City of Burnaby

Meeting March 27, 2023

COUNCIL REPORT

PLANNING AND DEVELOPMENT COMMITTEE

TO: *MAYOR AND COUNCILLORS*

SUBJECT: BURNABY DISTRICT ENERGY POLICY

RECOMMENDATIONS:

1. **THAT** Council adopt the Draft Burnaby District Energy Policy (Attachment 2), with a delayed effective date, as outlined in Section 5.3 of this report.

2. **THAT** Council authorize staff to continue to advance work on the Burnaby District Energy Policy, as outlined in Section 6.0 of this report.

3. **THAT** Council share a copy of this report with the other partner agencies participating in the regional district energy project – Metro Vancouver, the City of Vancouver, and River District Energy.

4. **THAT** Council share a copy of this report with interested parties - ACORN, BC Co-op Association (BCCA), Burnaby Schools – School District 41, Condominium Home Owner Association (CHOA), Landlords BC, and Urban Development Institute (UDI)

REPORT

The Planning and Development Committee, at its Open meeting held on March 8, 2023, received and adopted the *attached* report seeking Council approval of the Draft Burnaby District Energy Policy.

Respectfully submitted,

Councillor P. Calendino
Chair

Councillor J. Keithley
Vice Chair

City of Burnaby

Meeting March 8, 2023
COMMITTEE REPORT

TO: CHAIR AND MEMBERS
PLANNING AND DEVELOPMENT COMMITTEE
DATE: February 23, 2023

FROM: GENERAL MANAGER LANDS & FACILITIES
GENERAL MANAGER PLANNING & DEVELOPMENT
FILE: 33200-02
Reference: Burnaby DEU

SUBJECT: BURNABY DISTRICT ENERGY POLICY

PURPOSE: To seek Council approval of the Draft Burnaby District Energy Policy.

RECOMMENDATIONS:

1. **THAT** the Committee recommend that Council adopt the Draft Burnaby District Energy Policy (**Attachment 2**), with a delayed effective date as outlined in Section 5.3 of this report.

2. **THAT** the Committee recommend that Council authorize staff to continue to advance work on the Burnaby District Energy Policy as outlined in Section 6.0 of this report.

3. **THAT** the Committee recommend that Council share a copy of this report with the other partner agencies participating in the regional district energy project - Metro Vancouver, the City of Vancouver, and River District Energy.

4. **THAT** the Committee recommend that Council share a copy of this report with interested parties ACORN, BC Co-op Association (BCCA), Burnaby Schools – School District 41, Condominium Home Owner Association (CHOA), Landlords BC, and Urban Development Institute (UDI).

REPORT

1.0 INTRODUCTION

The City of Burnaby is committed to climate action and is currently developing a district energy utility (DEU) to serve space heating[1] and domestic hot water needs of buildings in south Burnaby. Burnaby's DEU is a City-led project that will help meet Burnaby's greenhouse gas (GHG) emissions reduction targets and will integrate with the City's green building strategy for reducing building emissions.

The purpose of this report is to seek Council approval of the Draft Burnaby District Energy (DE) Policy and authorize staff to continue to advance work on the DE Policy.

The DE Policy is being brought forward at this time to support the proposed future implementation of a Burnaby DEU and to ensure that future buildings that are being reviewed through the rezoning process will be designed and built to be compatible with a Burnaby DEU and will be able to connect to a Burnaby DEU in future.

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[1] The City is investigating cooling, but cooling is not currently part of the DEU service concept.

2.0 POLICY CONTEXT

The proposed Burnaby DEU aligns with policy objectives contained in Burnaby's Climate Action Framework (2020), Burnaby's Corporate Strategic Plan (2022), Burnaby's Environmental Sustainability Strategy (2016), Burnaby's Community Energy and Emissions Plan (2016), Metrotown District Energy Prefeasibility Study (2013), and Burnaby's Economic Development Strategy (2007).

