WHITE PAPER

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Challenges In The Water Industry: Fragmented Water Systems

There are over 53,000 water systems[1] in the U.S. today serving more than 250 million American residents.[2] That is about one system for every 4,700 people. Only seven percent of the country's systems serve populations of over 10,000 and a mere one percent of the systems serve populations of over 100,000.[3] Some water industry analysts are questioning whether small systems are financially sustainable in terms of efficiency and performance. [4]

The severe fragmentation of the U.S. water industry poses serious challenges to meeting the great and growing water needs of Americans. One of the most effective ways to overcome water system inefficiency is to consolidate smaller and underperforming systems and thus create better services for the industry and consumers alike. The necessity of a clean and reliable water supply cannot be overemphasized, especially at a time when freshwater sources are dwindling. It is in this light that the need for water system change and greater cooperation throughout the industry has never seemed more important.

[1] For the purposes of this paper, the water systems discussed refer to Community Water Systems (CWS), which are systems that supply water to at least 15 service connections, or 25 individual residents, year round. This is different from Non-Transient Non-Community Water Systems (NTNCWS), which supply water to at least 25 of the same people at least six months per year, but not year round, and Transient Non-Community Water Systems (TNCWS), which provide water in places where people do not remain for long periods of time (i.e., campgrounds). When taking all of the aforementioned systems into account, the U.S. has 158,000 different water systems. Additional information and statistics can be found at: U.S. Environmental Protection Agency, *Factoids: Drinking Water and Groundwater Statistics for 2005*

[2] This figure is derived from the current U.S. population minus the percentage (15percent) of those served by private wells (and thus not served by U.S. water systems). Percentage of people relying on wells derived from www.epa.gov/safewater/privatewells/index2.html

[3] U.S. Environmental Protection Agency, *Factoids: Drinking Water and Groundwater Statistics for 2005*

[4] Shih, Jhih-Shyang; Harrington, Winston; Pizer A., William; Gillingham Kenneth. *Economies of Scale in Community Water Systems.* American Water Works Association Journal. September 2006
Beecher Policy Research Inc., & Cadmus Group Inc., 2002. *Scale and Scope Economies for Water Systems: Illustrations.* Draft Report. Cadmus Group Boston

UNDERTSANDING THE CHALLENGES

To appreciate the types of challenges fragmentation poses, it helps to understand basic U.S. water industry facts. To begin with, the industry is significantly more fragmented than other utilities in the U.S. such as natural gas (3,000 providers) and electric (3,000 providers).[5] Comparing water systems with other countries reveals the U.K. has fewer than 30[6] and France only two. Of the 53,000 U.S. water systems, 83 percent serve populations of less than 3,300 people and an astonishing 56 percent serve less than 500 people.[7] The vast majority of these small systems are within a few miles of other small systems.[8]

It should be noted that the 53,000 figure does not reflect how many water system providers exist in the U.S. but rather, the number of individual water systems with a Public Water System Identification (PWSID). A PWSID is given to each water system that is not interconnected with another system. Thus, a water provider can own several non-interconnected water systems within the 53,000 systems. While the number of providers in the U.S. is fewer than 53,000, current data makes it difficult to determine the exact number. For the purposes of this paper, the 53,000 number will be referenced. That said, even with a lower number of providers, the industry is still significantly fragmented.[9]

When small systems provide stand-alone services to only a few consumers, both the providers and customers miss economies of scale and the expertise of larger and more profitable water providers. Specifically, the types of challenges facing these fragmented systems include:

Access to Capital

For small systems, attracting investment often proves difficult with the need for capital driven by necessary costly repairs, the need for new equipment and meeting U.S. Environmental Protection Agency (EPA) regulations.[10] Small system owners will find it particularly challenging and costly to apply for loans as this often requires hiring professionals to assist them with the process. The only way to mitigate costs is to pass expenses on to customers by way of rate increases. This can become a vicious cycle, since small water systems often struggle to maintain the integrity of financial records, which are crucial to justifying the need to raise rates. Even when financial records are adequately maintained, small system owners may choose not to pursue the process of preparing a rate increase application as it can be too complicated and costly. Without adequate rates, financial performance suffers, and access to capital is even more limited.

