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Water tight 2012
The top issues in the global water sector

Energy & Resources

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Foreword

Welcome to The top issues in the global water sector

Water is our most precious resource. Its availability transcends political borders. While the challenge of increased competition for water is global, the issues must be solved on a local level by governments, businesses, non-governmental organizations (NGOs) and domestic consumers all working together.

The aim of this report is to highlight the top issues that the Global Deloitte Energy & Resources water practice regard as the most important for the water sector. These issues are of course all interconnected with each other and with other resource issues, and should not be considered in isolation.

Rapid growth in demand for this finite resource is a central theme and is reflected in all of the issues we discuss. The global water sector's future will be characterised by efforts to manage demand and increase supply. We think that continued awareness campaigns, more effective water pricing, a better understanding of the relationship between water, energy and food, and technology advances will all play an important role in these efforts.

Climate change is also a key theme. It increases the risk of volatility in the availability of water resources and exacerbates the impact of forces driving demand. Unpredictable weather conditions also adversely affect the functioning of water assets and make planning and investment in water infrastructure more expensive.

To meet future demand, trillions of dollars will be needed on a global level to upgrade ageing infrastructure and expand water related assets. With government funding and borrowing capabilities severely impaired as a result of the ongoing financial crisis, the private sector is likely to play a bigger role in the water industry in the future. More water suppliers may be privatised, and it may be necessary to find mechanisms that allow water to be priced as a true commodity.

Efforts to demonstrate water stewardship will be a key theme for utilities and water users in coming years. Close collaboration between utilities, regulators and all users of water is required to address the ultimate issue – the scarcity of water resources in many parts of the world.

Our themes have been developed in consultation with senior practitioners from Deloitte member firms around the world. I would like to thank them for their help and support. I would also like to thank Netti Farkas for her invaluable assistance in preparing this report.

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1. Growing demand for a finite resource: The future is not bright

The supply of readily available fresh water is finite and in many watersheds its quality is declining. Treated water is also being lost at alarming rates through inadequate infrastructure in many parts of the world. At the same time demand for this precious resource is expected to grow rapidly. International competition for water is also likely to intensify.

Although water covers 70 per cent of the earth's surface, less than 0.5 per cent of the world's water is available for human and animal use in the form of fresh surface and ground water.[1] While water is replaced through the water cycle, this is a finite resource – neither created nor destroyed.

Scarcity of supply is not the only challenge. The decline in water quality is also a growing problem in many watersheds of the world. The lack of adequate sanitation and waste collection services in many cities and rural settings means that the majority of sewage and waste ends up in local rivers. As a result, several cities no longer take water from nearby rivers and instead use depleting groundwater sources. This not only increases the cost of supplying water for utilities and businesses, but also creates serious health hazards for local residents.

In addition, ageing infrastructure, old pipes and rusty joints are prone to failure. Leaks are costly to repair, cause disruption and exacerbate water loss. In its 2011 annual report the UK water regulator, the Water Service Regulation Authority (Ofwat), noted that six out of 21 companies failed to meet their leakage targets. In England and Wales, 20 per cent of the treated water supply, equivalent to 3.3 billion litres of water, is lost every day through burst pipes.[2]

Some water assets are vulnerable and disruption in supply can cause havoc and economic damage. In the winter of 2010, 40,000 homes and businesses in Northern Ireland remained without water for several days as pipes burst due to icy conditions.[3]

Water is also unevenly distributed around the world. It is essentially a management problem: some regions have plenty, while others have very little. According to World Bank data, Canada's per capita water supply is 86,427 m^3 compared with 2,134 m^3 in China.[4]

This comparison can be shown even more starkly: Canadians, who make up 0.5 per cent of the world's population, have access to 20 per cent of the world's water supply, while the Chinese, who constitute 20 per cent of the world's population, have access to only six per cent of the world's water. Increasing water shortages and the effects of uneven distribution forced China to create the world's largest and most controversial water scheme, the South-to-North water diversion project.

Against this backdrop of a limited supply, quality issues and uneven distribution, demand for water is expected to increase rapidly. The last 40 years have seen an unprecedented growth in global population – to nearly seven billion. This surge in population has more than doubled fresh water demand in agriculture, energy, industry and domestic use. Today, scientists estimate that we 'withdraw' about 50 per cent of globally accessible and renewable water on an annual basis and this is set to increase as the United Nations (UN) estimates that the world's population will reach 9.4 billion by 2050.[5]

The majority of population growth is expected to occur in developing and emerging countries. Currently around four billion people live in the Asia-Pacific region. By 2030, this number is expected to reach five billion.[6] The effects of this on water resources are heightened by rapid urbanisation, dietary and lifestyle changes as these regions become more industrialised.