3.0 BACKGROUND

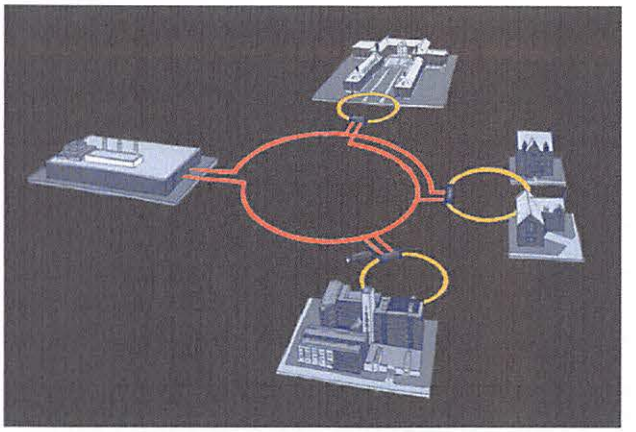
3.1 Council Endorsement

On July 29, 2019 Council endorsed a series of six guiding principles (see **Attachment 1**) for the district energy system (DES), and authorized staff to work with Metro Vancouver on the business case and ownership model using heat from Metro Vancouver's Waste to Energy Facility (WTEF) for the DES based on the guiding principles.

City staff have continued to advance work on a proposed Burnaby DEU that would connect to Metro Vancouver's WTEF DES project.

3.2 What is District Energy?

Figure 1: *DE Systems Supply Heat to Many Buildings*[1]



DESs have heat sources or energy plants, underground distribution pipes, building energy transfer stations, and building mechanical systems. Because different buildings are connected by a network of underground pipes they can share energy across a site, a neighbourhood, a city, or a region.

Thermal energy is transferred from the DES to the buildings' heating systems, avoiding the need for boilers or other heating sources in individual buildings. Buildings connected to the system use this thermal energy for space heating, domestic hot water heating, and in some cases space cooling.

3.2.1 Existing District Energy Systems in Burnaby

There are already a number of district heating systems in operation in Burnaby like the Burnaby Mountain District Energy Utility at Simon Fraser University (SFU), British Columbia Institute of Technology (BCIT), Solo District, and Burnaby Central Secondary School. A new district energy system for the Gilmore Place development is also under construction.

SFU recently announced they were able to reduce corporate operational GHG emissions by 85%[2] with their biomass district energy centre on Burnaby Mountain. This has enabled them to meet their goals

[2] The equivalent to the emissions from 900 homes annually.

for reducing GHG emission years ahead of schedule. This has helped SFU achieve one of the smallest GHG footprints of any university in Canada.

Some existing buildings in Metrotown already have hot water (hydronic) building heating systems but are using their own boilers as a heat source.

3.2.2 District Energy System Components

A DES includes three main components:

- **Energy Centre (i.e., the energy source)** – The energy generation plant that produces thermal energy from renewable sources like geoexchange, solar thermal, biofuels, wastewater heat recovery or other heat recovery sources and/or traditional energy sources which typically use natural gas boilers (for heating) or electric chillers (for cooling).
- **Distribution Piping System (DPS) (i.e., the network)** – An underground piping system below the street and on the customer's property that carries the thermal energy to the customer building in the form of hot, warm, or cool water.
- **Energy Transfer Station (ETS) (i.e., the building interface)** – A mechanical system that transfers energy between the DES and the customer building's heating systems. The ETS equipment may include heat exchangers, controls, energy meters, and related mechanical equipment. An ETS typically includes separate heat exchangers for the building's space heating, space cooling, and domestic hot water (DHW) systems. The final design of the ETS will be dependent on the building's heating and cooling needs and the design parameters of the future DES.

3.2.3 Ownership and Operating Models

There are three typical types of ownership and operating models for local government-initiated DEUs:

- **Third party or private sector Energy Utility model**, where a municipality or other organization will hand over the operation and delivery of the DES to a third party owner/operator. An example of this ownership and operating model is:
  - Burnaby Mountain District Energy Utility[3] operated by Corix.
- **Local Government Energy Utility model**, where a municipality will establish a business unit of the local government, which is responsible for delivering the City's DES. Examples of this ownership and operating model include:
  - Surrey City Energy[4], and
  - Vancouver's False Creek Neighbourhood Energy Utility[5].
- **Hybrid Energy Utility model**, where the utility is wholly owned by the municipality, but operates as a separate company and the municipality's role is limited to governance. Examples of this ownership and operating model include:
  - Lulu Island Energy Company[6], and

