
TO: CITY MANAGER **DATE:** 2011 November 2

FROM: DIRECTOR PLANNING AND BUILDING **FILE:** 76500 20
Ref: MDES

SUBJECT: METROTOWN DISTRICT ENERGY (PRE-FEASIBILITY) STUDY (MDES)

PURPOSE: To seek Council funding approval for the *Metrotown District Energy (Pre-Feasibility) Study* (MDES).

RECOMMENDATIONS:

1. **THAT** Council approve the expenditure from Gaming Funds of \$77,280 (inclusive of 12% HST) for the *Metrotown District Energy (Pre-Feasibility) Study* (MDES).
2. **THAT** Council authorize staff to enter into a partnership funding agreement with BC Hydro for an estimated \$34,500 contribution toward the completion of the *Metrotown District Energy (Pre-Feasibility) Study* (MDES) to thereby reduce the city's net project cost to a maximum of \$42,780.
3. **THAT** a copy of this report be sent to the Finance and Civic Development Committee, and the Environment Committee for their information.

REPORT**1.0 INTRODUCTION**

The purpose of this report is to seek Council funding approval for the *Metrotown District Energy (Pre-Feasibility) Study* (MDES) and to seek Council authorization for staff to enter into a partnership funding agreement with BC Hydro for the MDES.

2.0 DISTRICT ENERGY SYSTEMS

There are currently many types of district energy systems in operation that are well proven, allowing localized, decentralized energy production, often using 'waste' heat (energy sharing or from other sources, including sewer lines), heat from an ambient ground source (geothermal), or 'waste' products (including waste wood or biosolids¹).

¹ Sewage sludge.

There are both public (highlighted with an * below) and private local examples of working district energy systems throughout the Lower Mainland including Burnaby (BCIT*, Burnaby General Hospital*, and SFU*), North Vancouver (Lonsdale Energy Corporation*), Richmond (Alexandra District Energy Utility*), Vancouver (Central Heat Distribution, and Southeast False Creek Neighbourhood Energy Utility*), and Whistler (Cheakamus Crossing District Energy at the Athletes Village*).

These systems provide excellent adaptability by servicing small areas that may also be linked together, providing a network system that is less vulnerable to failure. Other benefits include very high efficiency, with production located close to the end users, and sustainable and responsible use of ‘waste’ (resources) such as waste wood, waste heat, and organics.

The nature of district energy systems provides the potential for excellent environmental and financial benefits for the host community.

2.1 Potential for District Energy with the City of Burnaby

Based on preliminary discussions with energy professionals, many areas in Burnaby are likely to be ideally suited to district energy systems, particularly where there are:

- large populations living at higher densities (e.g., town centres such as Metrotown, Edmonds, Lougheed, and Brentwood);
- exiting centralised heating systems (e.g., large boiler systems in place at BCIT, SFU, and Burnaby General Hospital); and/or
- facilities producing large amounts of waste heat (e.g., Waste to Energy facility (W2E), ice rinks, pools, and malls).

It is also possible to link energy production with waste treatment (Integrated Resource Management²) at the neighbourhood or large building scale, for example³:

- Small scale *on-site wastewater treatment systems* can provide non-potable water, while anaerobic digestion can process the resulting biosolids into methane for power generation and/or home heating/cooking.
- *Gasification* is another technology that processes dry organic waste (e.g., yard trimmings, dried biosolids) to produce syngas, a versatile gas that can be used to produce heat and power.

² Ministry of Community Development, 2008: Resources From Waste; Integrated Resource Management Study Phase 1 Report. http://www.cscd.gov.bc.ca/ministry/docs/IRM_report.pdf

³ Although these concepts are not typically considered as part of district energy (pre-feasibility) studies, city staff would like to see some consideration given to these concepts in both the CEEP and the MDES.

City staff have toured the energy facility at Southeast False Creek, and have discussed in general terms the possibility of including district energy systems in larger redevelopments. However, more detailed analysis and investigation is required, in order to understand the opportunities and constraints specific to Burnaby and specific areas within the city.

2.2 Why Metrotown?

For the following reasons, staff are recommending the Metrotown Town Centre for a District Energy Pre-Feasibility Study:

- Metrotown is the City of Burnaby’s only regional town centre.
- Metrotown is planned to accommodate a significant amount of the city’s future development potential.
- Metrotown’s future planned development potential has huge potential benefit (reduction in energy consumption and reduction in GHG emissions) if district energy system(s) were to be implemented.
- Metrotown is the subject of continued development interest, given city plans for the area to accommodate higher density residential and commercial uses.
- Metrotown exceeds BC Hydro’s minimum criteria⁴ for District Energy Pre-Feasibility partnership funding.
- Some of the lessons learned from the MDES could likely be applied to the City of Burnaby’s three municipal town centres – Brentwood, Lougheed and Edmonds.

