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The Regional Municipality of Durham Report

To:	Committee of the Whole
From:	Chief Administrative Officer
Report:	#2025-COW-19
Date:	May 14, 2024

Subject:

Courtice Transit-Oriented Community District Energy System – Recommended Business Model and Governance Framework to Enable Implementation

Recommendation:

That the Committee of the Whole recommends to Regional Council:

A) That Regional Staff be directed to collaborate with staff from the Municipality of Clarington to prepare the comprehensive business case study and conduct the public consultation required under the Municipal Act and the regulations to allow the municipalities to create a Joint Municipal Services Board (JMSB) to govern the delivery of a district energy system (DES) in the Courtice Transit Oriented Community (CTOC), and a jointly owned Municipal Services Corporation (MSC) with a mandate to develop, own, and operate the CTOC DES.

B) That staff be directed to take necessary steps to submit a preliminary funding application to the Federation of Canadian Municipalities' Green Municipal Fund Community Energy Systems Capital Project Stream for a combined grant and loan up to a maximum of $10 million to support the first phase of the proposed CTOC DES project.

C) That staff be directed to explore opportunities for public and private sector financing partnerships to support the implementation of the proposed CTOC DES, including grant funding from the federal and provincial governments, as well as project financing opportunities through the Canada Infrastructure Bank, Infrastructure Ontario, and other institutions.

D) That staff be directed to undertake a non-binding Request for Expressions of Interest (RFEOI) to identify potential private sector partners to enable the provision of necessary infrastructure, operational support, and expertise in DES delivery in the CTOC.

E) That staff be directed to report back to Council before the end of Q1 2026 with a comprehensive business case study for a jointly-owned Municipal Service Board and MSC between the Region and Clarington for final approval to create both entities, including key recommendations on how the entities are proposed to be governed and managed, sources of capital to enable project implementation, available preliminary business case updates, key partnerships with third parties for project implementation and operations, as well as a detailed project implementation plan that shows how the infrastructure will be delivered in time for the high density development planned around the future Courtice GO Station.

F) That a copy of this report be forwarded to local area municipalities in Durham Region, GTHA upper-tier Regional Municipalities, the Association of Municipalities of Ontario (AMO), the Ontario Ministry of Municipal Affairs and Housing, the Ontario Ministry of Energy and Mines, Natural Resources Canada, the Durham Region Home Builders' Association (DRHBA), and the Federation of Canadian Municipalities (FCM) for their information.

Report:

1. Purpose

1.1 The purpose of this report is to:

a. Provide a high-level update to the preliminary business case for the CTOC DES since the last update provided to Regional Council through Report 2024-COW-1.

b. Respond to Council direction to evaluate ownership and governance models for the proposed CTOC DES and provide a recommendation.

c. Obtain Council direction to staff to undertake critical next steps, including:

- Conducting detailed analysis in support of the creation of a JMSB to govern the proposed CTOC DES, and a jointly owned Municipal Services Corporation (MSC) with a mandate to develop, own and operate the proposed CTOC DES.
- Conducting formal engagement with potential funding partners (including grant funding and other financing) in support of the development of a detailed capital plan for the proposed CTOC DES MSC.
- Conducting market sounding to solicit interest from third parties to facilitate future project design, and potential construction, operations, finance and maintenance.
- Conducting public consultation required under the Municipal Act to establish an MSC.

- Developing a Comprehensive Business Case Study for a DES MSC, including a proposed organizational structure, in addition to capital financing plan, operations plan, and implementation plans, including consideration of partnership opportunities identified.

2. Background

2.1 In 2019, through the recommendations of Report #2019-A-18, Regional Council approved in in principle the Durham Community Energy Plan (DCEP). DCEP identified district energy as one of the top decarbonization strategies for Durham Region. This finding is backed up by more recent analysis from the RBC Climate Action Institute which in a report released in August 2024 entitled "A Smart Heating Solution For Canada's Fiscally-Strained Municipalities" estimated that scaling district heating systems could lower building sector emissions in Canada's largest cities by 36% while providing a significant new revenue stream in the case of municipally owned systems.

2.2 In addition to enabling decarbonization, district energy can provide a wide range of benefits including energy efficiency, fuel flexibility, simplified building operations and maintenance, and decreased costs for building owners/occupants, while also serving as critical infrastructure, that supports high quality local employment.

2.3 District energy is generally most cost effective when deployed in high-density mixed-use developments where infrastructure costs can be shared across many end-use customers, and where there is variability in heating demand throughout the day. It is particularly cost effective in greenfield developments where district energy can be planned and implemented alongside other infrastructure and utility connections in a coordinated manner.

2.4 Seven of Durham's Major Transit Station Areas (MTSAs) along the Lakeshore East GO Train corridor are seen as key opportunity areas for district energy given the high-density mixed-use development planned for these areas. Regional staff have focused initial efforts on exploring the feasibility of a DES serving the high-density areas planned around the future Courtice GO station (e.g. Courtice Transit Oriented Community, or CTOC) for the following key reasons:

a. The CTOC MTSA is projected to see significant new population density and commercial floor area over the coming decades;

b. The CTOC MTSA is a greenfield development area where new infrastructure is yet to be implemented (e.g. roads, water supply, sanitary sewer). This provides the opportunity to coordinate district energy implementation with overall site servicing to realize economies of scope and scale while minimizing future disruption; and

c. The CTOC MTSA is strategically located within proximity to the Durham York Energy Centre (DYEC) which is governed by a Host Community Agreement between Durham Region and Clarington that commits to "strongly encourage

and promote development within the Clarington Energy Park and other areas of Clarington to utilize district heating and cooling provided by the energy from waste facility".

2.5 A 2022 pre-feasibility study co-led by Clarington and the Region found that conditions in South Courtice were favourable to the implementation of a DES given proximate sources of low carbon heat, and the planned high-density development surrounding the future Courtice GO Station. Following the 2022 pre-feasibility study Region and Clarington staff developed a preliminary business case focused on serving the Courtice MTSA with waste heat from Regionally-owned infrastructure in the Energy Park immediately to the south of Highway 401. That preliminary business case study was presented to Regional Council and Clarington Council in early 2024, and the CTOC project concept was unanimously endorsed in principle with staff directed to:

a. work with staff from the Municipality of Clarington to incorporate the DES concept into the CTOC Secondary Plan to support the future implementation of a DES focused on serving new development in the CTOC Major Transit Station Area (MTSA).

b. evaluate potential grant and low-interest financing options that might be available to support the proposed CTOC DES project concept.

c. evaluate ownership and governance models for the CTOC DES in collaboration with the Municipality of Clarington, landowners in the area, as well as potential energy utility partners

d. report back to Council with a recommended ownership and governance model as well as an updated and refined preliminary business case, identifying Regional financial, business planning and budget implications, opportunity costs and assessment of risk and potential mitigation strategies based on refined project timing and implementation strategies.

2.6 This report primarily focuses on presenting a recommended ownership and governance model for the CTOC DES. It also presents high-level updates to the underlying preliminary business case based on input from the CTOC Landowner Group (LOG). Regional staff continue to work with staff from the Municipality of Clarington to develop an enabling policy framework for the CTOC DES, including through the CTOC Secondary Plan. Council endorsement of the recommended ownership and governance model will enable Regional staff to advance due diligence around potential financing options, and identification of Regional financial implications and risk mitigation strategies.

3. CTOC DES Preliminary Business Case

3.1 The preliminary business case study referred to in Section 2 assessed technical feasibility, costs, and GHG reduction potential of leveraging waste heat from Regional infrastructure, such as the DYEC and the Courtice Water Pollution

Control Plant (CWPCP). The study found that a heating-only DES leveraging waste heat from DYEC is the most cost-effective DES option.

3.2 Following Council endorsement of the CTOC DES concept project in principle, Regional staff have worked with the Municipality of Clarington and the CTOC Landowner Group (LOG) to update and refine the preliminary business case with a focus on an initial Phase 1 implementation concept (e.g. to 2035). Key updates to the preliminary business case (Attachment #2 to this report) include:

a. Increased floor area forecast: the prior update to the preliminary business case was based on a conservative density scenario, which translates into approximately 700,000 m^2 of floor area by 2057. Through engagement with the CTOC LOG, staff have learned that developers in the area have plans to build significantly more housing units and overall floor area than initially considered, totalling up to 2 million m^2. As such, the revised preliminary business case is based on a still-conservative estimate of 1 million m^2 over a 30-year build-out starting in 2029. In terms of Phase 1 DES implementation, this translates into nine multi-unit residential buildings connected to the system by 2035.

b. Removal of CWPCP as an anchor-DES load: the prior update to the preliminary business case included the CWPCP as an anchor DES load, based on the assumption that the CWPCP could meet its plant heating demands from DES, which would free up the biogas produced on site to be upgraded to renewable natural gas (RNG) and injected into the Enbridge distribution network. While the RNG opportunity at CWPCP continues to be explored by Regional staff in collaboration with Enbridge Gas, initial assessments suggest that projected biogas production volumes at CWPCP are not expected to be high enough in the near-term to warrant the inclusion of the CWPCP in the refined preliminary business case focused on Phase 1 DES implementation. The opportunity for RNG utilization strategies and inclusion of the CWPCP as a key DES customer may be revisited through ongoing evaluation work as additional data becomes available, and as the proposed DES connection to DYEC progresses.

3.3 Key findings from the updated preliminary business case are summarized below:

a. Lower GHG emissions: ~70% lower GHG emissions compared to a business-as-usual (BAU) scenario where each building meets its heating demand through on-site natural gas systems.

b. Lower lifecycle costs: Overall capital costs are estimated at $67 million (in 2023 dollars) which compares favourably against alternative decarbonization strategies, namely electrified heating systems on-site at each building on a lifecycle cost basis. These costs will be incurred over time as the DES is built-out, and will be subject to escalation. However, there are potential grant and low-interest financing opportunities which could help cover upfront capital

costs and further reduce overall lifecycle costs relative to alternative strategies.

c. Energy cost stability: In addition to reduced lifecycle costs, the DES provides potential for greater energy cost stability for CTOC MTSA residents, relative to building electrification, due to reduced exposure to escalating electricity rates. In a scenario where electricity rates escalate higher than historical averages, CTOC DES users will see substantially lower monthly heating costs than a fully electrified decarbonization strategy.

d. Competitive rates and connection fees: CTOC DES preliminary utility rates compare favourably against rate benchmarks from regulated DES systems in British Columbia, where thermal energy is regulated by the BC Utilities Commission and data on DES utility rates is publicly available. There is limited publicly available data on DES utility rates across Canada outside of British Columbia.

e. Flexibility for future heat utilization and low carbon energy production: DYEC has a project agreement and an electricity generation contract (i.e. Power Purchase Agreement selling net electricity generated to the Ontario electrical grid) with the Independent Electricity System Operator (IESO) that expires in 2036. That contract limits the amount of heat that can be economically extracted to serve the CTOC DES. Future agreements may provide opportunities to enhance returns on investment from the DYEC, with a potential increase in heat extraction relative to electricity production. The DES may also enable opportunities for future RNG production at the CWPCP as biogas production volumes increase because of planned increases in wastewater treatment capacity.

4. De-risking District Energy Deployment in the Courtice Transit Oriented Community

4.1 Establishing a DES requires a secure base load of end-use customers to justify the initial upfront capital investment. The first phase of a DES is often the most challenging as significant capital needs to be deployed to serve a small portion of the anticipated development. Underpinning the updated preliminary business case outlined in Section 3 is an assumption that all new high-density development in the CTOC connects to the proposed DES. The preliminary business case demonstrates that there are potential benefits to all stakeholders if universal connection among high density development is realized, however there are two major categories of risk that need to be further assessed and addressed through policy and governance frameworks:

a. Connection risk: A lack of certainty regarding customer connection undermines the business case for a new DES, therefore it is crucial that customers within a defined DES service area be connected to the system to make the system viable.

b. Timing risk: The timing of new building construction and occupancy can be unpredictable, impacting when buildings can connect to the DES and potentially delaying the investment returns due to reduced revenues.

4.2 Municipalities across North America are implementing a range of policy tools and strategies to reduce connection and timing risks for new district energy systems, including:

a. **Conditional Rezoning** – where a rezoning is required (e.g. from residential to employment), a municipality can consider requiring the creation of a DES as a condition. See the River District Energy System Case study in Attachment #1 for an example of this. The CTOC Secondary Plan area is already zoned residential, so this approach is not seen as a viable strategy to reduce connection risk.

b. **Joint Development Agreement** – where a site is municipally-owned, and the municipality wishes to partner with private sector entities to develop the site, the municipality has greater leverage to ensure that all buildings connect to a DES through development agreements. This approach was used by the City of Toronto in the Etobicoke Civic Centre Project (see case study in Attachment #1). However, this approach is not seen as viable in the CTOC Secondary Plan area as there is limited municipal land ownership and no immediate plans for joint development of these lands.

c. **Limits on new natural gas service connections** – some municipalities across Canada and the US (including, for example, New York City, Montreal, and Vancouver), are implementing bans on natural gas connections in new homes. However, initial legal analysis completed by Regional staff indicate that Ontario municipalities do not have the authority to deny building permits based on choice of fuel source, so this option is not seen as a viable approach to reduce connection risk.

d. **Green Development Standards** - GHG limits on new buildings are an emerging municipal policy tool in Ontario, initially implemented by the City of Toronto through the Toronto Green Standard (TGS). Such policies can incentivize customers to connect to a low-carbon DES. Several local area municipalities in Durham have similar programs (Whitby, Ajax and Pickering), however there is considerable uncertainty over the ability of municipalities to impose GHG requirements for new buildings given provincial legislative changes (e.g. Bill 23) and an active legal challenge by the Residential Construction Council of Ontario (RESCON) against the City of Toronto for its TGS. While Clarington is in the process of developing its own Green Development Standard program, this on its own is not seen as a potential strategy to fully reduce connection risk.

e. **Mandatory connection policies** – mandatory connection can be limited to specific areas, specific types of connections, or specific time periods.

Connections outside a designated service area remain voluntary and at the discretion of a DES Utility. Mandatory connection may be used temporarily as a tool to support new system development by promoting an efficient layout and helping achieve adequate scale to launch the utility. For example, the City of Vancouver has a mandatory connection by-law covering new construction and major renovations with a designated service area for its False Creek Neighbourhood energy utility (see Case Study in Attachment #1). The aforementioned RBC Climate Action Institute report "A Smart Heating Solution For Canada's Fiscally-Strained Municipalities" lists the introduction of mandatory connection by-laws as a key policy support to speed up the adoption of district energy systems.

4.3 Analysis of the policy tools and strategies outlined above indicates that a mandatory connection policy is the most viable approach to reducing connection risk to the proposed CTOC DES and realizing the multi-faceted benefits outlined in the preliminary business case update. Municipalities have authority under the Municipal Act to pass by-laws relating to public utilities, which include district energy systems.

4.4 The mandatory connection policy approach does not address the timing risk noted above. The preliminary business case update addresses timing risk through a phased implementation of DES infrastructure to minimize early investment in the system, and by assuming staged expansion to match projected growth within the CTOC high-density neighbourhood. Initial heating demand could be served using temporary energy centres located within the CTOC (fuelled by natural gas), and only once sufficient development in the area is underway would the utility invest in the infrastructure to interconnect with the DYEC for heat supply. It is important to note that the DYEC is not part of the DES itself but is connected to the DES to supply waste heat.

4.5 These findings have significant implications for the proposed ownership model for the CTOC DES, which will be discussed in the following sections.

5. District Energy Ownership Models

5.1 Generally, there is no universal ownership model for district energy although most DES fall along a spectrum from fully public to fully private (see Figure 1 below), with a range of hybrid models possible in between:

a. Public Ownership – this is the most common model globally, often in the form of municipal ownership, providing control over objectives and means of district energy development. This offers low-cost financing, access to grants and other contributions, and aligns affordability with local energy security and decarbonization objectives. Private sector partners can reduce demands on municipal capacity and capital, provide expertise and services (ranging from design, construction, operations and maintenance), and offer risk transfer opportunities. Municipal ownership is beneficial in early stages to mitigate

connection risk through coordination with municipal planning or mandatory connection policies.

b. Private ownership – Privately-owned district energy utilities are less common globally. Some private systems emerged out of previously publicly owned systems (e.g., the Enwave district heating system in downtown Toronto). Private systems serve primarily commercial interests: competitive rates, reliability and investor profits, but can also evolve in response to policies and incentives such as green development standards, carbon pricing or other environmental regulation.

c. Hybrid ownership – many of the benefits of public (municipal) ownership can be secured through private-sector delivery although this requires a high degree of cooperation between municipalities and the private sector. Hybrid governance models can reduce capital and organizational demands on municipalities, while also transferring risk. However, governance can be more complicated, and private ownership tends to increase financing costs and constrain the typical trade-offs between financial returns and public benefits that are possible under direct public ownership.

Figure 1: Spectrum of DE Ownership Models

5.2 In addition to mitigating connection risk as discussed in Section 4, common ownership model considerations for municipalities establishing new DES include:

a. Investment required – a wholly municipally owned and delivered utility will require the municipality to fund all capital costs. However, municipal ownership with private sector partnerships can offload some or all the financing requirements to a third-party utility company. Municipal ownership with private sector partners may unlock access to grants directed at public

sector agencies which are not available to a private sector owner. Fully private systems would typically require no municipal capital contributions.

b. Influence over end user rates and affordability – Municipal ownership provides the greatest degree of control over rates and affordability, as the municipalities can determine how best to manage competing priorities such as customer affordability, cost recovery and overall environmental performance.

