MOUNTAIN EQUIPMENT CO-OP'S GREEN BUILDING APPROACH

CASE STUDY SUMMARY

MEC's Green Building Approach is one of the company's efforts to improve the sustainability of its business. Through the construction of successive retail stores across Canada over the last ten years, MEC has refined its green building design practices to achieve significant operating cost reductions over conventional retail store designs. MEC's retail buildings can be considered on the leading edge of green building design and technology in North America. Several of their buildings incorporate features such as occupancy sensors that control lighting, rooftop gardens, locally sourced materials, and rainwater collection systems.

MEC CORPORATE OVERVIEW

Founded in 1971, MEC is an innovative, wilderness activity equipment consumer co-operative operating eight retail stores across Canada (Vancouver, Calgary, Edmonton, Winnipeg, Toronto, Ottawa, Montreal, and Halifax). In addition to retail, MEC offers online shopping, catalogue sales, equipment rentals and facilitates regular "gear swaps" as a means of encouraging the reuse and recycling of used equipment. Operating as a co-operative, members are encouraged to provide feedback on a variety of business and product issues. MEC's operations are driven by its member's needs and values rather than a financial drive to maximize profit. MEC is striving for social and environmental leadership, expressed in its Vision Statement as the following:

"Mountain Equipment Co-op is an innovative,
thriving co-operative that inspires excellence in products and services,
passion for wilderness experiences, leadership for a just world,
and action for a healthy planet."

DRIVERS FOR MEC'S GREEN BUILDING APPROACH

In the early 1990's, the widespread publicizing of ozone depletion as a significant environmental issue rang close to home for MEC. The Board of Directors realized the company had ozone-depleting substances (ODSs) in their building cooling systems. The Board struck a company-wide policy to eliminate ODSs from all of the company's buildings. Construction of the new Vancouver MEC retail store was underway at the time, but MEC could not eliminate ODSs from the cooling systems due to high cost and lack of alternative technologies. During the construction of the Vancouver store in 1994-95, MEC realized that by increasing the energy efficiency of its retail buildings, dependency on ODSs would be reduced or even eliminated. This realization spurred the broadening of MEC's perspective on

the possibilities of other green design features that could be integrated into new store designs. In addition to Board support, these investigations were supported by MEC's Values (Box 1) and managers looking for ways to demonstrate commitment to the environment, local communities and improve the co-operative's sustainability.

Box 1: MEC Values

We conduct ourselves ethically and with integrity. We show respect for others in our words and actions. We act in the spirit of community and co-operation. We respect and protect our natural environment. We strive for personal growth, continual learning, and adventure.

MEC's Values commit the company specifically to "respect and protect the natural environment". According to Rick Kohn, MEC's Chief Financial Officer, this obligation to its members includes protecting backcountry environments as well as front-country environments – the urban areas where its stores are located. This commitment to lighten its footprint wherever possible is intended to play out in all of the company's business operations. It would be hypocritical to provide a retail store or meeting place for its members that is not consistent with its core Values. Therefore, all of MEC's environmental initiatives, including its evolving green building approach, are inseparable with the company's overall strategy and environmental ethic. Simply put, MEC's members and stakeholders expect the company to take a consistent, holistic approach to all environmental issues and that it will continue to look for ways to actively live its environmental ethic.

BACKGROUND AND IMPLEMENTATION

With this background knowledge of the impacts of ODSs on the environment, and in light of other environmental issues associated with building design and construction, Corin Flood, MEC's current Facilities Planner, proposed taking a broader policy approach to the design and construction of new MEC retail stores (beyond simply eliminating ODSs). MEC's Board was extremely receptive to this idea and in 1997, developed a more holistic approach (incorporating environmental and social considerations) to building design.

This new approach was supported through a Board policy, midway through the construction of the Toronto and Edmonton MEC stores. Despite the construction timeline, Corin Flood saw immediate opportunities to improve the Toronto store to be more energy efficient than the original design, and approached the Board for monetary support. The Board allocated $250,000 to incorporate green building design features. Together with a private consultant, the design team decided to focus on green building techniques that would be highly visible to members / customers, shareholders and other stakeholders. Some of the green building features of the Toronto store include:

- Incorporating reused structural timber components from demolished buildings – reduced need for new timber;
- Maximizing natural lighting through high efficiency double glazed windows with low-emission coatings - reduced need for artificial lighting and the cooling load;
- Incorporating a computerized Building Management System (BMS) - reduced energy use in heating and cooling systems;

- ODS free heating and cooling system;
- Minimized use of interior finishing (e.g. limited painted surfaces, exposed concrete floor, etc.) – avoided using unnecessary materials; and
- Incorporating a roof top garden and planted street trees – easing demand on city sewers during periods of peak run-off and increased urban green area.

