

What is the Infrastructure Problem and What are the Solutions?

Issue Paper

H₂O (Help to Optimize Water) Coalition¹

February 9, 2001

Executive Summary

EPA and others have estimated that the drinking water industry must invest hundreds of billions of dollars over the next 20 years to replace failing water and wastewater infrastructure and upgrade treatment to comply with new more stringent standards. Some have claimed that this is a crisis. While we do not agree it is a crisis today for the majority of systems, it could become one for many utilities if they don't substantially increase their level of investment in water infrastructure from what it is today.

Given this, many of us in the water industry are concerned about some of the solutions that are being proposed. Some think the response to this challenge is to have the federal government subsidize the water industry's capital investments indefinitely with a massive federal grant program. While some federal assistance, like grants and loans with forgiveness of principal, may be appropriate in the short or intermediate term to help those utilities (both public and private) where a substantial portion of their customers cannot afford the cost of needed investments, we believe that such assistance must be used very judiciously to avoid having the industry become dependent on such subsidies. Long term subsidies of this kind will reduce the incentive for the industry to improve its efficiencies and to develop its own solutions, such as public, private partnerships.

We believe loans are a more appropriate form of assistance for capital projects in most cases, especially over the longer term, because the loan programs themselves are self-replenishing and don't have the economic disincentives associated with grants. The best mechanism for providing loans and grants is a modified and expanded State Revolving Loan Fund (SRF) Program under the Safe Drinking Water Act (SDWA) and the Clean Water Act.

To minimize any future drain on the Treasury, we believe the water industry should move toward becoming self-sustaining, like the electric, gas, and telecommunication utilities. Since this can happen only if utilities charge their customers full cost of service rates, any assistance program for the industry should be structured to assure water utilities, if they are not already doing so, eventually charge rates that cover the full cost of service. An additional benefit of full cost of service rates is they send the proper economic signals to consumers, helping to assure they make appropriate market choices.

¹ The Coalition includes National Association of Water Companies, National Council for Public Private Partnerships, Water and Wastewater Equipment Manufacturers Association, and the Association of State Drinking Water Administrators.

Because full cost of service rates may not be affordable in some cases to low-income households, we support a federal program that would assist these homeowners pay their water bills. There is already a working model for such a program in the Low-Income Home Energy Assistance Program (LIHEAP) that helps low-income homeowners pay their home heating and cooling bills. Programs like this use federal dollars much more efficiently than grants for capital investments because they target the assistance to those customers that have a true economic need rather than subsidizing everybody's utility bill. We believe a water bill assistance programs is an appropriate form of long term assistance, especially to larger utilities, where only a fraction of its customers are likely to be impoverished.

What is the Infrastructure Problem?

Water and wastewater utilities face a significant financial challenge to replace aging infrastructure and upgrade treatment required by increasingly stringent new standards. If all the necessary costs for these replacements and upgrades were borne by customers receiving the services, their water and sewer rates would have to rise significantly. Even though water services have generally been under priced in this country relative to other utility and related services, raising rates significantly for water and sewer is at a minimum a major political and marketing challenge for utilities. While political difficulties alone are not sufficient to justify Federal assistance, many low-income households served by those utilities may not be able to afford the higher rates. This is a social problem that we cannot ignore.

Infrastructure, including pressured drinking water pipes and wastewater collection pipes, that were installed before the turn of the 20th Century and during the first half of the 20th Century have finally deteriorated to the point where they must be replaced or rehabilitated. Many groups have estimated what the repair and replacement costs will be. In 1997 the U.S. Environmental Protection Agency (EPA) estimated the drinking water need to be \$138 billion over 20 years with 56% for transmission and distribution and 26% for treatment. The American Water Works Association, after re-examining distribution needs, re-estimated the 20-year need to be \$360 billion. A report published by the Water Infrastructure Network (WIN) in 2000 estimated the total water and wastewater needs to be about \$1 trillion over 20 years. The WIN report also estimated that current capital investments by the water industry were \$23 billion per year below what should be spent to meet the needed capital investments. We believe that more analysis needs to be done before we will be able to reach a consensus on the how much capital investment the industry must make over the next 20 years.

