

Funding America's Drinking Water Infrastructure

From Public to Private

Christina Brow, WISE 2001
NSPE

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About the Author

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The WISE Program

Founded in 1980, the Washington Internship for Students of Engineering is a ten-week program for up to 16 junior or senior engineering students in which they “learn how government officials make decisions on complex technological issues and how engineers can contribute to legislative and regulatory public policy decisions.” Throughout the ten weeks, the students interact with leaders in Congress and the Administration, industry, non-governmental organizations, executive office departments, congressional committees, and corporate government affairs offices. In addition, each student researches and presents a paper on a topical engineering-related public policy issue that is important to the sponsoring society. For more information, visit the WISE homepage at <http://www.wise-intern.org>.

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List of Abbreviations

ASCE – American Society of Civil Engineers
AWWA – American Water Works Association
CBO – Congressional Budget Office
CIFA – Council of Infrastructure Financing Authorities
CWA – Clean Water Act
DWSRF – Drinking Water State Revolving Fund
FY – Fiscal year
GFG – Government Finance Group
MGD – Million gallons per day
NSPE – National Society of Professional Engineers
O&M – Operation & maintenance
OMB – Office of Management and Budget
OM&M – Operation, Maintenance & Management
PAB – Private activity bond
PBR – Performance-based regulation
PPP – Public-Private Partnership
SDWA – Safe Drinking Water Act
UK – United Kingdom
USEPA – United States Environmental Protection Agency
WIN – Water Infrastructure Network
WISE – Washington Internship for Students of Engineering
3P – USEPA’s Public-Private Partnership Program

Executive Summary

Water infrastructure refers to the facilities and pipes associated with water treatment, distribution, and collection. When the public sector began providing water supply service in the mid 1800s, water utilities boasted only a small asset base. After over a century of investment, that asset base has increased dramatically. However, because much of our functional water infrastructure was built in waves that occurred prior to the 1950s, much of it is reaching, or past its useful design life and is in need of costly repair or replacement.

United States drinking water infrastructure received the grade of “D” according to the American Society of Civil Engineers’ “Report Card for America’s Infrastructure.” Similarly, in April of 2000 the Water Infrastructure Network released a report estimating a need of over \$138 billion dollars over the next 20 years in order to attain or maintain regulatory compliance. The increasingly stringent standards of the Safe Drinking Water Act are putting both capital and operating pressure of drinking water systems. Local taxpayers and governments must fund 90 percent of safe drinking water infrastructure. For many systems, this is too heavy a burden to bear.

While the best way to fund drinking water infrastructure is currently through the Drinking Water State Revolving Fund loan program, many ascertain that federal funding alone isn’t, and won’t be enough to assist local governments in meeting their drinking water infrastructure needs and bridging the anticipate funding gap. One funding alternative receiving considerable attention is the use of public-private partnerships.

This report explores the history and development of publicly owned water supply systems in the United States, reasons for revived interest in private sector involvement, and the potential benefits for communities seeking to engage in such involvement. It outlines several types of public-private partnerships and associated legal, societal, and financial barriers to increased involvement in such partnerships. It also provides examples of successful partnerships and how creative solutions can be used to overcome some common concerns.

Background

Water infrastructure refers to the facilities and pipes associated with water treatment, distribution, and collection. Because a majority of the components that make up water infrastructure systems are hidden from the public eye, water infrastructure has been referred to as “invisible” infrastructure.

There have been two major waves of water infrastructure investment in the United States. The first wave came in response to population growth in the late 1800s and early 1900s. Post-war demographic changes of the 1920s and 1950s ushered in the second wave²³. What this means for operating water utilities is that much of the critical infrastructure is nearing, or operating, beyond its useful life-span. This critical infrastructure is paramount to not only public health but also economy.

Through the 1996 amendments to the Safe Drinking Water Act (SDWA), the Drinking Water State Revolving Fund (DWSRF) loan program was created and \$1 billion is authorized annually for the DWSRF. Although State Revolving Funds for wastewater have been authorized since the 1987 amendments to the Clean Water Act (CWA), funds appropriated for the DWSRF were first seen only in 1997⁴. Through this program, public water systems can obtain financial assistance for achieving, or maintaining compliance with SDWA regulations. Under this program, the United States Environmental Protection Agency (USEPA) awards capitalization grants to states that in-turn can provide low-interest loans and other assistance to drinking water systems¹⁵.

