

COVER Upgrading and greening old commercial buildings delivers sustainability to the bottom line

Deep green retrofits

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Owners of commercial buildings can make more income "mining" their existing inventory than building new, a recent Vancouver conference on green construction was told – and they could also make a startling reduction in greenhouse gas emissions.

Metro Vancouver alone has 1,697 highrise buildings that are more than 30 years old, a few hundred that date back more than 80 years and another 381 that were built between 1990 and 1999, according to the **Building Owners and Managers Association of BC (BOMA BC)**.

There are at least 5,000 more such aging towers across Canada. In Vancouver, they represent 98.5 per cent of the commercial space.

"A staggering number of these buildings are in need of complete retrofits if they are to continue to perform efficiently and remain attractive to tenants," **Lorina Keery** of BOMA BC told a recent meeting organized by Vancouver's **Lighthouse Building Centre**.

The June seminar, entitled "Extreme Makeovers: Whole Building Retrofits," featured a panel of building owners, property managers, energy experts and architects who have worked on taming the old energy hogs.

The aging buildings are often heat-

ed with rugged but wasteful old boilers, cooled inefficiently, lack control systems and need lighting upgrades. They also waste a lot of valuable lease space, the audience was told.

Bryce Conacher, manager of the Renew program with **Ledcor Construction**, said bringing the aging inventory up to modern energy-saving standards is an investment, not a cost.

"This is the new resource, the resource for the next decade. Mining that resource for energy savings and other opportunities is the real payback," Conacher said. The per-square-foot productivity of an old building can be dramatically improved with a "deep green" upgrade, he noted.

It is Ledcor Renew's contention that, instead of "chipping away" at an older building by slowly replacing old heating, cooling and lighting equipment to save energy, it is best to do the entire upgrade at once, and

put in modern control systems to make it all work together.

More leaseable space

This is not always an easy sell. The typical building owner must tolerate a 10-year horizon on financing, but will see immediate annual returns on investment that would beat most equity or stock plays, Conacher said.

Ledcor has documented that the average return on investment for a whole-building retrofit of an aging commercial building is 9 per cent or better.

585 Howe Street, Vancouver: the 30-year old, 112,000-square-foot, Class B office tower underwent a complete retrofit. All heating, cooling and lighting was replaced and new digital control systems put in place. Result: a 32 per cent annual saving in energy costs, a 618-tonne reduction in greenhouse gas emissions and a total payback in 12.9 years.

In one case study, a \$22 million retrofit and energy-saving program in a 22-storey, 40-year-old office tower to LEED silver pencilled out to a 17 per cent return on investment. And it was not just in energy savings.

Not uncommon in old towers, the existing HVAC hardware took the entire two top floors of the building. By upgrading to efficient compact heating systems, an entire floor was freed up for leaseable space, Conacher said.

"The value proposition is that, instead of improving the bottom line through acquisition, look into the existing portfolio and mine that asset," Conacher said.

The expert panel also included **Derek Page** of building owner and developer **Oxford Properties**, property manager **Jim MacKenzie** of **Colliers International** and Toronto architect **Paul Gogan** of **B+H Hunting Coady**, which led the \$130 million



Photo: Colliers International

retrofit of the 75-storey First Canadian Place in Toronto.

It is not cutting-edge green construction that is the key to turning old Class B space into Class A inventory, the experts say: it is replacing old equipment and getting the tenants to buy into an energy-saving attitude.

Such changes aren't sexy like green roofs or solar panels but they can deliver a much better return, MacKenzie explained.

On rooftops, it is more efficient to add improved insulation than opt for solar heating panels or planted materials, the panel agreed. The experts also noted that it is often not worth the cost of replacing existing glazing, that is in good shape and double-paned.

MacKenzie, whose company manages 47 million square feet of commercial space around the globe and often consults on retrofits, said the energy saving usually focuses on boilers, coolers and lighting, where the payback can be measured and immediate. He said many builder owners are rightfully wary of fancy new green technology.

"Some of this is obsolete before it is paid for," MacKenzie said.

Simple is better

As a comparison, many of the original energy-eating boilers and coolers in old buildings, even those 30 or 40 years old, are still working fine. Their reliability has likely delayed a more-rapid move to retrofits, he said.

MacKenzie said simple solutions can provide big savings.

When a tenant in a 105,000-square-foot Vancouver office building hired more staff, the energy costs also increased, he explained in a case study presentation.

By upgrading the digital controls to monitor and direct the new energy demands, "energy consumption for heating was reduced by 26 per cent, resulting in a two-month payback."

Replacing conventional exit lights with LED lamps can reduce energy use from 30 watts per fixture to three watts per fixture.

"Simple is better," MacKenzie said.

Good Earth

A case in point is the Good Earth Building at 595 Howe Street in Vancouver, built in the mid-70s and totally retrofitted in 2006.

Under a Colliers program, all lighting was replaced with T-8 lamps with electronic controls; old boilers and coolers were replaced with high-efficiency units. As in many old buildings, MacKenzie said, the original coolers and boilers were at least 30 per cent oversized.



First Canadian Place, Toronto: \$130 million retrofit and recladding of Canada's tallest office tower. The 45-year old, 72-storey, 2.8-million-square-foot building had the latest mechanical and electrical systems installed and marble façade replaced. Result: Annual energy saving cut by 17 per cent; increased leaseable space. Payback: 16 years.

The result was a 32 per cent reduction in energy costs, an increase in lease rates for the 112,000-square-foot Class B building, a 618-tonne reduction in greenhouse gas emissions – and payback of the total cost in less than 13 years.

Oxford Properties also discovered that simple works when it embarked on the whole-building retrofit of the 45-year-old Guinness Tower on West Hastings Street in Vancouver, part of re-development of a block that includes the historic Marine Building and a new LEED-rated office tower that starts construction this year.

While the entire HVAC, water and lighting systems in the Guinness Tower were replaced, small changes also delivered startling savings.

By just upgrading lighting in the underground parking with occupancy sensors – a

\$20,000 expense – Oxford saved \$4,075 per year.

The largest example of a Canadian office tower energy retrofit is First Canadian Place in Toronto, which included more than replacing the mechanical systems and lighting.

Built in 1975 and still the tallest office tower in Canada, the entire marble façade was stripped off the 75-storey building and replaced during the three-year retrofit, explained Gogan.

The payback was enhanced when moving windows in the bottom two floors resulted in more leaseable retail space at a prime downtown location, he noted.

All the panellists agreed that any green upgrades must always include an attitude adjustment by the building's tenants so they will support energy-saving ideas and cooperate with recycling efforts. ♦

Construction Association warns of "green liability"

The BC Construction Association (BCAA) has released a study on the risks and liabilities of green buildings, which cautions that reliance on new energy-saving technologies and materials could lead to lawsuits.

The 74-page report states: "Our association is very supportive of sustainability in the built environment. However, we recognize that any time our members are faced with the need to embrace new concepts it is essential to investigate the broader consequences to the industry. Liability is always a large factor to be considered."

The purpose of the study was to examine the risks of defects associated with building green.

The study looks at a number of U.S. cases where liability issues surfaced on green construction, and it includes some warnings for Canadian architects and contractors.

For example, it notes that if the owner of a building is sued because of under-performance of a green building, he or she is likely to pass blame onto the designer and the contractor.

The study notes that green-roof contracts and high-performance glazing may be particularly vulnerable, since most liability is seen regarding the building envelope.

Phil Long, chair of the BCCA's sustainability advisory council, sees the report as providing a good "heads up" to developers as they take on green projects. "If we recognize the issues up front we can take steps to manage our contracts and avoid problems before they occur."