Executive Summary

When we turn on the tap in the morning, clean, drinkable water flows from the faucet. It is an uninteresting and unremarkable fact of modern life until, one day, no water comes out.

"When the well is dry, we know the worth of water."

– Benjamin Franklin

We have learned to take the reliability of our drinking water and wastewater disposal systems as well as our storm water systems for granted. It is only when there is a major problem with our water infrastructure systems—a large water main breaks, or leaking sewage causes a beach closing, or a blocked drain causes flooding—that we start to pay attention to the thousands of miles of pipes, pumping facilities, and numerous treatment plants that are part of our water infrastructure.

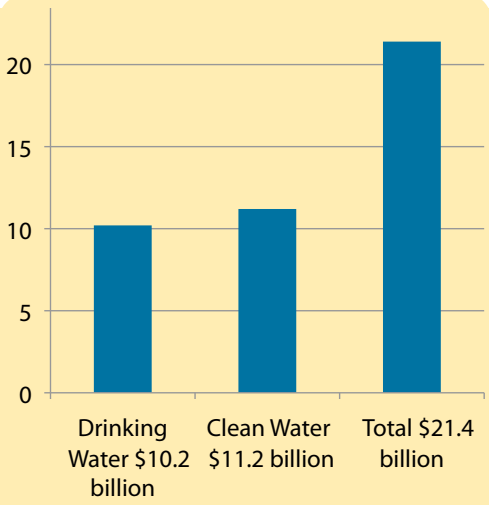
Clean water is perhaps our most precious commodity and assuredly our most recycled resource

Clean water is perhaps our most precious commodity and assuredly our most recycled resource. Our water supply, wastewater treatment, and storm water management protect our health, keeping us safe from deadly waterborne diseases. The availability of high quality water is an important consideration for many businesses, including life sciences and manufacturing. A high-pressure water system allows us to put out fires, and healthy rivers, lakes and wetlands free from pollution are critical for a thriving natural environment.

A well-maintained, reliable water infrastructure system is vital to the Commonwealth's health, economy, environment, and cultural vitality.

Yet despite its importance, our aging water infrastructure system suffers from a lack of investment, delayed maintenance and insufficient resources. Hundreds of miles of pipes are kept in service far past their useful life, leading to lost water and sewage through underground leaks and, in the worst case, water main breaks that can leave thousands of families without water for days or even weeks. Many municipal treatment plants are in need of updating to meet current public health and environmental guidelines. Like the homeowner who postpones repairs until the roof leaks, we jeopardize our water services when we fail to maintain and upgrade our existing infrastructure.

Our drinking water, wastewater and stormwater infrastructure need increased investment if they are going to continue to deliver reliable clean water and keep wastes and toxic chemicals out of our environment without service interruptions.



Estimated Gap in water and clean water investments over the next 20 years
(in billions of dollars)

At the same time, sources of revenue to pay for these investments are on decline at the federal, state and municipal level. The result is a large and growing Gap—estimated to be $21.4 billion over the next 20 years—between current funding for the state's water infrastructure and wastewater systems and the amount of funding actually needed.

The Water Infrastructure Finance Commission was created by the Massachusetts Legislature in 2009 to analyze our water infrastructure funding needs and develop recommendations for financing these needs going forward. What follows are the findings and final recommendations of this Commission.

Mind the Gap

The Commission finds that Massachusetts, like other states, faces a substantial water infrastructure Gap. Using the best available data, the Commission estimates that the Commonwealth conservatively faces a $10.2 billion Gap in resources for drinking water and an $11.2 billion Gap in resources for clean water (wastewater) projects over the next 20 years.

The Commission's Gap estimates include capital investment, repair and replacement, operations, maintenance and debt service. Estimates do not include the cost of evolving regulatory requirements or investments to accommodate economic growth. As such, these estimates are more likely to understate rather than overstate the Gap and the funding need.

One particularly large regulatory change looms on the horizon and may require significant attention and additional resources: potentially forthcoming federal stormwater regulations. Estimates of the expected costs to communities are varied, limited, and sometimes conflicting, but the Commission's analysis suggests that perhaps $18 billion in stormwater investment (in addition to the $21.4 billion for water and clean water) may be required over the next 20 years depending on federal regulatory requirements.

