WR COMMUNITY ENERGY

POWERING THE ENERGY TRANSITION

2024 Progress Report

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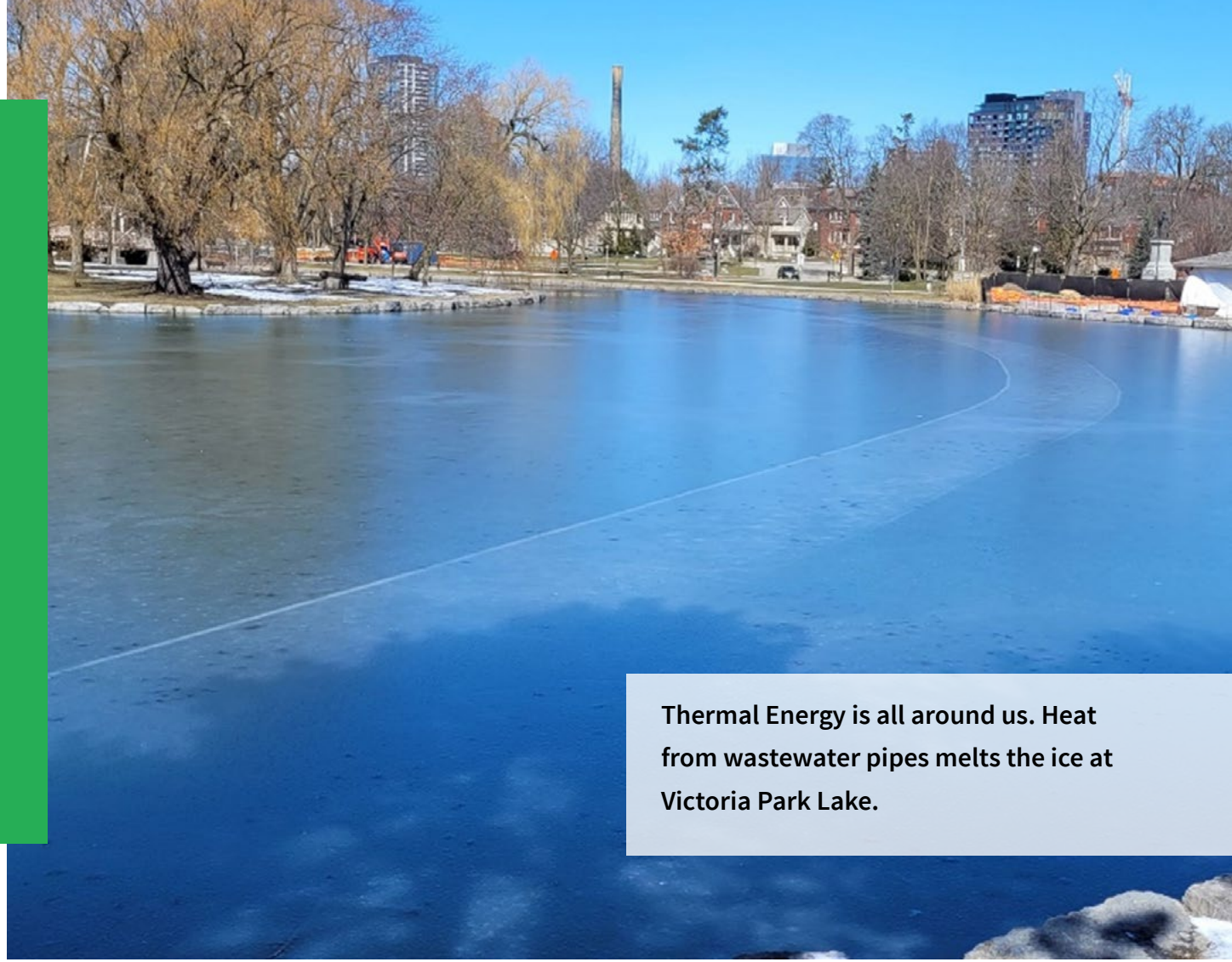


Thermal Energy is all around us. Heat from wastewater pipes melts the ice at Victoria Park Lake.

MESSAGE FROM THE BOARD

Waterloo Region is making progress in the low carbon energy transition!

WR Community Energy (WRCE)'s first term priorities have provided a solid foundation for action during our second term[i]. We continue to support Waterloo region in achieving its goals to reduce emissions and invest in local energy. Our work with municipal partners, local utilities, and businesses is strengthening regional policy, shaping infrastructure decisions, and developing the market for efficiency and renewable energy development.