Every year, the American Society of Civil Engineers (ASCE) publishes its “Report Card for America’s Infrastructure.” In the 2001 Report Card, ASCE gives water supply infrastructure a rating of “poor” as denoted by the “D” grade. Significant improvements in America’s water supply infrastructure must be made in order to ensure quality drinking water services as well as public and environmental health. In April of 2000, the Water Infrastructure Network (WIN) released a report documenting an unprecedented financial problem for the water industry. It is estimated that more than \$138 billion will be needed over the next 20 years for drinking water infrastructure simply to attain or maintain regulatory compliance¹⁴.

This anticipated funding gap has received much attention from water utility managers and some politicians. Despite the fact that many are calling for increased federal funding to bridge the gap, Congress has been given little in the way of economic

incentives to do so. In fact, a 1998 Congressional Budget Office (CBO) report claims that increased federal spending on investment in infrastructure, is unlikely to have a perceptible positive effect on economic growth³. What the CBO report fails to comment on; however, is the cost of doing nothing. The replacement cost of infrastructure increases once past its optimal design life. Failure of a water main, for example, incurs not only the replacement costs, but can also impart the additional costs of lost water, and flood damage. The reliability of water service is also affected by doing nothing. A failure in any component of the infrastructure system can leave customers without service for days until repair is complete.

Although some are calling for increased federal funding for the nation's water supply systems, there are also those who believe the time has come to explore other options. These people feel that increased federal funds alone cannot sufficiently fund the mounting need. They believe that the public sector is incapable of providing the incentives necessary for utilities to maintain efficient capital investment programs and they support getting the private sector involved in what are known as public-private partnerships (PPPs). The remainder of this report will examine the history of US water supply utilities, the reasons public ownership developed, why PPPs are gaining momentum, the different types of PPPs possible, difficulties and benefits in implementing water supply PPPs, and suggestions as to how PPPs can be further encouraged.

A History of Public Ownership

Government ownership of water supply utilities in the United States arose for a number of reasons. Demographics and the inability of early regulation to control business abuse are cited as two of the main causes of such development. Early drinking water planners opted for government ownership over private ownership because the regulatory environment for drinking water was not well developed. By nature of supply location and economies of scale, drinking water utilities are natural monopolies. The capital-intensive nature of maintaining a water supply and distribution system makes it uneconomical for rival systems to compete side-by-side. If the private sector is to own or manage such a monopoly, a well-developed regulatory environment is necessary¹⁶.

Other motivations for government ownership of drinking water utilities arose from demographics. The remoteness of small rural towns and the lack of local private sector resources discouraged private investment in capital-intensive drinking water infrastructure. Economies of scale also tilted against private ownership. Smaller towns are forced to provide the same quality product as their larger neighbors; however, their per capita costs are much greater. At the time of early water supply investment, large water companies capable of operating multiple small systems did not exist. Therefore small systems within regions could not operate under the same company and enjoy the benefits of consolidation. Because of this, private investment in small, rural systems was not profitable or practical thus service had to be provided by the public sector. Finally, municipalities saw public ownership of water utilities as a means of controlling development. Because water service is a necessary commodity, governments could control the spatial direction of development by controlling where water service would be available. Communities wishing for control over development would then prefer controlling the water supply system rather than leaving it to the private sector¹³.

Publicly Owned Systems Today

When water utilities first appeared in the US in the mid-1800s, they boasted only a small asset base. Water supply facilities were few and distribution pipelines were short. After more than a century of investment, that asset base has increased

dramatically and water utilities have more to manage, operate, and expand upon, and also have a much larger population to serve. Communities began spreading outward and facilities grew to support the rising population. Individual systems now boast hundreds of miles of distribution pipelines and facilities capable of treating millions of gallons each day. These water supply systems also now face unique challenges in comparison to other utilities. Today, water supply systems in the US are primarily under municipal ownership. Eighty-five percent of the nation's population receives its drinking water from publicly owned systems. Unlike power utilities that can sell excess power from one region to another, water supply utilities are independent of each other and are not interconnected due to the high cost of collecting, treating and distributing water. Municipally owned systems pay less for capital because they can issue tax-exempt debt. In contrast to private systems that rely primarily on retained earnings or revenue, municipal systems receive up to 60% of their financing needs from the municipal tax-exempt bond market. Finally, much of the technology necessary to promote increased productivity in water supply systems is embodied in physical capital that has a relatively long life span. Physical capital, such as pipes, comprises the majority of the total system. However, incrementally improving such capital is not possible. Pipes are buried beneath other critical infrastructure such as roads thus access to them is limited. It is not practical to make improvements prior to the end of a pipe's design life thus increases in productivity come slowly and at great expense¹⁰.