The struggle to ensure access to water has shaped human history. To support life and economic growth, water has to be plentiful and securely supplied. More than 300 rivers span more than one country.[7] This means that one country's water management system can greatly impact another country's access to water from the same river further downstream and can lead to geopolitical conflicts. The Nile river basin stretches across ten countries and 200 million people with the region's economic growth depending on it.[8] Recent plans by Ethiopia, Rwanda and Uganda to increase water intensive farming practices would have put 95 per cent of Egypt's water supply at risk.

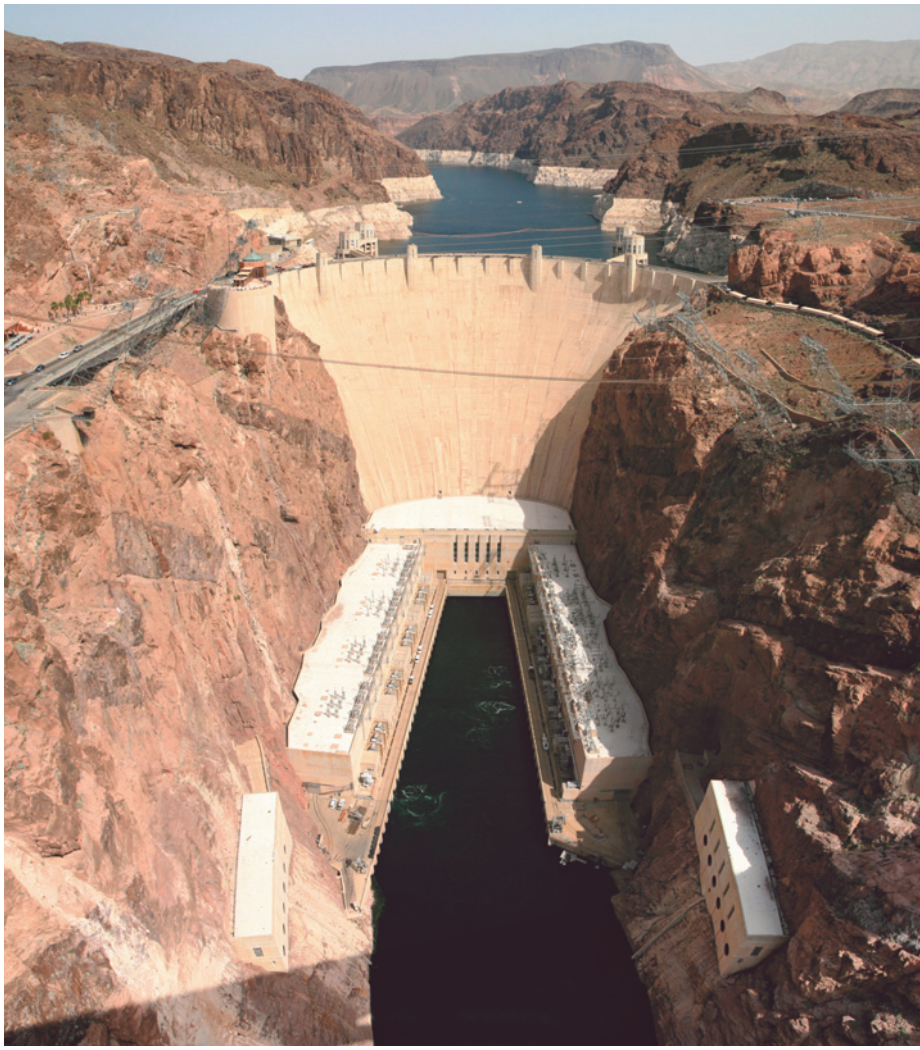
Finally, the possibility of terrorist attacks on water supplies is a political concern in many countries where millions of people and businesses depend on reservoirs and dams. The physical destruction from burst dams is horrific as are the consequences of tampering with water.

Bottom line

On a global level, the numbers don't add up: we have a finite resource for which demand will soon outstrip supply. The world's population is not distributed according to the availability of water, there are regions where water scarcity is and will remain critical. If we do not address these issues by creating frameworks at a global level and take action locally, there is the increasing threat of conflict as competition for water sources intensifies.

Security of water supply needs to be at the top of every country's agenda. Where countries rely on each other, this needs to be recognised and formalised. Within this framework, the water industry can play its part in capturing, treating and transporting water efficiently, while at the same time promoting ethical usage.

