



**To:** Public Works and Transportation Committee

**Date:** September 24, 2014

**From:** John Irving, P.Eng. MPA  
Director, Engineering

**File:** 10-6600-10-01/2014-  
Vol 01

**Re:** **City Centre North District Energy - Request for Expression of Interest**

**Staff Recommendation**

That the issuance of a Request for Expressions of Interest by Lulu Island Energy Company for a utility partner to develop a feasibility plan to design, build, finance and operate a District Energy Utility (DEU) in the City Centre North area on the basis of the following guiding principles be endorsed:

1. The DEU will provide end users with energy costs that are competitive with conventional energy costs based on the same level of service; and
2. Council will retain the authority of setting customer rates, fees and charges for DEU services.

John Irving, P.Eng. MPA  
Director, Engineering  
(604-276-4140)

Att. 2

<b>REPORT CONCURRENCE</b>		
<b>ROUTED TO:</b>  Finance Division Development Applications	<b>CONCURRENCE</b>  <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	<b>CONCURRENCE OF GENERAL MANAGER</b>  
<b>REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE</b>	<b>INITIALS:</b>  JC	<b>APPROVED BY CAO</b>  

## Staff Report

### Origin

In October 2009, Council directed staff to issue requests for expressions of interest to provide implementation and operational support of District Energy Utilities in partnership with the City, Developers and other agencies.

Building on the success of the Alexandra District Energy Utility (ADEU), since 2009 the City has been securing commitments for district energy ready buildings in the City Centre area through rezoning, development and building permit processes.

Following direction from Council, in 2013 the Lulu Island Energy Company (LIEC) was established as a wholly-owned corporation of the City for the purposes of managing district energy utilities on the City's behalf. In April 2014, Council authorized City staff to execute a District Energy Utilities Agreement between the City and LIEC, assigning LIEC the function of providing district energy services on behalf of the City, including partnering with third parties to deliver such services.

The City has identified the potential for district energy systems in the North City Center area.

This report supports Council's Term Goal #8 Sustainability:

*To demonstrate leadership in sustainability through continued implementation of the City's Sustainability Framework.*

*8.1. Continued implementation and significant progress towards achieving the City's Sustainability Framework, and associated targets.*

*8.4. Review opportunities for increasing sustainable development requirements for all new developments, including consideration of increasing requirements for sustainable roof treatments (e.g. rooftop gardens, solar panels, etc.) and energy security (e.g. use of local renewable energy sources, use of district energy systems, etc.).*

### Background

#### District Energy Utilities as Part of a Sustainable Community

Richmond's 2041 OCP establishes a target to reduce community greenhouse gas (GHG) emissions 33 per cent below 2007 levels by 2020 and 80 per cent by 2050. Additionally, the OCP includes a target to reduce energy use 10 per cent below 2007 levels by 2020. Richmond's CEEP identifies that buildings account for about 64 per cent of energy consumption in Richmond, and 43 per cent of GHG emissions; residential units especially are prime energy consumers in the community. Richmond is growing, with today's population expected to increase by 35 per cent by 2041, and employment by 22 per cent. This growth will be accompanied by new building development, the majority of which will occur in Richmond's City Centre.

In the context of this growing community, shifting to more sustainable energy systems for buildings is required to meet Richmond's climate and energy targets. Sustainable energy systems have the following characteristics:

- Use energy wisely – e.g. they are efficient, minimize consumption, minimize waste energy, and use renewable sources of energy.
- Increase energy security by being reliant and resilient – e.g. they minimize price volatility, incorporate localized systems to avoid being completely dependent on external systems, and are adaptable to future technologies and energy sources.
- Have low-carbon intensity – e.g. they emit zero to low GHG emissions.
- Are cost-effective and do not result in unacceptable impacts (social, environmental or economic).

