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A game plan for aging water infrastructure

UTILITY MANAGERS CAN USE THIS STEP-BY-STEP PLAN FOR ADDRESSING AGING WATER INFRASTRUCTURE TO TRANSITION FROM A PROGRESSIVELY FAILING SYSTEM TO ONE THAT IS FISCALLY FEASIBLE AND SUSTAINABLE.

The game has started, the clock is ticking, and everyone in this generation has to play. Each player is a risk specialist, and part of the game is to see how many times your community can pass through the aging water infrastructure (AWI) solution cycle. The catch is that there is a time limit, and part of the game is to discover all catastrophic events and mitigate the risks while staying ahead of the countdown. By working together and following this 10-step plan (see the illustration on page 75) the players in the AWI game will come out on the winning team.

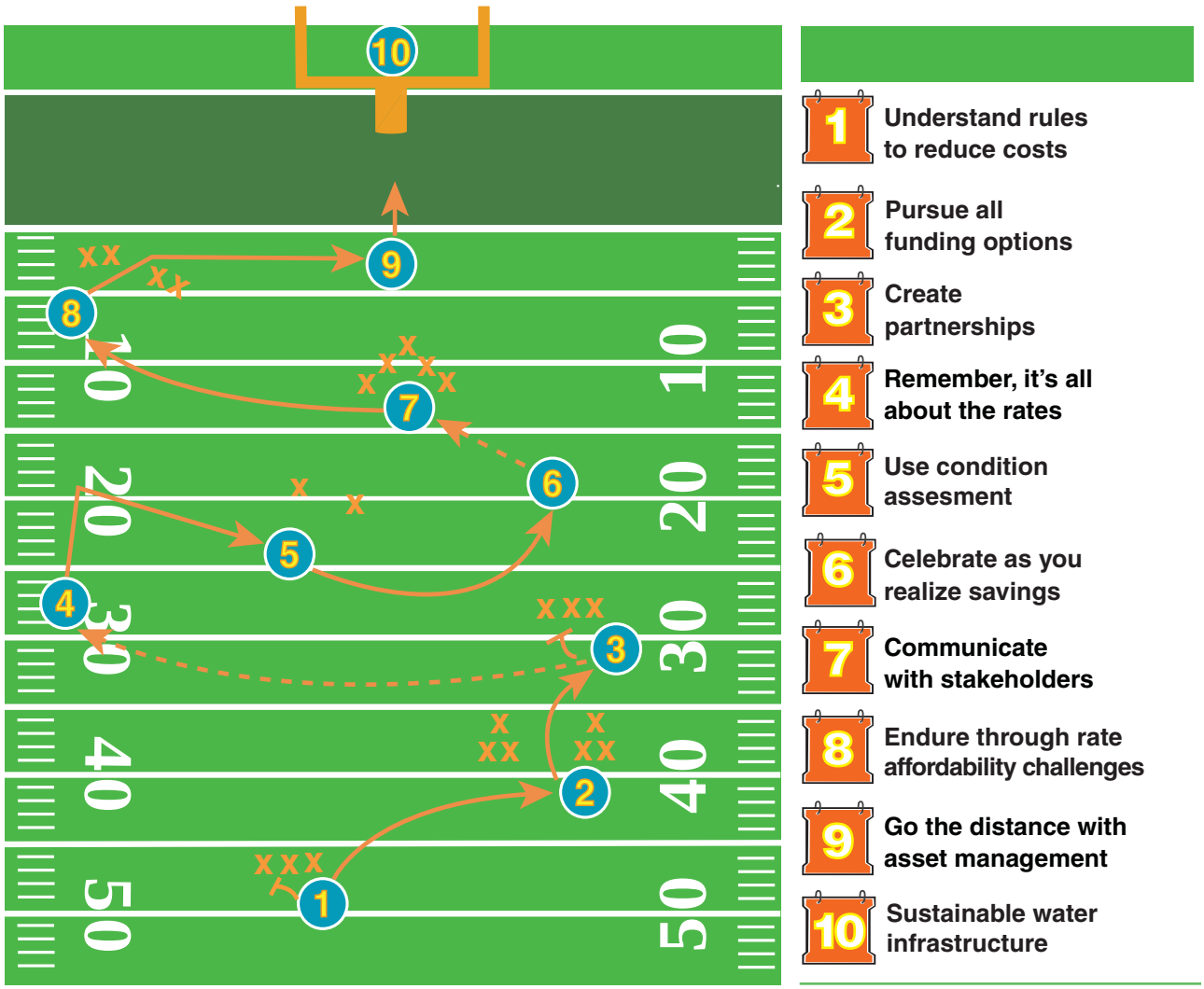
UNDERSTAND THE RULES

Policy-makers all across the United States are engaged in deliberations concerning the sustainability of the country's aging water infrastructure. The infrastructure has been built over several generations and is not expected to fail all at once. The task at hand is to establish a sustainable process to provide for the renewal of our water and wastewater systems. The AWI solution cycle is a game plan that offers a series of steps that every community must pass through in order to effectively address this complex issue. In fact, the more times a community completes each step in the process, the closer it comes to the goal of rate affordability and sustainability. After all, for anything to really be sustainable, it must also be affordable.

Like the rest of the world, the United States installed underground water infrastructure in three main time periods because of population growth in the 1800s, 1900–45, and post-1945. Pipes constructed in each of these three eras will all start to fail over the next couple of decades for a number of reasons—ranging from age to inadequate design to poor installation. Additionally, the life span of the materials used has become shorter with each new investment cycle (WIN, 2002). The main hot spots for these failures will be in the industrialized population growth centers established after World War II.

Under the 1996 Amendments to the Safe Drinking Water Act, the US Environmental Protection Agency (USEPA) is required to conduct an infrastructure needs assessment every four years. In 2001, the Water Infrastructure Network (WIN)—a consortium of industry, municipal, and nonprofit associations—estimated that up to $1 trillion over a 20-year period would be needed to sustain the country's water and wastewater systems, when both capital investments needs and the cost of financing were considered. USEPA suggested that funding gaps need not be inevitable (USEPA, 2002). They will occur only if capital and operations and maintenance (O&M) spending and practices remain unchanged from present levels.

In the past 10 years, the required investments have not been made. In 2009, the American Society of Civil Engineers gave the US drinking water infrastructure a rating



