

# Richmond, B.C., and Corix partner on City Centre district energy program

The city of Richmond, B.C., has created a novel public-private partnership with Corix Utilities to develop district energy services for its downtown core.

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Photo Peter Russell.

City Centre, Richmond, B.C.

Located on Lulu Island in the Fraser River estuary, the city of Richmond is part of the Metro Vancouver area in the lower mainland of British Columbia. This coastal city of nearly 220,000 residents was a key venue during the 2010 Winter Olympic Games, site of the long-track speed skating events. In recent decades, Richmond has experienced rapid growth and today continues its transition from suburban community to a regional town center with international clout. In the process, its downtown core is undergoing a major redevelopment: City Centre (fig. 1), the fastest-growing part of

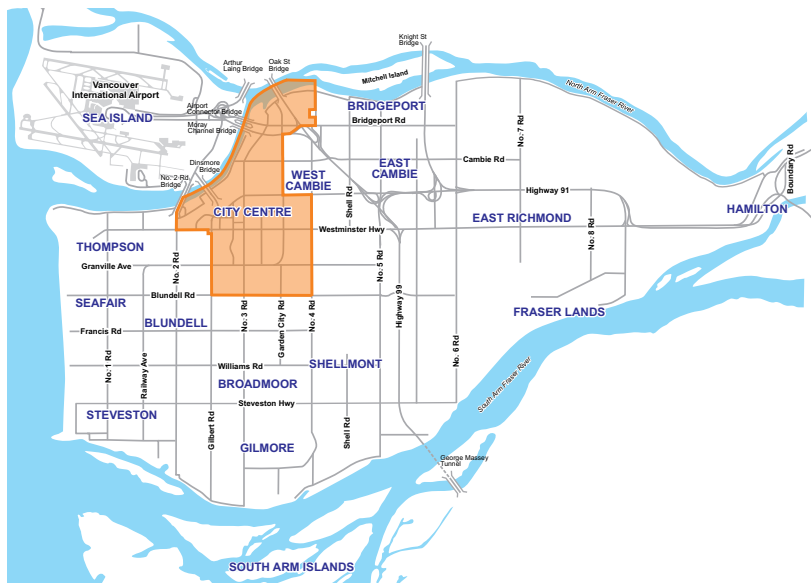
Richmond (fig. 2), is being transformed from a low-density, predominantly commercial precinct into a series of high-density, mixed-used neighborhoods that will have an estimated 50,000-80,000 residents at buildout by 2040.

Today, providing space and domestic hot water heating in City Centre is the new Oval Village District Energy Utility. Located adjacent to the Richmond Olympic Oval – now an indoor multisport arena – this district energy system has been in commercial operation since 2014 and connected its first customer in April 2015. The first phase of the project currently serves

1.9 million sq ft of space in eight customer buildings from two temporary energy centers, both equipped with natural gas-fired boilers totaling 11 MW (37.5 MMBtu/hr) of hot water heating capacity. Future plans for the system call for construction of a larger permanent energy plant that will extract low-carbon heat from a sewer force main, reducing system greenhouse gas emissions by up to 80 percent.

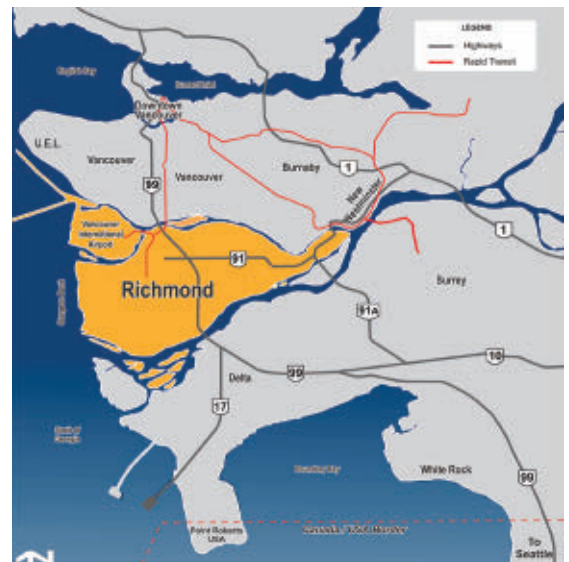
As it develops the Oval Village system, Richmond has been leading the way in creating a novel model for a public-private partnership that will see the provision of district energy services throughout

FIGURE 1. City of Richmond, B.C., and its neighborhoods, including City Centre.