One consequence of using tax-exempt debt has been that prices charged for water have historically not reflected the full cost of providing water services. Publicly owned systems do not have the profit motive that privately owned systems do. The rates charged by publicly owned systems reflect only the cost of providing the service, and not of retaining a profit. When running off tax-exempt funds, the cost of providing the service is artificially lowered. Because of the capital intensive, low revenue character of the water industry, only municipally owned systems have traditionally been able to provide water at below full cost. This characteristic of the water industry is shown in table 1 that illustrates the ratio of required capital investment per revenue dollar as compared to other utilities. The argument associated with underpriced water is that it is inherently misused. Without prices that reflect the full cost of providing water service, there is little motivation to increase efficiency or reduce demand¹⁰.

Table 1: Asset Requirement per Dollar Revenue

Sector	Asset Requirement per Dollar Revenue
Water systems	10-12
Telephone service	3
Electric utilities	3-4
Railroads	2
Airlines	1

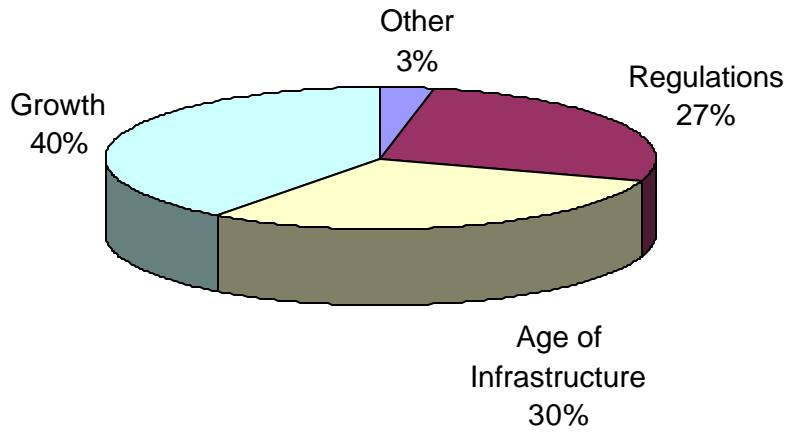
Source: *The Nation's Public Works: Report on Water Supply*. Wade Miller Associates Inc.

Drinking water utilities in the United States are being confronted with an unprecedented challenge. While the cost associated with regulatory compliance increases and public funds dwindle, many systems are simultaneously faced with the need to invest heavily in capital improvements⁵. Federal funding for water infrastructure has fallen nearly 70 percent since 1980 while local investment has doubled⁷. Local governments and taxpayers must now fund 90 percent of safe drinking water infrastructure while the federal government's share is 10 percent. Often, improvements in water supply infrastructure are put off in order to fund other competing, more visible, needs such as roads and social services².

Many factors drive the need for increased water supply infrastructure investment. As shown in figure 1, regulatory compliance, growth, and the age of infrastructure, are the three major factors driving infrastructure investment. However, although the age of infrastructure appears to account for only 30 percent, that number reflects money spent, not money needed. Few public utilities have master replacement schedules or policies in place for capital maintenance. When funding is limited, water utilities are forced to invest in new technologies to comply with regulations and thus aging and deteriorating infrastructure in need of rehabilitation or replacement is neglected, often until failure. Investment in infrastructure maintenance is rare in comparison to investment in replacement post-failure. The prevailing trend is one of "if it ain't broke, don't fix it." This is not reflective of a perceived lack of infrastructure improvement needs, but rather a

lack of available funds. This ultimately imparts an increased threat to public and environmental health⁵.

Figure 1: Factors Driving Capital Improvements



Source: R.W. Beck Inc. 1998 Water Resources Survey

Moving Towards Public-Private Partnerships

In order to successfully respond to the above-mentioned challenges, drinking water utilities must become competitive in the sense that they combine both engineering and economic efficiency. As a means of becoming more competitive, PPPs are being considered by several systems. According to a 1998 water resources survey, as many as 35 percent of municipalities have considered some form of PPP⁵. Following is the EPA definition of public-private partnerships as pertaining to environmental services²¹:

“A public-private environmental partnership is a contractual relationship between a public and private partner (e.g., a municipality and a local firm or district) that commits both to providing an environmental service. The private sector can be involved in a variety of ways, from the initial design of a facility to its daily operation and maintenance.”