of D-minus. For the past decade these organizations, along with AWWA, have preached that the era of replacement is upon us. The AWI solution cycle, if followed, is designed to reduce the financial gaps estimated by the USEPA and others.

Affordability is the heart of the challenge. The main question for policymakers and utility managers is whether the increased rate of infrastructure spending that utilities must face over the next 20 years can be financed by the utilities themselves at rates that customers can afford (AWWA, 2001). The issue is more about a funding problem than an engineering one. However, to correctly address the issue, a high degree of collaboration and functional alignment must exist among a number of professional disciplines.

AWWA remains committed to the principle that utilities should be self-sustaining through their rates. In fact, most utilities are operated as enterprise funds that contain a self-balancing set of accounts and have dedicated user fees and charges as revenue sources to pay for the cost of the operations, the debt, and capital projects.

Everyone dislikes the need for higher rates, but there are things that are feared more than a rate battle—sinkholes and the loss of water services, contamination and public health issues, unplanned rate shocks, and moratoriums on growth and development. These items will always cause significant political and economic repercussions. What is desirable is a predictable, long-term plan that will actually address these safety issues and minimize rate increases into the future.

Normally, rate increases are acceptable if given enough lead time and implemented slowly over several years. Many agencies may not have enough lead time at this point to meet the burden of the replacement costs. If a utility chooses to ignore the problem or to continue to defer capital replacement projects to avoid basic rate increases, the investment gap will widen significantly, and the costs of the projects will increase, creating a larger future liability for ratepayers.

In terms of AWI as a financial issue, there are various factors that can lead to an increase or decrease in the inevitable replacement costs. Factors likely to decrease the estimate include decreasing labor costs as a result of the integration of services, regionalizing services, com-

petitive practices, condition assessment and other asset management strategies, and technological innovations to help extend an asset's life. Factors likely to raise the estimate include increasing costs of chemicals and power, growing regulatory requirements, and rising repair and maintenance costs (USEPA, 2002).

A utility is not in control of many of these factors; however, those that would increase the costs are already realistic assumptions held by many utility managers. The AWI solution cycle offers a strategy of

- reducing the cost of capital,
- adopting stewardship roles,
- calculating and communicating the cost of services the utility provides,
- reviewing the current and historical investments,
- exploring the current condition of critical assets,
- revising capital plans by replacing only what needs to be replaced,
- realizing both capital and operational savings,
- and communicating the plans and results to all stakeholders.