Although the problems are global, the solutions are all local. Therefore governments, businesses, NGOs and the public all need to work together to ensure safe and clean water supplies.



2. Climate change: A volatile future

The scientific community, governments and, increasingly, the business world all single out climate change as having the greatest influence on global water supply and demand.[9] What makes climate change such a powerful issue is that the outcomes are unpredictable.

The last 50 years have seen the quickest rise in the earth's temperature since records began.[10] While the causes of this are still being debated, its consequences for the global water system are becoming increasingly clear.

The impact of warmer or more volatile weather on water resources will vary according to location. One significant effect may be large-scale change in precipitation patterns and intensity. This could mean storms, cyclones and flooding in some regions and heat waves, water scarcity and drought in others. Water supplies and natural water storage capacity in glaciers and snow cover are also predicted to decline. While this will increase the water supply in the short term in parts of China, India, the western United States, the Andes, Pakistan and Bangladesh, over time the amount of water will diminish. Rising water temperatures will also cause the quality of water to deteriorate as the ecosystems become more vulnerable with diminished capacity to store and filter water. At the same time rising sea levels could devastate coastal areas.

Water scarcity issues also have a significant impact on the condition and functioning of existing water infrastructure. Pipes, irrigation systems, hydroelectric plants, flood defences, sewerage and water management systems are all vulnerable to droughts, flooding and extreme changes in the hydrological cycle.

Climate change could lead to large scale societal change including human migration. According to a 2009 Intergovernmental Panel on Climate Change report, water scarcity issues already affect around one-third of the world's population.[11] Furthermore, the majority of glacier-fed regions that supply one-sixth of the world's population are located in economically 'fragile' developing countries. Providing water to a shifting population will put enormous stress on governments' planning and financing capabilities, as well as on water utilities.

A warmer climate will also drive demand for water. More water will be needed for agricultural use, industrial cooling and domestic purposes.[12] In addition, water will need to be transported longer distances.

Planning for the effects of climate change is not easy. The unpredictability of weather patterns makes it difficult to rely on historical statistics, and new technologies are required for planning and investment purposes. There is a need for high-quality data and more analysis into the consequences of climate change. The water industry has had to deal with vagaries in hydrology for a long time and has developed a wide range of tools to cope with changes in the water cycle. Future planning needs to build on these established practices and techniques. However, there is also a need to increase planning and development of a range of scenarios to help prepare for the impact of volatility on water supply and demand.

So far, however, only a few governments have incorporated climate related risks in their water reform plans. In Australia, the water sector has always occupied a central position in government planning. The Water for the Future initiative was launched in 2008 and put action on climate change at the top of its agenda. In the United Kingdom, Ofwat considers adapting to climate change and mitigating its effects as its top two future challenges.

Bottom line

Climate change increases the risk of volatility in water supply thus making it impossible for the industry to rely solely on historical data for future planning.

The main challenge for utilities is to reduce the effect of volatility on resources, infrastructure and demand. There is an urgent need for contingency planning based on scenarios relying on high-quality data and analytics.

Ultimately, we need flexible and smart systems that monitor, regulate and anticipate continuing changes in circumstances. There is also need for close collaboration between utilities and policymakers to work together to address this critical issue.

3. Managing demand: The era of cheap water is over

The growing demand for water makes conservation and efficient use central issues. Both utilities and governments are coming under pressure to safeguard this increasingly precious resource and incentivise customers to manage their water usage better. We believe that clearer pricing will have an important role to play in this.

A number of international institutions have highlighted the importance of pricing as a tool to enforce more efficient water management.[13] The World Bank and the Organisation for Economic Co-operation and Development have both argued that water prices should be set to address scarcity related issues.[14]

Even though water is essential, it is also often cheap. In contrast to energy prices, in many parts of the world water is free to the consumer, or the bills do not cause much concern for households. They also mostly appear as a minor expense in company profit and loss accounts. It is often taken for granted that water is plentiful, clean and safe to drink. Furthermore, access to water for domestic usage is considered a basic human right. Many regard water as a free resource and utilities process and transport water, but do not own it.

Water prices should be affordable, but at the same time utilities should be able to recover the costs of providing the service and invest for the future. Operating water infrastructure is becoming more expensive with rising chemical, energy and labour costs. There is also considerable investment required to fund the replacement of ageing infrastructure or to build new facilities. However, this approach does not address a number of important issues such as growing water scarcity, and environmental and social concerns.