3.0 METROTOWN DISTRICT ENERGY (PRE-FEASIBILITY) STUDY (MDES)

The MDES is intended to be a pre-feasibility study to assess the potential opportunity - the feasibility and advisability of using district energy system(s) to supply heat and/or hot water for parts or all of the Metrotown area.

3.1 Project Governance

In some respects, key aspects of the MDES would be different than the Environmental Sustainability Strategy (ESS) and the Community Energy and Emissions Plan (CEEP). The MDES is proposed to provide an internal learning exercise to explore practical operational issues. As such, the Steering Committee for this project would likely be limited to key city staff and staff representatives of major utilities. Moreover, opportunities for wider community input would also likely be more limited and as a

⁴ 750,000 sq. ft. of new high-density mixed use residential development within BC Hydro’s service area; minimum of three buildings, each with a floor area of at least 20,000 sq. ft.; forecast reduction in annual GHG production and in annual electricity usage when compared to Business-as-Usual (BAU).

result, project outreach activities will likely be more focused on communication rather than consultation.

3.2 Major Activities

Under the terms of BC Hydro's Sustainable Communities Program, BC Hydro is interested in supporting communities in the development of district energy pre-feasibility studies.

Major activities to be completed during the MDES would include an inventory and assessment of opportunities (convertible sites, development sites, fuel sources), and an assessment of alternative district energy technologies. More specifically, project activities would include:

- a neighbourhood overview;
- a neighbourhood district energy service plan;
- business-as-usual (BAU) energy demands;
- energy profile and load analysis;
- energy supply alternatives analysis;
- combined heat and power assessment;
- district energy governance review;
- sensitivity analysis; and
- recommendations / next steps.

3.3 Potential Outcomes

The MDES would entail exploring a range of possible district energy technologies and ownership models, in order to focus on the best options for the city and the local community. More specifically, the MDES would result in the following deliverables:

- A quantitative and qualitative description of the district energy study area, including the core service area and opportunities for connectivity and expansion.
- A phased service plan for the core area which shall include a renewable energy phase.
- An economic, environmental and social analysis of the renewable energy alternatives for the full build out of the system and comparison to business-as-usual (BAU).
- A qualitative summary of the benefits of district energy.

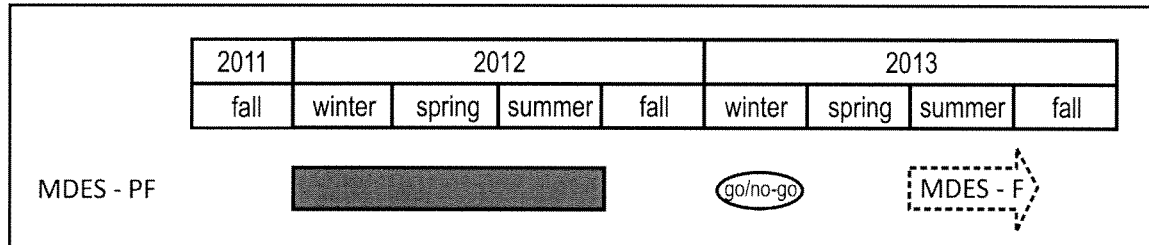
- A summary of the key trade-offs between public and private ownership and operations of the Neighbourhood Energy Utility (NEU) from a long term and public benefit view.

4.0 POTENTIAL FUTURE WORK – A FEASIBILITY STUDY

As shown in **Figure 1** (below), once the MDES is completed, the city would be at a go/no-go decision on undertaking the next step – a feasibility study. If the potential cost/benefits do not warrant any further work, no additional work would be undertaken. If significant potential cost/benefits are identified, a feasibility study would be recommended.

The feasibility study, if advanced, would involve more detailed analysis of the preferred option(s), potentially within a smaller area (likely representing the first phase of an expandable system). The outcome of this work would allow the city to pursue the development of an area-specific district energy system with confidence of a successful outcome.

Figure 1
Metrotown District Energy - Pre-Feasibility and Feasibility - Studies



5.0 FINANCE

As introduced in the related overview Council report (1 of 4) appearing elsewhere on the Council agenda, staff have identified that BC Hydro’s *Sustainable Communities Program* provides for a significant partnership funding opportunity. Under the terms of this program, BC Hydro would provide expertise and funding to assist the city to determine the viability (cost, impact, benefits) of a district energy system. Based on discussions with BC Hydro, city staff have been informed that Metrotown would exceed BC Hydro’s requirements and that Metrotown likely has significant district energy potential. As shown in **Figure 2** (next page), given the City of Burnaby’s population, BC Hydro would provide 50% funding up to a maximum of \$50,000 toward the cost of producing the MDES.

It should be noted that the terms of BC Hydro’s financing agreement would see their portion of the payment held back until the completion of the assignment to their satisfaction, and then the payment would flow through the city to the consultant.

