FINANCIAL SUSTAINABILITY IN ACTION

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Canadian Water Network
Igniting interest.
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Water metering

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The challenge: The cost of asset management

Municipal water utilities face a significant challenge: they need to accelerate the renewal of existing assets, adapt infrastructure to a changing climate, and implement more stringent health and environmental regulations. Ensuring efficient and fair service delivery and sustainable financing requires revenue that is predictable even when consumption fluctuates with seasons, economic conditions, and growth. Utilities also need a way to encourage conservation and fairness without undermining their ability to fund operations and long-term capital renewal, while upholding affordability for essential household use.[1]

In Canada, municipal water services are funded largely through user fees, meaning direct charges to customers for water and wastewater that may be volumetric or non volumetric.[2] When designed well, user fee structures are widely considered the most practical and flexible tool for long-term service sustainability.[1] They support full cost recovery by covering operations, maintenance, and infrastructure renewal. User fees also contribute an appropriate share of capital costs, provide dependable revenue for asset management, and help utilities meet regulatory and environmental requirements.[3]

The context: Water metering

While user fees are the primary revenue tool that supports full cost recovery, metering ensures charges reflect actual consumption,[3] which supports equity and financial resilience. Volumetric billing aligns revenue with system demands and gives customers actionable visibility into their own use. When rate design is informed by metering data, utilities can balance operational needs, sustain capital renewal, and improve transparency and accountability.[4]

What we mean by "user fees"

In this case study, user fees include both volumetric charges based on metered consumption and non volumetric charges such as fixed fees or property linked surcharges earmarked for water and wastewater services. In jurisdictions with lower rates of metering, non volumetric mechanisms often play a larger role while still functioning as direct charges to service users.[4]

Evidence of demand impacts

Canadian households billed volumetrically use about 65 percent less water than unmetered households with fixed rates. In Québec, municipalities with volumetric fees use 74 percent less water than those with fixed fees.[3]

Metering coverage varies across Canada

As of 2021, an estimated 40 percent of municipal residential customers were metered nationally. Saskatchewan, Alberta, and Manitoba have comparatively higher metering rates at approximately 63 percent, while Ontario follows at 56 percent. Quebec and Newfoundland and Labrador have the lowest penetration, with only 22 percent and 13 percent of customers metered, respectively. These disparities affect cost recovery, equity, and the ability to manage demand, plan capital investments, and communicate clearly about how rates are set.[5]

Without meters, utilities set rates based on broad averages that often fail to reflect actual usage patterns. This can create inequities across customer groups and introduce revenue volatility when consumption changes. Metering improves fairness because customers pay in proportion to what they use. This reduces implicit subsidies from lower-use to higher-use accounts.

Water metering as a core practice for financial sustainability

Water metering is a foundational practice for financially sustainable water services. Metered data provides information on customer consumption, which enables utilities to analyze seasonal demand patterns, unaccounted-for water losses, and long-term usage trends. These insights support rightsized capacity planning, more strategic timing of capital investments, and more responsive and explainable rate setting. Metering also improves transparency, reduces financial risk, and strengthens a utility's ability to make evidence-based decisions.

Advanced Metering Infrastructure (AMI)

Traditional manual meters record consumption mechanically and require staff to visit properties to collect readings, often only a few times per year. In contrast, advanced metering infrastructure (AMI) is a two-way digital system that automatically transmits data between the meter and the utility. AMI enables near real-time monitoring, leak detection, earlier identification of service issues and allows utilities to analyze peak demands on an hourly basis. This reduces water loss, lowers the cost of emergency repairs, and improves customer service by giving both customers and utilities timely information about usage and anomalies.[6]

For utilities managing aging infrastructure, climate-driven variability, or tightening budgets, AMI provides a critical information backbone. By offering more granular and timely data than manual meters, it enhances operational efficiency and supports long-term financial resilience.[6] AMI has also been found to be critical in reducing water interruptions during large construction projects by finding bypasses and in enforcing water restrictions during drought conditions. It also helps significantly minimize staff time.

