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Funding the Future: Meeting the Costs of Capital Replacement

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In 1996, significant amendments to the Safe Drinking Water Act (SDWA) were adopted that reflected the concerns of many in the drinking water industry to define the performance of water utilities in broader terms. Prior to this time, water systems that were providing safe drinking water on a consistent basis were considered "viable," and failing systems were termed "non-viable." The SDWA amendments discarded this binary measurement system and formalized the idea of "capacity," which now encompasses the technical, management, and financial aspects of delivering safe drinking water to the public. Instead of a pass-fail basis of measuring performance, capacity could be measured along a continuum. This article focuses on the measures of financial capacity that reflect the commitment of managers and boards of directors regarding the long-term funding requirements of drinking water systems.

This new concept of capacity required the regulated community of water systems—as well as the regulators and other stakeholders—to develop measures of capacity to determine the point upon the capacity continuum where systems would be more likely than not to be sustainable. State drinking water programs were required to develop measures of technical, financial, and managerial capacity for proposed water systems as well as for those seeking to borrow money from the new Drinking Water State Revolving Fund (DWSRF) for system improvements. Many states have used those capacity measures to examine existing water systems and to search for those needing capacity building assistance.

Regarding financial capacity, the Idaho Drinking Water Program uses eleven indicators that describe the fiscal capacity and financial management of water systems seeking state revolving loan funds. Among these are indicators that can be used either to compare the capabilities of water systems that are similar in size or to track financial performance of an individual system over time. From such comparisons, we can draw inferences about the financial indicators that correlate with the reliability, safety, and cost of providing safe drinking water.

Experts believe that the long-term success of water systems is related to keeping their capital facilities in good shape. This means not only investing in the water system when it is built, but also anticipating the costs of replacing it when it wears out. Regulatory agencies have devoted program resources toward improving the sustainability of public water systems. In 2003, the U. S. Environmental Protection Agency (EPA), for example, released two handbooks for water system managers addressing the topics of strategic planning and capital asset management (U.S. Environmental Protection Agency, 2003a; 2003b).

Acting to Reduce Risk in Delivering Essential Services

As required by law and regulation, water system board members and officers are obligated to deliver safe drinking water to their customers. Running a water system like a business is not only what customers want (and assume), it is an appropriate approach given the complexity of the task of producing and delivering safe drinking water. Without good management, a system will not be able to meet future challenges. Poor planning puts the water system finances and its customers' health at risk. As financial capacity measures have been instituted by the state drinking water programs, we are beginning to learn about the relatedness of poor planning and troubled water systems.

Capital Budgeting and Capital Improvements Planning

Within general purpose governments, or as special units of government, utility operations (such as water systems) are considered business enterprises: the full cost of a water system should be supported by the customers who purchase service. Given this expectation, how do water systems perform? Are these water "businesses" in danger of going out of business?

Looking beyond water testing results to discover the viability or capacity of water systems reveals that small water systems can be dangerously close to being unsustainable even while they continue to supply water. Over the past five years, the Environmental Finance Center at Boise State University (EFC) has reviewed the financial capacity of water systems seeking capital improvement resources from the DWSRF—the Idaho Drinking Water State Revolving Fund (20 reviews)—and the Alaska Drinking Water State Revolving Fund (8 reviews). A review of the descriptive statistics generated from the Idaho reviews indicates that smaller systems do a poor job of capital budgeting and capital improvements planning (Environmental Finance Center, 2004). The effects of the lack of long-range financial planning for these water systems are also reflected in their financial records and reports.

In Idaho, 78 % of the systems seeking taxpayer-subsidized low-interest financing from the DWSRF did not meet minimum standards for capital budgets and capital improvement plans. These water systems presented no evidence that future infrastructure needs had been identified, either for replacing worn-out assets or for acquiring the new structures or materials necessary for supplying safe water. Not surprisingly, these DWSRF applicants presented neither a funding strategy nor a capital budget for existing or proposed infrastructure improvements.

