



HIGH PERFORMANCE
NEW CONSTRUCTION



Leading outdoor retailer blazes trail for green buildings





Unique load shifting is a green first

Mountain Equipment Co-op's new Burlington store was designed with a "whole building" approach to energy efficiency. A first-in-Canada ice storage cooling system, enhanced insulation, and high efficiency lighting combined with daylighting and occupancy sensors all result in dramatic energy savings. A 78 kW reduction in peak demand qualified the store for custom stream incentives from the Ontario Power Authority's High Performance New Construction (HPNC) Program.

Background

With its high profile as a signature supplier of outdoor and adventure gear and equipment, it comes as no surprise that Mountain Equipment Co-op (MEC) is one of the most environmentally committed companies in Canada. MEC's sustainability agenda aims to have long and short term impacts in: reducing their operational and product environmental footprint; improving conditions in factory communities; supporting wilderness conservation and active Canadians - and doing this in a way that furthers marketplace change around sustainability. From an environmental perspective, this means footprint perspective, this leads to programs across all aspects of operations – whether it is energy efficiency, recycling and reuse, creating bicycle access or enabling online gear "swapping".

Green buildings are a vital component of this sustainability strategy. MEC is blazing a trail with innovative technologies, designs, and building practices. Their Burlington location is one of their stores to receive LEED® Canada certification. It is the first building in Canada to use Ice-Bear packaged storage units for cooling to shift summer air conditioning load from peak hours to off-peak.

Challenge

MEC aims to lead and help change the marketplace by demonstrating that sustainability practices make good business sense. Over the years the member-owned co-op has pioneered the use of many leading-edge environmental features, becoming a focal point for school tours, community groups and open houses. For all of its stores, MEC has pushed the agenda further

by using a whole-building approach to sustainability. Sandy Treagus, Chief Financial Officer at Mountain Equipment Co-op, underscores how MEC's environmental and business objectives go hand-in-hand:

"Our goal is to keep raising the bar with respect to new technologies and new building techniques. But, it's not leadership if we introduce state-of-the-art technologies that are not replicable. Everything we employ in our new stores aims to meet the test of 'highest and best use of capital invested.' Initially we may incur higher capital costs but these are offset by the energy and capital cost savings over the lifetime of the building."

Solution

A number of energy and environmental efficiency programs now focus on whole-building approaches. This encouraged MEC to aim for peak performance in their new Burlington outlet. Corin Flood, and Emermodal Engineering Ltd. worked with Stone McQuire Vogt Architects and the design team to come up with a package of energy and environmental solutions. The resulting two-story design houses retail, warehouse, and office space. The innovative store was completed in 2008 and LEED Gold certified the next year. Because of its impressive reduction in electricity demand, and shift in time of electricity draw and use, it met the highest standard for custom project incentives under the Ontario Power Authority High Performance New Construction (HPNC) Program. The store's high performance comes from innovation across all building systems.

Unique Cooling System
MEC's Burlington store is being

cooled without conventional chillers. The building is the first in Canada to use Ice Bear™ ice storage systems to shift electrical load to off-peak demand hours. The system uses energy at night to make ice which is then stored in tanks. In the day a liquid refrigerant circulates through the ice tanks into fan coils in the store, transferring the stored coolness into the interior with minimal use of electricity. As a result 50% to 90% of the cooling is done at night. Treagus describes the system as "beauty in its simplicity."

Solar Power Generation

Tracking rooftop photovoltaic panels are to generate 48 kW of electricity. As part of MEC's "best return on capital strategy" this electricity is sold to the electricity grid while MEC purchases green power from an electricity supplier for its own needs. The solar panels are also used to heat the building's domestic hot water.

Building Envelope

A high-performance building envelope prevents heat losses in winter and cooling loss in summer. The new outlet features R30 roof and R24 wall insulation as well as under-slab insulation. Windows are low-e coated with double-glazing. Further reductions in peak cooling demand were achieved by using windows that can be opened when outside conditions permit and by including a ventilating clerestory dampers (band of windows at the top of one wall).

Heating and Ventilation

Two condensing, gas-fired modulating boilers supply hot water to a radiant floor heating system. A rooftop Energy Recovery Ventilator (ERV) and under-floor displacement ventilation system supply outside air. In winter all

ventilation air is pre-warmed by the ERV and by hot water pipes in the floor heating system. The result is substantial natural gas savings compared with conventional building heating and ventilation systems.