Whether or not necessary stormwater investments are included, the message is clear: a significant increase in spending above current levels will be necessary to maintain current levels of service and sustain necessary infrastructure growth. And, while federal subsidies will continue at some level, it is clear that state

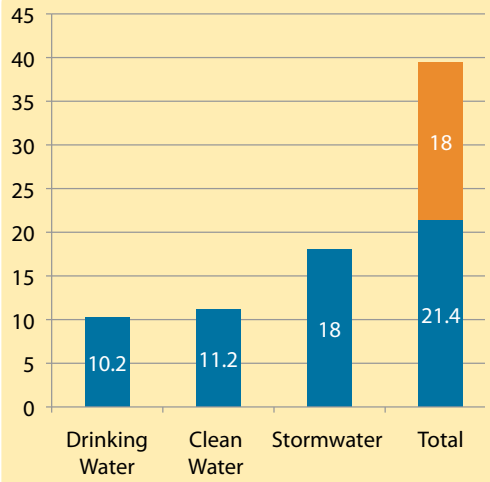
and local governments across the country will need to prepare integrated responses to this impending crisis.

The Gap is Growing

If the Commonwealth does not take action quickly, this infrastructure funding Gap will only grow larger. A number of factors—including increasing costs and decreasing revenues—are contributing to the widening of this Gap.

Water utilities face many cost challenges:

- **Aging systems need investments**. Some water and sewer systems in Massachusetts'ss older cities were constructed as early as the 1800s. Major federal investments in water and wastewater in the 1970s and 1980s brought new plants and new technologies to many towns, but many of these assets are nearing the end of their intended service life. As a result, many communities in the Commonwealth are facing serious challenges posed by the cost of needed upkeep, upgrades, and improvements to aging water and sewer systems.
- **Environmental and public health concerns need to be addressed.** Many systems are in need of improvements and upgrades in their level of treatment to meet stronger environmental or public health standards. Many municipal systems are facing ongoing, increasingly expensive, and unfunded court orders and regulatory requirements to address various environmental or public health requirements. Nutrient control and stormwater mitigation are particularly significant challenges in Massachusetts. The cost of addressing them is high and sometimes unpredictable.
- **Lack of state level control over Clean Water permits may be preventing smart planning and prioritization of resources**. Massachusetts is one of only four states in the nation that has not taken over responsibility ("primacy") for managing water pollutant control from the federal government. While the state would still be required to meet federal standards, primacy may allow the state to work collaboratively with cities and towns to manage wastewater and stormwater programs and provide the flexibility needed to most effectively prioritize scarce pollutant control resources. As federal wastewater and stormwater regulations become more and more stringent, having this flexibility on the local level may become increasingly important.



The Gap could nearly double if stormwater mitigation estimates are included (in billions of dollars)

[1] Summary: Closing the Gap: Innovative Solutions for America's Water Infrastructure Forum; January 2003 http://water.epa.gov/infrastructure/sustain/upload/2009_05_26_waterinfrastructures_summary_si_waterinfrastructureforum-2003.pdf

All too often, municipal water and sewer rates do not come close to covering the full cost of providing clean water and eliminating waste

- **Security and redundancy investments are required**. To protect the public during emergencies—from natural disasters to system failures to acts of terrorism—communities must invest significant dollars in security and redundancy in their systems.
- **Costs are rising**. Pumping, delivering, collecting and cleaning water and wastewater uses a significant amount of energy, chemicals and manpower. As these costs rise, so does the cost of providing clean water. Similarly, as treatment systems become more complex, so does the level of skill and training of personnel needed to operate them, and the compensation needed to attract them has increased.
- **Many water utilities are not running at optimal efficiency.** Generally accepted industry best management practices exist, but are used only partially or not at all by water utilities across the state. Many municipalities need technical assistance and training that could help them run more efficient and financially healthy systems that recognize and address the true costs of water services.
- **Municipal debt is a growing burden**. Many municipalities have taken on increasing levels of debt to maintain their water infrastructure and meet obligations for mandated improvement projects. For many communities, this means a significant portion of their finances have been and will continue to be consumed by debt service.

Revenues are not keeping pace with needs:

- **Federal and state funding sources are trending downward**. Both federal and state funding available to municipalities to fund water and wastewater infrastructure has steadily decreased since the 1970's. Line items that once funded infrastructure projects, provided rate relief, or funded low-interest loans have been cut dramatically or eliminated. These funding cuts have been further exacerbated by the recent recession.
- **Rates vary widely and do not always cover the full cost of service**. Unlike other utilities, all too often, municipal water and sewer rates do not come close to covering the full cost of providing clean water and eliminating waste. In particular, rates frequently do not cover capital improvement plans, the management and replacement of pipes and other assets, or

the protection of watershed land. As a result, the public has grown accustomed to low user rates and can dramatically underestimate or misunderstand and resist rates that reflect the true cost of service.

