

Making it Happen – The Transition to a Sustainable Society

Workbook - Workshop 2

Barriers to a Green Residential Sector

Identifying barriers to change and innovation to
reduce impacts of climate change in the residential
sector

Monday February 23, 2009

The residential sector in Canada generates at least one tenth of our greenhouse gases. These emissions could be reduced by as much as 60% by the year 2030. Achieving this target requires the deployment of known technologies, innovations, and practices that are already on the market. **What's stopping us from reaching that objective?**

In the course of research, we identified a number of highly relevant documents and analyses that would help us in our workshop discussions. Produced by NAFTA's Council for Environmental Cooperation (excerpts 1, and 2 below) and West Coast Environmental Law (excerpt 3), these reports provide an initial analysis of the type of barriers to innovation and change that are stopping us from making the residential sector green.

In reviewing these barriers, we asked workshop participants to reflect on their own experience, identify which of these barriers they have actually encountered in their work, and consider how they dealt with them. We also asked participants to identify the top three barriers that have stopped or hindered the development of green buildings and share them with others at the workshop.

Key questions addressed:

- **What have we learned?**
Over the last thirty years we have tried to reduce usage of fossil fuels. Many of the necessary technologies already exist and are available in the market. Refinements and improvements are always possible, but there is enough available already to make a big difference. So what have we learned from these years of federal, provincial, and municipal efforts to reduce energy consumption of Canada's residential sector?
- **What are the barriers to change?**
Identify major themes and obstacles, including jurisdictional, legal/economical, and behavioural challenges
- **What are some common themes?**
Discuss common themes and possible integrated areas of intervention.
- **Preliminary results** of the Telfer School research project on barriers to innovation and change.

Background Documentation

Excerpt 1. "Green Building in North America: Opportunities and Challenges"; Council For Environmental Cooperation, Secretariat Report to Council Under Article 13 of the North American Agreement on Environmental Cooperation, 2008

http://www.cec.org/files/PDF//GB_Report_EN.pdf

This is the final report of a project on green buildings, commissioned by NAFTA's Council for Environmental Cooperation. The research looks at Mexico, the US as well as Canada. One section of the final report (Chapter 6) specifically examines barriers to green buildings:

Barriers to green buildings

Despite momentum in all three countries, significant barriers impede green building growth and result in a tendency to rely on business-as-usual approaches. In Mexico, these barriers are further compounded by the lack of building regulations, codes, urban planning tools, and consensus-based, widely accepted green building rating systems.

Some of the barriers identified for all three countries are:

Separate capital and operating budgets

Many governments at the federal, state, and local level, as well as public and private institutions, appropriate funds for real estate acquisitions independently from funds for property operations. This separation creates an accounting scenario where the savings from the operation of green buildings is not used to offset any initial higher construction costs.

Understanding the life-cycle costs of a building is still a significant challenge. A building's initial construction costs typically may represent only 20 to 30 percent of the building's entire costs over its useful life, underscoring the need to consider not just the initial cost of the building but also the year-to-year operating costs. As well, owners of investment property typically evaluate construction and operating costs over a holding period of ten years or fewer.

Split incentives

Often the one paying the bill and the one capturing the benefits differ. Developers may not be interested in paying for green features when the benefits will be passed on to the new owners or tenants—unless, of course, they are able to recoup the additional cost of green features in the sale price or project income realized. The split incentive problem is particularly evident for new homes and condominiums and for non-owner-occupied existing commercial buildings where, because of high turnover rates, owners may want short payback periods on energy-saving investments.

Higher perceived—or actual—first costs

Higher perceived or actual first costs of many green building strategies and technologies are a significant disincentive. A survey released in August 2007 by the World Business Council on Sustainable Development found that key players in the real estate industry overstated the cost of green building by an average of 300 percent, estimating the cost to be 17 percent above conventional construction, more than triple the cost estimated by the study's authors of 5 percent. Researchers interviewed 1,423 people in Japan, China, Brazil, the United States, Spain, France, and Germany.

Another key cost barrier is the uncertainty that developers, real estate professionals, and some capital providers feel about green building. Developers and other decision-makers may have contractors, subcontractors, materials, and service providers lined up for traditional building or retrofitting; moving to green building may require new service providers, materials vendors, and the implementation of an integrated design process in order to build green at a comparable cost.