This report focuses on three things. First, it draws from several years of studies, discussions, and analysis to present a vision of generating half of our distributed energy from local, clean, and equitable sources. Second, it highlights work underway across the community that demonstrates how we're better aligning local energy supply with demand. Third, it highlights the two projects WRCE is working on to advance this work: High-Performance Development Standards (HPDS) and a Low-Carbon Thermal Strategy. By leveraging existing technologies, scaling them across the community, and aligning with economic development trends, this region's collaborative and innovative spirit can make this vision a reality and help our community meet its 2050 climate targets.

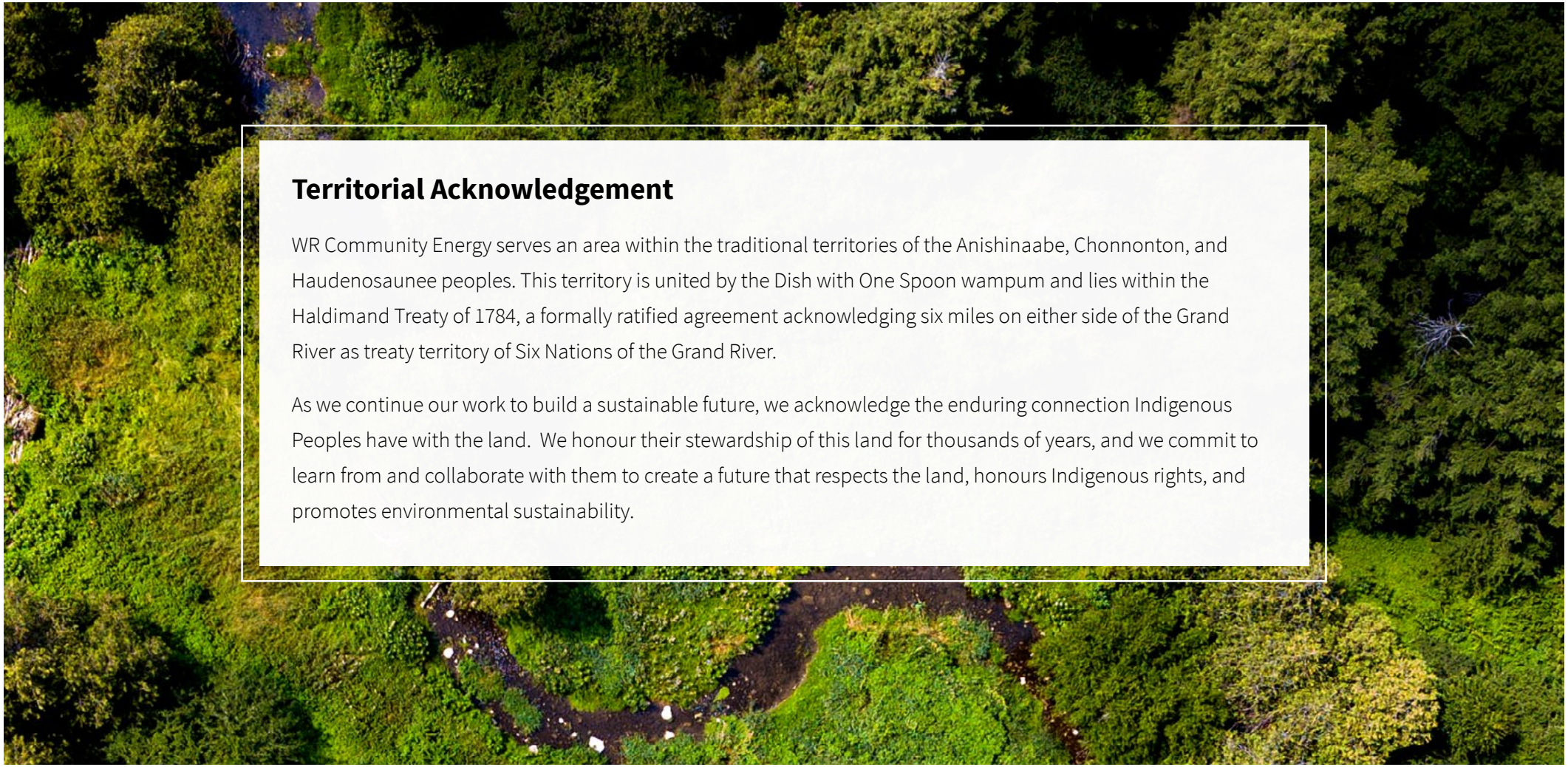
The energy transition is a critical priority for Waterloo Region's future resilience. WRCE is excited to play a role in guiding how our community responds. WRCE is adapting, and in 2024, as its role as an independent voice and energy transition facilitator became clearer, WRCE incorporated as a non-profit. This new structure allows us to focus on deepening partnerships, evaluating systems-wide benefits, and ultimately driving investments.
At our core, we are shaping ourselves to better convene material conversations among policy, infrastructure, and industry leaders. We continue to believe that coordinated actions will deliver long-term benefits for the environment, economy, and local community.

