Testimony on

Water Infrastructure Needs

Presented Before

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Committee on Environment and Public Works

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By

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On Behalf of

The H_2O Coalition[1]

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[1] The H_2O Coalition is made up of the National Association of Water Companies, the National Council for Public-Private Partnerships, and the Water and Wastewater Equipment Manufacturers Association.

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Purpose

Water and wastewater services are vital to the quality of life for citizens across this country. Although estimates of the industries' total infrastructure needs lack precision, there is actually a considerable amount of consensus that the water sector faces its most formidable challenge in terms of replacing and upgrading the aged delivery infrastructure.

The purpose of this testimony is to provide some general "reality checks" in relation to the current national debate over infrastructure funding. The purpose of the analysis is not to critique any particular perspective, but rather to help inform the dialog on these most important issues.

The Infrastructure Funding Issue

Why is water infrastructure funding on the Policy agenda? The infrastructure needs of the water and wastewater industries have recently taken a prominent place on the policy agenda, even though this issue is not entirely new. The industries are experiencing extraordinary increases in costs and investment needs that are closely related to "people and pipe" demographics – that is, historical patterns of urban development and the age and condition of the physical plant in place. Today, new data, models, and other tools have improved our understanding of this issue. The various stakeholders that recognize these needs have reached a critical mass.

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Estimating Needs

General agreement exists on the physical condition of the nation's many local water and wastewater systems. A recent report card issued by the American Society of Civil Engineers (ASCE) assigned low grades to most of the nation's various infrastructure sectors, including "Ds" for water and wastewater.

In 1995, studies by the U.S. EPA estimated that water industry assets totaled about $144 billion (Community Water System Survey, inflation-adjusted to 1999), while the estimated 20-year infrastructure need totaled about $151 billion (Needs Survey, inflation-adjusted to 1999). USEPA has recently issued an updated 20-year needs estimate that also is in the range of $151 billion. EPA's estimates focus on needs directly and indirectly associated with Safe Drinking Water Act (SDWA) compliance.

USEPA found that more than half of the total infrastructure need is for transmission and distribution system needs. About 25 percent of the total need is for water treatment facilities. USEPA has also estimated the impact of infrastructure costs on households served by systems of different sizes. These findings demonstrate how scale economies are a key determinant of cost impacts. Smaller water systems are disadvantaged in this regard, although the service populations of small systems vary in their ability to support the cost of service.

In 1998, the American Water Works Association (AWWA) escalated total 20-year water needs to $366, billion (inflation-adjusted to 1999), focusing in particular on distribution system needs. Today, various groups have coalesced around a total 20-year needs estimate in the realm of $1 trillion for the water and wastewater industries.

The $1 trillion 20-year needs estimate for water and wastewater systems has become a focal point for discussion. The $1 trillion estimate is imprecise. Comprehensive, valid, and reliable technical and financial data on the nation's water and wastewater systems is not readily available. A precise needs estimate is not as important as recognizing the general need. Indeed, devoting scarce analytical resources to estimating the need may not be beneficial. The gap is the projected cumulative shortfall that will result if – and only if – (1) the infrastructure need estimate is accurate and (2) expenditures on infrastructure are not increased. In other words, the gap will materialize only if no action is taken to close it.

Understanding the Infrastructure Monster

Understanding the "infrastructure monster" is a challenge. It is instructive to look back to earlier research on water utility costs. Evidence from earlier studies suggests an awareness of rising costs and the role of infrastructure replacement in the cost profile:

- The Nation's Public Works: Report on Water Supply (Wade Miller Associates, 1987) forecast annual needs for the water industry in the range of $4.8 to 7.1 billion as follows: 37-49% for deferred infrastructure maintenance/replacement; 39-55% for meeting demand growth; and 8-13% for Safe Drinking Water Act (SDWA) regulatory compliance

- Meeting Water Utility Revenue Requirements (NRRI, 1993) found that "In reality, SDWA compliance costs may pale in comparison to costs associated with infrastructure and demand growth needs."

Some of the larger utility systems also have been aware of the need to step-up the pace of infrastructure replacement. Some of the investor-owned (private) water utilities have been particularly active in this area. As an example, St. Louis County Water prepared detailed assessment of its distribution system in 1994. According to the company:

- "An accelerated replacement program is needed now if we are to avoid excessive customer reaction and a 'crisis' response plan…

- The Company's infrastructure replacement program is unique because it does not involve the construction of one extraordinary asset over a long construction cycle (e.g., a nuclear plant), but a multitude of short-cycle construction projects which, taken as a whole, are extraordinary in nature…

- The Company believes it is critical and in the public interest…[to] synchronize rate recovery with plant completion." (St Louis County Water Company, 1994).

