

Housing project taps wood-waste energy

Gasification system delivers heat, hot water

By Monte Stewart - Business Edge

Published: 04/20/2007 - Vol. 7, No. 8

Partners in a Victoria green-housing project hope its wood-waste gasification project will become a staple of future communities across Canada.

Dockside Green, an internationally acclaimed \$500-million project under construction on Victoria's downtown waterfront, will be the first housing community in the country to feature the gasification system provided by Vancouver-based Nexterra Energy Corp.

The Nexterra facility, due to be completed next year, will provide heat and hot water to all 26 buildings on the 7.3-million-sq.-ft. site via underground pipes, eliminating the need for in-suite hot-water tanks and heating equipment, such as a furnace.

"It's going to reduce greenhouse gas emissions by something like 5,000 tonnes a year," says Jonathan Rhone, Nexterra's president and CEO. "That's like taking 1,200 cars off the road."



Courtesy of Nexterra Energy Corp.

Nexterra's gasification residential system for the Dockside Green's project in Victoria converts wood waste into synthetic gas that is used to heat buildings and provide hot water.

Until now, Nexterra has catered to industrial facilities. The company has installed systems at Tolko Industries Ltd.'s Heffley Creek plywood mill near Kamloops and the University of South Carolina, where it heats all buildings on campus.

Dockside's gasification setup will be much smaller than those projects. But Rhone believes Dockside is the start of an "enormous" business opportunity in the residential sector.

"It represents a continuation of this major shift we're seeing in the energy market," says Rhone.

He believes high fuel prices have sparked unprecedented, sustainable demand for green energy sources.

At Dockside, Nexterra's system will be fuelled by wood waste derived from land-clearing activities, the remains of two-by-fours used in construction and used pallets trucked in from Vancouver Island locales.

Nexterra's technology converts the wood waste into synthetic gas - more commonly known as syngas - through a fixed-bed updraft design.

Small pieces of wood, sized three inches or less, are fed into the bottom of the cylindrical gasifier. The wood is then heated and, following a chemical change, converted into syngas which then travels into an oxidizer where it is combusted. The resulting flue gas goes into a boiler, which then distributes hot water to the buildings via underground pipes.

The underground water provides the energy needed to heat the buildings and the water used in each unit. Meanwhile, after

exiting the boiler, the flue gas is cleaned in an electrostatic precipitator that filters out particulate matter.

After it cools, the piped water returns to the boiler and the heating process starts over.

"We looked at all sorts of things - solar and various other technologies," says Joe Van Belleghem, who heads developments for Windmill Development Group Ltd., which is co-developing Dockside with Vancity Capital. "In the end, we decided to use the Nexterra system because it showed that it had the most potential replicability as well for other communities."



Jonathan Rhone

Dockside will also contain office and commercial space. Windmill has five projects in the design and construction phases in Victoria, Calgary and Ottawa.

Van Belleghem says he's in confidential discussions to provide the Nexterra system to another new community outside B.C.

Windmill, Vancity, Corix Group of Companies, which contracted Nexterra in its role as Dockside's alternative-energy supplier, and Terasen Gas have created a "micro-utility" that will administer the heating and hot-water service. Terasen will process and collect bills on the partners' behalf.

"Part of our business model as a developer is, we believe that we have to get into becoming micro-utilities, because part of our strategy is to provide energy solutions in our projects that are good for the environment but also provide energy security to our customers," says Van Belleghem.

Canadian cities, he says, are blessed with an abundance of biomass ranging from clean construction waste to pallets. Some communities may also be able to use wood destroyed by the mountain pine beetle.

"We think this is a solution that has a lot of export potential," says Van Belleghem. "Quite frankly, if you can make it work in B.C., you're likely going to be able to make it work in other places, because B.C. has very low energy rates compared to most other jurisdictions."

The Nexterra facility will provide several benefits to residents, he says, because it provides a centralized heating and hot-water system, saving homeowners the cost of having boilers (more commonly known as hot-water heaters) in every suite.

The technology also uses substantially less biomass than other co-generation systems that produce the same amount of energy. Dockside and some off-site customers will use about 3,000 tonnes of wood waste per year, which works out to a couple of semi-truck loads per week.

"We'll obviously generate greenhouse gas emissions from the delivery of the material," says Van Belleghem. "There's some greenhouse gas generated from the development as a result of (electricity) use on site. There will be none associated with heating or hot water, and then we're selling biomass heat offsite to other customers, which will result in greenhouse gas savings.

"So when you measure the whole thing, we'll actually be greenhouse gas positive - which is the first time a community development has been able to do that from a building-energy perspective."

Dockside's first residents will move in this December. Construction has just started on a sewage-treatment plant and builders will start constructing a new office building in approximately four months.

In a bid to conserve energy, each Dockside unit will also contain water and electricity meters that can be monitored and adjusted via the Internet.

"So you'll actually be able to be at your office or on a holiday and you can control - remotely - the heat in your suite," he says.

Energy conservation features include double-glazed windows, shading devices on south- and west-facing windows to help cool suites, coiled pipes, LED lighting in corridors, compact fluorescent lighting in suites, ultra-efficient appliances, carbon monoxide sensors and controlled-ventilation sensors in parkades and interfacing, carbon-neutral carpet piles that allow for replacement of sections rather than the entire carpet and bamboo doors.

Some condos will also contain wood derived from flooded old-growth forests.

The entire project is due to be complete in approximately five years, but Van Belleghem says it could be built faster if demand remains as strong as it has.

The Nexterra project is designed to help Dockside achieve platinum status under the LEED green-building certification program.

Van Belleghem initially got involved with green buildings about eight years ago, when he helped build the Vancouver Island Technology Park. Initially, he says, his motive was to provide something different to the marketplace and generate publicity - it was not holistic.

But his life changed after he read Paul Hoffman's book Natural Capitalism and discovered "all these ecological issues that we're facing on this planet."

He calls Dockside is a "catalyst for change" as developers from around the world come to Victoria, check it out and go home and launch their own green projects.

"Essentially, what we're trying to do is build the community of the future today," says Van Belleghem.

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