Thank you to everyone who has contributed to WRCE's journey so far. We look forward to continuing this vital work with all of you in the months and years ahead.

Let's keep the dialogue open. An evidence-based, nuanced, and empathetic approach to collaborations will lay the foundation for a healthy and prosperous Waterloo region.

Justin Readman,
City of Kitchener
WR Community Energy Board Chair

[i] See page 6 for more information about energy terms.



Territorial Acknowledgement

WR Community Energy serves an area within the traditional territories of the Anishinaabe, Chonnonton, and Haudenosaunee peoples. This territory is united by the Dish with One Spoon wampum and lies within the Haldimand Treaty of 1784, a formally ratified agreement acknowledging six miles on either side of the Grand River as treaty territory of Six Nations of the Grand River.

As we continue our work to build a sustainable future, we acknowledge the enduring connection Indigenous Peoples have with the land. We honour their stewardship of this land for thousands of years, and we commit to learn from and collaborate with them to create a future that respects the land, honours Indigenous rights, and promotes environmental sustainability.

The Energy Transition

Energy transitions are periods in human history when our energy system undergoes a major change. Waterloo region has experienced several energy transitions over the past 200 years, and each one has transformed our economy and built environment.

Our energy system is changing again. We're returning to cleaner and local energy sources with newer and more efficient technologies. In Waterloo region, our energy transition will be powered by investments in solar, geothermal, and wastewater heat recovery, and district energy.

Aligning the goals of municipalities and utilities presents a unique opportunity to expand local investments in clean energy. The market is ready. Key sectors of our economy, especially education, research and technology, real estate, and healthcare, are eager to develop these affordable sources of clean energy.

These investments will have far reaching community benefits, including meeting our environmental targets, creating a more resilient energy grid, encouraging innovation and green technologies, supporting local utility planning, and keeping energy dollars in our community.

The energy transition is a global shift from fossil fuels to renewable energy sources. By creating a predictable path to a cleaner, smarter, and more sustainable community, Waterloo region is sending the signal we are committed to and ready for investments in a sustainable future.

▷ **From waterwheels to smart cities, energy transitions have enormous impacts on communities.**

About WR Community Energy

WR Community Energy (WRCE) is a 5-year-old collaboration between the Region of Waterloo; the Cities of Cambridge, Kitchener, and Waterloo; Enova Power Corp., GrandBridge Energy, and Kitchener Utilities. We coordinate targeted sustainable energy investments in Waterloo region. We use our annual reports to refine our vision and plan of action. Our focus has evolved towards integrating policy, infrastructure, and market development in preparation for a clean, local, and equitable energy future.

This year, we incorporated as a non-profit organization to better act on this vision. Our new structure allows us to maintain the benefit of senior municipal and utility leadership while leveraging strategic participation and investments from other sectors. This approach is key to navigating the complexities of a successful energy transition and responding to innovation. WRCE is a 25-year project structured across 6 terms of council. Term 2 focuses on thermal energy development.

THE ENERGY TRANSITION ACROSS 6 TERMS OF COUNCIL

Term 1 (2019-2022) Vision Setting	Term 2 (2023-2026) Heating Strategy	Term 3 (2027-2030)	Term 4 (2031-2034)	Term 5 (2035-2038)	Term 6 (2039-2042)

WRCE will spend 6 terms of council implementing the Community Energy Investment Strategy with our municipal and utility partners. Priorities for terms 3–6 will evolve iteratively through ongoing dialogue with the community and municipal councils.

Term 2 Projects

WRCE is advancing 2 interconnected projects this term that speak to the value of collaboration and harmonization: **High-Performance Development Standards** (HPDS) and a **Low-Carbon Thermal Strategy**.

