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## EXECUTIVE SUMMARY

1. The water sector faces serious challenges. The failure to meet basic human needs for water; difficulties in meeting the financial requirements for maintaining, extending, and upgrading both new and aging water systems; new regulatory requirements for water quality; increasing water scarcity; competition for limited capital, and global climate change will continue to affect the development of the water sector. In addition, the water objectives of the Millennium Development Goals add impetus to efforts in developing countries and the Big 5 economies (BRICS)<sup>1</sup> to halve the proportion of people without access to safe drinking water and sanitation. As existing water infrastructure hits the century-old mark, the developed OECD countries are also facing immediate needs to replace and upgrade infrastructure, respond to new water quality regulations, and ensure the security of water supplies in response to climate change, pollution, and growing populations. For all water systems, the main focus is on the best ways to finance and implement improvements in operation and maintenance of systems.

2. Existing business models have been changing in key ways to respond to these challenges in the water sector. Public models are responding to competition from private actors by instituting efficiency through re-engineering their operations and services. Private sector models are also changing the nature and role of their investments.

3. Beyond these challenges already affecting current business models, there are 6 key drivers and opportunities that will further interact and shape the water sector for the decades to come. These drivers will affect both the public and the private spheres creating the need for new synergies, new partnership formats and even new actors in the water sector. Future business models will have to assimilate certain fundamental characteristics to face the challenges and seize the new opportunities in the water and wastewater sectors.

### *Current Business Models and Recent Trends*

4. Different business models involving different relationships between private and public roles have emerged and become predominant in France, England, Canada, the U.S., Germany, and in other OECD countries. These models range from the purely public, to a mix of public and private, to purely private. They vary in terms of level of decentralization, who owns system assets, who finances investments, and who defines the price and level of service. While the private sector has a relatively minor role in the provision of water and sewerages services in the vast majority of OECD and Big 5 countries, private sector participation has played an important role in some parts of the world.

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<sup>1</sup> Big 5 economies are Brazil, Russia, India, China, and South Africa

5. In the eleven OECD and BRIC countries<sup>2</sup> considered in this study, concessions and Greenfield Projects were by far the most common private sector form; they represented respectively 39% and 37% of all private sector participation initiatives between 1990 and 2004. Over that same period, management and lease contracts represented 17% of projects while full divestiture projects represented only 7% of projects. Total public-private partnership investments in the water and sewerage sector in these eleven OECD + BRIC countries were US\$ 11.2 billion (2000\$) between 1990 and 2004. Current investments in these same countries are nearly 30 percent below their 1998 peak level of US\$ 1.6 billion (2000\$). These numbers seem to indicate that private sector participation is coming to a standstill. But in reality, they merely reflect the fact that the nature and form of PSP is evolving.

6. This evolution stems from the fact that, having been stung by public backlash against previous failed public-private agreements, private companies are moving from divestiture agreements and concessions, which involve high capital risk, to operation and management contracts which do not imply private investments. There has been a growing trend toward wastewater contracts versus water contracts, possibly because wastewater contracts are less politically charged. The private sector is embracing the need for transparency and stakeholder involvement in successful public-private agreements. Local private actors are also taking a much more significant role in the water sector, particularly in China and Russia. When analysing the data more closely, it has become apparent that private companies are focusing in key regions and withdrawing from others. We anticipate that in the near future, local private actors will become more predominant, and that concessions will continue to be attractive in some stable economies, but in others O&M contracts will be preferred. After a decline in private investments, we expect private investments to pick up again with changing actors and new strategies.