Deficiencies of Publicly Owned Systems

As a result of more stringent water quality standards and aging infrastructure, water suppliers are faced with the pressure of having to increase both capital and operating expenditures. Public systems are not exposed to competition and many believe they thus lack the market discipline necessary to maintain efficient investment programs. Increases in service standards, lack of efficient resource management capabilities, underpriced water and lack of efficient rate structures, commingled funds, and increased risk, are all making the water utility business less attractive for governments to be in.

The stricter standards of the SDWA have imposed significant capital requirements on water supply systems as well as higher operating costs for increased monitoring and reporting. It is ultimately the ratepayers who must bear the additional cost. However, smaller communities are often not capable of shouldering these costs due to economies of scale. To some smaller communities, the financial solution to stricter regulation may be to sell the system to a larger, private utility. Because the private investor often owns several smaller systems, the economies of scale are tolerable to the private sector where as they are not to the small public sector¹³.

Efficient resource management, which is a fundamental goal of commercial enterprise, is less probable under public ownership than private ownership. Public

ventures are more subject to political interference than are private ventures. Many believe that public systems are less capable of offering the salaries and benefits necessary to obtain and retain high quality managers. Finally, the interests of capital, i.e. replacement and improvement needs, are not represented as well by public systems as they are by private systems. Because public systems face no bottom line and are not motivated by profit or loss, optimization of physical capital and operational procedures is not as common as it would be in the private sector¹⁰. The use of asset management, which helps make repair and replacement decisions based on investment, is far more common in private utilities¹. Studies in all areas of infrastructure, including water supply infrastructure, indicate that publicly owned capital deteriorates faster than privately owned capital because private investors tend to devote more resources to maintenance¹⁰.

As noted, the tax status of publicly owned water supply systems allows them to underprice water. Many in the water industry argue that water prices that accurately reflect the cost of the commodity are necessary else it is inherently misused. For the past decade the CBO, the National Council on Public Works, and the American Water Works Association (AWWA), have reported that public water supply utilities fail to engage in full-cost pricing. The CBO goes so far as to state that only privately owned utilities charge enough to cover costs as well as facility and infrastructure depreciation³.

In comparison to privately owned water utilities, publicly owned systems have less incentive to develop and adopt complex rate structures. Despite being faced with severe financial constraints, a surprising many publicly owned water supply systems continue to engage in water pricing practices that arguably give water away. A 1998 survey by the American Water Works shows that 39 percent of America's water supply systems still charge uniform rates. This means customers pay the same rate per gallon no matter how much they use. In addition, 33 percent of systems go as far as to provide volume discounts; water rates decrease as the volume used increases¹⁹. The pricing structures of private sector systems more closely mirror cost and demand dynamics. This is not exclusive to water supply systems. Privately owned electric utilities have more efficient rate structures than publicly owned electric utilities as well¹⁰.

Publicly owned water supply systems also run into financial difficulty when the operations and financing are integrated with other government operations. In such cases, government departments must compete for funds. Because water supply

infrastructure is “invisible”, other departments competing for funds (such as police and fire departments), receive more attention and water infrastructure can often be neglected¹⁰.

The increasing risk of remaining in the water utility business is another force driving the movement towards PPPs. Both federal and state agencies can impose civil and criminal penalties for violations of SDWA standards. Many smaller utilities are not only incapable of bearing those risks but also often lack the equipment or personnel to monitor for these risks. Although in the beginning the regulatory environment (or lack thereof) encouraged public ownership of water supply systems, the new regulatory environment with its ever stricter standards, in fact, is a disincentive for public ownership¹³.

Examples of the above mentioned deficiencies can be seen in New York, and Philadelphia. New York City’s water supply system averages 500 main breaks annually. This number is expected to double by 2030 if significant funds are not allocated for infrastructure rehabilitation and replacement. The supply system is also plagued by high leakage rates; however, a precise grasp on the loss cannot be estimated because metered water represents less than 20 percent of the total consumption. Philadelphia experiences a leakage rate of 27 percent and a significant portion of the distribution system is over 100 years old and in need of significant restoration. Losses of up to \$42.5 million on operating revenues of \$270 million are not uncommon. Confounding the problem is the fact that the city’s water department manages both the water supply system and the sewer system, and its funds are entwined with other city money in a consolidated cash account¹⁰.

History of PPP Development

As far back as the 19th century, toll roads and bridges were privately owned and operated. Similarly, the Manhattan Company, now JP Morgan Chase, built one of New York’s first reservoirs in the 1800s. Private ownership of utilities and facilities that serve the public is not a new concept in the United States, but rather one that is being reinvented only recently. A report tracking the increase in public service being provided by the private sector illustrates that some of the highest increases are for environmental services such as water supply utilities¹⁷.

