mix a dwindling supply of fresh and clean water, increased energy costs and the entry of managers with a new way of thinking as well as new and large corporates and we have an ecosystem where new technologies can thrive. We therefore believe a large opportunity for investors is unfolding.

EXHIBIT 6: DRIVERS FOR CHANGE IN THE WATER INDUSTRY



Source: GP Bullhound

The **collision** between the drivers for change and the built in resistance to change will foster opportunities in the acceptance of new technologies, the drive to improve operational efficiencies and a change in the public-private paradigm. They represent the most logical solution to the impasse.

Firstly and perhaps as the spark, there is a generational shift currently taking place where more business-oriented people are increasingly managing water utilities. It used to be solely engineers and civil engineers who were more concerned with the actual working and

reliability of the plants. This generational shift to having business managers enter the Water space and manage costs down while improving quality is one of the key initial enablers for change. Why are new and talented managers entering such a staid backwater? It's either the job market is really bad or they are recognizing these same trends. We believe it is the latter.

An in depth examination of each of the major forces and obstacles is beyond the scope of this report. However we examine a few.

Large Diversified Corporates are Entering Water

In recent years, several large diversified companies, such as GE, Siemens, LG and BASF decided to enter the Water space in a strategic way. These companies are building internal businesses and looking for new technologies in order to be part of this transition to a new Water market where innovation will be a key determinant and differentiator.

High-profile acquisitions such as Zenon by GE (March 2006), US Filter by Siemens (2004) and this year Inge by BASF were events that are being closely followed by investors. It is becoming clear that as "giants" step into the market, performance will become a key metric. This not only opens up the opportunity for commercial success for smaller companies but also shows exit opportunities for investors willing to back early stage technology companies. These deals paved the way.

Beyond outright acquisitions, other large conglomerates are zooming in on water. This is mainly because it is a critical cost to manage for Oil companies or consumer goods majors such as Coca-Cola, Nestle and Unilever (in fact Unilever has a corporate VC arm specifically dedicated.) The list of corporates talking about water grows every day and will be a major driver for innovation because of environmental regulations, costs initiatives and public image. Each are setting up water policies and soliciting new solutions.

In addition, another group of corporates now see water as the next big play and as an extension to their current business. Most notably, IBM and Oracle have been very public in increasing their expertise and profile in Water and finding ways in which to "make a play". Both are already active in providing network and analytical solutions. We expect this space to become crowded and possibly hyped as Infotech and Smart Grid players enter the fray. The Corporates have in fact been the biggest investors in water technology by far.

Water-Focused Services Companies

Water-focused services companies such as Veolia and Suez Environnement have a different approach to large diversified corporates because their objective in terms of innovative technologies is to convert a pool existing technologies into adaptable solutions. They are both operators and technology companies. They benefit by having water as their core (vs. GE where water is only approximately 2% of their total revenues) but are challenged to keep pace with change. How to innovate? Do we need to? The Veolia-type companies won't automatically push innovation to the customer directly. They want to have it in case customers ask for it, but they won't push it by themselves. In not managing the ecosystem

proactively, startup companies are going to be able to lead and this is recognized. The setting up of the Veolia's Innovator Accelerator and Suez's Blue Orange are initial steps.

Industrial Focus

Industrial companies will be key protagonists as they understand change and the benefits of new technologies. They also need water for industrial purposes and not public drinking. Therefore young technology companies that have a particular application to an industry are more likely to see faster commercial interest. This is about focus: they need to go through the first stage and demonstrate ability to prove the technology. For young companies it will be about validation and credibility. The uptake potential from industry could be the largest sector for new businesses for some time to come.

Saving Opex

Today more than half of the annual expenditure of $400+ billion is spent on operating expenses. Of the remaining 40+% that is capital expenditure, a majority is pipes, pumps and civil works and other standardized equipment. Technology spend can be quite small. In desalination, only 5% of the total cost is the membrane. Hence the big enemy is Opex which is largely energy related.

Innovations currently becoming available have huge potential to reduce operating costs by 30-50%. There is therefore a building interest on the part of operators, technology players and infrastructure capital to increase their position in the industrial sector to own and operate water services on behalf of industrial clients or municipals and benefit from the adoption of Opex saving opportunities.