#### *Key drivers and their impact on future business models*

7. When analyzing long term trends in the water sector, a number of key drivers have been identified as having the potential of substantially affecting the robustness of business models. They must be considered when defining future models in order to maximize the benefits linked to new opportunities which could increase water management efficiency. These drivers are briefly detailed below:

#### *Financing*

8. Financing is critical for ongoing operation and maintenance as well as responding to needs for new infrastructure. The role and nature of traditional actors in the water financing sector are changing significantly. General budgets which funded much of the construction of water infrastructure are shifting away from ongoing funding because of competition for government funds as well as decreasing funds. An OECD paper estimates that by 2015, an average annual investment of \$ 772 billion will be needed in OECD and BRIC countries. With growing financial needs, along with a decline in public investments in water, and the lack of private investment being directed to this sector (only 5 percent of private investments tracked by the World Bank went to the water sector), new strategies need to be identified.

9. Full cost pricing through user charges that account for all the costs of providing water and wastewater services is being considered in communities throughout the world to address water sector needs. Yet, currently very few systems worldwide are fully funded by current or future customers of the service, continuing to depend on taxes and international aid. Future business models will have to gradually adopt full cost pricing if they are to face the huge financial challenges of the water sector. Another option that could alleviate the financial burden faced by governments is the implementation of revolving funds. In the United States, a mechanism was created to help States meet federal requirements under the Safe

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<sup>2</sup> The eleven countries addressed in this study are: the Czech Republic, Hungary, Mexico, Poland, the Slovak Republic, Turkey, Brazil, Russia, India, China and Indonesia.

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Drinking Water Act. This bill established the Drinking Water State Revolving Fund (DWSRF) to make funds available as grants to finance infrastructure improvements. The program also emphasizes providing funds to small and disadvantaged communities and to programs that encourage pollution prevention as a tool for ensuring safe drinking water.

10. These are just a few innovative ways of facing the financing problematic. Identifying and adapting to local specificities the proper financing strategies is without a doubt the most crucial element influencing the robustness of future models.

### *Demand Management*

11. Demand management, by reducing the amount of water and wastewater services that are needed through efficiency, conservation, and structural changes can substantially reduce the capital requirements of existing water systems. A demand management approach in water increases the productivity of water use, rather than seeking endless new sources of supply. Demand management changes the industrial dynamics, increases the time scale of planning efforts (focus on long-term vs. short-term) and focuses on the end-goal instead of the path to reach it. While investment would be required for conservation and efficiency programs and technologies, these are likely to be far less costly than large infrastructure projects (Gleick et al. 2002, Gleick et al. 2005).

12. A classic example of avoiding a multi-billion dollar infrastructure investment is the experience of New York City in developing innovative policies for satisfying a new federal requirement for water filtration. In order to meet the new standard, the City of New York would have had to spend an estimated US\$ 6 billion for a state-of-the-art filtration system. Instead, they petitioned the U.S. government for permission to work with local residents in the upstate watershed to reduce contamination from local septic and sewer systems, to protect land from inappropriate uses that contributed to water contamination, and to locally manage storm water runoff. By implementing a wide range of watershed management tools, the City was able to meet its water quality obligations for about a third of the cost of the centralized infrastructure. Therefore, demand management could create opportunities for new private sector actors in the field of conservation and efficiency as well as reduce the level of investments needed to provide adequate water and wastewater services.

### *Scale of Water Systems*

13. In order to address challenges in the water sector, different approaches are being tried that either expand or reduce the scale of water systems. In the U.S. and Canada approaches to regionalize water systems capture economies of scale by banding together several municipalities. Regionalized water systems can reduce costs, share expertise, improve performance, enhance the security of water supply in uncertain climate conditions, and manage water systems at a more appropriate watershed scale.

14. At the same time, advances in technology are reducing diseconomies of scale associated with small systems. Today, on-site and closed-loop systems are a small but growing share of the water and wastewater sector. Numerous private companies have emerged to provide small-scale conventional treatment for water and wastewater. Emerging economies are increasingly requiring on-site treatment for wastewater instead of connection to overburdened centralized systems. This introduces new actors and methods of financing into the water sector including property and land owners, flat complex developers in water stressed areas, and engineering firms who provide DBO functions.

