Mountain Equipment Co-op Burlington

Prepared for:
Canadian Consulting Engineering Awards

Prepared by
Enermodal Engineering Limited
582 Lancaster St. W
Kitchener, ON N2K 1M3
tel: 519-743-8777
fax: 519-743-8778
e-mail: office@enermodal.com
web site: www.enermodal.com

ENERMODAL ENGINEERING

Creating energy and resource efficient buildings

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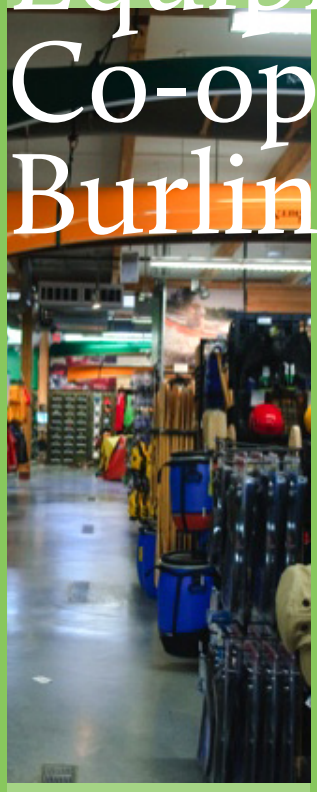
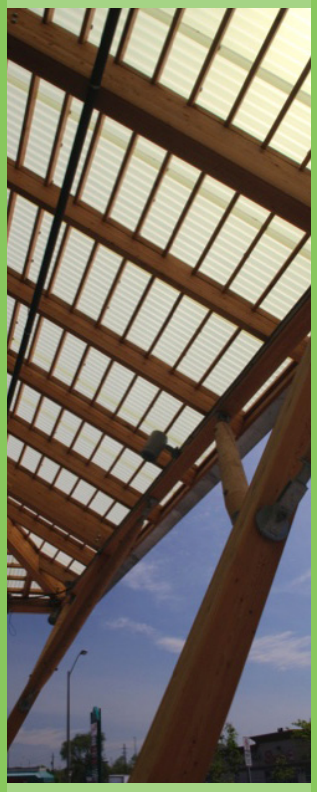
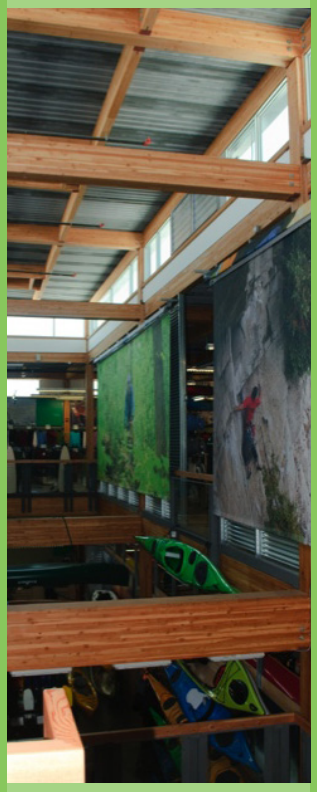
Mountain Equipment Co-op Burlington



Project Highlights

Mountain Equipment Co-op Burlington
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Mountain Equipment Co-op (MEC) Burlington is the first MEC store to receive LEED Canada v1.0 certification. The 2,500 m2 building, which houses retail, a warehouse, and administrative space, is a model for sustainable retail. From an innovative rainwater cistern to a never-before-seen ice block cooling system, MEC Burlington sets the bar high.

MEC, founded by six Canadian mountain climbers in 1971, has grown to over 3 million members and become the largest outdoors store in Canada. Its branch stores span 12 cities and sell outdoor and adventure gear and equipment. MEC exists to serve its members, and this includes promoting a healthy environment and retail experience.

The core of MEC Burlington is its one-of-a-kind mechanical system. The cooling system uses six ice thermal storage units, the first packaged system of its kind used in Canada. The packaged system makes ice at night (to shift the peak cooling electrical load to night time when there is less demand for energy), then cools the building during the day by circulating liquid refrigerant between the ice tank outside and the fan coils at the store ceiling.

