

# Is District Energy Right For Your Community?

## Part 3: Supporting Resources

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This is the last in a series of three articles that look at the design and operation of municipal district energy systems. In the first and second articles, issues relating to thermodynamics and engineering were discussed, leading up to a basic assessment of system load and capacity. In this article, the discussion will centre on the non-engineering issues that influence system success: ownership, administration and supporting resources.

operative ownership models. The district energy model is transforming, from one of a supply utility to a network that manages the needs of the community. The new system is demand side, rather than supply side driven.

### System Ownership

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The singularly independent nature of district energy development in Canada has led to the creation of a variety of functional business models, with ownership ranging from 100 percent private to 100 percent public.

Recent research undertaken by the Canadian District Energy Association and the Canadian Urban Institute suggests there are more than 80 district energy systems operating in Canada. Uncertainty in the number stems only from the evolution of the term “district energy.” The belief that a district energy system must comprise a centralized heating and cooling plant serving multiple customers is being challenged. Alternative designs are emerging that include multiple, distributed supply points with low temperature or renewable energy technologies, not to mention a variety of co-

functional business models. Ownership ranges from 100 percent private to 100 percent public; from the privately owned Central Heat Distribution (CHD) in Vancouver, British Columbia and Climatization et Chauffage Urbains de Montréal (CCUM) in Montreal, Quebec to the publicly owned systems in Markham and Hamilton, both in Ontario. Systems may also be owned by institutions such as hospitals and universities; the University of Regina and the Health Science Centre in Ottawa are but two.

Government ownership includes the federally-owned Cliff Street plant in Ottawa and the utility-owned systems in Nunavut and the Northwest Territories. Since business management requires knowledge of energy generation, marketing, operation and billing – all issues that are not always found in the same industrial sector – partnerships are often developed. Revelstoke, in British Columbia, brings together city hall and an independent sawmill owner; and in Sudbury, Ontario city hall has teamed up with a major engine manufacturer. Sometimes, the development of partnerships brings



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Charlottetown, Prince Edward Island uses municipal waste as well as biomass.

unexpected benefits as in the case of Watson Lake in the Yukon. Legislation prevents the territorial utility from selling heat from its diesel generators and so, to partner with the town on its district energy project, it instead donated the waste heat.

The division of municipal electrical utilities in Ontario into regulated “distribution” and unregulated “services” sectors has enabled a number of systems to be developed. As yet, only British Columbia requires district energy pricing to be regulated, and the Ontario utilities see the generation and delivery of thermal energy as a natural fit within their portfolios. Hamilton, Markham and Cornwall all make use of their local utility. Elsewhere, municipalities must apply to the provincial government to create a local utility. This was the case with Lonsdale Energy Corporation in North Vancouver, a joint venture between the city and Terasen Gas.

Of the systems owned and operated by municipal governments, the decision to retain ownership was often given as: to simplify the design process (normally a city-hall intensive process); to ensure/gain public confidence; to ensure equality of access to the finished system; and to maximize the level of future benefits accruing to the city. While this demonstrates the altruistic purpose of municipal government, it does sometimes create restrictions in the level of expertise and funding available. The cost of capital may be lower for a municipality, but it is impacted by the level of debt allowed: municipalities may avoid tax on capital expenditures, but private sector operators have access to the accelerated taxation instruments such as the federal CCA Classes 43.1 and 43.2 and a PST rebate in Ontario.

### System Funding

Capital funding often depends on the nature and status of the project. The moderate rate of return developed from most district energy projects limits the level of interest shown by the venture capital sector. However, institutions such as pension funds see the pricing stability afforded by district energy as a pathway to long-term stable returns.

They have more than adequate resources for investment, and are becoming active in the marketplace, seeking out systems with proven track records. New ventures must often seek funding partners who are familiar with start-up risk, and these are predominantly institutionally-based programs. For example, ecoEnergy for Renewable Power<sup>1</sup> and Sustainable Development Technology Canada<sup>2</sup> are both programs from the federal government that support innovation, and the Green Municipal Fund<sup>3</sup> of the Federation of Canadian Municipalities provides grant money for feasibility studies and low interest loans for construction. These programs are also complemented at the provincial level in Alberta, British Columbia and Manitoba, although each program varies in its requirements and scope.