5.3 Municipal ownership can include joint ownership by two or more municipalities, and municipal ownership does not preclude partnerships (in the form of service contracts) with private sector service providers to support design, construction, operation, maintenance and financing of the utility.

5.4 Regardless of the ownership model, most successful business models for DES involve a municipality to some degree, typically through policy, planning, and/or partial or full ownership.

6. Courtice DES Ownership and Governance Model Evaluation and Recommendation

6.1 Building on the policy analysis in Section 4 and ownership model considerations outlined in Section 5 above, staff conducted an options-oriented analysis of ownership and governance structures ranging from fully municipal ownership to fully private ownership models. This evaluation points to an arms-length municipal-ownership model via a municipal services corporation (MSC) as the preferred ownership model for the following key reasons:

a. Municipal ownership places the DES in the best position to manage connection risk and ensure building connections within the CTOC. Ensuring building connections is critical to the preliminary business case outlined in Section 3, and will be critical in enabling the DES to attract grant funding and low-cost capital through public and private sources which in turn supports overall affordability of energy delivered;

b. Municipal ownership provides the Region and Clarington with control over the end user rates and connection fees charged by the utility, which provides transparency and accountability to ratepayers, and supports affordability objectives for landowners and district energy customers in CTOC; and

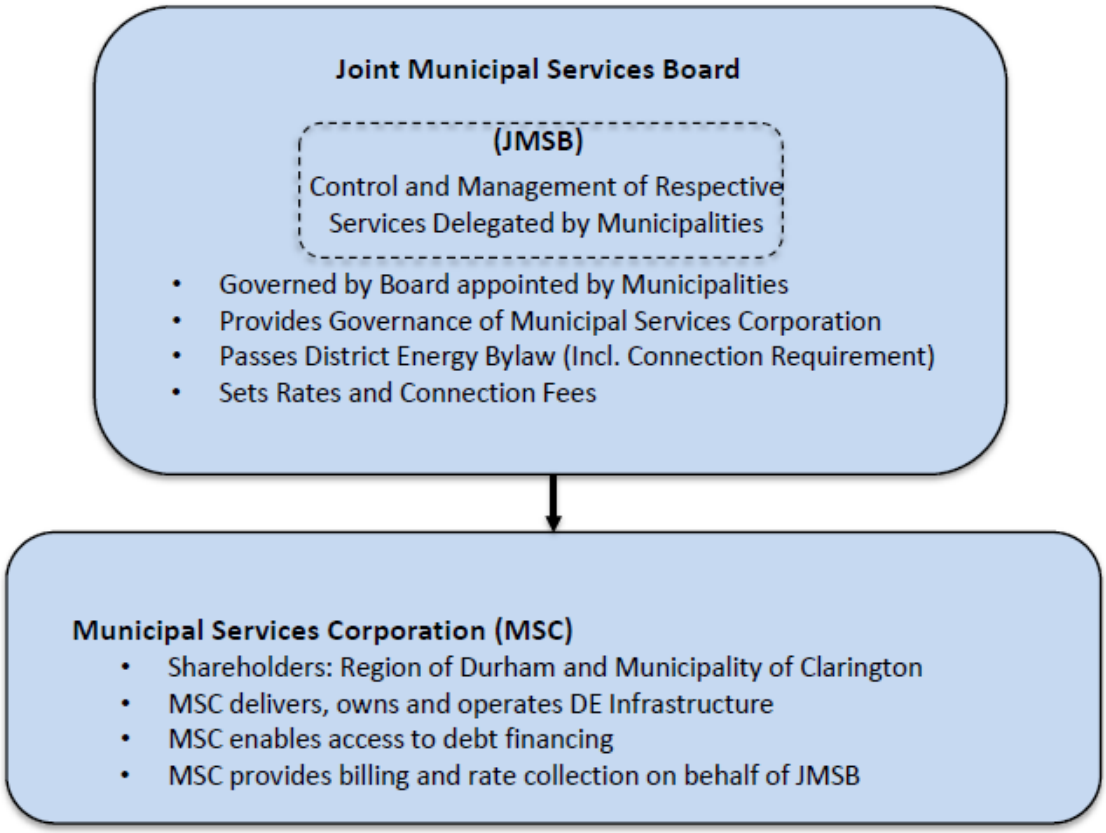
c. Given that the CTOC DES is ultimately based on a future energy supply from jointly-owned infrastructure between Durham and York, namely, the Durham York Energy Centre (DYEC), any matters related to connection, heat sales agreements, or energy supply will presumably require coordination with York Region. As the DES also contemplates municipal infrastructure and facilities in the Clarington Energy Park and CTOC as customers, municipal ownership allows the Region and Clarington to control costs and ensure reliable service delivery.

6.2 Building on the ownership model considerations, and associated legislative analysis, Regional Staff propose development of a DES ownership and governance model consisting of two entities as shown in Figure 2, and described below:

a. A Joint Municipal Services Board (JMSB) with delegated authority over the services required to operationalize the CTOC DES. The JMSB acts like an extension of the municipalities and will include representatives appointed by the respective Councils of both the Region and the Municipality of Clarington. The JMSB would provide governance over a jointly owned Municipal Services Corporation (MSC), including approving annual budgets and the user rates that the MSC charges to customers in the DE service area. The JMSB would be delegated the authority to implement a district energy mandatory connection by-law for high density development in the CTOC MTSA.

b. A Municipal Services Corporation (MSC) jointly owned by the Region and Clarington would be responsible for delivery, ownership, and operations of the DES. It would hire staff for its operations and establish contracts with private sector partners needed for construction, operations, maintenance, etc.

Figure 2: Recommended CTOC DES Ownership and Governance Model



6.3 Establishment of an MSC is permitted under Ontario Regulation 599/60 which requires the Region and Clarington to:

a. Develop a business case study for the MSC (Section 6);

b. Consult with the community about the plan to create the MSC;

c. Adopt and maintain policies with respect to the transfer of assets; and

d. Obtain Council approval in the form of a resolution or by-law.

6.4 The MSC would function as a subsidiary corporation of, and therefore operate as a separate legal entity from, the corporations of the Region and Clarington. This model is recommended as it permits a greater degree of autonomy from ongoing municipal operating processes, providing the increased organizational agility necessary to achieve the DES goals and objectives more efficiently and expeditiously.

6.5 Moving forward with the MSC, an important consideration is that only municipalities may be owners. In the result, the sole shareholders would be the Region and Clarington. As per Section 196 of the Municipal Act, it is up to the discretion of the municipal owner to determine the initial composition of the Board of Directors. In terms of keeping Council informed as the shareholder, it is up to the owner municipalities to determine whether they will be informed through regular reporting, or if they would prefer to have Council member(s) on the Board of Directors to act as the informative link between the MSC and Council. In addition, the Chair of the Board will be selected by the Shareholder, and the Board will play a role in decision making and governance. Staff from the Region and Clarington will collaborate to develop business recommendations on these issues.

6.6 The MSC will develop a Board of Directors that will be responsible for governance of operations, and as mentioned above, the municipal owners will decide if a Council member is part of the Board. The municipal owner will be responsible for deciding the number of members they would like on the Board initially; it will likely be recommended that an uneven number of members are selected in order to break any voting ties. Some general policies that should be adopted and developed for the MSC include:

- Financial policies
- Human Resource Practices/regulations
- Operations and Programs
- Asset Management Strategies
- Standard Operating Procedures

The implementation of these policies occurs after the incorporation of the MSC and staff from the Region and Clarington will undertake to develop them in draft now, for subsequent Council consideration.

6.7 It is anticipated that the MSC will work with experienced third parties to support implementation of the CTOC DES, including: obtaining financing, construction of the necessary infrastructure, operations and maintenance of the district energy service including customer billing services. Regional staff propose to conduct an initial Request for Expressions of Interest (RFEOI) in Q3 2025 to understand options for third party partnerships to mitigate risks and support project implementation.

7. Potential Funding Sources for CTOC DES

7.1 The proposed DES could potentially be supported by a variety of funding and financing sources to enhance its overall financial viability. These include:

a. FCM Green Municipal Fund (GMF): offering up to $10 million comprised of a mix of grants and low-interest loans under the Community Energy Systems stream.

b. Canada Infrastructure Bank (CIB): provides low-interest debt financing, with over $1 billion already allocated to DES utilities over the last two years although it should be recognized that there is inherent political risk and uncertainty associated with the future availability of this funding source.

7.2 Through this report Regional Staff are seeking direction to explore the potential for grant and low-interest debt financing options to support the business case and overall financial viability for the CTOC DES.

8. Tentative Project Development Timeline

8.1 The critical path for the CTOC DES calls for the proposed DES and related service to be available in time for the first buildings in the CTOC high density core to connect, which is currently forecasted to be 2029.

8.2 Initial steps over the period of 2025-2026 focus on establishing the CTOC DES policy and governance framework as outlined in this report. Key immediate next steps include:

a. Inclusion of DES supportive policy in the CTOC Secondary Plan

b. Establish a Joint Municipal Services Board (JMSB) and Municipal Services Corporation (MSC) through completion of a comprehensive business case study, including development of a capital financing strategy, and engagement with potential private sector DE operating partners; and

c. Continued engagement with CTOC LOG to refine district energy service area and phasing plan

8.3 Building on the initial steps outlined above, Phase 1 of DES design, procurement and construction is forecasted to begin in 2027 to enable service delivery in 2029

when initial high-density buildings are expected to be completed. Initial DES demand will be served by a temporary energy centre in the CTOC.

8.4 The utility will closely monitor development in CTOC in collaboration with the LOG to ensure appropriate phasing of investment in subsequent district energy infrastructure, including the design and construction of the DYEC heat recovery system and transmission piping system which is forecasted to be in place by the early to mid-2030's based on current development projections.

9. Conclusions and Recommended Next Steps

9.1 The updated preliminary business case for the CTOC DES reaffirms the potential feasibility and benefits of leveraging waste heat from DYEC. The refined financial model, increased projected floor area, and phased implementation strategy assist in strengthening the case for a municipal-led ownership model. To mitigate connection risk and ensure project viability, a mandatory connection policy is recommended.

9.2 In undertaking next steps, staff seek Council direction to:

a. Conduct a detailed analysis to establish a Joint Municipal Services Board (JMSB) and a Municipal Services Corporation (MSC) to govern and operate the proposed CTOC DES.

b. Engage potential funding partners to develop a comprehensive capital financing plan.

c. Conduct market sounding and issue RFEOI to assess third-party interest in project development and operation.

d. Conducting public consultation required under the Municipal Act to establish an MSC.

e. Develop a comprehensive business case study outlining governance, financial, and operational strategies for the DES MSC.

10. Relationship to Strategic Plan

10.1 This report aligns with/addresses the following strategic goals and priorities in the Durham Region Strategic Plan:

a. Goal #2 – Environmental Sustainability and Climate Action

- Goal E1 – Reduce corporate greenhouse gas emissions to meet established targets.

- Goal E2 - Collaborate with partners on the low carbon transition to reduce community greenhouse gas emissions;
- Goal E4 – Lead the transition to sustainable living through waste management, diversion, and the circular economy; and

b. Goal #4 – Resilient Local Economies

- Goal R1 - Attract and retain quality employers that strengthen key economic sectors, including energy and technology.

10.2 For additional information, contact: Ian McVey, Manager of Sustainability at 905-668-7711, extension 3803.

Approved by: Sandra Austin, Executive Director, Strategic Initiatives

11. Attachments

Attachment #1: District Energy Ownership Models – Briefing Report – Reshape Strategies

Attachment #2: Courtice District Energy System Preliminary Business Case Overview

Respectfully submitted,

Original Signed by

Elaine C. Baxter-Trahair
Chief Administrative Officer

Attachment #1

District Energy Ownership Models

Briefing Report R2

Reshape Project Number P808

January 16, 2025

RESHAPE STRATEGIES

Statement of Limitations

This report has been prepared by Reshape Infrastructure Strategies ("Reshape") and its partners for the exclusive use and benefit of the Region of Durham ("Client"). This document represents the best professional judgment of Reshape and our partners, based on the information available at the time of its completion and as appropriate for the scope of work. Services were performed according to normal professional standards in a similar context and for a similar scope of work.

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1 Introduction

This report provides information on common district energy ownership models, typical ownership considerations for municipalities when establishing new district energy utilities, and case studies of new and evolving district energy systems in Canada.

The purpose of this report is to inform subsequent discussions and decision making regarding a preferred ownership model for the proposed Courtice Transit Oriented Community District Energy System in Durham Region.

2 District Energy Ownership Models

There is no universal ownership model for district energy. Ownership models vary greatly by country and by region, as well as technology and stage of market development. Ownership models are as much a function of local history and cultural preferences as explicit public policy. For many utilities, ownership has evolved over time with changes in market maturity, system size, technology, public sector priorities, and other considerations. The presence and form of economic regulation of district energy can also influence or constrain ownership models in a jurisdiction.

Most DE systems fall along a spectrum from fully public to fully private (Figure 1) Between fully public and fully private there are many types of hybrid models with varying degrees of shared ownership or governance.

Figure 1: Spectrum of DE Ownership Models

2.1 Public Ownership

At one end of the ownership spectrum is full public ownership. This is still the most common model globally for DE. It often takes the form of municipal ownership but can also include ownership by other public sector entities such as regional governments, state/provincial agencies, or social housing agencies. Municipal ownership provides the greatest opportunity for control over both the objectives and means of DE development. Outcomes important to the public sector go beyond commercial goals of affordability, reliability, and profitability, and often include climate, environmental, equity, resilience, and economic development considerations.

Municipal ownership allows governments to determine an acceptable balance across multiple objectives and to select the specific means of achieving the desired outcomes (e.g., service areas, technologies, financing model, rate structures, rates, etc.). Municipal ownership provides greater opportunities for low-cost financing (e.g., 100% debt financing and lower-cost sources of debt), access to grants and other direct contributions for public benefits, which can help to reduce the tension between affordability and other policy objectives.

Municipal ownership and financing require municipalities to have access to adequate capital for investment. It can also create new commercial or reputational risks as well as demands on organizational capacity and expertise. Further, unlike typical municipal services which cover the entire community, a new DE service will typically only cover a small area, at least initially. This can pose novel investment, governance, and accountability challenges for municipalities.

There are also examples of municipal DE systems that secure services from the private sector without transferring ownership or control of DE systems. These services can include design, construction, operations or maintenance. These may even include financing support. Outsourcing of services can help reduce demands on organizational capacity or capital; provide access to industry-specific expertise; and create opportunities for some risk transfer while retaining municipal ownership and control.

Municipal ownership can be very helpful in the early stages of DE development, as well as in periods of major technological change such as the transition from conventional to low-carbon energy sources. Municipal ownership may enhance public trust and acceptance of new DE systems and during periods of transition (such as decarbonization). Public ownership can enable more direct control over risks which may hinder private sector investment or increase private sector financing costs. Connection risk can be a major impediment to setting up DE networks or transitioning existing networks to low-carbon energy, particularly in the absence of other supporting policies. Municipalities can reduce connection risk through close coordination of DE development with municipal policy/planning or mandatory connection policies.

Municipal ownership may increase public acceptance and legal support for mandatory connection policies. Municipal ownership may also reduce development or transition risks by

bringing low-cost financing or lowering upfront capital costs through strategies such as coordinating the installation of DE infrastructure with other municipal infrastructure.

The benefits of and need for municipal ownership can decline over time with increased scale and maturity of systems. This has led some municipalities to divest of mature systems. Nevertheless, early municipal ownership can have lasting impacts on the layout of networks, the mix of technologies, and the design of contracts or rates long after divestment.

Case studies of municipally owned systems are provided for Markham District Energy, the City of Guelph's district energy program, and the City of Vancouver False Creek NEU.

2.2 Private Ownership

At the other end of the ownership spectrum is full private ownership.[1] Privately-owned DE utilities are less common globally. This model is more common in markets with little or no economic regulation of private DE systems, particularly in the United States, but also parts of Canada and Europe. Private owners can include dedicated DE utilities, gas and electric utilities with DE subsidiaries, and property developers (e.g., large master-planned developments which include DE systems). Pension and infrastructure funds are active investors in private DE systems.

Some private systems emerged out of previously publicly owned systems (e.g., the Enwave district heating system in downtown Toronto). Others have emerged in response to unique commercial opportunities to provide competitive energy services through economies of scale and efficiency. For example, the Creative Energy system in downtown Vancouver was developed by private interests starting in the late 1960s at a time when natural gas was less common and district energy offered a strong value proposition to the consumer, as well as air quality benefits.

Many of the oldest DE systems in the United States were developed by electric utilities and relied on waste heat from electric power plants located in urban areas. As electricity generation moved towards larger power plants located farther from urban centres, many electric utilities divested their DE systems, although there are examples of continued ownership, such as the Manhattan Steam System owned by Con Edison.

Though less common, there are also cooperative or community ownership models which can be categorized as private ownership in that they do not involve direct municipal ownership or governance. However, municipal governments may still lead the formation of these models and also participate indirectly in their governance.