A rooftop Energy Recovery Ventilator (ERV) and a true under floor displacement ventilation system supply 100% outside air to floor grilles in the runway around the main floor and mezzanine retail area. (It is exceptionally rare for a large retail store to provide this level of outdoor air ventilation.) The ventilation levels are determined by CO2 sensors. In winter, ventilation air is pre-conditioned by the ERV, then further warmed by hot water pipes wrapped around the underfloor ducts set in the radiant heated floor. All spaces are heated by hot water radiant floors and two modulating condensing gas boilers. In the summer, when outdoor conditions permit, three automated natural ventilation exhaust warm air to cool the space.

The building is modeled to consume 68% less energy than a conventional building, and the best practice commissioning agent attests that there were very few problems during building start up and over the first year of operation to detract from potential performance.

Mountain Equipment Co-op Burlington
Project Highlights

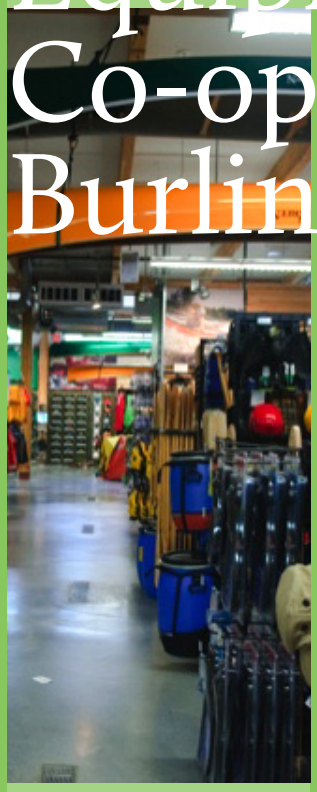
Many green buildings have one rain cistern; MEC Burlington has two. One collects stormwater runoff from the parking lot for irrigation, another collects rainwater from the roof for toilet flushing. Both cisterns overflow to a beautiful on-site stormwater pond. As a result, MEC Burlington achieved a remarkable predicted indoor water savings of 82%, and no potable water is used for irrigation. The cistern also makes use of an innovative filtering system with a floating intake, vortex filter, and calming water entry to create clearer water with less energy use.

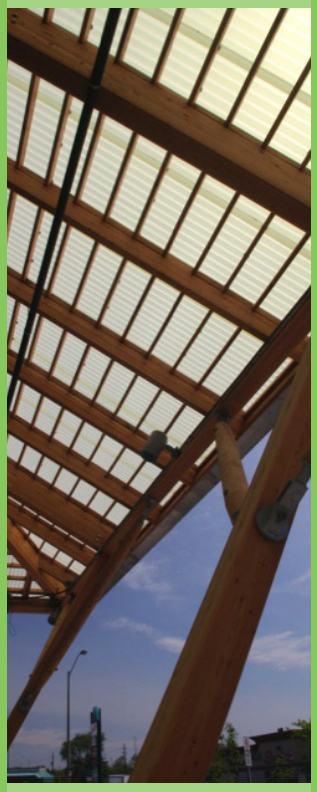
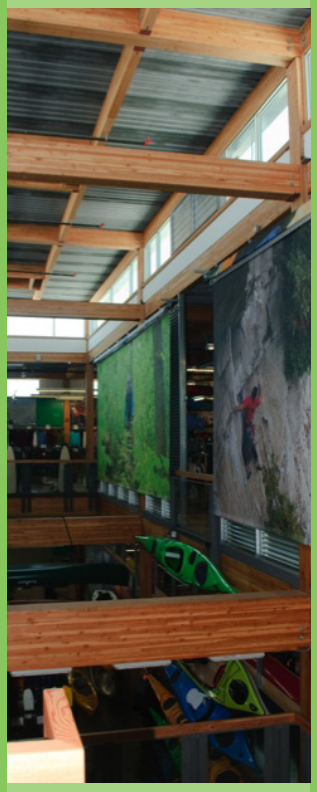
Lighting is typically a major energy load for retail stores as products must be displayed effectively, and some lights are on for security purposes during off-hours. To minimize unnecessary lighting, MEC Burlington features bi-level lighting which allows for lights to be at half their maximum luminescence when an area is unoccupied and automatically increase to full levels when occupied. In the warehouse and washrooms, lights are off as a default and only turn on when the occupancy sensors detect movement. These measures result in the interior lighting design using 63% less energy than ASHRAE standards.