- **Unanticipated financial effects of water conservation have an impact on utilities' bottom lines**. Increasing levels of water conservation is undoubtedly good news for the environment and should be encouraged. Because water is billed based on volume sold, however, water conservation has unfortunately led to reduced revenues for maintaining water systems.
- **Affordability is an important issue for many communities.** Rate payers are very concerned about the cost of services, and system managers must address affordability in setting their rates. Keeping water and sewer service affordable is of particular concern to individuals on low and/or fixed incomes. As water infrastructure is paid for increasingly with user rates, it is important to recognize that different communities have different abilities to pay for necessary improvement.

A nationwide problem

Massachusetts is not alone in facing these issues and an enormous water infrastructure funding Gap. The US Environmental Protection Agency has articulated these concerns repeatedly over the last decade, and continues to encourage creative solutions.

In crafting Recommendations, the Commission strove to be consistent with approaches recommended by the EPA (see boxes).

The true cost of water: educating the public and policymakers

The public is often unaware of the true costs of fully supporting, operating, maintaining and investing in our water infrastructure.

At the same time, consumers generally underestimate the value of water in protecting public health and safety, promoting economic vitality, creating jobs, and preserving our environment.

Most of all, the public and policymakers at all levels often misunderstand the consequences of failing to invest, from the

> "Although the figures are staggering, it is critical that our nation invest in infrastructure for the long-term protection of public health, our environment and the economy. EPA is committed to promoting sustainable practices that will help reduce the Gap between funding needs and spending at the local level. EPA believes that better management practices, efficient water and energy use, the full cost pricing of services, and using a watershed approach when making funding decisions can all help responsible municipalities and utilities operate more sustainably, now and in the long-term."
>
> Water Infrastructure Funding Options for a Sustainable Future, USEPA New England Region, October 2008

> "The vision outlined in the Clean Water Act—fishable, swimmable waters—has not changed. In fact, this strategy is about how we can achieve a leap forward in our nation's water quality to move us closer to realizing this vision."
>
> "There is no silver bullet—no single program or regulation will allow us to accomplish our goal. Carrying out all of these principles is where the true "coming together" must happen to address the primary stressors from multiple angles: smarter regulations, stronger partnerships, more balanced and coordinated compliance and enforcement, more integrated approaches to capitalize on synergies, improved communication with a broader audience, and greater leveraging of programs. Just as EPA will have to employ all of its tools, so too must all our partners."
>
> Coming Together for Clean Water: EPA's Strategy for Achieving Clean Water, Public Discussion Draft, August 2010

> "EPA is firmly committed to helping local governments identify opportunities to achieve clean water using a comprehensive integrated planning approach. An integrated approach allows communities to prioritize their investments to address the most serious water issues first and provides flexibility to use innovative, cost-effective storm – and wastewater management solutions—including green infrastructure."
>
> EPA Develops New Planning Approach to Improve Water Quality in U.S. Cities
> Bob Perciasepe, EPA Deputy Administrator
> press release – October 28, 2011

high costs of deferred maintenance and emergency repairs to the missed opportunity to grow our economy by strengthening our infrastructure.

The result is a lack of public attention to and support for policies that will ensure we have the resources necessary to rehabilitate our aging infrastructure, meet the challenges of environmental regulation, and continue to provide safe, clean drinking water across the Commonwealth without interruption.

Until the public begins to understand the true costs and high value of water, it will be difficult to make progress on many of the Commission's recommendations.

There is hope, however: polling suggests that voters value clean water and are starting to become concerned about the state of the nation's water infrastructure. A 2010 ITT Corporation survey of American voters found that:

- 69% agreed with the statement "I generally take my access to clean water for granted."
- 95% valued water over any other services they received, including heat and electricity.
- Nearly 1 in 4 are "very concerned" about the state of the nation's water infrastructure.
- 29% understand that water pipes and systems in America are "crumbling and approaching a state of crisis."
- 3 out of 4 stated that disruptions in the water system would have "direct and personal consequences."

95% of American voters valued water over any other services they received, including heat and electricity[2]

The poll also found that voters are willing to pay more for their water services.

This is good news, because it suggests that efforts to educate the public on the actual and full costs of providing a reliable water supply can impact the willingness of ratepayers to pay for those services.

