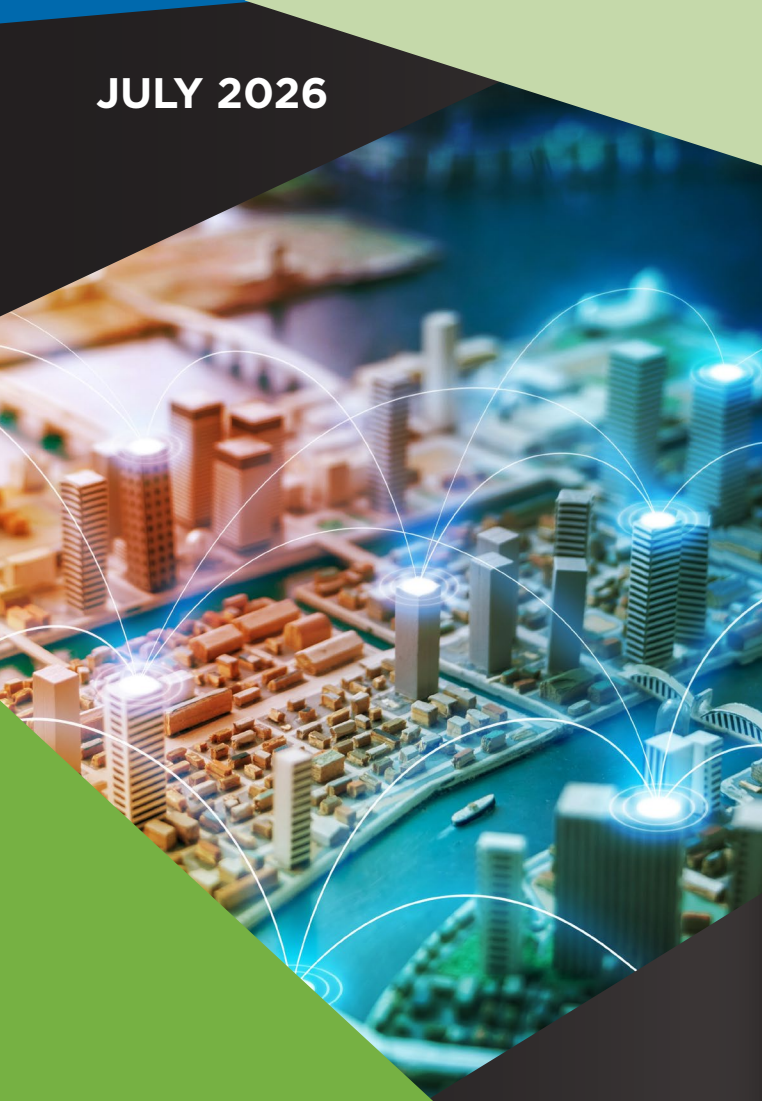


CASE STUDY

Markham District Energy Wastewater Energy Transfer

JULY 2026



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Key takeaways

- Constraints can become long-term assets when utilities reconsider existing conditions through innovation and evolving priorities.
- Aligning political and organizational values is critical to moving projects from idea to implementation.
- A shared understanding of risk, built through ongoing communication, enables strong and functional partnerships.
- Fair and well-designed energy transfer fees are essential to capturing value while remaining equitable for customers.

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Background

Canadian municipalities and utilities are reimagining local energy to deliver climate action without sacrificing reliability. Markham District Energy Inc. (MDE), a publicly owned thermal energy utility, demonstrates leadership in this transition through the development of a Wastewater Energy Transfer (WET) system in partnership with the Regional Municipality of York (York Region).

This case study examines the enablers, barriers, impacts, and lessons learned from developing the project. WET systems provide a stable, renewable energy source that strengthens district energy resilience while supporting community climate goals.

The MDE WET system at the Warden Energy Centre adds 18.75 MW of thermal energy and 3,600 tonnes of cooling capacity into the facility's District Energy System (DES), making it the largest WET system in North America.

The system uses the HUBER ThermWin system, composed of five HUBER ROTAMAT® RoK4 700XL screening units and 16 HUBER RoWin Heat Exchangers. The HUBER Heat Exchangers are a shell-and-tube system, which flows untreated and unfiltered wastewater around a series of tubes to extract thermal energy. After the wastewater has passed through the heat exchanger, it is returned to the sewer in the same condition as when it entered the energy center. This results in no impact on the functionality and operation of the existing wastewater infrastructure. The German-made system has low maintenance requirements, with mechanical scrapers travelling the tubes to ensure efficient thermal energy transfer. There are also documented stories of the systems requiring minimal maintenance despite years of operation.