[1] The discussion in this section focuses on utilities which serve external customers. Many institutional campuses such as hospitals, universities and military bases have DE systems serving their own facilities; while they are technically DE systems, they do not have the same issues and challenges.

Regardless of how they came about, most private systems now serve primarily commercial interests: competitive rates, reliability, and investor profits. Private systems can also evolve in response to policies and incentives such as new building standards, carbon pricing or other environmental regulations. This is the case for some new private DE systems in master planned communities facing higher environmental standards (an example of this is the River District Energy system case study). These systems are commercial responses to new policies – they are not necessarily pursuing these public benefits as ends in and of themselves.

2.3 Hybrid Ownership Models

Many of the benefits of municipal ownership can, in theory, be secured through private-sector delivery with the right ownership or governance models. However, this requires a high level of trust and cooperation between municipalities and the private sector or other community organizations. These hybrid ownership models can reduce or eliminate capital and organizational demands on municipalities, while also transferring risk and securing additional expertise. But public sector influence in hybrid ownership models may be more indirect and necessarily more oriented to ends (such as GHG outcomes) rather than to specific means (such as technology selection). Governance can also be more complicated and nuanced in these other models. Private ownership tends to increase financing costs and constrain the kinds of trade-offs between financial returns and public benefits that are possible under direct public ownership. However, these trade-offs may also be reduced by greater efficiency or transfer of risks under private sector delivery.

2.3.1 Concessions

In some cases, there is strong public governance of private systems beyond or in lieu of traditional economic regulation. This may be the granting of concessions or through strategic partnerships between municipalities and private companies to support the creation, transition, or expansion of private systems in support of new policy objectives. Neither of these approaches involve direct ownership by municipalities, but they can provide indirect control over outcomes and operations to secure public benefits over and above private benefits.

2.3.2 Strategic Partnerships

Strategic partnerships do not involve ownership by municipalities but rather strategic consideration in exchange for public benefit. For example, in exchange for securing public benefits (such as GHG reductions), a municipality may provide support to a private DE utility such as:

- Providing access to land, resources, and infrastructure (possibly on favourable terms);
- Contributing land or infrastructure paid for by the municipality on favourable terms;
- Committing to connect municipal buildings or to include connection requirements as a condition in the sale of municipal land to developers;

- Committing to align policies to encourage connection to DE (e.g., green building policies, accelerated permitting processes for developments connecting to DE; property tax rebates for buildings connected to DE);
- Coordinating installation of municipal and DE infrastructure;
- Accelerating permitting process for DE projects; or
- Providing property tax rebates for DE systems (where private DE systems are required to pay property taxes) or for properties that connect to approved DE systems.

Private systems may be incented to work with municipalities on strategic partnerships in order to protect their existing assets or to secure and de-risk new investment opportunities.

2.3.3 Joint Ventures

Joint ventures are playing an increasing role in the DE sector, particularly in large European cities. In a joint venture, a special purpose vehicle is formed, with shared ownership between the public and private partners. Governance is shared, with municipal control proportional to their representation on the board of directors. The Zibi Community Utility is an example of a joint venture with municipal participation via Hydro Ottawa.

2.3.4 Split Asset Ownership

Another form of public-private partnership is the split asset model, where private companies control some assets and public companies control the remaining assets, with contracts governing the relationships between assets and owners. For example, a municipality may own a distribution piping system (and be responsible for setting retail rates and governance of the DPS), while a partner may own and operate the energy centre and sell heat to the municipal DPS at a wholesale rate (or vice versa). This concept is illustrated in Figure 2.

As an example of a split asset model, Metro Vancouver, which owns an existing waste-to-energy plant, is building new heat recovery and transmission infrastructure to sell heat under a long-term supply contract to an existing private DE utility in Vancouver. Metro Vancouver is also exploring the possibility of extending transmission infrastructure and selling heat to a new municipally owned DE system in Burnaby, BC (this example is described in greater detail in the River District / Meto Vancouver case study in Section 4).

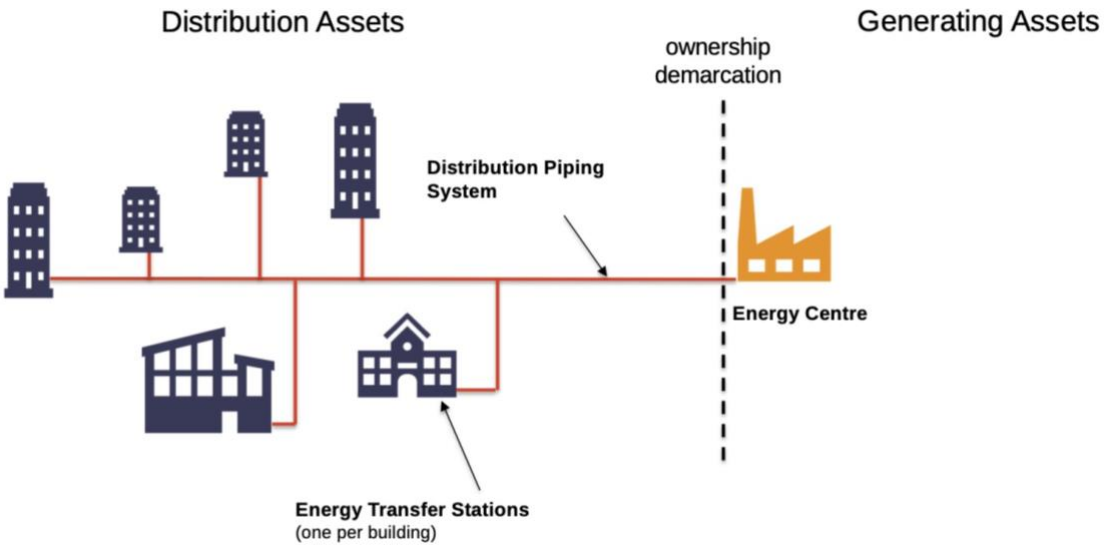


Figure 2: Example of Split Asset Ownership between Generation and Distribution

3 Ownership Model Considerations for New DE Systems

Common ownership model considerations for municipalities establishing new district energy systems include:

- Municipal Investment Required
- Municipal Ability to Reduce Connection Risk
- Municipal Influence over Rates and Affordability
- Municipal Control over GHG Outcomes.

These considerations are discussed below and summarized in Table 1.

Municipal Investment Required

This is the most straightforward; a fully municipally owned and delivered utility will require the municipality to fund all capital costs. Municipal ownership with a design-build-operate-finance-maintain (DBOFM) contract can offload some or all of the financing requirements to a third party utility company. Hybrid models may require some municipal financing depending on how the project is structured. Fully private systems would typically require no municipal capital contributions.

A potential benefit of municipal ownership is that it may unlock access to grants directed at public sector agencies, which a private-sector owner may not be able to access.

Municipal Ability to Reduce Connection Risk

Connection risk is usually the most critical risk faced by a new district energy utility. A lack of connected customers is fatal to the success of a new system, and the nature of district energy infrastructure means that any DE assets can only serve buildings within a relatively short distance, making it crucial that target customers are connected to the system.

Perhaps the simplest and strongest tool available is a mandatory connection policy. Mandatory connection can be limited to specific areas, specific types of connections or specific time periods. Outside these parameters, connections or renewals can be voluntary. For example, the City of Vancouver has a mandatory connection bylaw covering new construction and major renovations within a designated service area for its False Creek Neighborhood Energy Utility (see Section 4 for further information on the False Creek NEU). Connections by existing buildings, or by buildings outside the service area, remain voluntary. Mandatory connection may be used temporarily as tool to support new system development by promoting an efficient layout and helping achieve adequate scale to launch the utility.

There are no examples we are familiar with in Canada where a municipality has passed a mandatory connection bylaw compelling connection to a privately held district energy system. There are open questions whether this would be legally permissible or politically acceptable in Ontario.

There are cases where municipalities have ensured connection to private DE systems through other means. The River District Energy system (described in Section 4) is one example. River District Energy is owned by the master developer of a large brownfield site. City of Vancouver required the creation of a district energy system as a condition of the site's rezoning from industrial to residential uses.

The Etobicoke Civic Centre project (also described in Section 4) shows another approach to ensuring connection to a privately-held DE utility. The site is largely owned by the City of Toronto, and through its Joint Development Agreement with Enwave, the City and Enwave worked collaboratively to ensure that the site would be served by low-carbon district energy and that all buildings would be connected to the system.

Given that the Courtice GO station area has multiple developers, not a single master developer, and municipal government is not a major landowner, these two approaches may not be viable.

Other tools can indirectly incentivize buildings to connect to district energy. Any connection incentive policies must be reasonably credible to support private investment, and private investors may also want assurance that such policies will continue for a sufficient period. These incentives can be financial or non-financial.

For example, limits on new gas connections or strong green building standards that allow compliance through DE connections can help de-risk new system development, though these tools are not currently available to the Region of Durham. Expedited rezoning and development application approvals for buildings connecting to low-carbon DE can also incentivize connection. In general, there are fewer examples of these types of indirect tools leading to successful development of new systems, particularly in the context of sites with multiple landowners.

Municipal Influence over Rates and Affordability

Municipal ownership likely provides the greatest degree of control over rates and affordability. With municipal ownership, municipalities can determine how best to manage competing priorities such as affordability, cost recovery, and environmental performance.

Municipal Control over GHG Outcomes

Greenhouse gas intensity limits (GHGi) on new buildings are an emerging policy tool in Canada. Initially implemented by the City of Vancouver and the City of Toronto, they are now being deployed by other communities, though the ability of municipalities in Ontario to impose GHGi requirements on new buildings is somewhat uncertain given the potential for the province to limit municipal powers under Bill 23.

Greenhouse gas intensity limits on new construction can indirectly impose a low-carbon requirement on district energy utilities by requiring them to provide service to a certain standard if they are going to connect customers. Some municipalities also provide separate compliance pathways which incentivize customers to connect to low-carbon district energy systems by allowing buildings served by low-carbon DE to meet less stringent thermal energy demand standards.

Alternatively, with municipal ownership, municipalities can directly manage the GHG intensity of a district energy system as part of their ownership and operation of the system. The City of Vancouver's False Creek NEU has operated in this manner for many years. The City has had a longstanding target to supply 70% of the utility's energy from renewable sources. Council has now directed the utility to evaluate options to increase the share of renewables to 100%.

Table 1: Summary of Key Considerations for New DE Utilities in Ontario by Ownership Model

Ownership	Municipal Investment Required	Municipal Ability to Reduce Connection Risk	Municipal Influence over Rates and Affordability	Municipal Control over GHG Outcomes
Municipal	Highest	Highest (potential for mandatory connection)	Highest	Highest
Municipal with DBFOM or Similar	Potentially none	High (potential for mandatory connection)	Potentially same as full municipal ownership	Potentially same as full municipal ownership
Hybrid Models (JV, Split Asset)	Depends on arrangement	Depends on arrangement – high degree of uncertainty	Depends on details of agreement	Likely requires GHG regulation via green building policy
Private Ownership with Strategic Partnership	Typically none	Limited Best suited to projects with municipally-owned land	Limited	Likely requires GHG regulation via green building policy

An overview of DE policies from other Canadian jurisdictions is provided in Table 2. Although the list is not exhaustive, it illustrates that municipal ownership with a mandatory connection bylaw is a very common strategy for overcoming connection risk when establishing new DES.

Table 2: Overview of DE Policies in Canadian Jurisdictions

City (Province)	Mandatory Connection to Municipally Owned System	DE Requirement in Site Rezoning	City Buildings as Anchor Loads	City-wide Green Building Policy with GHGI	Economic Incentives for Connection	Informal / "Encouraged" in Development Application Approvals Process
City of Edmonton (AB)	✓		✓			
City of Calgary (AB)			✓		✓	✓
City of Vancouver (BC)	✓	✓		✓		
City of Surrey (BC)	✓			✓		
City of North Vancouver (BC)	✓			✓		
City of Richmond (BC)	✓	✓		✓		
City of Toronto (ON)			✓	✓		
City of Markham (ON)					✓	✓

4 Case Studies

4.1 Markham District Energy

Markham District Energy (MDE) is a utility company owned by the City of Markham. MDE operates two geographically independent district energy systems:

- The Markham Centre system, the first system developed by MDE, which serves Markham's main business and retail centre, and
- the Cornell Centre system, which is anchored by the regional hospital.

The Markham Centre system began operations in 2000. The Cornell Centre system began operation in 2012 as part of an expansion of the hospital campus. In total, MDE operates four energy plants within Markham, providing hot water and chilled water. Heat is generated from a combination of combined heat-and-power engines and natural gas-fired boilers, while cooling is provided by chiller plants.

Table 3: Markham District Energy – Key Data

Markham District Energy	
Location	Markham, ON
Ownership Model	Owned by the City of Markham
Governance	Board of Directors
Economic Regulation	Not regulated by the Ontario Energy Board
Year Established	2000
Services	Heating and Cooling
Current Service Area	1.2 million m^2 (13 million ft^2)
Low Carbon Energy Supply	Several projects in the planning phase
Connection Incentives / Requirements	No mandatory connection bylaw.

System History and Development

MDE was established by the City in the late 1990s due to two main drivers. The first driver was resiliency concerns in response to the 1998 ice storm in eastern Ontario and Quebec. The storm did not significantly impact the City of Markham, but the event raised awareness of the potential impacts from a major weather event. The second driver was economic development. District energy was seen as a differentiating factor which the City could use to attract high-value business such as IBM which, at the time, was canvassing cities to locate a major new facility.

Recent legislative changes had opened up the opportunity for municipalities to invest in new utility operations (including thermal energy systems), and MDE was born.

Ownership, Governance and Operation

MDE is owned by Markham Enterprises Corporation, a holding company entirely owned by the City of Markham. Markham Enterprises Corporation is also one of the owners of Alectra Utilities. The Board of Directors is made up of four members of Markham City Council (including the mayor) plus five independent directors.

All operational resources are internal to MDE, and the City has no role in MDE, other than governance via the Board. MDE has a total of 35 staff, including operations and management.

MDE was initiated with loans from the City of Markham and Markham Enterprises, as well as funding from provincial gas tax revenues. Subsequent financing was provided by Infrastructure Ontario and Manulife Financial. MDE now has a relatively high debt-to-equity ratio, but as a mature system with many long-term contracts it has a low risk profile for lenders.

Connection Incentives, Rates and Regulation

Thermal energy utilities in Ontario are not economically regulated by the Ontario Energy Board. Rates are generally established via long-term contracts between utilities and their customers. The City of Markham does not intervene in the rate setting process for MDE. Instead, customer rates are negotiated with individual customer buildings to be commercially competitive with a comparable on-site alternative. MDE has not historically charged connection fees to private developers connecting new buildings to the system.

MDE does not have a mandatory connection bylaw and all customers have been secured through negotiation. The City does not offer density bonuses for connection to MDE. Nevertheless, MDE claims to have signed every new building in their service areas, and credits their success to offering competitive terms, as well as providing the qualitative benefits of a district energy connection (reliability, additional space, etc.).

The absence of a connection fee (sometimes referred to as a developer contribution) is likely a strong connection incentive, as it reduces the building's construction cost (though more costs must be recovered through rates).

MDE's contracts typically have terms of 20-30 years. As the Markham Centre system began operation in 2000, many of MDE's original customers are in the process of renewing their contracts. Renewal language is typically included in existing contracts; most contracts include two 10-year extension terms.[2] According to the terms of the contracts, renewal rates must be in line with rates recently offered to similar customers at the time of renewal.

System Decarbonization

The City has not directly regulated MDE's greenhouse gas emissions. MDE has announced a commitment to reducing GHG emissions in line with the City of Markham municipal targets and aims to achieve zero-carbon operations by 2050.

MDE has secured $135M in low-cost financing from the Canada Infrastructure Bank to fund low-carbon projects. This amount has been matched by CIBC for a total of $270M in available low-cost financing. MDE has also been successful in securing grants from the Federation of Canadian Municipalities and the federal Low-Carbon Economy Fund.

The funding and financing noted above will provide capital for three major low-carbon projects to decarbonize MDE's systems. These initiatives include a large-scale wastewater heat recovery project, a pilot biomass plant, and a heat recovery chiller to recover heat from IT and healthcare loads that require cooling in the winter. These planned projects are forecast to reduce MDE's GHG emissions by ~80%.

Although older customer contract rates are based on an avoided cost of natural gas heating, the avoided cost benchmark used to negotiate rates with new customers is based on lower GHG-intensity heating, typically using a heat pump. Costs for system decarbonization will be recovered through renegotiated rates with existing customers (as contracts are renewed) and through contracts with new connections.

4.2 Zibi Community Utility

The Zibi Community Utility (ZCU) District Energy System will provide net-zero carbon heating and cooling for all buildings in a new 34-acre development in Ottawa and Gatineau on a former industrial site on the Ottawa River.

To provide heating, the system recovers low-grade waste heat from the neighboring Kruger tissue mill. In summer, cooling is provided by rejecting heat into the Ottawa river, either through direct river water heat exchange or via chillers. The energy centre currently services six buildings totaling 57,000 m^2 but will service 370,000 m^2 at full buildout in 2032. ZCU is integral to helping Zibi be the region's first zero-carbon emission community.