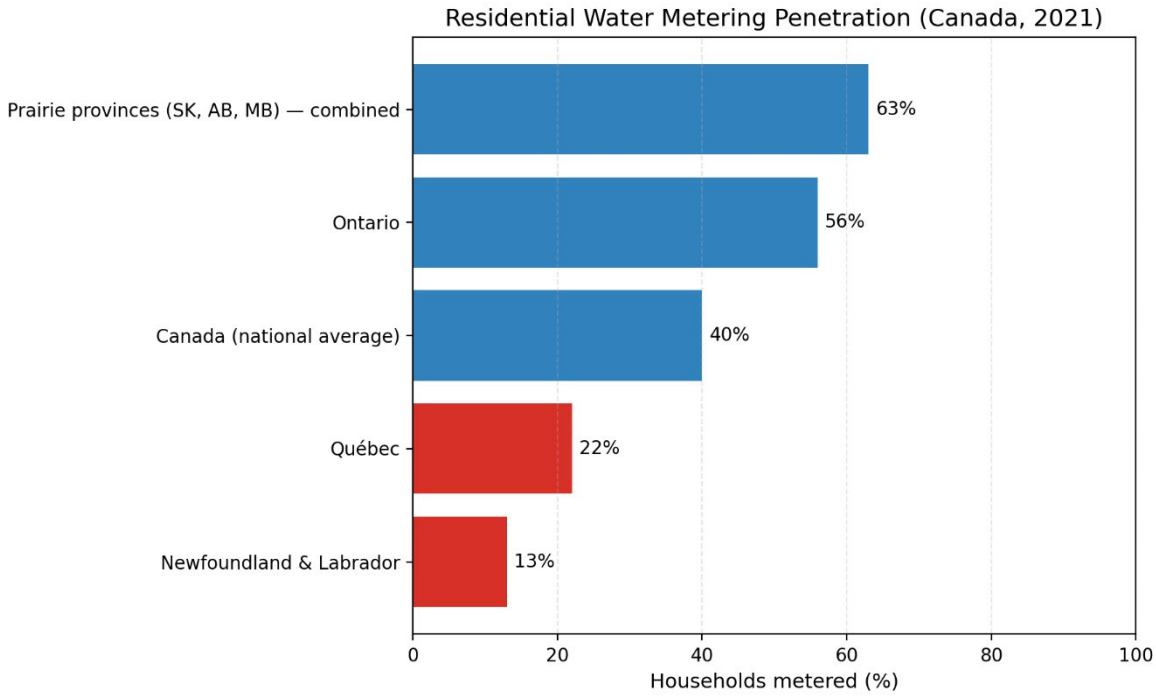

Figure 1: Canadian Infrastructure Council, 2025.

Rate structure matters

A well-designed rate structure typically combines a fixed charge that covers customer and system readiness costs—such as staffing, maintenance, regulatory compliance, and baseline infrastructure—with a volumetric charge that reflects actual use. This pairing stabilizes revenue, aligns payment with demand on the system, and preserves incentives for conservation.[4] Tiered volumetric rates can also help meet utility conservation goals soon and more effectively.

Achieving equity in water service design

Accurate measurement is fundamental to designing appropriate user rates and ensuring pricing equity. Here, equity means allocating costs based on how customers use and benefit from the system; affordability means households pay a manageable share of income for essential water services. Achieving equity assigns costs in proportion to the demands customers place on the system, while reserving targeted assistance or lifeline blocks for basic needs where appropriate.[4]

Horizontal and vertical equity

Horizontal equity requires that similar users be treated similarly. Vertical equity requires that dissimilar users be treated differently based on usage patterns and service characteristics. These principles appear in the American Water Works Association's (AWWA) M1 manual7 and the Bonbright framework,[8] which recommend grouping customers into classes that reflect similar consumption profiles or service needs. Although Canadian utilities often use fewer classes, equitable design can still be achieved through cost causation analysis and volumetric structures where tiers target distinct usage levels. Metering supports both forms of equity by generating accurate data, ensuring like customers pay similar amounts, and assigning proportionally higher costs to heavier users.[4]

Intergenerational equity

Equity also spans time. Full cost recovery includes lifecycle renewal, upgrades for growth, and environmental protection, all of which occur over multiple decades. Building reserves and employing prudent debt aligns the costs of multigenerational assets with the users who benefit from them. At the same time, utilities should avoid shifting burdens forward by deferring maintenance or degrading water sources. Metering and volumetric pricing improve demand forecasting, loss management, and long-term cost visibility, helping align today's payments with total lifecycle costs.[4]

Case Study: Regional District of North Okanagan, British Columbia

About the Regional District of North Okanagan (RDNO)

The Regional District of North Okanagan (RDNO) in British Columbia supplies, treats, and distributes drinking water to approximately 54,000 residents and 2,833 hectares of agricultural land in Greater Vernon. It also manages one small wastewater service in Mabel Lake and operates the smaller utilities in Silver Star, Mabel Lake, Grindrod, and Whitevale.[12]

Greater Vernon Water (GVW) is the largest of RDNO's water utilities. Under this model, RDNO owns and manages the water utility, directly operates the water supply infrastructure, and completes all capital works. The City of Vernon and the District of Coldstream are contracted to operate and maintain the distribution system.

GVW oversees a substantial infrastructure network, including 670 kilometres of water mains, 22,000 water connections, two treatment plants, 39 pumping stations, 22 enclosed storage facilities and six open supply reservoirs.

Serving both urban centres and rural communities, the RDNO system supports a significant agricultural sector with high seasonal demand. These characteristics contribute to notable operational complexity. Summer water use can reach 220 megalitres per day—compared with roughly 35 megalitres per day in winter—which creates substantial pressure on operations, infrastructure capacity, and financial planning.[12,13]

The Regional District of North Okanagan (RDNO) demonstrates how an integrated approach to meter renewal, pricing reform, and transparency supports long-term financial sustainability in a regional system facing growth pressures, aging infrastructure, and variable water demand with vastly different customer classes.

