

Revelstoke Community Energy Corporation

A Community Partnership in Energy Innovation



District Energy (DE) - What is it? Who uses it? Why use it?

District energy systems provide heating and/or cooling from a central plant rather than conventional building-scale systems. Energy created at the central plant is distributed through insulated underground pipes to individual buildings. Each customer has an energy transfer station which meters and controls the heat energy supply. Buildings with hydronic heating, ventilating and air conditioning (HVAC) systems which distribute thermal energy via water in pipes are most easily converted to district energy supply.

Used as far back as the Romans, district energy is a very old concept. Today, district energy is evolving rapidly in the western world:

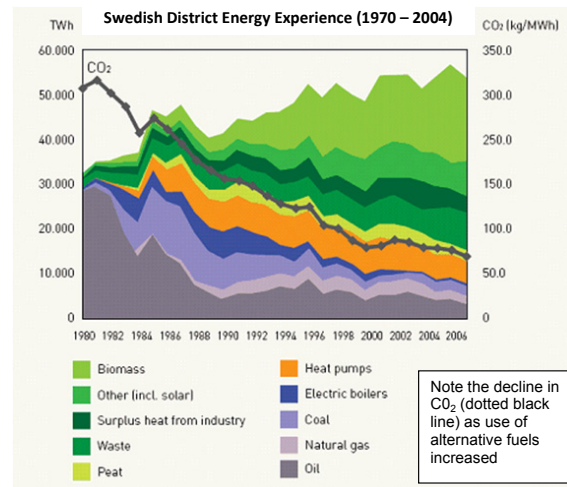
- Northern Europe - more than 50% of all building stock in some countries is connected to district energy systems.
- North America - more than 6,000 district energy systems.
- Canada - about 120 district energy systems, with more under development.
- BC – two biomass systems, in Revelstoke and Victoria - systems in Vancouver use natural gas.

Regardless of the type of fuel that is used, district energy systems offer potential advantages to customers over conventional building-scale systems:

- *Reduced initial costs and/or lifecycle costs* as the DE system maintains equipment, secures lower cost fuel supply contracts, and can switch among technologies and fuels in response to changing technology or fuel prices.
- *Improved quality of service* with back-up in case of breakdowns and via the

relative comfort of hydronic heat.

- *Improved environmental performance* through regular maintenance and efficiency upgrades.
- *Reduced risk and increased flexibility* by reduced exposure to fluctuating fuel prices and the ability to shift technologies and/or fuels swiftly.



Using alternative energy sources such as biomass and waste heat has renewed interest in DE systems. In this context, these systems benefit both customers and society as a whole through:

- lower energy costs
- reduced reliance on imported fuels
- increased local economic activity, and
- reduced greenhouse gas emissions.

For more detailed information about DE systems see: DISTRICT ENERGY BACKGROUNDER at: <http://revelstokecep.weebly.com/>.

What is the Revelstoke District Energy Corporation (RCEC)?

RCEC is a wholly owned subsidiary of the

City of Revelstoke. The City appoints a Board of Directors to run the corporation. The Board includes three City Councilors, one City staff member and three appointed community members. David Johnson is the current Chair of the RCEC Board. The energy system is managed by a part-time contracted manager.

Downie Timber Ltd., the business that operates the sawmill near the centre of Revelstoke, is a crucial community partner. The plant is located at the Downie mill, and RCEC partially funds an experienced Downie employee to operate the energy plant. RCEC has a secure 20 year biomass fuel supply agreement with Downie Timber and an agreement to supply steam for the sawmill dry kilns.

RCEC shares office space and admin staff with Revelstoke Community Forest Corporation (RCFC), another wholly owned City corporation, and another strong community partner.

Timeline	
1997 – 2004	Four feasibility studies completed.
2005	Plant starts operations.
2005-2007	First six buildings connected.
2009-2010	Second stage of hook-ups completed – Ten buildings connected.

Why was RCEC created?

During the late 1990's, community concerns grew about the air quality and health impacts of the beehive burner at Downie's sawmill. In 1997 the City began studying district energy options to divert wood waste from the burner to a DE system to heat local buildings and to produce electricity to sell to BC Hydro.

In addition to improving air quality, the benefits of district energy in Revelstoke

were increased energy self-sufficiency, reduced energy costs, long-term and stable local energy prices, creating community jobs, retaining energy revenues in the community and reduced greenhouse gas emissions.

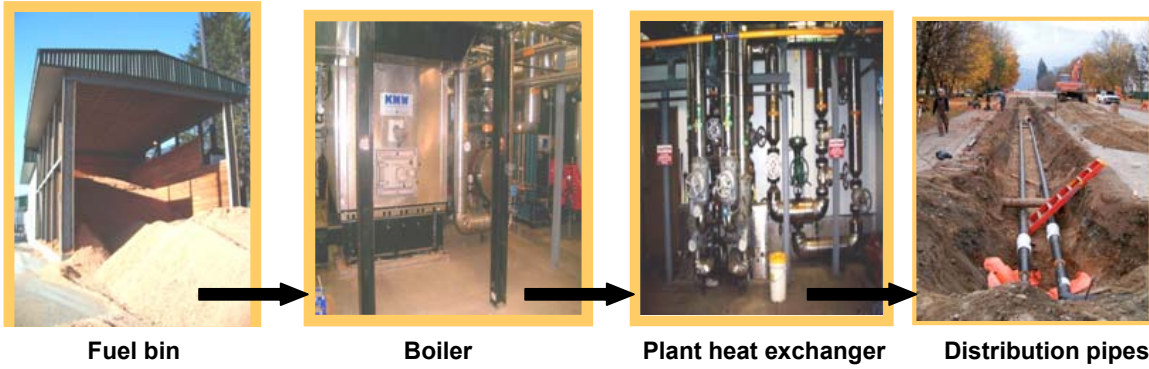


The studies pointed to the district heating option as having the most promise. RCEC continues to be interested in the potential of selling power to BC Hydro in the future.