The Toronto store opened on March 31st, 1998 and has since performed 35% better than conventional buildings in terms of energy efficiency.

Since the construction of the Toronto store, MEC has worked hard to refine and improve its process with each new retail store. Corin Flood was interested in further advancing MEC's approach by designing the next MEC retail store to be C-2000 compliant (Box 2). He approached Nils Larsson from the C-2000 Buildings Program about a possible partnership. MEC proposed a joint project developing a case study for the C-2000 program on the design and construction of its Ottawa store in return for access to the program's professional experts, a C-2000 facilitator and financial assistance. This development enabled MEC to more fully realize the potential of incorporating green building principles into the design and construction process.

Box 2: C-2000 Program

The C-2000 Program for Advanced Commercial Buildings supports the development of a range of advanced energy-efficient and environmentally responsible technologies and practices for buildings, and was developed and sponsored by the CANMET Energy Technology Centre (CETC), part of Natural Resources Canada. C-2000 compliant buildings are at least 50% more energy efficient than traditional commercial and residential buildings.

Figure 1: Ottawa MEC Store

Through assistance from the C-2000 Building Program, the design team for the new Ottawa store used an Integrated Design Process to take a more comprehensive and consistent approach to green building design (as opposed to item-by-item approach used in the Toronto project).

The Integrated Design Process

The Integrated Design Process (IDP) brings all expertise required to design and construct the building to the table at the concept development stage. This includes architects, structural, electrical, and mechanical engineers, landscape architects, energy modelers, HVAC system experts, building contractors, and others. This allows each element of the design to be developed with the needs and requirements of others in mind. All elements of the building and site are interdependent, and thinking of it as a system rather than a collection of elements is essential to finding the most energy efficient and cost effective solutions. IDP also allows people to learn from each other, find synergies and facilitates smoother transition from design to construction.

It is important at the beginning of the IDP process to set performance goals for the building. Reaching the goals requires that basic assumptions about construction and design are questioned and that everyone involved explores new ways of reducing the environmental impact of the building. As Corin Flood stated, "the objective is to realize an elegant design solution that is energy efficient in construction and use, and ultimately more cost effective than traditional buildings."

Members of the design team typically congregate for a series of 5-6 meetings during the first phase of the design project. The team begins with a series of charettes – each focusing on different building systems or aspects (e.g. building orientation, distribution of internal space, etc.). These charettes give experts the background information they need to develop their models. The design team runs through each major building system in ½ day segments. After 5-6 meetings, the team takes a break and later reconvenes to share models and go through a second round of iteration.

MEC has found IDP to be extremely effective at finding synergies and innovative solutions. Professional members of the design teams get engaged and enjoy working interdependently as a group. It is quite a different process than the traditional design process where each team member works in isolation. IDP forces team members to collaborate with each other and share expertise, which often results in innovative solutions (Box 3). As a result of IDP, MEC's Ottawa and Winnipeg stores were the first two retail buildings in Canada to comply with Natural Resource Canada's C-2000 Green Building Standard.

Box 3: Montreal Store - Innovative Solutions
MEC's Montreal store incorporates a rainwater collection system that uses an underground cistern to supply toilets and provide irrigation for landscaped areas. Once the cistern is full, excess roof water, along with parking lot runoff, is captured in an underground pond where it percolates back into the ground. This reduces the use of fresh water, the burden on municipal sewers, the risk of polluting local watercourses and refreshes groundwater aquifers.

Communicating MEC's Green Building Approach
MEC did not formally communicate its green building approach across the co-operative, rather, the tactile tangible nature of building and construction made it easy to raise awareness and knowledge about the benefits. Furthermore, the building performance improvements and highly visible features generated positive feedback from customers and the media, and drew attention from staff.

Responsibility
Historically, MEC retained a private retail development consultant during construction of its stores. Given the success of the Toronto store, Corin Flood has since been the primary project consultant and champion for MEC's Green Building Approach. Corin facilitates a team of experts in the IDP process and brings in external expertise if required.

The "Rs" of Construction
MEC takes a site-specific approach to each new store development. Design teams look at four main categories when considering the initiatives to be adopted during construction:

- Reduce - Avoid using unnecessary materials.
- Reuse - Incorporate existing materials.
- Recycle - Incorporate existing materials in new ways.
- Rethink - Look for new and better building solutions.

The key questions presented in Box 4 are examples of the types of questions that MEC's design team asks itself, and are essentially derivatives of the 4R's of construction. Questions like these force everyone involved in the process to think outside the box and explore new ways of thinking about the environmental impacts of buildings and how to reduce those impacts.