Waterloo Region
HIGH-PERFORMANCE
DEVELOPMENT STANDARDS

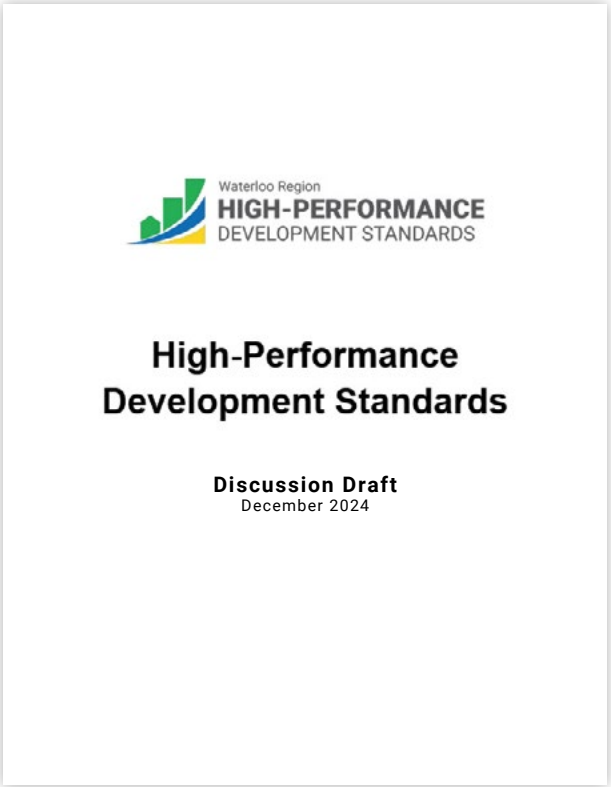
▷ **The High-Performance Development Standards is a streamlined, made-in-Waterloo region approach to embed energy and climate resilience into the planning and approvals process.**

The HPDS will embed climate resilience into the planning and approvals process for new buildings. It will ensure future growth is more sustainable and more affordable. These standards are being developed through a multisector collaboration to ensure both fairness and garner stakeholder support and innovation. By harmonizing across the 3 cities and, ideally, the 4 townships, a simple process is created for developers, reducing costs, and ensuring a "level playing field". By aligning with provincial, national, and continental best practices, our standards will provide the predictability for our utilities, tradespeople, planners, and the development industry needed to promote innovation. By integrating HPDS into local policy, councils and utility providers will be promoting the construction of energy-efficient, resilient buildings that meet long-term environmental and sustainability goals.

Background Context

Our low-carbon thermal strategy work compliments the High-Performance Development Standards and the broader energy transition work by facilitating the development of low-carbon thermal energy sources for heating and cooling. A current project under this initiative is progressing through a collaboration between municipalities, utilities, and post-secondary institutions to develop a conceptual business case for a region-wide low-carbon heating and cooling solution. It follows a thermal energy strategic assessment completed in 2023.

Through careful co-ordination, WRCE will advance these two projects, and maximize the benefits to our community. Together, they form the foundation of a cohesive strategy to drive Waterloo region's energy transition forward and create a more sustainable future.



Key Community Projects

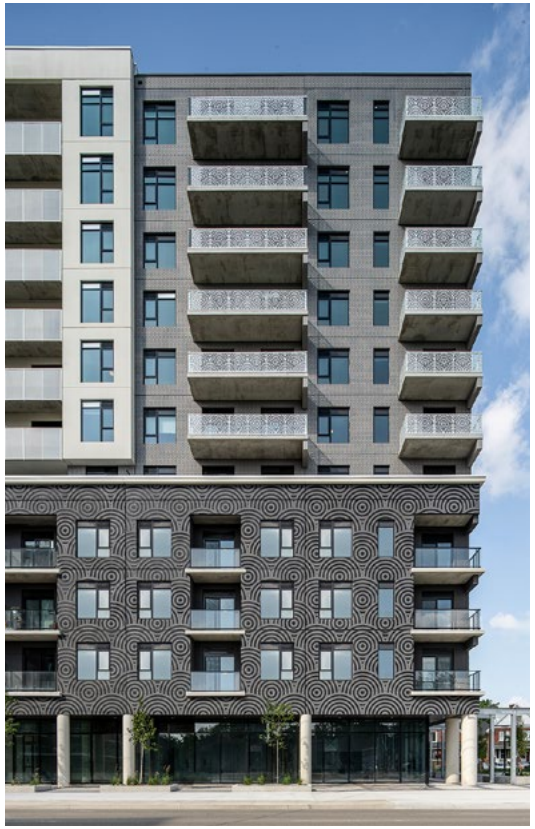
The energy transition affects nearly all segments of society. Thankfully, our community partners are as engaged and solutions-oriented as we are. Below is a selection of projects across our community that complement each other.

Our local electric utilities, Enova Power Corp. and GrandBridge Energy, are investing in the people and technologies to enable the efficient integration of distributed energy resources into local electricity grids, including **Distribution System Operators** and utility-scale energy managers.

Another important effort is **Kitchener Utilities' Clean Energy Transition Strategy**. This project assesses options for the City's community-facing energy businesses in light of the clean energy transition, and includes an examination of a thermal utility.