However, this will require service providers that are large enough to assure their clients of reliability and quality. Entrepreneurs could do well to target this sector.

Following Regulation

With EU regulations becoming stiffer coupled with more contaminants entering into the Water system, there will be a growing demand for companies to show their systems. Building technologies that meet the stringent demands of the EU could be leveraged for application to countries that are soon expected to increase quality and energy standards that match the EU. China, for example, is looking to leapfrog the development cycle by installing state of the art systems for quality, treatment and network management. As regulations become more universally accepted at least one part of the market may become less fragmented.

SELECTING THE MOST PROMISING TECHNOLOGY SECTORS

There are more than 1,000 new technology companies emerging in the Water sector today. Many deal in areas beyond the scope of this report such as irrigation, water from air etc. The main sectors gaining investor and customer interest include network management, desalination and water re-use, waste-to-energy.

"Even if individual technologies demonstrate a lot of potential, it is critically important to be able to integrate products into full solutions" and according to Assaf Barnea, CEO of Israel's Kinrot Ventures, provide "a simple friendly interface between innovation and the infrastructure". This will undoubtedly require more cooperation and consolidation among the innovators.

EXHIBIT 7: MARKET LANDSCAPE

Source: GP Bullhound

Network Management – A Smart Water Infrastructure

This involves managing the assets in the ground more intelligently. This is one of the biggest gaps and it is moving very quickly. Maintaining the piping and pumping systems for a longer life inevitably means avoiding disasters and heavy capital expenditures. It is all about knowing the network and what is going on inside it.

This is an area that will need **sensors** for a myriad of applications such as leaks, pressure, chemicals, temperature and flow. UV sensors that spot numerous contaminants are also a promising area and one ripe for new patents. There is clearly room for more innovation in

addition to what exists now. If viable, these sensors would be applied on a mass scale. Therefore cheap capital costs, installation and operation will be crucial.

According to Professor Alexander Zehnder, "it can however be a challenge to reach agreement on what sensors need to measure and receive government approvals. In Canada, as progressive as it is, this takes two years. Another challenge can be obtaining a license to perform the monitoring which introduces another level of risk to commercialization. The upside however is that this solution can be added at any time as it can be separate from the regular buying cycle".

Related to sensors is **on line analysis** and **controls**. According to Piers Clark, "the industry is becoming data rich but analytics hungry. The key is converting that data into knowledge around the assets and managing them for performance. There are some software solutions emerging today but there is room for more". Given that analytics do not interfere with the quality of the underlying process (i.e. require a process change and approval) it can be an easier selling process. Potential revenue to be made from the intelligence around data is considerable.

The biggest plus with network management is also the ability to do upgrades on a spot basis rather than system wide and the capital saves that go along with it.

Waste to Energy – Recovering Energy and Water from Waste

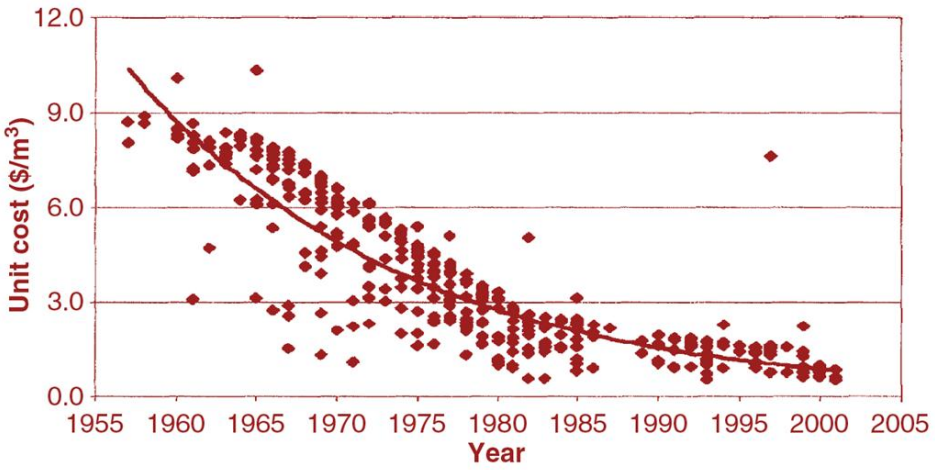
According to Paul O'Callaghan, Principal at O2 Environmental, each year and in the US alone, there are 36.5 Million MW hours of energy lost down in wastewater, 25 Million MW hours of this ends up on the sludge. Up until now we have been throwing away our two most critical resources: energy and water.