[3] https://www.corix.com/bmdeu/about-us
[4] https://www.surrey.ca/about-surrey/sustainability-energy-services/surrey-city-energy
[5] https://vancouver.ca/home-property-development/southeast-false-creek-neighbourhood-energy-utility.aspx
[6] http://www.luluislandenergy.ca/

- Lonsdale Energy Company (LEC).[7]

It is currently proposed that the City of Burnaby will be both the owner and operator of the Burnaby DEU, starting out as a branch of the Engineering Department (described as the Local Government Energy Utility model above) with the intention of it eventually becoming a City-owned Local Government Corporation (described as the Hybrid Energy Utility model above). This approach would allow the City to retain the benefit of streamlined implementation, staffing, planning and operations in the short term while achieving all other benefits and flexibility to refine the governance and operating structure based on City objectives like reducing investment exposure and risk allocation in the long term.

Using a City department to start the Burnaby DEU will allow for quick and streamlined construction, setup and operation of the Burnaby DEU. The Engineering Department is already familiar with utility construction, standards, specifications, and processes that will minimize training time and help streamline reviews and approvals. This will also allow for close internal coordination with other City departments such as Corporate Services, Finance, Lands and Facilities and Planning and Development as well as the ability to be nimble in managing policy or scope changes.

Successful implementation will require appropriately managing existing staff resources and/or additional resources to provide expected levels of service while establishing and sustaining the Burnaby DEU. Where required, external expertise may be required to supplement gaps in knowledge, experience, and best practices. Once a well-established operating framework is in place, the intent is to transition this utility to a Hybrid Energy Utility model.

Recommendations on the proposed ownership and operating model will be brought forward in a separate report to Council in future.

3.3 Benefits of District Energy

DESs can help improve energy efficiency, share thermal energy, reduce emissions, enable fuel flexibility, simplify building operations and maintenance, decrease costs, serve as vital infrastructure, and provide high quality local jobs. Connecting multiple buildings to a district system creates economies of scale that enable the deployment of more efficient, resilient local energy resources.

Additional benefits of DESs can be grouped as benefits for community, customers, and developers.

3.3.1 Benefits for Community

- **A low-carbon energy source** – district energy can allow multiple buildings to connect to a system that uses more sustainable energy sources, such as capturing heat from the ground, and waste heat from buildings, waste-to-energy facilities, and sewer pipes. This provides a long-term, consistent, and low-carbon energy supply for the community.
- **Affordable energy** – DESs can deliver energy at competitive rates to connected buildings.
- **Flexibility** – different heat sources can be used to feed the system enabling the use of many different heat sources both now and in the future.

[7] LEC is wholly owned by the City of North Vancouver, but operates as a separate company and the City's role is that of a rate regulator to ensure customers receive clean, affordable district energy heating.

- **Local economic development** – the development and operation of a local DES supports local 'green' job creation.
- **Resilience benefits** – DES are more reliable than traditional heating systems as they keep operating during power outages and hydro or natural gas disruptions.
- **Adaptation benefits** – when designed correctly, the building-scale mechanical equipment required to connect to DES are less prone to encountering issues such as damage caused by flooding.

3.3.2 Benefits for Customers

- **Competitive or reduced life-cycle costs** – because thermal energy is delivered to buildings in a ready-to-use form, buildings connected to a DES need to invest less in equipment such as boilers and chillers.
- **Fuel flexibility and adaptability** – DESs can switch to different fuel systems, taking advantage of future opportunities for affordable fuel and lower costs.
- **Simplified building operations** – DES-connected buildings have simplified building operations, allowing customers precise control over heating and providing flexibility to adapt as occupant needs change or building efficiency improves.

3.3.3 Benefits for Developers

- **Free up roof tops** – a DES can increase the useable area at the top of the building by relocating mechanical equipment to the building's basement. This can free up space for other high-demand uses like amenity spaces[8] or additional residential units.
- **Reduce capital costs** – removing the need for building components like a heat source and domestic hot water storage tanks[9] can save up front design and capital costs.
- **Expand marketing opportunities** – a reliable, stable and resilient energy system can be marketed as insurance against future climate impacts, while a low-carbon system can be promoted to people looking to reduce their environmental footprint without impacting their lifestyle.

