COUNCIL REPORT

IMPLEMENTING EDMONTON'S DISTRICT ENERGY STRATEGY

Recommendation

That the February 27, 2024, Integrated Infrastructure Services report IIS02148, be received for information.

Requested Action		**Information only**	
ConnectEdmonton's Guiding Principle		**ConnectEdmonton Strategic Goals**	
CONNECTED This unifies our work to achieve our strategic goals.		**Climate Resilience**	
City Plan Values.	CREATE		
City Plan Big City Move(s)	Greener as we grow	**Relationship to Council's Strategic Priorities**	Climate adaptation and energy transition
Corporate Business Plan	Transforming the future		
Council Policy, Program or Project Relationships	• C627 Climate Resilience Policy • C555 Private Public Partnerships (P3) Policy • Edmonton's Community Energy Transition Strategy • Climate Resilient Edmonton: Adaptation Strategy and Action Plan • District Energy Strategy • Downtown District Energy Initiative • Blatchford Renewable Energy Utility		
Related Council Discussions	• June 23, 2023, Integrated Infrastructure Services report IIS01386, Downtown District Energy Initiative • October 31, 2022, Financial Services Report FCS 01393, Proposed 2023-2026 Capital Budget		

Executive Summary

- As of 2022, commercial, residential and institutional buildings together account for 36 per cent of the City of Edmonton's GHG emissions. Within the "Renewable and Resilient Energy

Transition" pathway of the Community Energy Transition Strategy, establishing a "city wide district energy network" is a "Big Win Action" to reduce emissions.

- The District Energy Strategy outlines the City's role in leading district energy systems initiation and development to accelerate decarbonization of connected buildings through the provision of low-carbon thermal energy. Its implementation supports City Council's 10-year Climate Resilience objectives, The City Plan and Edmonton's Community Energy Transition Strategy.
- A district energy system consists of three main components: One or more energy centres to produce thermal energy; a distribution piping system to connect the energy centres to individual buildings; and energy transfer stations at each building to supply space heating, domestic hot water heating and/or space cooling.
- Administration plans to advance district energy feasibility studies in up to five high-priority opportunity areas, including River Crossing, Exhibition Lands, Downtown, Bonnie Doon and Heritage Valley.
- Administration will undertake an open, competitive procurement process to access private sector expertise and capital. To achieve the full-scale vision depicted in the District Energy Strategy and remain aligned with Edmonton's climate targets, this work will likely require future injection of public and/or private investment.
- Thermal load uncertainty is a risk and potential deterrent for private investment in new district energy systems. As such, bylaws, policies and other instruments that compel connection are tools City Council can utilize to encourage private investment in district energy systems in Edmonton.
- Administration will return to Council at key milestones with updates on District Energy Strategy implementation and/or on a project-specific basis.

REPORT

Background

Edmonton has set ambitious climate targets to reduce greenhouse gas (GHG) emissions by 50 per cent by 2030 and achieve net-zero emissions per person by 2050. To meet these climate targets, it is imperative greenhouse gas (GHG) emissions from heating and cooling both new and existing buildings are reduced. As of 2022, commercial, residential and institutional buildings together account for 36 per cent of the City's GHG emissions[1].

To accelerate the decarbonization of new construction in Edmonton, it is essential that both building energy performance and transformation to low-carbon district energy systems be considered and optimized in parallel. Therefore, this report is presented alongside the February 27, 2024 Urban Planning and Economy reports UPE01754 (Implementing and Enforcing More Advanced Energy Codes) and UPE01755 (Implementing Mandatory Energy Labelling for New Construction) to highlight the synergies inherent in these efforts.