[2] The primary source for this case study is an interview with Bruce Ander (President & CEO) and Peter Ronson (Chief Operating Officer) of MDE carried out over Zoom on October 23, 2023.

Table 4: Zibi Community Utility – Key Data

Zibi Community Utility	
Location	Ottawa, ON and Gatineau, QC
Ownership Model	Equal Partnership between Hydro Ottawa & Dream
Governance	Board of Directors
Economic Regulation	Thermal networks not regulated in Ontario or Quebec
Year Established	2021
Services	Heating and Cooling
Current Service Area / Load	Current: 57,000m^2 (613,000 ft^2) Future: 370,000 m^2 (4 million ft^2) at full build-out
Low Carbon Energy Supply	Industrial waste heat recovery, river water heat exchange
Connection Incentives / Requirements	Utility is 50% owned by developer

System Development

Theia Partners, a real estate developer focused on projects with high environmental performance, led the whole Zibi development including the ZCU. Theia's vision for Zibi was to create one of the world's most sustainable and environmentally conscious communities, with a goals of being net zero carbon, and achieving 30% reduction in operational building energy use compared with a code-compliant baseline.

The master planning phase was led by Theia, which later sold its share to the other investors (Dream Impact Trust and Dream Asset Management Corporation), who now own equal shares of the development. Theia continues to actively manage the Zibi Community Utility system in partnership with Hydro Ottawa and Dream.[3]

Hydro Ottawa became involved in Zibi because of the City of Ottawa's low-carbon development strategy that encourages Hydro Ottawa to engage in partnerships to deliver low-carbon infrastructure. Hydro Ottawa has also set a target to be net zero by 2030.

[3] https://theiapartners.com/projects#district

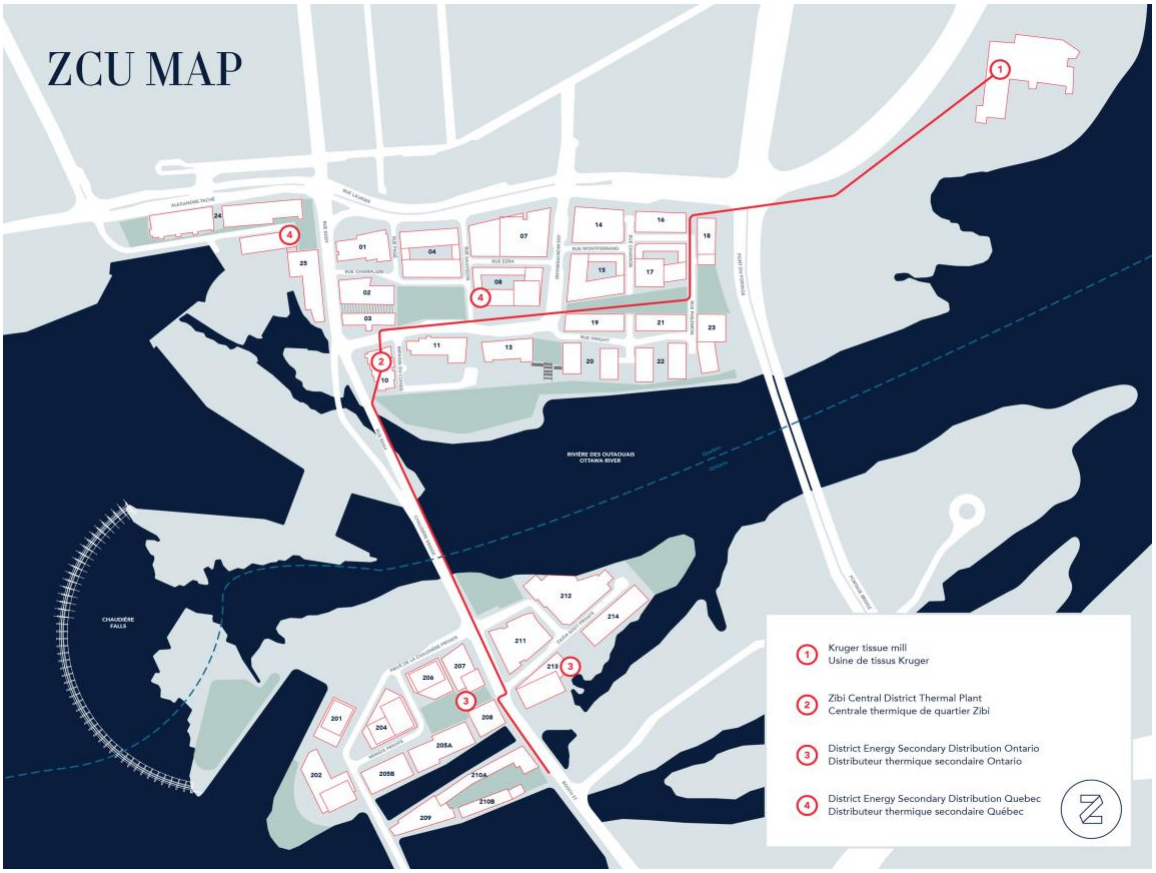


Figure 3: ZCU System Map (Zibi.ca)

System Ownership, Governance and Operation

Windmill Dream Limited Partnership (Dream) and Hydro Ottawa each have a 50% interest in the utility.[4] The system is operated by Ottawa Hydro[5] and governed by a board of directors.

ZCU secured a $20 million loan and $3 million grant from the Federation of Canadian Municipalities (FCM) Green Municipal fund (GMF).[6] Natural Resource Canada also provided a $1 million Energy Innovation fund grant. As of 2019, approximately $10 million in partner equity has also been invested in the system.

[4] Zibi Community Utility LP Financial Statements, December 31, 2019

[5] https://hydroottawa.com/en/blog/ottawas-first-carbon-neutral-community-here

[6] https://fcm.ca/en/news-media/news-release/gmf/canada-and-fcm-invest-in-national-capital-regions-first-net-zero-community/backgrounder

Rates, Connection Incentives and Regulation

As both landowner/developer of Zibi and a 50% shareholder in the Zibi Community Utility, Dream can ensure that all buildings in Zibi are connected to ZCU, making additional connection incentives or requirements unnecessary. Through Dream's role in the governance of ZCU, Dream has a degree of control over the utility's rates. As the landowner, Dream has an interest in ensuring that ZCU rates are not a deterrent to the marketability of the development.[7]

Since ZCU's infrastructure includes a pipeline which crosses the provincial boundary, they have required approvals from the Canada Energy Regulator (CER). CER does not regulate thermal energy rates; its regulation has focused on environmental protection and ensuring Zibi has set aside sufficient financial resources to deal with any future abandonment of the thermal energy pipeline.[8] Thermal energy utilities are not economically regulated by the Ontario Energy Board in Ontario or Régie de L'énergie in Quebec.

4.3 Lakeview Village District Energy System

Lakeview Village is a planned mixed-use waterfront community in Mississauga, on the former site of an Ontario Power Generation coal-fired power plant. Lakeview Village is expected to have up to 20,000 residents at buildout. As part of the planned redevelopment of the site, the property developer, Lakeview Community Partners (LCP), has announced their intent to include a low-carbon district energy system.

The planned technical solution is to provide both district heating and district cooling via a four-pipe system (supply and return pipes for both heating and cooling). The chilled water loop will be supplied via a centrifugal chiller plant. The hot water loop will be supplied via a central heat pump using heat recovered from treated effluent at the G.E. Booth Wastewater Treatment Plant (WWTP). The G.E Booth WWTP is owned by the Region of Peel and located immediately east of the Lakeview Village development site.

Lakeview Community Partners has engaged Enwave, a Toronto-based district energy utility, to deliver the thermal energy system. The details of the LCP-Enwave arrangement are not yet public. As the master developer of the entire site, LCP is in a position to ensure that all buildings at Lakeview will connect to the thermal energy system.

[7] https://dream.ca/wp-content/uploads/2022/02/DRM_AnnualReport_final.pdf
[8] Order XC-001-2021. Canada Energy Regulator, 22 February 2021.

Figure 4: Lakeview Village Rendering (Source: City of Mississauga / Cicada Designs)

The current technical concept for Lakeview DE is for thermal energy to be transferred from the treated effluent a the WWTP to a separate loop via a heat exchanger. The Region of Peel expects to own the effluent heat loop on the G.E. Booth site and potentially the heat exchanger.

All downstream infrastructure such as distribution piping, the effluent heat recovery heat pump, and all chilled water infrastructure is expected to be owned by Enwave.

Similar to Zibi, the Lakeview DE utility rates will not be regulated by the Ontario Energy Board.

Table 5: Lakeview Village District Energy – Key Data

Lakeview Village District Energy	
Location	Mississauga, ON
Ownership Model	Unknown. Enwave was selected as utility partner but ownership arrangement is not yet public.
Governance	Unknown
Economic Regulation	Thermal networks not regulated in Ontario
Year Established	TBC
Services	Heating and Cooling

Lakeview Village District Energy	
Service Area / Load	Planned: 1,000,000 m^2 (11 million ft^2) at full build-out
Low Carbon Energy Supply	Effluent heat recovery
Connection Incentives / Requirements	Unknown. Property developer selected utility partner so connection requirements likely.

4.4 City of Guelph District Energy

In 2013, the City of Guelph launched two separate district energy service areas, one in the downtown core and one in a business park on the periphery of the city. The initial vision was for each service area to be served by a 10 MW combined heat and power (CHP) plant. The district energy project was delivered by Envida Community Energy, a new subsidiary of Guelph Hydro, itself a subsidiary of the City-owned Guelph Municipal Holdings Inc[9].

The City invested rapidly in these new service areas, with total investment on the order of $14 million. The City did successfully sign up several customers. However, customer growth stalled, and it eventually became apparent that the systems were far from achieving the scale required to make the CHP plants viable. The project's financial performance was poor, and the City eventually elected to dismantle the business park system entirely.

The downtown Guelph DES provides heating and cooling to two customers (a convention centre, and a residential condo tower). In June 2022, Guelph announced that the downtown district energy system had been sold to Cascara Energy. Cascara had previously been engaged to operate the system on the City's behalf. According to a later Freedom of Information request, Cascara purchased the system from the City effectively for free[10]. Available information suggests that ultimately the City's entire $14 million investment was written off.

[9] "Combined heat and power facility announced for Hanlon Creek Business Park". Ward 2 Guelph Press Release, April 10, 2014.
[10] Saxon, Tony. "We finally know how much the city sold downtown district energy for (spoiler alert: $8)". GuelphToday, Dec 6 2023.

Guelph DE Case Study Insights

The experience of the Guelph district energy initiative illustrates that commitment and a willingness to invest are not sufficient to successfully establish a new district energy system. Customer connections are critical, and brand-new systems are particularly vulnerable to connection risk. Without a combination of the right circumstances (typically, a major new development area) and either enthusiastic customer participation or policy tools to drive connection, new district energy systems can face significant challenges.

While there are examples of new DE systems being established by municipalities without relying on compulsory tools such as mandatory connection, those cases are relatively rare. Strong municipal policies to ensure buildings (typically new builds) connect remains the most common connection risk mitigation strategy for new district energy systems.

4.5 Enwave Toronto

Enwave Toronto is Canada's largest district energy system. Enwave's Toronto system includes a steam heating system as well as an innovative chilled water system. Enwave serves approximately 180 buildings in downtown Toronto, including many landmark buildings and institutions. Enwave also owns other district energy systems in Canada, though the Toronto system is the company's largest.

History

The company that is now Enwave was originally established in 1969 as a non-share capital corporation to provide heat to four hospitals in downtown Toronto[11]. In 1980, it was merged with other steam system assets in the area. It remained a non-share corporation and the board was expanded to include representatives appointed by the City, the hospitals, the provincial government, and the University of Toronto[12].

The utility was converted to a share corporation in 1998, with shares issued to the City, the provincial government, the University of Toronto, and the four hospitals which founded the system[13]. All of these entities owned large buildings served by the district energy system.

Over time, these customers sold their shares, and ownership was eventually consolidated. Today, Enwave is owned by Ontario Teachers' Pension Plan and IFM Investors, an investment management firm. Since privatization in 1998, Enwave has continued to expand. The utility added its chilled water service in Toronto in 2004 and has subsequently purchased existing DE systems and established new systems throughout North America.

[11] *The Toronto Hospitals Steam Corporation Act, 1969*. Statutes of the Province of Ontario 1968-69, Chapter 131.
[12] *The Toronto District Heating Corporation Act, 1980*. Statutes of the Province of Ontario 1980, Chapter 73.
[13] *The Toronto District Heating Corporation Act, 1998*. Statutes of the Province of Ontario 1998, Chapter 15 Sched C.

The history of Enwave illustrates how district energy ownership can evolve over time. The project, which began as a non-profit collaboration between four hospitals, expanded to include participation by the municipality, the province, and other major customers. This type of ownership evolution has also been quite common in Sweden, where the share of district energy utilities owned by municipalities declined from nearly 100% in 1990 to about 60% by 2004.

Joint Development Agreement with City of Toronto

In response to City policies requiring low-carbon heating systems for new buildings, Enwave has continued to work in partnership with the City of Toronto. In 2018, following a procurement process by the City to select a "revenue partner to deliver district energy systems across Toronto with little risk to the City", Enwave and the City completed a Joint Development Agreement.[14] The stated objectives of the JDA are to:

- Reduce greenhouse gas emissions, and improve energy resilience;
- Achieve speed to market, scalability, and ability to fund projects identified for development; including attracting grants from external parties;
- Foster economic development, City building, and new revenue opportunities;
- Mitigate risks associated with project development and operation; and
- Create balance between long term project development and the capability to initiate projects that are ready for development now.[15]

Following the selection of Enwave as the preferred proponent, the City of Toronto and Enwave negotiated the terms of the JDA (the full term sheet can be found on the City's website[16]). Under the JDA, a joint development team will "identify and propose" potential DE projects to recommend to City Council and Enwave's Board of Directors and "Council approval will be required before the City can commit resources or access to City assets to a project".

The City will share in the benefits derived from approved project implementation, which may include revenue sharing and ownership of carbon credits. The City's financial contribution to individual projects may include in-kind contributions, capital in the form of grants from other levels of government, and leases/access to City assets.

The first project completed under the JDA is the district energy system at Etobicoke Civic Centre in Toronto (also known as Six Points, at the intersections of Bloor Street West and Kipling Ave). This project will serve a 17-acre City-owned site, comprising seven development blocks, including the new Etobicoke Civic Centre and five blocks of residential development delivered by CreateTO as part of The City's Housing Now Initiative. The proposed DES will be a "networked" geoexchange system with the borefields located beneath the footprints of

[14] https://www.toronto.ca/legdocs/mmis/2022/gl/bgrd/backgroundfile-227886.pdf
[15] https://www.toronto.ca/legdocs/mmis/2017/ex/bgrd/backgroundfile-109095.pdf
[16] https://www.toronto.ca/legdocs/mmis/2018/ex/bgrd/backgroundfile-112992.pdf

buildings on the site. The networked geoexchange fields will connect to a single energy centre housed in the Etobicoke Civic Centre that will provide hot and chilled water to the district.[17] The DES will enable the Six Points community to have near-zero operating emissions. As the developer of the site, the City will ensure that all buildings connect to the Enwave system, eliminating connection risk.

Figure 5: Etobicoke Civic Centre Development

[17] The Six Points site is adjacent to another CreateTO site at Bloor Street West and Islington Avenue, comprising an additional four residential towers, these buildings are not part of the Six Points DES, however the agreement does appear to allow Enwave to build DES infrastructure beyond the development site, which would enable the system to grow beyond the Six Points service area in the future, in addition to the existing large buildings that neighbour the site.

4.6 River District Energy / Metro Vancouver Waste-to-Energy Facility

This project is a collaboration between the public and private sectors to deliver a regional-scale district heating utility. The major components include:

- River District Energy (RDE), a privately-held district heating utility serving new buildings within the River District development site in southeast Vancouver. RDE has been in operation since 2012 and provides hot water service to 20 buildings using temporary gas-fired boiler plants.

- Metro Vancouver Regional District (MVRD), a regional government for the greater Vancouver area. It provides regional services such as water, wastewater, and solid waste management to its member municipalities. MVRD owns the Waste-to-Energy Facility (WTEF), a solid waste management facility in Burnaby, BC which currently produces 22 MW of electricity. MVRD has signed a contract to provide thermal energy to RDE by drawing waste heat off the WTEF.

