Fixing America's Crumbling Underground Water Infrastructure

Competitive Bidding Offers a Way Out

By Bonner R. Cohen

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Executive Summary

America's population is expected to grow by 100 million—a 30-percent increase—by the middle of the 21st century. This growth will put enormous strains on the nation's infrastructure, including roads, bridges, tunnels, and air-traffic control systems. Yet the transportation system is only the most visible of the infrastructure challenges we face. Out of sight, if not completely out of mind, are America's vast underground water networks, many of which have reached a state of deterioration that exceeds that of the transportation infrastructure above ground. Over the next 20 years, upgrading the nation's water and wastewater systems is expected to cost between $3 and $5 trillion. Building and replacing water and sewage lines alone will cost some $660 billion to $1.1 trillion over the same time period.

These projected expenditures are coming at a time when governments at all levels—federal, state, and local—are facing substantial budget shortfalls. Yet modernizing the nation's underground water infrastructure is absolutely essential. The nation's economic well being and public health are in no small way dependent on a reliable drinking water and wastewater sector. The task at hand is to address the problems besetting those underground networks in the most efficient and cost-effective manner possible.

Inserting some market discipline into the process would go a long way toward achieving that goal. Opening up the bidding process under the principle of "may the best technology win" will immeasurably improve the quality of America's underground water infrastructure in a cost-effective fashion. Competitive bidding can serve as an essential safeguard against the influence of politically preferred providers of government services. When government tries to pick winners and losers by mandating the use of one technology over another, it sends out an open invitation to crony capitalism, in which the well-connected gorge themselves at the public trough, at everybody else's expense.

One option public officials do not have is to continue business as usual. According to the Water Innovations Alliance, a coalition cost-conscious water providers and experts, it will take 15 to 20 years of significant investments to stabilize and modernize the U.S. water infrastructure at a cost of $365 billion, in today's dollars. With little prospect that the funds required to address the problem will be forthcoming in the near future, responsible public officials are going to have to look elsewhere to satisfy the public's demand for safe and affordable water.

By doing something as simple and sensible as opening up municipal procurement processes to fair competition, the products of our most creative minds can be put to the service of ensuring Americans access to clean, reliable, and affordable water in their homes, schools, and businesses for generations to come.

Introduction

America's population is expected to grow by 100 million—a 30-percent increase—by the middle of the 21st century.[1] This growth will put enormous strains on the nation's infrastructure, including roads, bridges, tunnels, and air-traffic control system. Yet the transportation sector is only the most visible of the infrastructure challenges we face. Out of sight, if not completely out of mind, are America's vast underground water networks, many of which have reached a state of deterioration that exceeds that of the transport infrastructure above ground. Over the next 20 years, upgrading municipal water and wastewater systems is expected to cost between $3 and $5 trillion.[2] Building and replacing water and sewage lines alone will cost some $660 billion to $1.1 trillion over the same time period.[3]

America's vast underground water networks, many of which have reached a state of deterioration that exceeds that of the transport infrastructure above ground.

These projected expenditures are coming at a time when governments at all levels—federal, state, and local—are facing substantial budget shortfalls. Yet modernizing the nation's underground water infrastructure is absolutely essential. The nation's economic well being and public health are in no small way dependent on a reliable drinking water and wastewater sector. The task at hand is to address the problems besetting those underground networks in the most efficient and cost-effective manner possible.

Inserting some market discipline into the process would go a long way toward achieving that goal. Opening up the bidding process under the principle of "may the best technology win" will go a long way to improving the quality of the nation's underground water infrastructure in a cost-effective fashion. (A fully open market would achieve even greater efficiencies, but the existing infrastructure and political considerations make that unlikely in the near future.)

The Crisis under Our Feet

There are over 300,000 water main breaks in North America annually, as a result of widespread corrosion in aging pipeline systems.[4] Reports of water main breaks have become a staple of local evening news broadcasts. Hundreds occur every day, adding up to a total repair cost of more than $3 billion nationwide over the course of a year. "This does not even include the costs associated with traffic disruptions, emergency equipment, or depleted water supplies," notes Gregory M. Baird, former chief financial officer for Aurora Water, Colorado's third-largest water utility.[5] Baird places the blame for the vast majority of water main breaks squarely at the feet of corrosion of metallic pipes, which he describes as "epidemic." "Corrosion [in the water and wastewater sector] is a $50.7 billion annual drain on our economy—including repairs, lost water, pipe replacements,

and implementation of expensive corrosion mitigation programs," he points out. "Leaking pipes also lose an estimated 2.6 trillion gallons of drinking water every year, or 17 percent of all water pumped in the United States. This represents $4.1 billion in wasted electricity every year."[6]

Viruses in municipal water systems are a predictable consequence of leaky sewer pipes that enable them to migrate into well water.

