



ALL LIT UP: The Calgary Water Centre is a leading star in the green build ranks. Energy savings from the operation of the centre are expected to offset the initial build cost over 15 years

Giving the Green Light

Building eco-friendly commercial properties used to be the stuff of dreams for your average contractor. Not anymore.

BY SHANNON SUTHERLAND

There are some golden opportunities to go green in the commercial building sector right now. And doing so could take millions of tonnes of greenhouse gases out of the air while also reducing operating costs and improving productivity.

With more than 440,000 commercial buildings across Canada, industry is a significant contributor to GHG emissions, representing 13 per cent of total emissions. Given that the sector also represents 14 per cent of all end-use energy consumption,

a new report by the federal government concludes that a focus on energy efficiency will lead to real, measurable GHG emission reductions.

Sustainable design must be seen as necessary, rather than negotiable, for many reasons, says Vivian Manasc, senior principal at Manasc Isaac Architects in Edmonton. Manasc is also vice-chair of the Canada Green Building Council (CaGBC), chair of the continuing education committee and a founding member of the Sustainable Buildings Symposium.



“Sustainable design practices in construction must be seen as an element of safety requirements,” says Manasc, “including the safety of indoor air quality, the reduction of harm from the waste stream caused by the construction industry, and the safety and security of our water and energy supply.”

There are many Alberta-based builders who are taking a leadership role in promoting the use of environmentally responsible technologies such as geothermal heating and cooling.

Clark Builders, for instance, recently

INSIDE OUT: Vivian Manasc, pictured at the Calgary Water Centre, has long been an advocate of the value and importance of eco-builds in Canada



PHOTO: BRYCE KRYNSKI

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managed the construction of the Qualico development in south Edmonton, which incorporated a geothermal system with boiler back-up as the primary source of heat, air conditioning, and domestic hot

water for the facility. The system was supported by 112 wells and 56 heat pumps. Geothermal technology uses the earth's heating properties to warm and cool entire buildings using heat pump systems. GeoExchange is an alternative to traditional non-renewable sourced heating, ventilation and air conditioning systems, and the American Environmental Protection Agency (EPA) has said GeoExchange is the most energy efficient,

environmentally clean and cost-effective space conditioning system available.

PCL Construction Enterprises Inc., another leader in sustainable building, has used geothermal technology in commercial building projects including the Manitoba Hydro downtown office project. Using geothermal technology and even simpler innovations such as passive solar heating, which makes use of the sun's heat without relying on additional mechanical equipment to heat a building, helps builders earn the credits they need to achieve LEED certifications.

The Leadership in Energy and Environmental Design (LEED) green building rating system is a third-party certification program for the design, construction and operation of green buildings. It recognizes performance in five key areas – sustainable site development, water efficiency, energy efficiency, materials selection and indoor environmental quality. There are four levels of certification which include certified, silver, gold and platinum, and industry and groups that promote environmental responsibility say communicating the benefits and affordability of certification has been a priority.

"I would say if you're looking at a silver or gold LEED certification, there would be a premium of between two and four per cent, and for a platinum certification, maybe a five to eight per cent premium," says John Droog, a senior project manager with PCL Construction Management Inc. "It really isn't as expensive as people think it is; although when the economy falters, it is more difficult to get people to make these types of investments."

This could, however, be counter-productive. Several reports over the last few years reviewed by the CaGBC have found preventable productivity losses of between \$29 and \$168 billion in the U.S. due to poorly designed buildings that have an impact on factors such as indoor air quality. Productivity gains of only 3.7 per cent can pay for all facility costs over a 30-year period, according to research by the U.S. Secretary of Defense.



FOR THE WORKERS: Offices within the Manitoba Hydro headquarters, Winnipeg, have constant 100 per cent fresh outdoor air



CURTAIN WALLS: Both the Calgary Water Centre (below) and the Greenstone Building (above) use glass curtain walls to make full use of the energy from the sun

The CaGBC, which administers LEED, wants to see an increase in carbon-neutral buildings and communities by 2030. Manasc was one of the first in Canada to adopt the 2030 Challenge (see panel page 13).