For example, MEC selected a site for the Winnipeg store with several derelict buildings on it that had been condemned. Initially, City officials agreed it would remove all the old buildings and demolition waste to prepare the site for MEC. However, follow up surveys conducted by MEC's design team (triggered by some key probing questions) determined that one of the buildings was structurally sound, and that many materials could be reused from the other two buildings. MEC and the City then agreed to redevelop the existing buildings, thus reducing the environmental impact of new construction. The new building is 96% reused and recycled material by weight.

Box 4: Key questions MEC asks itself when constructing a new retail store

When MEC makes the decision to open and construct a new retail facility, it asks itself a series of questions when considering each aspect of the new building:

1. Can we do without it?
2. Does it have less embodied energy (the energy required to manufacture and transport a product)?
3. Does it have less embodied pollution (the quantity of pollutants created in the manufacture and transportation)?
4. Is it more energy efficient?
5. Is it locally manufactured (contributes to the local economy, and reduces embodied energy and pollution)?
6. Does it have a longer lifecycle (longer lasting products reduce consumption)?
7. Can it be recycled, and does it contain recycled content?
8. Does it reduce the amount of waste destined for a landfill?
9. Is the product a naturally occurring, renewable, and sustainable resource?
10. Does it raise awareness of environmental issues?

These questions encourage the company to rethink traditional methods of construction and use more of a life cycle approach to building design and construction.

Figure 2: The Winnipeg MEC Store

Measuring Results
MEC has developed a number of indicators to measure and compare the performance of newly designed green buildings to more traditional retail stores. The primary indicators MEC uses to compare performance include:

- Energy efficiency;
- Embodied energy;
- Landfill diversion rates; and
- $C0_2$ emissions.

BUSINESS BENEFITS OF GREEN BUILDING DESIGN

MEC identified several business benefits the organization has realized through its Green Building Approach.

Lower operating costs – MEC's Montreal store saves $30-$40K/yr over a conventional building through increased energy efficiency. MEC spends less as a proportion of total cost on its mechanical systems in comparison to conventional buildings (e.g. 15% as opposed to 25%). MEC has tried to demonstrate a more quantitative return on investment, but it is difficult to determine, or tease out where the additional costs are and which should be applied against the reduced operating costs.

Enhanced public image and reputation – Customer / member response has been extremely positive. Environmental considerations always appear high on the list in the various customer / member surveys MEC conducts. MEC's green building approach and other environmental initiatives therefore strengthen relations with its members. Media coverage has also been extensive which is advantageous for an organization that does little advertising. MEC's green building approach helps the company maintain a reputable public image as a responsible corporate citizen, demonstrating actions that are consistent with its values.

Employees are proud of where they work – Employee morale is generally high in all MEC stores, however employees from the newer, "greener" stores tend to be extremely proud of where they work and express these sentiments to customers and friends. MEC has also noticed that it receives fewer complaints from employees working in the new stores regarding health and safety. Evidence is anecdotal at this point, however a number of examples support this claim. For instance, MEC has noticed that with its use of free air cooling systems in newer retail stores, there are much more frequent air changes than a conventional building and fewer employee complaints about poor indoor air quality. The air is fresher and dust and VOC's tend to get flushed out more quickly, both of which arise from products and packaging.

Improved shopping environment – MEC believes that its green building efforts have not only improved the indoor health of its buildings for employees, but the company has also improved the shopping environment for consumers. The architectural and mechanical aspects

of the buildings, such as natural lighting and air quality make for a comfortable and enjoyable shopping experience. This is good for sales as consumers who enjoy shopping in MEC stores tend to purchase MEC products and are often repeat customers.

Market access – Cities tend to be quite receptive and even "roll out the red carpet" when MEC approaches them about establishing a business. On the day of groundbreaking for the new Montreal store, a number of city officials turned out for the celebration. Later that same day, these same officials were meeting with another retail vendor who was interested in opening up a store across the street from the new MEC store. The city turned their proposals down three times before accepting – city officials wanted this store to be more like MEC. Obtaining permitting has never been a problem for MEC.

LESSONS LEARNED

Challenges

Cost is MEC's number one barrier to implementing and further advancing its green building approach. MEC's buildings cost up to 50% more than conventional big box retail buildings due to both architectural and green building features. Demonstrating the business case for integrating green building design features is also challenging given the length of time required to realize paybacks. It may take ten years for some design features to pay for themselves. With the integration of building systems it becomes difficult to attach precise costs to specific features that are offset by energy savings. When several green design features are combined in an IDP building, it is impractical to try to attribute percentages of energy savings or other reductions. Many of these features work together to achieve reduction in energy use etc. and cannot be accurately evaluated in isolation.