KEEP YOUR OPTIONS OPEN

Funding sources. Each community has unique needs and circumstances that may require a number of funding sources to pay for the replacement costs of its infrastructure. With the recent volatility of the financial markets, the increasing national deficit, and the tightening of credit there will be times during the next 20 years when nontraditional funding alternatives may have some advantage. The first priority is raising the user rates of the system. The second financial goal is to lower the cost of capital (borrowing). Cash on hand is the best alternative, but in most cases long-term debt financing will be required. Traditionally, finance directors have had easy access to the bond market. Interest rates were low for tax-exempt debt, and a utility's credit rating was only a marginal concern because bond insurance could simply be bought to bump the bond rating up to a AAA status. The recent worldwide financial crisis has forever changed these past practices. Bond insurance is not readily available, not trusted, and very expensive. The underlying credit of a utility is now paramount to its ability to attract low-interest loans and debt.

To prevent the development of a gap in critical water infrastructure financing, organizations have asked for changes in and expansions of the Drinking Water State Revolving Fund and other drinking water programs. With fears that the national debt will drive up long-term interest rates, many elected officials would like the option of low interest rates via a national infrastructure bond bank. "The case for federal investment is compelling. Needs are large and unprecedented. Clean and safe water is no less a national priority than is national defense" (WIN, 2000).

Congress has even made a request, and the US Government Accountability Office (USGAO), an independent, legislative branch agency, is examining potential options for financing wastewater infrastructure, including the creation of a National Infrastructure Bank (USGAO, 2009). In February 2010, a survey was sent out asking for input from stakeholders on design issues, structure, funding, the types of financing it should offer, and the types of projects it should fund. Results are expected in early summer 2010. Congress should also consider other alternatives that would lower the cost of capital by revising tax codes and passing other reforms to increase the availability and use of private capital. This would require removing some of the constraints on private activity bonds.

The goal is to have a sustainable funding source. According to the AWWA report *Water Infrastructure at a Turning Point: The Road to Sustainable Asset Management* (2006): "One-time solutions are not the answer. The specter of an 'infrastructure crisis' conjures images of a sudden and unexpected need for a large capital outlay to 'fix' a problem. Large outlays create their own impediment to action because a crisis must top all the other crises competing for attention to command large new outlays. Moreover, large outlays in response to a crisis are a tough act to follow because they create the impression that the problem has been solved and the needs have been met. Crisis response is not a sustainable funding strategy."

The total need of any particular system may be met in whole or part through financing arranged through several kinds of public and private sources. Grant funding makes up very little of the amount used toward project costs because of the severe lack of grant funding from state and federal sources. Most states have no dedicated, direct grant assistance program for disadvantaged communities. Large systems can often afford local solutions through financing and bonding. Generally, larger systems in more populated areas are able to spread out the cost of the required improvements through minor rate increases among their population base. Smaller systems do not have the luxury of many options (Bommer, 2008). Even with all of the issues and concerns about privatization, all options need to remain open because in some situations privatization may represent the best alternative for solving a complex water challenge (Maxwell, 2009).

There is a great deal of competition for limited funding. Beyond water and wastewater, their cousins, urban stormwater and rural runoff, have high costs (Monsma, 2010). Other important natural resources projects such as America's Great Waters Coalition will also complete for funding.

Funding research is a critical component of a comprehensive federal program on infrastructure. Research stimulates the development of new techniques and unleashes American ingenuity. It offers the chance to save billions of dollars over the years through more efficient management, repair, and replacement technologies (AWWA, 2001). USEPA has signifi-

cantly increased its support for research on infrastructure management, repair and replacement technologies, and methods for extending pipe life, as evidenced by its $10 million award to the Water Environment Research Foundation Jan. 6, 2010 (WERF, 2010). Other federal players have also developed strategies to progress toward resources sustainability, for example, the US Department of the Interior's Bureau of Reclamation and its WaterSMART (Sustain and Manage America's Resources for Tomorrow) program.

Lending requirements. New strategic loan requirements that create incentives and accountability should be mandatory for all future loans and grants. As funds become more scarce or as new funding sources are developed at a federal or state level, stricter lending requirements and prioritization rankings should be developed that create accountability at the local level.

