

This partially demolished million gallon elevated storage tank had exceeded its useful service life. Needs Survey respondents reported that elevated tanks of this size would cost an average of \$1 million.

Executive Summary

The nation's 55,000 community water systems must make significant investments to install, upgrade, or replace infrastructure to ensure the provision of safe drinking water to their 243 million customers. This first-ever national survey estimates that these systems must invest a minimum of \$138.4 billion over the next 20 years. Of this total, \$12.1 billion is needed now to meet current Safe Drinking Water Act (SDWA) requirements.

Over the past two years, the U.S. Environmental Protection Agency (EPA) has sponsored a national survey of drinking water infrastructure needs. In this unprecedented study, 4,000 community water systems documented their infrastructure improvement needs for the next 20 years.

SDWA Need

- The current Safe Drinking Water Act (SDWA) need totals \$12.1 billion.¹ Current SDWA needs are capital costs for projects needed now to ensure compliance with existing SDWA regulations.

Treatment for microbiological contaminants under the SDWA accounts for \$10.2 billion—about 84 percent of the current SDWA need. Microbiological contaminants, regulated under the Surface Water Treatment Rule (SWTR) and Total Coliform Rule (TCR), can lead to

gastrointestinal illness and, in extreme cases, death. The SWTR and TCR need is for construction of new infrastructure at systems not now in compliance and for replacement of existing infrastructure that no longer functions adequately. In addition to the need associated with the SWTR and TCR, almost \$0.2 billion is needed to meet standards for nitrate, which causes acute health effects in children, and \$1.7 billion is needed for contaminants that pose chronic health risks.

It is important to note that the current need attributable to the SDWA is overstated. SDWA projects often include components that are not required for compliance but are undertaken at the same time to realize savings in design and building costs. Another component of the need would exist even in the absence of the SDWA because of State and local requirements and communities' efforts to provide a consistent level of water quality.

The Drinking Water Infrastructure Needs Survey is intended to meet the requirements of Sections 1452(h) and 1452(i)(4) of the Safe Drinking Water Act.

¹ This figure is comparable to the capital needs estimate from the 1993 Chafee-Lautenberg Report to Congress.

- In addition to the \$12.1 billion needed now to comply with the SDWA, \$4.2 billion will be needed through the year 2014 for infrastructure replacement or improvement to comply with existing SDWA regulations.
- Another \$14.0 billion will be needed for proposed regulations that will protect against microbiological contaminants and disinfection byproducts.
- An additional \$35.7 billion is needed for replacement of distribution piping that poses a threat of coliform contamination. Approximately \$22.3 billion of this total is needed now. Distribution piping replacement is categorized as a SDWA-related need because the monitoring required under the TCR helps to identify problems in the distribution system. However, these problems would exist in the absence of TCR monitoring and would eventually

degrade water quality to the extent that problems would be detected without the TCR.

Total Need

- The total infrastructure investment need is large—\$138.4 billion. As shown in Exhibit ES-1, the largest share of the need, \$58.5 billion, is for infrastructure improvements at large water systems. Medium and small water systems also have substantial needs at \$41.4 billion and \$37.2 billion. American Indian and Alaska Native water systems have needs totaling \$1.3 billion. The total need includes the SDWA need.
- Over \$76.8 billion is for infrastructure improvements that are needed now to protect public health. Projects for these improvements are defined as current needs. Current needs include projects such as source, storage, treatment, and water main improvements necessary to minimize the risk of contamination of water supplies.

The remaining \$61.6 billion is for future needs, which are projects designed to provide safe drinking water through the year 2014. Future needs include projects to replace existing infrastructure. A portion of the future need is for proposed regulations.

The estimate of total need is conservative. Many systems were unable to identify all of their needs for the full 20-year period. In some cases, systems were not able to provide documentation for all of their identified needs. In addition, the survey examined only the needs of community water systems; non-community water systems, such as

Exhibit ES-1: Total 20-Year Need by System Size
(in billions of Jan. '95 dollars)

System Size	Total Need
Large Systems (serving more than 50,000 people)	\$58.5
Medium Systems (serving 3,301 to 50,000 people)	\$41.4
Small Systems (serving 3,300 and fewer people)	\$37.2
American Indian and Alaska Native Systems	\$1.3
Total	\$138.4

schools and churches with their own water systems, were not included. Needs associated solely with future growth were also excluded from this survey.

Categories of Need

- The single largest category of need is installation and rehabilitation of transmission and distribution systems. As shown in Exhibit ES-2, the total 20-year need for this category is \$77.2 billion.