Rigorous federal enforcement actions under the Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) are putting additional pressure on hard-pressed municipal governments. In recent years, the U.S. Environmental Protection Agency (EPA) and the Department of Justice (DOJ) have cracked down on more than 30 cities whose decaying water and sewer systems are deemed to pose environmental or public health hazards, or both. The EPA and DOJ have forced these municipalities into binding legal agreements to undertake what often amounts to multi-billion dollar repairs and upgrades under strict timelines. As a result, cash-strapped municipalities find themselves in a no-win situation. Their infrastructure needs are real but so are the financial constraints under which they must operate. Beyond a certain point, simply passing the cost of repairs and upgrades on to ratepayers becomes politically untenable, particularly in a sluggish economy.

The EPA, responding to the plight of municipal officials, issued a guidance memorandum in October 2011 instructing regulators to show more "flexibility" in drawing up plans to deal with the problem. The agency noted that, "many of our local government partners find themselves facing difficult financial conditions. Their ability to finance improvements by raising revenues or issuing bonds has been significantly impacted during this ongoing economic recovery."[7]

The urgent need for improvements can be seen in a U.S. Geological Survey (USGS) study conducted in 2010 in Milwaukee, Wisconsin. The USGS researchers investigated the source, transport, and occurrence of intestinal viruses in municipal well water. They found that all their water samples tested positive both for viruses and for the presence of wastewater. They concluded that leaky sewage pipes were one source of entry for the viruses and that the problem could be traced to aging sewer systems dating to the early 1900s that were not being properly maintained.[8] Randall Hunt, one of the study's authors, commented, "With viruses now understood to be in drinking water and causing illness, the question becomes what are the sources and how do they get into wells."[9]

Viruses in municipal water systems are a predictable consequence of leaky sewer pipes that enable them to migrate into well water. And it is just these kinds of threats to public health that have prompted the EPA to force offending cities into consent agreements to remedy the situation. While the agency is prepared to show some understanding of the financial plight of the

municipalities it regulates, there are clear limits beyond which it is not prepared to go. EPA Assistant Administrator for Enforcement and Compliance Assurance Cynthia Giles, at a December 2011 House Transportation and Infrastructure Committee hearing, said that her agency would continue its criminal prosecution of cities and utilities found in violation of the CWA. She noted that where longstanding problems exist and are not adequately addressed, "enforcement remains an option on the table."[10]

During the same hearing, Kansas City, Kansas, Mayor Joe Reardon said that his city's sewer fees have increased by 40 percent in the last three years and would have to rise by another 400 percent in the next five years to meet the EPA's settlement requirements. "With all due respect, our citizens can't afford more," he said.[11]

This growing burden is shared by municipalities nationwide. According to the American Society of Civil Engineers (ASCE), the need to maintain and rehabilitate the nation's aging water infrastructure will exceed local governments' ability to make the necessary capital investments, resulting in a projected $84 billion capital funding gap by 2020. ASCE President-elect Greg DiLoredo said recently in congressional testimony, "Putting the problem in terms we can all understand, the average family household budget will increase about $900 annually to cover the cost of increased water rates and lost income."[12]

If Kansas City, whose metropolitan area unemployment rate stood at 7.2 percent[13] in January 2012, cannot afford the capital investment to upgrade its underground water system, how do things stand in cities with less robust economies? In Detroit, where 35 billion gallons of water leak from the city's decaying water system each year, residents pay about $25 million annually for water that never reaches homes or businesses.[14] With an unemployment rate of 20 percent and facing a $47 million budget shortfall by June 2012, the Motor City is even less in a position to confront its water infrastructure needs.[15] Indeed, in economically depressed cities such as Detroit, the burden for upgrading municipal water systems will fall disproportionately on people living on fixed incomes, low incomes, and the unemployed.