Public-private partnerships have shown 20-23 percent growth in the past ten years and economic forecasts for the water industry predict significant growth with continue. Several visible mergers, such as those between American Water Works Service Company Inc. and Continental Water Company, and between Philadelphia Suburban Water Company and Consumers Water Company, indicate that the provision of water services is becoming big business. Additionally, the acquisition of water utilities by companies traditionally in the electric utility business indicates that the water utility business is becoming more competitive. Examples of such acquisitions are Enron Oil and Gas Company's purchase of the United Kingdom's water utility, and NIPSCO Industry's purchase of Indianapolis Water Company⁵.

As previously mentioned, 35 percent of communities were planning or will be considering some form of PPP in the future. Many municipalities will not be able to fund the necessary improvements to meet new regulations and the replacements necessary to maintain aging infrastructure. These municipalities will be forced to look elsewhere and expand involvement with the private sector. Although many factors affect PPPs and every case must be analyzed individually, barriers have slowly been melting away as will be discussed later⁵.

Models of Public-Private Partnerships

Despite the fact that each partnership is unique, the most common PPPs can generally be classified as one of six types as outlined by the USEPA's Public-Private Partnership Program (3P): contract services, turnkey projects, developer financing, privatization, and merchant facilities. These Types of PPPs are described in detail below²¹.

- Contract services – Private services contracts for environmental facilities are typically entered for operations & maintenance (O&M), or operation, maintenance and management (OM&M). In the case of O&M contracts, a public partner contracts with a private partner to provide and/or maintain a public service. Examples of services provided are laboratory testing, auditing, and the operation and maintenance of water treatment facilities. This type of operation has achieved efficiency savings of 10-40 percent as compared to public sector operations. Advantages such as risk sharing or even total transfer are also possible. In the case of OM&M contracts, a public partner contracts with a private partner to operate, maintain, and manage a public service. Under this option the public sector retains ownership of the facility but the private party may invest its own capital into the system. The longer the contract, the greater the opportunity for private sector investment. This type of operation has achieved efficiency savings of 10-30 percent as compared to public sector operations. Advantages such as risk sharing or even total transfer are also possible²¹.
- Turnkey facilities – A public agency contracts with a private investor or vendor to design and build a facility in accordance with specified performance standards. The private investor commits to build the facility for a fixed price and will absorb the construction risk of the price commitment. Typically, the private partners will not be subject to traditional public procurement regulations. This often enables the facility to be completed in less time and for less cost than with traditional techniques. The financing of the facility can rest with either the public or the private sector. This type of PPP is of particular advantage in situations where a highly-specialized technology is needed²¹.
- Developer financing – A private party finances the construction or expansion of a facility in exchange for the right to build residential housing, commercial stores,

and/or industrial facilities. The private party may also operate the facility under the oversight of local government. The developer gains the rights to use the facility and may also receive future income from user fees. Developers rarely build facilities. It is more common for them to be required to purchase capacity in an existing facility and the payment is used to expand or upgrade that facility. Developer financing may be either voluntary or involuntary. It is also typically limited to areas of rapid growth. The developer receives no preferential tax treatment and often resists, even to the point of litigation²¹.

- Privatization – In privatization, the public sector decides to provide a service and looks to the private sector to meet that need. The private sector contracts to design, build, own, and operate the facility. In the case of existing facilities the public sector sells its assets and the private sector takes up the facility and responsibility to operate it. Generally, the private sector partially or totally finances the facility. It may; however, obtain tax-exempt financing from the state through private-activity bonds. Privatization typically allows for the introduction of sophisticated technology otherwise not possible in the public sector. This is because large water companies often invest in research and develop much of the advanced technology themselves. Privatize companies often have to provide service to multiple systems in order to be profitable and practical. There may be employee/union opposition to privately owned/run facilities²¹.
- Merchant facilities – The private sector owns and operates the facility and the decision to provide public service is made by the private, rather than the public, sector. The most typical environmental example of this type of service is solid waste management. As with privatization, greater access to technology is inherent. These facilities do not go through the traditional public sector procurement process and can be build more quickly and at less of a cost than otherwise possible. There may be employee/union opposition to privately owned and run facilities²¹.
- Lease – The private sector leases or buys a facility from a public agency, invests its own capital to renovate, modernize or expand the facility, and then operates it under a contract with the public agency. Under this type of partnership, the public sector may not have to provide the capital necessary for improvement or upgrade and the public agency can take advantage of private sector efficiencies. The private partner receives the right to operate the facility for a predetermined length of time²¹.