Larger energy utilities are beginning to recognize the value of district energy, and incentive programs are being developed to encourage system growth. In Ontario, the Ontario Power Authority has programs for the clean power supply<sup>4</sup> that could be developed from the local generation. In British Columbia, too, the provincial government, through BC Hydro, has developed a program specifically for green energy, to take advantage of the large amounts of Mountain Pine Beetle killed wood that is available within BC.

### Customer Billing

Loans need to be repaid and revenue needs to be collected. Invoicing the customer normally includes a combination of fixed and variable costs. The fixed component represents a “capacity charge” or the customer’s share of the installation cost for the system. The variable component represents the cost to operate the system, including the flow-through cost of fuel. Some debate whether this is the best approach, since it not only passes all risk and responsibility to the initial group of customers, but it also stifles growth at the expense of the economic rate of return.

The argument is that project risk should be shared amongst all the players by amortizing the project cost over a long-term customer growth prediction. This would lead to lower cost for initial customers and an incentive for system expansion. However, shared risk will only be possible when investors grow more comfortable with district energy, and reduce their sometimes unreasonable demands on system developers. For example, a gas-fired system needs only an interruptible supply contract with a gas supplier (long, proven track record), yet a biomass system requires a firm commitment for 20 years of woodchips (no track record).

### External Resources

In a country of 33 million people, it is sometimes disconcerting that communities feel themselves as being on the leading edge of district energy design. Naturally risk-averse, municipalities ask themselves: Who do I turn to and where do I look for information? Fortunately, there are sources of information available on many of the technical and financial issues.



Opening day at the Revelstoke Community Energy System (November 2006).

Natural Resources Canada has long supported district energy, and provides advice and technical assistance. They undertake research into a variety of technologies, ranging from biomass to solar and heat pumps to underground thermal storage, as well as being Canada's agent for reference manuals by the International Energy Agency.

The Canadian District Energy Association represents the district energy sector, and provides insight into developments for its members. It was instrumental in advancing the federal Class 43.1 regulations and the Ontario Clean Energy Standing Offer program to include district energy components.

In Montreal, the Canadian GeoExchange Coalition provided standards and direction for the installation of ground source heat pumps, along with programs for operator training. Elsewhere in Canada, many of the climate change organizations and municipal associations are supportive, and will provide assistance wherever possible. In British Columbia, for example, the Community Energy Association also has created a toolbox of information on energy systems, specifically for the needs

## Useful Internet Resources

### Natural Resources Canada

<[www.sbc.nrcan.gc.ca](http://www.sbc.nrcan.gc.ca)>

<[www.canren.gc.ca](http://www.canren.gc.ca)>

<[www.oee.gc.ca](http://www.oee.gc.ca)>

### Infrastructure Canada

<[www.infrastructure.gc.ca](http://www.infrastructure.gc.ca)>

### Canadian District Energy Association

<[www.cdea.ca](http://www.cdea.ca)>

### Ontario Power Authority

<[www.powerauthority.ca](http://www.powerauthority.ca)>

### BC Community Energy Association

<[www.communityenergy.bc.ca](http://www.communityenergy.bc.ca)>

### Climate Change Central

<[www.climatechangecentral.com](http://www.climatechangecentral.com)>

### Smart Growth Canada Network

<[www.smartgrowth.ca](http://www.smartgrowth.ca)>

of west coast communities, helping them address their issues.

To sum up, the three articles in the past three issues present the salient points of district energy within a community. They ask: What does it do and where does it fit, what does it look like and what does it need? Finally, they try to identify who owns it. The rest is up to you. *MW*

1 <[www.ecoaction.gc.ca/index-eng.cfm](http://www.ecoaction.gc.ca/index-eng.cfm)>

2 <[www.sdte.ca](http://www.sdte.ca)>

3 <[www.fcm.ca](http://www.fcm.ca)>

4 <[www.powerauthority.on.ca](http://www.powerauthority.on.ca)>

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