Given the lack of evidence of formal long-term planning, is it possible that some measure of the long-term responsibility for maintaining capital assets is occurring informally, as part of the operating budget? Infrastructure upkeep and repair should be occurring as part of the operating budget as an operating expense. For systems without formal capital budgeting and capital improvement plans, the annual operating expenses could conceivably include some of the longer-term replacement and expansion funding needs of the system because, at the operations level, field staff might not distinguish short-term maintenance and repair from long-term asset or component replacement. A couple of financial indicators may be used to detect if monies are available for the water system to use for capital replacement: the operating ratio and the sales-to-net fixed assets ratio.

A common financial indicator—the operating ratio—explains that these small Idaho water systems do not have the excess operating financial resources necessary for sustaining long-term service quality. The median operating ratio (operating revenues compared to operating expenses) for the Idaho DWSRF applicants was 1.33. After operating expenses are paid, the balance of revenues is available for reserves, debt service, and depreciation or system replacement costs. While the median value for the Idaho applicants seems reasonable, one water system demonstrated an operating ratio of 0.90 (the maximum ratio was 2.42). In this case, operating expenses exceeded operating revenues, a situation requiring the commitment of prior-year retained earnings, deficit financing, or some other means to meet operating costs. This is an unsustainable recipe for system operations.

It is not unusual for water system managers to believe that a "balanced budget"—where an operating ratio would be equal or close to 1.0—is acceptable. This view ignores the capital expenses that are essential for system longevity.

Another common financial indicator that underscores the responsibility to fund capital replacement is the ratio of sales to net fixed assets. Assuming that water sales provide the revenues for both operations and capital asset replacement and acquisition, the components of this ratio provide a wealth of information for consideration.

Small water systems require tremendous investments in capital assets before a drop of water can be supplied to their customers. For example, it is not unusual for small towns of one or two hundred people to face the challenge of installing $500,000 of treatment equipment to meet new regulatory standards. Revenues from water sales must support the operation, maintenance, and replacement of facilities needed to deliver safe water. The sales-to-net fixed assets ratio demonstrates the ability of the utility assets to generate sales. If the population served is small, the user fees collected from water sales may be insufficient to support that investment.

The Idaho DWSRF applicants' sales-to-net fixed asset ratio median value was 0.26 and can be interpreted as a return on capital investment of 26%. For most businesses this would be an attractive return on investment. Note, however, that the ratio of sales to net fixed assets for capital intensive businesses must be higher than for capital-lean enterprises. In other words, sales must be generated at a level to support the operational and other non-operating expenses of the capital-intensive business.

The following example demonstrates the challenges a system would face where sales are low in relation to capital investment needs. Imagine a water system that has a net fixed asset value of $1 million, with a sales-to-net fixed assets ratio of 26% (generating water sales of $260,000) and operating expenses of $195,000 (using the Idaho median operating ratio of 1.33). After subtracting operating expenses from sales, only $65,000 remains for debt service, reserves, anad system replacement. Assume further $15,000 of that $65,000 is necessary for annual debt service. The remainder of $50,000 could be available for reserves, system replacement, and capital acquisition expenses. A prudent approach would sequester additional sums for emergencies and professional engineering services—say a total of $20,000 annually. After all of those expenses are counted against sales, only $30,000, or the equivalent of 3% of the asset value, remains for replacement. This is a very small sum for a capital-intensive enterprise.

Business enterprises fund the wear and tear on capital assets used in the production process through sales receipts to replenish their production capability. If a water system's production assets are not expensed to the customers that use up those assets, someone other than those customers will need to replace the system when it wears out. In our example above, the remainder of $30,000—after operating and other expenses are paid—would not come close to the annual expense of capital replacement funding regardless of whether a depreciation or asset replacement methodology is being used to replenish the capital investment in the system.

Although the data set is smaller for Alaska utilities, the EFC's financial reviews show that the median of the sales-to-net fixed asset ratio was only 0.11, which shows that the return on investment for these Alaska water systems was 11% *before* expenses are counted against sales. An examination of net sales to net fixed assets would present an even more discouraging picture of financial sustainability for these same Alaska systems.