Capital Intensity, Age, and Deferral

The water industry is very capital intensive, that is, physical plant or infrastructure is a substantial core cost. Water investments also have very long service lives that benefit generations of customers. Measured as a ratio of utility plant to revenues generated, water utilities are more capital intensive than the natural gas, electric, and telecommunications industries. Water utilities must invest more than $3.50 for every dollar of annual revenues received from customers. Trend data (and projected investments) indicate that the water industry is becoming even more capital intensive.

Industry experts have estimated that pipes were installed in the early part of the century at a cost of about $5 per foot (or less). It is not unusual for replacement costs to total $100 per foot – which is more than double the overall rate of inflation for the same period. The rate of replacement reflects the anticipated life expectancy for a physical investment. A replacement rate of 1 percent implies a life expectancy of 100 years. Lower rates imply a much longer – and unrealistic – life expectancy. Today's pipe materials today are expected to last about 75 years, serving generations of customers.

The rate of pipe breakage increases as infrastructure ages. Breakages lose water, disrupt service, and pose public health risks. Emergency repairs typically are much more costly than planned repairs. The rate of breakage varies with pipe material, which also correlates with the period of installation. Also, as facilities age, the overall percentage of "accounted-for" water declines; that is, more water is lost. The value of water losses has increased with the increased cost of water supplies, treatment, and pumping.

Following its assessment, St. Louis County proposed to pick up the pace of replacement from 5 (.13%) to 30 (.8%) miles of pipe per year (total pipe miles equal 3,882). But even the accelerated pace of replacement now used by some systems is probably inadequate based on current knowledge about the life expectancy of materials. But making the case for replacement needs to rate regulators and other oversight bodies (mayors and city councils) has been a significant challenge. Recently, some private utilities have won approval for surcharge mechanisms to help fund a continuous program of replacement, while also mitigating rate shock (the leading example is the Distribution System Improvement Charge, implemented in Pennsylvania).

Although much of the infrastructure challenge is simply age-related, at least part of the current need can be attributed to capital deferrals, or the postponement of infrastructure investments. Because their profit is based on the value of their rate base, investor-owned utilities have less incentive to defer capital investments. Deferrals exacerbate the "gap" problem by increasing the level of need and thereby widening the gap between future expenditure levels and current revenue levels.

A model developed by Australian researchers suggests that the compound effect of infrastructure replacement needs over several decades suggests a "Nessie curve," named after the mythical Loch Ness monster. These cost curves can provide a useful model to help utilities and other stakeholders understand needs at the system level.

In reality, the challenges of prudent capital replacement and "lumpy capacity" are not new to utility economics. Other utility sectors have faced – and are facing – infrastructure needs. However, today's water and wastewater infrastructures were cheap to begin with, were well-subsidized (particularly for wastewater), and have long been depreciated. These factors combine to create an extraordinary pressure on costs. Emerging information systems, planning and management tools, and alternative technologies can help manage the monster – and close the funding gap.

The real risk today may be in the potential for a "responsiveness gap," that is, the gap between awareness and knowledge about an issue or problem and taking the actions necessary to address the problem and avoid or mitigate deleterious effects. However, debate is open as to how to respond to the challenges now faced by the water industry, particularly with respect to private versus public responsibilities.

The Emerging Myths

The infrastructure funding debate is contributing to a number of emerging myths that may or may not be grounded in reality. The myths suggest:

- That a national crisis is looming.
- That the cost of water services cannot be supported through rates.
- That a funding gap is inevitable.
- That public (that is, federal) funding solutions are essential.

Some reality checks may help inform the infrastructure funding debate by challenging some of the emerging myths. These reality checks are offered not as criticism of any given perspective, but rather to bring an empirical perspective to the dialog about these important issues.

Reality Check: Municipal Finances

The water and wastewater industries are dominated by municipal ownership. Care should be taken to not over-generalize about municipal finances. However, some of the available data (from the U.S. Census of Governments and elsewhere) may be relevant to the funding debate.

The data indicate that in general, when municipalities provide electricity and natural gas services, revenues from user charges exceed expenditures. For water and sewer services (as well as solid waste and transit services), expenditures *exceed* revenues from user charges. The findings generally suggest that municipal water customers do not cover expenditures through rates. The implications of this "gap" are worse if the expenditures understate the cost of water service (as is the case with deferrals). Of course, individual water and wastewater systems may have very different financial profiles.