Understanding that a building is only as green as the sum of its parts (and how easily these parts can be reused), MEC's decommissioning was considered during its design. MEC Burlington is designed for simple disassembly and material recycling or reuse. MEC Burlington's structure is comprised of wood – a renewable resource. Additionally, 97% of this wood is FSC-certified, ensuring it was sustainably grown and harvested.

While MEC Burlington is a sustainable building, its corporate practices are also amongst the most environmentally and socially progressive in the country. For example, MEC is the first retailer in Canada to provide the locations of all the factories that supply its clothes. Other ways that it exceeds the industry standard are the provision of 32 extra bike rack spaces (relative to LEED credit requirements) and the implementation of a green housekeeping program.

Mountain Equipment Co-op Burlington



Full Project Details

Mountain Equipment Co-op Burlington

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On time, on budget

Introduction

Mountain Equipment Co-op (MEC) Burlington is the first MEC store to receive LEED Canada v1.0 certification. The 2,500 m^2 building, which houses retail, a warehouse, and administrative space, is a model for sustainable retail. From an innovative rainwater cistern to the first packaged ice block/liquid refrigerant cooling system in Canada, MEC Burlington sets the bar high.

This retail facility not only achieved LEED Gold certification, but also disproved the theory that retail spaces cannot be simultaneously energy-efficient, attractive, operate well, and be healthy for employees and shoppers.

MEC, founded by six Canadian mountain climbers in 1971, has grown to over 3 million members and become the largest outdoors store in Canada. Its branch stores span 12 cities and sell outdoor and adventure gear and equipment. MEC exists to serve its members, and this includes promoting a healthy environment and retail experience.

The project finished in a tight timeline on budget.

Making ice by night to cool by day

Making ice by night to cool by day

Innovation: The core of MEC Burlington is its one-of-a-kind mechanical system. The cooling system uses six ice thermal storage units, the first packaged system of this kind in Canada. The system makes ice at night (to shift the peak cooling electrical load to night time when there is less demand for energy), then cools the building during the day by circulating liquid refrigerant between the ice tank outside and the fan coils at the store ceiling.

68% energy savings

A comfortable, energy-efficient retail space

To save energy, the ventilation system is separated from the heating/cooling system. All spaces are heated by hot water radiant floors and two modulating condensing gas boilers.

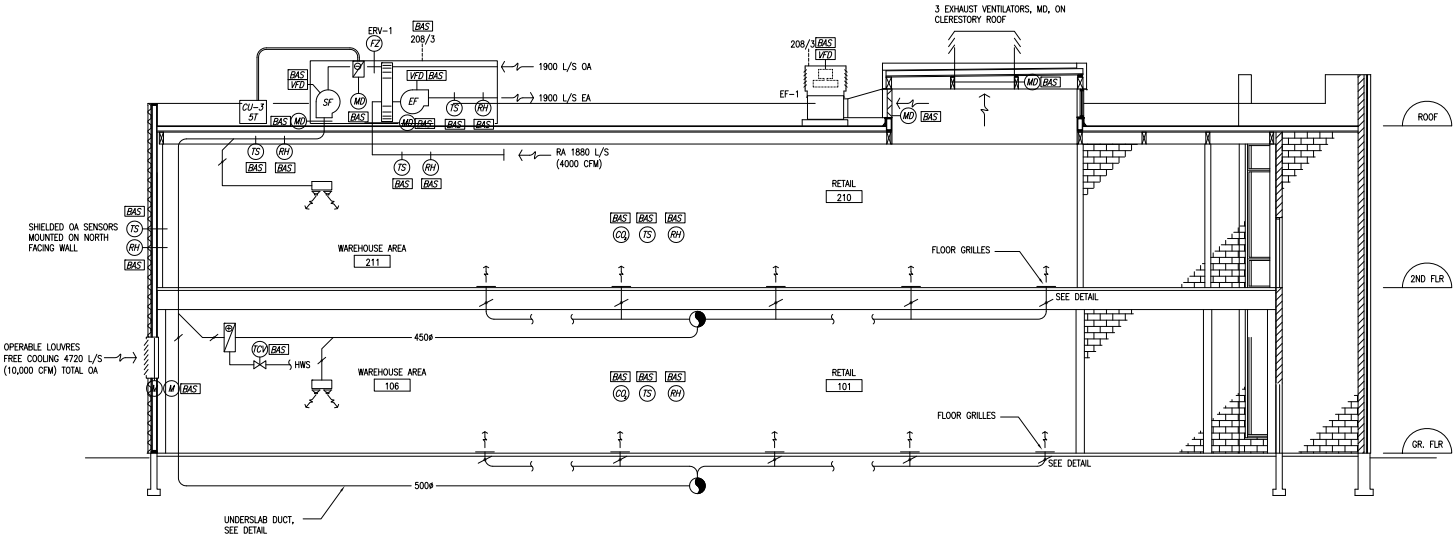
In the summer, when outdoor conditions permit, several automated wall and roof louvers open to naturally ventilate and cool the space. A supplementary exhaust fan can give the system a boost.