This is about reducing the amount of energy we need to treat our waste water and get rid of sludge and the recovery of the energy in waste water. As an example, sludge management is a major cost to the Water industry and can vary between $50-100 per ton. As one fund manager recently put it, "it is about turning waste from a cost center into a profit center".

Costs involve the dewatering, transportation and disposal through incineration, land use or land-fill. With regulation being put in place against incineration, land use and land-fills, the options are few. A number of promising technologies include: gasification, conversion into fertilizer, and the production of power through electrochemical processes. Supercritical water oxidation processes that eliminate (higher cost and harder to handle) toxic industrial and military wastes are also not far from commercialization. Converting sludge into high quality plastics is also an area getting much attention and has significant potential. The recapture of scarce minerals, phosphorous and nitrates are becoming increasingly viable.

Desalination and Water Re-use – A Lot of Promises

EXHIBIT 8: DESALINATION - UNIT WATER COST OVER YEARS BY MSF PROCESS

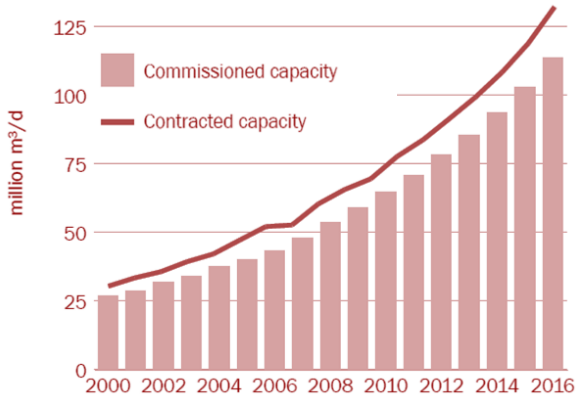


Note: MSF stands for Multi-Stage Flash Distillation
Source: Reddy and Ghaffour (2007) Desalination 205: 340-353

Desalination is an area that is receiving a lot of attention. It still lives under the perception that it is prohibitively expensive and the domain of oil rich Gulf States. However, with costs having dropped dramatically in the last thirty years, cost levels are now 0.30-0.50 $/m^3. According to Paul O'Callaghan, desalination costs at the new Carlsbad desalination project in San Diego are now equivalent on a cubic meter basis to the cost of pumping water in from Northern California.

We believe there is room for increased performance in desalination. This will be around pre-treatment, reduced membrane fouling, and enhanced energy recovery. Areas such as Electro desalination, Forward Osmosis and Multiple Effect Desalination are areas that look interesting.

EXHIBIT 9: DESALINATION – MARKET FORECAST TO 2016



Source: Source: GWI, Global Water Market 2011

OVERCOMING THE BARRIERS TO ENTRY

Emerging technology companies face significant barriers to entry in the Water sector. Much of this is down to the Water industry itself due to its fragmented structure and conservative nature. Other key barriers for young companies center around the need for references, the capacity to scale, access to appropriate capital, route to market and the ability to attract entrepreneurial and talented management.

There is a hardly a well-beaten path to success that young companies can look to for role models. Other technology sectors such as Digital Media and now Cleantech have multiple examples of success that have created an ecosystem of available capital, talented management and ready customers. For Water this is only beginning to emerge.

Establish References

"References, references and references are the key barriers" according to Assaf Barnea, CEO at Israel's Kinrot Ventures. "If you find the right way to install and demonstrate your technology, it is a different game in such a conservative market". Potential customers and adopters need technologies that are proven in their region and can be used as evidence that the technology is sound. This is particularly true of biological processes which require at least 12 to 18 months of testing allowing for the effects of seasons.

Building a reference site not only requires considerable capital but time as well as the appropriate certified testing authorities for validation. With this in mind, the Israeli Government has a National Water Program (called Newtec) where subsidies of 70% for the installation of the new water technologies in local municipalities are offered. In Assaf Barnea's view, "this allows promising technologies to become reality".