Markham District Energy Warden Energy Centre

City: Markham, Region of York

Commissioning year: 2026

Service area: 140,000m²

Technology: HUBER ThermWin

Production capacity: 18.75 MWt

Estimated GHG reduction: up to 30,000 tonnes/year

Project funding

The MDE Warden Energy Centre WET project was funded by MDE with financial support from the federal government and private institutions. This ensured no development costs were passed on to York Region taxpayers. A comparable facility using conventional methods would cost approximately \$30 million.

The project received a \$16.7 million from the Government of Canada's Low Carbon Economy Fund, and an additional \$500,000 from Enbridge. These contributions helped de-risk the adoption of the wastewater heat recovery system.

MDE also secured a preferential loan facility from the Canada Infrastructure Bank, matched by CIBC. This accelerated the expansion of MDE's thermal network, including the WET project, and supported the connection of more buildings to the system.

Opportunity

For over 25 years, MDE has been providing district energy heating and cooling to the Markham area. Since developing the Warden Energy Center, MDE has developed two additional facilities. It now provides heating and cooling for over 140,000 m² of housing and commercial needs in Markham Centre. In addition, in 2012, MDE constructed a second district energy system in the Cornell Centre that supports the Markham Stouville Hospital and surrounding buildings.

Historically, MDE's energy facilities have used technologies that rely on natural gas for heating and electricity for cooling. In addition to natural gas boilers, MDE has cogeneration to efficiently produce heating and cooling simultaneously.

By the late 2010s, rapid population and development growth had significantly increased energy demand in Markham. This made it necessary to expand the existing district energy system to maintain service reliability. MDE was presented with an important decision: continue relying on conventional energy technologies or innovate

by adopting low carbon solutions that would reduce its environmental footprint and support the city's climate goals.

Interestingly, the opportunity itself had been identified years earlier. In the early 2000s, MDE identified that a major sewer trunk line easement ran adjacent to the Warden Energy Centre property. At the time, this was considered more of a barrier than a benefit, an inconvenient constraint that complicated the routing of thermal energy piping. However, as the need to expand the energy centre grew, MDE revisited this overlooked asset. A feasibility study was conducted to assess whether thermal energy from the sewer system could be captured and used for district heating applications.


Simultaneously, York Region was actively seeking ways to strengthen its leadership in climate action. This alignment of regional climate priorities with MDE's operational needs created a natural partnership, setting the stage for a collaborative move toward innovative, low carbon district energy solutions.

Strategy

Conversations between MDE and York Region revealed several key enabling conditions that helped shape the development of the WET system.

Strong political and organizational alignment

York Region and MDE shared a commitment to collaboration. For York Region, the project presented an opportunity to demonstrate innovation and practical progress towards local decarbonization goals. Having an advanced, modern energy facility operating within the region would also help economic investment and development goals. Along with the political will for the project's success, the organizational alignment between MDE and York Region further strengthened the partnership. As a publicly owned entity, MDE's mandate is closely aligned with York Region's public service objectives.



**MARKHAM DISTRICT
ENERGY INC.**

Existing infrastructure and capacity

Existing thermal energy infrastructure owned and operated by MDE helped ensure the project's viability. MDE's operational experience also contributed to the project's success. Since it had operated as a district energy provider for many years prior to the development of the WET system in Markham, it had already developed the staffing and technical capacity needed to integrate WET systems into existing operations. This has meant that despite adding a new technology and energy source, the integrability of the WET technology with legacy infrastructure has not required MDE to hire specialists to work with the new system.

Purposeful communication and relationship management

Open communication between both project partners has proved essential from the outset of the project. As the project moves into the operation stage, MDE and York Region maintain monthly meetings to ensure all parties are informed of planned activities. This ensures that any potential disruptions to the sewer operation are highlighted ahead of time so that proper mitigation efforts can be taken.

A learning tour to Germany with staff from both MDE and York Region further strengthened trust. By seeing the technology in operation, staff from both organizations were able to better understand the technology, how to address odour concerns, maintenance requirements, and the overall impact on the surrounding community.

To streamline communication during the project's development and construction phases, York Region created a central point of contact. This role helped direct questions to the most appropriate working groups and ensured a consistent narrative when handling external communication. The contact also ensured effective communication between all relevant departments, which helped maintain the project's momentum.