Operational Efficiencies

Basic services such as billing, customer service, and water testing are often duplicated in neighboring systems with overlapping boundaries. For small systems, the technical, managerial, and financial capabilities required of a modern water treatment system are often too expensive to afford, resulting in sub-optimal water quality and service. Indeed, systems serving 25-500 individuals experience the most EPA regulatory violations per 1,000 people served.[11] Likewise, small private systems (of which there are about 26,500), often lack the expertise or determination to file for a rate increase with their State Public Utilities Commission (PUC), which must occur if a private provider wishes to increase rates and recoup financial

[5] U.S. Environmental Protection Agency, *Keynote Address to the Association of State Drinking Water Administrators,* Annual Meeting - Baltimore, MD, 24 October 2001
[6] Levin, Ronnie B., Paul R. Epstein, Tim Ford, Winston Harrington, Erik Olson, and Eric G. Reichard. *U.S. Drinking Water Challenges in the Twenty-First Century*. Environmental Health Perspectives. 110.1 (Feb. 2002): 43 - 52
[7] U.S. Environmental Protection Agency, *Factoids: Drinking Water and Groundwater Statistics for 2005*
[8] U.S. Environmental Protection Agency, *Keynote Address to the Association of State Drinking Water Administrators,* Annual Meeting - Baltimore, MD, 24 October 2001
[9] American Water, as the largest water provider in the U.S. and four times as large as their next competitor, owns about 800 water systems with individual PWSID numbers. Smaller providers will likely have significantly fewer water systems.
[10] Indeed the cost to repair the U.S. water infrastructure is estimated at up to $1 trillion over the next twenty years.
[11] Shih, Jhih-Shyang; Harrington, Winston; Pizer A., William; Gillingham Kenneth. *Economies of Scale in Community Water Systems.* American Water Works Association Journal. September 2006

investments made in a system. Deficient rate increases, and thus financial returns, will prevent a water provider from being able to make any future improvements and thus, adequately provide reliable and clean drinking water.

Becoming EPA Compliant

EPA regulations are continuously updated. Each new regulation demands greater expertise from the utility operators and costs more money to implement and maintain. In fact, the EPA suggests that the per household cost of monitoring and treating water to maintain compliance is $4 per year in systems serving more than 500,000 people, but $300 per year for systems serving no more than 100 people.[12] Monitoring and testing requirements continue to burden small systems, many of which do not even have a full time operator.[13]

Purchasing Power

Smaller systems have less bargaining power and must therefore pay higher prices for equipment, tools, services and chemicals than larger systems. The greatest opportunity for efficiency in water systems exists in the cost categories for capital, outside services and materials, suggesting that larger providers may be better at bargaining for and obtaining outside services and materials for lower costs than smaller providers. As such, basic water utility management and maintenance comes at a much higher price.[14]

As operations become increasingly complex and costly, many of these systems will find it difficult to provide high quality water, succeed financially or sustain operations. With U.S. demand for water 70 percent greater per capita than Europe[15] and steadily growing, the need to find a more efficient method for delivering water service is essential.

CONSIDERING CONSOLIDATION

One way to help resolve the challenges of fragmentation is consolidation of water providers. Indeed, many industry experts believe that consolidation has the potential to allow for greater efficiencies through shared central infrastructure, effective management and expertise, better cost structures and purchasing power, and greater access to capital, among others.[16] As one expert notes: "Consolidating water systems - whether through merging smaller systems or through a larger system absorbing one or more small systems - may be a way to reduce the cost of supplying water and to improve the ability of these systems to meet more-stringent regulatory requirements cost-effectively."[17] Furthermore, by improving the overall efficiency of these systems, one improves the overall level of service and water quality reaching the consumer.

Yet it is not enough simply to consolidate fragmented systems in order to achieve economies of scale. Of equal importance is the way in which consolidation will take place. A meaningful strategy must be in place that can leverage water providers' pre-existing systems.

