# MOVING TOWARDS GREEN
# A BRIEF HISTORY OF THE BEGINNINGS OF SUSTAINABLE DESIGN IN CANADA

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Real change does not just “happen”. It requires either a catalyst or a series of events to effect evolution. Lasting change requires both success and commitment. Sustainable design has been no different. The directed evolution of green building, from its inception in the mid 1960s to its current state in the year 2005, has been the result of a series of publications, key events, legislative encouragement and significant buildings. Commercial and institutional building has been slow on the uptake, but progress is beginning to be evident.

It wasn’t always called “green building”. And it wasn’t always even about building. It started in the 60’s with the publication of Rachel Carson’s book “Silent Spring” that dealt with the effects of pesticides and herbicides on the environment. Carson’s book was followed very closely by two important works that brought environmental concerns to the field of architecture: “Design with Climate” by Victor Olgyay, published in 1963, and “Design with Nature” by Ian McHarg, published in 1969. Olgyay’s book initiated a different approach to thinking about building. It’s premise, that buildings should be designed to accommodate regional climatic differences based on vernacular models for building, ran completely counter to the more popular ideas behind Modern Movement architecture.

Olgyay initiated a way of thinking that favoured solar control and natural ventilation in buildings. This trend in thinking, of course, went counter to the creation of the hermetically sealed glass boxes that were springing up all over Europe and North America during the post-war building boom. And of course, needless to say, this revolutionary idea of using architectural devices (operable windows, shading devices, building orientation, planting) to modify the interior environment, rather than handing over the job to one’s mechanical engineer, proved to be very unpopular with the majority of big-name architects. The new “solar” buildings looked so remarkably different from mainstream modern architecture, resulting in by-and-large rejection as a viable means of designing commercial and institutional buildings. Most of the “environmentally

◂ CMHC Healthy House
Close up view of PV screen
suspended from balcony railing,
▾ Healthy House Waterloo Biofilter unit in a closet.
Photo: http://www.architecture.uwaterloo.ca/faculty_projects/terri/cmhc.html

**History Projects**

Text will be added here to introduce the history timeline that follows through this essay. Tionsecte tem nit laor se dolore doloreet acipit lore min vel ut nosto od del iuscipit luptatuer adip eliqui tio conulla consectet lum zzriuscil et lutpat. Lortionse tie faccumm olortio nsequis ad modo con vulla feugait landipit, quip et, vent la commolorper am voloreet ad tie min ut adio dolore dolore verostrud ent lore

TIMELINE

1960

**1962**
Rachel Carson’s book
*Silent Spring*

**1963**
Victor Olgyay’s book
*Design with Climate*

1970

**1969**
Ian McHarg book
*Design with Nature*

R-2000 Home Program
Developed to promote
energy efficient building

1980

Growth of limited solar
building movement
Directed at energy consumption
as a result of rising fuel costs.

1990

**1991**
Toronto City Council established the Toronto Atmospheric Fund (TAF) to finance local initiatives to combat global warming and improve air quality in Toronto.

**1991**
Healthy House
Competition
Developed to promote
energy efficient building

**1992**
CMHC Healthy House
Toronto, Ontario
Martin Liefhebber Architect
(See Above)

**1993**
C-2000 Program
Developed to promote
energy efficient building in
commercial buildings

**1993**
The Body Shop Canada Headquarters
Don Mills ON,
Keen Engineering,
Colborne Architectural Group
Uses the Living Machine site waste water treatment system, designed by Dr. John Todd, which uses biological processes to clean domestic sewage water.

designed" buildings that were developed during this period were houses or smaller community type projects, taken on by the more daring. These unique clients were interested in working with the innovative ideas and building systems presented by environmentally designed buildings, and were less concerned with "high design appearance".

The 1970s saw the growth of a limited solar building movement that was directed at reducing the energy consumption in buildings as a result of rising fuel costs. In Canada, winter conditions governed design choices. Window strategies were developed to maximize penetration for free heating. Insulation levels were increased and buildings were tightly sealed to cut down on leakage. When people began to suffer the ill effects of buildings that were too tight, fresh air requirements were examined and standards modified to include indoor air quality as a consideration. Indoor air quality concerns nudged open windows again—operable windows began to come back into "vogue", but in limited application on commercial and institutional buildings.

