

Difficult times create opportunities for creativity in the water/wastewater market

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The single-most valuable resource today – water – is practically being given away. Crucial for energy production, manufacturing, agriculture and public health, the raw economics of water consumption and management are both compelling and challenging: water security, economic development and GDP are all tightly interlinked. As the U.S. repositions its financial system in the wake of the recession, the growth potential for emerging and established economies alike depends on the availability of water resources.

Global consumption of water is doubling every 20 years, according to Goldman Sachs, yet water is heavily subsidized the world over, and freshwater reserves remain unaudited. Assuming continued economic and population growth, McKinsey predicts that by 2030, water supplies will satisfy only 60 percent of global demand, on average. Climate change could further exacerbate the problem.

The current economic downturn offers an opportunity to start addressing the emerging water crisis – both at a global and national level. The escalating pressures of dry funding pools, combined with new regulatory requirements and decrepit water/wastewater infrastructure, are starting to drive revitalization of the industry, with technological leaps and innovative alliances crystallizing into new opportunities for engineering and construction firms. Those ready to embrace new ways of conceptualizing solutions to complex problems and open to alternative delivery methods will lead the industry for years to come.

The following sections describe the state of the water/wastewater industry, including impacts of the recession; industry challenges and obstacles as well as drivers of the water business; the shift toward new project delivery methods and innovation based on current external forces, including implications for engineering and construction companies; and finally, an outlook of the water/wastewater industry.

State of the water/wastewater industry and impacts of the recession

America's century-old wastewater systems are responsible for billions of gallons of direct water pollution each year. The directive to replace derelict systems and establish new ones is estimated to cost \$390 billion over the next 20 years by the Environmental Protection Agency (EPA).

Around 7 billion gallons of clean drinking water are lost to leaking pipes each day, owing to an annual investment shortfall of \$11 billion (EPA) to replace old systems – some currently in violation of federal code, and many more projected to fail future water regulations.

Exacerbated by inadequate budgets, the lag in investment is a further deterrent to real action; at the same time, increased funding levels are required to meet heightened demand. Without proper maintenance and expansion of the water/wastewater network, the EPA and other groups have warned that public health threats loom, and three decades of environmental progress could be lost. As the situation worsens, problems relating to America's "invisible infrastructure" will become impossible to ignore.

Mirroring a broader shakeup in the engineering and construction industry, the water and wastewater segments are experiencing intensified competition for contracts.

Although many forecasters have airily predicted exploding growth for the water/wastewater industry in the near-term future, most segments of the business have experienced slower but very consistent growth, in spite of uncertain economic and business conditions (see sidebar).

While the recent economic downturn slowed industry activity in the water/wastewater market, it also placed increasing strain on existing funding sources. Ad hoc funding for water and wastewater projects currently comes from local user rates, hook-up fees, government bonds and State Revolving Funds. Some of the impacts of this deep recession include:

1. With the collapse of the housing market, many water/wastewater services were no longer needed due to changed population growth expectations and delayed or canceled expansion projects.
2. Reductions in collected tax revenues and hook-up fees have further limited investment abilities for municipalities.
3. The municipal bond market meltdown cut out a tool used to fund water-related projects (municipalities float municipal bonds to fund water and wastewater infrastructure). Today, the bond market remains tight and municipalities struggle to find new funding resources.
4. To some extent, stimulus funds slowed construction since many municipalities delayed their projects in hope of getting “free” money. In some cases, municipalities even delayed projects for which they had the funding.

Mirroring a broader shakeup in the engineering and construction industry, the water and wastewater segments are experiencing intensified competition for contracts. Engineering and construction firms are lowering their fee threshold and competing for smaller projects. At the same time, new players such as local civil engineers and small contractors are bidding on projects in the \$25 to \$100 million range – often without having any experience in water/wastewater projects. Larger contracts are still cost prohibitive to bid on for smaller firms.