3.4 Local Context

There are several local factors and projects that support Burnaby's adoption of a District Energy Policy, as described below.

3.4.1 38% of Burnaby's GHG Emissions are from Buildings

In 2016, about 38%[10] of Burnaby's emissions were from buildings. The City of Burnaby has been exploring ways to use the existing WTEF heat source and Metro Vancouver's new DES to provide

[8] Amenity spaces can include both outdoor spaces like rooftop patios and indoor spaces like enclosed amenity rooms.
[9] Many building designers will still include DHW storage tanks, even if connected to DES.
[10] Updated 2016 GHG inventory based on work done by C2MP for Climate Action Framework (p.5); smaller proportion of total city-wide emissions than 2010 numbers because inventory was done using GPC+ which is increasingly being adopted by BC communities. GPC = World Resources Institute, C40 Cities and ICLEI "Global

heat and hot water to Burnaby neighbourhoods to help reduce the City of Burnaby's community greenhouse gas emissions.

3.4.2 Waste to Energy Facility

Metro Vancouver is committed to becoming a carbon neutral region by 2050. Optimizing the use of energy from the Waste-to-Energy Facility will allow Metro Vancouver to reduce its carbon footprint while providing a sustainable heat source for homes and businesses. Metro Vancouver's district energy system will use the existing Waste-to-Energy Facility as the heat source for the new regional district energy system.

Metro Vancouver's WTEF has operated in Burnaby since 1988 and handles about a quarter of the region's garbage. It generates about 90 megawatts of heat which in turn generates approximately 22 megawatts of electricity — enough to power nearly 16,000 homes — which it sells to BC Hydro.

Supplying heat through district energy, in addition to generating electricity, triples the amount of energy that can be recovered from the waste-to-energy process.

3.4.3 Metro Vancouver's Regional District Energy System

Metro Vancouver has identified that:

- Recovering waste heat from Metro Vancouver's WTEF is a feasible project that would benefit the residents of Burnaby with safe, reliable, and cost competitive thermal energy.
- The feasibility and cost effectiveness of the DES is further strengthened if the project were expanded beyond Burnaby's borders, to Vancouver and/or New Westminster.
- The project also provides a significant amount of GHG credits that would support the City's Climate Action goals.

As shown in **Table 1**, below, the Metro Vancouver DES is proposed to provide heat from the WTEF, the regional district energy centre would use the heat from the WTEF to heat the water in the regional pipes and pump the hot water through the pipes, and the regional pipes would carry the hot water to each of the district energy utilities including River District Energy and the Burnaby DEU.

In January 2022, River District Energy was announced as Metro Vancouver's first district energy customer when it committed to purchase 10 megawatts of heat annually (about 11% of the total heat supply) from Metro Vancouver's WTEF starting in 2025. The DES will provide heat and hot water for 18,000 residents and more than 500,000 square feet of office and commercial space when River District is fully constructed. Using district energy will help to reduce the use of natural gas and will also reduce GHG emissions at River District by up to 90%.

Protocol for Community-Scale Greenhouse Gas Emission Inventories" https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities

3.4.4 Burnaby District Energy Utility (DEU)

The split in district energy services between Metro Vancouver and the proposed Burnaby DEU is shown in **Table 1**, below.

The Burnaby DEU would receive WTEF heat from Metro Vancouver's DES and then distribute that heat to each of the service areas within Burnaby as defined by the DE Policy. The feasibility study completed for the Burnaby DEU estimates that 92% of the annual heating energy demand for the Metrotown DEU service area and 94% of the annual heating energy demand for the Edmonds DEU service area can be supplied by heat from the WTEF.

Table 1: *Split in District Energy Services – Metro Vancouver DES and Burnaby DEU*

Metro Vancouver DES	Burnaby DEU
WTEF (heat source)	
Regional DES Energy Centre (Big Bend) • heat distribution WTEF	**Neighbourhood Energy Centres**[11] • heat distribution from MV DES • new heat – interim, peaking, back-up[12]
Regional Pipes • Vancouver • Burnaby	**Neighbourhood Pipes** • distribution piping systems (DPS) • connecting customers to the Neighbourhood Energy Centres
	Energy Transfer Stations (ETS) • in each building[13]

The Burnaby DEU would use neighbourhood energy centres (NECs) within each service area to distribute the heat from the regional pipes and add heat using natural gas boilers[14] when needed in the interim, for peaking, or back-up[15]. The Burnaby DEU would use a distribution piping system (DPS) to connect the NECs to the energy transfer stations (ETSs) within each building. The ETS within each building would be owned and operated by the Burnaby DEU.