Many countries subsidise the price of water to make it available for the public and business. However, subsidies have been criticised for creating artificially low prices that fail to encourage effective water management and leave utilities underfunded, struggling to provide adequate services and attract investment. This is certainly the case in some parts of China where low prices have lead to over-extraction. Some also argue that heavy subsidies in countries such as India fail to provide help where it is most needed. This is because many people living under the poverty line do not have permanent access to water and purchase it from street vendors who can charge in excess of the subsidised price.

There is a compelling case for utilities either to increase water prices or create a better pricing system that addresses scarcity issues and provides a satisfactory financial return. Increasing water prices, however, is a difficult political decision, because in many countries water infrastructure is publicly owned and municipalities or a regulator determine the prices we pay, sometimes through taxes. Raising awareness of water related issues and educating the public about the necessity of more effective water pricing is crucial.

One potential solution that could provide both affordable prices and sufficient returns is the introduction of tiered prices. Under such a system, some 30 to 50 litres of water a day may be provided at a low price for basic domestic usage. As water usage increases so would the price. This has been successfully used to encourage water conservation and make water easier to afford in several countries including Israel, Australia, Hong Kong, Japan, South Korea and parts of the United States.[15]

Prices have already started rising in a number of countries. Price increases well above inflation have occurred in the United States and the United Kingdom.[16] Much of the increase has been linked to the rising cost of chemicals, labour and energy, while Australian customers are paying for desalination plants that had been approved during a period of prolonged drought, but many have yet to come on stream.[17] In Israel, water prices have increased sharply as a result of worsening drought conditions, which caused per capita water consumption to decline from 110 to 90 cubic metres.[18]

Bottom line

In many countries, pricing systems must be rethought: pricing should reflect the issue of growing demand and diminishing supplies. Utilities should be able to recover the increasing costs of providing the service and while at the same time investing in more efficient infrastructure. Higher water prices should also encourage water conservation and efficiency programmes in agriculture, industry and in homes. A tiered pricing system could help address availability issues.

While water may be a free resource in the environment, its extraction, treatment for drinking, distribution, collection, and re-treatment for discharge is very capital and operationally intensive, and the costs must be recovered from somewhere.

While price increases are difficult political decisions, providing more information and educating the public about why higher prices are necessary will be key both for utilities and customers.

4. Managing demand: The water and energy nexus

A strategy to manage water usage more effectively should include an integrated approach to addressing the relationship between water and energy. The link is simple: the more energy we use, the more water is needed for production. The more water we need for energy production, the more energy we use in the process. Utility and energy companies need to work together to create integrated solutions to reduce water usage during energy production. Collaboration will not only help utilities manage their investments more effectively, but it can also cut significantly ever increasing energy costs. Both water service providers and energy companies will also find that closer collaboration can have a positive impact on their carbon and other emissions.

The energy industry relies on fresh water supplies. While significant water efficiency savings have been made in agriculture since the 1980s, the energy industry's thirst for water has grown unabated. In fact, thermoelectric power accounts for 45 per cent of fresh water withdrawals in the United States today, making it the largest withdrawer of water, ahead of irrigated agriculture.[19] With US electricity demand expected to grow around 50 per cent by 2030, experts argue that the corresponding fresh water supply and infrastructure will simply be insufficient to support such growth if no efficiency savings are made. The picture is even bleaker in rapidly industrialising countries such as China and India.

The energy industry's need for water is well documented: production, transportation and refining all require water. Oil extraction requires between 10 and 60 gallons per MMBtu, while enhanced oil recovery can require as much as 95 gallons per MMBtu.[20] Electricity generation is particularly water intensive. Thermoelectric plants, such as coal, natural gas and nuclear, draw large amounts of fresh water for cooling and water also turns the hydroelectric turbines.

Many governments promote the use of renewable energy to meet green energy targets, help energy security and reduce reliance on fossil fuels. However, with the exceptions of wind, solar and wave power generation, biofuels require considerably more fresh water than electricity generated from traditional fossil fuels. Irrigated corn ethanol, for example, requires an eye-watering 1,000 gallons of water per MMBtu on average. In addition, carbon capture and sequestration reportedly adds 45-90 per cent more water to coal-fired thermoelectric plants.[21]

With unconventional resources becoming more important for oil and gas suppliers, the concern is how much water such resources will require. Water is used to extract heavy bitumen from oil sands, which makes tar sands water intensive, as even the most efficient facilities use between 20 to 50 gallons of water per MMBtu. One gallon of synfuel, depending on the quality of the coal used, can require between 41 and 60 gallons of water per MMBtu.[22]

The energy sector can also have a negative impact on the quality of water. For instance, hydraulic fracturing is used to release gas trapped in rock formations. This involves pumping a mixture of water, chemicals and sand into the rock which may then find its way to water bodies thus increasing water treatment costs for utilities. In addition to being potentially damaging to the environment, hydraulic fracturing also requires a large amount of water.