Growth projections for both the water supply and wastewater construction markets:

Water supply construction:

- U.S. water supply construction will remain flat for the next two years, impacted by:
 - Declining municipal and county tax revenues
 - Strong dependency on credit markets
 - Bonding capacity
- Total U.S. water supply construction put in place has grown from \$7.6 billion in 1999 to \$16.6 billion in 2009. It is expected to grow to \$20.2 billion in 2013.
- However, in the long term, there will be increases in construction levels due to:
 - Need for repair, modernization and replacement
 - Increased environmental regulations
 - EPA consent decrees
 - Population growth and mobility
- Thousands of smaller municipalities and drinking water systems face a significant challenge to upgrade to new EPA standards for drinking water.

Wastewater construction:

- U.S. wastewater construction will remain at a historically high level.
 - The total U.S. wastewater construction market has more than tripled in size over the last decade, from \$3.2 billion in 1999 to \$10.3 billion in 2009.¹
 - Slow, steady growth will push the market to reach \$12.7 billion in 2013.
 - Five states will use 40% of the funds needed for upgrade of infrastructure: New York, California, Illinois, Florida and Ohio.
 - Funding for projects is primarily left to municipalities and will compete for funding from other non-sewage/waste infrastructure upgrade priorities.
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¹FMI's estimates for wastewater include dry waste.



Industry challenges and obstacles

To meet unprecedented demand, the water and wastewater industry must work to reinvent itself. The segments have long suffered from a lack of advocacy. One of the obstacles to holistic change is the fragmented nature of water/wastewater infrastructure. Regional boundaries are an arbitrary patchwork of political constituencies, and often do not follow the natural watershed. As such, varying laws govern adjacent water and wastewater systems, and the buck is often “passed on” where municipalities are incapable of meeting the rising price tag for system upgrades, and where the end-user cannot absorb another hike in rates – California rate payers are predicted to face double-digit rate increases in coming years.

The majority of the U.S. sewer pipe network was constructed more than 50 years ago; some of it prior to 1900. In need of replacement and upgrades, the 16,000 wastewater systems nationwide discharge over 850 billion gallons of untreated sewage into surface waters each year. Broken or blocked pipes are responsible for the overflow of 10 billion gallons of raw sewage annually. The American Society of Civil Engineers (ASCE) gave both Drinking Water and Wastewater “D” grades in their 2009 American Infrastructure Report Card.

System architecture is not the only vestige of the mid-twentieth century. Today’s funding structure for water and wastewater infrastructure is largely derived from the 1972 Clean Water Act (CWA). While the CWA has been kept in fibrillation by numerous amendments, ongoing funding for many of the original research and maintenance projects it supported has lapsed.

Federal assistance for the safe drinking water State Revolving Fund (SRF) in the 11-year period between 1997 and 2008 totaled \$9.5 billion – just slightly more than the investment gap for each

Drivers of the water/wastewater business:

Water as a scarce resource

- Both water quality and quantity issues are becoming more pervasive, and the public is starting to recognize water as a scarce resource; one that needs to be protected, managed and valued in a sustainable manner. Increased awareness is translating into greater government review, oversight, legislation, regulatory control and enforcement.

The energy-water nexus

- With plans for new alternative energy infrastructure come threats to water supply; a problem identified as the “energy-water nexus.”
- While energy procurement is the hot issue in the Capitol, the immense dependence of energy production on water will likely incentivize government investment in sustainable water and wastewater infrastructure in the coming years.

Regulatory requirements drive new projects and technological progress

- New policies and regulatory requirements are increasingly driving new projects and technological advancements in both the water and wastewater markets.
- “The need for new capacity slowed with the recession, but that did not change the regulatory pressure for upgrades, and it would appear that a new administration with a new attitude is going to add more pressure on the regulatory side.”²

Population growth and urban expansion

- A net increase in national population in the future will place greater pressure on agriculture, energy and industry – and therefore water demand – as well as on overtaxed waterways and sewer systems in the years to come.
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²Dave Clark, senior vice president and director of Omaha-based HDR’s wastewater division, ENR, “Breathing New Life Into Old Facilities,” October 5, 2009.