USEPA's research has suggested that rates may need to increase 3% above inflation every year to address the funding requirements over the next 20 years (USEPA, 2002). To create an even playing field, access to low-interest loans or long-term funding and grants should require a utility to do all that it can do first. Many times, as a result of political pressure, rate increases are not implemented, and consequently the required regulatory improvements and capital replacement programs are left incomplete. In these cases, the prioritization process for grant funding should include a review of actions the utility has taken historically. This could include a review of minimum inflationary rate increases. If the community is pushing against 2% of median household income for annual water and sewer bills, then it could be determined that the utility has tapped out its own financial capacities (Fischer, Sheehan & Cotton, 2005). (Even the 2% definition of affordability will be revisited as the true costs and impacts of all water system needs are realized.) Utilities that have not increased rates for years have not addressed the aging infrastructure issue and are really behind in the game, but they will not know it until it is too late. As an incentive for a low-interest loan or a grant, or perhaps as a requirement of accepting one, utilities and local elected officials could be required to increase rates at a minimum level each year or could play catchup (also called "rate shock") to qualify for a state revolving fund (SRF) loan.

Requiring current and future officials, whether elected or appointed, to take an "oath of sustainability" would obligate them to accept responsibility and be accountable for maintaining the utility infrastructure and would ensure that these individuals understand that increasing rates is part of their jobs. Elected officials should never run for office with a slogan of "no more rate hikes." They might as well be campaigning on a platform to "reduce water quality and reliability." It is hoped that in the future credit agencies and underwriters will require an analysis of the financial risks of a utility's aging water infrastructure, the resulting required investment over the next 20–40 years, and the effects on rates and affordability. This information will be critical to attracting and protecting current and future bond holders and investors (Baird, 2009).

DEVELOP TEAM WORK

Local government outreach and accountability. USEPA has made positive gains in trying to educate local officials on their water issues. AWWA, the Water Environment Federation (WEF), and others have also consistently reached out to local governments and their utilities. The messages have included everything from the value of water to asset management. About 85% of water utilities are municipal (USEPA, 2002), and many of these are governed by boards variously made up of political appointees, elected members, or city councils. Often the makeup of a municipal water utility's board results in a high level of political consideration in decision-making. Politicizing decisions has the potential to severely delay projects, resulting in inflationary cost increases (Water Research Foundation & USEPA, 2009).

AWWA has hosted a number of policy discussions over the past decade that illustrate how mired in politics decision-making has become. When members were asked "What does it take to motivate local action on water infrastructure?" responses included: a disaster, a catastrophe, or a public health crisis (AWWA, 2006).

Proactive movements to address the issue. Although there is a role for every level of government to address the issues related to aging water infrastructure, utilities should not expect a federal bailout. At a state and regional level, WIN-Colorado and the St. Louis (Mo.) Metro Water Infrastructure Partnership are setting examples and creating models on how state and regional interests can come together in order to achieve synergies for public education and outreach, developing funding options, assessing infrastructure, and reviewing regulations.

In Colorado, to address a $4.3 billion infrastructure gap, the dedicated partners include the American Council of Engineering Companies of Colorado, the American Society of Civil Engineers Colorado Section, the Association of General Contractors of Colorado, the Colorado Contractors Association, the Colorado Environmental Coalition, the Colorado Municipal League, the Colorado Water Resources and Power Development Authority, AWWA Rocky Mountain Section, Rocky Mountain Water Environment Association, the Special District Association of Colorado, the American Public Works Association, and the Colorado Water Congress. Outreach is extended to all water agencies and communities throughout the state and to the municipal finance association, the Colorado Government Finance Officers Association (GFOA).

In Colorado, there is a special concern over affordability issues and the needs of rural communities. By the development of these special relationships, difficult dialogues about collaboration, consolidation, and regionalization can occur as alternatives are explored to find ways to reduce the overall cost of replacements and maintain the affordability of services to customers.

KEEP YOUR EYE ON THE BALL

Know your rates. As a utility manager or a policymaker, it is critical to know what it costs to serve your customers. A basic question that every customer should ask is "What does it really cost to serve me?" It is important to calculate a utility's cost of service by its different customer classes. Knowing your cost of service is the first step and is the best way to promote both understanding and acceptance of your rates on the principles of fairness and equity. Most likely, aging infrastructure replacement costs are only one aspect of the cost drivers for the utility. Ultimately, however, the rate-paying public will have to finance the replacement of the nation's water infrastructure either through rates or taxes. Local funds are expected to cover the cost of the great majority of the nation's water infrastructure needs, the full costs of which should be recovered through rates (AWWA, 2001).