3.4.5 Energy Step Code and Carbon Pollution Standards

The province continues to increase the Energy Step Code requirements for new buildings and on February 8, 2023 the most recent changes were introduced. These latest BC Building Code (BCBC)

[11] The Neighbourhood Energy Centres are proposed to use natural gas boilers for interim, peaking, and back-up, as they have lower capital cost and are well suited to frequent start-stop use. Alternative technologies could be implemented in the future.
[12] Interim heat may be required before the heat from the WTEF is available. Peaking heat is the additional heat needed at peaks times beyond the heat that is provided by the WTEF. Back-up heating is provided when the WTEF heat is not available during situations like a service disruption or maintenance of the WTEF.
[13] Owned and operated by Burnaby DEU.
[14] Natural gas boilers are proposed as they have lower capital cost and are well suited to frequent start-stop use.
[15] Interim heat may be required before the heat from the WTEF is available. Peaking heat is the additional heat needed at peaks times beyond the heat that is provided by the WTEF. Back-up heating is provided when the WTEF heat is not available during situations like a service disruption or maintenance of the WTEF.

changes come into effective on May 1, 2023 and enable 20% better energy efficiency and provide an opt-in Zero Carbon Step Code (formerly known as the Carbon Pollution Standard)[16]. Utilizing these tools can support Burnaby's efforts to achieve community goals for greenhouse gas emission reductions, and connection to a DES can align with achieving the greenhouse gas emission metrics of the Zero Carbon Step Code for new construction. These changes to the BCBC and their significance to Burnaby's Green Building Policy (as described in Section 4.1.3 of the Draft DE Policy in **Attachment 2**) will be the subject of a separate future report to Council.

4.0 PROPOSED DE POLICY

The purpose of the proposed DE Policy is to outline building requirements for future DE system connections and readiness in Burnaby. Although it is anticipated that most of the heat from the Burnaby DEU will be supplied to new buildings, the DE Policy will outline both:

- future opportunities for existing buildings to connect to the Burnaby DEU, and
- future requirements for new buildings to connect to the Burnaby DEU.

Staff will work to coordinate the ongoing work of the Building Retrofit Task Force and the potential for existing buildings to connect to the Burnaby DEU moving forward.

The Draft DE Policy (see **Attachment 2**) describes:

- Background information for context
- The purpose of the policy
- The legislative authority on which the policy was created
- Qualifying buildings
    - DE policy framework
        - Four service areas
        - 23 land use zones within five land use districts
        - Building size
- DEU compatibility requirements
    - Rezoning
        - Building design
        - DEU service is available
        - DEU service is not available
    - Process and procedures
        - For connecting existing buildings
        - For connecting new buildings

5.0 PROPOSED POLICY IMPLEMENTATION

This section summarizes the mechanisms that are proposed to be used to implement the DE Policy.

5.1 Procedures

A set of draft procedures for both existing and new buildings are listed in Section 5.2 of the Draft DE Policy (see **Attachment 2**).

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[16] https://us15.campaign-archive.com/?u=6394fa7be6bf69bb22890b08e&id=ac626dfe4a

5.2 Communication and Engagement

The communications and engagement approach being proposed for the Draft DE Policy is providing information in combination with follow-up meetings with interested parties.

A more extensive outreach and engagement effort with First Nations will be coordinated by the City's First Nations engagement consultant.

For the Draft DE Policy, staff are also proposing that small group meetings be hosted with interested parties to share information and listen to any concerns.

There has already been some early communication and engagement with the Burnaby Urban Development Institute (UDI) Municipal Liaison Committee, with two meetings held in the fall of 2022. Recognizing the development industry's interest in this project, staff propose to work with UDI to develop an effective forum to continue the dialogue that has already started. One option would be the creation of a UDI Burnaby DEU Subcommittee, which could build on the success of previous dialogues with UDI on topics including the City's Tenant Assistance Program, Rental Use Zoning Policy, and Energy Step Code.