The Commission proposes a road map to a sustainable future:

Over the past decade, many studies have confirmed the need for investment in the nation's drinking water, wastewater, and stormwater infrastructure. While estimates of the size of the

[2] "Value of Water Survey" ITT Corporation White Plains, NY 2010 http://www.itt.com/valueofwater/

Gap may vary, the underlying message is clear. A significant increase in spending above current levels will be necessary to meet this investment need. And, while federal subsidies will continue at some level, it is clear that the states and local governments across the country will need to prepare integrated responses to this impending crisis.

The Commission finds that Massachusetts, like other states, faces a substantial Gap between current revenue levels and that needed over the next 20 years. This Gap is not a static number—its size will depend on our actions and many other variables. The Commission recommends that the Commonwealth should continue to gather information about the size of that Gap and the challenges facing each municipal, district, or authority in the Commonwealth. However, we can't afford to wait for more precise information to act.

The Commonwealth needs to catch up with the rehabilitation of aging infrastructure, meet the challenges of environmental regulation, invest in a sustained asset management program, and integrate our infrastructure to be more energy efficient and more environmentally sustainable.

The challenge is to find a sustainable way of accomplishing these goals now and in the future. Today's financial backdrop is grim, but this challenge is too important to postpone for better times.

The Commission proposes that the Commonwealth undertake a variety of approaches to move our water-related utilities to a more sustainable future.

Establish a new Trust Fund, to be funded annually at $200 million and used for a mixed program of direct payments to cities and towns, low interest loans, and grants

Recommendations of the Commission

The Commission believes that the Commonwealth has an obligation and an opportunity to reduce the likelihood of inconvenient or catastrophic water system failures that threaten public health and safety and our economic well-being.

We also can embrace tremendous opportunities for innovation that can stimulate research and development, provide good jobs, and lay the groundwork for a twenty-first century water infrastructure network that addresses structural deficiencies, is sustainable, cost-efficient and protective of our environment and future generations.

Protect water sources through watershed protection programs

To do this will require a significant increase in spending above current levels.

As a Commonwealth, we can and must take strategic steps to reduce the size of the predicted Gap:

1. Increase and wisely use available funds for critical investment
2. Embrace new ways of managing our infrastructure to find efficiencies and cost savings
3. Manage our water resources in more environmentally sound and sustainable ways

As we do this, the Commonwealth has an opportunity to continue to bring the most modern, science-based understanding of water resources to future decisions and investments.

Specifically, the Commission recommends:

1. **Increasing funds available for water-related infrastructure at all levels**
   - Sustain current programs and investments at the state and federal level, including in particular state and federal contributions to the Water and Sewer State Revolving Funds
   - Establish a new Trust Fund, to be funded annually at $200 million and used for a mixed program of direct payments to cities and towns, low interest loans, and grants
   - Incent all communities, authorities and districts to utilize rate structures that reflect the full cost of water supply and wastewater treatment.
2. **Reducing costs and find efficiencies**
   - Provide strong incentives for municipalities, districts, and authorities to use best management practices
   - Encourage enterprise funds for stormwater mitigation
   - Encourage appropriate regional solutions starting with management and technical assistance and followed where appropriate with system integration
   - Encourage sustainable infrastructure

- Use a watershed approach when making funding decisions
- Encourage efficient water and energy use
- Encourage strategic public-private partnerships
- Require adoption of best management practices in applications for state revolving funds and other state grant loans
- Assist towns in the adoption of best management practices through changes in law, technical assistance and other incentives

3. Assisting municipalities, districts, and authorities in retiring their existing debt

- Commit to newly structured debt assistance program funded at $50 – $60 million annually through the General Fund. While the Commission strongly recommends that communities approach future debt by using full-cost pricing, it recognizes that some communities will continue to need assistance in retiring their debt.

4. Addressing the issue of affordability

- Identify creative ways to address affordability for municipalities and individual ratepayers. Measure their local contribution and commitment using a ratio of average household annual utility cost to the community's Median Household Income (MHI ratio).
- Consider making SRF loan decisions more need-based by considering the MHI ratio in the selection criteria for loans, grants, interest rates and principal forgiveness
- Seek new federal and state support to address affordability concerns

5. Promoting environmental sustainability

- Encourage investments and regulations that are aligned with environmentally sustainable principles:
  1. Prioritize solutions that use technologies that are environmentally and financially sustainable over the lifetime of the assets
  2. Promote water conservation and water reuse