[1] City of Edmonton 2022 Community Greenhouse Gas (GHG) Emissions Inventory Report, July 2023

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Within the "Renewable and Resilient Energy Transition" pathway of the Community Energy Transition Strategy, establishing a "city-wide district energy network" is a "Big Win Action." The creation of Edmonton's first District Energy Strategy (Attachment 1) and identification of district energy opportunity areas (OAs) was one specific, near-term action called for in the Community Energy Transition Strategy. Next, it calls for the expansion of the district energy network into priority OAs through mutually beneficial partnerships between industry, communities and the City, as well as collaborating with district energy system owners and operators to advance low-carbon energy sources for the systems. OAs are generally aligned with Priority Growth Areas described in The City Plan and identified in the June 14, 2022 Urban Planning Committee report UPE01029 Growth Management Framework Update.

This transformational work offers the opportunity to significantly reduce GHG emissions through the use of low-carbon, alternative and renewable energy for local district energy systems. In addition, district energy systems improve climate resiliency, better preparing Edmontonians for the impacts of a changing climate, as identified in the City's Adaptation Strategy and Action Plan[2].

District Energy Strategy

The City of Edmonton's District Energy Strategy was published in August 2022, outlining the City's role in leading district energy systems initiation and development to accelerate decarbonization of connected buildings through the provision of low-carbon thermal energy. The District Energy Strategy lays out the vision of a growing network of district energy OAs which, over time, have the potential to interconnect into an efficient, large-scale, decarbonized energy network.

A total of 15 OAs are identified in the District Energy Strategy, along with their initial level of priority. At the time the District Energy Strategy was published, the 15 OAs were estimated to account for approximately 25 per cent of new residential construction that would be developed in Edmonton to reach a population of 2 million, in accordance with The City Plan. In other words, the District Energy Strategy strives to ensure that approximately 25 per cent of all new residential construction in Edmonton has low-carbon district energy heating for space heating and domestic hot water. The OAs identified may also be suitable for low-carbon district cooling which will be evaluated through area-specific feasibility studies. Based on certain energy use assumptions, the total annual emission reductions across all district energy OAs could be in the order of 230,000 tonnes of CO_2e per year (at build out).

Existing buildings within identified OAs may also connect to the district energy system, providing an opportunity to reduce GHG emissions without needing to invest in extensive and potentially cost-prohibitive building envelope retrofits.

The District Energy Strategy calls for initial City ownership to de-risk new district energy systems, divest the systems once established and reinvest in a new district energy system or existing district energy system expansion. This transitional approach enables the City to concurrently

[2] Climate Resilient Edmonton: Adaptation Strategy and Action Plan
https://www.edmonton.ca/sites/default/files/public-files/assets/Climate_Resilient_Edmonton.pdf?cb=1702922215

establish the policy and regulatory framework for increased private sector investment in district energy systems in the long term.

District Energy Strategy Implementation Approach

Administration is working to implement the near-term actions outlined in the District Energy Strategy using a three-fold approach: advancing district energy feasibility studies in priority OAs, establishing private sector partnership(s), as well as developing an effective district energy regulatory framework to compel connection.

District Energy Feasibility Studies

The 15 OAs in the District Energy Strategy were identified based on a combination of expected demand density, development timing and other key factors such as presence of low-carbon energy sources and City-owned buildings with high thermal energy loads (i.e., anchor loads).

The next step is for Administration to advance OA-level district energy feasibility studies, which will inform data-driven decision making. This work aims to identify a preferred low-carbon energy source and technology, infrastructure requirements, site service area and system phasing for business case development by order of priority and timing of OA development. Thermal energy data collected through energy labeling for large residential, commercial, institutional and industrial buildings would support district energy feasibility studies (UPE01755). Specifically, this data could provide thermal energy estimates for space and water heating for new construction in Edmonton.

Over the course of the approved four-year budget cycle (2023-2026), Administration plans to advance feasibility studies in up to five high-priority OAs. District energy feasibility studies beyond the current budget cycle will be necessary to further progress the implementation of the District Energy Strategy. Where possible, the City will seek to engage developers and other interested parties to advance district energy feasibility studies.