While there are significant differences of opinion about what the true investments needs are, all would agree that the needs are significant and that the current rate of capital investment at many utilities is insufficient to replace and upgrade infrastructure and treatment at a prudent pace. While we may not have a crisis today, we will if utilities don't substantially increase their level of investment in water infrastructure from what it is today.

There are other aspects of this problem that we are learning about all the time. While the need is driven mostly by infrastructure (estimated at 56% of the total cost), treatment (estimated at 26%) also has a significant impact. Infrastructure needs will ramp up continuously over the next 20 years with some low level peaks echoing the periods in the 20th Century when the infrastructure investment was at its highest. On the other hand, treatment needs, which are generally driven by new EPA regulations, often appear as sudden spikes on top of the gradually rising infrastructure needs. Spikes are generally more difficult to manage than ramp functions.

These characteristics imply that any assistance program needs to be flexible so it can provide help that will effectively address the totality of the need. In some circumstances new treatment investments will put the utility in financial distress. In other cases it may be the unrelenting ramp up of infrastructure replacement needs. Whatever the primary cause, water rates in some communities would have to rise substantially to provide the capital for essential investments.

The question then becomes are the rates affordable to a substantial portion of the customers. In many communities the rates may be unaffordable using recognized benchmarks. Because assistance funds are not limitless, unaffordability must be essential evaluation criteria in deciding whether assistance will be provided. Potential public dissatisfaction with a rate increase is not sufficient reason for federal assistance. Consequently, a utility seeking assistance would have to demonstrate that its rates would be unaffordable to a substantial portion of its customers to get assistance.

There is another need that adds considerably to the challenge the industry faces. This is the cost of addressing combined sewer overflows and sanitary sewer overflows. The estimated costs to address these problems alone are daunting and may be driving the views of the wastewater utilities about how much financial assistance they need. In addition, it is more difficult to convince customers that they should have to pay for this. It is one thing to tell customers that they should pay the full cost of the services they are getting such as having safe drinking water piped to their homes and having their sanitary sewage waste removed and treated. It is another to say because street runoff is overwhelming the wastewater treatment processes and collection system that they will have to pay even more. Most customers would have difficulty understanding how these payments relate to any direct service they are getting. We will need to look at this issue very carefully so we can determine if the federal role in providing assistance in this area should be different than for other infrastructure challenges.

What assistance approaches could provide solutions to the problem?

There are really two dramatically different approaches one could pursue in providing assistance to help address these challenges. They are:

- Subsidize the water utilities' capital investments, which will indirectly subsidize the rates of all customers.

Provide continuous government (federal, state, and local) subsidies to the industry to cover a sufficient portion of the needed capital investment so that water and sewer rates can be held at acceptable levels for all customers.

- Have utilities pay for capital investments through rates alone and subsidize the rates of only low-income households that cannot afford the higher rates.

Have the industry pay for all the needed capital investment through full cost of service rates. For low-income households that cannot afford the rates, provide a federal financial subsidy to those household that will cover that portion of the water and sewer bill that is unaffordable.

There is already a working model for such a program in the Low-Income Home Energy Assistance Program (LIHEAP) that helps low-income homeowners pay their home heating bills. Programs like this use federal dollars much more efficiently than capital grant programs because they target the assistance to those customers that have a true economic need rather than subsidizing everybody's utility bill.

Of course these two approaches could be phased in or combined in various ways, but ultimately the country and the water industry will have to decide what approach makes the most economic and public policy sense and move the industry in that direction over the long term.

What are the advantages and disadvantages of the two approaches?

The following table summarizes the characteristics and by implication the advantages and disadvantages of the two approaches.

Approaches Characteristics	Subsidize Capital Investments & Indirectly All Customers' Rates	Charge Full Cost of Service and Subsidize Only Rates of Poor
Degree of economic efficiency in use of Federal Funds	Less efficient because it subsidizes everyone's rates, even those who can afford them.	More efficient because it subsidizes only the rates of those who cannot afford them.
Incentive to assure cost-effective investments that will lower overall costs	Because the investments will be heavily subsidized, there may be less incentive to assure the capital investments are cost-effective.	With the utility paying 100% of the cost of the capital investment there will be a great incentive to make sure it is cost-effective.
Impact of rate structure on consumer behavior and overall costs	Failure to charge full cost of service rates will continue the economic charade of under pricing water.	The public will know the true cost of water and will put significant pressure on the utility be efficient to