- City of Burnaby. The City of Burnaby is developing new district energy systems in Burnaby. It will own and operate these systems and has passed a connection bylaw requiring new buildings to connect and will seek to retrofit existing buildings for connection. The City of Burnaby and MVRD are working to finalize a contract for MVRD to sell thermal energy to a new district energy utility being developed by Burnaby.[18]

Figure 6: Rendering of River District at Build-out (Wesgroup Properties)

[18] Burnaby District Energy Policy, 2023

Table 6: MVRD / RDE – Key Data

River District Energy & Metro Vancouver Waste-to-Energy DES	
Location	Vancouver, BC and Burnaby, BC
Ownership Model	Split asset. Includes a privately held utility and multiple publicly-owned utilities. Transmission system is separate from distribution.
Governance	• RDE: investor-owned, privately held • MVRD: board made up of elected officials from member municipalities • City of Burnaby: City Council
Economic Regulation	• River District Energy is regulated by the BC Utilities Commission • Thermal energy sales by City of Burnaby to its customers will be unregulated • Metro Vancouver's sale of wholesale thermal energy to RDE and the City of Burnaby is technically subject to regulation by the BCUC, however Metro Vancouver intends to request an exemption from BCUC regulation
Year Established	• RDE established 2011 • MVRD district heating system to begin operations in 2027 • City of Burnaby district heating service to begin 2026
Service	RDE: Heating Only Burnaby: TBD
Current Service Area / Load	RDE Current: 300,000 m^2 (3.2 million ft^2) RDE Build-out: 900,000 m^2 (9.7 million ft^2) Burnaby: TBD
Low Carbon Energy Supply	Waste heat from existing MVRD-owned waste-to-energy facility
Connection Incentives / Requirements	Rezoning of River District area includes requirement to connect to RDE. Burnaby has passed a connection bylaw for new buildings in Metrotown and Edmonds service areas.
Funding / Financing	RDE has received commercial debt financing on favourable terms due to the project's environmental benefits.

Figure 7: Thermal Energy Transmission Line from WTEF to River District Energy, Metrotown and Edmonds

System History and Development

The WTEF heat transmission system was established through close collaboration between local governments and Wesgroup, the developer of River District.

Metro Vancouver and the City of Vancouver both have a longstanding interest in increasing resource recovery from the WTEF through district energy. When the WTEF was first built in the late 1980s, MVRD sold steam to an adjacent paper mill. In the early 2000s, MVRD added a turbine and generator and began generating power for sale to BC Hydro to supplement revenue from steam sales. In 2011, the paper mill closed, and since that time power sales have been the only source of energy sales revenue from the WTEF.

The City of Vancouver has pushed for the development of new district energy projects since the launch of its own system, the Neighbourhood Energy Utility, in 2010. When Wesgroup, the owner of the River District site, was in discussions with the City regarding rezoning to allow the construction of multifamily residential, the City included a requirement that the River District area include district energy. As a result of this, buildings within River District have been required to connect to RDE under the terms of the rezoning of the site since 2011.

Wesgroup evaluated potential utility partners for River District, but ultimately chose to establish their own utility, River District Energy. RDE has been owned by Wesgroup from the system's inception and ownership has never expressed interest in divesting of the system.

Later policies implemented by the City of Vancouver required that RDE add a low-carbon resource rather than rely indefinitely on natural gas. River District completed a feasibility study for low-carbon energy supply, the results of which showed that multiple low-carbon technology options were considered feasible, including purchasing thermal energy from the WTEF.

The RDE study was followed by a WTEF DES Business Case study commissioned by Metro Vancouver. As part of this study, Metro Vancouver considered a range of ownership options for the heat transmission system, but ultimately decided to own it directly. Once that decision was made, MVRD and RDE worked together on a thermal energy purchase agreement.

In 2021, Metro Vancouver and River District Energy concluded a thermal energy purchase agreement. MVRD is now working closely with the City of Burnaby to expand the system into major development nodes in Burnaby. As of 2024, new buildings larger than 9,293 m2 (100,000 ft2) in the Metrotown and Edmonds areas of Burnaby will be required to connect to a new DEU being established by the City of Burnaby.

Ownership, Operation, Governance and System Capitalization

Wesgroup will continue to own RDE, and RDE will continue to be responsible for its own assets including its community energy center (which includes backup boilers for periods when WTEF heat is unavailable), distribution lines to customer buildings, and energy transfer stations. RDE has not received any grants towards system development costs, however it has received a commercial debt financing on favorable terms due to the project's environmental benefits.

The City of Burnaby will own the Burnaby DEU. The DEU will initially be run within the City's engineering department but may be transferred to a wholly-owned subsidiary of the City. The City is pursuing grants to support system development costs.

Metro Vancouver owns the WTEF and will also own the heat transmission line system to bring thermal energy to RDE's community energy centre and to planned energy centres in Burnaby. Metro Vancouver is pursuing funding from the Government of Canada to support system development costs.

Rate Setting and Regulation

RDE's thermal energy rates are regulated by the BC Utilities Commission. Metro Vancouver's thermal energy sales to RDE and to the City of Burnaby are subject to regulation by BCUC, but Metro Vancouver intends to seek an exemption. The City of Burnaby's district energy system would not be subject to regulation by the BCUC as local governments are exempt from regulation by BCUC.

Under the City of Vancouver's Zero Emissions Building Plan, buildings connecting to RDE are required to meet increasingly stringent GHG emission limits from 2023 onwards. By the early 2030s, all new buildings connected to RDE must have a GHG emissions intensity of zero.

The City of Burnaby is implementing new policies to require low GHG emissions from new buildings, and these policies will also apply to buildings served by the Burnaby DEU.[19]

4.7 City of Vancouver False Creek Neighbourhood Energy Utility

The False Creek Neighbourhood Energy Utility provides low-carbon heating to the False Creek service area using waste heat recovered from untreated sewage. The energy centre is co-located with a sewage pumping station. Key project statistics are provided in Table E-2.

In 2005, several years after the City of Vancouver was awarded the 2010 Winter Olympics, City Council approved plans to redevelop a former industrial site at the southeast end of False Creek to house the Olympic Village. After the games, the buildings would be repurposed as housing, and the rest of the site would be built out as a sustainable, mixed-use community known as Southeast False Creek.

The primary objective for the development of the False Creek Neighbourhood Energy Utility (FC NEU) was the reduction of GHG emissions, in alignment with the sustainability goals for the neighbourhood.[20]

In addition to GHG emission reductions, the City's goals for the creation of the NEU were to provide reliable, comfortable and cost-competitive thermal energy; and reduce the use of high-quality energy (electricity) for the provision of low-grade space and hot water heating.

The City wanted to establish the FC NEU to demonstrate the commercial viability of DE, however the development timeline dictated by the 2010 Olympics meant that there was insufficient time for the City to select a private sector utility partner and obtain the necessary

[19] The source of information for this case study is Reshape's direct experience supporting Wesgroup, River District Energy and Metro Vancouver throughout the development of this project since 2011, supporting sources are noted and linked throughout.
[20] The utility was originally known as the Southeast False Creek NEU, but with the expansion of the system outside of Southeast False Creek, the system name was changed to the False Creek NEU.

regulatory approvals from the BC Utilities Commission, so the City elected to develop the project as a 100% municipally owned utility.

Figure 8: Construction of the Olympic Village, Vancouver

Table 7: False Creek NEU – Key Data

False Creek NEU	
Location	Vancouver, BC
Ownership Model	Municipally owned (part of City's engineering department)
Governance	Governed by City Council with independent expert rate review panel.
Economic Regulation	Exempt from regulation by the BC Utilities Commission.
Year Established	2010
System Size	Current: 620,000 m2 (6,700,000 ft^2) Future: 1,900,000 m2 (20,500,000 ft^2)
Service	Heating
Low Carbon Energy Supply	Base-load heating is supplied by sewage heat pumps (current NEU target is 70% renewable supply) combined with natural gas boilers fueled by renewable and conventional natural gas.
Connection Incentives / Requirements	Mandatory connection within service area (defined in NEU bylaw)

The City's main drivers for establishing a 100% publicly owned DE utility were:

- Limited time to select private sector partner.
- Public ownership enables exemption from regulation by BC Utilities Commission.
- Direct municipal control over 25% of the connected floor area in the first phase of the system provided load certainty.
- Ability to establish a mandatory DE connection bylaw in the NEU service area to ensure connection of future loads.
- Ability to access significant grants and low-cost financing.

The False Creek NEU is operated by the City of Vancouver engineering department, and is overseen by Vancouver City Council, who make decisions on capital investment, policy and customer rates. The rates are reviewed by an independent rate review panel.

The rate structure of the NEU is designed to mirror a regulated private sector model; capital and operating costs are recovered through customer rates, including a return on equity.[21] The rate structure was designed to demonstrate commercial viability of DE and to enable benchmarking against other DE utilities.[22] The transparency of the business model would also help facilitate the sale of the NEU to the private sector in the future, if the City chose to sell the asset.

4.8 Lulu Island Energy Company

Lulu Island Energy Company (LIEC) is a wholly-owned municipal corporation that provides heating and cooling services in two service areas within the City of Richmond. LIEC's energy is supplied by a mixture of low carbon and conventional energy sources. At present, LIEC provides service to approximately 600,000 m2 of connected floor area.

Table 8: Lulu Island Energy Corporation – Key Data

Lulu Island Energy Company	
Location	City of Richmond, BC
Ownership Model	Wholly-owned subsidiary of the City of Richmond. 30-year design, build, finance, operate and maintain (DBFOM) agreement with Corix Utilities to assist with delivery of City Centre service area (with debt financing provided by Canadian Infrastructure Bank).
Governance	• District Energy Service Agreement between LIEC and the City outlining roles, responsibilities, requirements and processes. • Board currently composed entirely of City managers.

[21] Subject to a soft rate cap that prices be no more than 10% above electricity rates.
[22] The City chose not to include notional income taxes on the utility proforma.

Lulu Island Energy Company	
	• Council determines and enforces connection requirements via Service Area Bylaws and establishes retail rates, with regard to LIEC costs, contributions/grants, and conditions of any LIEC financing.
Economic Regulation	Excluded (municipal systems are not subject to regulation in BC)
Year Established	2013
Service	Heating and Cooling
Service Area	Current Alexandra Neighbourhood: 214,000 m2 (2.3 million ft^2) Current City Centre (including Oval Village): 390,000 m2 (4.2 million ft^2) Future City Centre 4.4 million m^2 (47 million ft^2)
Low Carbon Energy Supply	Alexandra Neighbourhood: Geoexchange, air source heat pump, evaporative fluid coolers, condensing boilers, renewable natural gas City Centre: Condensing boilers, chillers, sewer heat recovery (future), renewable natural gas
Connection Incentives / Requirements	Service Area Bylaw with Mandatory Connection

System History and Development

As the fourth largest city in British Columbia, Richmond has become a leader in the development of district energy to support the City's ambitious greenhouse gas reduction targets. Richmond made the initial decision to establish a fully-owned municipal system to ensure full control over its development and rates, including exclusion from onerous regulation by the BC Utilities Commission. There has been strong political support from the system throughout its history. While LIEC directs and owns all infrastructure and services (and Council has full authority over rates), LIEC has pursued innovative partnerships to assist in the delivery of the infrastructure and services, including financing.

The explicit goals of LIEC are to:

- Establish a highly efficient district energy network providing heating and, in some cases, cooling services to buildings at competitive rates;
- Provide reliable, resilient local energy for the benefit of its customers;
- Operate and maintain low carbon energy systems;
- Position Richmond to be a national and international leader in district energy utilities;
- Develop and manage effective partnerships; and
- Sustain long term financial viability.

LIEC was established in 2013 following the construction of the first phase of the City's very first district energy system – the Alexandra District Energy Utility (ADEU). The ADEU employs a mix of technologies including air-source heat pumps, evaporative fluid coolers, condensing boilers, and geo-exchange fields located in City lands to efficiently heat and cool connected buildings. LIEC's second service area was a new neighbourhood surrounding the Olympic Oval built for the 2010 Winter Olympics, which has since been converted to a community centre. In 2014, LIEC entered into a 30-year Concession Agreement with Corix Infrastructure to design, construct, finance, operate, and maintain the infrastructure for this new service area. LIEC retained governance and full ownership of the infrastructure, with rates set by Council.

In 2022, LIEC entered into an agreement with Corix Infrastructure Inc. and the Canada Infrastructure Bank (CIB) to help design, build, finance, operate and maintain a district energy system for the entire Richmond City Centre (City Centre District Energy Utility (CCDEU)). This agreement replaces the concession agreement for the Oval Village, which is now part of the much larger CCDEU service area. The expanded utility will serve an additional 170 new buildings (an additional 4.6 million m^2), representing $500 million of new capital and over one million tonnes of GHG reductions.

Under the new agreement, Corix will continue to support design, construction, operation and financing of the CCDEU (including the Oval Village). The CIB will provide $175 million in debt financing for the CCDEU, facilitating waste heat recovery from the regional sewer system. The CCDEU will continue to be owned entirely by the City of Richmond through LIEC. LIEC approves all capital, operating and maintenance plans of the new special purpose entity set up by Corix, Council continues to set retail rates and enforce connection requirements. The current LIEC service areas are shown in Figure 9, below. The area outlined in red as the future service area is the new larger CCDEU service area in the agreement with Corix.

Procurement Process and Agreements

The current arrangement with Corix and CIB evolved incrementally for over a decade. The City of Richmond originally explored the feasibility of a district energy system around the Olympic Oval in partnership with the developer of the lands prior to the Olympics as part of the rezoning process. After determining preliminary feasibility, the City decided to pursue a district energy system under City ownership but with a third-party delivery partner.

The City issued a Request for Expressions of Interest, and after evaluating responses, entered into a Memorandum of Understanding with Corix to develop a district energy system on the

City's behalf. After further due diligence, the City and Corix entered into a concession agreement for Corix to design, build, finance, operate and maintain the system.
Several years later, the City issued another RFEOI to support development of district energy in the City Centre. After reviewing responses, the City entered negotiations with Corix to develop a larger district energy system for the City Centre, including the Oval Village. During negotiations, LIEC secured a memorandum of understanding (MOU) with the CIB to explore a possible role for CIB in financing an expanded system. After several years of due diligence and negations, Corix, CIB and LIEC executed a design, build, finance, operate and maintain (DBFOM) agreement for City Centre in September 2021.

Ownership, Governance and Rate Setting

LIEC is a wholly-owned municipal corporation. As a municipal utility, it is excluded from regulation by the BC Utilities Commission. After the incorporation of LIEC (which required approval of the Inspector of Municipalities), the City of Richmond and LIEC entered into a District Energy Utilities Agreement in 2014, which assigned LIEC the function of establishing and operating district energy systems and providing thermal energy services on behalf of the City. LIEC currently owns and operates the ADEU and the new CCDEU. Richmond has been experiencing rapid development in these areas and LIEC has been expanding to meet this increased energy demand.

LIEC is governed by a Board of Directors currently composed entirely of City staff. It is required at least once in every calendar year to have its sole shareholder, the City of Richmond, endorse consent resolutions addressing the business that would otherwise be required to be transacted at an annual general meeting. LIEC's articles of incorporation also require that the Board appoint an auditor and officers of LIEC, and that LIEC holds an annual information meeting open to the public, at which LIEC must present the audited financial statements for the previous fiscal year.

Council is responsible for approving and enforcing connection requirements and for establishing retail rates under Service Area Bylaws. LIEC currently operates under three Service Area Bylaws (an artifact representing that the Olympic Oval service area preceded the larger CCDEU Service Area), with three separate rate schedules.[23] In setting rates, Council must have regard to the costs of LIEC (net of any developer contributions or grants) and also any conditions of financing for LIEC. However, Council has considerable discretion to manage rates through the use of deferral accounts (which operate like lines of credit to manage discrepancies between revenues and costs over time, particularly during the early development phases of development where infrastructure is constructed in advance of development).

Retail rates for end users are also managed through the use of developer contributions and external grants, when available. Developer contributions may be required as a condition of connection and may take the form of financial contributions or contributed infrastructure (e.g.,

[23] ADEU Bylaw, CCDEU Bylaw, OVDEU Bylaw

energy transfer stations or interim on-site energy sources which are designed and constructed by developers under the direction of LIEC and Corix).

Under the DBFOM agreement with Corix, equity financing is provided on terms similar to regulated utilities in BC, with Corix assuming certain risks and performance requirements in exchange for a return on its equity. Long-term debt financing is provided by the Canadian Infrastructure Bank on favourable terms.

Council provides direction to LIEC on low-carbon energy. LIEC, in turn, is responsible for reviewing and approving Corix's annual capital and operating plans to achieve these goals. Corix is compensated for its cost of service, which includes financing, staff and other approved costs. The cost of service is calculated annually but payments may be deferred subject to limits on cumulative deferrals. Any deferred payments are subject to financing on comparable terms. Deferrals are used to ensure affordable rates as infrastructure and carbon requirements are phased.[24]

[24] This case study is based on Reshape's first-hand experience supporting LIEC development and agreement negotiation on behalf of LIEC.