Attracting Private Investment

Significant ongoing public and private investment in district energy systems is needed to achieve the required emissions reductions by 2050. Both The City Plan and Community Energy Transition Strategy refer to "Levers of Change," such as partnerships, incentives, activation, infrastructure investment and/or policy and regulation. These are tools, actions or approaches the City can use to enact change and achieve specific outcomes — in this case, the outcome being attracting private investment to stimulate growth of district energy in Edmonton.

Aligned with actions in both the Community Energy Transition Strategy and the District Energy Strategy, Administration intends to seek a private sector partner(s) in the form of an open, competitive procurement process to access private sector expertise and capital.

While the District Energy Strategy calls for municipal ownership of the systems, this does not necessarily mean that all systems are designed, financed, owned, operated and maintained by the City. To better understand the nuances of partnership models, ranging from fully public to fully private, Administration has engaged a consultant to complete a jurisdictional scan of

selected case studies and develop an approach most fitting to the Edmonton context. Attachment 2 provides a summary of the selected district energy case studies from North American and other jurisdictions. Each case study details its partnership model, decarbonization pathway, connection incentives and governance. In most case studies, low-carbon energy sources were gradually introduced into the district energy system, while others were designed to be low-carbon from the first day of operation.

The value proposition for a private sector partner would outline:

1. The largest and/or fastest growing modern district energy systems in Canada have grown with the strong support of and/or direct ownership by municipalities to mitigate connection risk.
2. The opportunity to develop multiple district energy systems across Edmonton, thereby achieving economies of scale in delivery and reducing risk through both scale and diversification (i.e., ability to cross-subsidize district energy systems).
3. In addition to the prioritized new district energy OAs, the private sector may have an opportunity to acquire established City-owned district energy systems where connection risk is minimized, such as the Blatchford Renewable Energy Utility.

As a next step, Administration will work to develop a procurement strategy, in alignment with the C555 Public Private Partnership (P3) Policy, to assess interest from potential private sector partners.

Compelling Connection

As district energy systems require significant up-front capital prior to building connections, one of the greatest deterrents of private investment in new district energy systems is load risk.[3] Load risk can encompass both uncertainty in future development (i.e., when buildings will connect) and uncertainty of building connection (i.e., if buildings will connect). As such, bylaws, policies or other instruments that reduce the risk and uncertainty of building connections are a valuable City contribution to support private investment.

Administration is working to incorporate district energy systems in the infrastructure planning and development process. District energy has been added to the "Energy Transition and Climate Adaptation" section of the revised 2023 draft District Policy, and all 15 OAs have been identified within the appropriate District Plans. In addition, Administration has identified several preliminary options to mandate or support future connection of new construction and existing buildings within district energy OAs. These options are briefly summarized in Attachment 3.

Given the various stages of neighbourhood and district energy development, the mix of new construction and existing buildings, as well as the breadth in land and building ownership, there is no "one-size-fits-all" tool for compelling connection across all OAs. Instead, Administration will work to tailor the bylaws, policies and other Levers of Change to achieve the best possible outcome in each district energy OA.

[3] District Energy in Cities: Unlocking the Potential of Energy Efficiency and Renewable Energy, November 2015 https://www.unep.org/resources/report/district-energy-cities-unlocking-potential-energy-efficiency-and-renewable-energy

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The District Energy Strategy outlines a policy framework for district energy development. Initiation of district energy systems requires strong connection requirements or incentives to mitigate thermal load risk. In the long term, the District Energy Strategy proposes the adoption of GHG emission regulations and policies by the City for both new construction and existing buildings. This strategy encourages buildings to connect to district energy as the lowest cost and easiest compliance pathway. The City has options to support or incentivize higher levels of energy efficiency in new building construction; however regulation using City Charter Regulation powers will not be a viable option. City Charter powers and alternative strategies for supporting higher levels of energy efficiency in new building construction are explored in detail in UPE01754. Consequently, the policy framework outlined in the District Energy Strategy may initially focus on bylaws and policies within the City's jurisdiction (e.g., mandatory connection bylaw).