Risk and uncertainty

Although investments and interest in green building are growing rapidly, for a number of complex and varied reasons, the financial case for green building has not yet firmly taken hold in the real estate and development community. Background paper 2b, Toward Sustainable

Financing and Strong Markets for Green Building: US Green Building Finance Review, outlines the following risks that exist in the real estate community regarding green buildings:

- Uncertainty over reliability of green building technologies;
- Uncertainty over costs of developing of green real estate;
- Uncertainty about the economic benefits of green real estate; and
- Uncertainty about green building performance over time.

The author notes that in the United States, while capital is beginning to move into green commercial real estate investment, “many green developers report that lenders and investors are reluctant to recognize additional investment value in green features with respect to energy cost savings or consumer appeal.” Similarly, many commercial real estate lenders and investors feel that they are ‘flying blind’ when asked to assess the value of green commercial real estate projects, noting the lack of lending and investment guidelines dealing specifically with green buildings.

Lack of experienced workforce

One impediment cited repeatedly by many during the Secretariat’s green building consultations but not explored well in the literature and research, is rapid industry expansion threatening to compound the problem of the lack of experienced workers and thus increasing the risk of inexperienced or untrained service providers entering the green building market in search of a premium on their services.

Lack of coordination and consistency in government policies affecting building

The background papers on the topic of Institutional Efforts for Green Building (topic 3) discuss how the lack of coordination and consistency in government policies can act as a barrier to green building. For example, building codes can hinder the use of alternative building materials and innovative design strategies, unintentionally require environmentally harmful practices, and fail to require environmentally preferable practices.

In terms of financial incentives, Canada lacks a comprehensive federal act directed at individuals like the Energy Policy Act in the United States and provincial efforts are not always well coordinated. In Ontario, for example, municipalities are not permitted to mandate any performance requirements above those required by the Ontario Building Code.

Lack of research investments

A recent report found that US funding for research related to green building practices averaged \$193 million per year from 2002 to 2005. This represents only 0.02 percent of the estimated annual value of US building construction and 0.2 percent of all federal research.³⁹ Advances in green building research can result in significant consumer savings and a strong return on investments. The United States National Academy of Sciences found a number of remarkable returns-on-investments associated with green building features. For example, a DOE investment of \$4 million in development of low-emissivity glazing yielded cumulative consumer cost savings of \$8 billion through 2000. With electronic ballasts for fluorescent lighting, DOE invested \$6 million and consumers realized cumulative savings of \$15 billion through 2000.

***Excerpt 2. Green Building: Council for Environmental Cooperation, PAPER 4c:
“Residential Green Building in North America: The Benefits of a North American***

Strategy: A Perspective from Canada”, The Sheltair Group (Innes Hood), March 2008

http://www.cec.org/pubs_docs/documents/index.cfm?varlan=english&ID=2241

This background paper prepared by Innes Hood of Vancouver-based Sheltair Group as part of NAFTA’s Council for Environmental Cooperation project on Green Building, provides a good overview of the development of green buildings in Canada, including a concise, “5 As” presentation of the most important barriers to green sustainable buildings:

The Barriers to Increased Green Residential Building

Despite considerable knowledge related to the techniques and technologies required to implement green residential projects, numerous barriers, real and perceived, regulatory and non-regulatory, have slowed the pace at which green residential building is becoming standard practice in Canada. This section provides an overview of the barriers classified as the “five A’s”:

1. Availability
2. Accessibility
3. Awareness
4. Affordability
5. Acceptance

Availability addresses the availability of current technology to satisfactorily meet desired green building standards. Certain barriers limit the availability of higher performance green building components in the Canadian market. For example, there is an absence of high efficiency hot water tanks in Canada. As well, certain products are designed for the average North American dwelling. This means that builders and developers cannot use the most energy efficient or environmentally low impact products for their specific region or climate. Local capacity to design and construct certain green building products, such as photovoltaic systems, is also lacking in Canada.

Accessibility refers to the ability of the market to respond to the improvements required for green building products/systems/standards for residential buildings without undue supply constraints or other limitations. Having a sufficient number of market actors/players (manufacturers, distributors, manufacturers, installers/contractors) with expertise or interest in green residential construction is one part of the challenge. The other is having a construction industry willing to adopt new practices and a regulatory industry able to accept new practices and technologies. Builders and developers generally prefer to repeat past successes rather than assume the risk of innovation and are reluctant, therefore, to adopt new practices such as advanced framing or air-tight construction or to attempt to meet green standards. Furthermore, our legal and administrative institutions have created regulatory barriers, such as building codes and planning, zoning and health regulations that can hamper green building by impeding the easy adoption of technological innovations and new land-use patterns by key actors. For example, an absence of green building equivalencies in building codes perpetuates the use of conventional construction materials, since proving compliance can be onerous and costly. Zoning bylaws can also thwart such green planning practices as increased density, by restricting secondary suites, infill development, and the number and location of private entrances.