Based on these criteria, the City has identified district energy utilities (DEUs) as a key component of sustainable energy systems that can be implemented in neighbourhoods going through significant development activities. Some of the key benefits of a DEU are as follows:

- Reduced building capital and operations costs – DEUs replace the need for individual buildings to have their own boilers or furnaces, chillers or air conditioners, resulting in capital cost and maintenance cost savings.
- Efficiency – DEUs can operate more efficiently than typical stand-alone building mechanical systems, thereby reducing emissions and costs.
- Reduced emissions through using renewable energy and waste energy sources – DEUs can use renewable sources such as sewer heat recovery, geothermal, biomass, combined heat and power generation, and other technologies with the potential for very low emissions. Moreover, DEUs can capture and use waste heat from industrial, commercial and institutional use (i.e. ice surfaces and wastewater treatment plants).
- Reliability – DEUs use proven technology; most DEU's operate with a high reliability rate.
- Resiliency – District energy systems' ability to make use of multiple different fuel sources allow DEUs to incorporate new energy source opportunities in the future, providing financial and environmental resiliency and mitigating the potential for volatility in thermal energy prices.

Many DEUs come to be identified by the energy source they are hooked up to, such as geothermal, biomass, or solar; however, the most critical elements of a DEU are the user base and the distribution network, and when establishing the partnerships and legal framework of a DEU the primary focus should be on these elements. The specific system or technology that is used to generate the heat can be altered or switched out over the life of the DEU depending on the best available technology at the time.

### District Energy in Richmond

Given the benefits noted above, the City has been active exploring and implementing DEU opportunities in appropriate neighbourhoods. In 2010, the City issued a Request for Expression of Interest (RFEOI), seeking a partner to develop a plan to design, build, finance and operate a district energy utility for the ASPAC lands, named the River Green DEU (RGDEU). The City subsequently signed an Memorandum of Understanding (MOU) with the successful proponent, Corix Utilities Ltd. The MOU was based on the concept that the City would own the RGDEU, and Corix would provide design, construction, financing and operating functions.

In November 2012, Council directed staff to incorporate the Lulu Island Energy Company (LIEC), with the City of Richmond as its sole shareholder, with the intention that the LIEC would own and operate City DEUs. This includes ultimately transferring ownership and operations of Alexandra District Energy Utility (ADEU) to LIEC, as well as LIEC's operating RGDEU and other potential City DEUs. In June 2014, following Council's direction, staff have executed a District Energy Utilities Agreement between the City and LIEC, assigning LIEC the function of providing district energy services on behalf of the City.

Consequently, LIEC and Corix are in the process of signing the concession agreement whereby LIEC will own the RGDEU and its infrastructure and Corix will design, construct, finance, operate and maintain the RGDEU, subject to City as the shareholder of LIEC setting rates to customers.

In parallel to these activities, the City has developed the ADEU. The first phase of the ADEU was undertaken in partnership with Oris Geo Energy Ltd. In 2011, the Alexandra District Energy Utility Bylaw was established, requiring connection by all new developments in the ADEU service area. ADEU Phases 1 and 2 were commissioned in July 2012; the system currently provides energy to three developments with over 800 residential units, representing 760,000 sq ft of space. Phase 3 expansion is currently underway, which will provide service to additional 1,530,000 sq ft of residential and commercial space. At full build-out of the service area, ADEU will serve approximately 3.2 million sq ft of building space reducing 700 tonnes of GHG emissions annually.

In light of these district energy activities, the City has continued to secure commitments that new developments be "District Energy Ready" through rezoning, development and building permit processes. This means that new developments in appropriate potential service areas have in-building mechanical systems that are compatible with district energy connection for space heating and domestic water heating.

### **Analysis**

#### District Energy Opportunities in City Centre North

Over 8.5M sq.ft. of residential and commercial floor space is currently in different stages of development in the City Centre North area. This is 1.5 times the size of ADEU and RGDEU together at full build out. Attachment 1 illustrates the current and potential development sites in City Centre North, which could comprise the customer base for a new DEU node. Through the development approvals processes, the City secures commitments that new developments in this area are "District Energy Ready". Some developments are currently in construction, with occupancy forecasted to begin in 2016.

