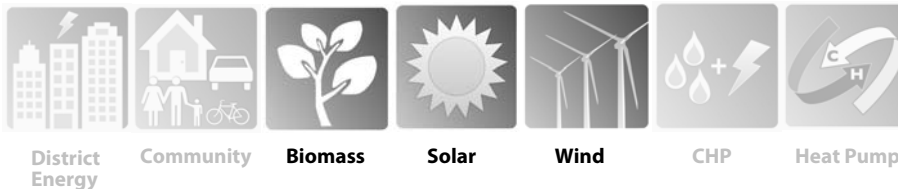


# CanmetENERGY

*Leadership in ecoInnovation*

## COMMUNITY ENERGY CASE STUDIES:

**Dockside Green**  
Victoria, BC



### Integrated Community Energy System Application

- Dockside Green site is a mixed-use residential and commercial real estate brownfield redevelopment that applies the principles of “Smart Growth”.
- Biomass gasification plant that supplies heat and hot water to buildings within the development.
- All buildings being built to LEED™ Platinum standards, except those that are not eligible.<sup>1</sup>

### Context

- Victoria City Council was committed to cleaning up the environmental contamination at this site and developing it in a sustainable way.



### Archetype Characterization

*Archetype:*  
*New Neighbourhood Development*

*Density:*  
*2.084 Floor Space Ratio (FSR)*

*Size:*  
*15 Acre*

*Mix:*  
*87% residential at full proposed  
build-out; 73% residential as of  
2008*

<sup>1</sup> Not all buildings are eligible for LEED certification, including: the biomass and sewage plants, R-4 (a three story townhouse), Ci-1 and Ci-2 core and shell buildings.

## Drivers and Rationale to do the Project

- The City saw the redevelopment as an opportunity to create new jobs and new revenue to help fund services, social programs and community amenities such as public art and green space.

## Benefits

- The biomass gasification plant will make Dockside Green the first large community-scale development in North America to be “greenhouse gas neutral” or better from a building energy perspective.
- Excess heat produced will be sold off-site to neighbouring businesses. This will offset emissions created onsite from electricity and the delivery of waste wood to the site.
- All buildings at Dockside Green will be 48 - 52 % more energy efficient than the Canadian Model National Energy Code (MNECB).
- The combination of residential units with retail, offices, and other commercial space within a single building helps create walkable neighbourhoods, and reduce transportation-related energy costs.

## Project Description

- Dockside Green is located in Victoria, BC close to downtown, adjacent to the Upper Harbour between the Johnson and Bay Street bridges.
- The site is a brownfield redevelopment and will have three distinct neighbourhoods.
- The developers are striving to make Dockside the first greenhouse gas-neutral development in North America.
- There are several features used in Dockside to conserve energy and aim to be a greenhouse gas neutral development:
  - 1. Biomass gasification:**
    - A waste wood gasification process that supplies heat and hot water to buildings within the development.
    - The waste wood gasification process produces a gas that is then burned to produce renewable hot water for buildings and domestic hot water heating.
    - This is a smokeless, odourless and efficient process that requires only 3,000 tonnes of bone dry waste wood per year. This is equivalent to 110 truck (B-train) loads of wood.
    - By design, this district energy system generates low cost heat using local waste wood for biofuel.

## Timeline and Status

**1989**

The City of Victoria purchased the Dockside Lands from the Province of British Columbia for the sum of One Dollar (\$1.00)

**2002**

The City of Victoria made the Dockside lands available for redevelopment after a business case was prepared by City staff to assess potential development opportunities

**2004**

The City selected Windmill Developments (along with VanCity Enterprises) through a competitive bid process, to lead the development of the site

The developers committed to using a Triple Bottom Line approach that balances economic development and profits with environmental and social benefits in developing the Dockside lands

**2005**

The Master Development Agreement and Sales Contract were signed between the City and developer

**2008**

Synergy, the first residential phase was completed and became available for occupancy