AWWA's Manual M1, *Principles of Water Rates, Fees, and Charges* (AWWA, 2000), is the water industry's guide on all of the elements of rate-making and will continue to be a critical tool in developing and explaining rates and rate structures to utility managers and customers. (Manual M1 is currently being updated.)

Larger utilities have the ability to independently calculate and maintain their cost-of-service calculations. Some utility rate advisors are catering to the needs of medium and small communities by providing a professional rate study that is completed every year at a fixed price based on the number of customers served.[1] These advisors will keep the rates up-to-date as the costs change and the utility grows.

Establish a baseline. Once the cost of service and the annual water and sewer bill are calculated as a percentage of median household income, a new baseline is established. The utility can now initiate the next steps of taking inventory of its historical assets and assessing their condition.

USE YOUR BEST STRATEGIES

Condition assessment. The information from a baseline cost-of-service study is the foundation for developing a financial plan (i.e., a multiyear cash flow projection). The next steps are taking inventory of your assets and calculating their expected life. For example:

- Look back over records for the past 50–60 years, making note of when large population growth occurred.
- Estimate by year the length and cost of pipes that were added to the system.The accounting books may have assumed a 50-year life, so many assets would have been fully depreciated but may have some remaining life.
- Create a capital replacement program based on an estimate of when the aging pipes may fail, and fold these data into the financial plan.

This simple analysis demonstrates one possible baseline scenario of risk and the potential financial impact to the rate-paying customers. In many cases, if a community experienced a period of high growth just after WWII, a huge wave of reinvestment expense may be just ahead.But this is a limited view. If the price tag nationwide is truly $1 trillion over 20 years, then it may be critical to replace only the infrastructure that needs to be replaced before failure. If the dollar amount is fixed, conducting a condition assessment may reveal opportunities to stretch a 20-year replacement window to 30 or 40 years, buying valuable time to adjust rates and perceptions.

Useful life. According to the USEPA, the life of an asset can be estimated based on its material, but other factors related to the environment and maintenance can affect the useful life of a component of infrastructure. The useful life of pipe, which comprises most of the assets of both clean water and drinking water systems, varies considerably based on a number of factors, including:

- the material from which the pipe is made,
- the conditions of the soil in which it is buried, and
- the character of the water or wastewater flowing through it.

In addition, pipes do not deteriorate at a constant rate. During the initial period following installation the deterioration rate is likely to be slow, and the repair and upkeep expenses are probably low. For pipe, this initial period may last several decades. Later in its life cycle, pipe will deteriorate more rapidly. The best way to determine the remaining useful life of a system is to conduct periodic condition assessments (USEPA, 2002).

Finance professionals spend a great deal of time looking for safe investments that offer a good rate of return. Making capital investments in infrastructure—whether it is for future development or a reinvestment in existing infrastructure that needs to be maintained—should be viewed in the same light. An examination of existing research on aging infrastructure reveals that there is a lack of data on the condition of the underground assets required to help finance professionals make the capital investment decisions.

The majority of the costs to repair the entire water infrastructure system is for transmission and distribution lines. So focusing on 12-in.-diameter or larger pipes, which are pressurized and in continual service, is one of the main financial concerns because these are the most costly. Typically, public works engineers and their consultants approach a finance officer and say they have tested 20% of a pipeline and it all needs to be replaced. A finance officer should be able to check the

accounting for the asset and would likely discover that it has been fully depreciated and is at the end of its useful life. On the basis of this common scenario, the entire pipeline would require funding for replacement. However, if a piece of pipe that still has some useful life is replaced, money has been wasted. If an asset is replaced too late and fails, the emergency replacement cost may actually be double. The true need is to find the sweet spot where the capital investment actually reduces the risk and limited capital is allocated efficiently (Baird, 2010).