Table 2 summarizes where the responsibilities lie in each of the types of PPPs outlined. Table 3 compares actual usage, administrative ease, savings, and environmental benefits of the above-listed PPP types¹⁷.

Table 2: Responsibility Division

Type of PPP	Financing	Design	Construction	Ownership	O&M
Contract services	Public	Public/ Private	Public/ Private	Public	Private
Turnkey Projects	Public	Private	Private	Public	Private
Developer financing	Private	Either	Either	Either	Either
Privatization	Private	Private	Private	Private	Private
Merchant facilities	Private	Private	Private	Private	Private
Lease	Public/ Private	Public	Public	Public	Private

"Either" indicates that the responsibility can be held either publicly OR privately
 "Public/Private" indicates that both sectors are involved

Table 3: Comparison of PPPs

Type of PPP	Actual Use	Savings	Administrative Ease	Environmental Benefits
Contract services	High	Mod – High	Mod – High	Mod
Turnkey projects	High	Mod – High	Mod – High	High
Developer financing	High	Mod	Mod	Mod
Privatization	High	Mod – High	Mod	High
Merchant facilities	Mod – High	Mod	Mod – High	Mod – High
Lease	Low	Mod	Low	Mod

High use – over 25 states
 Mod use – 10 to 25 states
 Low use – limited scope

Mod = Moderate

Source: "Tools for Building Public-Private Partnerships" – EPA

Once a community has selected an appropriate PPP option, the procurement process must begin. The three most common types of selected are advertised procurement, competitive negotiation, and a two-step advertising procurement. Advertised procurement involves the preparation of a very specific invitation for bid. The bidders cannot alter the terms or amend them. This type of procurement is best suited for communities that know exactly what they want built and how they want the project to be financed. The competitive negotiation procurement type allows the project needs to be described more generally. For example, the project needs are defined in terms of performance standards rather than in terms of a specific technology. With this option, communities can negotiate with one or more bidders. Finally, two-step advertising procurement combines the above two procurement types. It is used to provide flexibility when negotiation is not permissible²².

Barriers to Public-Private Partnerships

Legal Barriers

The level of engagement in PPPs is dependent on a number of factors. There may be legal issues which would need to be addressed such as outstanding bond issues, the authority to sell assets, and regulatory commission approval. If the local government wishing to engage in a PPP financed prior system improvements with bonds that are still outstanding, provisions in the PPP arrangement for the payment of bonds must be considered. Local governments may also be required to comply with certain statutory requirements regarding the sale of assets. A board vote or an advertisement for bids may be necessary to accomplish a sale. It is also possible that state regulatory commission approval is necessary¹³.

Societal Barriers

Other issues affecting the feasibility of engagement in PPPs for water supply systems include the existence of well-financed North American and global companies with experience in providing environmental services, the level of resistance encountered from public water supply employees, and the perceived lack of control. Some public water utilities have responded to the pressure to privatize by launching efforts to incorporate private sector techniques such as benchmarking, automation, and staff reductions. The degree to which these optimization efforts are successful can also play a role in determining the feasibility and necessity of PPPs¹.

Financial Barriers

The Government Finance Group (GFG) and the Syracuse University Environmental Finance Center collaborated under a grant from the USEPA to conduct an alternative funding study as was requested in USEPA's FY1995 appropriation. The paper produced by GFG, "Debt Financing Strategies for Funding Water Quality Infrastructure," sparked the formation of a panel to respond to its background. Panelists were selected by the Council of Infrastructure Financing Authorities (CIFA) and the USEPA to represent both the public and the private sector. A total of 26 panelists selected by CIFA and USEPA gathered in October at the USEPA Region II Office in

New York City to identify the financial and legal barriers to greater investment in water infrastructure, particularly from the private sector. They also were to discuss strategies to reduce or remove those barriers⁹.

The paper cited a number of barriers to greater private investment in water supply facilities. The panelists ranked these barriers and those appearing most substantial dealt primarily with the Federal tax code. The lack of tax-exempt financing availability and extended depreciation schedules have often been a determining factor in the feasibility of PPPs⁹.

Volume caps on private activity bonds (PABs) were first imposed by Congress in 1984. The caps limit the volume of tax-exempt bonds that states can issue for private activity. While a number of states have room to maneuver under the cap, others have completely exhausted their cap limits. This is seen as detrimental to private investment in water supply infrastructure because companies are reluctant to consider undertaking environmental projects that typically depend on tax-exempt financing. If the volume cap is used up, the likelihood of attracting private investment falls⁹.