Sound transmission and distribution systems are critical to protecting the public from contaminants that cause acute illness. Deteriorated distribution piping can allow water in the distribution system to become contaminated and can lead to interruptions in water service. Transmission line failure can lead to interruptions in treatment and water service. Most needs in this category involve the replacement of existing pipe. In some cases, wooden mains that have been in service for more than 100 years must be replaced. In other instances, pipe that is severely undersized, or that has exceeded its useful service life, must be replaced. Such pipe often leaks and is prone to high rates of breakage, which can lead to contamination.

- Treatment needs constitute the second largest category of need. The total 20-year need for this category is \$36.2 billion.

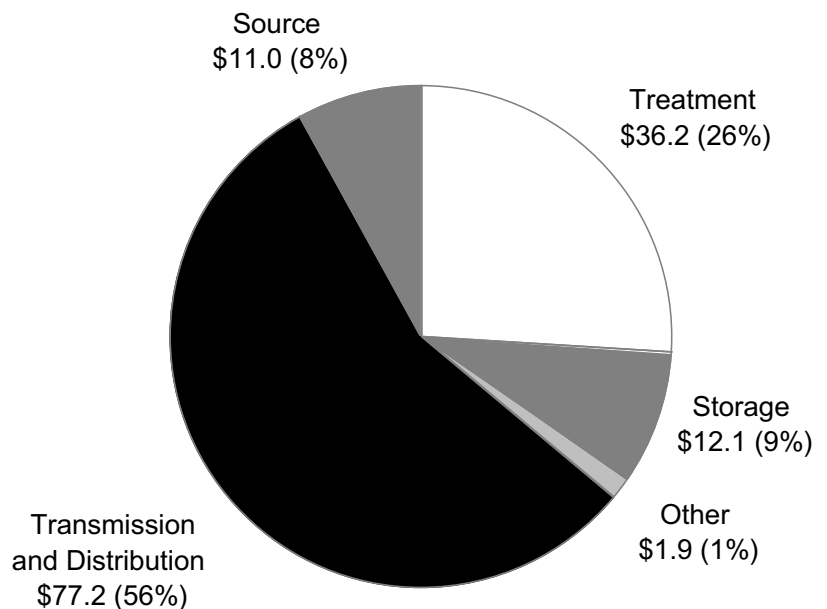
All surface water and a significant percentage of ground water must be treated before it can be considered safe to drink. Over half of all treatment needs (\$20.2 billion) are to reduce the threat from contaminants that can cause acute health effects.

One in every four systems needs to improve its treatment for these contaminants. In addition, treatment infrastructure must be installed, upgraded, or replaced to improve treatment for contaminants that pose chronic health risks, or for contaminants that cause taste and odor or other aesthetic problems.

- Storage needs are the third largest category of need. The total 20-year need for this category is \$12.1 billion.

Storage ensures the positive water pressure necessary to prevent contaminants from entering the system. Storage also provides water during periods of peak usage. Storage facilities require periodic rehabilitation to ensure their structural integrity and to prevent the entry and growth of microbiological contaminants.

Exhibit ES-2: Total 20-Year Need by Category (in billions of Jan. '95 dollars)



- The fourth category of need is source rehabilitation and development. The total 20-year need for this category is \$11.0 billion.

Source rehabilitation and development is necessary for systems to continue to provide an adequate quantity and quality of drinking water.

- An additional \$1.9 billion in need is categorized as “other.” These needs include projects to protect water systems against earthquake damage, automate treatment plant operations, and improve laboratory facilities.

Unique Needs of Small Systems

Of the nation’s 55,000 community water systems, approximately 46,500 are small systems which serve up to 3,300 persons each. There are small systems in every State, and together they serve about 10 percent of the nation’s population.

The total need facing these systems is \$37.2 billion, about 27 percent of the total national need. Exhibit ES-3 shows per-household need by system size. Customers of small systems face a particularly heavy burden because these systems lack economies of scale. As a result, their average per-household costs are significantly higher than those of medium and large systems.

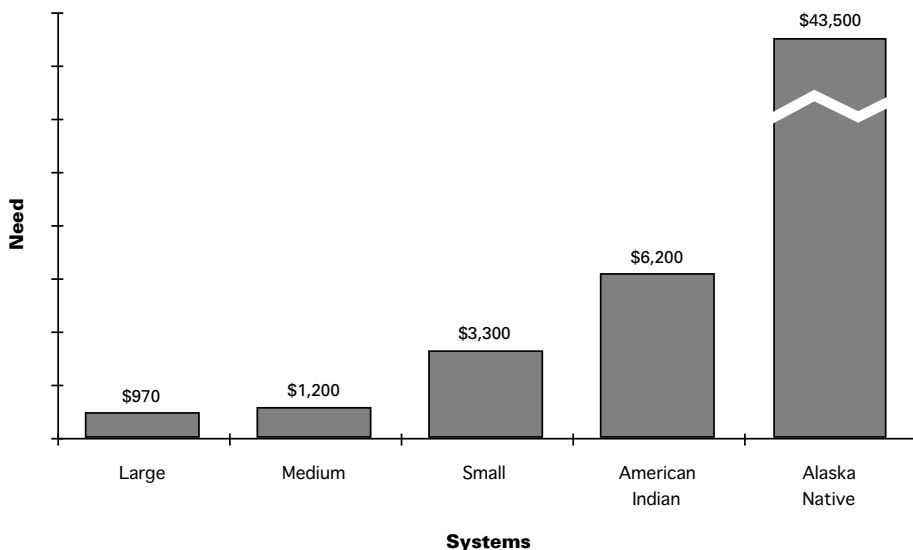
American Indian and Alaska Native Systems