A City Centre North District Energy Pre-Feasibility Study was conducted by FVB Energy Inc. to evaluate district energy concepts that could provide energy services at a competitive price for building owners, while reducing energy consumption and greenhouse gas emissions and providing other district energy benefits. This preliminary analysis evaluated the following heat sources to provide district energy heating services:

- River heat recovery;
- Sewer heat recovery;
- Biomass heating; and
- Biomass-fuelled combined heat and power, producing both heat and electricity.

Further feasibility studies are required to refine district energy concepts and develop a business case for the preferred system.

If a City Centre North DEU is to proceed, it is important that its implementation occur in a timely manner. District energy systems ideally will be operational before occupancy occurs, so that new developments can forgo the costs of installing conventional heating equipment such as onsite boilers. If a buildings' boiler plant is installed, future connection to district energy systems is postponed to the time when the boiler plant needs replacement. Likewise, installing the necessary DEU piping networks in a previously developed road is more costly than installing the system simultaneously with new development. Each development that moves forward using conventional heat and hot water systems is a missed opportunity to realize the economic and environmental benefits of district energy. Not serving these early developments could also constitute a barrier to future DEU growth, as DEUs have significant economies of scale, and become much easier to operate with larger and more consistent demand loads.

#### LIEC Governance Model

LIEC is a wholly-owned local government corporation, with the City of Richmond as its sole shareholder. Council appoints a board to administer daily operations of DEUs, and Council approves utility rates, policies, and practices.

Operating LIEC in partnership with private-sector partners entails important advantages compared to other governance models, such as a municipal-owned and operated utility, or a privately owned utility. Notably, this model entails:

- Council oversight and control over DEU utilities. As sole owner, the City appoints LIEC's Board, and establishes policies and practices.
- Ability to set rates. Unlike privately-owned utilities, local government utilities are not subject to regulation by the BC Utilities commission; this affords the City responsibility for setting utility rates, and making other decisions about the utilities' operations.
- Limited City investment of capital. DEUs are capital intensive to develop; partnering with a third party with access to capital markets allows the City to reduce or eliminate capital investment associated with DEUs.

- Lower risks. Agreements with DEU utility partners can be structured to allocate construction, financing, technology and operation risks to the partners, who are best positioned to manage these risks.
- Opportunities for City revenue generation. Business models can be designed to provide a revenue stream over and above operating and capital cost recovery for the DEU.
- LIEC can act as a private corporation with greater operational freedom, not limited by local government statutes.
- Design, construction, and operations expertise from private sector partners.

For the above reasons, the City has identified a Public Private Partnership model in which LIEC owns DEU assets and a private utility partner designs, builds, finances and operates the system as a preferred model for implementing district energy systems. This model is reflected in the LIEC's agreement with Corix Utilities Ltd. for Corix to develop, finance and operate the River Green DEU.

#### Issuing a Request for Expression of Interest for DEU Development, Financing and Operation

The next step in pursuing district energy opportunities in City Centre North is for LIEC to engage a partner to further evaluate the feasibility of implementing a DEU in North City Center, and, if determined as viable and meeting the City's interests, to subsequently engage in DEU design, financing, construction and operation. As in the River Green DEU's development, the appropriate process for engaging the third partner is through a Request for Expressions of Interest (RFEOI). The RFEOI will be guided by the following objectives:

- Provide competitive energy service lifecycle costs to residents and businesses.
- Provide an equivalent or greater level of reliability.
- Increase environmental performance, i.e., lower GHG emissions.
- Provide a flexible platform for adopting alternative energy technologies over time and for expanding service to other areas of the city.

The selected proponent will be responsible for undertaking necessary feasibility studies (due diligence) to develop the business case to establish the DEU. The feasibility studies will include forecasting demand for thermal energy services, evaluation of energy source technologies, system conceptual design, business analysis, risk analysis and estimated energy rate to customers. The RFEOI will specify that the preferred proponent will be responsible for assuming the costs of this due diligence. If the City determines that there is a viable business case and it is the City's best interest, a legal agreement will be negotiated between LIEC and the successful RFEOI proponent, outlining the terms and responsibilities for the DEU's development and operations in City Centre North. Council endorsement of the recommendations from the LIEC Board will be sought through different stages of this process.