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The municipal water infrastructure problem is an equal-opportunity crisis, plaguing both relatively affluent communities and those mired in economic hard times. For example, the underground water networks in prosperous Washington, D.C., are plagued by the same decay afflicting other cities. *The Washington Post* recently reported that the average age of a pipe in D.C. is 77 years, but a great many were laid in the 19th century. Sewers are even older. Emergency crews now rush from site to site to repair an average of 450 water

main breaks a year. As a result, the average water and sewer bill has gone up by about 50 percent in just four years, to $65 a month for single-family homes. The city is replacing water pipes at an average of 11 miles a year. At that rate, it will take Washington over 100 years to complete the replacement process.[16]

For Americans accustomed to having access to affordable water, that may soon become a luxury with a very high price tag. Preventing that must be a priority for policy makers.

A cross-section of the nationwide funding crunch facing local governments can be seen in the nearby table. For every dollar raised in revenue during the decade from 2000 to 2009, governments spent $1.15,[17] while long-term debt rose by a whopping 816.76 percent.[18] During the same period, spending on maintaining and upgrading water and wastewater systems rose by 65.4 percent.[19] Yet even this increase in funding failed to stem the tide of deterioration. Clearly, addressing the crisis requires not just more money, but a new approach.

Why the Crisis?

As the examples of Kansas City, Detroit, and Washington show, the continued use of corrosion-prone piping is undermining our ability to confront the problem. For Americans accustomed to having access to affordable water, that may soon become a luxury with a very high price tag. Preventing that must be a priority for policy makers. To address the problem, they first need to understand its causes.

America's roughly 54,000 community drinking water systems are a testament to the "Great Sanitary Awakening" that gripped the country a little more than a century ago.[20] Waterborne diseases such as cholera and typhoid fever were eradicated thanks largely to chlorination of drinking water. Roughly coinciding with the advent of modern water-purification techniques was the construction of underground pipe networks that began crisscrossing towns and cities in the late 19th century.

The pipes comprising today's networks were laid at different times, made of different materials and manufacturing techniques, and have different life expectancies. Cast-iron pipes were laid in the late 19th century and have an average life expectancy of 120 years. Ductile iron pipes were introduced in the 1950s, a time of rapid population growth, and were marketed as an improvement over their cast-iron predecessors. They have a life expectancy of 50 to 75 years, but thinner-walled versions have a considerably shorter life cycle. In addition to traditional cast-iron and ductile pipes, the last half-century also saw the expanded use of pipes made from corrosion-resistant polyvinyl chloride (PVC).[21]

The problems afflicting today's underground systems stem from the deteriorating, corrosion-prone metallic pipes. Indeed, as is clear from the pipes' expiration dates, aging underground water networks will reach their breaking points during the next two decades. The decaying pipelines, depleted municipal coffers, and determination of federal regulators to force cities to upgrade their

Local Government Finances and Water and Wastewater Spending

Category	Expenditures For Every Dollar of Revenue 2009 ($)	Change in Long Term Debt 2009 vs 2000 (%)	Wastewater and Water Supply Spending 2009 ($ thou)	Change in Wastewater and Water Supply Spending 2009 vs 2000 (%)
United States[1]	1.15	81.76	103,453,483	65.4
Alaska	1.12	17.86	208,078	13.3
Arkansas	1.09	68.76	714,627	88.0
California	1.27	98.17	20,670,260	89.2
District of Columbia	1.31	91.44	506,621	-10.0
Florida	1.11	79.57	6,566,127	65.3
Hawaii	1.08	98.23	662,341	107.6
Illinois	1.32	83.84	3,564,791	32.8
Indiana	1.00	131.42	1,580,761	81.9
Louisiana	1.03	63.00	1,019,521	70.4
Maryland	1.22	22.50	1,145,049	24.7
Massachusetts	1.20	53.79	1,550,883	42.1
Michigan	1.26	72.33	3,662,040	35.3
Minnesota	1.10	53.38	1,306,531	31.3
Missouri	1.22	144.86	1,516,238	58.3
New York	1.26	75.96	6,802,296	96.6
Ohio	1.03	93.91	3,722,271	52.3
Oklahoma	1.01	49.41	981,284	55.2
Pennsylvania	1.08	38.56	2,816,532	25.2
Tennessee	1.08	111.80	1,663,679	35.7
Texas	1.15	143.34	8,569,326	80.2
Washington	1.04	56.53	3,045,259	119.3
West Virginia	1.01	-0.80	391,013	35.2
Wisconsin	1.13	43.33	1,407,606	39.0

Source: Testimony of Mayor Jim Suttle before the Water Resources Subcommittee of the House Transportation and Infrastructure Committee, "Integrated Planning and Permitting: An Opportunity for EPA to Provide Communities with Flexibility to Make Smart Investments in Water Quality," December 14, 2011, p. 7.