Condition assessment provides the information needed to replace only those pipes that need to be replaced. In fact, condition assessment is the strategic keystone, bridging the gap of investment and risk. Historically, utilities have had funds budgeted on an annual basis for system repairs and rehabilitation. Current funding levels are typically inadequate for the aging water infrastructure issue as a whole, but a portion of the funding should be diverted to a new capital planning budget line item called condition assessment (Baird, 2010). Engineering firms need to realize that condition assessment analysis creates the low-cost, early win for both elected officials and finance professionals and will lead a utility toward the path to full asset management.

Condition assessment technology. Technology has been developed and improved in recent years that targets condition assessment for in-use, pressurized, large-diameter pipes. The application of this technology as part of a tailor-made condition assessment plan now offers utilities the ability to address some of the most high-cost issues when dealing with underground assets. The use of leak detection devices with tethered acoustic systems is well documented in Europe, North and South America, the Middle East, and Australia. The system provides utilities with real-time data on the location and approximate size of leaks, which can be directly input to asset management software. This technology is also the first to allow for visual in-line inspection up to 6,000 ft while the line remains in service.

Remote field transformer coupling (RFTC) technology detects and quantifies the number of breaks in the wire that reinforces prestressed concrete cylinder pipes (PCCP). RFTC provides pipeline owners with information on the location and number of wire breaks within individual lengths of pipe, identifying structurally weak areas. A new free-swimming RFTC tool simplifies the inspection process because it eliminates the need for dewatering and is capable of inspecting distances more than 30 mi long. These technologies can help accurately value the pipeline and also prioritize repair and replacement programs (Baird, 2010).

Many utilities may rely on these types of services only when an emergency or crisis occurs. But according to Brian Mergelas, chief executive officer and cofounder of the Pressure Pipe Inspection Company (PPIC), there are potential cost savings for utilities that conduct planned periodic inspections versus an emergency mobilization effort. Data gathered by PPIC over a decade's worth of experience using advanced condition assessment technologies show that only 4% of PCCP had significant distress levels, indicating that 96% was still in working condition. Furthermore, finding and correcting leaks sooner on large-diameter mains presents a significant opportunity to save water and system operations costs in general.

The most basic steps of condition assessment are inventory the assets, assess their condition, estimate their remaining useful life, manage the wear-out process, and continually improve the plan.

From 2003 to 2006, USEPA developed a series of guides (www.epa.gov/safewater) on rate-setting, conducting asset inventories, asset management planning, and strategic planning. These guides were created for small and medium-sized utilities to just get them started in asset management and long-term planning (Barrett, 2010).

The capital planning process. Every utility has a capital improvement plan (CIP). Some of these plans have mostly new capacity projects, whereas others have a mix of replacements and growth. A complete CIP will be built based on the careful planning efforts for the future (master plans) and the methodic review of current and historical assets. CIPs are changed and updated based on population, water demand, revenue fluctuations (rate increases and economic downturns), and the access to and availability of debt financing. The baseline CIP before a condition assessment–prioritized adjustment may seem overwhelming on the basis of the size of replacement projects and the costs. The ongong effort of periodic assessment and review will be the key to efficiently allocating funds to the right project at the right time, leading to a new strategic replacement process.

Capital intensity. One additional element of the capital-planning process involves reducing the costs of the design, planning, and construction of the projects. Water and wastewater are the most capital-intensive businesses. The term capital intensity is used to describe the level of assets required to support a business in the generation of revenues. The ratio of assets to revenues represents the net dollar amount of assets needed to generate one dollar of revenues. The revenues are then used to pay for the operations, debt, and capital projects. The capital intensity of a municipal water utility is $7.03, and a municipal wastewater utility is $7.85. This compares with an electricity utility at $1.61 and a telecommunications service provider at $1.11; the average of all industries is $1.69 (Water Research Foundation & USEPA, 2009).

Capital efficiency. Utilities have made most of the O&M efficiency improvements in the past decade. Now the focus needs to be on capital-intensive businesses like water and

wastewater utilities that must be efficient in their capital process and related decision-making. The publication "Improving Water Utility Capital Efficiency" (Water Research Foundation & USEPA, 2009) offers insight on ways to reduce costs in the capital process. The publication also promotes the use of metrics or benchmarks that can be used to compare the capital efficiency of related programs. So in addition to the debt-coverage ratio to review financial strength and the debt ratio (total liabilities divided by total assets) to measure indebtedness, a system renewal and replacement rate (actual expenditures on renewal and replacement plus reserves divided by total present worth of renewal and replacement needs for each asset class) offers a measure of spending as a percentage of needs. For the water operations, three indirect measures could include drinking water compliance rate (percent of total days), distribution system water loss (as a percentage of total water), and water distribution system integrity (leaks plus breaks divided by miles of distribution piping).