Municipal **Official Plan** policy alignment ensures energy sustainability goals are integrated into regional and municipal planning processes and promotes a future-ready approach to development, sustainability, and resilience. These partnerships are driving local growth, innovation, and energy independence with an eye to supporting community vitality.

Low-Carbon District Energy Studies are underway or being considered all over the region, including the University of Waterloo, Wilfrid Laurier University, Conestoga College, the City of Kitchener, Intermarket Properties in Cambridge, the Region of Waterloo—and the list is growing. These projects are examining the potential to set up centralized energy systems that supply multiple buildings with efficient heating and cooling.



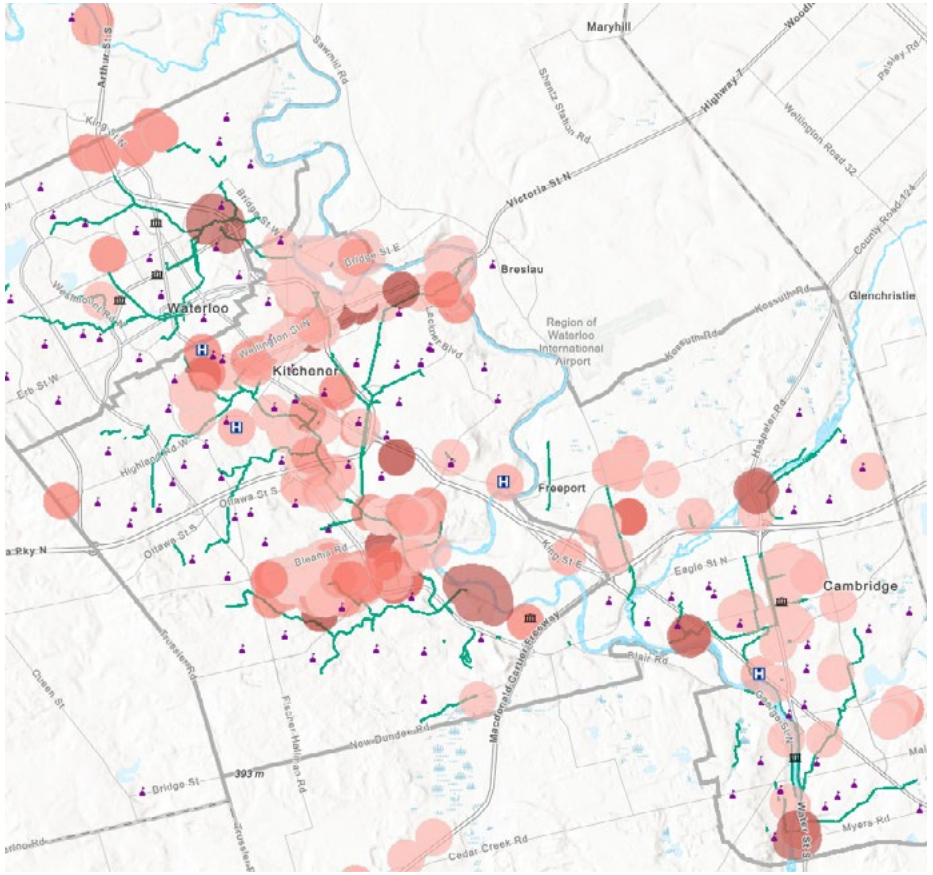
△ Killam Apartment REIT's award winning Civic 66 building near downtown Kitchener is heated by geothermal energy.

A Vision for Energy Generation

Over the past few years, we've uncovered some meaningful opportunities within our local energy system. In fact, there is a $900+ million / year market for efficient, clean, local energy in Waterloo Region.

Consider this: 99% of Waterloo Region's energy supply is imported, with fossil fuels powering most of it. We spend over $2 billion annually on this energy and a staggering 87% of that money exits our community. Exacerbating environmental harm and economic loss, 45% of this energy is wasted due to conversion losses and other inefficiencies[i]. The good news is that there are local solutions.

Even without factoring in the immense costs of climate change and health impacts or the economic benefits of skills training and resilient local utilities, there is a massive and untapped opportunity to invest in sustainable solutions that keep money within our community, create jobs, and protect our environment. A good place to start is by developing a clean, local, and equitable heating supply and demand. We have the opportunities and collaborative spirit to change our energy system for the benefit of our community.