With their internal funding for replacement of assets falling far short of the amounts required to replace or improve capital equipment, many water systems are unprepared for the future. In our review of Idaho applicants for revolving loans, 75% of the systems fell into this category. More troubling is that the systems studied are a tiny subset of the 2,100 public water systems regulated by the State of Idaho. Our sample suggests that capital improvement planning and capital budgets are non-existent for the majority of systems and that existing user charges are not sufficient to the fund the full costs of providing service. The costs of replenishing the productive assets needed to provide water service are either ignored or under-funded. If small water systems have similar financial liabilities from state to state, it seems likely that the majority of small systems across the country are underfunded.

What other factors contribute to the problem of sustaining financial capacity? Customer perception of the cost of service, which is conditioned by the price they are accustomed to paying for water, is one factor. Related to that perception are the problems of calculating the full costs of service for a water system to be financially sustainable and of persuading customers that full-cost pricing is necessary.

Customer Perception of Cost of Service

In presenting numerous long-term budgeting, rate setting, and capital asset financing workshops to small water systems in the northwest states of Alaska, Idaho, Oregon, and Washington, some common themes emerge. First, those who attend those workshops are usually motivated by a need for capital financing and a desire to understand the impact of that financing on existing budgets. Second, upon realizing that most capital resources that may be received require repayment with interest, the attendees are anxious to minimize the increase in user charges that may be necessary to support additional debt service. Third, many attendees are not happy to discover that acquisition of capital resources may require that user charges be adjusted to include other costs that have not been incorporated into those charges previously.

It is in these workshops that "reality" meets the customer perception of cost of service. This customer perception is conditioned by the price paid over time for water service. Even if water has been "under-priced"—as compared to the full cost of providing it (the "reality" mentioned above)—customers seem to react to any increases in charges or costs imposed by governments regardless of their legitimacy. More troubling is the "sticker shock" reaction of customers to rapid and significant price increases necessary to compensate for delays in system improvements or failures to properly reserve resources for future capital improvements.

Figure 1 represents the underfunded water system that has not planned for the future and experiences a major unanticipated event that requires additional resources. That event—usually unanticipated because of a lack of proper planning—requires new capital facility funding (debt financing because of a lack of capital reserve funds) and new facility operating funds above the current increasing operating expenses (line ab). The trigger for capital replacement can be a breakdown of system components or a change in regulatory standards that requires new technology. The *new* full-cost funding level (line ef) is above the prior full-cost level (line cd), which was above the level of funding previously supported by user charges. The double arrow represents this change in funding that the customers must now bear. In this scenario, the greater the distance between the current and new full-cost funding levels, the greater the sticker shock and customer resistance to user charge increases.

Returning to the EFC's analysis of applicants to the State Revolving Fund, the customer perception of current cost and future cost relative to capital acquisition should not be a limiting factor to user charge increases. The EFC examined the affordability of the applicant water systems' *current* user charges and *future* user charges relative to incurring DWSRF debt financing. Affordability of user charges has been defined by the State of Idaho as less than 1.5% of median household income. The median values for current and future user charge affordability were significantly below the state threshold of 1.5%. Current charges amounted to 0.76% of median monthly household income while the charges required to cover operations plus needed capital improvements amounted to 1.0% of median household income. This situation leads one to conclude that the real problem is not the affordability of the needed charges but the illusion that is created when rates are held substantially below true costs.

GASB 34: An Additional Driver for Full-Cost Pricing of Service

New accounting standards for government-owned public water systems will have some effect upon managers and board members of water systems regarding full-cost pricing. The Governmental Accounting Standards Board's (1999) Statement 34 requires that governments adequately express the extent to which the public has invested in public infrastructure as well as its financial plan to protect that investment. These requirements became effective for governments with sales of less than $10 million beginning June 15, 2003. Water systems have two options for reporting capital investments and reinvestment to the public. The first approach is the traditional depreciation of assets method, and the other is an asset replacement methodology (modified approach). Finance managers and accountants seem to prefer the depreciation method because it is easier to calculate. The modified approach seems to be preferred by utility managers because it generates an inventory of capital assets which respects the real differences of useful life and condition for specific assets.[1] Professional organizations such as the American Society of Civil Engineers have presented strong arguments for the latter (Koechling, 2004). Water systems seeking to establish full-cost pricing benefit from using the modified approach because its asset management methodology provides detailed information for persuading customers of the need to reinvest in the water system through increased user charges. It is