[1] Interpretation: Local governments in the United States spent $1.15 for every dollar raised in revenue; long term debt rose 811.76 percent from 2000 to 2009; wastewater and water supply spending in 2009 by local government was $103.4 billion; and, wastewater and water supply spending increased by 65.4 percent in 2009 from a base year of 2000.

water systems are creating a perfect storm that threatens to overwhelm local officials, ratepayers, and taxpayers.

No element of that perfect storm is more destructive than pipe corrosion, which causes leaks and triggers water main breaks. Use of corrosion-prone materials in the pipes affects operational and maintenance costs of water and wastewater systems. The longer they are in the ground, the more acute the corrosion problem becomes. Corrosion can occur both internally and externally. Internal corrosion restricts the flow of water. When the flow of water is impeded, additional problems can arise, such as slow-moving water that can be a breeding ground for bacteria.[22]

The American Society of Civil Engineers report card gave its lowest grade, D-, to drinking water and wastewater infrastructure.

As problems from the widespread presence of corrosion-prone metallic pipes mount, an anxious public will hold utilities and municipal officials accountable for the quality of their water systems. The pipe network represents the single largest component of a utility's infrastructure assets and significantly affects operations and maintenance costs, which are increasing annually by 6 percent above the rate of inflation.[23] For municipalities eager to attract financing for infrastructure improvement projects, selecting which kind of underground pipes will replace old ones is a critical decision.

Given the high cost of maintaining and upgrading decaying water systems, experts estimate that water and sewer bills will eventually grow to nearly 5 percent of median household income, which could mean a 200- to 300-percent rise in water utility rates above today's levels.[24] The driving force behind all this is corrosion, which is unavoidable in metallic pipes.

Infrastructure's Financial Crisis

Water systems are capital-intensive operations. When municipalities fail to raise sufficient funds to cover the cost of rehabilitating their water systems, upgrades are put off, and decay accelerates. It is a vicious cycle that has spread like wildfire across the country. Every four years, the American Society of Civil Engineers (ASCE) issues a U.S. Infrastructure Report Card, which grades the condition of the nation's infrastructure, including roads, bridges, dams, among other facilities. ASCE's most recent report card (2009) gave its lowest grade, D-, to drinking water and wastewater infrastructure.[25]

Moreover, the decline in home values since 2007 will have a profound, if not yet fully appreciated, effect on the corrosion-driven crisis gripping underground pipe networks. During the housing bubble of the early 2000s, tax assessments on properties soared across the nation. The bust that began in 2007 caused home values to plummet, and the resulting decline in local property-tax revenues is only now making its presence felt. Baltimore, for example, collected $815 million in property tax revenues in FY 2011. But, as property assessments fall to more realistic levels, city officials expect that figure to decline to $729.4 million by 2015.[26]

That decline in revenues is hitting the city at the worst possible time. A series of spectacular water main breaks in recent years has wreaked havoc with Baltimore's budget, with city officials estimating that at least $2 billion will be needed to upgrade corrosion-degraded underground pipes.[27] The collapse in home prices and the shrinking tax base that goes along with it is not limited to Baltimore. A September 2011 report by the National League of Cities concluded, "The

fiscal condition of cities continues to weaken. … In response, cities are continuing to cut personnel, infrastructure investments and key services."[28]

In a December 2011 Cleveland Fed study, economists Thomas J. Fitzpatrick and Mary Zenker conclude that cash-strapped cities will have little choice but to make deep cuts. "It appears that the dramatic fall in property values across the country will accelerate the financial distress of municipalities in the wake of the Great Recession," they write. "If creative ways to make up for this lack of revenue are not found, local governments may face the undesirable choice of either raising property taxes or reducing funding for essential services."[29] Indeed, Chicago Mayor Rahm Emanuel has proposed reducing the city's work force, closing police stations, and raising water and sewer fees as a means to close the budget gap.[30]