At the same time, the water industry requires a large amount of power. In the United States, the water and waste water industries account for roughly four per cent of total annual electricity usage.[23] Electricity is needed to lift water from aquifers and pump it through canals and pipes. It is also needed to control water pressure and flow, and treat water and wastewater. As water becomes scarcer, more will need to be pumped for longer distances or produced by alternative means such as desalination plants. These plants in particular require considerable energy.

Recent examples show collaboration between the water and energy industries can yield savings for both industries. In the United Kingdom, Anglian Water and Welsh Water are using sustainable technology to treat, clean and enrich the by-product of waste water treatment. This can be recycled as biofuel, and generates over 6MW of sustainable electricity that is used to power the treatment plant with the excess sold to the grid.

Bottom line

The futures of the water and energy industries are inextricably linked. Increased energy demand will require more water, which utilities and water sources may struggle to provide. Increased water demand, especially in areas of scarcity, will lead to higher energy costs and additional investment in water infrastructure. This symbiotic relationship can no longer be ignored.

There is an urgent need for closer collaboration between these two sectors. In the energy industry, when planning and developing new projects, the impact on water resources and requirements should be minimised. At the same time, the energy requirements of individual water projects should be kept as low as possible.

This integrated approach to solving key issues between the water and energy sectors may also lead to lower carbon emissions while at the same time benefiting ecosystems.

5. Increasing supply: Technology in the driving seat

Technological advances in sustainable water management and efficient usage can only increase in importance. With its public ownership, low customer prices and assets with a life span of 60 to 80 years in most countries, the water industry has not been a frontrunner in innovation. It is often considered inefficient, conservative and slow to change compared with other industries.[24] However, continuing scarcity and security issues combined with growing demand will force the industry to react more quickly and more creatively. Technology already plays an important part in increasing supplies of water around the world. With demand for water expected to continue growing, this role will only increase. Higher consumer prices and the necessary future investment are expected to drive innovation in the sector. Closer engagement between utilities and technology providers will therefore transform the way we source, use and treat water.

Agriculture accounts for around 70 per cent of global water withdrawal. Thus water conservation and efficiency techniques were introduced in this sector first and have had a considerable impact. The 'green revolution' which took place between 1970 and the 1990s doubled Asia's cereal production while increasing land use by only four per cent. During that period research mostly focused on introducing new drip irrigation, soil fertility and pest control techniques, and producing high-yielding varieties of rice, wheat and corn. Today, there is a new movement to grow 'more crops per drop'. This essentially means efforts are being focussed on 'precision agriculture', using technology to make the sector more water efficient, while also developing drought resistant crops.

Utilities not only need reservoirs and pipes, they also need data and analysis to make informed decisions. Such data can decrease the likelihood of costly investment mistakes while expanding services and increasing revenues. The use of metering can have a significant impact on the water industry. For example, an Israeli city is installing 27,000 meter readers.[25] Once the system is operational, it will collect and analyse data every 15 minutes and report any leakage thus allowing consumers to monitor and change their usage. The data will also enable authorities to understand the city's usage pattern and in turn help them plan for future needs.

Additionally, a 2010 survey by Oracle in the United States and Canada found that more than three-quarters of customers are concerned about the need to reduce water consumption and believe that more information about water usage would encourage them to save water.[26]

The term 'smart meter' traditionally refers to devices used to measure electricity or gas consumption that allow two-way communication between the meter and the central system. This enables utilities to match the electricity generated with consumption, while also keeping customers informed about the cost of the electricity or gas they use. Although smart meters have existed for years, employing them to monitor water usage and encourage reduced consumption is a recent development. One-third of utilities in the United States and Canada are considering or already implementing smart meter technologies.[27]

Technology will also play a pivotal role in creating additional water resources to meet ever increasing demand. Over the last two decades, advances in membrane technology has contributed greatly to improvements in water remediation techniques and has recently matured from being an emerging technology to a relatively common approach for water and waste water treatment. In China, using new membrane technology has decreased the cost of desalination from RMB6-7 per ton to RMB4-5 per ton.[28]

Membrane filtration also opens up opportunities for increased water recycling and reuse. In Singapore, advanced waste water treatment technology produces 30 per cent of its water supply thus reducing the country's reliance on water imports from Malaysia. After the traditional water treatment processes, the water is further purified by dual-membrane (microfiltration and reverse osmosis) and ultraviolet technologies. NEWater, as it is branded, is clean enough for human consumption but is mostly used in industries requiring high quality purified water.