Technology is also a limiting factor to advancing green building design for MEC. Given the best technology currently available, MEC believes it will only be able to achieve a 65 % improvement in energy efficiency. To comply with C-2000, the building must use 50 % less energy than a conventional structure and MEC has already achieved this with its Ottawa, Winnipeg and Montreal stores; the Montreal store is projected to be in excess of 60% more efficient than a conventional building. Greatly improving upon this level of efficiency becomes difficult with the status of existing technologies.

Also limiting advancement of MEC's green building approach is consumer and employee behaviour. Once you start to impinge on consumer behaviour or convenience, you start to see resistance. Designing green buildings where behavioural change is not required is much easier. For example, employees who are encouraged to bike to work expect that they will be able to have hot showers as soon as they get to work in the morning, not mid-morning when the solar panels are able to heat the water. Consumers expect ample lighting levels in retail stores therefore MEC is limited in how much it can reduce artificial lighting levels and/or increase its dependence on natural daylighting. Despite designing systems to push the conventional temperature limits consumers and staff will only tolerate so much variation from normal interior temperatures before objecting or registering complaints.

MEC realizes that its green building approach only addresses a very small part of the organization's overall environmental footprint. To illustrate, MEC's most expensive retail building to date cost the company $10 million to construct. Given a 25-year planning horizon, the building will sell through in excess of $750,000,000 worth of product and will payout over $60,000,000 in staff salaries. Corin Flood expressed this as follows: "It is much harder to change products – buildings are low hanging fruit when it comes to organizational change".

Success Factors

Corin Flood identifies several key factors that contributed to successful integration of green building approaches within MEC:

- Little behavioural change was required on the part of managers and employees.
- MEC's Board is sensitive to sustainability issues and therefore receptive to suggestions for improving the organization's performance. The Board knew it was the "right thing to do" and that it made business sense given the image it is trying to portray and the customers it is trying to attract.
- Having an internal champion facilitated the relatively easy adoption of green building design and construction principles. Corin Flood was instrumental in advancing MEC's approach and still holds the responsibility of seeing green building projects through from beginning to end.
- Financial assistance from the C-2000 program and Nils Larsson supported MEC in initially getting a more formal program off the ground. The knowledge and expertise from C-2000 staff was also a signficant supporting factor.
- The sharing of knowledge and expertise between MEC and various organizations local to each project has also been an asset. In Winnipeg, MEC worked with Habitat for Humanity and an employment agency that provides transitional employment for native Canadians.

Initial success with the Toronto store (e.g. media coverage, public acceptance) spurred a more integrated approach to green building design and construction within the organization. It was a success story that demonstrated the Board's openness to suggestions for improving upon MEC's social and environmental leadership, and encouraged other employees to take initiatives promoting and advancing the sustainability of the co-op. MEC initiated a Social and Environmental Responsibility Network with representatives in all departments and stores. This Network meets monthly, and works to ensure that employees have a conduit to bring good ideas to the management and board level. Following the success of the green building approach, a number of internal champions spearheaded other programs, for example:

- Organic cotton clothing program;
- Supplier team evaluation process as part of SCM program;
- Elimination of dyes in tent fabrics; and
- Old-Growth Free program.

The succes of the above programs can be attributed to the work of committed staff. The organization tends to attract individuals who already share a degree of personal commitment to sustainability and the working environment empowers people to take on initiatives and become leaders.

SUPPORTING PROCESSES, POLICIES AND INFORMATION SOURCES

Although MEC predominantly advanced its green building approach through its own internal knowledge base, Corin Flood indicated that the 1996 Green Building Conference in Vancouver clarified a lot about the tools and techniques required for effective green building design and construction.

MEC has partnered with several organizations in the past based on the issues the organization was tackling at that time. For example, MEC has worked closely with the Pembina Institute on energy issues, with human rights organizations on supply chain management issues, with the Avalanche Association on backcountry safety issues, etc. MEC also encourages its employees to volunteer with local environmental and social organizations and these experiences tend to contribute to the company's overall awareness and understanding of SD issues.

MEC worked with Manitoba Hydro who contributed a great deal of expertise to the Winnipeg project through its Power Smart staff. In Québec, MEC worked with Recyc-Québec to develop a construction waste management case study, Ecosmart to source supplementary cementitious materials for concrete and Hydro Québec. The Montreal store is 100% electric, Hydro Québec is monitoring the performance of the building and provided the equipment to monitor the geoexchange system. Hydro Québec will be active collecting data and studying the building as it is interested in further promoting electric buildings within the Province.

REFERENCES

- Personal interviews with Corin Flood, MEC's Facilities Planner and with Rick Kohn, Chief Financial Officer with MEC.
- Mountain Equipment Co-op's website: www.mec.ca
- C-2000 Buildings Program. Natural Resources Centre – CANMET. http://www.nrcan.gc.ca/es/etb/cetc/cetc01/htmldocs/factsheet_c-2000_buildings_program_e.html