### *Public Involvement and Equity*

15. Public involvement will be crucial in facilitating much larger investments in the water sector. Ultimately, water utilities will be subject to the court of public opinion to determine whether they have

convinced ratepayers, taxpayers, and stockholders of the need for new infrastructure investments and the utility's ability to manage those infrastructure improvements effectively. Lack of public involvement can, and has, led to the failure of projects and investments. Because water is fundamental for life and health, ensuring equity is a key goal and a driver in the water sector. Pressures for full cost pricing will make it increasingly difficult to ensure that water is affordable for the poor, and will require the involvement of a health agency to ensure that the needs of the poor are being met. Therefore, it is unlikely that full divestiture projects will become frequent in the future; the varying degrees of private-public partnerships appear as the best solution to meet financial and social needs in the water sector. Also, by providing an environment where new financial mechanisms, technologies, and solutions can emerge and become successful, governments have a greater chance of success in meeting growing needs in the water sector.

### *Competition*

16. Seeing the success of the introduction of competition in the telecommunications sector in terms of reduced cost and improved service, competition is being tried in the water sector. Because of the high costs of infrastructure and the key public health nature of the service, introducing competition in water has been more difficult. It is being done in a few key ways. Third party access, or allowing a third party to use the capital intensive water distribution network, is being tried in England. This tool was created as a way to facilitate new entrants and increase competition between established players in the English water market (Ofwat 1999). Another strategy being considered is water transfers. They are being used to reallocate water among users instead of looking for new sources of water. Finally, benchmark competition in the form of performance scorecards has been used in Australia and the UK. Reportedly, doing well in these appraisals has become a significant driver for utility boards and senior managers.<sup>3</sup> These strategies will probably be extended to other countries since they provide policymakers with proper tools to improve efficiency. They also create incentives for private and public providers to maintain adequate levels of services in the water sector. Increased competition appears as a necessary aspect of new water management strategies.

### *Climate Change*

17. Climate change and water pollution were considered by Ashley and Cashman (2005) to have the greatest impact on increasing the cost of water services. Ashley and Cashman (2006) indicate that these factors may increase costs by as much as 33 percent. Climate change will undoubtedly have considerable impacts on water resources, although the extent of the impact and the precise locations where major impacts will be felt is unknown. In different regions of the world, climate change will affect where, when, how much, and how water fall; increase the vulnerability of water supplies; increase the severity of droughts and flooding events; threaten coastal aquifers among other impacts. Investments will be needed to protect water security, diversify sources of water, and introduce low cost methods of increasing supply, including demand management. Also, as water becomes polluted, or climate change impacts water security in certain regions, governance of water and wastewater systems may need to be undertaken at a larger scale allowing water systems to develop partnerships with other systems as added security. The scale of governance may need to change as the regional scope of water resource abstraction increases, as more regions seek to obtain water from greater distances.

### *Characteristics of successful future business models*

18. In light of these dynamic changes in the water sector, there are certain underlying characteristics successful business models will share in the future. A few of these characteristics include the ability to incorporate multiple scales into water management, the ability to develop strategic partnerships in an ever

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<sup>3</sup> Based on discussions by author Wolff with utility and Australian Water Association staff in Brisbane, Sydney, and Melbourne in July and August 2005.

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widening circle of water sector actors, the ability to leverage innovative sources of financing while still maintaining a level of public funding, the ability to incorporate adaptive management and performance based incentives to improve performance, and the ability to communicate with and involve the public in decisions about the water system. Successful water system business models will also manage system assets effectively, staff their businesses effectively, and ensure proper assessment of the problem before proposing a solution.

19. Furthermore, national and state governments have an important role to play in facilitating the success of water, wastewater, and storm water management in the next few decades. As existing and new water sector providers respond to infrastructure needs and growing populations, the implications for government policy are significant. Governments must create the conditions necessary for water and waste system providers to make needed investments, achieve social and health goals, and protect against threats to water security, while at the same time providing strong regulatory oversight.