Another revenue stream to finance water infrastructure improvements is also in jeopardy. State Revolving Funds (SRFs), authorized under amendments to the Clean Water Act and the Safe Drinking Water Act, have provided water systems much-needed infusions of cash to replace aging pipes and make other improvements. Under the SRF program, Congress authorizes the EPA to make capitalization grants to states. States use these grants, which they match with 20 percent of their own funds, to provide loans and other assistance to public water systems. Communities repay the loans into a fund which—in principle—replenishes the financing mechanism, thereby making funds available for other communities. However, funding levels for SRFs have not kept pace with the deterioration of underground water systems, and the Obama administration, reacting to budgetary pressures, has proposed cutting the money for SRFs in FY 2012 by 38 percent.[31]

With little prospect of relief from either state governments or Washington, municipal officials are in an increasingly untenable position. Fitzpatrick and Zenker's warning that unless "creative ways" are found to deal with the crisis, dire consequences will follow, hits the nail right on the head. However, as unsettling as the situation is, there is a step forward-looking municipal officials can take that offers a promising alternative to an unacceptable status quo.

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A Way Out: Competitive Bidding

Infrastructure asset management must include an acceptable level of service at the lowest possible life-cycle cost. Eighty-five percent of the nation's water systems are controlled or owned by municipalities that have elected officials, city councils, or water boards determining how much rates will rise for the entire community.[32] The extraordinary challenges of maintaining and rehabilitating underground water systems at a time of severe financial constraints will require

far-reaching changes in municipal infrastructure management. This will entail:

- Monitoring leaks in underground pipes and investigating their causes;
- Assessing the life-cycle of materials and the cost of their procurement and replacement;
- Rehabilitating underground water networks; and
- Prioritizing the selection, design, and timing of replacing aging assets.[33]

The easiest way for cash-strapped municipalities to manage their physical assets is to open up the bidding process to ensure that all materials and technologies get the consideration they deserve.

As decay takes hold of one water network after another, it becomes clear that the old ways of doing things are inadequate to the task at hand. While great strides have been made in the technology undergirding public water systems, many cities have procurement policies that are mired in an earlier era. Discarding outdated and prohibitive local procurement policies that discriminate against the use of innovative, more cost-effective materials will help usher in a new era of municipal infrastructure management. By considering life-cycle costs and performance of materials in all public projects, local officials can rid themselves of what are often self-imposed restrictions on how they spend taxpayer money.

The easiest way for cash-strapped municipalities to manage their physical assets is to open up the bidding process to ensure that all materials and technologies get the consideration they deserve. This is particularly true when it comes to the expensive business of replacing underground pipes. It is a major expenditure and one which, if not guided by sound asset management, will cost taxpayers and ratepayers dearly in the long run. Unfortunately, many municipalities, including some of the nation's largest, have procurement policies that effectively shut the door on truly competitive bidding. Procurement rules that prevent informed decisions on how billions of taxpayer dollars are to be spent undermine public confidence in local governments' ability to deliver essential services to residents.

In the case of underground water networks, discriminatory procurement rules in many cities keep pipe made of PVC from even being considered in the bidding process. In some cases, the restrictive procurement rules can be attributed to bureaucratic inertia. Having used metallic pipes in their systems for many decades, municipal officials have simply neglected to update their bidding requirements to account for new technologies.

But regardless of the reason, cities sticking to outdated procurement procedures are narrowing their options in addressing their water infrastructure challenges. Currently, only 45 of the 100 largest U.S. cities use PVC pipe in their water distribution networks.[34] Cities whose procurement rules effectively

exclude PVC pipes from the bidding process include Atlanta; Baltimore; Boston; Chicago; Cincinnati; Columbus, Ohio; Jackson, Mississippi; Los Angeles; Memphis; Miami; New York; Philadelphia; and Phoenix. These cities are facing the daunting financial challenges in upgrading their underground water systems with one arm tied behind their backs.

Cities that have opened up the bidding process to PVC pipe have benefited from the competition.