	Consumers will not feel the pinch of higher rates and will not insist on greater efficiencies. In addition, consumer use patterns will not reflect the true economic cost of the service.	keep rates under control. Water usage patterns are more likely to be consistent with the true cost of water.
Impact of full cost of service rates on the U.S. Treasury	Failure to move toward full cost of service rates means less revenue will be collected from customers than is possible. All other things being equal, the drain on the Treasury for assistance will be greater in those utilities that are not collecting as much as they can from their customers.	Full cost of service rates assure that the utility will get as much of their needed revenues from customers as they can. If some long-term subsidy is still needed (e.g. low-income households); the amount of federal assistance will be less than if the utility didn't collect all it could from customers.
Impact of full cost of service rates on self-sustaining utility operations	There is no chance of self-sustaining operations unless the utility moves toward full cost of service rates. Other utilities such as telecommunication, gas, and electric utilities are self-sustaining, why not the water utilities?	Full cost of service rates will improve the chances of a utility becoming self-sustaining if they are not already.
Impact of Congressional jurisdictions	Passing legislation for capital assistance alone would involve the traditional infrastructure committees.	Legislation that would provide help to low income households would be within the purview of committees different from infrastructure, complicating the legislative process.

If it is decided that the full cost of service option is the best, it may be necessary to phase it in over time and use a combination of the two options in the short and intermediate term. For example, most utilities not already charging full cost of service could not do so over night because of the rate shock that would occur. So some transition would obviously be necessary.

In addition, there may be circumstances where a capital investment subsidy, at least initially, may make sense even though it subsidizes everybody's rates because all or most customers may need assistance. An example is a small community that lacks economies of scale where almost any major capital investment may raise rates to the unaffordable

level. Another is a large city with a very high proportion of low-income households that cannot afford to pay the higher water bills caused by the large capital investments. Over the long term, financial assistance program managers would need to determine what type of assistance was most economically efficient in those circumstances.

What specific problems should an assistance program address?

From earlier discussions it is obvious that there are many more challenges than just aging pipes that the water utility industry must meet. Treatment must be periodically upgraded as new more stringent health standards are promulgated and the gradual deterioration of utility plant can create health risks and service problems. Consequently, we need to assure that an assistance program addresses all the fundamental problems that can arise. This includes:

- Immediate and anticipated significant health threats that the utility is financially unable to address.
- Significant service quality problems that the utility is financially unable to address.
- Significant treatment and infrastructure costs that result in unaffordable water rates when all current and future costs are included (treatment, infrastructure rehabilitation or replacement, and O&M)

In this context, “financially unable to address” means that a substantial portion of the utility’s customers cannot afford the full cost of service rates that would have to be charged to make the necessary capital investments.

Who should administer the assistance program?

As with the current SRF Program the states are the appropriate administrators of any new assistance program. In addition, the new federal financial assistance could be provided through the existing SRF Program with appropriate modifications and improvements. A separate and potentially competing program to provide the new assistance poses many problems. Some of the principles that should shape the assistance program include:

- State capitalization grants should be based on a survey of the capital needs of eligible potential recipients of financial assistance. This assures that federal dollars will go where they will have the best chance of being put to use.
- Each state will be allocated assistance monies based on its water and wastewater needs relative to other states as determined by a needs survey that includes infrastructure needs. This is consistent with the approach currently used in the SRF Program.

- Fifty percent of the assistance funds will be allocated to state drinking water needs and fifty percent to wastewater needs. This is to assure equity between the two water programs.

What financial aid delivery mechanisms should be used?

Water problems are often complex and require the states to carefully consider a number of potential options before a truly cost-effective long-range solution is found. In addition, the states must concern themselves with preserving the funds available for assistance so assistance can continue to be provided over the long term. They must make decisions about how much assistance should be in the form of grants or other donations, such as forgiving the payback of principal on loans, and conventional low interest loans. The former will permanently reduce assistance funds, while conventional low interest loans and some other forms of support will assure the financial corpus of the assistance program is not permanently depleted. This argues that there should be many solutions available to the states and that they should have the flexibility to use them in combinations that will produce long-term solutions and will assure that federal monies are used cost-effectively.