Still throughout the 1970s and 1980s such concerns remained "residential" in their influence. Larger buildings continued to follow traditional modern principles of design. Frankly, many of the early solar buildings were either quite unattractive, or downright strange looking. In some cases excessive amounts of unprotected south facing glass resulted in extreme overheating as wood frame construction lacked the thermal mass required to store this free energy. In Canada the R-2000 Home Program was developed during the 1970s to promote more energy efficient building. Canada Mortgage and Housing Corporation announced the "Healthy House Competition" in 1991. 1993 saw the introduction of the C-2000 program for commercial buildings. Energy efficiency remained the primary focus for early "green" buildings.

Architectural design has never been about willfully creating buildings whose primary concern is not Design. Commercial buildings need to be viable. Tenants want smart looking buildings. Institutional buildings must answer to the public. The public also wants "accountable" appearing architecture. The 1980s experienced numerous stylistic changes in architectural design: post-modernism, high-tech, neo-rationalism, deconstructivism. Environmentalism was not included. It was not fun. It required scientific calculations to make it credible. It did not look good. Only the hardcore environmentalists were committed. Mainstream superstars shunned the idea.

The World Commission on Environment and Development, Our Common Future, 1987 established that sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.

The boundary conditions had changed from concern about the mere consumption of increasingly expensive fossil fuels, to global issues of environmental stability. Statistics regarding dwindling supplies of natural resources needed to create and maintain our lifestyle, caught the attention of many. It was becoming increasingly obvious to architectural educators as well as a wider body of practicing architects that the problems posed by the sustainable design question were not about to go away. Architectural curricula began to both develop and expand courses in "environmental building design". The new definition of sustainable design was increasingly holistic in its approach to building, expanding the definition of "energy efficient" architecture to include energy and atmosphere, materials and resources, indoor environmental quality, site design and water efficiency.

It is difficult to pinpoint an exact "event" that changed the game, but… In 1992 the German corporation of Commerzbank announced a competition for a radically innovative skyscraper. It was to be the first and tallest ecological building. The programmatic requirements included: reduction in energy use, a specialized skin that would allow natural ventilation (unheard of in high rise construction), high levels of daylighting for occupant comfort, skygardens, recycled greywater systems as well as care at ground level to integrate the building into the community surroundings.

**1994**

Low cost dwellings
for the Environmentally Hypersensitive

Barrhaven, Ottawa, ON,
Phillip Sharp Architect Limited

Integrated with a conventional suburban neighbourhood, this project acts as a catalyst for social and environmental responsibility. It allows many people who would otherwise be institutionalised to live in the community at large.

**1994**

Renfrew Library

Renfrew Park, BC,
Hughes Condon Marler: Architects

Features include a reflecting pool on the roof; and durable local building materials such as glulams, local brick and concrete.

**1995**

401 Richmond Building

Toronto ON,
UrbanSpace Property Group

Established 10 years ago, the building's café/bistro, roof garden, quarterly newsletter and community bulletin boards promote a sense of community and cultural space. 401 Richmond received a surprisingly high rating by an environmental audit for a heritage building.

**1996**

The Conservation Co-op

ON,
Cole and Associates

An 84 unit, four-storey apartment building committed to "housing that won't cost the earth." Stays within stringent Ontario Ministry of Housing budget limits.

The winner of this limited competition was Sir Norman Foster and Associates—a superstar! The sustainable building game had just changed.

Still, the majority of green buildings that were constructed in Canada during the 1990s remained small in scale, limited in budget and purposefully experimental in nature. The intention of the YMCA Environmental Learning Centre in St. Clements, Ontario, and the Boyne Conservation Centre, in Shelburne, Ontario, was to provide visitors with the experience of living with sustainable and natural systems. The more systems used the better. The motive was public education.