Source: City of Richmond, B.C.

FIGURE 2. The city of Richmond, B.C., and the Greater Vancouver area.



Source: City of Richmond, B.C.

**FIGURE 3.** Aerial rendering of the Oval Village District Energy Utility service area.



Source: City of Richmond, B.C.

City Centre. The model leverages private-sector design, financing, construction and operations expertise while ownership of the utility is retained via the city’s energy company. The utility is regulated by Richmond City Council, which defines rates and service areas. The approach stands out as an efficient model for delivering district energy services in Canada – a model catching the interest of other cities.

**THE BACKGROUND STORY**

When the city of Richmond developed its Community Energy & Emissions Plan in 2012, it was estimated that Richmond residents, businesses and institutions spent CA\$440 million (\$354.5 million) on energy in 2010. Those dollars were largely directed to major energy utilities and multinational oil companies. At the time, the city already understood through the 2012 launch of its Alexandra District Energy Utility in Richmond’s West Cambie area (adjacent to City Centre) that district energy was an effective tool for reducing community greenhouse gas emissions. District energy could also raise new non-tax-base revenues while creating local jobs. Each new building connected to district energy in Richmond represented (and represents) a new significant retention of energy spending in the community, effectively “localizing” energy generation. Of those cities and universities seizing the opportunity in British Columbia, some began investing directly using their own resources while others sought to engage the private sector.

The city saw the opportunity to “get ahead” of redevelopment by planning for

district energy in its City Centre. Richmond’s City Centre Area Plan was rapidly being implemented; the 2,500-acre area, largely defined by low-density commercial uses, was transforming into several high-density mixed-use neighborhoods. The city envisioned that district energy services would be developed in a phased program, with smaller nodes emerging in different areas but eventually connected to form a City Centre-scaled system with multiple energy plants.

An early opportunity emerged to get district energy planning work going. As a host city for the 2010 Winter Olympic Games, Richmond committed to building a speed skating oval venue. To raise a portion of the funds to build the venue, the city disposed of a number of consolidated sites in 2006, while retaining a major waterfront parcel in the center on which to construct the Olympic Oval; significant residual funds raised from the disposition were used to replenish and further grow the city’s land inventory. The land disposition also created the opportunity for the city to approach the waterfront parcel developer to work together to assess the viability of district energy to service buildings on that site. The result of the city’s direct engagement with the developer eventually led to the parties signing a memorandum of understanding to work together. This site and eventually surrounding sites would become the service area for the Oval Village District Energy Utility (fig. 3).

Around the same time, seeing the long-term potential of district energy across City Centre, the city also began including a “district energy-ready” require-

ment for new buildings undergoing rezoning. District energy-ready buildings must be designed to utilize energy from the district system when a neighborhood utility is available. Connection to the future utility is secured with a legal agreement prior to the rezoning adoption. Further down the development approvals, this commitment is also registered on the land title. Since implementing this practice in 2009, the city has secured over 8,000 district energy-ready residential units to date in the City Centre area, ensuring the necessary demand for energy services needed to support a low-risk investment environment.

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To date, most of these buildings are still in the design or approval stages. Some have already been constructed as district energy-ready but without a district energy connection. These buildings are built using hot water hydronic heating systems with a developer-installed boiler plant instead of an energy transfer station. Given the pace of development and the varied locations of where redevelopment is occurring throughout City Centre, the city had to make strategic choices regarding where and when it would service new buildings. The Oval Village was the first such area, but other areas with potential for servicing exist throughout City Centre. The city expects that over time and with Richmond council endorsement, those buildings could eventually be connected once the distribution network is more established in those areas.