A 2006 study conducted by consulting firm, R.W. Beck, found that 96 percent of municipal utilities that had experimented with alternative delivery methods such as design-build would do so again.

of those years – and so funds have not kept pace with demand. Therefore, the burden falls to municipalities, who face increasing pressure for other upgrades in areas like transportation and energy production. Inadequacies in water and wastewater networks are far less visible than are power outages, security breaches, crowded hospitals or badly worn roads. “Clean water” has become political shorthand for environmental stewardship. “Clean water” is touted as right of all Americans; meanwhile, approximately 17 million people in the U.S. are served by sub-standard water facilities. Often the mandate is there to invest in water and wastewater, but the means is not.

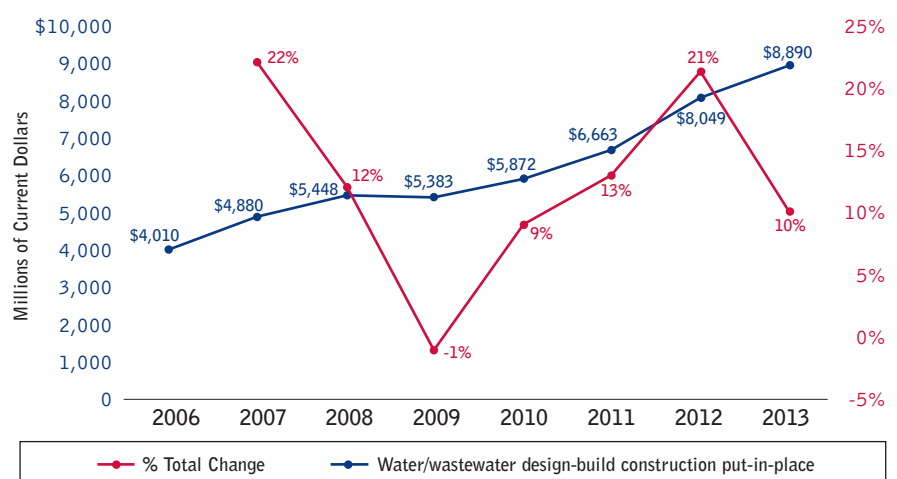
Shift toward new project delivery methods and implications for engineering and construction firms

Dry funding pools, stricter regulatory requirements, and dilapidated water/wastewater infrastructure have effectively blocked the way forward for the water/wastewater industry. The result is a forced evolution in which existing business practices are reworked, and innovative alternatives explored in order to find a new direction for the industry; one that bypasses current and future challenges.

Craig Goehring, CEO of Brown and Caldwell, believes the industry is reviving itself on the heels of crippling insolvency. “It’s an exciting time to be in the sector – there are forceful drivers at work. We’re beginning to see a real premium on creativity, looking at infrastructure differently, and in some cases solutions are appearing.” There is a sense, he notes, that participation is vital to future prosperity in the industry.

Signs of change are already visible today. Sarah Chittenden, Executive Director of the Water Design-Build Council states, “Design-build and construction management at-risk project delivery is continuing to grow and now represents about 20–30 percent of all U.S. water and wastewater projects; 70–80 percent of all water/wastewater projects are still being completed through traditional design-bid-build contracts.” FMI expects these numbers to shift toward more design-build and other alternative delivery methods as municipalities are forced to find new ways to deliver projects faster, cheaper and more efficiently in order to meet stringent consent decrees while operating within limited budgets (Exhibit 1).

Exhibit 1: U.S. water supply and wastewater construction –
U.S. historical and forecast design-build construction put-in-place



Source: FMI estimates

The timely completion of the \$180 million Broad Run Water Reclamation Facility (BRWRF) in Virginia was achieved through a highly collaborative process employing goal-setting, problem-solving and structured partnering for all parties involved.