The YMCA and Boyne sites include buildings that are dependent on passive ventilation, solar heating, daylighting, and also feature specialized greywater treatment systems. They also used a new architectural language of sustainable building and materials that were not easily incorporated into mainstream practice.

Slowly throughout the 1990s the green building movement started to gather steam as an increasing number of higher profile Canadian architectural firms took interest in the movement and began working with clients and engineering consultants to create more sustainable commercial and institutional projects.

The Green Building Challenge, an international gathering and competition for quality sustainable buildings, has provided a key opportunity to both show off, as well as learn, about varying strategies and solutions to sustainable building issues from around the globe. The Challenge started in 1998, and has been running approximately every two years since. In 1998 the first three Canadian buildings submitted at the initial Vancouver based conference were: Revenue Canada Taxation Centre, Surrey, BC, Busby + Associates; Horton Secondary School, Nova Scotia; and the Conservation Coop in Ottawa. They were chosen to identify environmental building solutions from a variety of building types. Where the exterior solar shades on Revenue Canada would signal a higher level of environmental concern to the public, both Horton and the Conservation Coop maintained a normative appearance.

The 2000 GBC submissions included: the Angus Technopole, Montreal; the renovation to the William Farrell Telus Building, Vancouver, by Busby + Associates; and the York University Computer Science Building by Busby + Associates with Van Nostrand di Castri Architects. Both Angus and Telus were unique in that they involved significant reuse of existing buildings. This reflected a changed position about the environmental potential in the existing building stock, which reflected increased awareness about issues of limited natural resources and embodied energy in buildings and their components. The York Computer Science building replaced a similar structure that was only ten years old. The planning of the new building was done to recognize the likelihood for significant planimetric changes in this type of building—so flexibility in the partition layout was a key sustainable notion in the design.

Add to that, the selection of buildings for the GBC "Poster Projects", including the Terasan Gas Operations Centre and Liu Centre for Asian Studies, we begin to have a wide range of building uses, scales as well as high profile architectural and environmental engineering firms involved in promoting green building. A cursory look at both the complexity of the projects, materials development, as well as the architectural "style" of the buildings, is quite telling of the fast paced evolution of green buildings in a mere 5 to 10 years.

Human comfort, occupant health, fresh air and environmental accountability in general, are becoming routine considerations in contemporary buildings. Sustainable "style" has entered mainstream architecture in a significant way.

Kyoto, 1997, focused the discussion of sustainable design on the production of greenhouses gases (mainly $CO_2$). The developed notion of sustainable building design expanded the area of concern in building design to not only include greenhouse gas emissions as a result of the burning of fuels associated with heating and cooling buildings, but also from the production of building materials, in terms of their embodied energy, transportation costs, as well as resource depletion with respect to deforestation. Canada has ratified

**1996**

Niagara Parks Butterfly Conservatory

Niagara ON,
Baird Sampson Neuert Architects

Includes a large tropical environment as well as an orientation theatre and interactive displays. Its integrated design includes a sophisticated computer control system which exploits natural thermo-cycling and evaporative cooling.

**1996**

YMCA Environmental Learning Centre

Kitchener-Waterloo ON,
Charles Simon Architect + Planner

Uses the Living Machine site waste water treatment system, designed by the Canadian Dr. John Todd, which uses biological processes to clean domestic sewage water.

**1996**

BREEAM Canada and BREEAM/Green Leaf™

Introduced by ECD Energy and Environment Canada

**1996**

**1997**

Boyne River Ecology Centre

Shelburne ON,
Sustainable Edge Ltd.

A renowned educational facility at the Toronto Board of Education's natural sciences school on the Niagara Escarpment. Features a 100% renewable energy supply and a sod roof.

**1997**

Model National Energy Code of Canada for Houses and Model National Energy Code of Canada for Buildings are established.

**1997**

Kyoto ACCORD

**1997**

The Commercial Building Incentive Program (CBIP) is created by Natural Resources Canada's Office of Energy Efficiency encouraging energy-efficiency in the design of commercial and institutional buildings.

