

Professional Practice Corner

Addressing the Emerging Service Deficit In the Water and Wastewater Industry

By Peter Binney, PE, Black & Veatch

For many decades, the water and wastewater industry has largely fulfilled its primary missions of providing safe and reliable water supplies and sanitation of municipal and industrial wastes with increasing benefits to the environment. But some significant issues have subliminally developed in the industry and these internal and external forces will require significant changes in management and financing approaches if this level of service is to be maintained.

The past performance of the water and wastewater industry has been achieved with substantial investment from the federal government. Past performance has also been subsidized by wetter hydrologic cycles, adequate reserve capacity in existing infrastructure, incremental expansions of service and deferrals of asset management programs or long term capital facilities. With increasing frequency, the capacity of the existing infrastructure is being exceeded by higher levels of demand, aging and increasingly vulnerable infrastructure, lower sources of supply because of drought or competition, more restrictive discharge and compliance conditions or institutional constraints such as those occurring in the Sacramento Delta or the Atlanta metropolitan area.

Beyond federal funding programs, the majority of revenues have been derived through local user fees that have been maintained at relatively benign levels as incremental solutions are delivered or those federal funds have been leveraged. The adequacy of these funding sources resulted in some of the highest levels of public health protection and environmental benefits of any water and wastewater system, but that system will require increased spending and major improvements in its management practices if it is to continue providing those benefits. Past practices have resulted in artificially lower costs of service where the value provided is substantially larger than the price paid by customers. This under-pricing of water and wastewater services has been an artificial elixir to local service providers who may be called on to balance utility services and investments with the more visible public safety and transportation needs of a community.

Water and wastewater systems are managed and operated within a complex and often internally conflicted natural resource policy framework that is subject to a wide array of laws, regulations, special interest advocacy and abstract decision processes. Our policies and utility management systems are increasingly challenged to effectively respond to the intricacies of these natural resource issues. It is therefore likely that significant reforms will be required in policies, utility management procedures, program delivery

alternatives, pricing of water-related services and the interactions between divergent groups who will be required to find consensus approaches to the intractable issues that are increasingly compromising our ability to meet the objectives of water and wastewater providers.

The catalyst for change may well come from the federal response to the ongoing economic crisis. The forecast increases in federal deficits will most likely limit the funds that will come from Washington, DC and the financing of operations and capital improvement programs will have to be increasingly developed from local sources. Local utilities will most likely have to adopt full-cost user fee based pricing with less reliance on tax-based sources and this will, in turn, dictate a stronger enterprise-based management structure.

The Future Is Unlikely to Repeat History

The water and wastewater industry has to respond to many emerging issues – growing populations, competition for available water resources, more variable water supply and environmental conditions in many parts of the country, aging infrastructure, regulatory requirements, organizational capacity, and deferred investments. It is projected that an additional 130,000,000 people will reside in the United States by the year 2050. About half that population growth will occur in water short areas of California, Texas and Florida. In addition to these growing demands for municipal water services, the needs of aging infrastructure including the Great Lakes states and northeastern United States will require substantial investments. This growing population and an increasingly urban-centric national economy will compete for water resources that are also required for energy and food production while being asked to protect and enhance environmental and riparian conditions.

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The rebalancing of how our nation’s water resources are allocated from a primarily agrarian-based economy to an urban centric economy that also requires reliable food and energy resources will require evolutionary policies and substantial investment from non-traditional sources. There is little doubt that society will also demand that environmental and cultural needs of water are satisfied while the urban and economic needs are being addressed – this will be a true test of our ability to meet the triple bottom line objectives of sustainable planning.

The Financial Needs of the Water and Wastewater Industry

The US Environmental Protection Agency (USEPA) completes a periodic report to Congress on the projected financial needs for maintaining adequate drinking water and sanitation services for municipal water and sanitation providers. The most recent reports (*2007 Drinking Water Infrastructure Needs Survey and Assessment, US EPA, February 2009; Clean Watersheds Needs Survey 2004, US EPA, January 2008*) contain details of the state by state distribution of anticipated capital and operating financial needs to address the identified needs of the various community water and sanitation systems.

These reports identify a number of estimates that have been made for constructing the required infrastructure upgrades, expansion and rehabilitation with a median projection through Year 2020 of \$324.9 billion. The needs of American Indian and Alaskan water systems and responding to proposed or recent regulations add another \$9.9 billion over that same period. The needs of the clean water programs include capital needs of wastewater treatment plants, combined sewer and storm water management programs. The reported clean water needs as of January 2004 are \$202.5 billion. Current capital spending for clean water programs is estimated to be \$13 billion per year while drinking water programs spending is estimated to be \$10.4 billion per year.

While current funding sources will continue to support many of these programs, there is a substantial gap that will have to be met by increased pricing of services by utilities. From a capital projects standpoint, it is projected that at least a \$10 billion per year deficit occurs in each of the drinking water and clean water programs. One scenario would suggest that the shortfall could be closed by increasing the costs of service by a compounding three to five percent per year above inflation rates. There are numerous examples where these annual increases are compressed into shorter and reactive time frames when cost increases are deferred and a utility must deliver deferred capital projects with substantial and sustained rate increases in a politically charged environment.

Similarly, the 20-year gaps in operations and maintenance funding of municipal water and sanitation providers are estimated to be about \$148 billion for drinking water systems and \$161 billion for clean water systems under a no-revenue-growth scenario.

Pathways to Respond to the Identified Deficits

Without real growth above inflation rates in pricing in the costs of service, the projected needs of operating and constructing the expansions and upgrades of water and wastewater systems will fall further behind. The objective of continuing to provide high levels of service will most likely be met through increasingly higher local costs of service and more enterprise-based approaches to managing, operating and delivering services. Today’s electric industry is one likely model that may describe the water industry in the next several decades. Alternative project delivery methods, risk and reward sharing between owners and contractors, regionalized water systems to capture the purchasing power of larger service populations and reforms in policy and governance that reflect water and resource scarcity and need for sustainable solutions of tomorrow’s world are likely.

There are a number of examples where leading edge water and sanitation utilities around the country are responding effectively to the stresses that are now confronting the industry. These locally-based initiatives are developing innovative approaches to uses of emerging technologies and programs such as demand management programs, desalination and planned indirect potable reclamation, groundwater recharge and advanced wastewater treatment. We will continue to develop programs that make more effective use of marginal quality waters and we will have to build surface storage reservoirs and trans-basin diversions to move water to where the needs are critical. More efficient use of water in the agricultural, municipal and industrial sectors will be driven by increasing demands and requirements to balance environmental needs with consumption needs.

Utility managers in the future will deliver water and sanitation services in a more sustainable but continually reliable manner. This will most likely require higher costs of service, successfully addressing competing needs in a complex resource constrained world and operating these systems using organizational structures that are increasingly reflective of enterprise-based principles. This will be challenging but these are not your conventional plumbing systems any longer. [CM](#)

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