The project partners also formalized responsibilities through a working agreement. The agreement outlines the point at which MDE becomes liable for the sewer line and the civil infrastructure related to the project, who has control over which gates, and how each party works together. Importantly, the agreement helps ensure that any liability associated with installing a WET system is not passed onto the taxpayer. Allowing York Region to help select the engineering consultants and civil contractors further increased transparency and trust.

Energy transfer fees in WET systems

Given that WET systems require tapping into public sewer infrastructure, negotiating the financial relationship between district energy utilities and municipal sewer authorities becomes a critical early step. Both York Region and MDE highlighted that the absence of established precedents due to a lack of comparable projects in North America as a major challenge in determining pricing for thermal energy. This lack of benchmarks

created uncertainty and financial risk when determining what constituted a fair or defensible fee structure. In looking for examples, York Region studied external examples from areas like Toronto, King County, and Metro Vancouver area to understand how other jurisdictions structured commercial agreements and thermal access pricing.

MDE ultimately adopted a royalty-based fee model, covering upfront municipal engineering review costs and committing to a long-term royalty tied generally to project profitability. This structure served as a compromise intended to offset municipal monitoring and risk while maintaining project feasibility. In setting the royalty rate, there was a risk of overpricing, which would jeopardize the project's financial viability.

Carbon tax signals

During the project's development and planning phases, Canada's Federal Carbon Tax played an important role in creating the business case for selecting WET systems over conventional heating approaches. As WET systems are inherently more capital intensive than natural gas boilers, the incremental cost difference was expected to be offset through the carbon tax framework. At the time, there were strong indications that Canada's carbon pricing system would remain in place and that future taxes on natural gas would continue to rise.

The WET system also grants MDE flexibility to provide low-cost energy for the DES. When natural gas prices are high due to either market conditions or higher carbon taxes, MDE can allocate a greater percentage of the heating to the WET system. Conversely, the natural gas infrastructure can be used more extensively when gas prices are low.

Impact

Construction is expected to be completed in mid 2026. Although the project has not yet been commissioned, there are initial impacts to consider in terms of risk management and permeance of policy.

Hesitancy from sewer management teams

For communities pursuing WET projects through partnerships, establishing a shared language and mutual understanding of risk tolerance is essential. As with many utilities, York Region's sewer operators' primary responsibility is the safe, uninterrupted operation of critical wastewater infrastructure. This responsibility initially translated into a limited tolerance for perceived risk related to third party access to trunk sewer systems.

As collaboration deepened, it became clear that York Region's reservations were not driven by opposition to decarbonization or innovation. Rather, they were driven by limited familiarity with how such projects, and their associated risks, can be structured to safeguard essential public services and protect critical infrastructure. Through open dialogue, York Region and MDE developed a shared understanding of potential operational and maintenance impacts on the sewer system. This collaborative approach enabled York Region to uphold its core mandate while creating the conditions necessary to advance the project.

Through MDE assuming responsibility for any incremental operational or maintenance impacts on the sewer system, York Region was able to protect its core mandate while enabling project advancement. These experiences have helped build internal capacity and reinforce the value of early engagement to ensure early buy-in and reduce friction for similar projects in the future.

Impacts of carbon tax removal on project viability

The removal of the federal carbon tax in 2025 had a significant impact on the project's financial viability and future replicability, as well as on other WET projects more broadly. Carbon pricing was a foundational assumption of the original business case and was expected to provide long term revenue support. While both organizations continue to emphasize that decarbonization remains a strategic priority, they noted that this project would not have received initial approval in the absence of the carbon tax.



Looking ahead, emerging opportunities may help partially offset the loss of carbon pricing support for future projects. These include accessing alternative funding programs, exploring eligibility for clean energy tax credits, and considering mechanisms such as green heat premiums. Together, these tools may help restore financial feasibility and support the continued deployment of WET projects despite a changing policy environment.

- **Equitable value capture:** Establishing energy transfer fees is an important part of developing WET systems. Doing so in a way that captures the value for the proponent and is equitable to the customer requires thoughtful consideration and evaluation.

Lessons learned

- **Reimagining constraints:** Constraints initially seen as barriers can become valuable assets when revisited through a long term, innovative lens. Re-examining existing infrastructure can unlock new opportunities as needs and priorities evolve.
- **Value convergence:** Political and organizational value alignment has the potential to propel projects from concept into reality.
- **Trust building:** Sustained communication and a shared understanding of risk tolerance are important for developing partnerships that are both functional and supportive. This is best achieved through timely, ongoing collaboration and meetings.