Attachment 2 is a resolution of the LIEC Board to issue an RFEOI for these services, subject to Council's endorsement.

**Financial Impact**

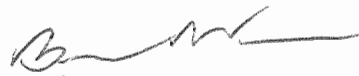
None at this time.

**Conclusion**

District Energy Utilities are an important part of meeting the City's climate and energy commitments, and can be delivered at comparable or lower energy service costs than conventional building energy technologies. An opportunity exists for Lulu Island Energy Company to implement a DEU node in City Centre North. To take advantage of this opportunity, it is recommended that LIEC issue a Request for Expression of Interest for a utility partner to provide design, construction, finance and operations of a DEU in City Centre North.



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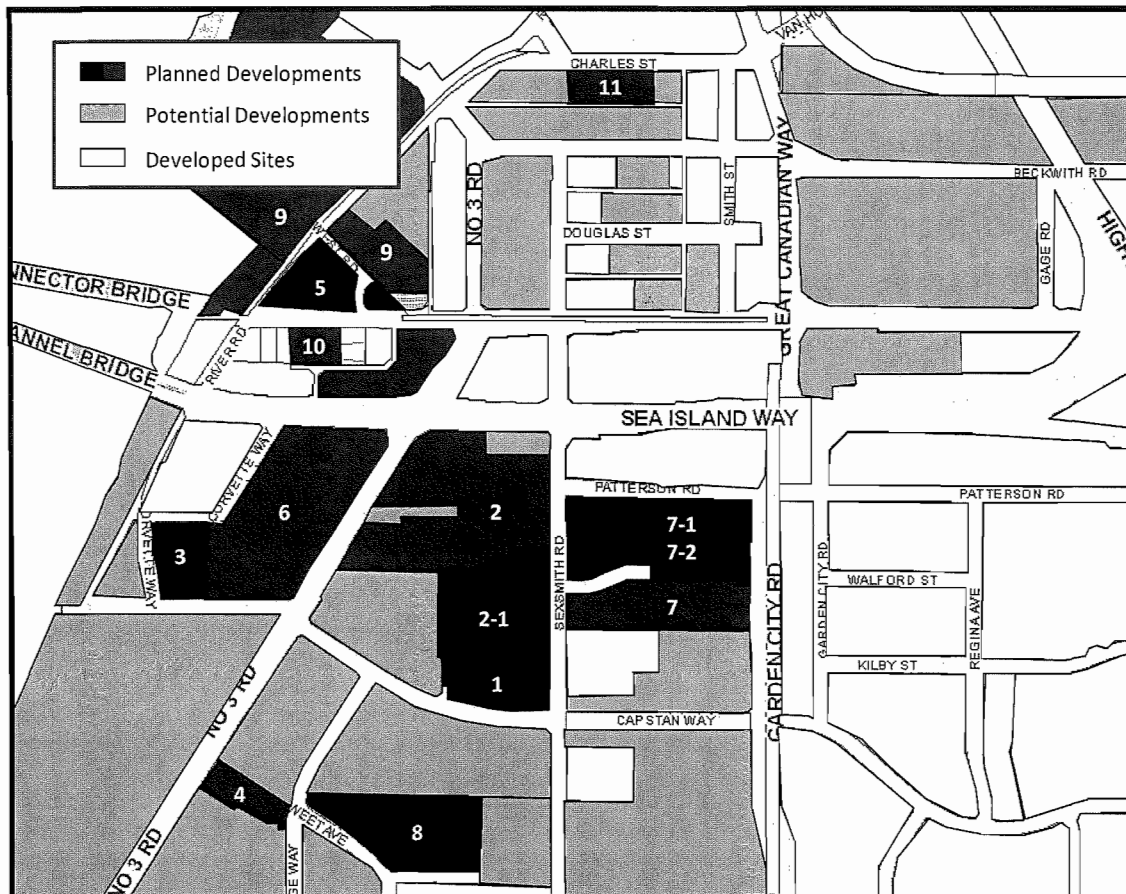