The building is modeled to consume 68% less energy than a conventional building, and the best practice commissioning agent attests that there were very few problems during building start up and over the first year of operation to detract from potential performance.

100% fresh air

100% Fresh Air

Very few retail stores provide 100% outdoor ventilation air. MEC not only provides this social and health benefit, but does so in an incredibly energy-efficient manner with a simple design.



The first step in the ventilation process is CO_2 sensors letting the ventilation system know when and how many people are in a given space. The next step is a rooftop Energy Recovery Ventilator (ERV), which pre-conditions incoming fresh air in winter by transferring heat and humidity to incoming air from the stale, outgoing air. The reverse process occurs in the summer.

Innovation: The air then travels to underfloor ducts to be warmed by hot water pipes that are part of the radiant heated floor system. The air is then delivered through floor grilles around the main floor and mezzanine retail area in a true displacement ventilation arrangement.

Two rainwater cisterns

Water — a valued resource

Many green buildings have one rain cistern; MEC Burlington has two. One collects stormwater runoff from the parking lot for irrigation, another collects rainwater from the roof for toilet flushing. Both cisterns overflow to a beautiful on-site stormwater pond. Of course, all fixtures in the building are of the low-flow variety. As a result, MEC Burlington achieved a remarkable predicted indoor water savings of 82%, and no potable water is used for irrigation.

Innovation: The cistern also makes use of an innovative filtering system with a vortex pre-filter, calming water entry, and floating intake for the submersible pump to create clearer water with less energy use.

A significant energy use in most cistern systems is a series of filters to remove sediment from the water before it is delivered to its end use. To eliminate these filters, the unique cistern system at MEC Burlington includes the following elements:

- Rainwater passes through a vortex filter to use the inertia of the falling water to spin out contaminates
- Water is delivered to the cistern at a location and reduced rate so as to not disturb the settled sediment at the bottom of the cistern.
- Cistern water is brought into the building through a floating suction line rather than near the bottom of the cistern where sediment collects.

Automated, bi-level display lighting

Let there be (less) light

Lighting is typically a major energy load for retail stores as products must be displayed effectively, and some lights are on for security purposes during off-hours.

Innovative: To minimize unnecessary lighting, MEC Burlington features bi-level lighting which allows for lights to be at half their maximum luminescence when an area is unoccupied and automatically increase to full levels when occupied.

Each general lighting fixture (non-track) had dual-level switching: the first half was controlled by a switch and the second half comes on/off with the local occupancy sensor. Each of the retail floors were split into 4 occupancy zones.

The lighting around the clearstory was controlled on/off with a daylight sensor. And the offices, locker, and boardrooms on the second floor had on/off daylighting as well.

Track lighting used ceramic metal halides for energy savings over the typical retail halogens while still providing good colour rendering for displays.

In the warehouse and washrooms, lights are off as a default and only turn on when the vacancy sensors detect movement.

