BUILDING DESCRIPTION

**LOCATION**

**Building Type:** Multi-use assembly center

**Site Size:** 15 acres, 2500 residents

**Location:** Victoria, British Columbia, Canada

**Occupancy Date:** In operation since 2009

**Treatment Plant Size:** 1,200 sq. feet (111 sq. m)

**Environmental Benefits:** Greenhouse gas emissions reduced by 3,400 tons/year; reduced water consumption; and reduced wood waste

**LEED Rating:** Canada Green Building Council LEED Platinum Rating

Dockside Green is an innovative residential and commercial development in central Victoria, British Columbia. When completed, the development will be home to more than 2,500 people. The development features on-site wastewater treatment and a biomass gasification facility which provides heat to a district heating system. This infrastructure is helping Dockside Green to attain a LEED Platinum rating. Dockside Green provides an innovative example of Integrated Resource Recovery (IRR) in an urban setting.
A central greenway running the length of the community will serve as a main pedestrian artery with a scenic naturalized waterway flowing alongside which will play a major role within the community’s ecosystem as an essential tool in treating storm water.

Dockside Green

Dockside Green accomplishes true environmental sustainability. The master-planned community offers three distinct neighborhoods alive with shops, restaurants, offices and the central gathering place - the amphitheatre. Dockside Green is leading the way in sustainable community design.

Dockside Green

A highly accessible waterfront walkway and park has been constructed on the northeast portion of the site adjacent to the shoreline. The existing shoreline has been enhanced to offer a tranquil seaside setting, cleared of invasive scrub and rubbish and replaced with native plantings and natural rock outcroppings.

Dockside Green
The 1st constructed neighborhood, Dockside Wharf is located at the north end of the site. It is home to an organic bakery, café', harbor ferry dock and fitness centre and is the future home of a harbor front restaurant.

SUSTAINABLE INITIATIVES

• Wastewater Treatment Plant
  • The reclaimed water (effluent) from the treatment plant exceeds the quality standards for potable water
• Tree Planting
  • Extensive tree planting throughout the site promotes urban ecology through natural shading and habitat while reinforcing the west coast aesthetic

As the 2nd neighborhood in this dynamic community, Dockside Commons features peaceful courtyards, scenic vistas and light landscaping promoting a calming environment.

SUSTAINABLE INITIATIVES

• Bio Mass Gasification Facility
  • The gasification plant uses locally sourced wood waste from construction demolition and tree trimmings. The wood, which would fill two semi trucks every week, will provide more heat than is required by Dockside Green.
• Creeks and Ponds
  • Creeks and ponds comes from Dockside’s Wastewater Treatment Plant and from rainfall.
The 3rd and final phase of the project, Dockside Village is located at the south end of the community, this dynamic neighborhood features the broadest spectrum of uses including homes, offices and locally owned shops and services.

SUSTAINABLE INITIATIVES

- Local Businesses
  - The South Plaza will house community-minded local businesses - such as bakeries, organic coffee shops, hair stylists, framing stores, health food stores, craft stores, restaurants, local pubs, kayak rentals, and a grocery store.

- Green Technologies
  - Various additional renewable energy strategies will be demonstrated on site as part of an environmental education plan. Examples include solar water heating, photovoltaic's, and small-building wind turbines.

BUILDING DESCRIPTION

SUSTAINABLE INFRASTRUCTURE

BIOMASS GASIFICATION PLANT

Through the biomass gasification process, organic wastes (such as wood) can be converted into natural gas which in turn is used to provide heat and hot water to the 26 planned buildings of the development. The product, called synthetic gas or "syngas", is greenhouse gas neutral. When the gas is combusted, it can be used in any application that natural gas could be used for - the generation of heat, electricity, or both (cogeneration).

NATURALIZED CREEKS & PONDS

A central greenway running the length of the community will serve as a main pedestrian artery with a scenic naturalized waterway flowing alongside which will play a major role within.

WASTEWATER TREATMENT PLANT

A $4 million on-site wastewater treatment plant is integrated into the center of Dockside Green. The plant sits beneath some of the residential buildings. The reclaimed water (effluent) from the treatment plant exceeds the quality standards for potable water. Dockside Green re-uses this water for flushing toilets, irrigation, and to supply a waterway which provides both aesthetic appeal and habitat for wildlife. Reuse of the treated water saves approximately 113 million liters of drinking water per year.
For both the built and remaining proposed, all of the anticipated rainfall is able to be retained on site. It is then recycled through filtration to be used for grey water applications like irrigation for the roof, on-site water features and toilet usage. After toilet use, the then black water flows through to storage and a treatment plant. From there it is let into the on site bio-swales, or overflow is released into normal sewage.
1 **Fuel In-feed**