Therefore, staff are seeking authorization for the total project cost of \$77,280 (including 15% contingency and 12% HST). Once the estimated partnership funding payment of \$34,500 is received from BC Hydro, the city’s estimated maximum net cost would be \$42,780.

Figure 2
BC Hydro Partnership Funding Opportunity - MDES
(including HST and contingency)

	MDES Estimated Cost	Source of Funding
CEEP	\$60,000	
Contingency (@15%)	\$9,000	
SUB-TOTAL	\$69,000	
12% HST	\$8,280	
TOTAL PROJECT COST	\$77,280	
Less BC Hydro Contribution	(\$34,500) ⁵	BC Hydro
NET PROJECT COST	\$42,780	Gaming Fund Reserve

City staff and BC Hydro staff have had several meetings to discuss the potential benefits of the partnership arrangement in completing the MDES and these meetings have resulted in BC Hydro issuing the letter of support that is included as *Attachment A*.

It should be noted that should a feasibility study be recommended as the outcome of the MDES, BC Hydro staff have noted that these can range between \$100,000 to \$150,000 and 50% partnership funding is also available to a maximum of \$75,000. Again, this would be subject to the outcome of the MDES, and this latter amount would be the subject of a separate request to Council in future, if required.

6.0 CONCLUSION

There are currently many types of district energy systems in operation that are well proven. There are both public and private local examples of working district energy systems throughout the Lower Mainland. These systems range in size from small to large, are highly adaptable, and can be linked together to provide a network that has redundancy to increase reliability. The nature of district energy systems provides the potential for excellent environmental and financial benefits for the host community.

⁵ BC Hydro has offered a contract extension for the MDES which would increase the maximum eligibility from \$20,000 to \$50,000.

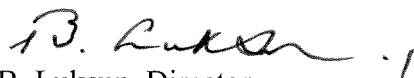
To: City Manager
From: Director Planning and Building
Re: Metrotown District Energy (Pre-Feasibility) Study (MDES) (4 of 4)
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City staff in association with staff from BC Hydro have identified Metrotown as a strong candidate area with significant potential for one or more district energy systems, as a result of the large amount of future density anticipated in the area. With several large projects already coming on-stream, the timing is ideal to explore the opportunities for integrating this new development with sustainable and local energy production that contributes to community values.

BC Hydro's *Sustainable Communities Program* provides for a significant partnership funding opportunity. Under the terms of this program, BC Hydro would provide expertise and funding to assist the city to determine the viability (cost, impact, benefits) of a district energy system.

Subject to Council adoption of this report, the next steps would be for staff to enter into a partnership agreement with BC Hydro, engage the services of a consultant for the MDES (in accordance with BC Hydro's requirements), and assemble the Project Steering Committee for the MDES.

Staff are, therefore recommending that: Council approve the expenditure from Gaming Funds of \$77,280 (inclusive of 12% HST) for the *Metrotown District Energy (Pre-Feasibility) Study* (MDES); that Council authorize staff to enter into a partnership funding agreement for an estimated \$34,500 toward the completion of the *Metrotown District Energy (Pre-Feasibility) Study* (MDES) to thereby reduce the city's net project cost to a maximum of \$42,780; and that a copy of this report be sent to the Finance and Civic Development Committee, and the Environment Committee.



B. Luksun, Director
PLANNING AND BUILDING

Attachment

DAC/LT:jc

cc: Deputy City Managers
Director Engineering
Director Finance
Director Parks, Recreation and Cultural Services
OIC – RCMP
Fire Chief
Chief Librarian
City Clerk
City Solicitor



Eddie Young
BC Hydro, Power Smart
Program Manager - Community Marketing
900-4555 Kingsway
Burnaby, BC V5H 4T8

May 16, 2011

Mayor Derek Corrigan
City of Burnaby
4949 Canada Way
Burnaby, BC V5G 1M2

Dear Mayor Corrigan

Re: Metrotown District Energy Study

Power Smart is interested in supporting the advancement of district energy systems which provide the benefits of reduced electrical energy consumption and reduced greenhouse gas emissions over what is considered business as usual.

The Power Smart Sustainable Communities Program offers matching funding for the type of study being contemplated at Metrotown, which we would classify as a pre-feasibility study under our program definitions. The study provides a high-level screening of technology options available for the given site.

The funding offer is for up to 50% funding to assess the general feasibility for district energy in a specific location (maximum \$20,000). However, given the size and scale of the Metrotown area, Power Smart will increase this maximum to \$50,000 (matching funding) for the Metrotown District Energy Study.

Power Smart is excited that the City of Burnaby is interested in exploring the potential for district energy in the Metrotown area. It is an area that has the potential to be well-suited for a district energy system given the planned development in the area. We look forward to working with the City of Burnaby to advance this study.

Best Regards,

A handwritten signature in black ink, appearing to read "Eddie Young".

Eddie Young