

NO: **L008**

COUNCIL DATE: **December 12, 2011**

REGULAR COUNCIL - LAND USE

TO: **Mayor & Council**

DATE: **December 7, 2011**

FROM: **General Manager, Engineering**

FILE: **7911-0075-00**

SUBJECT: **Implementation of Hydronic Heating and Hot Water Systems in City Centre in Support of the City Centre District Energy System**

RECOMMENDATION

The Engineering Department recommends that Council:

1. Receive this report as information;
2. Authorize staff to develop a formal policy for consideration by Council that would provide repayable financial assistance by the district energy utility through a partnering agreement with the developer for the purpose of encouraging the installation of hydronic heating and hot water systems in new development projects in City Centre to encourage “early adoption” of such systems in support of the implementation of a District Energy System in City Centre; and
3. Request that staff study, evaluate and report on the merits of Council adopting a by-law that would act to require all new development projects in City Centre to install hydronic heating and hot water systems and then to connect to the City Centre district energy system when such a system is available and that this work be done in conjunction with the policy work referenced in recommendation 2. above.

INTENT

The purpose of this report is to advise Council about progress that staff has made in relation to addressing the matter of having a hydronic heating and hot water system installed in the proposed high rise residential development project at 13286 and 13300 - 104 Avenue, which is being processed under Development Application No. 7911-0075-00. Such a system would facilitate the future connection of this project to a district energy system when it is available to this site.

BACKGROUND

During its consideration of the subject development application during the Regular Council - Land Use meeting on July 11, 2011, Council resolved:

“That staff work with the applicant to address the challenges standing in the way of the project being designed and constructed so as to allow its future connection to the City Centre District Energy System and provide a report back to Council on the matter.”

At its Regular Council - Land Use meeting on July 25, 2011, Council considered Corporate Report L005; 2011, a copy of which is attached as Appendix I. Council adopted the recommendation of that report, which introduced an additional requirement that is to be satisfied in advance of final adoption of the Rezoning By-law related to Development Application No. 7911 0075-00 for the lots at 13286 and 13300 – 104 Avenue. Under this additional requirement the applicant was to provide an estimate to the City of the cost to design a hydronic heating and hot water system for the development project, for the purpose of allowing the City an opportunity to decide whether to assist in funding the design and construction of such a system, which would then leave the development in a position of being able to connect to a district energy system in the future. Council further resolved:

“That staff provide a report to Council regarding the outcome of this process in the early fall of this year complete with recommendations, prior to the Rezoning By-law related to the subject development application being forwarded to Council for consideration of final adoption.”

DISCUSSION

Staff has worked with the applicant to establish the cost of constructing a hydronic heating and hot water system as part of the development. The cost estimates as provided by the applicant are summarized in the following tables:

Electric Base Board Heating System (as reported by the applicant)

Item	Cost
In-suite electric base boards heating system	\$175,000
Domestic hot water system	\$60,000
Common area heating system	\$75,000
TOTAL	\$310,000
	\$0.75 per square foot of building area

Hydronic Heating System (as reported by the applicant)

Item	Cost
In-suite hydronic heating system and domestic hot water system	\$1,530,000
Common area heating system	\$75,000
TOTAL	\$1,605,000
	\$3.89 per square foot of building area

Based on the cost estimates as presented, the use of hydronic heating results in a capital cost increase of \$3.14 per square foot of building area or \$1,295,000 for the project, which equates to an average of \$2,750 per dwelling unit (i.e., 850 square feet in area). Although, staff has concerns

that both estimates are on the low side, the difference between the estimates appears to be in the correct range (i.e., \$3.00 to \$3.50 per sq. ft.).

Life Cycle Analysis

Staff has undertaken a financial analysis of the life cycle costs of a hydronic heating system connected to a district energy system in comparison to an electric heating system in a typical high rise residential project. The analysis shows that over the course of a 25-year period and including the cost of energy, the cost to operate and maintain the system and the amortization of capital costs a high rise residential development connected to a district energy system will have a comparable cost of energy to the same development serviced by in-suite electric baseboard heaters with natural gas make up air units and natural gas hot water heaters on the basis of the energy cost projections of the energy providers (B.C. Gas, FortisBC).

Development projects serviced by district energy systems offer the following advantages:

- 1) they emit significantly less greenhouse gases in comparison to developments serviced by natural gas make up air units and natural gas hot water heaters;
- 2) energy sources are flexible to minimize energy costs over time; and
- 3) they gain a significant financial advantage if the cost of electricity and natural gas increases more rapidly than is currently projected.

Individual Suite Metering

The applicant for the proposed high rise residential development project at 13286 and 13300 - 104 Avenue holds the view that individual energy meters in each dwelling unit will be of high value to their potential purchasers to ensure an equitable distribution of energy consumption charges between the dwelling units and to avoid additional monthly costs to investors who choose to sublet their suite. The applicant has estimated that utility-grade thermal energy meters for each suite would add \$1.94 per square foot of building area to the capital cost of the hydronic heating system for this project.