The deficit between expenditures and user charge revenues is detectable for different types of publicly owned water systems: municipalities, special districts, counties, and townships. Trend data indicate that the expenditure-revenue gap has been persistent over time, although it has closed somewhat. The difference between expenditures and revenues must be made up through tax revenues and subsidies (grants). The trend data are comparable when displayed on a per-capita basis. Data for individual cities show that aggregate expenditures on water, energy, and transit utilities exceed user-fee revenues in some cases, but not in others. Similar results can be seen for municipal wastewater systems.

For investor-owned water utilities, operating revenues are provided primarily through cost-based rates charged to customers, and revenues exceed expenditures. An investor-owned water utility must support the full cost of service through rates in order to survive. The difference between revenues and expenditures is used to pay for taxes, depreciation, and the cost of capital. Rates charged by private water utilities are strictly regulated by

state public utility commissions, which adhere to accepted systems of accounts and cost-of-service standards of ratemaking. USEPA data (Community Water Systems Survey, 1995) also revealed that privately owned water systems collect more revenues per gallon than publicly owned systems.

Municipal debt can be used for long-term capital investments, such as water treatment facilities. Debt instruments that can be used by the water sector include traditional issuances, as well as private-activity bonds. Debt instruments should not be used for routine maintenance (considered an annual expense). However, debt (short-term and long-term) can be used for major capital replacements to amortize costs over time. Ideally, costs are recovered over the useful life of the capital investment (although in practice shorter time periods are used).

Several interrelated financing issues have contributed to or complicated the infrastructure funding problem. These factors include: unrealistic service-life expectations, extraordinary cost inflation, inadequate accounting and accounting standards, investment deferrals, inadequate user charges, profits and reserves for a few systems, and concerns about rates and equity. Accounting standards are the domain of the Governmental Accounting Standards Board (GASB) for governmental utilities and the state public utility commissions for investor-owned utilities.

Reality Check: Household Expenditures

Household expenditures for utility services and other goods and services provide another relevant perspective. Consumer expenditure data are available from the Consumer Expenditure Survey (Bureau of Labor Statistics). Although the data have limitations, they are useful for general purposes.

Water and public services (sewer and solid waste) account for a relatively small share of the average household utility budget (less than .8% of total expenditures), particularly in comparison to electricity (2.4%) and telecommunications (2.1%). In many respects, water services are a "bargain" to average households. Of course, averages mask relevant variations and actual expenditures are affected by many factors. Over time, average household expenditures for utilities have climbed, but expenditures for water and other public services have retained their relative position. The *percentage* of household income and expenditures devoted to utilities has declined with time, although the share for water and other public services has remained relatively constant.

On average, a four-person household spends about the same amount each year on cable television and tobacco products as on water services. Americans have shown a tremendous willingness to pay for advanced communications and entertainment technologies, including cellular phones ($41.24 per month), cable television ($28.92 per month), and internet services ($21.95 per month). For many U.S. households, the expenditures for these more discretionary services are greater than for water services. It

is noteworthy that the nation's $80 billion cellular telephony infrastructure has been entirely supported by private providers who collect fees from users.

Reality Check: Global Comparison

Another reality check can be made using comparative international data. Americans use more water per capita overall than most nations of the world. Yet water prices in the United States are comparatively lower than prices charged by water service providers in many other developed countries. These findings also are supported by a study conducted by researchers in the Great Britain who controlled for international difference in the gross domestic product.

Reality Check: Rate Shock

Large rate increases have the potential to cause rate shock among customers. Technically, rate shock applies when a rate increase is associated with a significant drop in usage, which reflects the willingness (and ability) to pay for service. For essential services (with relatively price-inelastic demand), these drops may be transitory. The term "rate shock" is also used to describe the pubic outcry associated with rate increases – which may have no basis in affordability. However, the extent of rate shock and affordability concerns depends in part on the level of the current water bill and the magnitude of the rate increase. Techniques are available to mitigate rate shock and address genuine affordability problems.

Consumer Price Index data (BLS) reveal that real (inflation-adjusted) water rates are rising faster than the overall rate of inflation – along with prices for garbage collection, cable television, and local telephone service. Data for individual communities suggest that real (inflation-adjusted) rates have risen for some but declined for others.

Any given rate increase may or may not trigger rate shock or cause hardship. A higher percentage increase on a low base may not be problematic for most households. The magnitude of the increase relative to household income levels should be considered. Public involvement and communications (including informative bills) can help customers understand the reasons for the rate increase.