Access Capital and Markets

The Water industry, is if nothing else, capital hungry. This is also true not just in development in the lab but in the need for testing, and reference sites. Development costs range between $5-20 million and this is getting to the customer testing phase of 12-18 months which could require another $10-20 million. Then the challenge is whether you have enough customer orders to create a positive margin.

Getting commercial traction requires marketing spend. According to Joe Mangion, "the water market remains highly fragmented with many small companies having an excellent product or technology but lack the funding to develop effective marketing and distribution channels. Market adoption takes time, particularly by utilities and municipalities." A possible solution is a "cooperative for marketing that puts new solutions from small companies through an accepted sales channel. Municipalities tend to buy from trusted people. They will buy new technology but from trusted players".

Even when a customer is prepared to adopt a new technology uptake can be slow because of the capital decisions. Getting clients to commit capital to projects is difficult. It is best to offer solutions on a BOT basis ("Build-Operate-Transfer"), hence requiring additional capital, sometimes significant. For example, if a growth company is developing water solutions to the Shale Gas industry via fracking, capital demands will be significant. Fracking requires large

amounts of fresh water to be trucked in and a pumping solution to take the waste water out and truck it to a waste site. A solution would be an on-site waste treatment facility.

Capital is available for water but is typically for utility risk. According to Piers Clark, "there is money out there and people want to invest. But much of that capital is risk averse and people do not want to take a gamble." However with the high-profile transactions completed by strategic players, VCs and PEs are beginning to develop expertise in water and build up portfolios. Players such as XPV Capital, Water Asset Management, Swarraton Partners, Zouk and Emerald Technology Ventures among others are pioneering in Water and paving the way for the large generalist Cleantech funds to also enter.

On commercialization, "there is also a disconnect within the industry between 'we will have a look at it' and 'where are we actually going to implement it?'. Most of the water companies have framework agreements with the large engineering firms that have no incentive to innovate or experiment. The barrier is mainly in the way utilities have set up their capital and maintenance agreements, who is it that can take the decision on innovation?" according to Professor Tom Stephenson, Chairman of British Water and Head of School Applied Sciences at UK's Cranfield University.

Long investment cycles mean that installations will normally have a 10-20 year renewal cycle. If you are a young company and you manage to hit the window then it is very fortunate. However it could mean that whatever type of technology you have will have to wait until the refurbishment cycle is ready and that will be longer than investors can bear. By having an aggressive growth projection it is difficult because of the slow buying cycle. Converting from pipeline to purchase orders is the golden moment.

Build Management Teams

Among the experts interviewed for this report there was a resounding agreement on the need for qualified and entrepreneurial management. The challenge is to attract world-class managers into a small technology company given all of the challenges above. The solar industry benefitted from executives and process engineers from the silicon chip industry that had the entrepreneurial skills and experience in adjacent businesses to take the industry forward to large scale production and global sales.

According to Helge Daebel, "the biggest hurdles are the people. It is the skills set of the team. Having the right skills sets in marketing, sales and right leadership can make a big difference." Isle Consulting say they see "lots of new companies but most lack the management skills to grow. Entrepreneurialism is not strong in water. The big issue is around the capability and quality of the team." Laura Shenkar, Principal at The Artemis Project goes even further: "the main thing you need is someone not from the water business and who understands that this is something that has never been done". Entrepreneurs especially from the internet world could be beneficial as they understand product road maps that are built on constant upgrades: version 2.0, 2.2 and so on. This doesn't exist in the Water industry.

The water technology sector is already seeing some early converts from the internet such as Bluewater Bio's CEO, Daniel Ishag. Other sideways moves are benefitting Emefcy where the CEO Eytan Levy is coming from the power industry. More talent is expected as the sector begins to post successes.

CLASSIC PITFALLS FOR WATER TECHNOLOGY INVESTORS

The Water industry has seen a limited history of success with very few proper high return-generating exits for financial investors. Compared to other sectors such as Digital Media and Solar, no one has really made significant money in the Water space yet. For investors, the major question is the exit model, and the level of return they can expect. Relevant transaction multiples for the Water space are few and far between.