The shift toward metering and financial sustainability was fueled by a 2010 contamination event that led to criminal charges under the Drinking Water Protection Act.[10] The incident exposed system vulnerabilities and the risks of deferred investment. The event led leaders to prioritize water safety over short-term affordability. This mindset shift opened the door to financial reforms.

Pricing reform and predictability

One of the first steps was a major rate increase to address infrastructure deficits after more than a decade of limited adjustments. Following a new master water plan, RDNO implemented a rate increase of 15 percent in 2013 and 17 percent in 2015. Since 2017, annual



increases have followed a formula of CPI + 1.5 percent, which created predictable revenue and rebuilt reserves. Rates were set to obtain half the annual budget requirements from flat fees for revenue stability, with half generated from volumetric rates to encourage water conservation. A rate stabilization reserve was developed to support years where revenue did not meet budget to avoid moving the formula off course. Tiered rates were implemented to support normal indoor water use, and higher rates were set to send a price signal for high water users and outdoor water use.

Treat metering as core infrastructure

Metering played a pivotal role. RDNO embedded meter replacement and upgrades to an AMI system in its asset management program.11 Beginning in 2017, it implemented a meter replacement fee that was set aside to ensure available funds for meter renewal. When the time came to replace 4,000 aging meters, funds were already available. Treating metering as routine infrastructure avoided special approvals and political delays, which stabilized program delivery and costs.

Cost allocation and conservation.

Metering also improved cost allocation. Agricultural demand is extremely high in summer and can exceed the capacity of some assets. Historically, agricultural customers are charged a flat fee for a set volume based on land area with a high overconsumption fee. Metering provides tools for customers to manage their water and stay within their allocation, with heavy users paying substantially more. This reduces unintended cross-subsidies and improves fairness. In 2027, the utility is implementing volumetric billing for agriculture customers. This will provide financial incentives for further water conservation, including fixing leaks and upgrading irrigation systems for more efficient watering.

Data-driven planning

Accurate metering data enhanced planning in RDNO. The utility uses consumption information to model risk, assess vulnerabilities, and guide capital decisions. Risk-based tools help staff prioritize renewal by comparing break frequency, asset condition, and service criticality.[12] Metering contributes flow and performance data that sharpens targeting and sequencing of investments.

Public trust and transparency

Metering also strengthened public trust. Utility leaders meet regularly with elected officials to explain risk profiles, performance metrics, and budget needs. Since metering links consumption and cost, rate rationales are clearer. Customers can see the connection between their use, infrastructure condition, and the investments required to maintain service levels. Over time, the community shifted from resisting increases to recognizing the benefits of sustained investment.

Proactive renewal culture

Finally, metering in RDNO supports a proactive renewal culture. The utility maintains a decommissioning budget and removes outdated or risky infrastructure in stages. Meter upgrades are delivered alongside other renewal work. This avoids sharp spending spikes and supports a stable financial outlook.

Bottom line

RDNO's experience shows how metering becomes a strategic asset when embedded in a broader financial plan. Metering improves fairness, strengthens resilience, and supports long-term cost recovery. It allows utilities to manage seasonal pressures, allocate costs appropriately, and sustain investment in critical infrastructure.

Benefits of effective rate setting supported by metering

A thoughtfully designed rate system supported by metering delivers value across financial, environmental, and social dimensions.

- **Financial stability.** Metering supports accurate volumetric billing, stabilizes revenue, and improves long-term planning.
- **Conservation and environmental protection.** Customers who understand their consumption and have a price signal are more likely to conserve. Lower consumption reduces strain on resources and infrastructure and defers, often indefinitely, very expensive infrastructure upgrades.
- **Equity and fairness.** Metering ensures that customers pay in proportion to what they use. This reduces cross-subsidies and promotes equitable cost distribution.
- **Public trust and accountability.** Transparent rate setting, informed by metering data, helps customers understand where their money goes and why investment is necessary.

Key takeaways

- **Rely on user fees as the core funding source.** Structure water service financing around user fees, which provide a stable and predictable foundation for long-term system sustainability.
- **Use metering to enable fair, sustainable rate systems.** Tie charges to actual consumption to promote conservation, strengthen financial sustainability, and ensure customers pay for what they use.
- **Adopt multi-part rate structures for balance and fairness.** Combine fixed and volumetric charges to ensure revenue stability while allocating costs equitably across different types of users.
- **Leverage metering data to improve planning and investments.** Use consumption data to strengthen financial forecasts, support right-sizing of capital projects, and reduce revenue volatility.
- **Employ AMI metering to reduce leaks and water losses.** Use advanced metering infrastructure to detect customer leaks, identify system losses, and reduce non-revenue water.
- **Tailor rates to local conditions and adjust them transparently.** Design rate structures that reflect community needs and update them predictably and openly to build and maintain public trust.



- **Use tiered rates to support conservation and equity goals.** Set lower rates for essential indoor use and apply higher rates for discretionary or outdoor consumption to send clear price signals.
- **Embed metering as a core governance tool.** Use metering to support long-term system reliability, environmental stewardship, and strong public confidence in utility management.

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