Emerging countries are anticipated to be the next big market where utilities will closely engage with technology providers. Seventy per cent of the world's population may live in cities by 2050, compared with 50 per cent today, with 95 per cent of the increase expected in emerging countries.[29] Acutely aware of the issue, the Chinese government is firmly focused on water conservation, pledging to spend RMB30 billion on recycling water over the next decade.[30] Technologies that help achieve this goal in a cost effective and environmentally friendly way will shape the future of the water industry. These will include water reuse and recycling. The Chilean mining industry is also looking to implement unconventional technical solutions to manage water scarcity risks. These include the increased use of water recovery technologies from mining projects, desalination and water reuse.

Bottom line

The water sector could benefit enormously from closer collaboration with technology providers to achieve sustainable water and effective water usage.

Smart meters and cost efficient desalination, as well as innovative water reuse technologies, can become essential tools in easing supply-side constraints. Globally, the water industry should be large enough to pay for the development of technology-based solutions, many of which may not be affordable at the local level.

6. Sources of funding: Going private

A large amount of capital will need to be invested in the water industry over the next decades to carry out necessary upgrades, and to deal with growing demand and the effects of climate change. Where is the funding going to come from? It could come from increasing the price of water, but this can be a difficult political decision in many countries, while governments are struggling to find extra funding in these economically challenging times. Therefore, the private sector may need to play a more significant role, not only by running publicly owned infrastructure but also by buying up government owned assets.

A large portion of water related infrastructure in the developed world was built decades ago. Half of London's water mains, for example, are thought to be more than 100 years old and a third could be over 150 years old.[31] Old is not necessarily bad, but problems start to arise when pipes burst causing substantial water loss, and therefore increased cost, or when sewerage systems are no longer able to cope with demand. Such problems are common in the developed world. In addition to the capital needed to address these issues, stringent environmental and water quality standards will also require a significant amount of investment. In developing countries and emerging markets utilities are struggling to cope with growing demand due to population growth, urbanisation and changing lifestyles. Increased demand, combined with a lack of decent sanitation, is already affecting economic growth.

A 2010 study by The Boston Consulting Group (BCG) puts the total cumulative investment required to meet urgent infrastructure needs globally at $35 trillion to $40 trillion. Of this, the study suggests that $16 trillion should be dedicated to water over the next two decades.[32] Water tariffs in many countries hardly cover the costs of infrastructure maintenance and operations, leaving next to nothing for upgrading or extending the system. Increasing water prices in these countries is also a difficult political decision to make.

One potential, but diminishing, source is public funding. Although stimulus packages passed as a response to the financial crisis in some countries included funds dedicated to public water infrastructure, large budget deficits are undermining many governments' borrowing capabilities. This will make it difficult for governments to raise the funds necessary to carry out major capital programmes in the future. BCG estimates that the funding gap between expected costs and governments' ability to pay may range from $20 trillion to $25 trillion for all infrastructure needs, leaving at least half of the bill to be financed elsewhere.

Private sector participation in the water industry is not new. Around 70 million people worldwide are served by private companies. In addition, private companies operating publicly owned water facilities serve another 200 million people in over 40 countries including France, Spain and Saudi Arabia.

Private sector engagement in the water industry is expected to grow. This is because in the era of government budget constraints, the private sector's funding power is becoming more important. According to estimates from consulting firm Sustainable Asset Management, the water related equipment and services market reached $480 billion in 2010.[33] In the emerging markets, notably China, the Russian Federation and several parts of Southeast Asia, there has been a surge in the number of private sector companies winning contracts in the waste water treatment and desalination sectors.

With the effects of the economic crisis and budgetary constraints continuing, privatising water assets could become more common. For example, the Greek government is planning to sell stakes in two of its water companies that could raise €50 billion by 2015.[34]

The United Kingdom provides an example of a successful privatisation programme. Since the industry was privatised in 1989, customer service has improved significantly. Leakages have been reduced by 35 per cent, the industry's environmental standards have greatly improved and £85 billion has been invested by water companies in maintaining and improving the assets. The UK water industry is also considered well capitalised and regulated. It is attractive to institutional investors such as pension funds, infrastructure funds and sovereign wealth funds. This is because UK water companies operate in a low risk environment with predictable cash flows. Thanks to cost-reflective water prices, returns are also higher than in other countries. These considerations led to two recent acquisitions, the sale of Northumbrian Water to Cheung Kong Infrastructure of China and Bristol Water to Capstone, a Canadian infrastructure fund.[35]

Bottom line

The large amount of capital needed in the coming decades to upgrade ageing infrastructure in the industrialised world and build new water systems in developing and emerging countries will stretch public finances and test the ability of countries to borrow.