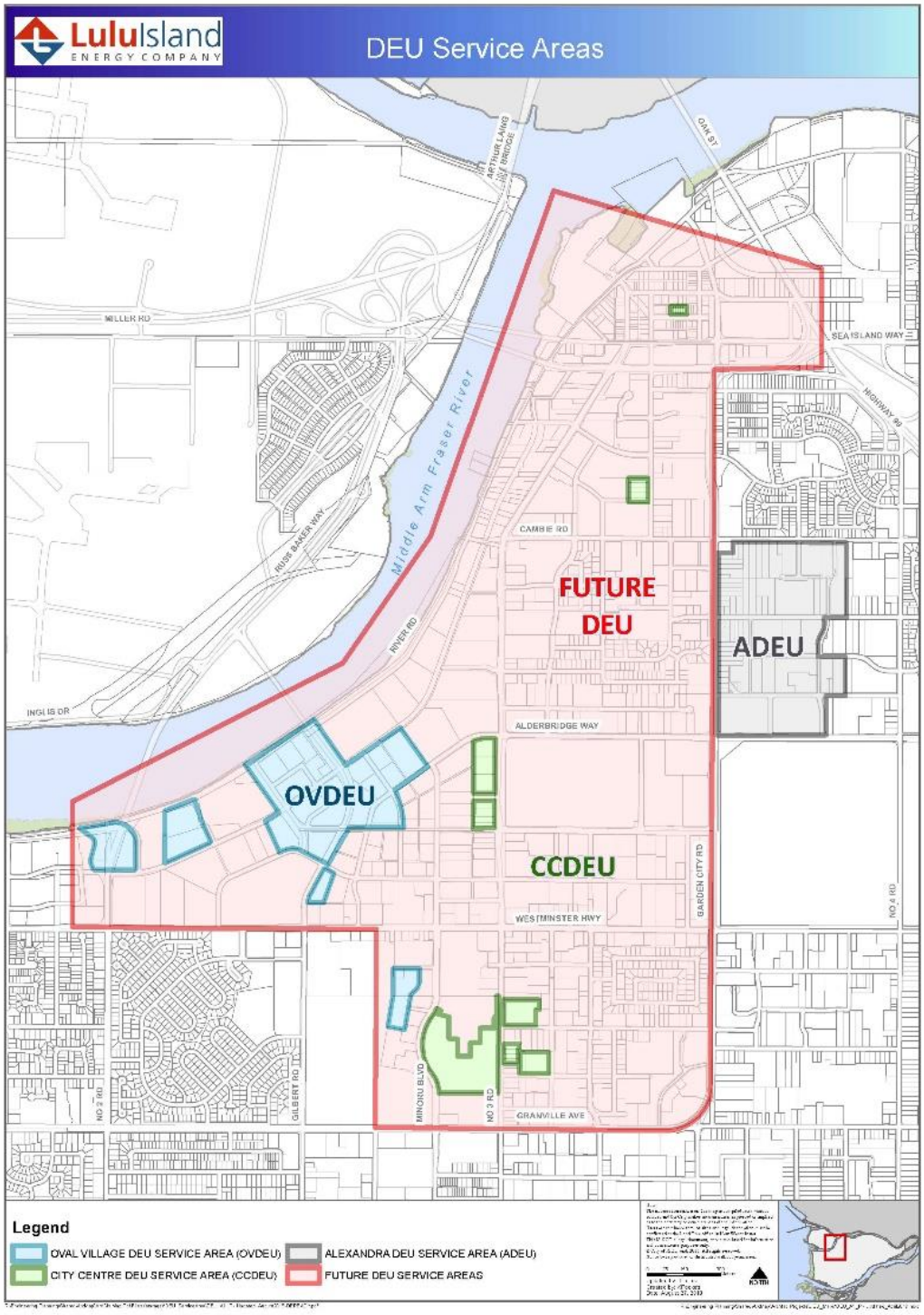
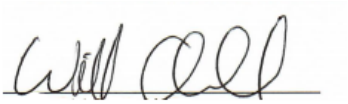


Figure 9: LIEC Service Areas (Lulu Island Energy Company)

5 Report Submission

RESHAPE INFRASTRUCTURE STRATEGIES

Prepared By:



Will Cleveland, MSc
Principal

Reviewed By:

Sonja Wilson, PEng (AB, BC, ON)
Principal

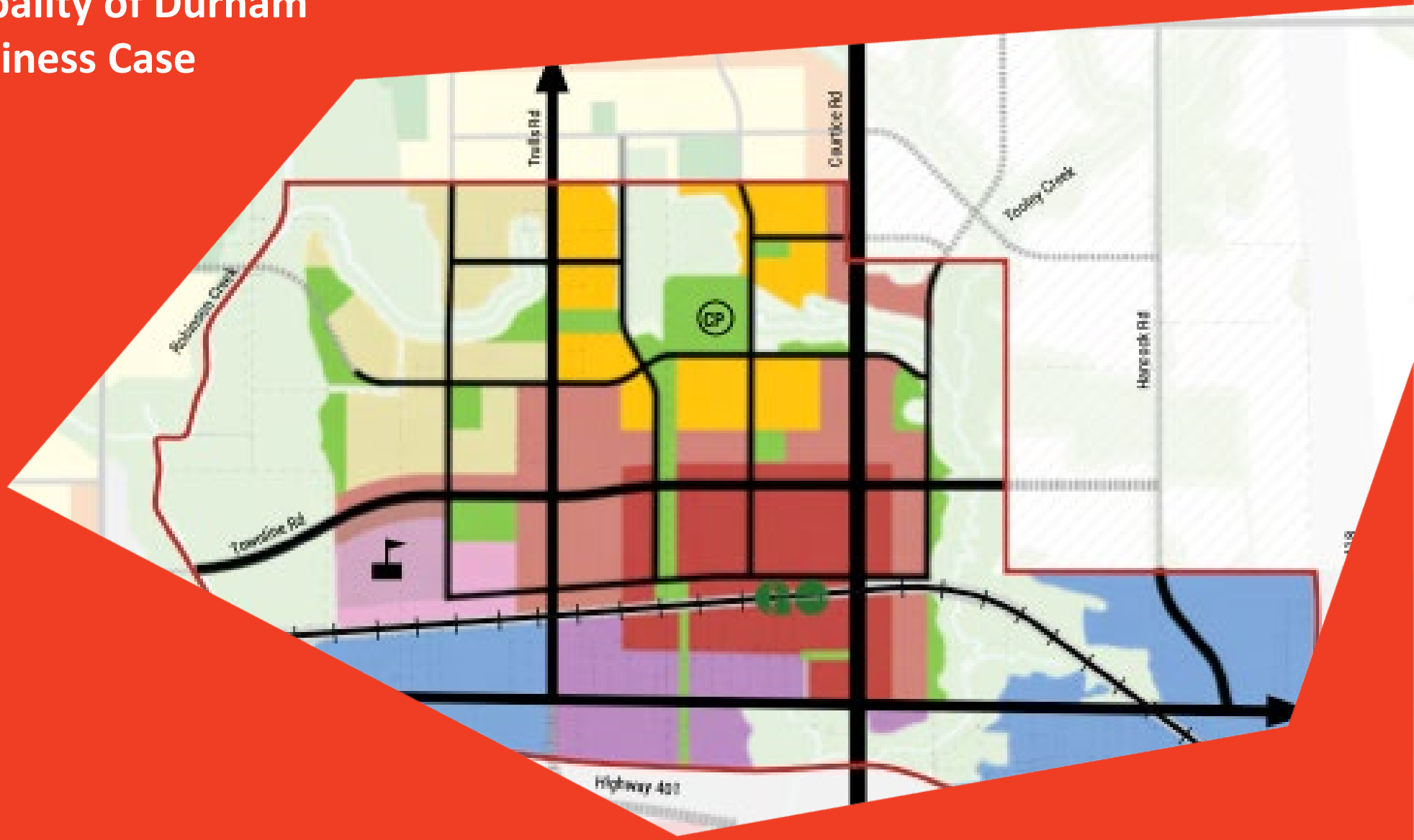
Revision History

Revision #	Date	Status	Revision Description	Author
0	2024.03.08	Draft	Issued for Client Review	WPC
1	2024.03.13	Draft	Issued for Client Review	WPC
2	2024.01.16	Final	Final Issue	WPC

Filename: RPT-P808-RegionOfDurham-DEOwnership-FINAL-R2.docx

Regional Municipality of Durham
Courtice DES Business Case

April 2025



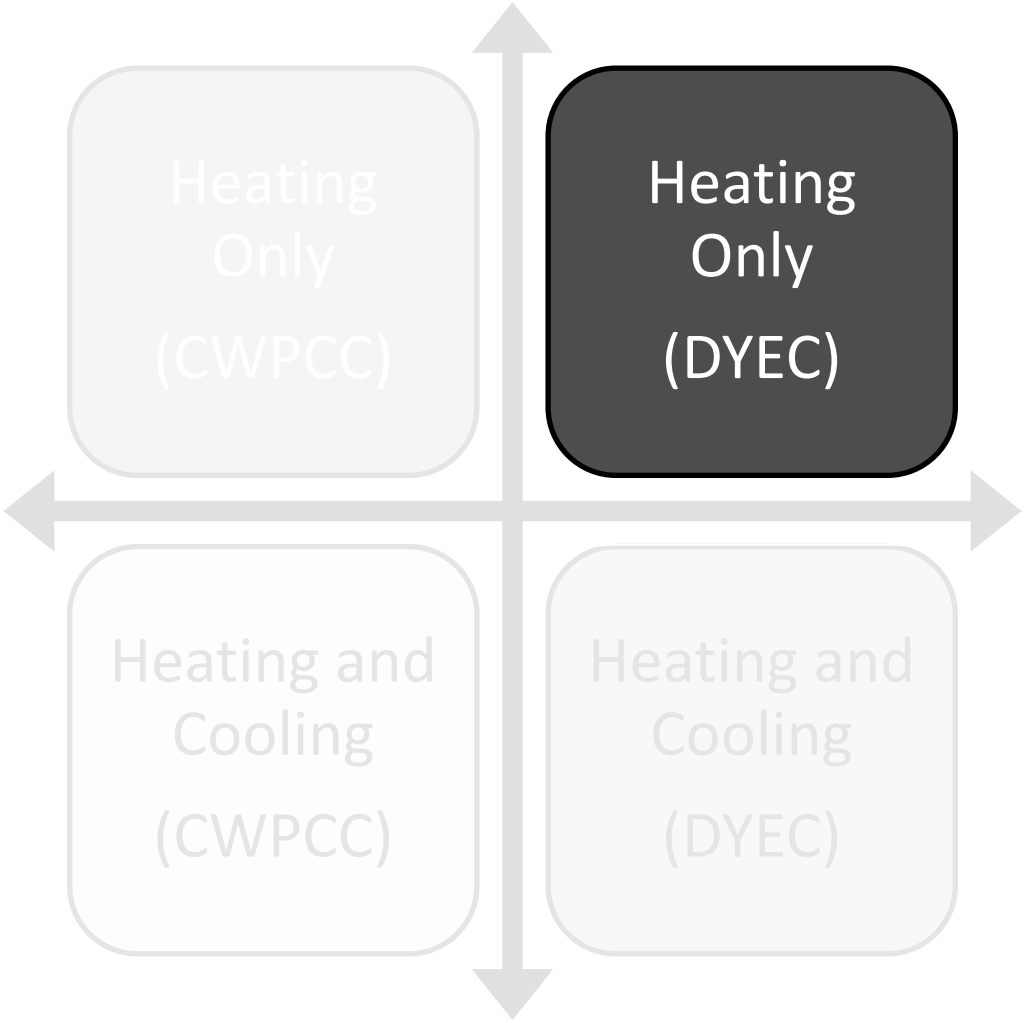
RESHAPE STRATEGIES

COURTICE DES SERVICE AREA (CONCEPTUAL ONLY)

CTOC 3D View Looking SW (Urban Strategies DRAFT CTOC Demonstration Plan, December 2023)

Red outline indicates approximate DES service area (can be expanded to serve adjacent areas)

DISTRICT ENERGY OPTIONS EVALUATED

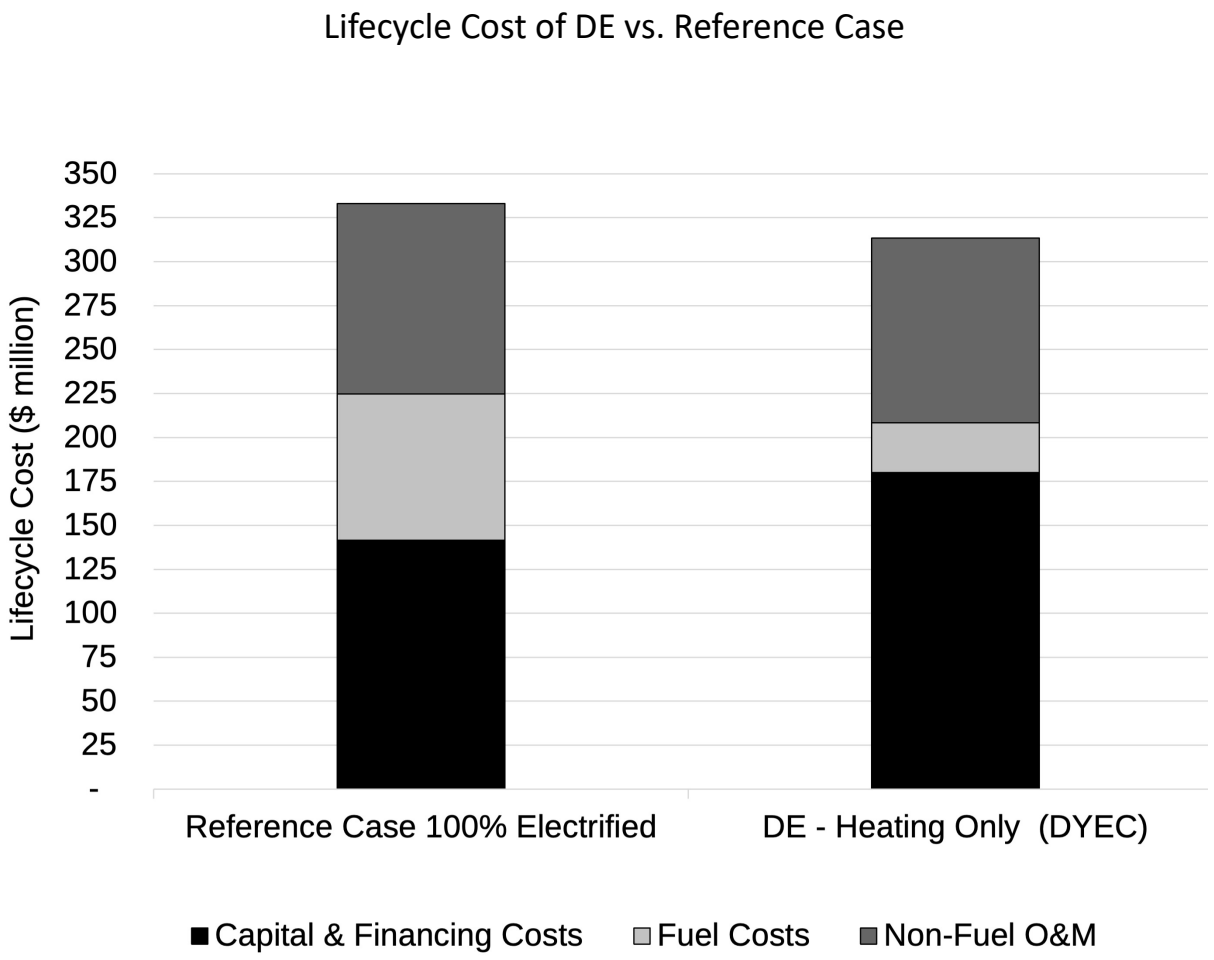


A heating-only system with heat from DYEC is the preferred DES concept and the basis of the DE business case because it:

- Has the lowest capital and lifecycle cost[1]
- Results in an 70% reduction in GHG emissions from gas boiler BAU over analysis period.
- Results in the lowest cost per tonne of avoided GHG emissions.

1. Including the capital and lifecycle costs of in-building cooling systems

DYEC HEATING ONLY - DES BUSINESS CASE



- To achieve similar GHG outcomes without the DES, all buildings in the Courtice MTSA would need to have 100% electrified heating (Reference case).
- The lifecycle cost of low-carbon heating in the Courtice MTSA supplied by DE is lower than electrification of heating at the building level.
- In the reference case, fuel costs are ~30% of the lifecycle cost, and capital is ~40%. In the DE case, capital and financing costs are 57% of the total lifecycle cost and the fuel cost is 9%.
  - DE provides greater energy cost stability to MTSA residents, relative to building electrification, due to reduced exposure to escalating electricity rates.