The Federal tax code itself has also been criticized for not accounting for the long-term nature of water supply infrastructure. The majority of capital expense in water supply systems is embodied in infrastructure with a relatively long useful life span. Prior to 1986, private companies with investments in facilities such as water supply utilities were able to depreciate over a five-year period even when they were financed with tax-exempt bonds. The 1986 Tax Act changed that; private companies are no longer able to use accelerated depreciation. They must instead use straight-line methods that extend the depreciated life of capital up to 50 years⁹.

Encouragement for Public-Private Partnerships

A previously mentioned, the desire to become more competitive and efficient has driven much of the push for PPPs. PPPs offer the opportunity to separate the provisional and regulatory components of water supply utilities and thus eliminate conflicts of interest. Asset sale can provide municipalities with much needed capital infusions that can be used for other areas of infrastructure or program investment. This can make corresponding tax increases less necessary. PPPs may minimize future rate increases in some instances by allowing residents to benefit from regionalization and consolidation that they would otherwise not have access to because traditional public utilities are not interconnected. PPPs can also offer more expert management when entered with companies having a long history of service and experience¹³. Finally, communities with unique problems requiring highly technical solutions can benefit from PPPs. Whereas publicly owned systems often lack the resources to develop and implement technical solutions, large water companies have the ability to do so. For example, San Antonio, Texas teamed up with United Water to build an ultrafiltration water treatment facility to provide water to 250,000 residents. Suez, the parent company of United Water, refined and developed the ultrafiltration process and thus was able to provide its expertise to the community²⁰. Creatively constructed PPPs can also be structured to address concerns over lack of control and loss of jobs. Depending on the type of PPP selected, governments can retain control and ownership of facilities and employees can, in a sense, be leased from the city or municipality so that no jobs are lost.

Executive Orders 12803 and 12893

One previous barrier to private investment in water utilities has been that municipalities were required to repay the Federal government when selling facilities originally financed by Federal grants. In 1992, the Bush Administration issued Executive Order 12803 that freed municipalities from some of that repayment obligation⁶. The Order sought to promote infrastructure privatization by drawing on corporate and capital markets. To follow up on that Order, the Clinton Administration issued Executive Order 12893 that directed agencies to tell the Office of Management and Budget (OMB) how they would remove barriers to private investment⁹.

H.R. 2207

In recognition of the difficulty that volume caps place on increasing private investment in environmental infrastructure, H.R. 2207 was introduced in the house on June 14, 2001. The bill, introduced by Mrs. Thurman, proposed to amend the Internal Revenue Code of 1986 such that the volume cap on private activity bonds shall not apply to water and wastewater facilities¹¹.

Success Stories

Perhaps the best way to illustrate the growing interest in, and viability of, public private partnerships in the water supply industry is to cite some successful partnership examples:

Hoboken, New Jersey faced a \$800,000 annual loss if it continued to operate its 40-mile distribution system and its residents were faced with a 35 percent rate increase before the city entered a partnership with United Water in 1994. The partnership was the first of its kind in New Jersey history and a unique arrangement was worked out to address numerous local concerns. The city retains ownership of the system and also retains rate setting authority. United Water agreed to provide the city's water supply, all system maintenance, repairs, customer service, billing, and 24-hour emergency service. In addition, the city was provided an up front concession of \$5.5 million in much needed financial relief. The 20-year contract is negotiable in 10-year increments beginning in 2014. Because workers were concerned with the possibility of lost jobs, an arrangement was reached where most of the employees were rotated to other projects within the department while the remaining employees became employees of United Water. Then Mayor Russo of Jersey City, credits the "unqualified success" of the Hoboken/United Water Partnership as the catalyst for the passage of two public-private contracting acts for water and wastewater in NJ that were signed into law in 1995 in the spirit of Executive Order 12803²⁰.

Jersey City, New Jersey took full advantage of the new legislation and entered a contract with United Water in 1995. Under the contract, United Water serves the city's 239,000 residents by managing the local watershed, an 80 million gallon per day (MGD) treatment plant, a 5 MGD storage facility, 2 reservoirs, 23 miles of aqueduct, and a 275-mile distribution system. It is responsible for all maintenance, billing, repairs, collections,

and customer service. The 5-year contract provided the city with \$30 million in savings over the first 2.5 years and a \$2.5 million up front concession fee. No jobs were lost as a result of the partnership. Through an innovative arrangement, employees of United Water in Jersey City are "leased" from the city. They remain employees of the municipal government and retain eligibility for municipal pensions and benefits. This PPP was deemed so successful that it was recently honored by the National Council for Public-Private Partnerships. The award recognizes projects that best demonstrate exemplary public-private partnerships²⁰.