Compared to other Cleantech sectors, patience is also an essential component as there is a need for money to follow up on an initial investment. If there is a longer "go to market" time required, someone will need to pick up and help these emerging innovative companies in the long term.

Industry expertise is also essential given that investors with limited understanding of the structure of the industry are likely to apply the wrong strategies. According to Laura Shenkar, Principal at the Artemis Project, "you can have water as a theme as long as you have a domain expertise". You need to be so close to the customers so you can see how you are going to sell it. Also, if you are not able to assess what the company can achieve within the projected timing, you can spend a lot of money for a long period of time.

Some classic "don't"s include:

- Overpaying: sums paid by ultimate buyers can be limited
- Betting on the wrong technology
- Spending too much too quickly, relative to company commercialization
- Underestimating how conservative the industry can be
- It is a mistake to take a company public too early. You need the right levels of stable revenues beforehand

PLAYING INTERNET AS THE WILD CARD

"The Internet is a wild card and will change a lot in the industry from awareness to productivity, by moving communication from the one to one to the one to many", according to

David Henderson.

The Internet will assist tremendously in productivity particularly in network management. Just having valves and pumps talk to each other and coordinate can increase efficiency by 30-40%. With the transition to a more business oriented management and to a younger and more tech friendly generation, the use of the smartphones or iPads to manage pumps and valves will be quite normal.

The Internet is also already forcing the Water industry into action and to account to the public at large. Smart phone amateur videos of spectacular explosions and burst water mains are all over YouTube. Software analytics were installed in the Washington DC's water system as a result of the negative publicity on the blow outs they had. It is doubted whether much would have changed if not for the publicity on the Internet.

EXHIBIT 10: EXAMPLES OF BURST WATER MAINS RELAYED BY THE INTERNET

Source: YouTube.com - Left in Liverpool (UK), right in San Francisco (US)

The Internet is having a big impact. "Water is the first area where there will be real accountability if there is a problem" says David Henderson. "You know where the pollutants will come from in the case there is a problem. The Internet will turn a local problem into a global one. Any mishap can be blasted out into the cyberspace in seconds." With the BP spill on the Event Horizon, CNN put a camera down on the well-head and transmitted oil spewing out live. This had a large impact on public opinion and arguably caused the urgency it did. Because people can see it as it happens, it increases the pressure for action.

Water is a very personal issue and transmitting it via the internet on You Tube can make it very powerful. Most large companies are resisting change because budget constraints or the unions. Facebook can break this because of the bad publicity and will help usher in a new way of thinking.