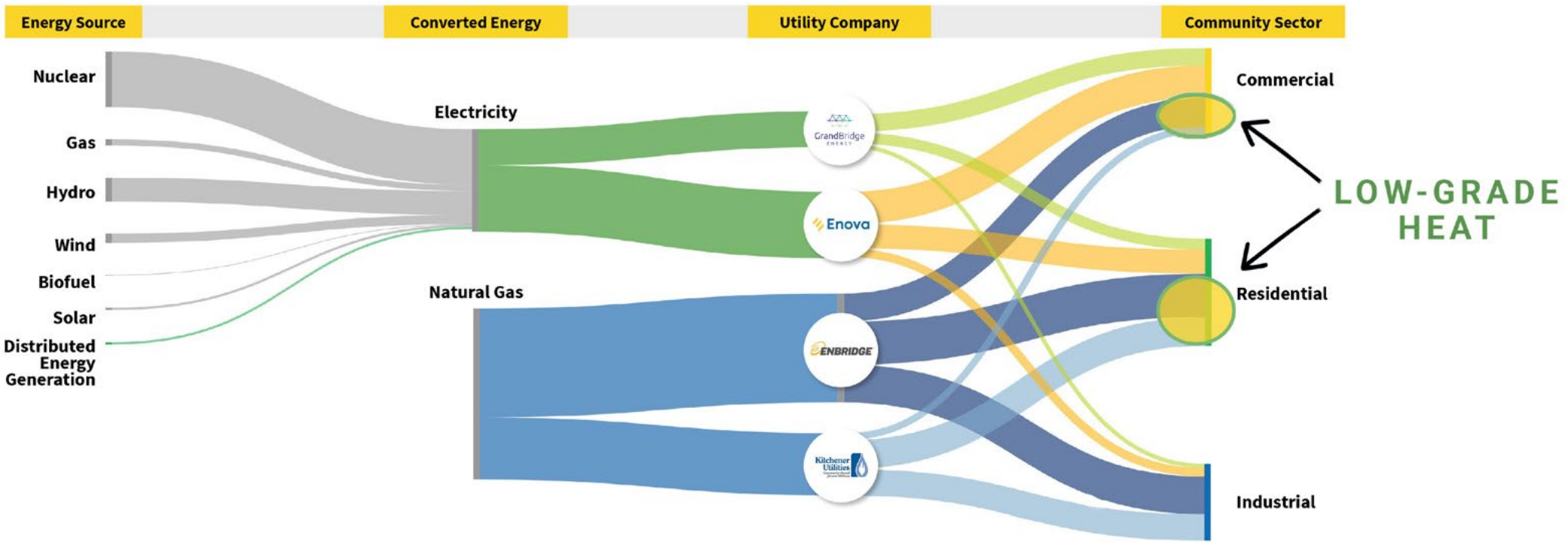
△ As Waterloo region's economy becomes more high-tech, new heat capture opportunities are emerging. This map shows estimated industrial heat capture potential represented by the shaded circles.

[i] Community Energy Investment Strategy

Local Energy Demand: Introducing Low-Grade Heat

▽ Through our 4 utilities, Waterloo region distributes 50 petajoules (PJ) of energy. 20PJ is used for low-grade space and water heating.