By contrast, cities that have opened up the bidding process to PVC pipe have benefited from the competition. Municipalities as diverse in size and location as Charlotte, Cleveland, Dallas, Denver, Fargo, Houston, Indianapolis, Jacksonville, Las Vegas, Louisville, Myrtle Beach, Oakland, San Antonio, and San Diego have joined a host of other cities in allowing the competitive bidding process to decide the future of their water networks.[35]

Their experience echoes those of other cities that took the plunge into open competition some time ago. In Great Falls, Montana, for example, City Engineer Dave Dobbs reports his city's water main failure rate of 122 in 1997 was reduced to 35 in 2009 by "replacing old water lines with PVC pipe."[36] Similarly, the Canadian cities of Calgary and Edmonton, which permit open bidding, have each saved about $5 million annually in water maintenance costs because of their extensive use of PVC pipe.[37] Pleasanton, California, Mayor Jennifer Hosterman, who co-chairs the U.S. Conference of Mayors' Water Council, points out the PVC pipe is about 70 percent cheaper to use and less labor-intensive than ductile iron pipe. "Giving taxpayers the best bang for the buck should be the chief goal for mayors and elected officials across the country," she explains.[38]

One of the federal government's largest departments has recognized the benefits to taxpayers from a competitive procurement environment. For nearly a decade, the U.S. Department of Agriculture (USDA) has been at the forefront of fostering truly competitive bidding. The Department's Rural Utilities Service (RUS) program provides funding for water systems in rural areas across the country. As is usual with government programs, the money comes with strings attached, but the strings in this case are specifically designed to foster competition and benefit taxpayers. In an internal memorandum dated March 16, 2002, which was forwarded to state directors for rural development, the USDA stated, "All procurement transactions regardless whether by sealed bid or negotiation and without regard to dollar value, shall be conducted in a manner that provides maximum open and free competition." The memorandum further specifies:

> RUS expects the owner and the design engineer to be open to reasonable alternatives during the facility planning and design process. Contractors, manufacturers, and suppliers with acceptable equipment and materials should have a chance to participate in the project. Once the facility requirements have been established that

assures good quality, the goal is to construct the project at the best price for the system and the taxpayer.[39]

The evidence is overwhelming that corrosion, not just age, is eating away underground water systems.

With a life expectancy of 110 years, and with more than a million miles already in service throughout North America,[40] PVC pipe has shown that it can stand the rigors of time and the different types of soil in which it is laid. A recent study by the American Water Works Association Foundation urges water utilities to select pipes not only on the basis of their mechanical properties, but also on their resistance to corrosion.[41]

The evidence is overwhelming that corrosion, not just age, is eating away underground water systems. In fact, many of the decaying pipes are really not that old. For metallic pipes, thickness, or lack thereof, trumps age. A 2011 study by the American Water Works Association's Water Research Foundation found that pipes with the thinnest walls (15 mm) in a moderately corrosive environment have a life expectancy of 11 to 14 years.[42] The use of thin-walled metallic pipe is widespread because it is cheaper than thicker versions made of the same material, but its presence contributes to the corrosion woes afflicting many cities' water systems.

Toronto, for example, is spending CA$100 million (US$97 million) a year replacing 80 kilometers (49.7 miles) of cast-iron and metal pipes with PVC pipes. While the cast-iron pipes are a century old, the ductile iron pipes are of more recent vintage. They were laid in the 1950s but are now a primary cause of the city's skyrocketing water main breaks. "It's a thinner wall of material," explains Lou Di Gironimo, general manager of Toronto Water. "It's placed in clay soils, so you get a lot of corrosion." Pointing out that the average age of pipes in Toronto is 55 years, though some date to the dawn of the 20th century, Di Gironimo says that, "age is only one component of the problem that we have in the water mains in this city. The biggest problem is the type of materials, construction, and the soils that the pipes are placed in."[43] Di Gironimo's emergency crews handle 1,400 water main breaks a year, and the city's residents are going to see their water bills increase by 9 percent in 2012.[44] At least Toronto is taking steps to ensure that a later generation of its residents will not have to deal with the painful consequences of corrosion-driven decay of their city's water system. It's an example all cities should follow.

Conclusion

By opening up the bidding process in the spirit of "let the best technology win," municipalities can let competition decide the future of their underground water networks. The Agriculture Department's assistance program for rural water

systems should serve as a template for federal, state, and local government agencies to set specifications for truly competitive bidding. It creates strict environmental and safety standards but allows manufacturers and suppliers of competing materials and technologies to vie for contracts. At the federal level, the process could begin with the EPA issuing similar guidelines for its State Revolving Funds program.

