FINANCIAL SUSTAINABILITY IN ACTION

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Canadian Water Network
Igniting interest.
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Water-energy nexus

ABOUT THE AUTHOR

Nancy Goucher
Manager, Municipal Water Consortium
Canadian Water Network (CWN)

Dana Mears
Project Manager, Urban Water Decarbonization
Canadian Water Network (CWN)

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The challenge: Energy use in water utilities

Water and wastewater utilities are energy-intensive enterprises. They pump, treat, heat, aerate, and move large volumes of water and wastewater every hour of the day. In provinces and territories that depend heavily on fossil-fuel-based electricity or natural gas, the energy in the treatment and conveyance can be a significant contributor to local greenhouse gas (GHG) emissions and utility operating costs. Saskatchewan, for example, generates most of its electricity from fossil fuels. This means electricity-driven water operations carry a larger carbon footprint and cost exposure than in provinces and territories with low carbon grids.[1]

Across Canada, local and provincial governments have an increased focus on energy efficiency and clean power generation to meet federal net zero targets by 2050. Water and wastewater utilities are a material part of this conversation due to the high electricity demand in their pumping and treatment processes. Federal energy sectoral profiles highlight that Canada's grids are less dependent on fossil fuels and moving towards low carbon and renewable alternatives.[1] Provincial and territorial grid intensities remain real challenges for municipal services, as their mitigation efforts are in part dependent on the emission factors of the grid. This underscores the value of energy savings in utility operations.[1]

Improving energy efficiency and increasing low carbon energy generation offer high returns on investment and bolster environmental performance.[2] Like many industries, reducing energy both mitigates emissions and shields utility budgets from price volatility, which in turn supports financial sustainability.

Canadian municipal water utilities are facing rising costs in both their operating and capital efforts. These costs are being driven upwards by a variety of factors, including inflation, supply chain disruptions and shortages in the workforce.[3] Pressures are increasing for utilities to find innovative ways to mitigate rising costs; energy is one potential opportunity.

Overview: How energy savings translate into budget relief

The water–energy nexus presents several practical avenues for utilities to lower costs without compromising service standards. Research on efficiency programs shows that reducing water loss in drinking water systems, optimizing pumping and aeration, and encouraging customer-side efficiency can reduce energy consumption and postpone or avoid investments in expensive new sources and treatment capacity.[4] These avoided capital and operating costs are direct drivers of long-term financial sustainability. The Pacific Institute highlights that investments in utility and customer efficiency are often the cheapest and fastest way to meet water needs, reduce bills, and defer large capital outlays. It recommends strategies that include water loss management, incentives for efficient fixtures and appliances, partnership programs with energy providers, and modernization of codes and standards that reduce system demand over time.[5] Utilities that embed energy management into their asset strategies can capture predictable savings, which strengthens debt service capacity and stabilizes rates.[4,5]

Case study: Saskatoon turns an energy project into a permanent savings program

The population of Saskatoon, Saskatchewan has grown rapidly over the last decade and is projected to continue growing at a similar rate.[8] Saskatoon Water operates Class 4 drinking and wastewater treatment facilities sized to meet significant daily flows. Class 4 is the highest level of operational complexity within provincial classification systems. Recognizing that drinking water and wastewater operations were a substantial share of corporate emissions, Saskatoon Water launched the Energy Management project in 2020 to reduce energy consumption and GHGs while maintaining system reliability.[9] Natural Resources Canada provided a $180,000 grant to help seed the project.10

About the City of Saskatoon

Saskatoon Water provides essential water, wastewater, and stormwater services to a rapidly growing urban population in Saskatoon, Saskatchewan

As a municipal utility, Saskatoon Water operates Class 4 drinking water and wastewater treatment facilities—the highest level of operational complexity under provincial classification systems. These facilities are designed to accommodate significant daily flows, supporting both current and projected population growth.

The City's water system draws from the South Saskatchewan River, its sole drinking water source, supported by intake and treatment infrastructure designed to perform reliably even under low flow conditions. The stormwater system is fully separated and includes more than 100 outfalls that convey urban runoff to the river.[7,8]

Saskatoon's Low Emissions Community Plan[9] explicitly recognizes the role of drinking water and wastewater in the city's GHG inventory and frames actions to reduce energy use in core services as part of both climate responsibility and prudent financial management.