Strategic replacement and capital investments. The water industry has the accountability and stewardship to address the issue of aging infrastructure sustainability. The industry simply cannot afford to replace its entire aging pipeline infrastructure based solely on an "end of lifespan" decision-making process. The actual, real-time condition of a pipeline should be the major consideration. A condition assessment program can pay for itself in a number of ways, including:

- Deferral of capital investment. By prioritizing replacement decisions, municipalities can avoid replacing pipelines that do not need to be replaced and rehabilitate lines for a fraction of the cost of replacement.
- Avoiding catastrophic failure. This causes a reduction in risk management and insurance costs.
- Reduction in lost revenues as a result of water loss. Less lost water reduces the need to purchase additional water rights.
- Reduction in bonds and debt. This can both improve and protect credit ratings and also reduces water rate increases.

The national GFOA, with more than 17,000 members in the United States and Canada, has recently updated many of the best practices and advisories to help guide finance officers and to facilitate positive change and improved governmental management. One such update includes a Capital Asset Assessment, Maintenance and Replacement Policy (GFOA, 2010), that includes a best-practice and endorses-condition assessment as an important part of managing the asset during the entire life cycle.

CELEBRATE THE WINS

Conservation as a means to an end. Conservation and water efficiency are important elements in the path to sustainability and affordability. Many times, conservation may simply be defined as using less water, but the better definition may be the efficient use of water. The concept of conservation applied to a residential property could have a number of effects. First, conservation can be a result of mandatory water use restrictions, such as outdoor watering on even days only. This reduction in consumption can affect the long-term capital planning process. A new capacity-building project could be delayed or eliminated as a result. With increasing water rates there exists the price elasticity of demand (PED) effect that may actually result in lower revenues because consumers will naturally try to keep their water bill the same by reducing their consumption. This could also have both a short-term and long-term impact on capital planning efforts.

The capital-planning process must also look at the cost–benefit of alternative projects when balancing water supply with water demand. For example, is it more cost-effective to purchase additional water rights or find a means to reuse or recycle the water a utility already owns? This concept is not new but can still prove to be complicated and expensive. It could, however, mean that a city's population can grow by 20% without a corresponding 20% increase in demand. One sustainable approach is to sell reuse water for urban reuse projects that indirectly serve industrial water users or potable users by blending in reservoir and aquifer recharge water (Gasson, 2010). Once again, different conservation methods will have different effects on operations and projects and must be examined and monitored closely. Each of these projects will also compete for the same dollars that are available for funding maintenance and repair of aging infrastructure. Knowing the cost and risks associated with different replacement timing helps in the capital investment decision-making process.

Realizing capital savings. A natural result of reprioritizing projects based on condition needs assessments is more efficient allocation of capital dollars. This effort, combined with improvements in capital efficiency will help a utility realize capital savings. The process of proactive risk management reduces the costs of emergency and unplanned repairs. The practice of not replacing an asset just because it has been fully depreciated but still has some remaining economic life will also avoid premature capital outlays.

Return on investment and operational savings. As pipes near failure, water loss, possible cross-contamination, and maintenance costs increase. Asset management is all about understanding how to run all the assets in their most cost-efficient manner. Just taking the first step of condition assessment sets a utility on a better path. By budgeting each year for an ongoing condition assessment program, priority repair work can be planned in advance of any pressing need caused by failure of a pipeline. This shifts the focus to controlling risks versus crisis management. It is much more cost-effective to repair the pipes with the highest risk of failure on a schedule than to react to an emergency situa-

tion. This fundamentally shifts the financial focus on gaining a return on investment away from existing infrastructure by applying a strategic investment. The application of condition assessment will also improve operational costs by reducing water loss, which includes operational energy and treatment costs and overall lower debt issuances by improving long-term fiscal management of these assets. Controlling water loss aids in the ability to influence conservation and therefore reduces overall future water supply needs. It is all connected and works hand-in-hand toward better water resource management and long-term financial planning.