How does RCEC create and distribute energy?

The energy plant burns about 4 tonnes of wood waste from the Downie sawmill to fire a biomass boiler. Approximately 10% of Downie's wood waste is used at the plant, even during the current downturn in operations. Downie has committed to a 20 year biomass fuel supply agreement, beginning in 2005. Alternative biomass sources include wood waste from logging operations and the landfill.

Heat generated by the biomass boiler is held in a thermal oil system. This system transfers heat to water for distribution to customers at ten buildings via a 2.3 km network of insulated distribution piping. Hot water travels through one pipe to each customer's building where the heat is extracted by an on-site heat exchanger, then the cold water returns to the plant for reheating and redistribution. A steam



generator at the plant converts heat from the thermal oil system to steam for Downie's kilns.

The plant has built-in back-up systems for both heat (a propane boiler) and electricity, so even power failures don't interrupt the delivery of heat to customers.

Implementing any new system presents challenges - there have been difficulties with some of the equipment and a recent fire in the plant was a setback. RCEC continued to supply heat to its customers during these situations, showing the strength of the corporation and the system.

Who uses energy from RCEC?

As well as providing steam to the kilns at the Downie sawmill, RCEC distributes hot water to:

- municipal buildings including the Community and Aquatic Centre, the Forum arena and City Hall
- the existing high school, and under a new agreement, the new high school and elementary school complex
- the federal building on 3rd St. that houses Canada Post and Parks Canada,
- the Catholic church, and
- several businesses including a bed and breakfast, hotel and apartment block.

Each building has a heat exchanger that extracts the heat from the hot water and

transfers this heat to the building heating systems, which usually includes space heating and domestic hot water. Each building also has a meter to monitor use for billing.



These buildings were previously heated using propane imported by rail and truck.

Customer heat exchanger (blue box)

What did the plant cost? How is RCEC financed?

The plant and initial distribution pipes cost \$7 million to design and build. This was been financed through a diversity of sources:

- 31% through grants,
- 33% by loans - 19% in a low interest loan and 14% by a loan at prime plus, and
- 35% from the City of Revelstoke, in part from Revelstoke Community Forest Corporation.

Analyses show these investments are sound, with a return of 5.3% over a payback period of 13 years.

What are the advantages for RCEC customers?

Customers on the RCEC system experience

a number of advantages:

- Lower capital cost and easy installation – RCEC handles the initial installment and maintenance of heat exchangers and meters which eliminate the need for other sources of heat, and the usual capital cost of new boilers or furnaces.
- Long-term, stable, low energy cost - All customers are guaranteed a long term (usually 20 years) low price for energy, which is lower than alternatives available in Revelstoke now. This creates a stable energy cost, which can be a competitive advantage.
- Energy supply is certain – The back-up systems in the RCEC plant ensure continuous heat supply, which can't be achieved with electric or propane boiler systems.
- Buildings on the RCEC system are simple to run – No more boilers to maintain; less labour maintenance and operating costs; fewer contractors to deal with; less security issues; and reduced administration.
- Environmental benefits - RCEC reduces propane consumption and thus greenhouse gas emissions in the community by over 3,400 tonnes per year. This is the equivalent of not running 650 vehicles for a year.

The City saves money by having the Forum, the Community & Aquatic Centre and City Hall heated by RCEC. The province now requires all municipalities to stop emitting greenhouse gases or to pay to offset any emissions. Since RCEC doesn't create emissions, the City will pay less for offsets. And we save money by not having to maintain and replace boilers. We are also doing a good thing for the environment. This is a valuable community asset that we want to support.

Graham Inglis, City of Revelstoke Director of Finance

For Downie Timber, RCEC provides another way to dispose of waste wood, without

having to truck the waste out of town.

What are RCEC's future plans?

While continuing to serve existing customers, RCEC is examining opportunities to strengthen and grow the corporation and its system by:

- Responding swiftly with innovative solutions for potential new customers
- Crafting a long-term business plan to guide future decisions and operations
- Studying expansion opportunities, and
- Responding to BC Hydro's call for expressions of interest for electricity from alternative energy suppliers.

We can be proud!

Revelstoke has been recognized for its leadership and innovation in bringing district energy systems to small towns in Canada.

- 2004** Energy Aware Award from the Community Energy Association for 'long-term energy commitment and leadership, community partnership and its ability to overcome a number of barriers and challenges through innovation'
- 2005** Sustainable Communities Award from the Federation of Canadian Municipalities-CH2M HILL in recognition of 'excellence and innovation in municipal service delivery that has advanced sustainable community development'.

For More Information

Please go to the RCEC website at: <http://www.cityofrevelstoke.com/edc/energyproject2002.htm>

Email us at rcec@rcfc.bc.ca or call us at (250) 814-0115