As suggested in the review of municipal finances, underpricing of water services may be an important factor in the projected funding gap. Underpricing sends inappropriate signals to customers about the value of water, leading to inefficient useage. According to basic economic theory, underpricing also leads to over-consumption and inefficient supply decisions to meet inflated demand. Privately owned utilities are more likely to adhere to cost-based ratemaking that recovers total revenue requirements (capital and operating costs).

Some communities deliberately maintain "low" prices for water and wastewater services for reasons that include community values, economic development, and political

expedience. In some cases, rate increases have been avoided for very long time periods. Taking inflation into effect, a "stable" rate is actually a rate that has decreased over time. The "loss" of revenue presents an opportunity cost to the community in terms of its ability to make appropriate infrastructure investments.

Rate shock in the water sector is possible because rising costs must be recovered over flat per-capita demand. Affordability concerns are real but manageable. Financing, ratemaking, and conservation strategies can mitigate rate shock to a degree. Surcharge adjustments can be used to achieve gradualism in rate increases. Larger systems can use consolidated rates, progressive rate structures, and conservation targeted to low-income households. *Needs-based* subsidies can be used to help eligible customers by providing direct payment assistance or funding a lifeline rate.

From a theoretical standpoint, willingness to pay is represented by the demand curve, which incorporates the consumer's ability to pay. From a practical standpoint, ability to pay is a function of price and income and can be addressed through rate design and subsidies (respectively). For many publicly owned systems, the real problem is not the willingness nor the ability to pay – but the "willingness to charge" customers at rates closer to the true value of water service.

Reality Check: Consumer Preferences

Another "gap" seems to persist between customer preferences and their willingness to pay for safe and reliable water service. According to opinion polls (Gallup) Americans consistently express a high degree of concern about drinking water and related issues. Paradoxically, consumers do not necessarily appreciate the value of water services. Consumers often appear unwilling to support rate increases necessary to ensure drinking water quality and reliability. Indeed, low prices reinforce the view that water services are an entitlement. Public education is needed to close the gap between opinion and willingness to pay the cost for arguably the most essential utility services.

Water itself has no substitutes, but alternative methods of delivery are available. For many U.S. households, the price of one gallon of centrally-supplied water – conveniently delivered to the tap – is less than one-third of one penny (see Raftelis Environmental Consulting Rate Survey). In general, every other water alternative is no more safe, much less convenient, and astronomically more expensive. At $1.15 per gallon, the price of "designer water" is 347 times the price of tap water.

Despite the high costs, Americans continue to buy bottled water in increasing amounts.
In 1999, bottled water sales had increased by 12 percent. In 1999, the nation's water utilities collected revenues totaling about $29.4 billion. Wastewater treatment works collected revenues totaling about $26.3 billion. The bottled water industry collected revenues totaling $5.2 billion.

Rough estimates can be used to compare the profit margin for bottled water versus tap water. For larger bottlers, total production costs (including source costs) amount to about 10 cents for each bottle that can be sold for 70 cents or more (a 600% markup). The "markup" for tap water, even for private companies, is closer to 10 percent.

Reality Check: Federal Funding

The reality of the broader context of federal funding also is relevant to any particular constituency, including the water and wastewater industries. It is important for the water industries to have realistic expectations about future federal funding for water programs in order to plan sufficiently to meet infrastructure needs.

Water services have always been and always will be subsidized to a degree. Some subsidies are in the public interest because of equity considerations, as well as health, safety, and environmental protection concerns. All subsidies have distributional consequences (that is, they result in both winners and losers). Subsidies can also perpetuate dependence, inefficiency, and stagnation on the part of recipients. Whether a water system or a customer, subsidies can mute incentives for cost control. Subsidies require tax revenues and taxpayers are also ratepayers (the same households pay one way or another). The social benefits of subsidies should outweigh the total costs.

Programs have been established to assist low-income customers in other utility sectors. The LIHEAP programs provide payment assistance for energy services. Under the 1996 Telecommunications Act, the Lifeline and Linkup programs provide assistance to telephone customers.

In reality, water and wastewater infrastructure funding already exceeds federal funding provided to the LIHEAP and Lifeline/Linkup programs. Levels of funding under the WIN (Water Infrastructure NOW) proposal would vastly exceed current levels for water infrastructure, as well as other utility programs. The WIN proposal expands grant subsidies, which effectively can both reward and perpetuate inefficiency. If a subsidy rewards past inefficiency, continued inefficiency on the part of the system is assured because underpricing will persist.