MARKET ACTIVITY

Recent Financing Activity

Company	Country	Date	Size ($m)	Investors
Amplio Filtration	UK	Q4-11	24.3	Ambienta
BCR Environmental	USA	Q4-11	10.0	XPV Capital, True North Venture Partners
Quench	USA	Q4-11	30.0	Virgin, Pohlad, Potomac, ORIX, Element, Advent-Morro
Bristol Water	UK	Q4-11	202.8	Capstone Infrastructure
FilterBoxx	Canada	Q3-11	9.0	XPV Capital, EnerTech Capital
RedZone Robotics	USA	Q3-11	25.0	ABS Capital Partners
Orege	France	Q3-11	11.2	Oraxys, Climate Change Capital
Latitude Solutions	USA	Q2-11	8.0	Undisclosed
Produced Water Absorbents	USA	Q2-11	11.0	Harris & Harris Group, Energy Ventures
BWA Water Additives	UK	Q2-11	300.0	Berw ind Corporation
Netafim	Israel	Q2-11	549.0	Permira
Va Tech Wabag	Austria	Q1-11	36.0	Capital International Fund
Xeros	UK	Q4-10	5.6	RisingStars, Parkw alk, IP Gr., Fin. Yorkshire, Entrepreneurs
i2O Water	UK	Q4-10	15.7	Sw arraton, Nemadi Advisors Limited, Naxos
AM Conservation Group	USA	Q4-10	325.0	Matrix Asset Management
Mapal Green Energy	Israel	Q4-10	9.0	Charles Street Securities
Seven Seas Water	USA	Q4-10	16.1	Element Partners
ItN Nanovation	Germany	Q4-10	20.0	Yorkville Advisors
Bluew ater Bio	UK	Q3-10	6.1	Ecofin, Aqua Resources Fund Limited
Seven Seas Water	USA	Q3-10	6.7	Element Partners
ThermoEnergy Corp.	USA	Q3-10	5.0	Security Global Investors
TALIS	Germany	Q3-10	245.0	Triton Beteiligungsberatung
ENBALA Pow er	Canada	Q3-10	8.0	XPV, Walsingham, EnerTech, edc et, EDC, Chrysalix
WaterHealth	USA	Q3-10	22.1	Undisclosed
NanoH2O	USA	Q2-10	10.0	PCG, CalPERS
Emefcy	Israel	Q2-10	5.0	Pond VP, Plan B Ventures, Israel Cleantech Ventures
Clean Filtration Technologies	USA	Q2-10	5.5	Dow VC
Envirogen Technologies	USA	Q2-10	50.0	Undisclosed
PhosphonicS	UK	Q2-10	5.3	Seventure Partners, Regents Park Partners, LBS VC fund
Seven Seas Water	USA	Q2-10	8.1	Elevation Partners
HydroPoint Data Systems	USA	Q1-10	8.6	Shea Ventures, RockPort, Monitor, Firelake, Chrysalix
Quench	USA	Q1-10	13.0	Virgin Green Fund, Element Partners, Doug Brow n
HaloSource	USA	Q1-10	10.0	Prime Partners Corporate Finance Pte Ltd
Waterleau Global Water Tech.	Belgium	Q1-10	27.0	Four Winds Capital Management
M2 Renew ables	USA	Q4-09	6.0	SAIL Capital Partners
Activeion	USA	Q4-09	5.0	SAIL Capital Partners, Next Step Investments
BioPure Technology, Ltd.	Israel	Q3-09	12.0	US Venture Partners, Pitango VC, Elron, Aurum Ventures
BPT	Israel	Q3-09	12.0	US Venture Partners, Pitango VC
Inge Watertechnologies	Germany	Q3-09	7.0	Emerald TV, Siemens, Entrepreneurs, BayTech, Stonefund,
WaterHealth	USA	Q2-09	10.0	SAIL Capital Partners, Dow VC, Acumen Fund
HydroPoint Data Systems	USA	Q2-09	8.0	Shea Ventures, RockPort, Monitor, Firelake, Chrysalix
i2O Water	UK	Q2-09	6.4	Sw arraton Partners
Neosens	France	Q1-09	5.4	Sofinnova, IRDI, ICSO PE, Galia Gestion, Capricorn
Oasys Water	USA	Q1-09	10.0	Flagship Ventures, DFJ, ATV
Triton Water	Germany	Q1-09	15.0	Zouk Capital, Meidlinger Partners
Amiad Water Systems	Israel	Q1-09	9.0	Viola Private Equity
Seven Seas Water	USA	Q1-09	15.0	Virgin Green Fund, Texas Pacific Group, Element Partners