Next Steps

To further implement the District Energy Strategy during the 2023-2026 budget cycle, Administration will:

- Complete initial district energy feasibility studies in priority OAs, first in Exhibition Lands and River Crossing (update to preliminary study), followed by Heritage Valley and Bonnie Doon.
- Develop a business case for implementing a district energy system, along with the recommended technology, in both River Crossing and Exhibition Lands. Following Council approval, advance the development of a new district energy system through the stages of concept, preliminary, detailed design and, if possible, begin construction.
- Strive to grow Edmonton's existing district energy network, including expansion of the Blatchford Renewable Energy Utility and the Downtown District Energy Initiative.
- Work to establish a robust regulatory framework to compel or incentivize connection of new and/or existing buildings within district energy OAs.
- Develop "District Energy Connection" and "District Energy Ready Guidelines" to support engineers, architects and building owners.
- Develop a procurement strategy to select a private sector district energy partner, utilizing best practices and learnings from other leading municipalities, based on the optimal partnership model for the Edmonton context.
- Evaluate and execute grant funding opportunities and other means of low-cost financing to support infrastructure investments.
- Continue industry consultation and enhance stakeholder engagement activities.

As these initiatives progress, Administration will return to Council at key milestones with updates on District Energy Strategy implementation and/or on a project-specific basis.

Budget/Financial Implications

District Energy Network Strategy and District Energy Nodes, capital profile CM-83-0001, is currently approved for $26.8 million, as part of the 2023-2026 capital budget deliberations. At the end of 2023, $0.2 million has been used for preliminary private partnership research and other

District Energy work. This leaves approximately $26.6 million for further feasibility studies and other District Energy work for the first 5 of 15 district energy opportunity areas.

In order to achieve the full-scale vision depicted in the District Energy Strategy and remain aligned with Edmonton's climate targets, this work will require additional public and/or private investment.

Legal Implications

Public utilities owned or operated by municipalities that provide service within that municipality are regulated by their municipal councils and are exempt from Alberta Utilities Commission regulation pursuant to s. 78(2) of the *Public Utilities Act*, RSA 2000, c P-45. Pursuant to the *Municipal Government Act*, municipalities may pass bylaws that require properties to connect to public utilities provided by municipalities.

Public utilities that are not owned or operated by municipalities that supply water, heat, light or power are regulated by the Alberta Utilities Commission. Municipally controlled corporations are exempt from regulation by the Alberta Utilities Commission with respect to utilities that provide water or steam within a municipality pursuant to s. 75.4 of the *Municipal Government Act*.

Community Insight

Administration presented its approach to District Energy Strategy implementation to the Energy Transition Climate Resilience Committee (ETCRC), and will continue to provide regular updates as various aspects of the work progress.

Opportunities to collaborate and consult with local developers and building owners/tenants are actively being explored in each of the priority OAs. In the case of River Crossing, implementation of district energy will align with the River Crossing governance project, which seeks to ensure involvement of Indigenous peoples and communities with historic connections to the land in its future.

More broadly, Administration has identified a need to develop a comprehensive plan to effectively communicate and engage community, industry and other interested parties in the implementation of the District Energy Strategy. Future public consultation activities will be integrated into project lifecycles to generate and increase awareness of the overall initiative.

GBA+

District Energy Strategy implementation supports City Council's 10-year Climate Resilience objectives, The City Plan and the growth of a "city-wide district energy network," which is identified as a "Big Win Action" in Edmonton's Community Energy Transition Strategy. On a community level, the reduction of GHGs and energy resilience will provide net positive impacts to Edmontonians.

Edmonton residents and other owners whose homes or buildings are within a current or planned district energy OA may directly benefit from increased access to low-carbon thermal energy. As various projects progress, Administration will explore other opportunities to apply an equity lens,

for example in procurement options, rate setting, policy and/or in program development to support connection.

Attachments

1. District Energy Strategy
2. Jurisdictional Scan: Case Studies
3. Preliminary Options: Compelling District Energy Connection