**1997**

**1998**

Offices for Revenue Canada Taxation

Surrey BC,
Busby and Associates

This modern office building blends into the streetscape. A staggered floor plan maximizes natural lighting. Large and column-free floor plates allow for flexibility. The building envelope is designed with a continuous air-barrier, according to rain-screen principles.

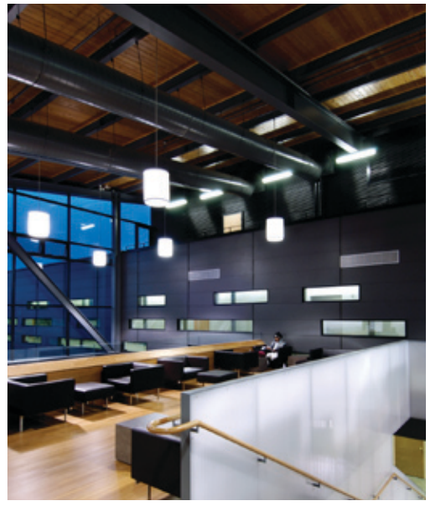
**1998**

this agreement, which seeks to reduce greenhouse gas emissions from 1990 levels by 7% from the period 2008 to 2012. Both the United States and Russia have still not signed the agreement.

During the mid 1990s the US Green Building Council was formed. A means to evaluate the relative "greenness" of buildings was sought. The British counterpart, BREEAM, had been developed, but did not suit American standards and codes. The LEED assessment tool, launched in 1998, post Kyoto, was developed to: establish a common standard of measurement for green buildings; promote integrated, whole building design processes; stimulate environmental building and competition; make consumers more aware of the benefits; and, transform the building market. By awarding buildings bronze, silver, gold and platinum medals, based on their sustainable design qualifications, the tool was designed to respond to commercial marketing strategies.

This is not to say that all good sustainable buildings are LEED medal driven. A number of highly successful Canadian examples have been motivated by the same principles that ground LEED, but do not go the certification route (which does cost money…). The ideals include a responsible attitude towards energy and resource use, natural ventilation strategies, sustainable site design as well as the benefits of daylighting as it connects to both indoor environmental quality as well as reduction in electrical consumption. The buildings herein will show some of the main strategies that are now being used in commercial and institutional construction, as well as highlight the creation of articulate mainstream architectural projects.

- Joan Foley Hall Student Residence at University of Toronto in Scarborough exterior. Photo:
- Joan Foley Hall nterior Student Space Featuring view of Highland Creek valley ecosystem. Photo:



**1999**

Condominium at 77 Governors Road

Dundas ON,
Enermodal Engineering Ltd.

Focus is on high-quality construction and design, better ventilation, is only 6 storeys high.

**2000**

Locoshop
Angus QC,
Aedifica

A 2.5 hectare business park in east central Montreal. Transformation of an historic industrial complex into a two-story high-tech industrial office mall.

**2000**

Liu Centre for the Study of Global Issues at University of British Columbia

Vancouver, BC,
Stantec

An international policy and research centre, in a dramatic wooded site on the UBC campus. First use of EcoSmart™, high volume ash concrete.

Mountain Equipment Co-op Head Office

BC,
Proscenium Architecture and Interiors Inc.

Incorporates a series of grass-roof shifts in traditional building practices. Recycled building on a brownfield site. Materials were recycled throughout the demolition and construction.

**2003**

Joan Foley Hall Student Residence
University of Toronto in Scarborough

Scarborough, ON
Baird Sampson Neuert Architects and Montgomery Sisam Architects, Architects in Joint Venture

This 231 bed residence is designed to enhance the landscape quality of its site. Along the ravine edge, study rooms on each floor allow stunning views of the Highland Creek valley ecosystem.

**2005**

The Green Building Alliance is established in Canada

**2005**

Project Green is launched by the Government of Canada: Moving forward on Climate Change: A Plan for Honouring our Kyoto Commitment.

**2005**

Stratus Vineyards becomes the first LEED certified project in Ontario and the first LEED Canada project to be certified.

**1999**

**2000**