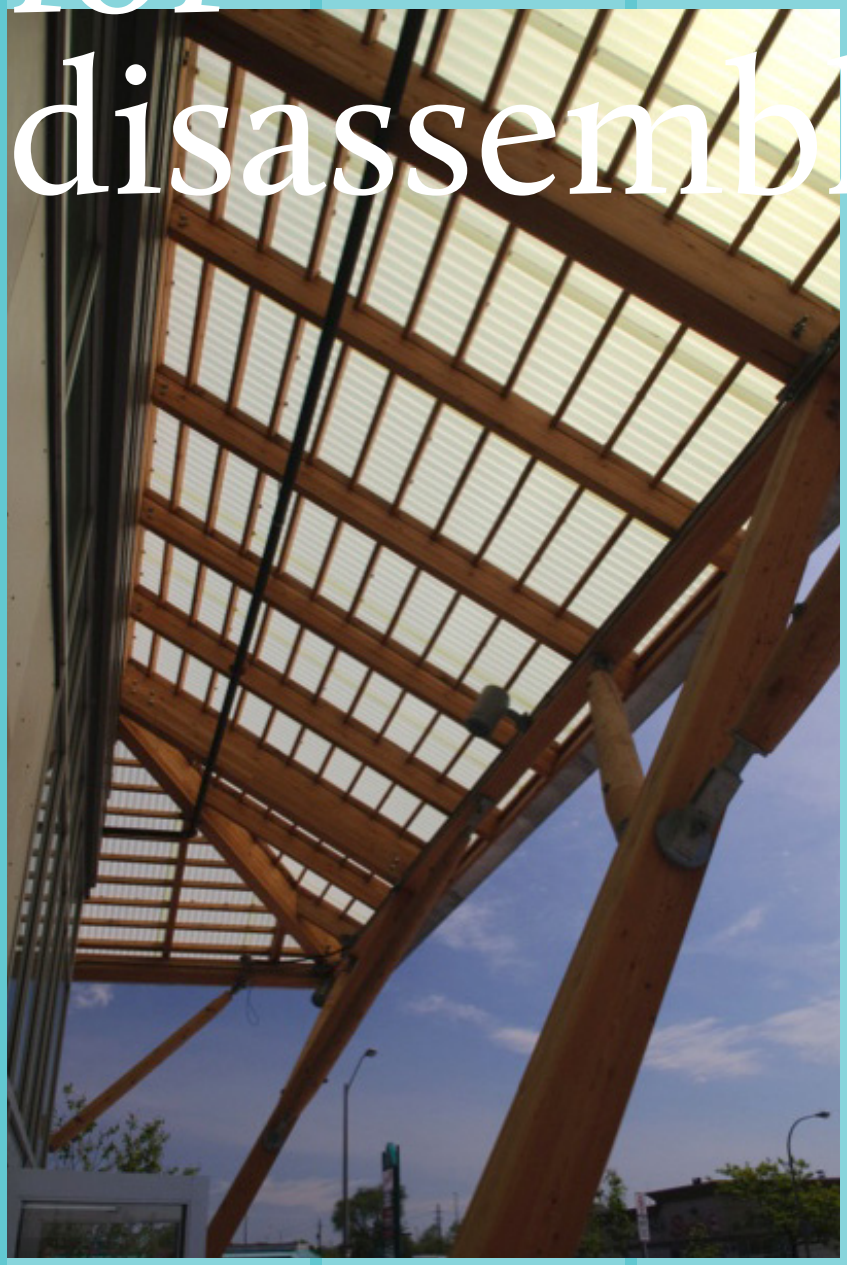
These measures meant the interior lighting design achieves 63% energy cost savings over a conventional building.

Individual radiant panels and ceiling fans

Comfortable, Healthy Indoor Environment

Innovation: Many retail establishments do not consider the comfort of their employees in the design of their facilities. However, at MEC Burlington, each cash register station has overhead radiant heated panels and ceiling fans to improve comfort – a big plus when most cash registers are located near exterior doors.

Designed for disassembly



Materially important

Understanding that a building is only as green as the sum of its parts (and how easily these parts can be reused), MEC's decommissioning was considered during its design. MEC Burlington is designed for simple disassembly and material recycling or reuse.

MEC Burlington's structure is comprised of a high percentage of wood – a renewable resource. Additionally, 97% of this wood is FSC-certified, ensuring it was sustainably grown and harvested.

To decrease the amount of materials used, the floor was left as unfinished concrete.

Best practice sustainable operations

Sustainable practices

While MEC Burlington is a sustainable building, its corporate practices are also amongst the most environmentally and socially progressive in the country. For example, MEC is the first retailer in Canada to provide the locations of all the factories that supply its clothes. Other ways that it exceeds the industry standard are the provision of 32 extra bike rack spaces (relative to LEED credit requirements) and the implementation of a green housekeeping program.