She says achieving this goal will be the greatest challenge that lies ahead. “In order to get there, we need to get people walking more, using cars less, washing their clothes in cold water, drying clothes on a line, and using the energy of the sun. In other words, the challenges are not in

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our pocketbooks but in our heads,” she says. “We need to get past the expectation that technology solves everything. Energy and water consumption, and the use of scarce materials will prove to be the limiting conditions. Everything old is new again, and often we will find that sustainable solutions cost less, rather than more.”

The Calgary Water Centre was designed by Manasc Isaac, in collaboration with Sturgess Architecture, and it is the largest LEED-rated office building in Alberta and one of the first to be built under the City’s sustainable buildings policy requiring all new facilities to meet a minimum LEED silver certification.

Water conservation was a primary design consideration during construction, and some of the building’s features included a green roof, rainwater harvesting and zero irrigation landscaping. Water that would normally be wasted in the metering shop was designed to be cycled into the building’s operation with the grey water system for toilet flushing, site irrigation, and truck washing.

“The City of Calgary has been exemplary in its leadership,” says Manasc. “It adopted a sustainable buildings policy before other municipalities. Since then, other Alberta cit-

ies and towns have adopted a LEED silver minimum requirement for their buildings, while Calgary raised its standard to LEED gold.

This standard is now on par with Vancouver's, although our colder climate and scarcer resources make sustainable design more challenging. Having said that, Alberta has a long way to go."

Where there is communication and a willingness to consider sustainable alternatives, however, there is hope, says Droog.

"There are so many elements to green design from landfill diversion – where we can divert 75 per cent of material from the landfill – to storm water collection, geothermal systems and improving indoor air quality," he says. "People have to be willing to come to the table and look at the options available though. The relatively small investments are going to pay off quite quickly when you look at the life of a commercial building." 

The 2030 Challenge

The 2030 Challenge is a program supporting design activities that will significantly reduce the greenhouse gas emissions of new and renovated Canadian buildings.

It addresses the energy use of buildings and has established a set of energy consumption targets for institutions and businesses to achieve.

The 2030 Challenge proposes targets for the energy consumption of new buildings on the following schedule: Immediately, all new buildings will be designed to consume 50 per cent of the fossil fuel energy for buildings of that type in the region. The fossil fuel consumption will be further reduced as follows:

- 60 per cent in 2010
- 70 per cent in 2015
- 80 per cent in 2020
- 90 per cent in 2025
- 100 per cent by 2030.

By 2030 all new buildings will use no fossil fuels, and will not produce greenhouse gases.



Aim for Zero

The residential building sector is also finding opportunities to go green. Net-zero energy homes, designed to produce as much energy as they consume on an annual basis, are slowly making their way into the housing market.

From a lifecycle analysis, the average Canadian home is responsible for between 10 and 20 tonnes of greenhouse gases emissions per year. Multiply that by 30 million people and you're looking at megatonnes of greenhouse gases per year that could be avoided. "It's a significant issue," says Gordon Shields, executive director of the Net-Zero Energy Home Coalition. "Homes represent 40 per cent of greenhouse gas emissions. That's almost half our greenhouse gas requirements. We don't put enough effort in addressing these emissions at the consumer level, in our homes particularly."

But the building community has begun to respond to a market that has become more sensitive to environmental issues. Energy efficiency has become the standard to live up to, and both levels of government are stepping in, with programs like EnergyStar and Alberta's Built Green program. Currently, local companies are building EQUilibrium™ demonstration homes across Alberta as part of a national housing initiative led by the Canada Mortgage and Housing Corporation (CMHC). The homes combine resource- and energy-efficient technologies to reduce their environmental impact. The Riverdale NetZero Project was completed in Edmonton last year; Calgary's EchoHaven project, which consists of 25 homes west of the city, is underway.

The Riverdale NetZero Project achieved its goal by following a program developed by Natural Resources Canada called the EnerGuide for Houses rating system, which helps people understand the level of energy efficiency in a home. EnerGuide rates energy efficiency on a scale of zero to 100. For a brand new house, a rating of 80 or higher is considered excellent. Energy efficiency alone in the Riverdale net-zero house brought its rating up to 86; electrical efficiency, passive solar heating, active solar space, water heating and solar electricity topped it up to 100.