This push toward innovation and alternative delivery methods in a traditionally slow-changing industry is going to have direct implications for engineering and construction firms. Successful companies will:

- Establish a solid value proposition and task-based deliverables, rather than bidding on man-hour cost estimates. Superior “sell work” capabilities are more important than superior “price work” capabilities.
- Share risk with the owner and other project participants; guarantee the results. This may involve teaming with specific insurance carriers.
- Have a strong ability to adopt and leverage new technological integration tools (e.g., BIM) to add value and reduce risk for the owner and all other parties involved.
- Have resources and star talent capable of innovating and conceptualizing new ideas and approaches to solve complex problems. Start looking for and developing star talent now.
- Develop a culture of collaboration for both process and technology.
- Have superior capabilities, specifically in the areas of pre-design, operation and maintenance, and project close out, including start-up, turnover, and acceptance processes.
- Have an open attitude toward participating in alternative delivery systems.
- Align their firm’s needs with those of owners to establish a relationship with long-term benefits.
- Have knowledge of alternative funding sources and strong connections with financial and political stakeholders.

Looking forward – the blue paradigm

Through the work of the American Water Works Association, the Clean Water America Alliance and Water Infrastructure Network, industry insiders are looking to solve their own problems through promotion and advocacy, public awareness campaigns (including the advent of a “blue footprint”), and proposals for additional federal funding and establishment of a “water bank.” Gradually, outdated laws are being updated to reflect the realities of an increasingly dry environment: looking to mobilize stakeholders in the U.S. water and wastewater industry, the call has been issued to create a national water policy – one that brings the limited concerns of various legislative acts (CWA, SDWA, Endangered Species Act) under one umbrella as a single federal priority.

In May 2009, the U.S. Government Accounting Office (GAO) issued a report into the feasibility of a clean water trust fund, intended to generate \$10 billion annually. One of their key recommendations was to establish a national infrastructure bank that would independently evaluate projects and determine the best way to fund them. Another was to designate a federal clean water trust fund, to mimic those of the Highway and Airport Trust Funds, with a combination of loans and grants on offer. The report advocated a water usage tax and/or industrial discharge tax – a crucial step toward increasing the value perception of water.

The water/wastewater industry, too, is starting to transition to a culture of shared allocation of risk in which general contractors and other project participants work together to reach mutually beneficial objectives. Several successful water infrastructure projects have incorporated the concepts of collaboration, accountability and consistency, allowing all project participants to complete quality work in a team environment – despite the often archaic contract structures.



As innovative solutions to water challenges are piloted and perfected, the industry is beginning to see a clear path ahead.

The timely completion of the \$180 million Broad Run Water Reclamation Facility (BRWRF) in Virginia was achieved through a highly collaborative process employing goal-setting, problem-solving and structured partnering for all parties involved. Richard Thoesen who was a Senior Project Executive for the Loudon County Sanitation Authority (LCSA) states, “While we communicated formally through the engineer, we enjoyed a solid rapport among all stakeholders and were able to demonstrate over time that we were independent. Our culture included an open door philosophy and to stay as impartial as possible.”

According to Goehring, there has been a demonstrable shift from a “transactional mindset to a relational mindset” between contractors and owners in recent years, as well as an increasing premium on creativity. It is this new creativity and ability to conceptualize alternative solutions to complex problems that will push the water/wastewater industry into the spotlight over the coming decade.

As innovative solutions to water challenges are piloted and perfected, the industry is beginning to see a clear path ahead. On the back of a century of improvisation, industry stakeholders are displaying a propensity toward creative, non-traditional solutions – it may well be the ingenuity of the mid-size civil firm or contractor that drives industry-wide change and revitalizes the industry. Says Goehring, “I think this is being driven by collaboration amongst all the partners – it’s engineers and scientists, it’s construction managers, the owner realizing that different delivery methods have a place, and it is the willingness to take some risks and try new things. We are approaching the inflection point.” ■

For more information on how FMI can help you tackle the acute challenges facing your firm, please contact:
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About FMI

FMI is the largest provider of Management Consulting and Investment Banking to the worldwide construction industry.

Founded in 1953 by Dr. Emol A. Fails, FMI delivers innovative, customized solutions to contractors; architects and engineers; construction materials producers; manufacturers and suppliers of building materials and construction equipment; private owners, managers, and developers; residential builders; utility companies; surety companies and industry trade associations.

FMI creates value through enhanced performance of companies, teams and individuals and by mitigating risk.

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