Source: Newsrun, GP Bullhound, CapitalIQ, Cleantech Group

Recent M&A Activity

Date	Target	Acquirer	Size ($m)	Target Description
Oct-11	Fluxa Filtri	Amplio Filtration	n/a	Filters and consumables for a wide range of applications
Oct-11	OpenCEL	Trojan Technologies	n/a	Processing of wastewater biosolids
Oct-11	Via Maris	Global Environmental Solutions	16	Seawater desalination facilities
Oct-11	Cambridge Water	South Staffordshire	n/a	Supplier of fresh water
Sep-11	Hydro-Guard	Mueller Co	n/a	Water quality monitoring solutions in distribution piping
Sep-11	Diemme Filtration	Bilfinger Berger	n/a	Manufacturer of filters used in water treatment systems
Aug-11	H2Oil & Gas	FilterBoxx	n/a	Water treatment technologies and services for oil / gas
Aug-11	Palm Water	Dubai Electricity & Water Authority	103	Water and wastewater treatment services
Aug-11	Northumbrian Water Group	Cheung Kong Infrastructure	3,900	Water and waste water services
Aug-11	Roark Water & Sewer	American Water - Missouri	2	Water utility
Jul-11	VAG Holding	Rexnord	249	Valves and engineered solutions for water distribution
Jul-11	Nalco Holding	Ecolab	5,400	Water treatment and process improvement services
Jul-11	YSI	ITT Corporation	310	Sensors, instruments, software, and data collection platforms
Jul-11	Western Company of Texas	Select Energy Services	n/a	Oilfield water transfer service provider
Jul-11	BEGEROW	Eaton Corporation	n/a	Advanced liquid filtration solutions
Jun-11	Consolidated Petroleum	Heckmann Corporation	n/a	Water pumping and delivery service
Jun-11	J&Y International	Tri-Tech	2	Water purification and wastewater treatment systems
Jun-11	GETCO	TEE International	8	Design, construction, installation, and operation of WWTP
Jun-11	Conquest Water Services	High Sierra Water Services	n/a	Oil and gas water disposal company in Colorado
Jun-11	Water Star	Orbio Technologies Group	n/a	Water disinfection products developed using electrochemistry
Apr-11	Danfoss Socla	Watts Water Technologies	176	Water protection valves and flow control solutions
Apr-11	Inge Watertechnologies	BASF	n/a	Ultra-filtration membranes and modules for water treatment
Apr-11	Peak Energy Services Ltd	Clean Harbors, Inc.	203	Drilling and production services
Apr-11	Cardo Flow Solutions	Sulzer Ltd	931	Collection, treatment, and transportation of wastewater
Apr-11	Norit Clean Process Technologies	Pentair	705	Water purification technologies
Mar-11	Internormen Technology Group	Eaton Corporation	n/a	Filters for hydraulic and lubricating fluid
Feb-11	Enviro-Solutions	Aqua-Chem	n/a	Water treatment equipments
Feb-11	Waterra	In-Situ Inc.	n/a	Groundwater monitoring and remediation equipment
Jan-11	Echologics	Mueller Water Products	8	Acoustic technologies to detect and locate leaks in fluid
Dec-10	Liquid Dynamics	Siemens Water Technologies	n/a	Oil extraction and fuel handling equipment
Nov-10	Biwater	MWH Global	n/a	Water construction and engineering services
Oct-10	PONSEL Mesure	Aqualabo	n/a	Equipment for water quality analysis
Sep-10	Water Innovate	Bluewater Bio	n/a	Water and wastewater treatment
Jul-10	Pressure Pipe Inspection Company I	Pure Technologies	35	Technologies to evaluate water infrastructure
Jul-10	MECANA Umwelttechnik	Aqua-Aerobic Systems	n/a	Sewage treatment systems
Jun-10	Godwin Pumps	ITT Corporation	585	Pumps and related engineering equipment
Jun-10	AbTech Industries	AbTech Holdings	n/a	Developer of polymer-based water filtration products
Jun-10	Assets of United Utilities - Sofiyska	Veolia Water	246	Principal non-regulated Water Interests in UK and Europe
Jun-10	Chaparral City Water Company	EPCOR Utilities	36	Water utility in Arizona
Mar-10	BHU Umwelttechnik GmbH	Von Roll AG	4	Water and wastewater treatment
Mar-10	Membrane Extraction Tech.	Evonik	n/a	Extract organic contaminants from chemical waste streams
Feb-10	Hyde Marine, Inc.	Calgon Carbon Corporation	n/a	Water and wastewater treatment solutions.
Dec-09	Pump Engineering Inc. - PEI	Energy Recovery	27	Pumps and energy-recovery devices for RO desalination
Oct-09	Agbar	Suez Environnement	1,300	Water services, distribution and treatment
May-09	Professional Water Technologies	H2O Innovation	n/a	Specialty chemicals for reverse osmosis processes
Apr-09	CALDER AG	Flowserve Corporation	45	Energy recovery devices and pump systems
Jan-09	Pathogen Detection Systems	Veolia Water	n/a	Automated systems for detecting pathogens

Source: Newsrun, GP Bullhound, CapitalIQ, Mergermarket, Cleantech Group

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Registered office: GP Bullhound LLP, 52 Jermyn Street, London, SW1Y 6LX
http://www.gpbullhound.com, info@gpbullhound.com, +44 20 7101 7560

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