LANDOWNER GROUP (LOG) DEVELOPMENT FORECAST (UPDATED JANUARY 2025)

MTSA Boundary

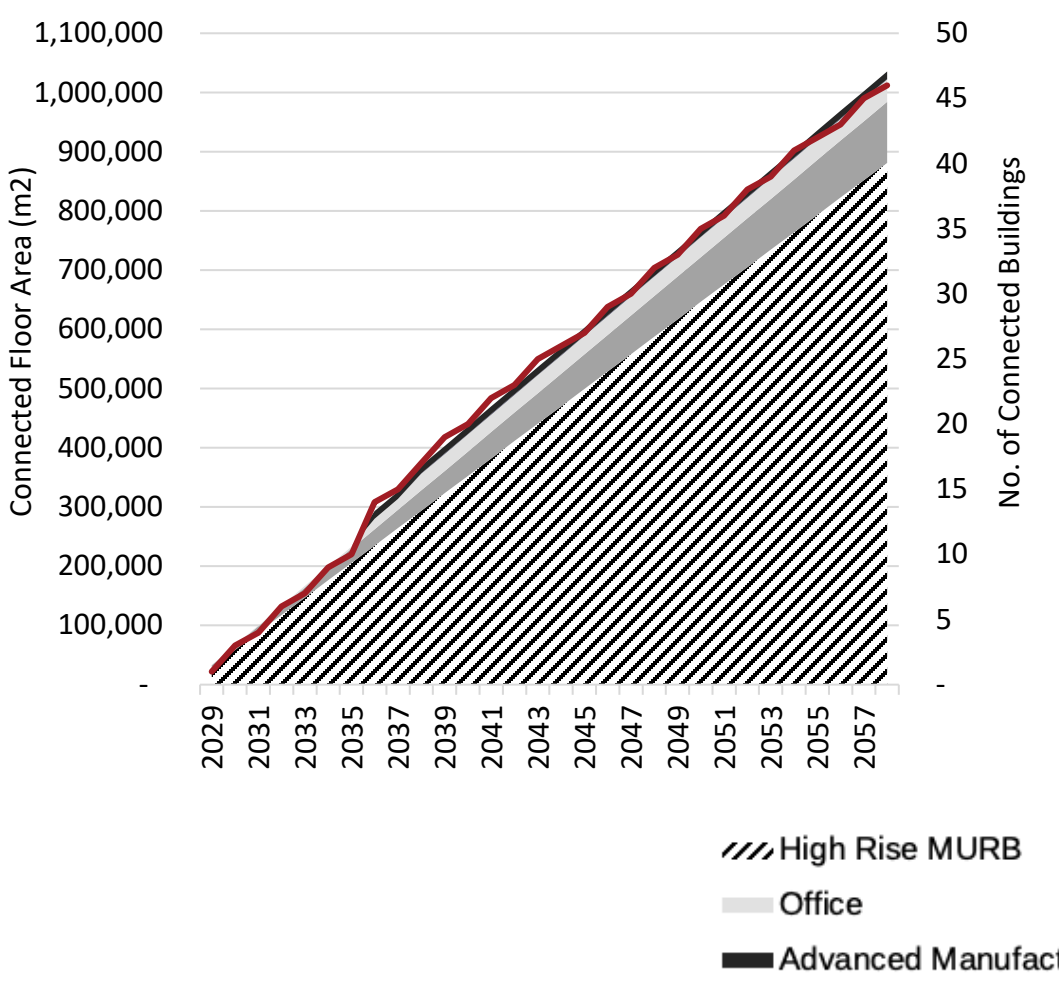
Ownership	Parcel	# Units / Year				Total Units
		2029	2030	2031	2032+	
Tribute	9	800	900	845	9,214	11,759
Brookfield Properties	12	525	550	550	3,725	5,350
Louisville Homes	15	-	-	-	1,625	1,625
Metrolinx	13	-	-	-	5,080	5,080
Non-Participants (NP)	NP, 32	-	-	-	6,401	6,401
Total Units		**1,325**	**1,450**	**1,395**	**26,045**	**30,215**

At an estimated average unit size of 720 ft^2 (67 m^2), the build-out floor area in the high-density area of the MTSA is estimated to be **2 million m^2 or ~20 million square feet.**

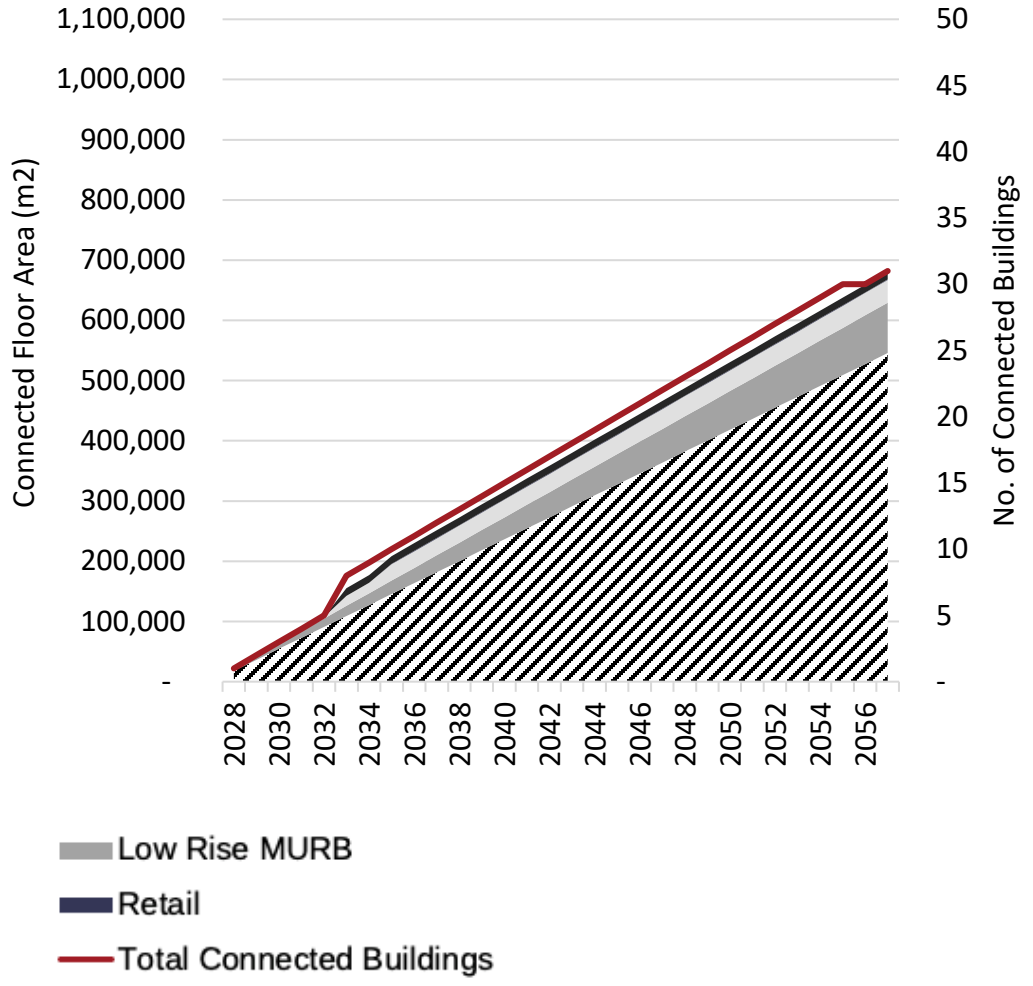
COURTICE DES LOAD FORECAST ASSUMPTIONS (UPDATED)

RESHAPE STRATEGIES

2025 Updated Forecast ("Target" Density)

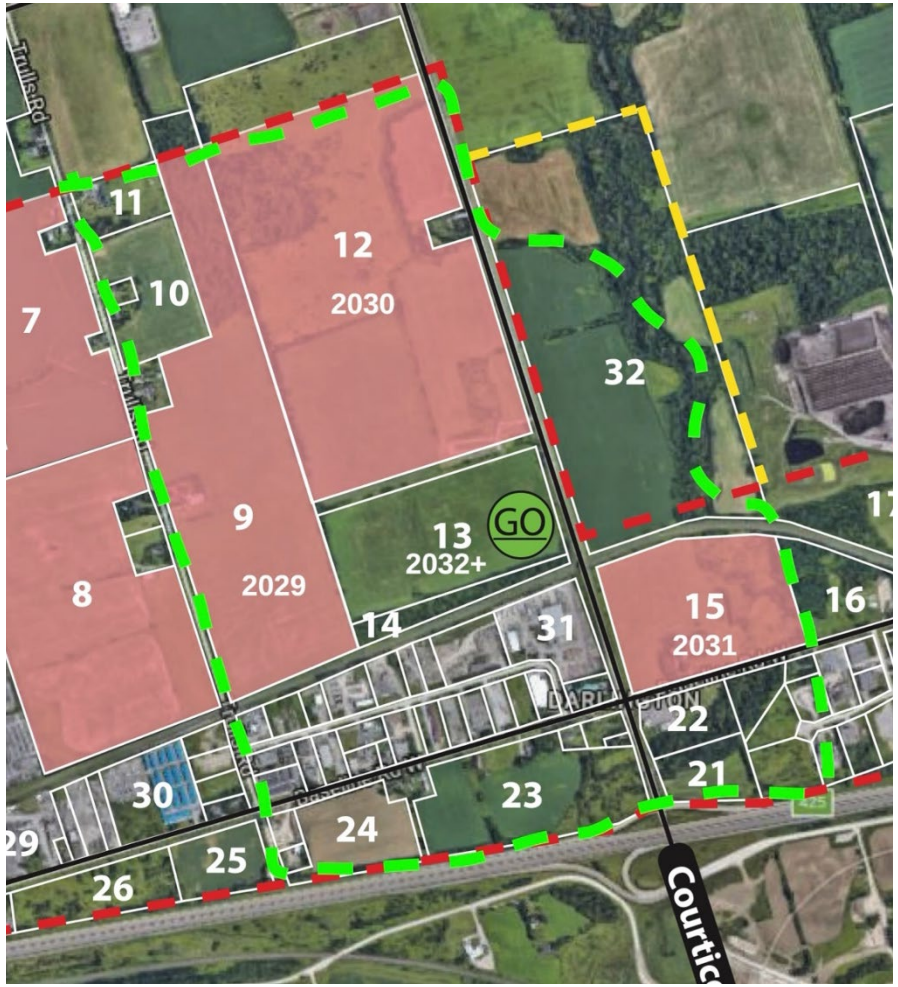


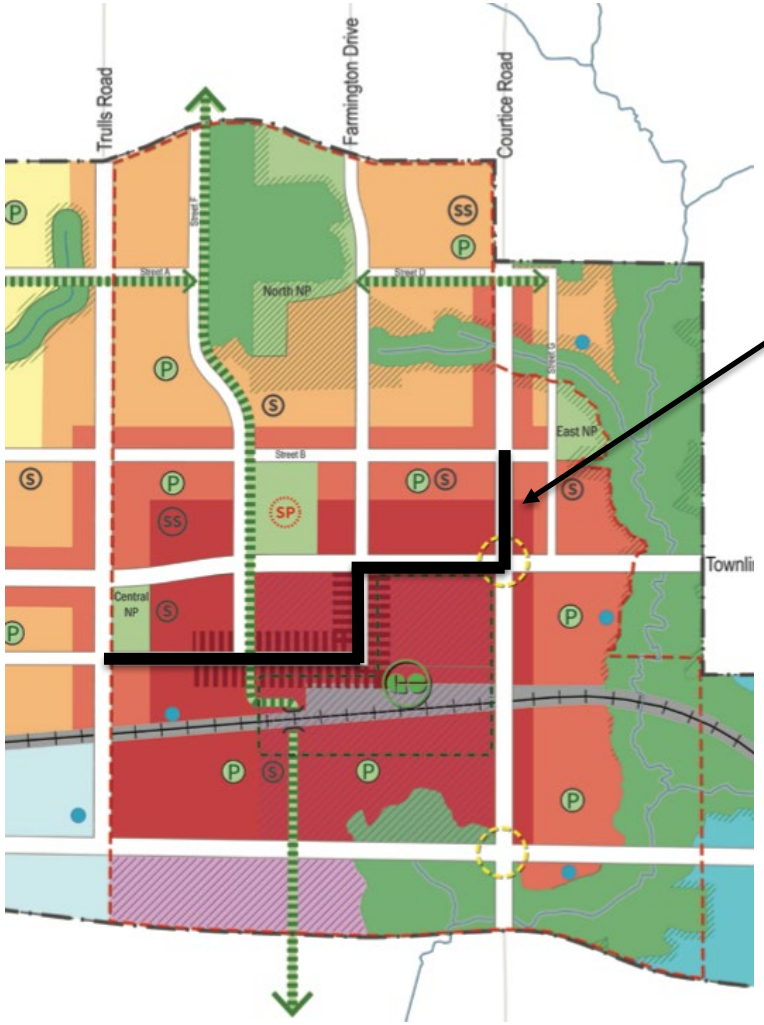
2023 Prior Forecast ("Minimum" Density)



High Rise MURB
Low Rise MURB
Office
Retail
Advanced Manufacturing
Total Connected Buildings

PHASE 1 DISTRIBUTION PIPING PLAN ASSUMPTIONS

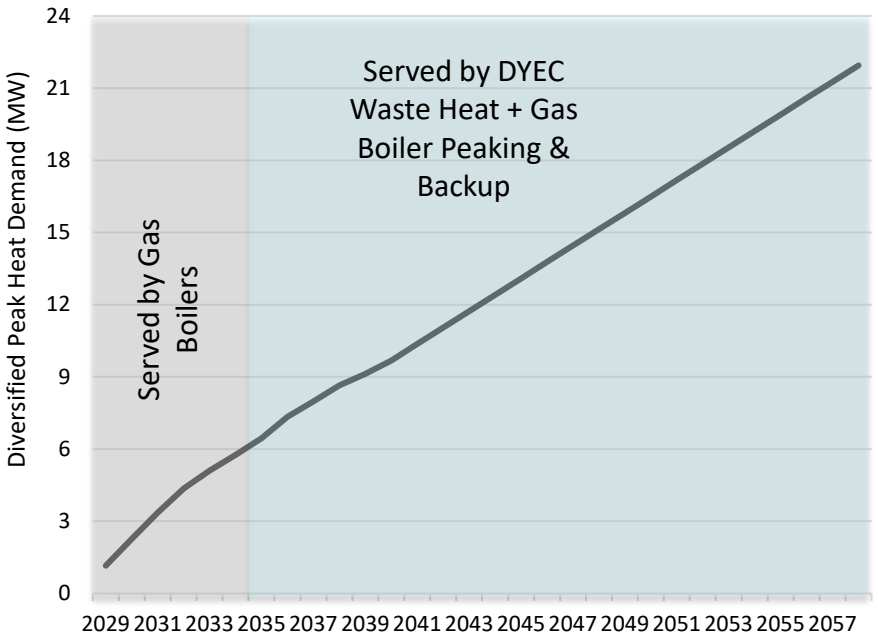




- First phase of distribution piping system
- Estimated to be 1400 m
- Service connections to buildings not shown

PHASE 1 – ENERGY CENTRE

- The first phase of the DES will be heated by a ~7 MW temporary energy centre (TEC).
- Once sufficient development in CTOC is underway, connection to DYEC will be

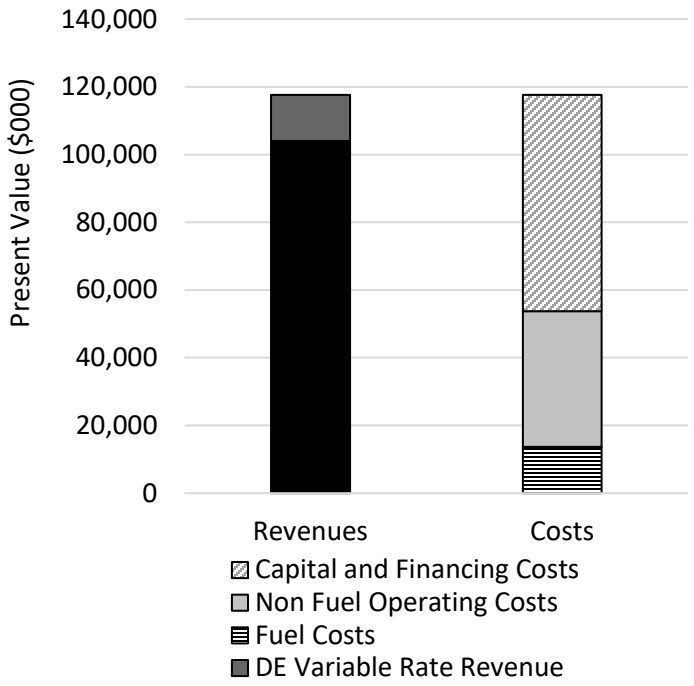


Temporary Energy Centre at the UBC Neighbourhood District Energy System (Corix Utilities)

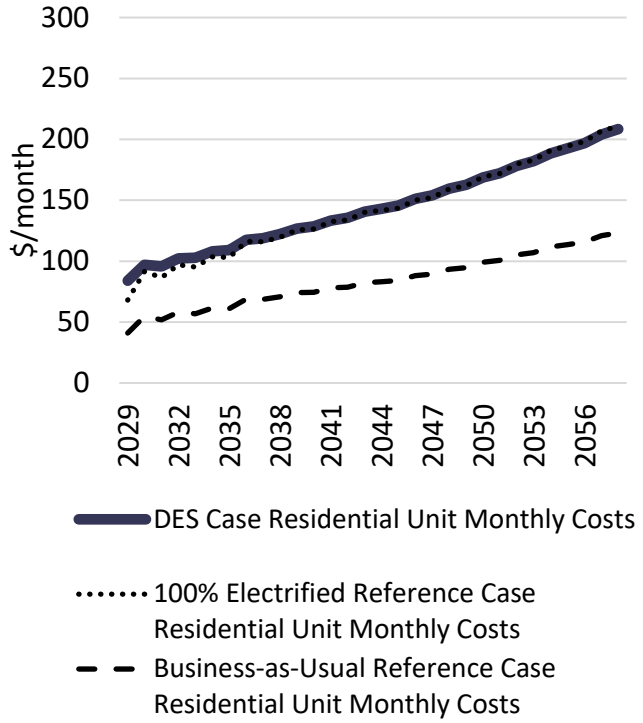
UPDATED DES BUSINESS CASE (BASE CASE)

Business case is presented as cost neutral from the DE Utility perspective (**including return on equity**) with competitive costs for DE rate payers and similar capital costs for landowners relative to the 100% electrified reference case.

