

# Investing in the Future: Upgrading Canada's Wastewater Infrastructure

By exploring and adapting international funding models, Canada can unlock the potential for efficient, sustainable, and resilient water management. BY JON GRANT

**I** WON'T BE THE FIRST to advocate for this and hopefully I'll be close to the last. When I started in the water sector, I took two lessons to heart from a mentor and later boss at a water technology company.

One, capital expenses to expand or upgrade is an easy thing for governments to fund because you can see the new plant. They don't fund assessments or optimization through opex well.

Two, if there was solid investment in inspecting a system first, you could optimize capital dollars to stretch further.

The need for reliable wastewater management systems can be seen not only in climate change and energy use, but in society's rapid industrialization to meet the needs of our economy and population. There are examples of countries who are getting infrastructure investment right and it all depends on the issues facing that region. Spain invested in its wastewater infrastructure, among other options like desalination, amidst drought conditions to ensure that they have reliable sources of water for the future. Canada faces unique challenges in managing wastewater efficiently and sustainably despite having a seemingly endless supply of freshwater. If we act now, we can learn from others and ensure that we have the right infrastructure to manage our growing population, increasing variability from industrial dischargers, energy efficient treatment, and ensure an increase in renewable energy.



## The Canadian challenge

Canada's wastewater systems are grappling with aging infrastructure and workforce exacerbated by high variability in influent due to increased loads on plants, growing population, and competing with other industries for talent. The environmental, health, and economic costs of inaction are too high not to act now. In Canada, we still discharge raw sewage discharge into natural water bodies. We can all do better.

## Global insights: Funding models and strategies

What can we learn from the rest of the world? The first thing we can learn is the age-old lesson: where there are issues that are clear and immediate people will work to solve them. A lot of countries have issues that bear relevance to Canada and the solutions could be used as well.

Spain offered billions of dollars in funding to support drought relief efforts, the latest coming in the form of \$13 billion in December 2023. Germany combines federal funding, state contributions, and environmental charges, ensuring steady investment into wastewater management where they have declared "All members of the general public must be able to rely on safe, affordable, and efficient water supply and wastewater disposal systems now and in the future." Japan's public-private partnerships (P3s) leverage private sector innovation while ensuring public oversight. Australia's National Urban Water and Desalination Plan demonstrates the value of targeted federal funding in driving large-scale projects. The United States employs State Revolving Funds (SRFs), providing low-interest loans for water quality projects through a sustainable funding mechanism.

All of this to say, we do have some great programs in Canada in general but not water specific. I would say that funding programs in Canada are challenging for



wastewater deployments that save energy in certain provinces. Many of the funding mechanisms are tied to Greenhouse Gas (GHG) emission reductions, which poses a problem. For instance, in Ontario the energy supply is very low on carbon emissions so a 20 percent energy savings at a wastewater plant doesn't save as much in GHG reduction as in other places. That makes it difficult to win at home early.

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#### **A Canadian model for the future**

We pride ourselves in Canada for strength in our human diversity. The diversity of Canadian water problems presents an interesting set of challenges. There isn't a one-size-fits-all option, but an approach that picks from the best could be amazing. I'd almost liken my personal ideal scenario to CanExport's programs that fit a variety of needs and scenarios.

Canada can draw from these international examples to address its funding gap. Implementing P3s as in Japan, or employing a blend of funding sources like Germany, could provide innovative solutions. Alternatively, initiating targeted investment programs similar to Australia, or considering revolving funds for sustainable financing akin to the United States, would offer diversified approaches to upgrading wastewater infrastructure.

What if we had a program that had different funding streams that focused on bringing the right observers and right groups to the table? Comprehensive funding that is both success-based but flexible for a Canadian context. I would have four funding streams that could be deployed in a number of contexts specifically for implementing water solutions and upgrades:

**1. PILOTING A NEW TECHNOLOGY.** Ensure that there is a host utility that will buy if it the deployment meets certain criteria and that there are three others that agree to do the same. There has to be a clear need for a technology and four utilities with one host site committing to purchase upon success will help win at home for new Canadian technology.

**2. PARTNERING WITH ANOTHER TECHNOLOGY FIRM.** Define a problem that is best solved with two types of technology. I'll use the example of a sensor and an AI or controls company. The combined technologies could support incremental benefits to using one or the other. However, utilities are not willing to pay for this and

companies cannot afford to deploy new solutions for free. Again, ensure that there are four utilities that will pay for this if successful.

#### **3. CONSULTING ENGINEERING FIRMS TO USE NEW TECHNOLOGY AND PUBLISH.**

Engineering firms are the end game for all technology companies. If you can create standard tools for engineers to use, it makes their lives easier and will bring better results to clients. If an engineering firm can use a new tool integrated into a project, they can learn. I would put conditions that this knowledge is shared through abstracts submitted to Canadian or Provincial conferences so that knowledge is disseminated.

**4. UPGRADE ASSESSMENT.** For any monitoring or optimization assessment, many solutions exist to allow us to do more with less. I would have a funding mechanism that provides a higher per cent of funding so more can be saved on the capital side through operational performance improvements.

I keep going back to four utilities because many regulations for technology involve three sites for three years, so this gives any new technology a better chance of broader use if it provides value.

#### **Embracing technologies and better ways to do things**

Investment in wastewater infrastructure is not just about replacing old pipes but about embracing technology and innovation. Advanced treatment technologies, such as membrane bioreactors and smart water systems, can enhance the efficiency and sustainability of wastewater treatment, positioning Canada as a leader in wastewater management.

The lessons from Spain, Germany, Japan, Australia, and the United States provide a roadmap for innovation and investment in Canada's wastewater infrastructure. Unfortunately, we couldn't get into the full details of each, but we can have this conversation as a sector and a country. By exploring and adapting these international funding models, Canada can unlock the potential for efficient, sustainable, and resilient water management. Investing in wastewater infrastructure is investing in the country's environmental sustainability, public health, and economic growth.

The urgency of upgrading Canada's wastewater infrastructure is clear. Drawing inspiration from international examples, Canada has the opportunity to lead by example in sustainable water management. This requires a concerted effort from all levels of government, industry, and the community to prioritize, fund, and implement the necessary upgrades. Let's embrace the opportunity to invest in a sustainable future for Canada's water resources, ensuring clean water for generations to come. <sup>WC</sup>

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## WATER CANADA



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