**ESTABLISHING A NEW ENERGY COMPANY**

Given the investment potential of the developer’s waterfront site alone and given the multiple rezonings under way in the immediate surrounding area, the city realized a new approach to financing a district energy project would be required. Rather than become encumbered with debt, the city sought a private-sector partner in 2010 to design, build, finance

and operate the Oval Village District Energy Utility, choosing Corix Utilities. Then in 2013, the city established Lulu Island Energy Co. (LIEC) as a wholly owned municipal corporation to work directly with its private-sector district energy partner.

For context, under the British Columbia Community Charter, local governments have broad powers to provide services to their citizens that “council considers necessary or desirable, and may do this directly or through another public authority or another person or organization” (Section 8.2); local governments also have the “authority to regulate, prohibit and impose requirements under the Community Charter in relation to a municipal service” (Section 8(3)a). Another regional local government in British Columbia, the city of North Vancouver, incorporated the Lonsdale Energy Co. to operate its district energy system in a similar way.

### WORKING WITH A PRIVATE-SECTOR PARTNER

The city of Richmond had selected Corix Utilities as its district energy partner through a rigorous procurement process. Corix is a privately held corporation, principally owned by the British Columbia Investment Management Corp., with offices in Vancouver, B.C., and Wauwatosa, Wis. Both parties would enter into an MOU to define roles and responsibilities in 2011, a process for working together and a compensation commitment to Corix should an agreement not be reached. The process for working together included two distinct stages: first, a due diligence phase that in-

cluded infrastructure, business and financial planning, and, second, development and execution of a long-term concession agreement.

Given the MOU the city held with the developer who purchased the waterfront site, the due diligence phase started with initially understanding development timing for the waterfront site alone and developing an appropriate infrastructure plan and financial model. The developer’s plan was to develop the site strategically over an approximately 15-to-20-year timeline. The Corix MOU also set specific expectations to use local renewable energy resources, which would be assessed as part of the due diligence process. In the meantime, however, more district energy-ready buildings in the surrounding area were finalizing development approvals, and the regional government had plans to replace a major sanitary force main that ran through the service area. Further analysis undertaken by Corix revealed that the district energy system buildout timeline could be significantly shortened if these buildings were serviced and that sewer heat was a viable energy source for the utility. These two opportunities supported a positive business case allowing both parties to move to the next stage of the process.

Hammering out a concession agreement of this magnitude was a new venture for LIEC and city staff. The process began with identifying the material terms of an agreement. Using the terms as a basis for a broader legal document, both LIEC and Corix worked together for over a year to

come to a final agreement that could be executed. Critical terms of the agreement included

- capital investment structure (debt/equity) with a defined debt rate and return on equity for Corix;
- capital, capital expenditure and operating plan review and approval processes;
- customer service standards;
- a process whereby LIEC had the right to complete a service-level review;
- expectations on service levels to be measured using clear performance metrics;
- competitive and transparent procurement processes for design and construction;
- service areas defined by a development plan in the agreement (as amended over time); and
- Richmond bylaws and development permit process developments as the tools to support customer connections.

The 30-year concession agreement was executed in October 2014 whereby LIEC would own the infrastructure, and Corix would design, build, finance and operate the system. At the same time, Richmond City Council enacted the Oval Village District Energy Utility through the adoption of a service area bylaw that requires mandatory connections to the district energy utility and defines customer rates. As regulator, Richmond City Council approved this approach with clear direction that utility rates must be competitive with business-as-usual customer rates, defined as conventional electric and/or natural gas utility rates for the same level of service for the lifecycle of the equipment.

THE AGREEMENT WAS EXECUTED IN 2014 WHEREBY LIEC WOULD OWN THE INFRASTRUCTURE, AND CORIX WOULD DESIGN, BUILD, FINANCE AND OPERATE THE SYSTEM.