The proposed community facing and interested parties communications methods for the Draft DE Policy moving forward include:

- Burnaby DEU project website,
- media release,
- project fact sheet,
- infographic on how the DES will work,
- frequently asked questions, and
- project contact information – phone number and email address.

The development and release of this information will follow Council approval of this report, and will be coordinated with Metro Vancouver as a key project partner.

These activities will be led by the City's DEU project team and supported by other City staff, as required, and would run over a period of six weeks. Staff would target reporting back both what we heard and presenting the updated DE Policy to the Planning and Development Committee. Staff should also be able to report back on the results of the cooling feasibility study at that time if it has not already been done.

5.3 Target Effective Date

It is proposed that fall 2023 be established as the target for the policy to become effective, which will allow for the communications, engagement and reporting back to Council on what we heard as outlined in Section 5.2. The specific effective date of the DE Policy will be recommended in that future report to the Planning and Development Committee.

Any rezoning applications that have not yet reached second reading at the effective date would be subject to the DE Policy.[17]

6.0 NEXT STEPS

The next steps for the refinement and implementation of the DE Policy are proposed to include:

- Staff continuing to work with Metro Vancouver to increase the effectiveness of the use of the heat from the WTEF by three times by using it as the primary heat source for the Burnaby DEU.
- Staff continuing to work with Metro Vancouver to achieve cost competitive rates that facilitate the use of the heat from the WTEF as the primary heat source for the Burnaby DEU.
- Staff completing the feasibility study of using the DES to provide cooling and the assessment of its potential addition to the DEU service concept.
- Staff undertaking communications and engagement activities on the Draft DE Policy as outlined in Section 5.2 of this report.
- Staff developing a coordinated approach to assigning phased greenhouse gas intensity (GHGI) for all Metro Vancouver's regional DES, the River District Energy system, and the Burnaby DEU based on the actual emissions factors for the existing WTEF, the DES and Burnaby DEU as outlined in Section 3.3 of the Draft DE Policy (see **Attachment 2**).
- Staff working with the City of Vancouver to harmonize their respective District Energy policies and activities along both sides of Boundary Road.
- Staff reporting on what we heard through the interested parties engagement process as part of a future report seeking Council adoption of the Final DE Policy.

The successful implementation of the Burnaby DEU project will also require coordinated work on a series of policies, bylaws, and other implementation tools. **Attachment 3** summarizes the proposed sequence of the policy, bylaw, program and guidelines work to come and how this anticipated work will be advanced for Council's consideration as either a Committee report or a Council report.

7.0 CONCLUSION

The City of Burnaby is committed to climate action and is currently developing a DEU to serve space heating and domestic hot water needs of buildings in south Burnaby.

Burnaby's DEU is a City-led project that will help meet Burnaby's GHG emissions reduction targets and will integrate with the City's green building strategy for reducing emissions in the building sector.

The DE policy is being brought forward at this time to support the proposed future implementation of a Burnaby DEU and to ensure that proposed buildings that are being reviewed through the rezoning

[17] As of November 2022, there were about 44 major project in the rezoning process south of the Trans Canada Highway that have yet to reach second reading – 13 in Metrotown (service area A1 – core/mandatory connection), eight in Edmonds (service area A2 – core/mandatory connection), nine in Royal Oak (service area B2 – expansion/DE Ready) and 14 in other locations (service area C – optional or opt in).

process can be designed and built so they will be compatible with a Burnaby DEU and can connect to a Burnaby DEU in future.

This report advances the Draft Burnaby DE Policy for the consideration of Council via the Planning and Development Committee and makes a number of recommendations aimed at continuing to advance work on the DE Policy.

James Lota, P.Eng., MBA, MPA
General Manager
LANDS AND FACILITIES

E.W. Kozak
General Manager
PLANNING AND DEVELOPMENT

DAC:ll/tn

Attachment 1 - Guiding Principles for the District Energy System
Attachment 2 - Draft District Energy (DE) Policy
Attachment 3 - Burnaby DEU Related Implementation Tools

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