**2009**

Balance, the second residential phase will be ready for occupancy

**2014**

All buildings on the site are expected to be complete

## Project Description (Continued)

### 2. Energy Performance Design Features:

- The building design approach uses passive building design, such as insulation, shading and daylighting. Passive design features used in the design of Synergy (the completed residential building) resulted in a 64% reduction in design energy cost relative to MNECB. Building features used to achieve these savings include:
  - Averages of R17 wall insulation and R22 roof insulation.
  - Low E double-glazed windows. These windows prohibit the escape of long-wave heat radiation that is produced by each unit's internal heat systems while at the same time prohibiting the transfer of short wave radiation produced by the sun's rays.
  - Heat recovery technology to pre-warm incoming fresh air by capturing the heat from ventilated air being exhausted.
  - A four-pipe fan coil system is used for the domestic hot water and cold water supply system. Two of the pipes are used for the domestic hot water and cold water supply system. This provides some free cooling to the retail spaces.

### 3. Other Demonstration Features:

- Photovoltaic and solar hot water products will be used on site.
- Wind turbines are being installed on the Ci-1 building.
- A solar compactor using photovoltaic technology has also been installed onsite.

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## Considerations for Implementation and Ownership

- The City rezoned the land and modified the Official Community Plan to reflect the design guidelines and land use designations. They created a comprehensive district bylaw for the site.
- Minimal parking requirements were reduced to one parking space per unit since the developers were implementing car share and mini-transit programs.
- Zoning was changed to allow for an additional floor of housing because the developers were offering affordable housing units.
- Sewer charges were waived since the development was treating its own waste water through its tertiary waste water treatment facility.
- A penalty clause was created between the developer and the City of Victoria of up to \$1 million dollars (\$1 per buildable sq. ft.) payable to the Municipality should LEED Platinum designation for each building not be obtained.

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## Operation - Component Expectancy and Challenge

- The biomass plant is being installed prior to the build-out of the development. This will result in significant excess heat in the early years and thus low project returns. At full build-out, the returns confirm the viability of the system for use in other applications or community developments.<sup>2</sup>

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<sup>2</sup> Dockside Green Annual Sustainability Report.

- Construction costs are estimated to be about 1 to 1.5% higher than a normal mixed-use development.
- VanCity Credit Union is providing \$20 million in equity to the project and has first right of refusal for financing all buildings and utility systems.
- VanCity has posted a \$25 million guarantee for the project to the City for the various commitments being provided in the development.
- Dockside Green Limited Partnership is setting aside \$1.5 million towards the biomass system with no expectation of return on investment (ROI) to assist overcoming the barriers of utilizing a central biomass system.

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### Relationship to Other Best Practices

- Dockside Green is a mixed-use residential and commercial real estate development which also includes public amenities such as affordable housing, public open space, a mini-transit system, a fitness centre, local shops, and an amphitheatre.
- All buildings developed at Dockside Green are being built to LEED™ Platinum standards, except those that are not eligible.
- The City of Victoria has applied a Triple Bottom Line approach to the selection of the Dockside Lands developer to ensure that the development will result in significant benefits to the public and the municipality.
- The municipality has developed a framework for the monitoring and reporting of economic, social and environmental performance goals. Penalties will be levied if performance goals are not achieved.

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### Lessons Learned (as of February 2009)

- The municipality facilitated the necessary zoning application to go forward to move the biomass plant to the Dockside Lands, as well as a property tax exemption. Without this support, the plant would not have proceeded.
- Worked with the community on the development's design and implemented their recommendation, which actually increased the marketability of the development.
- In the initial planning, it might have been better to put more of the detail on requirements into the bylaw versus the master development agreement, as it would have allowed for greater specificity and clarity.
- For the City of Victoria, Dockside Green has created a new expectation for future developments with respect to offering more amenity space and more environmentally appropriate technologies. The development community seems to be responding reasonably well to the higher standards being set.
- Work is ongoing to complete construction of the second and third phases of the development, and lessons are still being learned.

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### Additional Information

- Additional information may be obtained from the Dockside Green's web site at [www.docksidegreen.com](http://www.docksidegreen.com)

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