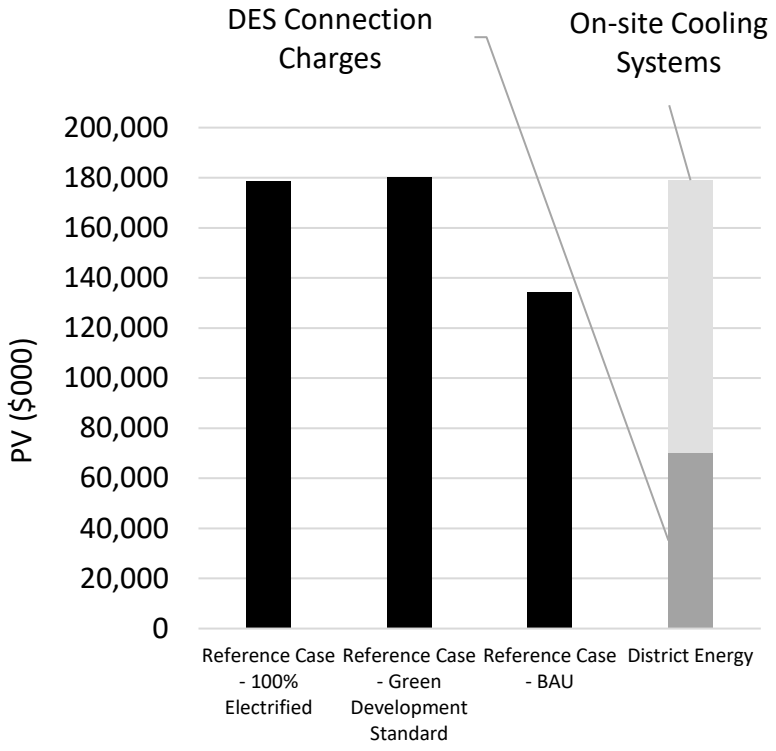
DE Utility Cost Recovery
DE Utility Revenues Equal to Costs on PV Basis (including RoE)



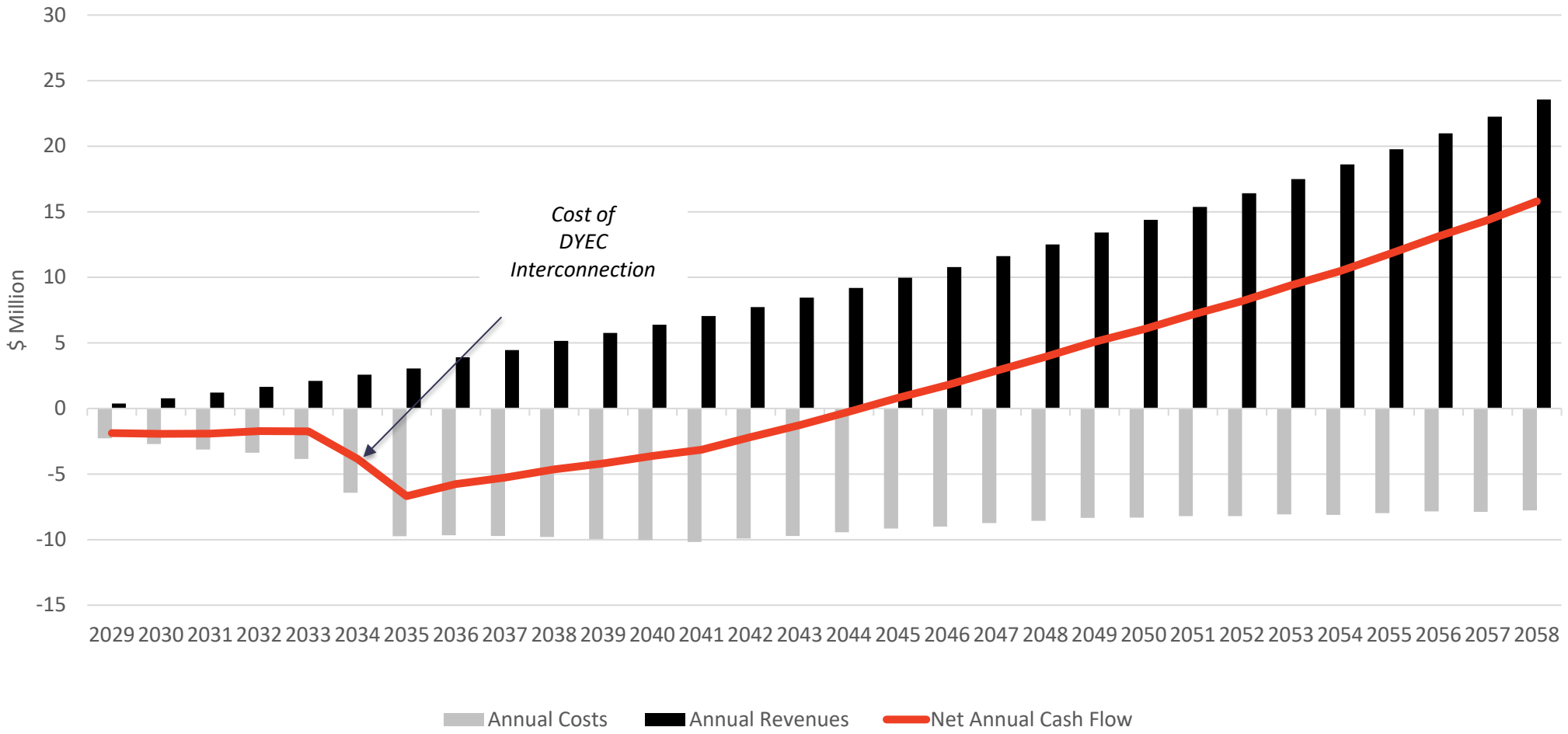
Rate Payer Costs
Monthly Heating and Cooling for Typical Residential Unit lower* with DE than with 100% Electrified Heating



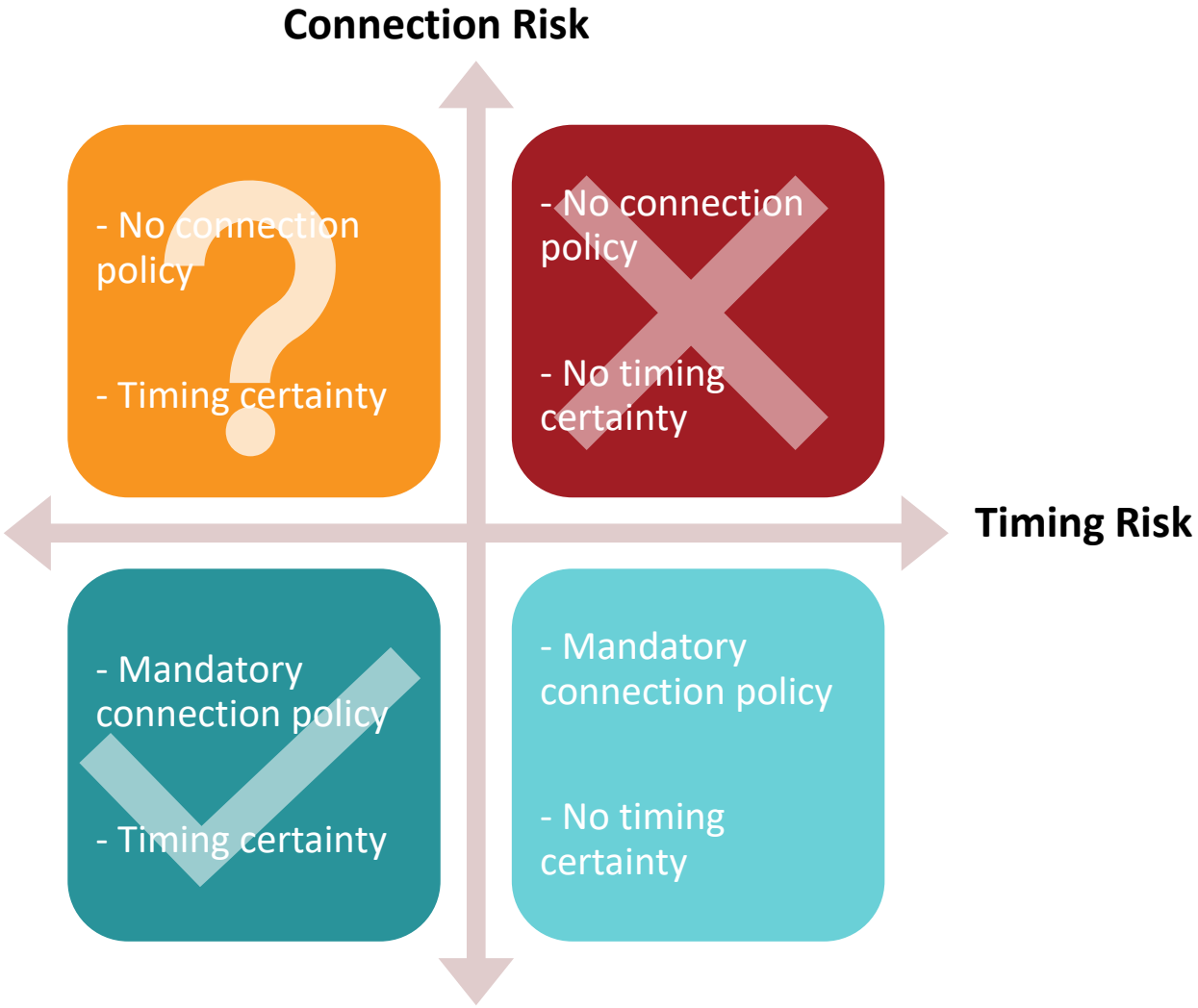
Landowner Costs
DE Connection Fees Similar to 100% Electric On-Site Systems



DES BUSINESS CASE – DE UTILITY CASH FLOW



FINANCIAL RISKS AND MITIGATION STRATEGIES



Connection Risk: *Will* buildings connect?

Timing Risk: *When* will buildings connect?

FINANCIAL RISKS AND MITIGATION STRATEGIES CONT.

Mitigating Strategies for Connection Risk

- Mandatory connection bylaw in defined service area.

- Supported with:
  - Competitive rates
  - Competitive connection fees
  - Streamlined / accelerated permitting process
  - Other incentives

Mitigating Strategies for Timing Risk

- Don’t build too much too soon!
  - Minimize early investment in system
  - Plan expansion of DES to match growth of neighbourhood
  - Utilize temporary energy centres
  - Complete cost/benefit analysis of extending service to new service areas (extension test).

OWNERSHIP & GOVERNANCE OF COURTICE DES

Joint Municipal Services Board (JMSB)

Control and Management of Respective Services Delegated by Municipalities

- Governed by Board appointed by Municipalities
- Provides Governance of Municipal Services Corporation
- Passes District Energy Bylaw (Incl. Connection Requirement)
- Sets Rates and Connection Fees

Municipal Services Corporation (MSC)

- Shareholders: Region of Durham and Municipality of Clarington
- MSC delivers, owns and operates DE Infrastructure
- MSC enables access to debt financing
- MSC provides billing and rate collection on behalf of JMSB

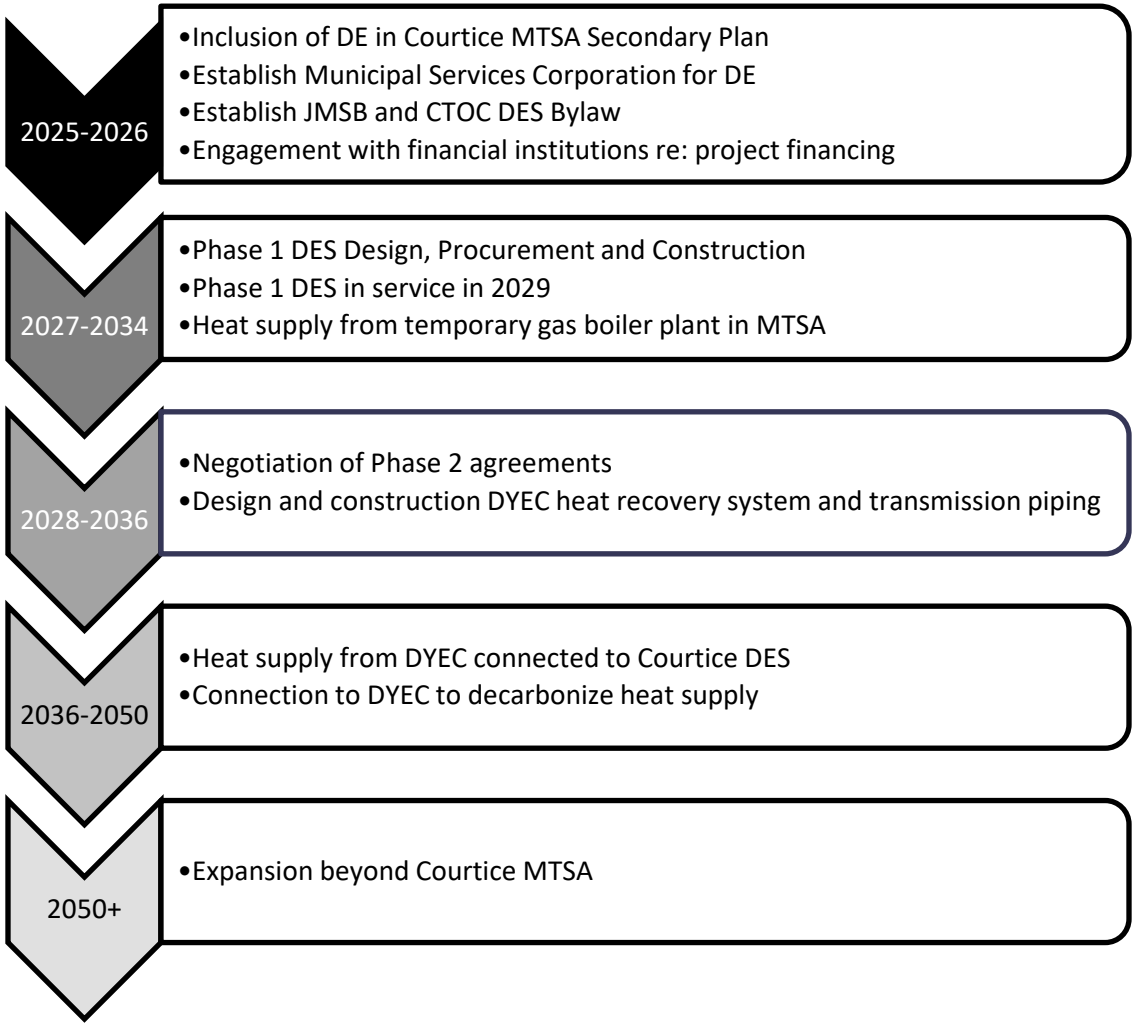
POTENTIAL FOR LOW-COST FINANCING AND GRANTS

- Over the past 2-3 years CIB has entered into financing agreements with three DES utilities totaling more than a billion dollars.
- Many low-carbon DE projects secure lesser amounts as grants.

Selection of Funding and Financing Recipients (non-exhaustive)

Name of Program	Recipient Project	Grant Amount ($ million)	Financing Amount ($ million)
Canadian Infrastructure Bank (CIB)	Markham Centre District Energy		135
Canadian Infrastructure Bank (CIB)	Enwave Energy Corporation		600
Green Municipal Fund (GMF)	Markham Centre District Energy	1	7.2
Green Municipal Fund (GMF)	Zibi Community Utility	3	20
Green Municipal Fund (GMF)	City of Vancouver NEU	1.5	15
Green Municipal Fund (GMF)	Lonsdale Energy Corporation	2	2
Low Carbon Economy Fund	Enwave Energy Corporation - PEI	3.5	

TARGET PROJECT DEVELOPMENT TIMELINE & PROCESS



- In the near term, the Municipalities will work to include DE as part of the Courtice MTSA Secondary Plan as an enabling policy for DE.
- The objective is to have DE service available in time for the first buildings in the CTOC to connect (2029).
- The DE Service Area and Phasing Plan will be developed in coordination with Landowner's Group.
- To manage investment risk, the first phase of the DES will be served by a temporary gas boiler plant (or plant integrated with a municipal facility).
- Once sufficient load is connected to the DES, the connection to DYEC will be completed, decarbonizing the heat supply to all buildings connected to the DES.
- Depending on growth outside the MTSA, the DES may be expanded to serve additional areas.

ESTABLISHING GOVERNANCE AND OWNERSHIP

- Following Council endorsement of proposed governance and ownership model, Regional and Clarington staff will undertake next steps as mandated by the Municipal Act to develop the proposed governance and ownership model, including:
  - **Develop a comprehensive Business Case Study** that outlines the rationale for establishing the Municipal Services Corporation, including projected costs, revenue streams, operational structure, and key benefits. The Plan will include:
    - **Governance structure design** – determine board composition, decision-making processes, and reporting mechanisms
    - **Funding mechanisms** – detail how the MSC will be funded through debt financing, connection fees, and user rates
    - **Asset transfer policies –** describe which assets will be transferred, and under what terms
    - **Staffing and recruitment** – describe the staffing plan, including management and technical personal, and how they will be recruited
  - **Conduct public consultations** – engage public through public meeting/information session to gather feedback on the proposed MSC, its services and potential impacts
  - **Legal review –** consult with legal counsel to ensure compliance with relevant provincial legislation regarding creation and operations
  - **Council approval –** Fall/winter 2025 staff will return to council to present the business case and seek approval