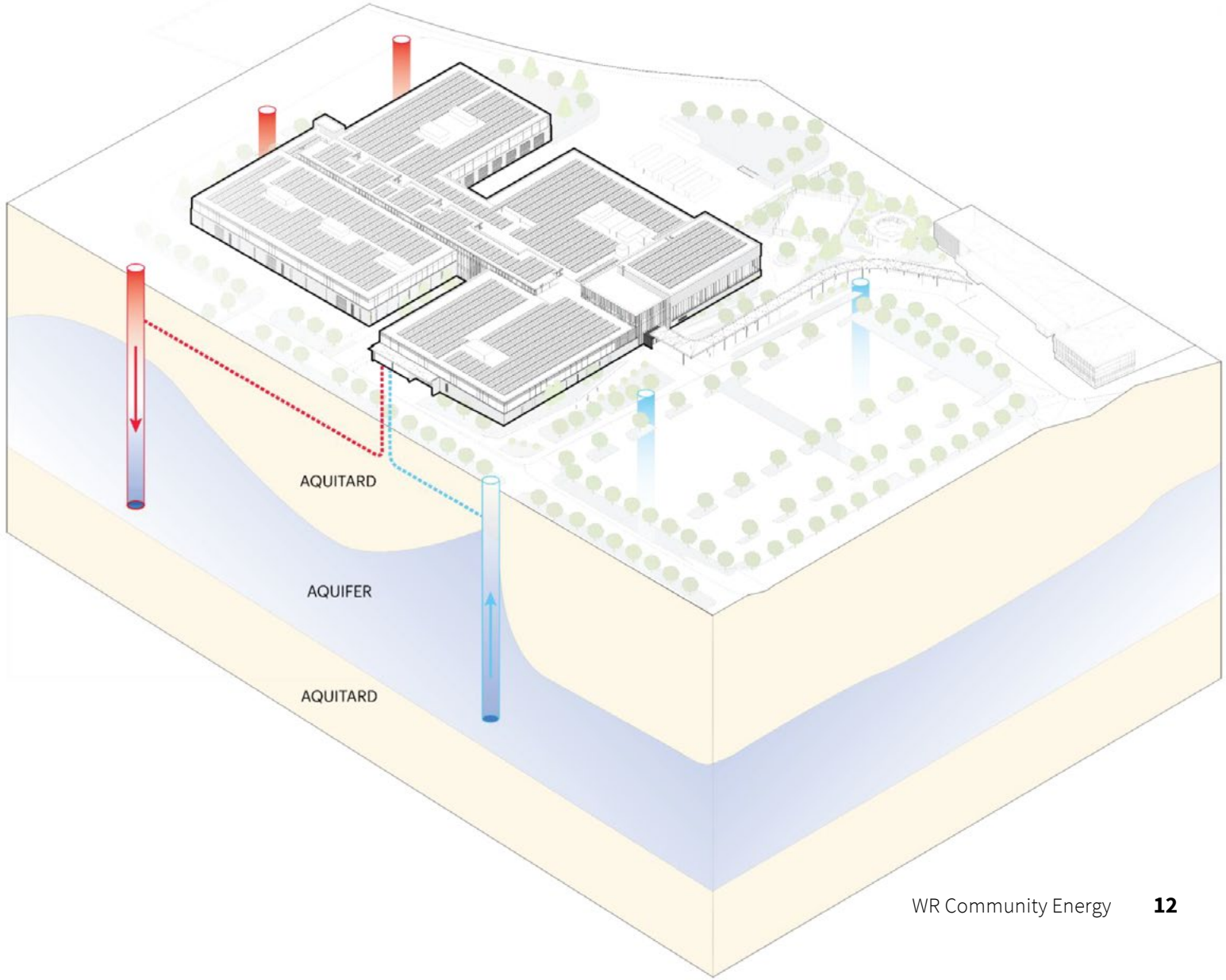
Fortunately, for at least 40% of our utility-level energy, we have an abundant supply that more than meets our current demand. The opportunities become clear if we look at end uses of this energy. The key is distinguishing between low-grade heat (<95 degree Celsius) used to heat space and water and higher grade heat used for industrial processes. The first can be captured from low-carbon thermal sources and heat pumps while the second will likely require imported energy for the foreseeable future. The breakdown of this energy is illustrated in the graphic below:



Local Energy Supply: Thermal Energy Sources

Waterloo region has in excess of 6 times of what is needed to meet our low-grade heat demand using 3 proven sources: geothermal energy (120PJ); industrial waste heat (3PJ); and wastewater heat recovery (1PJ). Each source has pros and cons, but all are proven both technologically and financially feasible across Waterloo region and Ontario.

Using heat pumps at this scale will consume more electricity, but not as much as you might think. Assuming a long-term average efficiency of 4 (CoP 4.0), this would at first glance require 25% more electricity. In reality, however, it could be less if our buildings continue to be more efficient, our grid peaks change, and technologies advance.



▷ **Rendering of an open-loop geoexchange system at Conestoga College's Skilled Trades Campus.**

