



# TROIS-RIVIÈRES

Governing with future risks in mind:  
ensuring the long-term supply of  
drinking water

*By Sophie Guilbault*

*Source: City of Trois-Rivières*

## THE SCIENCE

While many public infrastructure operate independently, several are part of a broader system that needs to be considered as a whole to further understand future risks and vulnerabilities faced by a specific asset. When looking at critical infrastructure such as municipal drinking water infrastructure system, proper operation and long-term planning of the assets is key to avoid future severe disruptions. The framework presented in the PIEVC protocol is one of the methodologies that can be used by municipalities when looking at both independent infrastructure and systems composed of various assets. A deeper understanding of best practices to rehabilitate, maintain and invest in infrastructure also allows communities to integrate specific interventions within their long-term climate adaptation plans and policies.

## THE TRIGGER

As the City of Trois-Rivières was planning the rehabilitation of its drinking water treatment plant to increase its capacity, the municipality started questioning whether or not it should maintain all of its drinking water supply sources. To answer that question, a deeper analysis of the drinking water supply and distribution system was instrumental to further understand the vulnerability to climate change faced by various components of the system such as treatment plants, aqueduct network, wells and water intake. Trois-Rivières decided to rely on the PIEVC protocol to better understand risks and vulnerabilities faced by the drinking water system and improve design and operation in the management of sudden and prolonged climatic events in the future.

The study conducted with the PIEVC protocol aligned with the sustainable development policies adopted by the municipality in March 2009, which has set the objectives to adapt to climate change and ensure the supply of quality drinking water for the current and future population as priorities.

## THE APPROACH

The City of Trois-Rivières undertook the PIEVC assessment with the support of Ouranos and consulting firm WSP (known then as Genivar). At the time of the study, the City of Trois-Rivières was getting its raw drinking water from surface reservoirs as well as 57 groundwater wells. The water treatment plant that was collecting water from the Saint-Maurice river was about to be rehabilitated to increase its capacity to better serve the City and neighboring communities, with plans to have sufficient capacity to support 175,000 people (the area served by the reservoir currently counts 140,000 people).

In an effort to better understand how changing climate conditions would affect the drinking water system in Trois-Rivières and consequently, how the network should be approached and maintained in years to come, the project team identified a list of climate variables and infrastructure assets to be considered in the analysis. They worked alongside several municipal departments including water, engineering, environment, and land use planning in addition to technical staff that operating the



**Figure 13:** Residents of Trois-Rivières were invited to visit the new water treatment plant after its rehabilitation. (Source: City of Trois-Rivières)

various infrastructure assets. Climate variables included variations in temperature, freeze/thaw cycles, ice storms, snow accumulations, severe winds, droughts and many others. The projected climate conditions prepared by Ouranos were then considered for each infrastructure asset involved in the analysis to understand what were the various vulnerabilities and risks on both individual assets and the system as a whole. The analysis was centered around the water demand and its evolution in usage over time, the quantity of water available at various sources, the quality of the water collected and methods to be used for water treatment.

One of the key findings of the PIEVC analysis was that several hydraulic infrastructure elements such as wells, reservoirs, water treatment systems and water intake were more sensitive to climate change, particularly under conditions such as high temperatures, periods of drought and heavy rains. With projected increase in extremely hot days, the rehabilitation of underground reservoirs was identified as a one of the key priorities for the City of Trois-Rivières.

## THE OUTCOME

The recommendations coming out of the PIEVC analysis were able to guide the political decision-making process and the City decided to maintain underground water supply and rehabilitate its underground reservoirs. The analysis demonstrated

that maintaining higher flexibility in water supply sources would be a great way to plan for future climate conditions and ensure access to drinking water if the St-Maurice River was not able to provide enough in the future. Since the publication of the PIEVC report, all reservoirs have been upgraded and the water treatment plant has been fully rehabilitated.

Rehabilitating water supply and treatment infrastructure is often very costly for municipalities. In Trois-Rivières, these investments were easier to justify given the pre-established plans that identified the preservation of drinking water supply and adaptation to current and future climate risks as priorities. The PIEVC protocol allowed the community to prioritize interventions to achieve the most impactful outcomes. In addition to the strong governance in place, municipal staff led several information campaigns, which included television and radio commercials as well as adds shared in various other media to ensure that residents were aware of the reasons behind the work that was taking place. This was particularly helpful during the rehabilitation of the water treatment plant when residents were asked to reduce their water usage at specific times.

## A WORD FROM TROIS-RIVIÈRES

When asked what he would recommend to other municipalities looking at implementing a similar initiative in their communities, Julien St-Laurent, Head of the Environmental Department with the City of Trois-Rivières, highlighted the importance of strong multi-disciplinary collaboration within municipal departments as well as strong outreach and engagement strategies with the population. “In Trois-Rivières, we have ensured complete transparency with the population through the rehabilitation process to appease residents. This was instrumental in getting buy in from the community and get residents' collaboration when reaching important milestones of the project”, said Mr. St-Laurent. Having a clear strategy in place and support from Council to invest in the drinking water system over an 8-year period was also key in ensuring the sustainable future of water supply in the City and its neighbouring communities.