Smart Consolidation Strategies

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[12] From the Congressional Budget Office Report. *Drinking Water and Wastewater Infrastructure*. November 2002
[13] Levin, Ronnie B., Paul R. Epstein, Tim Ford, Winston Harrington, Erik Olson, and Eric G. Reichard. *U.S. Drinking Water Challenges in the Twenty-First Century*. Environmental Health Perspectives. 110.1 (Feb. 2002): 43 - 52
[14] Shih, Jhih-Shyang; Harrington, Winston; Pizer A., William; Gillingham Kenneth. *Economies of Scale in Community Water Systems.* American Water Works Association Journal. September 2006
[15] Credit Suisse, *Water*, The New Perspective Series, 02 June 2007
[16] For examples of this research see: Levin, Ronnie B., Paul R. Epstein, Tim Ford, Winston Harrington, Erik Olson, and Eric G. Reichard. *U.S. Drinking Water Challenges in the Twenty-First Century*. Environmental Health Perspectives. 110.1 (Feb. 2002): 43 – 52.; Coy, Debra G. *Clean Water Issues*. Congressional Testimony. 19 January 2007.; National Drinking Water Advisory Council. *Affordability Recommendations*. July 2003.; Dickerson, John I. *Politicians Ignore Water Problems, thus Providing Investor Opportunities*. Summit Global Management Inc. February 2005.
[17] Shih, Jhih-Shyang; Harrington, Winston; Pizer A., William; Gillingham Kenneth. *Economies of Scale in Community Water Systems.* American Water Works Association Journal. September 2006

Meaningful consolidation strategies are smart strategies, such as tuck-ins, which allow a small water system to combine with a larger system in a contiguous geographic area in order to benefit from that larger system's expertise, access to capital, etc. "Smart consolidation" strategies also leverage areas in which the provider operates and where a high concentration of water systems can be consolidated. States like Texas (4,500 systems), California (3,000 systems), New York (2,800 systems), North Carolina (2,100 systems) and Pennsylvania (2,100 systems)[18] are all possible areas for further consolidation if the operator has a meaningful strategy that can leverage pre-existing systems in the area.[19]

Barriers to Cooperation

There are significant challenges in facilitating the consolidation of systems. A large number of small system providers, for example, are keen to preserve their independence and control over their utility functions, even at the expense of economic incentives.[20] Other challenges include public concern regarding land use vis-à-vis expanding populations, absence of an institutional authority for local cooperation, and lack of leadership at the state or local level to champion consolidation efforts.[21] To overcome these challenges, state and federal policy, regulations and financial assistance programs have begun touting the benefits of consolidation strategies, emphasizing factors such as economies of scale, access to capital and technology.[22]

Finding the Solution

Ultimately, the benefits of consolidating water systems outweigh the challenges. Towns and regions with consolidated water systems can more easily engage in public-private partnerships and thus gain access to private sector capital and expertise. In instances where a small system may be integrated with a larger provider, that small system not only enjoys economies of scale but can also benefit from solutions that transcend regions and states including access to specialized equipment, industry experts, and emergency response systems, the latter being particularly advantageous in the event of storms and other catastrophes.

Yet, even if consolidation experiences a significant upward trend in the future, it will take years before any meaningful reduction of the 53,000 figure takes place. The strategy of consolidation, as mentioned above, needs to be well-thought out and executed. It is far better to merge systems smartly than quickly.

CONCLUSION

High quality water and reliable water service are essential needs and demand for it will only increase in the coming years. Recognizing this demand by supplying high quality water in an efficient manner will require the ability to manage complex systems, keep up with new testing and monitoring methods, and improve water infrastructure. Most of the water systems in this country serve populations of less than 500, and there are a significant number of inefficient systems serving larger communities. There is clearly considerable room and need for consolidation. Given that water is vastly undervalued in the U.S. and that costs to operate water systems will only increase over time, the need to integrate inefficient systems becomes critical for both economic and practical reasons. Water systems that cannot financially sustain themselves pose risks not only to the providers that operate them but to the consumers who depend on them as well. Smart consolidation strategies that can leverage pre-existing systems serve as a viable way to mitigate these risks and make the industry more efficient.

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[18] U.S. Environmental Protection Agency, *Factoids: Drinking Water and Groundwater Statistics for 2005*

[19] Studies found that a water provider's level of acquisition can positively influence that company's performance and vice versa (Dickerson). That said, there have also been cases of companies that embarked on an acquisition spree that consequentially diminished their overall value, suggesting that "smart consolidation" is indeed important if a company is seeking to improve its performance.

[20] National Drinking Water Advisory Council. *Affordability Recommendations*. July 2003

[21] National Drinking Water Advisory Council. *Affordability Recommendations*. July 2003

[22] National Drinking Water Advisory Council. *Affordability Recommendations*. July 2003