2 **Gasifier**

3 **Oxidizer**

4 **Boiler**

5 **Community Distribution**

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1. **Fuel In-feed**
   - Reclaimed wood fuels delivered to fuel bay by truck
   - Wood can have up to 50% moisture content
   - Four hydraulic rakes guide wood fuel along the floor into a conveying auger
   - The fuel in-feed has the capability to process up to 20 tonnes per day

2. **Gasifier**
   - The Gasifier is fed by a fuel level control system
   - The wood fuel is deposited into a metering bin and then augered into the gasifier chamber up through the center cone
   - The Gasifier chamber is an oxygen deficient environment (only 10-14% O2, is forced depending on fuel moisture content)
   - The wood fuel passes through several stages including: drying, pyrolysis (a chemical change brought about by heat) and gasification, converting the wood into syngas which can be used like natural gas

3. **Oxidizer**
   - Syngas enters the Oxidizer
   - Fresh air is forced through two spiral channels causing a cyclone effect through the Oxidizer chamber
   - The syngas is combusted in the Oxidizer with the resulting flue gas/thermal energy directed to the boiler
Each facility constructed thus far has achieved LEED Platinum rating, as was the goal from the beginning. Though not quite half of the buildings are built as of yet, each of those remaining are planned to obtain the same level of rating.

BC Oil and Gas Commission Achieves LEED® Platinum Certification

VICTORIA - The BC Oil and Gas Commission (Commission) achieved LEED® Canada Platinum C1.0 certification at their Dockside Green office location in Victoria, Corporate Services Leader Randall Smith announced today.

“We are very pleased with the certification,” said Smith. “This new, green office space furthers the Commission’s goal to be a great place to work while contributing to environmental sustainability.”

LEED® rating is a system used to certify green interiors with a reduced environmental footprint.

Platinum is the highest level of certification given by the Canada Green Building Council and is currently held by only a handful of buildings in the country. The Commission worked closely with the developer of Dockside Green and their consultant team to ensure building materials, office furniture, finishes and lighting complied with LEED® Platinum requirements.

The office features heating from a biomass plant, treated wastewater for toilet flushing, opening windows maximizing natural ventilation and large windows offering high levels of natural light supplemented with sensor lighting to reduce unnecessary electricity consumption. All building materials and finishes contain low volatile organic compound (VOC) and no urea-formaldehyde. Furniture systems are cradle to cradle, and only green cleaning products are used. Staff also participate in the Dockside Green recycling and composting programs.

The BC Oil and Gas Commission is an independent, single-window regulator of oil and gas activities in the Province of British Columbia. The Commission has regulatory responsibility for industry activity from the exploration and development phases, through to facilities operation and decommissioning.

Lee Shanks
Manager, Communications
BC Oil and Gas Commission
250.793.7595
Lee_Shanks@gov.bc.ca
Build It Green is a non-profit membership organization whose mission is to promote healthy, energy- and resource-efficient building practices in California as an affordable alternative to LEED. Working mainly in single and multifamily housing they encourage low-cost sustainable building from sketch to completion. Upon which these residences achieved 267 of 318 available points.

<table>
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<th>Total Available Points</th>
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<td>267</td>
<td>49</td>
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Due to the subjective opinionated nature of this checklist we averaged scores given by both group members, which were quite close already.
SUSTAINABLE vs CLEAN FUEL SOURCE

The gasification plant uses trucks to bring in fuel which is largely waste byproducts like wood ships and scraps from other construction and lumber mills. These are kept to local sources but still need to be trucked in. If the property were to purchase its own clean diesel trucks for transport then the 2 semi-trucks per week would not contribute to the overall buildings impact on the environment.

GEOTHERMAL COOLING

The current air cooling system utilizes natural ventilation and shading in order to help cooling as well as power air conditioning at some locations. Installing a geothermal system would discourage individual owners/renters from using portable or other A/C units as well as limit the use of the fuel linked system currently employed for heat.

GASIFICATION FOR POWER

The university of South Carolina utilizes a gasification plant to generate electricity. Since the system is already largely in place it could be modified in order to do the same in addition to the proposed solar and wind power generators to future construction.

BUILDING REDESIGN PERFORMANCE ANALYSIS

Once implemented the aforementioned redesign strategies stand to improve the already outstanding sustainable practices. The main area where this multi-purpose community is lacking on the regenerative chart, is FUEL.

- By using clean diesel trucks the development will reduce it’s CO2 emissions into the atmosphere.
- By using geothermal cooling, the development will consume less energy during the summer months because of reduced AC use.
- Furthermore, if the gasification process were used to create power rather than just heat, the development may further reduce any reliance on outside energy sources. The added use of a desalinization plant, since its “dockside” would reduce the use of offsite water during dry months as well.

These three additions would further improve the efficiency and sustainability of the LEED Platinum development.
“Dockside Green has redefined the words bold and leadership when it comes to Green Development. In this one project, what is possible has been redefined for cities everywhere, a brilliant achievement that will change our world.”
-Paul Hawken
Author, Natural Capitalism and Ecology of Commerce