Infrastructure funding for water is provided through the Clean Water and Safe Drinking Water State Revolving Funds (SRF). The principles underlying the DWSRF are sound: demonstration of capacity by systems; priority on pubic health and affordability; emphasis on loans (v. grants); and ineligibility of maintenance and growth-related costs. The SRF should not reward cost avoidance and inefficiency. The SRF should not advantage publicly owned systems (and their customers) over privately owned systems (and their customers) and further widen the gap in rates.

Some programmatic reforms could enhance the existing Clean Water and Drinking Water funding programs. Potential measures include: improving efficiency and lowering administrative costs to states and systems; addressing barriers to access and funding

equity for different types of systems (large and small systems; publicly and privately owned systems); establishing fair criteria for funding infrastructure costs; and promoting sound cost accounting and rate design

The long-term federal funding environment for all utility services is not without uncertainty. Concerns have emerged about maintaining funding for telecommunications assistance programs under the Bush administration. Base-level funding for LIHEAP (excluding supplemental appropriations) has declined over the life of the program. The budget of the USEPA also has been targeted for budget cuts under the Bush administration.

Reality Check: State and Local Priorities

At the local level, water and wastewater services – although vital to communities – are not always assigned high priority. In many larger cities, funding needs for the water sector are comparable to funding provided for professional sports stadiums.

Given their primacy for water and wastewater policies, the state also must play a role in addressing the infrastructure issues. Several states have taken steps in this area, including: Pennsylvania (cost recovery), Kentucky (regional consolidation), Rhode Island (capital planning), Oregon (program integration), and Texas (regulatory reform).

Reality Check: The Gap

The concept of a funding gap merits further consideration and debate. The need to invest in the nation's water and wastewater infrastructure is real, but the "funding gap" is essentially a construct. The magnitude of the gap is uncertain and may be inflated. The potential to lower costs through restructuring, innovation, operational efficiency, and integrated resource management (including conservation achieved by water-efficient fixtures and practices) may not be fully considered. The need is largely attributable to system demographics (age and condition), although some deferrals have probably exacerbated the problem. Many water utilities (and most other utilities) can and do support the cost of service through rates. A funding gap will materialize if deferrals and underpricing persist; that is, if the responsiveness gap widens. The water industries must provide leadership and effectively manage their current and future assets on the public's behalf.

Aggressive action is needed to close the projected gap from the top (infrastructure needs) and from the bottom (expenditure levels). Cost-reduction strategies for closing the gap from the top include: efficiency and optimization (least-cost) approaches directed at both water production and usage; leadership and continued technological innovation; and industry restructuring to achieve scale economies and improve operational performance. Some gap estimates have attempted to incorporate efficiency improvements – but a gap is still anticipated. Technical and managerial innovation can substantially reduce operating

costs; capital costs can be reduced, but probably to a lesser degree given the basic capital intensity of water services. Industry restructuring includes consolidation and fundamental changes in system ownership and management (including privatization).

The gap can be closed from the bottom by increasing revenues to support infrastructure expenditures. Revenue-enhancement strategies include: cost-based (marginal-cost) rates to send better price signals to customers, along with other ratemaking strategies (such as surcharges); private-sector investment; and public-sector funding (local, state, and federal). With the magnitude of the infrastructure need and the complexity of the water sector, multiple revenue-enhancement solutions are necessary and appropriate. However, cost-based rates should be emphasized and public subsidies should be used judiciously.

The public sector will continue to play a central role in addressing water and wastewater infrastructure needs. The public sector can: leverage other public and private funding sources; provide incentives for optimal investment, operational efficiency, and cost-effective restructuring; support research and development, data collection and information dissemination; address at-risk systems and households based on demonstrable needs; and promote sustainable *water systems*, not sustainable subsidies.

The private sector can play an expanded role in addressing water and wastewater infrastructure needs. The private sector can: provide leadership, technical innovation, and research; promote efficiency and sustainability through market-based solutions as appropriate; develop a range of asset ownership and management options to address capital and operating needs; secure and utilize available public funding; and maintain accountability through regulation.

The Real Challenges

Moving forward, the real challenges to all stakeholders in the water and wastewater sectors may be to:

- Establish a new science of prudent asset management for the water sector.
- Engage the public on water issues through open and participatory processes.
- Demonstrate a willingness to charge for the true cost of water service.
- Use public funding strategically to make lasting improvements to operations.
- Do not postpone the inevitable and perpetuate the responsiveness gap.
- Promote equity and sustainability over a long-term planning horizon.
- Be receptive to technical and institutional innovation.

Although formidable, these challenges can be met.

I look forward to working with this Committee, the H_2O Coalition, and all other stake holders on this issue. Thank you for your attention.