ENGAGE THE FANS

Maintaining access to the capital markets. Maintaining a strong credit rating includes effectively communicating with financial advisors, underwriters, and credit agencies. Demonstrating strong managerial competency and developing, executing, and communicating a game plan are just as important as maintaining coverage ratios. AWI offers a dynamic roadmap that leads toward rate affordability and therefore sustainability. When costs and tradeoffs are managed correctly and communicated clearly, the successful management of risk is demonstrated. Working without a game plan leads to failure, if only by not being able to measure the progress that has been made.

The financial dilemma associated with aging water infrastructure will create the same type of recessionary pressures for individual agencies. The recession that began in 2008 has taken a toll across all sectors, including water utilities. The Water Research Foundation convened a forum of water utility leaders in September 2009 to discuss lessons learned (Water Research Foundation, 2009). The highlights included:

- The downturn has not treated all water utilities equally.
- External sources of stress are not evenly distributed throughout the United States.
- Utilities were positioned for different degrees of resilience by variations in utility policies, practices, rate structures, revenue streams, and whether they had initiated changes before the recession's impact began to grow.

Other findings included:

- Utilities with strong credit ratings and sufficient capital reserves were better positioned to take advantage of a greater supply of labor, lower cost of capital, and lower construction costs. Maintaining a strong credit rating was an incentive to avoid some otherwise attractive short-term fixes.
- Other vulnerabilities also became visible, including pension plans, instability in energy costs and financial markets, and the long-term effects of water rates that do not adequately fund capital needs.
- Different forms of governance (municipal authority, financial autonomy) enabled some strategies and constrained others.
- Utilities with long-term plans in place were more resilient. Utilities with strong credit ratings were able to restructure debt to lower financing costs.

DON'T GIVE UP

The key challenge is rate affordability. Although USEPA has forecast that with expected efficiency improvements, the growth in capital needs will result in annual rate increases of 3% above the rate of inflation, a continuation of current trends will most likely result, in the intermediate to long term, in annual rate increases higher than those forecast by USEPA (Water Research Foundation & USEPA, 2009).

As utilities understand their cost of service and select a rate structure to recover the necessary revenue, the replacement costs will slide the annual water and sewer rates up through 1% of the median household income and reach toward 2%. As this occurs, there will always be some segment of a community that may not have the ability to pay (NDWAC, 2003). In these cases, assistance programs need to be rigorously explored. "Best Practices in Customer Payment Assistant Programs" (Water Research Foundation & USEPA, 2010) is one of the best sources for a comprehensive list of options. Although some utilities will resist the move toward such a program, the reality is that the true cost of water will continue to increase and the economics to charge cost-of-service to the customers who can pay will automatically create collection issues with the disadvantaged. To effectively address this issue, even from a cost–benefit analysis viewpoint, it may be best to ultimately offer some kind of discount. The Aspen Institute in Washington, D.C., concluded that communities will need to consider a lifeline program as part of the path to sustainability (Monsma, 2010).

GO THE DISTANCE

The many paths to asset management. Much has been written on asset management, and it has been defined in many different ways (Marlow, 2010). The best approach will always be the one that works for your utility. There is a great deal you can do on your own—start by appointing an asset manager. The experts can help at different stages, but to be sustainable your utility must drive the effort from its core. It is truly a process, and it takes time and resources. Adjusting your capital program based on condition assessment will be the early win. The best advice is to keep moving forward at a speed you can handle and can afford. Long-term savings will occur by continuing to improve the processes and plans. Asset management is not just for the enterprise fund. "Multisector Asset Management Case Studies," a joint effort by Steve Allbee (of the USEPA) and the Federal Highway Administration, demonstrated that asset management processes applied across the public works sectors (water, wastewater, highways, airports, and mass transit) resulted in innovations and greater efficiencies.

CLAIM VICTORY

Our generation's contribution must be sustainability. Our job as utility managers is to establish sustainable processes to provide for infrastructure renewal that will last for generations to come. This can be our legacy (AWWA, 2006). Each facet of the water industry, whether it is government (federal, interstate, state, regional, and local) or the private sector needs to develop and follow a game plan like the AWI solution cycle. As these basic steps are followed, cost efficiencies will occur, and costly mistakes will be avoided. Overall asset risk will decrease, and the USEPA's infrastructure investment gap will be reduced. Sustainability is a process, and when it comes to water—it's not optional.

FOOTNOTE

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