Reduce the release of nutrients in watersheds

3. Reduce the release of nutrients in watersheds
4. Encourage energy efficiency
5. Prioritize solutions that keep water within its basin while protecting water quality
6. Protect water sources through watershed protection programs
7. Encourage more effective management of water resources through long-term planning, optimization of resources, and management efficiencies
8. Encourage integrated resource management, where "wastes" are viewed as resources from which revenues can be generated

– Increase regulatory flexibility to better direct funding to projects that deliver the highest public benefit

6. Promote innovation

– Allocate resources for programs that mitigate the inherent risks in innovation by supporting pilot projects, proof of concept projects and new technology

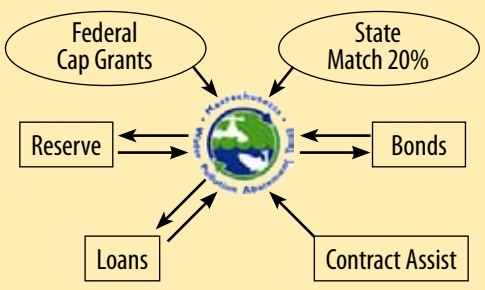
– Provide technical assistance to communities interested in innovative approaches

– Reduce regulatory barriers to innovation

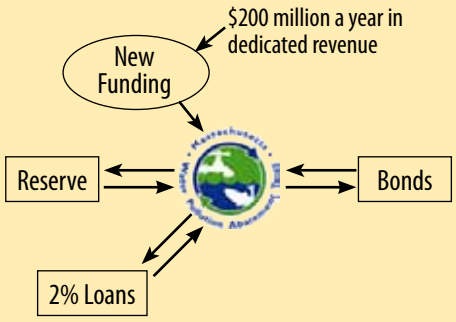
– Implement alternative analyses that put innovative solutions on an equal footing with traditional approaches

2% LEVERAGED LOAN MODEL

Existing MWPAT structure



New sustainable revenue stream



- Consider ways to facilitate regulatory compliance and reduce third-party litigation to address the economic risk of pilot innovative projects
- Invest in Massachusetts as a hub of innovation in the field of water, wastewater, and stormwater management and technology
- Harness the state's educational strengths to train engineers, scientists, researchers, and workers to be at the forefront of innovative water management

7. Continue the work of the Commission

- Fund an asset-based analysis of the Gap between projected needs and revenues. This study will provide a baseline of information on costs and investments in Massachusetts.
- Invest in consumer education about the true costs and value of our water infrastructure

These strategies will help us close the Gap

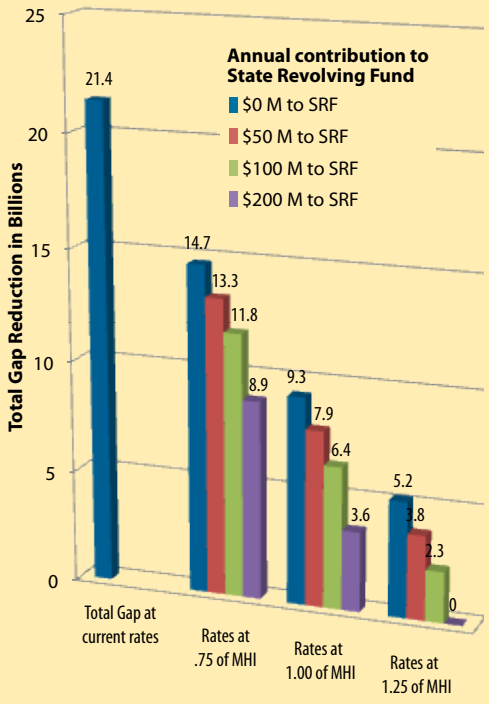
It is difficult to estimate precisely the size of the reduction of the Gap if these strategies are implemented. Many factors, including the levels of federal aid, economic conditions, bond market practices and more will influence the size of the Gap.

However, the Commission's analysis suggests that:

1. If municipalities, districts and authorities adopt full-cost pricing combined with moderate, predictable rate increases and increase their water and sewer rates to 1.25 percent of their Median Household Income, and
2. If the state creates and consistently funds a new Trust Fund with $200 million to provide a mix of direct assistance, low interest loans and grants to assist towns with their water infrastructure needs, then

the state will be able to eliminate the Gap entirely over the next 20 years. Adopting efficiency and best management practice measures, as recommended above, will help individual communities further reduce their own water infrastructure Gaps.

Gap reduction possible using rates increases and new revenues



Increases in rates to 1.25% of MHI with a $200 million annual appropriation from the state eliminates the Gap entirely

[3] For an in-depth explanation of full-cost pricing, please see pare 59.