Lighting

The high efficiency lighting system is another factor contributing to reduced electricity demand. A very efficient lighting design incorporates T5 fluorescent tubes with dimmer ballasts. Occupancy sensors lower the lighting level when areas are not in use. Daylight sensors are used to reduce artificial lighting when outside light is plentiful.

Other sustainability features

The project employed a cradle-to-cradle approach – using building materials and techniques that will make it possible to disassemble the building at end-of-life and re-use many of the materials. Wherever possible Forest Stewardship Council (FSC) certified wood was used in construction. Rooftop cisterns collect rainwater to be used for toilet flushing and irrigation while low-flow fixtures increase the water savings. Water use for landscaping is minimized by using indigenous plants and collected water.

MEC Burlington provides a model for sustainable retail buildings. MEC continues to develop its green building program, and is extending the whole-building approach to improving performance in its other new stores. Susan Clinesmith, Manager of the HPNC program, praises MEC for its drive to go farther on the green path, "MEC has a solid long term focus on social, environmental and economic sustainability. Design and material decisions were based on these considerations. They are really leading the charge and showing people what is possible and realistic."

Designing it right. Reaping the rewards.

MEC took a whole-building approach to improving energy efficiency and peak demand reduction in its new Burlington store. The mix of innovative technologies, design choices and advanced building techniques delivers savings over the life of the building, making a positive business case for sustainable practices.

Projected savings include:

Peak demand reduction of 78 kW

Total energy reduction of 63%

Greenhouse gas reduction of 108.68 tonnes

On the basis of the demand reduction MEC received

\$31,200

in custom program incentives from the Ontario Power Authority's High Performance New Construction (HPNC) program while the project architect received \$7,800 in incentive. The program also covered the costs of modeling building energy performance.

Lessons Learned

- 1** Take a comprehensive, whole-building approach. The Burlington store's performance – dramatically lower energy use and lower costs – has confirmed that green features can boost business benefits. MEC's Chief Financial Officer, Sandy Treagus sums it up this way: "Everything is interrelated. That's why a comprehensive, whole-building approach to design and construction really delivers the savings and benefits."
- 2** Address the unique characteristics, challenges and opportunities of each site. This means considering both land and surrounding building features, as well as unique municipal and provincial legislative and policy opportunities. One size does not always fit all.
- 3** Be clear in the outcomes that the building needs to achieve. In this case, optimizing resource use (both energy and financial) led to a creative, whole system solutions around load shifting and energy reduction across different elements of the building.
- 4** Proactively incorporate people and building use. The advantages of natural light and building positioning creates environmental, social and economic opportunities and leads to a building that employees and customers will embrace, further driving productivity.
- 5** Take a short and long-term view in creating the business case. Considering both capital and operating expenses enables a true cost assessment, and invariably demonstrates compelling business reasons for green investments. For owned and operated buildings, this is straightforward. For non-owned buildings, this requires collaboration with owners, management companies and potential users.



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OPA's High Performance New Construction (HPNC) Program

The Ontario Power Authority's HPNC program, delivered by Enbridge Gas Distribution and Union Gas, offers incentives to incorporate electricity efficiency in the design and construction phases of new buildings, additions and major renovations.

Incentives are available for both prescriptive projects (where builders choose from the OPA's menu of pre-approved technologies) and custom projects (where building modelling is used to determine the impact of site-specific efficiency upgrades).

Eligible new building projects include: office buildings, industrial buildings, retail spaces, multi-unit residential buildings, affordable housing complexes, colleges, universities, schools, hospitals, long-term care facilities, agricultural buildings, hotels and motels. Single-family dwellings are not eligible.

Find out how you can qualify by phoning 1-888-OPA-HPNC, visiting www.hpnc.ca, or emailing hpnc@enbridge.com.

To qualify for the HPNC Program, a project must be located in Ontario (excluding the 416 area code), conform to Part 3 of the Ontario Building Code (OBC), and be intended for commercial, institutional, industrial or multi-unit residential occupancy. Agricultural buildings may apply. Applications will be accepted for approval through late fall 2010, and projects must be completed, evaluated, and delivering energy savings by December 2012. Buildings that obtained a building permit between August 2007 and March 2008 may also be eligible.

⁰⁰¹ An official mark of the Ontario Power Authority.

Program Highlights

\$250 per verified kW saved in the prescriptive stream

\$200-\$250 available per verified ton for alternative energy measures

Up to \$60 per eligible in-suite appliance in multi-residential new construction

\$250-\$400 per verified kW saved in the custom stream

\$50-\$100 per verified kW saved available to design decision-maker in custom stream

100% of building modelling costs, up to \$10,000

Available throughout Ontario outside 416 area code.



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