Atlanta, Georgia entered into the nation's largest public-private partnerships agreement for water operations in 1999. Under a 20-year contract, United Water agreed to operate and maintain two treatment facilities, 12 storage tanks, 7 pumping stations, 25,000 fire hydrants, and a 2,400-mile distribution network. United Water also provides billing, collection, and customer service. The city, which currently provides water services to 1.5 million residents, will pay United Water an annual operations and maintenance fee of \$21.4 million. This is almost a 50 percent reduction in annual operating costs. United Water also offered positions to all 479 city employees at their current wages and benefits²⁰.

Implementing Public-Private Partnerships

As seen in table 2, some types of PPPs are more easily implemented than others. Much progress has been made to make engagement in a PPP easier but there are steps that could be taken to facilitate it further. Some suggest that moving away from a rate-of-return regulatory scheme to a performance-based scheme could provide greater incentive to reduce costs¹⁰. Others point to the importance of permitting privately owned or operated facilities to access tax-exempt financing⁹.

The most commonly used form of utility regulation in the United States is rate-of-return regulation. This type of regulation essentially allows companies to pass the costs it deems necessary to provide service directly onto end users in the form of a rate base. Supervisory bodies estimate appropriate rates of return based in part on the cost of capital to the utility. Any expenditure deemed appropriate by the regulating body is thus added to the base. Rate-of-return regulation is often also called cost-of-service regulation because the set rates guarantee that all costs of providing service are covered. It is argued that rate-of-return regulation reduces any incentive to adopt measures to reduce operating costs¹⁰. Because of this, some suggest that the water supply industry should move towards performance-based regulation (PBR). PBR is a system of regulatory tools to strengthen efficiency incentives for utilities. It establishes a reward-penalty mechanism in order to encourage efficiency. It also allows well managed companies to achieve a higher rate of return than poorly managed companies thus creating incentives not seen under current regulation. The current regulatory system does not allow rewards for exceptionally good performance. Thus if PBR is adopted, companies can potentially increase profits while reducing their cost of service. This could make private investment in water supply utilities more attractive. This type of regulation is the method of choice in the UK and New Zealand, both of which have successfully privatized the majority of their water supply systems¹².

Another suggestion made to increase the amount of private involvement in the water supply industry is that use, and not ownership, should determine tax-exempt status. The absence of availability of tax-exempt debt has been cited as one of the largest deterrents to increased private involvement. It is argued that if the public benefits from private investment in water supply infrastructure, then ownership of the facilities is

unimportant in determining tax status. Private ownership of a water supply utility for public use should not disqualify it from the tax-exempt status⁹.

Finally, the Tax Code of 1986 could be amended such that accelerated depreciation can be used for environmental facilities providing a public service. Also, in the spirit of H.R. 2207, water and wastewater facilities can be made exempt from volume cap regulations.

Conclusion

Drinking water infrastructure is paramount to both public and environmental health. Maintaining the current infrastructure system is essential to meeting and sustaining compliance with Safe Drinking Water Act regulations. The Drinking Water State Revolving Fund loan program may indeed be the best way provide federal funding for states to meet their financial needs. However, local government already shoulders 90% of the burden of safe drinking water infrastructure. Seeking private sector investment may be a viable way for local government to continue their commitment to quality drinking water infrastructure.

Through a variety of public-private partnerships, local governments can tap into private funds, access highly specialized technologies, and incorporate private sector efficiencies and savings. Creative partnerships can be constructed to ameliorate concerns regarding job loss and lack of control. Successful partnerships in the water supply industry exist and can be used as models. Local governments can even acquaint themselves with PPPs and the steps necessary to build them through a USEPA publication, "Public-Private Partnerships for Environmental Facilities: A Self-Help Guide for Local Governments."

Participation in partnerships has risen 20-23 percent in the past decade and that trend is projected to continue. Many barriers to involvement in PPPs have melted away and there is still momentum in the way of making such partnerships even easier. Although it would be premature to turn over all public water supply systems to private hands, PPPs may offer the best choice for systems in particularly need. For this reason it is important to act in the spirit of Executive Order 12803 and pave a clearer path for public-private partnerships for drinking water infrastructure.

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