Estimated needs for the 884 American Indian and Alaska Native systems total \$1.3 billion over 20 years. American Indian and Alaska Native systems have a small total need compared to systems regulated by the States, but their need is significant in terms of household cost and impact on public health and quality of life. Per-household needs are high for the customers of these systems — they average \$6,200 for American Indians and \$43,500 for Alaska Natives over the 20-year period covered by the survey.

More than 98 percent of American Indian and Alaska Native water systems are small. These systems share challenges common to most small systems.

American Indian and Alaska Native systems are often located in arid regions, where water sources are difficult to obtain. Natural conditions such as permafrost can make construction very expensive. Many small systems minimize costs by joining with other water systems. But since American Indian and Alaska Native water systems are often remote, this option is rarely available to them. They must find, treat, and distribute their own water.

Exhibit ES-3: Average 20-Year Per-Household Need (Total need in Jan. '95 dollars)



Households Not Served by Community Water Systems

This survey does not address the needs of the approximately 16 million households not served by community water systems. Many of these households have safe sources of running water, but an undetermined number do not. Some households that lack safe running water are close to existing community water systems, and some survey respondents estimated costs for connecting this type of household. Six billion dollars is a partial estimate for providing water to households that do not have a safe source of drinking water. Unfortunately, connecting to an existing community water system is not an option for all such homes. Further study is necessary to determine the full scope of this problem.

Methodology

The Drinking Water Infrastructure Needs Survey was a joint effort of the nation's drinking water utilities, State drinking water regulatory agencies, representatives of American Indians and Alaska Natives, the Indian Health Service (IHS), and EPA. The survey benefited from the unanimous support of every organization representing drinking water utilities.

The survey included community water systems from every State, Puerto Rico, the District of Columbia, the Virgin Islands, American Samoa, the Northern Mariana Islands, and Guam, as well as American Indian and Alaska Native systems. The survey's scope ranged from systems serving more than 15 million people to those serving only 25. Urban and rural water systems, both publicly and privately owned, were surveyed.

Of the 794 large water systems, which serve more than 50,000 people, 784 participated through a mail survey. All systems serving more than 110,000 people responded to the survey. Of the 6,800 medium systems serving a population of 3,301 to 50,000, a random sample of 2,760 systems was drawn. Ninety-three percent of these systems responded to the mail survey. To ensure an accurate estimate of infrastructure needs for the 46,500 small systems nationwide, drinking water professionals made on-site determinations of need for 537 systems serving 3,300 or fewer people. The small system needs assessment covered every State. The results of the statistical surveys were extrapolated to estimate needs for small and medium community water systems.



Wisconsin Department of Natural Resources

All 15 medium American Indian systems responded to the questionnaire. Of the 869 small American Indian and Alaska Native systems, needs were assessed for 77 representative systems. Needs for these sampled systems, in conjunction with IHS data, were used to derive needs for American Indian and Alaska Native systems.

EPA and State drinking water regulators thoroughly reviewed each system's estimates and supporting documents to ensure the validity and accuracy of the proposed projects and associated costs. The most common sources of documentation were capital improvement plans and engineers' estimates.

Conclusions

Community water systems need to invest significant amounts of money in infrastructure improvements if they are to continue providing water that is safe to drink. Much of the nation's drinking water infrastructure suffers from long-term neglect and serious deterioration. Recent events—including waterborne disease outbreaks and extended boil-water notices in major cities—have focused national attention on the dangers associated with contamination of public water supplies. Current needs for minimizing health threats from microbiological contaminants—those needs associated with the SWTR and the TCR—are especially critical.

Water systems around the country must make immediate investments in infrastructure to protect public health and ensure the availability of safe drinking water.

A distribution main break resulted in extensive damage to this Brooklyn street.



Dan Fraser



This dug well is vulnerable to contamination from nearby farming and grazing. After rainfall, water from the well is cloudy and often contains microbiological contaminants. Water from this well must be filtered and disinfected before it can be considered safe to drink. The bottles contain water taken from the well after rainfall.