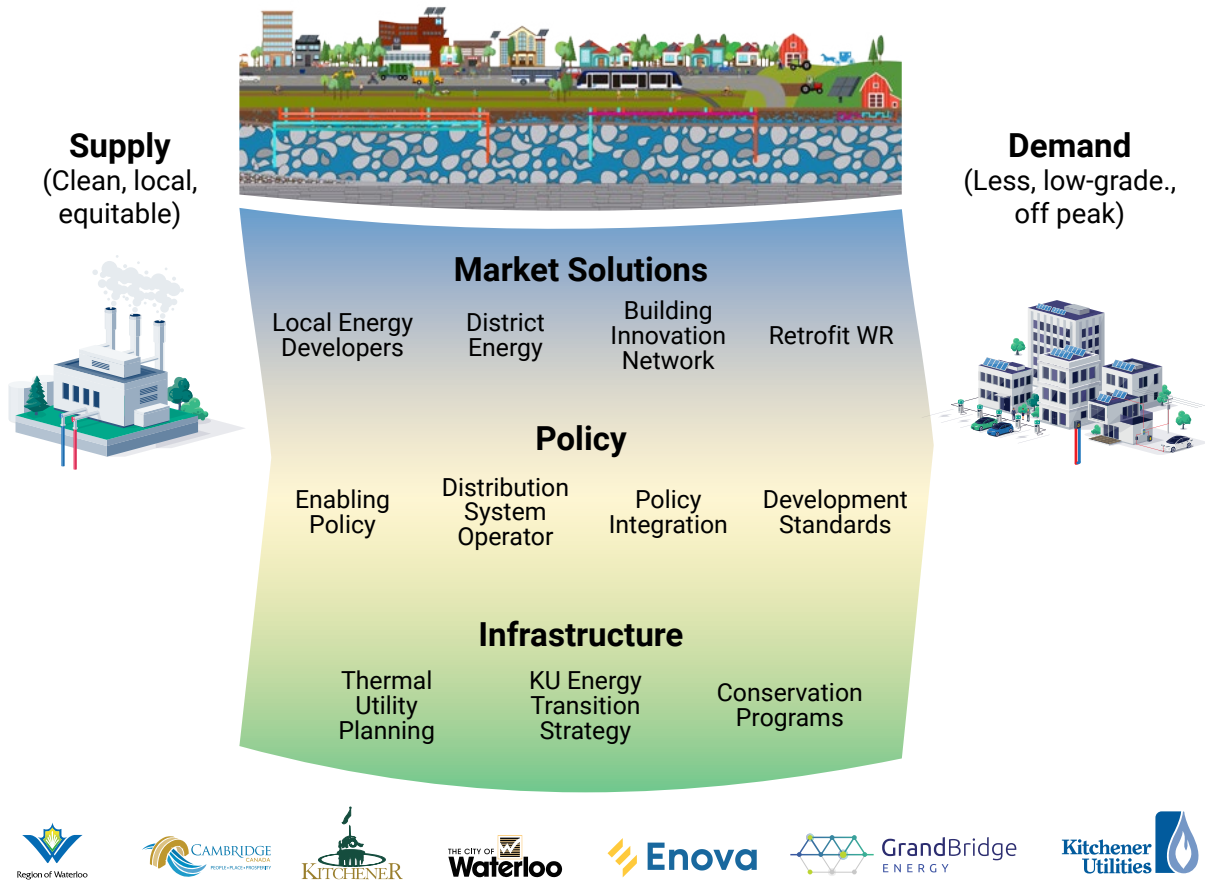
Managing Supply and Demand

WRCE believes it is reasonable to achieve and plan for half of our energy to be generated locally, with 40% to come from thermal energy sources and 10% from local electricity generation.

The conditions for success are well underway. Given Waterloo region's well-positioned assets and spirit of collaboration, we are already matching clean, local, and equitable energy supply with low-grade, off-peak, efficient energy demand. Enova Power Corp. and GrandBridge Energy are working on system and program upgrades to increase local electricity generation and reduce peak demand. Kitchener Utilities is looking at thermal energy networks, and our municipalities are developing, among other things, **High-Performance Development Standards** that encourage low-grade energy use in new development. Waterloo region is in an enviable position to integrate energy and land-use planning in support of our collective values and interests. WRCE's emerging **low-carbon thermal strategy** ensure we take advantage of our local assets to develop a 'made-in-Waterloo region' solution that works for our entire community.

With strategic investments in renewable energy infrastructure, policy alignment, and community engagement, Waterloo Region can create a cleaner, more resilient energy future that benefits the entire community.

Thermal Supply and Demand: System-Wide Collaboration



Towards a Resilient Future

WR Community Energy has made significant strides in advancing Waterloo region's energy transition, setting a vision to produce half of our energy locally. Such a transition represents a strategic opportunity to strengthen our economy, improve environmental sustainability, and future-proof our community for generations to come.

This report is a testament to our region's commitment to smart community-centred energy choices. By expanding our collaborative efforts, we can seize new opportunities, drive innovation, and build a resilient, sustainable energy future for all who live and do business here.

Activa's Net Zero Model Home, The Laurie, is Waterloo Region's first full Net Zero home. This home includes a drain water heat recovery system, dual-fuel furnace, rooftop solar panels and many other energy-saving features. △

For further details or to get involved with WR Community Energy, please contact:

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Conestoga College is ahead of the curve when it comes to using clean local energy sources. They have 5 systems at various stages of development all over the region. Their Fountain St. campus has a closed loop system that was installed in 2018. Their Skilled Trades campus and Waterloo campus (shown in photo) both have open-loop installations in progress. The Doon campus currently has test wells being monitored as part of a system design anticipated to offset at least 80% of heating and cooling needs. 22 Frederick St. in Kitchener will be home to their first geothermal powered student residence.

WR COMMUNITY ENERGY

IN PARTNERSHIP WITH

Region of Waterloo

CAMBRIDGE

KITCHENER

THE CITY OF Waterloo

Enova

GrandBridge ENERGY

Kitchener Utilities