The private sector is expected to take a more active role in the global water industry, not only in terms of managing assets on behalf of the state, but also in owning and financing the assets.

7. Water as the next 'hot' commodity: Has its turn come?

With demand for clean water potentially outstripping supply by as much as 40 per cent by 2030,[36] especially in countries such as China and India, the fundamentals could be in place to create a more liberalised market and turn water into the next 'hot' commodity. Although the possibility of selling water on a physical market is some way off, there are other options that could better address the supply-demand imbalance in the future. Ultimately, the aim is to secure adequate funding for more cost effective and efficient water services that are capable of serving an ever increasing customer base.

The idea of allocating water based on market dynamics has been explored in the past but encountered supply-side risks. While there is plenty of demand for water, who would risk being short? Selling water is also a highly political and emotional issue. For example, Canadian federal and provincial governments have enacted laws that prohibit the bulk removal of water from watersheds, with the intention of protecting bulk water from being exported to the United States. Water shortages ultimately threaten national security by causing disruption to food and supplies, hygiene and industry overall. There are alternatives for oil but there are no alternatives for water.

Water is not a resource that lends itself easily to be traded as a commodity. To date, the price of water has simply not been high enough. This, coupled with additional storage and transport costs, has not made it feasible to sell water on physical markets in large volumes over long distances.

However, opportunities may well exist at a local level to establish a market. Such a market could only work where the water supply and demand patterns of neighbouring regions differ substantially. In the United Kingdom, the sale of water between water utilities in an active market is not encouraged. Severn Trent, a British water company, has been challenging this position for a number of years. It argues that instead of over-extracting water in already scarce areas such as the southeast, and building costly reservoirs and desalination plants, utilities should be allowed to buy water from other parts of the country where supplies are plentiful. Water should also be moved through already existing infrastructure such as canals and rivers. This could keep costs down for both customers and utility companies, and provide water for a growing population.

The trading of water abstraction licences is another move towards establishing water markets, although in this case it is the right to access water, not the water itself that is being traded. Such a system creates market dynamics that relate to the availability of the resource. Trading water abstraction licences has been common practice in Australia since the mid-1990s. The system, whereby the amount of water to be abstracted is capped and the licence holders are allowed to trade the licences, has helped encourage water efficiency. Trading licences has also helped reorganise the irrigation industry and made it possible to build new supply facilities. Overall, the licence trade has reduced the economic impact of Australia's extreme weather conditions. Because the caps can be increased or decreased according to the availability of water, licence prices can be adjusted according to the availability of water supply.

Licence trading is also well established in certain parts of the United States, Chile and South Africa. Although allowed in the United Kingdom, the system is complex and therefore trade has so far been limited. The 2009 Cave Review on competition and innovation in the UK water sector recommended making water abstraction licences easier to trade. The government's response is expected in late 2011 following a consultation period with industry participants.

More radical changes could also be on the way. For example oil and LNG tankers could be backhauling water in the not too distant future. Although the economics of this have not been proven, the use of tankers may be a viable alternative to building additional desalination plants in the Middle East. We may also see long-term water trade agreements between neighbouring countries become more common and pipes carrying water rather than oil or gas appearing, similar to the water pipeline between Turkey and Northern Cyprus. This would be driven by a high commodity price relative to the transport and storage costs.

The goal of creating more liberalised water markets is to provide utilities with sufficient funding so that they can invest in more efficient water services and ensure the sustainable use of an increasingly scarce resource.

Bottom line

Given that it is our most precious resource, we expect to see more initiatives to trade water and rights to water based on market dynamics. These could include setting up local markets, selling abstraction licences or more radical steps such as long-term water trade agreements.

8. Water stewardship: The way forward

The essence of water stewardship is sustainable and ethical water management, and efficient usage for the benefit of current and future generations. Utilities, regulators, industrial and domestic users of water need to demonstrate their engagement in water stewardship at a local level. They also need to collaborate more closely, share information and expertise to have a larger impact at the global level.

