

Introduction

Lonsdale Energy Corporation (LEC) is a district energy heating utility wholly owned by the City of North Vancouver. LEC provides space and domestic hot water heating services to approximately 600,000 square feet of mid to high-density residential and commercial development. By 2007, LEC will provide thermal energy services to over 1 million square feet of building customers.

This article examines organizational, technical, regulatory and business policy issues addressed by the City during the planning and implementation of its district energy utility.

Background

The City of North Vancouver is a member municipality of the Greater Vancouver Regional District. The City's population is approximately 50,000 within a regional population of 2 million. The City's Official Community Plan, founded on the principle of sustainability, embraces a vision of a vibrant, diverse, and highly liveable community while balancing social, economic and environmental needs. All of the work of the City: its projects, programs, budgets and initiatives must support that vision.

In the late 1990's, planning commenced for the redevelopment of much of the City's waterfront and adjacent core areas. One significant distinction that City Council insisted be acted upon was the inclusion of energy planning along with other traditional urban planning issues such as land use, transportation, and infrastructure. This was an unusual consideration because in British Columbia, energy planning is traditionally carried out by provincial-scale organizations such as BC Hydro for electricity and Terasen Gas for natural gas. There is almost no history of a municipality planning for, or providing energy services, within the province of British Columbia.

However City Council knew that status quo land development practices, where large buildings are often heated solely with electricity, would only contribute to a growing electrical energy supply and demand gap within British Columbia. For Council, the status quo was no longer an option. The City had a responsibility to lead the way in ensuring that energy use was as sustainable as possible in its future.

Planning and Implementation

So how did a small city, with no prior history in providing an energy service, enter the energy industry and start a district heating utility? One word: partnerships.

The first and most crucial partnership is between Council and its staff. With a clear governance vision, an entire organization can be mobilized to achieve the goal. The integrated, combined knowledge of administrative, engineering, financial, and planning professionals will find a way to achieve that goal within the capacity of the organization.

The second crucial partnership developed with the group that represents the interests of Canadian cities at the national level. The concept of district energy as a viable alternative to the status quo was introduced to the City via 'energy missions' sponsored by the Federation of Canadian Municipalities (FCM). These missions occur annually and serve to introduce Canadian municipal decision makers to best practices in community energy systems in Europe. The visits and briefings confirmed for both Council and senior staff, that district energy can play an important role in driving a community toward a vision of a more sustainable future. The FCM ultimately facilitated the start up of Lonsdale Energy by providing low interest loans and grant funds, based on the concept of distributed generation applied by LEC.

The educational and information sessions sponsored by FCM led the City to commission engineering studies on how best to implement a district heating utility. The central plant model of implementation was initially studied but it presented several problems that had to be overcome. Firstly the City was, and remains, proudly debt-free. All projects and programs are internally funded and fiscal prudence is rigorously applied to City operations. Implementation of a central plant meant a very large up-front capital cost with relatively little marginal revenue. A large plant would require full time attendance of personnel with implications for operating expenses. In addition a central plant located in the midst of a high density high-value area of redevelopment had the likelihood of land use conflicts with immediate neighbours. Finally, land in the City was very expensive. A significant lost economic opportunity would accrue to the City if City-owned land were devoted to an energy plant rather than for a revenue-producing redevelopment.

The challenges with central plant implementation led to the examination of a non-central plant alternative. If a way could be found to distribute the generation equipment throughout the redeveloping service area, why bother with a central plant with the associated challenges?

The City has two roles in land development: as owner of a significant amount of land under redevelopment potential, and as regulator of land uses via zoning laws and requirements. In the first role, the City can place contractual requirements on builders who purchase City property for development purposes. In the second role, all municipalities commonly have regulation of land use as a core part of their business. A City has the ability in policy to make requirements of development in the best interests of the City. This brings us to another important partner: the development community.

All new buildings in the redevelopment precinct require underground parking garages. A 'mini plant', housing from 4 to 6 high efficiency condensing boilers, requires a floor area equivalent to several parking spaces. Developers are asked to provide, in certain select building sites, space (in a proper configuration) for a small energy plant. Given that a developer must build a concrete underground parking garage, this requirement has not been a barrier in proceeding with a building project. To date, two 'mini-plants' have been constructed and commissioned and are interconnected with the in-street energy distribution system. A third plant is under construction.

The interconnected mini-plant concept provides greater financial and operational flexibility for LEC during system build-out. Marginal costs of system growth are more closely matched with marginal revenues. In addition, system changes or improvements can be more easily incorporated into future growth with the distributed plant versus a central plant generation model.

Fitting out and commissioning the plants, along with operating the entire system, required the search for an operating partner. The City required a credible, highly experienced organization to provide system operations services as well as customer care and rate design services. Terasen Utility Services Inc. was contracted to provide a complete suite of energy utility operations services. With this last piece of the puzzle in place, Lonsdale Energy Corporation commenced operations in 2004.

In closing, LEC represents the combined effort of clarity of vision at the governance level, staff implementation guidance, consulting engineering expertise, development industry professionals, energy industry professionals, contractors, and collaborative support from Federation of Canadian Municipalities.