Awareness refers to the industry actors’ knowledge of the relevant green building technologies, products and practices. The lack of education, training and technical expertise within the

building industry and within relevant municipal departments can slow use of green building technologies and the adoption of green building standards, making building green more difficult, time-consuming and costly.

- A lack of training and education in green design and construction;
- A lack of technical understanding of green building materials, methods and systems among building industry members—designers, developers, contractors and inspectors;
- Poorly accessible information on green products and building systems;
- •A lack of information on performance and cost attributes of building elements, which can force projects to depend on specialized consultants;
- A lack of understanding of the interactions between the many green building standards;
- A lack of product information such that designers and builders risk costly call-backs to remedy green products that may not perform as intended;
- Traditional project design/delivery processes that discourage integration, keeping each project phase working in isolation, with different project goals and separate budgets;
- Longer up-front planning/design time requirements;
- Delays and greater cost to obtain green equivalencies or project approvals; and
- A lack of experience in the building trade and/or the absence of data on given green technologies and innovative practices, leading to a perception of undue risk.

Affordability addresses the financial barriers related to technologies and processes required to build green. Affordability can be defined on a first cost and a life-cycle cost basis. For example, although green buildings can be less expensive to build and operate, higher capital costs, including the additional costs of design, analysis, engineering, energy modeling, commissioning, etc., can act as deterrents to building green. The tendency of the development community to base decisions on a first cost basis rather than through life-cycle costing poses a significant barrier to the adoption of higher performance components. This is particularly evident in the residential sector, where building builders/developers do not intend to retain ownership of the property beyond completion.

Other affordability barriers include:

- Service fee structures do not account for the recovery of long-term savings. Additional costs for green building incurred by developers cannot be easily passed on to owners.
- A lack of incentives for builders and designers means that they do not profit directly from a building's operational cost savings, environmental performance or worker productivity.
- Integration among incentive programs (e.g., rebates, loans, technical assistance) is lacking, and confusing application procedures exist.
- Certain bylaws (e.g., development cost charges that fail to consider a green building's lower environmental impact) make green technology and innovations less competitive.
- Costs associated with obtaining green standards such as LEED or Built Green can be a disincentive to certification.

- The process of applying for building code equivalencies can cost in both time and money.
- Financing decisions are generally made for the short-to-medium term, an obstacle for green buildings, which may not realize economic gains within this timeframe.
- Property values and appraisers have also been slow to recognize the value in green features.
- Hidden subsidies to automobile infrastructure and distorted perceptions of the feasibility of car travel in more populated regions promote the residential housing status quo.

Acceptance refers to the acceptance of the green building materials, practices and standards as the norm by both the supply- and demand-side actors. On the supply side, although Canada's three levels of government are involved in residential housing development in one form or another, no level has set specific policies, standards, or targets to encourage or regulate green residential building. The financial and insurance sectors have also been slow to accept green buildings in terms of valuing social and environmental benefits or performance and recognizing long-term potential for economic gain. These risk-adverse industries continue to demonstrate a general preference for financing and insuring traditional building projects rather than those using new and innovative green technologies.

Although interest in green building on the part of developers and homebuyers is growing, market demand is still small. Barriers to wider acceptance also include:

- Consumer preferences for low-density detached single-family homes with private yards;
- A "not in my back yard" (NIMBY) position to mixed use and higher density;
- Vested interests of developers with large tracts of land on the urban periphery;
- Pressure placed on municipal councils by the development industry to approve developments on a site-by-site basis;
- A perception among individuals and the building trade that green buildings are more expensive to build;
- A lack of appreciation by homebuyers of the long-term cost savings and associated benefits of green building practices;
- A lack of public and industry education around green building;
- The absence of a one-stop source for green products, technical information, and best practices for the building trade; and
- A misperception that environmental protection and land development are incompatible.