For many businesses, water is emerging as the next critical risk.[37] Companies realise that a decline in the quantity and quality of water could threaten their business operations, supply chains and ultimately business continuity. Competition for diminishing water resources can lead to tensions between businesses and local communities. This in turn can damage a company's brand value (reputational risk from poor water stewardship) and could result in litigation or the withdrawal of its licence to operate. Water quality regulations, which will only become more stringent over time, will directly lead to increased costs. The majority of these costs will fall on private businesses, especially in emerging countries, where some governments fail to provide adequate water services.

Companies are therefore coming under increasing pressure to show more initiative in identifying water risks and managing their water usage more effectively. A few recent projects highlight the extent to which companies already address water related business risks.

One such initiative is the Water Disclosure (WD) questionnaire launched by the Carbon Disclosure Project (CDP) in 2009. Top global companies are invited to fill in the questionnaire on a voluntary basis. The CDP's success has been driven by the value that companies attach to voluntary carbon emissions disclosure. The WD project believes that disclosure of water usage will have a similar effect. Its aims are similar to the objectives of carbon disclosure. Its goals are to help top global companies measure and report their water usage and identify business opportunities and mitigation measures. The project is run every year and the number of voluntary respondents is increasing rapidly as more companies realise the value of water stewardship.

The 2010 report revealed that half of corporate respondents expect water risks to develop in their business in the next one to five years and a large proportion now have strategies and plans in place. In addition, more than half have water related performance targets.[38]

Another recent publication, "Murky Waters? Corporate Reporting on Water Risk", examines the corporate social responsibility agendas of a number of companies in various industries. The report concludes that the level of information disclosed in most cases is inadequate for stakeholders to understand a company's water related risks. The paper also highlights the need for water reporting to be included in company financial filings rather than as part of corporate sustainability reports.[39] This would further raise awareness of water scarcity issues and prompt businesses to set water reduction targets and apply appropriate mitigating measures.

Water reporting is indeed in its infancy. Essentially, water accounting could help companies measure how much water they use during operations and throughout the supply chain. This in turn could help evaluate the risks that water poses for an individual company. Regulators are in the process of developing accounting frameworks and standards that will provide companies with comparable, transparent and meaningful information on water usage. A 2010 Pacific Institute report provides an overview of methodologies currently available.[40] One such methodology is the 'water footprint', which was developed by the Water Footprint Network.[41] This is similar to the concept of the carbon footprint and essentially calculates the volume, timing and location of water used in operations and the supply chain.

A number of international businesses have already made progress in reducing their water intake. Substantial savings have been reported by companies in the most water intensive industries, including the food and beverage, semiconductor and energy industries. More efficient water usage does not only result in cost savings. It also forges stronger relationships with investors, regulators, local communities and employees. Furthermore, continuing water stewardship can have a positive impact on a company's reputation.

The number of companies developing strategic partnerships as part of their commitment to more effective water management is also growing.[42] For instance, a growing number of companies seek the help of local and international NGOs to explore ways of addressing water scarcity issues.

More detailed water reporting provides proof that businesses are taking water scarcity issues seriously. It will also help utilities and regulators to understand industrial water usage better so that they can develop integrated approaches to serve customers more efficiently while managing catchment areas more sustainably.

Spain recently conducted a water footprint study that calculated the amount of fresh water used to produce the county's goods and services.[43] It concluded that water scarcity was the result of inadequate water management in the agricultural sector. Spain was the first country to incorporate the findings of such a study in water related policymaking.

Utilities that position water stewardship at the centre of their operations stand to gain. Anglian Water, a UK water utility, recently launched a 'Love every drop' campaign. The campaign engages with those who influence water usage in the region including the regulator, domestic users, manufacturers, retailers and property developers. The aim of the campaign is to better understand water usage in order to provide more sustainable supply. Recent years have also seen an increase in campaigns by water providers to raise awareness of the importance of water conservation and efficient use. For instance, the Public Utilities Board, Singapore's water supplier, runs a continuous water conservation programme that has led to a reduction in per capita water consumption from 165 litres per day in 2003 to 154 litres today.[44]

Bottom line

Efforts to demonstrate water stewardship will be a key theme for utilities and water users in coming years. For utilities, placing water stewardship at the heart of operations can result in better relations with customers and regulators. At the same time, identifying and measuring water related risks will enable companies to devise appropriate mitigation measures. This can also help build better relationships with stakeholders, local communities and regulators. Close collaboration between utilities, regulators and all users of water is required to address the ultimate issue – the scarcity of water resources in many parts of the world.

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