Many promising solutions are non-federal or at least not traditional water solutions. An example is lifeline rate support assistance for low-income families to supplement their water and sewer bills. In many cases this would be a more cost-effective way to provide long term assistance than periodic capital construction grants. Public private partnerships are another approach that can offer cost-effective solutions. All of these as well as various combinations should be considered by the state in deciding what the best long-range solution is for the particular problems that must be addressed by a utility.

If there is to be a long term assistance program, there must be some limits on how much assistance can be provided in the form of grants or loan forgiveness, or the financial corpus of the assistance program will be permanently depleted. Consequently, no more than 30% (same as the current drinking water SRF) of the total federal funds should be used for the combined amounts of grants and loans with forgiveness of principal. This will assure that most of the financial assistance funds will eventually come back to the assistance program so it can be recycled to others who have need. It will truly be a long term, self-sustaining assistance program.

To assure “ownership” in the project by the recipient of the federal assistance, the federal share (the part that doesn’t have to be paid back) should not exceed 50% of the total project cost. “Ownership” via a significant financial stake by the utility is essential to prevent recipients from “gold plating” projects and to assure the most cost-effective capital investments are made. Cost-effectiveness should include consideration of life cycle costs.

As mentioned above, in structuring assistance packages, states should be able to choose from among the following types of assistance including a mix of these. In a subsequent

section of this paper suggestions are provided for how a state should decide among these types of assistance in putting a solution together.

- Low interest loans, including loans with zero interest and forgiveness of some or the entire principal.
- Lifeline rate support assistance for low-income families to supplement their water and sewer bills, either paid to the low-income families or directly to the utility. An analogous program is the Low Income Home Energy Assistance Program (LIHEAP) funded by block grants from the U.S. Department of Health and Human Services to the states. The program is implemented at the local level by a number of poverty agencies, which provide the financial assistance directly to low income households that apply and meet the criteria for assistance.

A program like this for drinking water and wastewater could conceivably be set up under the state agency administering the SRF. Low-income families would apply for assistance to the SRF agency or directly to the utility. If the applicant met the financial need criteria, the SRF agency would pay the water bill subsidy directly to the utility. The water utility would place a credit for that amount on the water bill sent out to these households. These households would then pay the remainder of the bill.

- Grants (with at least a 50% cost share by the recipient).
- Private activity bonds (The legislation must eliminate current caps on such bonds for water and wastewater projects.)
- Guarantees and insurance payments for municipal and private financing.

When should financial assistance be provided?

There are two criteria that should drive assistance, the seriousness of the problem and whether the customers of the utility can afford to pay for solving the problem themselves. These criteria have been incorporated into the following guidelines.

- Utilities with actual or potential health problems that they cannot financially address should be considered for assistance first. Serious health threats should be given priority attention, including temporary assistance to eliminate the immediate threat (even if there is a question about what the utility can afford), while affordability and longer-term solutions are being investigated. Long term solutions that would significantly reduce the chance of another health problem should be favored.
- Where there is not an immediate and serious health threat, to be considered for assistance a utility must demonstrate that a substantial portion of their customers will not be able to afford the rates for water and sewer service that would have to be

charged to cover eligible capital investments as well as other expenses. While direct grant assistance should not be provided for O&M, O&M costs must be considered when determining the affordability of rates. EPA should develop affordability guidelines after consultation with States and other federal agencies that provide water and sewer assistance.

- Before deciding to provide federal financial assistance, the state should review and evaluate non-federal solutions such as public private partnerships that could provide a more cost-effective long-term solution in combination with or in lieu of federal assistance.
- To receive direct assistance, the utility must show it will either remain economically viable (i.e. able to support themselves on rates charged customers) in the future or will become viable as a result of the assistance. This will assure that solutions will be long-term and not stop gap and that the federal funds are being used where they can produce true long-term solutions. EPA should provide guidance on determining economic viability. See additional discussion of viability below.

What specific types of projects could receive funding?

Many different kinds of projects and activities should be able to receive funding, provided they can meet the need criteria discussed in the previous section. This includes:

- Projects required to comply with EPA or state regulations;
- Projects needed to rehabilitate or replace infrastructure to maintain health and service standards;
- Projects needed to protect or improve the quality of raw water supplies;
- Activities to consolidate or regionalize service, when this provides a long -term solution; and
- Buy down of utility debt incurred for eligible capital investments.