Excerpt 3. "Cutting Green Tape: An Action Plan For Removing Regulatory Barriers To Green Innovations", West Coast Environmental Law, April 2002

<http://www.wcel.org/wcelpub/2002/13724.pdf>

This is an analysis of a wide range of regulatory barriers that impede the deployment of green buildings and communities. The report was written by Rodney Wilts, of West Coast Environmental Law, and now with Ottawa-based BuildGreen Solutions (A Windmill Company).

Key barriers identified in the report can be described as are as follows:

- Zoning bylaws
- Development Standards
- Development Cost Charges
- Approval Processes for Rezoning and Development Permits
- Approval Processes for Building Permits and Occupancy Permits
- Code Requirements
- Health Act Requirements.

The report proposes creating a “Smart Bylaws Guidebook” for municipalities on reforming their zoning bylaws, development standards and development approval processes. Topics in the proposed guide include:

- Infill, mixed use and density reforms for Zoning & Official Community Plans. Subtopics include:
 - Maintaining single-family residential ambiance, while allowing secondary or tertiary suites;
 - U of development permits and comprehensive development zoning; and
 - Use of performance standard zoning (allowing administrative approval of uses that are not designated as allowable, but meet certain criteria such as traffic generation, hazards, noise, vibration) and alternative zoning (uses allowed if conditions met).
- Density adjustments to encourage compact communities and protect natural amenities. Subtopics include:
 - Density bonusing and transfers to encourage compact communities and protect natural amenities; and
 - Average lot size and maximum lot size bylaws to protect natural amenities and encourage compact development.
- Industrial land use policies and incentives for brownfield development. Subtopics include:
 - Preserving space for industrial uses that are travel sensitive and need to be located near urban cores;
 - Incentives for and facilitation of brownfield development; and
 - Co-generation in industrial areas.
- Development Cost Charge (DCCs) reform. Subtopics include:
 - Charging DCCs on basis of area; and
 - Reducing DCCs for developments that that put less demand on municipal infrastructure.
- Parking Bylaw Reform to encourage reduced vehicle dependence and more efficient land use. Subtopics include:
 - Re-assessing parking requirements for secondary suites, residential and commercial uses;
 - Cost of parking, the relationship between parking needs and other variables such as transit proximity (see section below on Parking);
 - Alternatives to minimum parking requirements; and
 - Model bylaws/development permits relaxing parking requirements based on proximity to transit, mixed use or investments in transportation alternatives, or rehabilitation of existing buildings.

- Development approval process reform to facilitate renovation, material salvage and other green building practices. Subtopics include:
 - Integrated permitting processes (see Change Permitting Process);
 - Fast tracking for green projects; and
 - Training for permit officials in sustainable practices and green practice information sources.
- Reforming development standards to encourage efficient land use patterns. Subtopics include:
 - Road widths and Road permeability;
 - Road and building lot orientation for solar access; and
 - Surface stormwater best management practices.
- Zoning reform to encourage buildings that have longer life spans and are more energy efficient. Subtopics include:
 - Building height relaxations to allow increased floor to floor height for use of natural ventilation, daylight access or adaptability to other uses;
 - Height and set back restrictions for solar collectors;
 - Reforming aesthetic design standards to facilitate solar collectors and other renewable energy devices; and
 - Relaxing sideyard (non-fire related) and FSR and zoning envelope restrictions to allow for thicker walls (either for insulation or alternative materials¹).
 - Protecting Ecological Amenities and Green Space:
 - Density bonusing for protection of amenities;
 - Open space subdivision bylaws;
 - OCP provisions for ecologically sensitive areas; and
 - Comprehensive Development zones for protecting ecological features.

Excerpt 4. The Net Zero Energy Home Coalition

<http://netzeroenergyhome.ca>

Over the spring of 2007, the Coalition organized a series of forums with 150 stakeholders from sectors involved in the design, construction, integration, and deployment of residential green buildings. These consultations resulted in a final report *Getting to Zero: Defining the Path to Net Zero Energy Home Construction in Ontario* (June 2007). Presented here are the views of these stakeholders of the main barriers and needs that need to be addressed for deployment of Net Zero Energy homes. Their views on barriers and needs are summarized in the diagram on the following page. The report is available at this link.

<http://netzeroenergyhome.ca/Files/files/events/Ontario%20Forums%20-%20Getting%20to%20Zero/NZEH%20Getting%20to%20Zero%20Forums%20-%20Final%20Strategy%20Paper.pdf>

Figure 6.3: Barriers to and Needs for NZEH Deployment identified by NZEH Forum Participants