Brendan McEwen  
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BM:bm

- Att. 1: City Centre North Development Map
- 2: LIEC Board Resolution to Issue a RFEOI for Design, Construction, Finance and Operations Services for City Centre North

**Attachment 1 – City Centre North Development Map**



Map	Project	Proposed Floor Area (sq. ft.)	Use	Permit Stage
1	Pinnacle Living "Capstan"	187,200	Residential	Construction
2	Pinnacle International (4 Phases)	1.25M	Residential	RZ
2-1	Phase 1	370,000	Residential	DP
3	0893691 BC LTD	175,300	Mixed Use	DP
4	DHI Holdings "Studio One"	75,900	Residential	RZ
5	GBL "Hotel Versante"	214,000	Commercial	DP
6	Yuanheng Seaside Developments	756,600	Mixed Use	RZ
7	Concord Pacific (5 Phases)	1.05M	Residential	DP
7-1	Phase 1	250,000	Residential	Construction
7-2	Phase 2-3	330,000	Residential	BP
8	Polygon "Avanti"	478,000	Residential	BP
9	Jingon International	4.4M	Commercial	RZ
10	Wensley Architecture	320,000	Commercial	RZ
11	Eric Law Architect	120,000	Commercial	RZ



**CONSENT RESOLUTIONS OF THE DIRECTORS OF  
LULU ISLAND ENERGY COMPANY LTD.  
(the "Company")**

The undersigned, being all of the directors of the Company, hereby consent to and adopt in writing the following resolutions:

**Request for Expression of Interest**

WHEREAS:

- A. the Company was incorporated by the City of Richmond ("Richmond"), the Company's sole shareholder, for the purpose of managing one or more district energy utilities (each a "DEU") on Richmond's behalf;
- B. in April of 2014, the Company entered into an agreement with Richmond whereby the Company was assigned the function of providing district energy services on behalf of Richmond, including partnering with third parties to provide such services; and
- C. the Company now wishes to issue a request for expressions of interest ("RFEOI") to identify a utility partner to design, build, finance and operate a DEU in the City Centre North area of Richmond.

NOW THEREFORE IT IS HEREBY RESOLVED THAT:

1. the Company be and is authorized to issue a RFEOI, for the purpose of identifying a suitable utility partner to design, build, finance and operate a DEU in the City Centre North area of Richmond;
2. the RFEOI be guided by the objectives for the proposed DEU as follows:
  - (a) the DEU will provide end users with annual energy costs that are competitive with conventional energy costs based on the same level of service; and
  - (b) Richmond Council will retain the authority of setting DEU customer rates, fees and charges for DEU Services, through the adoption of a service area bylaw;.
3. any two directors or officers of the Company be and is hereby authorized to take all such actions and to execute and deliver on behalf of the Company all such other instruments, agreements and documents as he or she considers necessary, desirable or useful for the purpose of issuing the subject RFEOI and otherwise to carry out the intent of these resolutions.

**Execution by Counterparts**

These resolutions may be validly executed and delivered by the directors in any number of separate counterparts and all counterparts, when executed and delivered, will together

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constitute one and the same instrument. Executed copies of the signature pages of these resolutions sent by facsimile or transmitted electronically in either Tagged Image Format Files (TIFF) or Portable Document Format (PDF) will be treated as originals, with full legal force and effect, and the directors waive any rights they may have to object to such treatment. Notwithstanding the date of execution, these resolutions will be deemed to be dated as at September 30, 2014.

  
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CECILIA MARIA ACHIAM

  
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JERRY MING CHONG

  
\_\_\_\_\_  
GEORGE DUNCAN

  
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ROBERT GONZALEZ

  
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JOHN DAVID IRVING