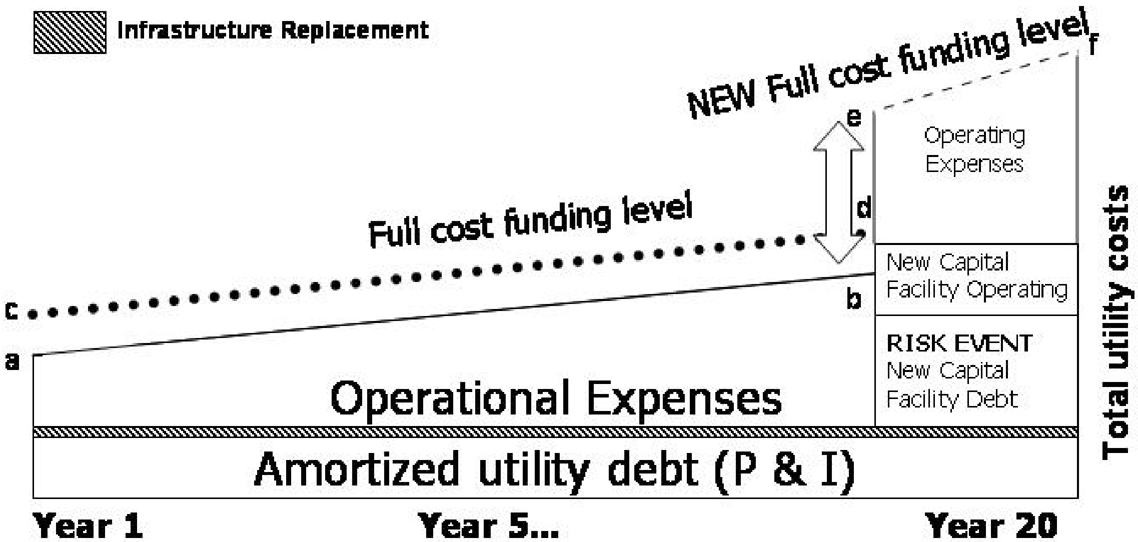

Figure 1. Anticipating the Need for Revenue Over Time: Risk Event Scenario

too soon to tell which approach will be preferred by smaller entities.

Conclusions

The Safe Drinking Water Act Amendments of 1996 transformed how drinking water systems are to be evaluated. The traditional measures of performance relative to the quality of drinking water delivered from the tap have now been expanded to include fiscal and financial management.

As a microcosm of America's small community water systems, applicants to the Idaho Drinking Water State Revolving Fund have a poor record of preparing their water systems to be financially sustainable and resilient in an operating environment that is constantly changing. While further empirical study is necessary, it is reasonable to expect that America's smallest public water systems, as a general rule, are not fully funded through user charges. While operational costs are probably being met in most cases, capital replacement and reinvestment costs are not. This situation poses financial and other risks to the current and future customers and owners of water systems.

A major obstacle to achieving sustainability is customer resistance to rate increases. Failure to adjust rates regularly as the real costs increase lulls consumers into a false sense of the true costs and increases the difficulty of making significant catch-up adjustments. New governmental accounting standards are transforming how information about public infrastructure investment is presented to the customers of governmental water systems. Hopefully, this will help systems to justify more consistent rate adjustments. Sustainable water systems are those that fund the full costs of service and that aggressively plan to acquire and restore the capital assets necessary to consistently provide safe drinking water.

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Notes

[1] The modified method is incorporated in CAPFinance, a software tool developed by the Region 10 Environmental Finance Center to help water utilities develop long-term capital budgets and to incorporate capital costs in user charge systems. See http://sspa.boisestate.edu/efc.