Installing an individual meter for each suite is an extremely expensive item that is not necessary to ensure effective distribution of thermal energy and equitable allocation of costs. Essentially the cost to measure energy consumption for each unit outstrips any significant variances in energy consumption between units. Based on available information related to district energy utilities within Canada there is no example in Canada where a utility has financed or installed meters for individual dwelling units in any high rise residential project.

Repayable Financial Assistance for Early Adopters

In recognition of the higher capital cost of a hydronic heating and hot water system in comparison to the conventional electrical heating and hot water systems and the uncertainty related to the energy costs associated with the district energy system in City Centre, staff is proposing that the City, through its energy utility, consider providing an incentive to encourage the early adoption of hydronic heating and hot water systems in new high rise development in City Centre. The City's district energy utility could provide a capital contribution to "early adopters" to assist in offsetting some of the difference in the capital costs of the hydronic system in comparison to the conventional electric systems. This repayable financial assistance would be

recovered through the energy rates that are charged to the benefitting units by the district energy utility.

Staff is recommending that a formal policy be developed with a view to the City District Energy Utility providing as an incentive to “early adopters” repayable financial assistance through a partnering agreement to qualifying projects of up to \$1.50 per square foot of the floor area of the dwelling units within the project but in any case not exceeding 50% of the aggregate difference in the capital cost between the design and installation of a hydronic system in the project in comparison to the design and installation of a conventional electric system. This repayable financial assistance would be provided to development projects in City Centre on a case-by-case basis to a combined total floor area limit of 1,250,000 square feet for all of the qualifying projects, provided that the requirements for hydronic compatibility as detailed in the partnering agreement are met. A floor area of 1,250,000 sq. ft. equates to approximately 1,500 dwelling units. As a point of reference, the project to which this report has earlier referred has a proposed floor area of approximately 400,000 sq. ft. The repayable financial assistance would only be available to projects in areas that are considered to be within the reasonably foreseeable service boundaries of the City’s district energy utility. The repayable financial assistance would be recovered on an amortized basis through the district energy rates charged to the benefitting projects.

Response from the Applicant

Staff has discussed the proposed policy with the subject applicant to determine the impact that this level of repayable financial assistance would have on their interest in incorporating a hydronic system into their project. The applicant has advised that any additional capital costs on their project at this stage would directly impact the viability of the project. The applicant holds the view that the current housing market in the City Centre is highly sensitive to small increases in unit costs such that their project would not be able to compete with other units currently on the market if the unit costs were to increase further.

Although the proposed policy as recommended in this report may not be of interest to the current applicant, staff holds the view that such a policy may motivate other developers in City Centre to move to district energy as a heat source. On this basis, staff is recommending that Council instruct staff to develop a formal policy in relation to providing repayable financial assistance through a partnering agreement for early adopters of District Energy in City Centre.

Mandating Connections to the District Energy System

The City of Vancouver and the City of North Vancouver each of which have operating district energy systems have put in place a by-law that requires projects in the areas covered by their district energy systems to connect to the district energy system. Neither of these cities provides any repayable financial assistance to offset the additional capital costs. Based on a review of available information, there is no indication that any district energy utility operating within Canada provides any sort of capital repayable financial assistance to help address the capital costs that must be incurred in implementing a hydronic heating and hot water system to allow connection to the district energy system.

It is recommended that staff be requested to study, evaluate and report on the merits of implementing a by-law that would act to require all new development projects in City Centre to

install hydronic heating and hot water systems and to connect to the City Centre district energy system when such a system is available.

Development of Information for the Development Industry

In addition to the above-referenced repayable financial assistance, staff is also working to develop appropriate information for the development community that outlines the advantages that would accrue to projects that are part of the City's district energy system. A copy of this information will be forwarded to Council as information when it is completed and ready for distribution.

Lower DCCs Payable in the Surrey City Centre

Development Cost Charges for multi-family residential projects in the City Centre are approximately 33% lower in comparison to what similar projects are required to pay outside of the City Centre area. As such, the proposed repayable financial assistance for the installation of hydronic heating systems in combination with the lower DCC rates will help to ensure that residential development in the City Centre area will continue to be viable for the developer and affordable for the future home owner.

CONCLUSION

Based on the above discussion, it is recommended that Council:

- Authorize staff to develop a formal policy for consideration by Council that would provide repayable financial assistance by the district energy utility through a partnering agreement with the developer for the purpose of encouraging the installation of hydronic heating and hot water systems in new development projects in City Centre to encourage "early adoption" of such systems in support of the implementation of a District Energy System in City Centre; and
- Request that staff study, evaluate and report on the merits of Council adopting a by-law that would act to require all new development projects in City Centre to install hydronic heating and hot water systems and then to connect to the City Centre district energy system when such a system is available and that this work be done in conjunction with the policy work referenced in recommendation 2. above.

Vincent Lalonde, P.Eng.
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JA/kd/brb

Appendix I: Corporate Report No. L005; 2011