Broadly, in British Columbia, rate reviews can be carried out by the city council under the province’s Community Charter; a similar approach is under consideration in Nova Scotia on the east coast.<sup>1</sup> Some municipally owned district energy operations in B.C. have also creat-



The Richmond Olympic Oval, site of 2010 Winter Olympic Games speed skating, is now a multisport arena containing a 20,000-sq-ft fitness training facility, two skating rinks, six hardwood sport courts, a track, climbing wall, cafe and other amenities.

**FIGURE 4.** The 2 River Green residential development on Richmond's Fraser River, estimated for completion in 2020, will be among the customers of the Oval Village District Energy Utility.



Source: City of Richmond, B.C.



This vinyl mural, *Underwater* by Andrea Sirois, wraps around the 53-ft shipping container that houses one of the Oval Village system interim plants.

ed an additional and separate dedicated body to oversee the rate review process, but city councils in these cases still approve rates.<sup>2</sup> Otherwise, private companies wishing to establish district energy utilities in the province are required to seek the approval of the B.C. Utilities Commission. Meanwhile, in Ontario, the Municipal Act gives local governments the authority to create bylaws respecting climate change and energy (excluding electricity), heating and cooling.<sup>3</sup>

### EXPLORING EXPANSION OPPORTUNITIES

For context, LIEC and the city always envisioned that a City Centre-scaled district energy system would be viable but considered that growth of the system would occur through a phased construction program. Bit by bit, service area nodes could be connected to form a City Centre-scaled district energy system serviced by multiple energy plants. LIEC's approach is to ensure infrastructure is phased in time

to provide thermal energy services prior to the commissioning of new buildings, thus avoiding the unnecessary deployment of capital. As demand for services grows, capital costs will be offset by additional revenues generating a positive rate of return. All costs are fully recovered through user fees applied to serviced properties. (See example customer property in figure 4.)

Using this approach since its inception in 2012, LIEC now is responsible for the operation of two service areas – the Alexandra District Energy Utility and Oval Village District Energy Utility – using four energy plants, two of which are temporary, to provide energy to over 3.5 million sq ft of residential, commercial and institutional space. This has eliminated an estimated 2,300 tonnes of greenhouse gas emissions in the community to date.

For a new energy utility like the Lulu Island Energy Co. that is wholly owned by a local government, the accountability

and performance stakes are higher than for a privately owned utility; citizens have higher expectations related to transparency and prompt response to their concerns, which, in turn, influences the city council's expectations of staff. These expectations have led staff to focus on customer service excellence and innovation. In this context and after LIEC assessed Corix's ability to successfully deploy district energy services in the Oval Village (a program that included an interim energy center; distribution piping; capital planning and project management processes; and, finally, managing customer and developer concerns), LIEC had the confidence to begin considering how buildings in other subareas of City Centre could be serviced by district energy through the public-private partnership model the company had established.

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**TODAY BOTH PARTIES ARE COMPLETING DUE DILIGENCE WORK TO DETERMINE HOW BEST TO SERVICE THE WHOLE OF CITY CENTRE.**  
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Efforts to understand the potential for expansion began in 2016 in the area immediately surrounding the Oval Village. Using development projections in the larger Oval Village area, LIEC worked with Corix to complete an expansion test to assess infrastructure and business strategies for extending the distribution network and adding generation capacity. The work showed positive results. Development was also proceeding rapidly in the northern part of Richmond, which led LIEC staff to consider how this area could be serviced. City Centre North is currently planned to include a broader mix of land uses such as apartments, hotels and large multiuse entertainment complexes. For this reason, LIEC considered that providing cooling services in addition to heating services in this area would be viable.

With these opportunities and the introduction of new private district energy service providers in the Greater Vancouver area, LIEC decided to test the market through a new provider procurement process. Corix was once again selected in 2017 as the lead proponent based on its experience and approach; today both parties are busy completing the impor-

tant due diligence work to determine how best to service the whole of City Centre.