The integrity of government contracting procedures will also improve, because competitive bidding can serve as an essential safeguard against the influence of politically preferred providers of government services. When government tries to pick winners and losers by mandating the use of one technology over another, it sends out an open invitation to crony capitalism, in which the well-connected gorge themselves at the public trough. Government does have a role to play in setting standards on projects affecting public health and safety, while avoiding micromanagement and regulatory overreach. When it comes to corrosion in pipes, some positive steps have already been taken. The Office of Pipeline Safety at the U.S. Department of Transportation, for example, has mandated tough requirements on pipelines transporting oil and natural gas.[45] This restricts government's role to asking manufacturers and suppliers one question: Can your pipe meet the new standards?

One option public officials do not have is to continue business as usual.

One option public officials do not have is to continue business as usual. According to the Water Innovations Alliance (WIA), a coalition of cost-conscious water providers and experts, it will take 15 to 20 years of significant investments to stabilize and modernize the U.S. water infrastructure at a cost of $365 billion, in today's dollars. WIA further points out that the average residential water bill has risen from $17 for drinking water and $22 for sewer service in 2001 to $28 for drinking water and $36 for sewer service in 2010—a compound annual increase of approximately 5.5 percent. Commercial and industrial water bills have risen at even faster rates, WIA notes.[46] This is unsustainable. With little prospect that the funds required to address the problem will be forthcoming in the near future, responsible public officials are going to have to look elsewhere for ways to satisfy the public's demand for safe and affordable water.

Human ingenuity has repeatedly come to the rescue of people confronted by problems long thought to be insurmountable. By doing something as simple and sensible as opening up municipal procurement procedures to fair competition, the products of our most creative minds can be put to the service of ensuring Americans access to clean, reliable, and affordable water in their homes, schools, and businesses for generations to come.

APPENDIX: The Political Reaction

Opening an area of economic activity to greater competition often can get bogged down in politics. That has been the case with proposals to open governments' bidding process for water infrastructure to PVC pipe. However, incumbent competitors' reactions have not been universally hostile.

The head of one metal pipe manufacturer recently suggested that his company would actually welcome the increased competition that opening the bidding process to PVC would bring. Testifying before the U.S. Senate Environment and Public Works Committee in December 2011, American Cast Iron Pipe Company President and CEO Van L. Richey touted his product's ability to compete in the marketplace. "Iron pipe has been the backbone of our nation's water systems since the 1800s and is still the most prevalent and preferred water pipe material used in the United States," he said. "Ductile iron pipe is recognized as an especially long-lasting and cost-effective solution for providing safe drinking water."[47]

Richey also voiced support for bipartisan legislation to remove federal limits on the use of private activity bonds (PABs) for water infrastructure projects. PABs are tax-exempt bonds that allow water utilities to finance a project with money from private investors. However, he also asked Congress to include a provision encouraging utilities to buy their pipes from American manufacturers to counter foreign producers that, he argued, are unfairly subsidized by their governments. "I can stand toe-to-toe with another company," he told the committee, "but not with another country."[48] Richey's request is odd in light of the fact that no foreign companies sell pipe to U.S. water utilities. Still, his public commitment to go "toe-to-toe" with any company is a welcome endorsement of the principle of open competition.

On the other hand, Ductile Iron Pipe Association President Greg Horn has accused the PVC pipe industry of supporting legislation that would bring federal involvement in local decision-making processes regarding the procurement of new underground pipes. Horn says the PVC industry "calls on the federal government to intercede in decisions made every day by water and wastewater utilities regarding the pipe they prefer to use in their local systems."[49] In response, Uni-Bell PVC Pipe Association Executive Director Bruce Hollands says his industry is not seeking to have Washington interfere with decisions made by local officials, and that his organization favors policies aimed at promoting competition. He said,"Fair bidding requires public officials to be open to reasonable alternatives, so that manufacturers and suppliers with acceptable products can be included and more informed decisions can be made."[50] Hollands added that "corrosion is the leading cause of the water-main break epidemic spreading throughout North America" and is a "drag on the U.S. economy."[51]

NOTES

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