Saskatoon Water hired a dedicated energy manager to make energy performance visible and formed plant-level energy teams that are



responsible for making the facility's energy use more visible internally. It adopted a new energy policy, completed a baseline and benchmark assessment of energy usage, and conducted an energy management system gap analysis to identify organizational improvements. Saskatoon Water also developed long-term energy strategies for the drinking water and wastewater plants and committed to participating in recurring energy studies every two years to feed the budget cycle. Strategies undertaken by Saskatoon Water to cut energy use include efficiency upgrades to equipment and moving to biogas to reduce natural gas use. A communication plan was also created to report on progress through the City of Saskatoon's Service, Savings, and Sustainability report and its Climate Action Plan.

From 2020 to 2023, Saskatoon identified approximately $1.1 million in savings and reduced energy consumption by about 95,000 gigajoules (GJ), which equates to approximately a reduction 5,300 tonnes of carbon dioxide equivalent (CO_2e). To put that into perspective, the emissions reduction is similar to taking about 1,200 cars off the road for a year. These savings enabled improved internal coordination of mitigation efforts, improved energy literacy among staff, and attracted additional external support. In 2023, the City converted the project into a permanent energy management program embedded within Saskatoon Water.

Why it worked

The program had several hallmarks of best practice:

Leadership and accountability: A designated energy manager served as a single point of contact, while cross-functional energy teams met regularly to drive actions at the plants.

Data-driven prioritization: Baselines, benchmarks, and an energy management gap analysis focused attention on high-impact measures and process optimizations with verifiable savings.

Stable funding and program design: Federal support helped launch the work, but the City's decision to institutionalize the program ensured persistence of savings. The plan to conduct energy studies every two years created a pipeline of capital and operational measures aligned with the budget.

Transparent reporting: Regular communication to senior leadership, Council, and the public made the financial case visible, which builds support for reinvestment.

Strategic connections: These actions align with Saskatoon's broader Low Emissions Community Plan and Climate Budget approach, which require departments to identify projects with GHG reductions. Integrating energy management with corporate climate governance helps keep savings visible and durable over time.

Translating energy cuts into financial sustainability

For utility leaders, the path to energy savings and stronger finances follows two reinforcing pathways.

Lower operating costs: Electricity and fuel are recurring costs. Efficiency measures that cut pump energy, optimize aeration, or reduce water loss deliver immediate operating savings that repeat every year, which strengthens debt service capacity and rate stability. Federal energy data underscores the importance of end-use efficiency in flattening operating cost exposure.

Managing energy demand and capacity: Customer-side efficiency and system loss control reduce peak demands and total volumes that drive treatment and distribution capacity.

Deferred or avoided capital: The Pacific Institute illustrates that avoided or deferred capital can be a financial benefit of efficiency and partnership programs that reduce demand on both the water and energy sides of the meter.

Key takeaways

- **Treat energy as a controllable cost.** Recognize that water and wastewater systems are energy-intensive. Reduce electricity and fuel use to lower emissions and operating expenses, which will directly strengthen financial sustainability.
- **Use efficiency as a primary cost-management strategy.** Pursue both utility-side and customer-side efficiency measures to meet water needs more quickly and at lower cost than building new supply, while deferring major capacity expansions.
- **Build an ongoing energy management program, not one-off projects.** Assign a dedicated energy manager, implement an energy management system, and create plant-level teams to ensure savings persist, compound, and become embedded in operations.
- **Finance the energy portfolio with multiple tools.** Combine grants, low-cost loans, and longer-term debt for capital-intensive upgrades. Use on-bill programs and incentives to support customer actions and reinvest verified utility savings into future projects.
- **Align energy work with broader climate goals.** Integrate the energy management program with municipal climate plans and report progress within the financial budgeting process to maintain leadership support and long-term commitment.
- **Demonstrate impact through continuous measurement and reporting.** Use baselining, regular studies, and transparent reporting to show results. Then make the program permanent.

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