Those portions of capital investments that will provide service to new customers (exclusive of a consolidation being pursued as a solution) should generally not be eligible for financial assistance. New customers should support 100% of the cost of providing service to their households. This is consistent with the concept of moving the water industry in the direction of becoming self-supporting on the rates it charges customers for service.

How should states structure assistance packages?

Before an appropriate assistance package can be assembled, the utility would also have to provide long term (20 year) forecasts of its infrastructure and treatment needs, capital and

other costs, its revenue streams under various rate scenarios, and the income levels of its customers. This would allow the program administrator to decide which assistance would provide the most cost-effective long-term solution for the utility. Such analyses should be done routinely by all large and mid sized utilities. Small utility requirements will probably have to be less substantial because of their limited resources and expertise.

To assure that federal monies are use in the most efficient and effective manner, states should use the following guidelines in structuring financial assistance packages.

- Assistance options should be selected that will provide an efficient long-term solution to the identified problems at the lowest cost to the government. This means in general that traditional loans would be favored over grants or loans in which interest and/or principal are forgiven. This is especially true for large systems that have significant economies of scale. Also, if there are long-term solutions such as a public private partnership or a consolidation that would reduce the federal money that would be needed, these options should be considered in lieu of an exclusively federally funded solution. The state should attempt to leverage private resources as much as possible to get the most mileage out of available federal funds.
- Economically efficient solutions should be favored. For example, except perhaps in cases where virtually all of the utility's customers are impoverished, lifeline rate support programs for low-income households should be favored over grants or loans. Grants or loans with substantial forgiveness subsidize all customers' rates, even those customers that are able to afford the full cost of service. Such across the board subsidies are not an efficient use of federal assistance money.
- Assistance must be structured to maximize the chance that the utility will remain or will become economically viable (i.e. able to support itself on the rates it charges). This is especially important with small systems with limited economies of scale. If direct assistance will not assure this, consolidation or regionalization options should be considered. An example is physical or managerial consolidation with another utility that is viable along with a combination of financial assistance to the viable utility and adjustment to its rate structures to allow it to subsidize the service to the consolidated utility without harming itself economically.
- Assistance packages can include funds to help utilities comply with conditions that are part of the assistance agreement. (See section on conditions below).
- Assistance in the form of grants or loan forgiveness should not be used to pay utility O&M costs.
- States should coordinate the design of the assistance packages with federal, state, and local agencies that provide water infrastructure assistance to assure all resources are considered and an effective and coordinated assistance package is developed.

- Assistance should not impede innovation. New technology should be allowed provided those proposing the new technology guarantee the performance of the technology.

What conditions should be met by those receiving assistance?

States should incorporate in the instruments providing assistance conditions that will facilitate movement toward self-sustaining utility operations, sound capital planning and investments, and improved operating efficiencies. If these conditions are not included and enforced, many utilities that receive assistance today will be back asking for more, time and time again. This is because the structural changes needed to eliminate their dependency on long-term subsidies have not taken place.

The larger the forgiveness associated with the financial assistance the more substantial the conditions the receiving utility must agree to. For example a grant would contain more substantial conditions than a loan on which the entire principal will be paid back. Listed below are conditions that states should consider putting in the assistance agreement if these activities or processes are not already operational. Since larger utilities have to submit significant planning and forecasting data to be considered for assistance, many of these activities may be well underway so the conditions that are included in the assistance documents should reflect this.

- Adopt the GASB 34 optional asset management system that would track the conditions of capital assets and develop estimates of replacement and rehabilitation costs.
- Develop and implement a 20-year capital asset repair and replacement plan that is based on consideration of life cycle costs of the assets.
- Establish a capital replacement fund to fund the capital needs identified in the above plan.
- Develop and implement an O&M plan including out year estimated expenses.
- Develop and implement a rate structure based on all estimated current and future costs including O&M and capital investments for treatment and infrastructure replacement or rehabilitation.
- Assess current operating efficiencies and develop a program for improvement.

Periodic reviews should be conducted by the state to determine progress made on the above conditions. Failure to make reasonable progress can result in the state withdrawing the assistance.

Conclusions

If implemented, the net affect of all these proposals would be a federal assistance program that would provide cost-effective financial assistance to utilities, provided they demonstrate need, to help put in place long term solutions. In addition, the assistance will promote self sustaining industry operations, thereby limiting future requests for assistance from the U.S Treasury.