## BUSINESS MATTERS

The Lulu Island Energy Co. is a wholly owned corporation as approved by the B.C. Office of the Inspector of Municipalities. As an administrative matter and with a strong company in place, the Alexandra District Energy Utility, initiated by the city's engineering department, was transferred in full to LIEC in 2017.

With respect to local economics, LIEC calculated that the buildout of district energy in City Centre could provide an estimated 630 design and construction jobs by 2040. An estimated 10 operating jobs will turn into full-time positions over the duration of the project. Currently, local artists are involved during the design to incorporate public art into the energy plant buildings' exteriors. Furthermore, 25 percent of the contractors have headquarters in Richmond, and district energy jobs provide a strong incentive for them to continue anchoring their businesses in the city.

## LESSONS LEARNED


Through this initiative, Richmond and LIEC created a replicable model using district energy to create a low-carbon community, at a lower cost. Lessons learned to date in Richmond include the following:

- **Seize those early opportunities to catalyze action; you don't need all the answers to get started.** Trust that your knowledge will grow and your thinking will shift to address concerns or challenges. In Richmond's case, the opportunity was partnering with private developers that either had experience operating geexchange systems, as in the case of the Alexandra District Energy Utility (see cover story in this issue and article in Second Quarter 2014 *District Energy*), or had a major land holding, as in Oval Village.
- **Spread the risk; partners offer value beyond their resources and expertise.** In addition to the risks that can be managed by your partner, the city found that it can also manage risks using municipal regulatory powers identified in this article (i.e., rezoning, building permits).
- **Take the time to build confidence in**

**your partner, and invest in building your local council's confidence in staff and the new venture.** Consistent messaging, highlighting the benefits and addressing community concerns and customer complaints as a priority are a must in this context.

- **Rate-competitiveness with business as usual is a great starting place.** It pushes innovation and strategic phasing of infrastructure and deployment of capital. Matching business-as-usual costs also reduces public fears of future utility costs.
- **Every phase of infrastructure development has to stand on its own.** "Self-sufficient" business cases and construction programs are a must, given the potential for shifting council priorities and housing market fluctuations. For many local governments in Canada, energy utilities are not a core service area; district energy, however, builds on local government utility management expertise (e.g., water and sanitary utilities).
- **Establish a level playing field for private developers.** If developers all have the same costs related to district energy in their pro forma and disclosure requirements, they will have less concern about the competition in marketing their developments.

The city of Richmond benefited from a unique starting point: a city center area ripe for redevelopment. Richmond's City Centre Area Plan most recently updated in 2009 included a far-reaching community consultation to produce a vision for a higher-density, mixed-use, transit-oriented City Centre area. Introducing district energy services in this area simply made sense, but this followed extensive business case analysis, stakeholder consul-

tation and, most importantly, securing a private-sector partner to design, build, finance and operate the district energy utility. Today, supplied with thermal energy from the city's wholly owned Lulu Island Energy Co., district energy customers benefit from Richmond City Council's mandate to provide customer service excellence and competitive rates using low-carbon energy systems. 



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## End notes

<sup>1</sup> Ken Church, Natural Resources Canada on behalf of Canadian District Energy Working Group – Market Development Subcommittee, *Encouraging District Energy Growth through Municipal Policies and Programs – A Discussion Paper on Possible Growth Strategies* (draft), October 2017.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

## FOR MORE INFORMATION, PLEASE VISIT:

- CITY OF RICHMOND, B.C. – [www.richmond.ca](http://www.richmond.ca)
- LULU ISLAND ENERGY CO. – [www.luluislandenergy.ca](http://www.luluislandenergy.ca), for current service areas and rates, future plans, and resources for customers including educational videos and a Kids' Corner
- ENERGYSAVE RICHMOND – [www.energy.richmond.ca](http://www.energy.richmond.ca), for energy efficiency programs for existing and new buildings
- CORIX UTILITIES – [www.corix.com/corix-companies/corix-utilities](http://www.corix.com/corix-companies/corix-utilities)