



Green Building: Opportunities and Challenges in North America

**A Secretariat Report prepared under Article 13 of the
North American Agreement on Environmental Cooperation**

**Phase II: Study Plan for the
Development of Background Papers**

10 October 2006

Table of Contents

1. Introduction
2. Summary of 13 June 2006 Advisory Group Meeting
3. The Secretariat's Report
 - 3.1. Scope of the Final Report
 - 3.2. Methodology for the Final Report
 - 3.3. Methodology for Background Papers
4. The Background Papers
 - 4.1 Paper One – Green Building Market Penetration in North America: Achievable Milestones and Associated Positive Environmental Impacts
 - 4.2 Paper Two - Toward Sustainable Financing and Strong Markets for Green Building
 - 4.3 Paper Three – Institutional Approaches to Foster Green Building in North America
 - 4.4 Paper Four – Greening Residential Buildings in North America
 - 4.5 Paper Five - Survey of Issues and Opportunities in Mexico

Attachments

Advisory Group Minutes

1. Introduction

This study plan will guide the development of background papers which the CEC Secretariat is commissioning as part of a report it is preparing on the opportunities and challenges for green building in North America.

To assist in the development of the report, the Secretariat established an international advisory group (<http://www.cec.org/news/details/index.cfm?varlan=english&ID=2707>) with broad expertise relevant to the entire spectrum of green building issues. Members include prominent developers and architects, sustainable energy experts, real estate appraisers and brokers, together with local and national government representatives.

2. Summary of 13 June 2006 Advisory Group Meeting

The Advisory Group convened on 13 June 2006 to provide direction to the Secretariat on the development of the report. Advisory Group members shared their views on the most important issues facing green building in North America, guided by background documents to support the meeting prepared for the Secretariat by the International Initiative for a Sustainable Built Environment (see Attachment A).

Some key points that the Advisory Group made were:

- (1) The definition of green building used to develop the report should adequately account for issues related to sustainability.
- (2) The Secretariat's report should include issues related to both residential (housing) and non-residential building and to both new buildings and the retrofitting and upgrading of existing buildings.
- (3) The Secretariat's report should emphasize the positive environmental, public health and economic impacts of green building.

In addition, the collective advice of the Advisory Group was that the background reports should:

- (1) Present a vision of building performance in North America by building type and region in 2017 and 2027,(or maybe 2020 and 2030) based on aggressive but achievable uptake of green building practice in the construction of new buildings and renovation of existing buildings. This vision should show the positive environmental, social and economic benefits that would be associated with achieving specific performance benchmarks (e.g. energy and water savings, reduction in greenhouses

gases, increased productivity, new markets and employment opportunities, etc.).

- (2) Address financing options, valuation issues, financial incentives, and ways to determine how to value public and private benefit of green features for green building in North America.
- (3) Address regulatory reform issues, local codes, tax issues, capital budgeting, regulatory incentives, and the respective roles of different levels of government in promoting green building.

The Advisory Group minutes are contained in Attachment B.

3. The Secretariat's Report

3.1 Scope of Final Report

This report will address the opportunities and challenges for green building in Canada, Mexico and the United States in an engaging, accessible and forward looking manner. It will create a vision for building performance by building type and region in selected years, such as 2015 and 2030, in terms of the positive environmental, social and economic benefits associated with achieving specific benchmarks. It will identify drivers moving North America toward this vision and barriers preventing the realization of these benefits. It will also identify data and information gaps. The report will contain specific recommendations from the Secretariat to the CEC Council—the top environment officials from Canada, Mexico and the United States—on the issues raised in the report.

To develop the report, the working definition of the term green building is “the practice of 1) increasing the efficiency with which buildings and their sites use energy, water and materials, and 2) reducing building impacts on human health and the environment, through better siting, design, construction, operation, maintenance and removal – the complete building life cycle.”¹ The Secretariat will continue to refine this definition through discussions with the Advisory Group and authors of the background papers. The Secretariat's intention is to ensure that the concept of green building as used in the report is linked to broader issues related to the important secondary impacts of buildings on infrastructure development and community transportation systems.

¹ This definition is used by the United States Office of Federal Environmental Executive, *The Federal Commitment to Green Building: Experiences and Expectations*, 18 September 2003, see. www.ofee.gov/sb/state_fgb_1.pdf.

This report will address both new buildings and existing buildings, residential and non-residential. The report will take into account a statement and advice on recommendations from the Secretariat's Advisory Group members.

3.2 Methodology for Final Report

The Secretariat will base its report largely on the background papers, the Advisory Group's Statement and Advice on Recommendations and information gathered through interviews, surveys, public workshops and other information gathering efforts.

The Secretariat report, as well as the background papers, will be peer-reviewed and reviewed by the Advisory Group.

3.3 Methodology for Background Papers

Experts, or teams of experts, from Canada, Mexico and the United States will design and write the background papers based upon this study plan and terms of reference for each study or paper.

Each expert or team of experts will work with the Secretariat in developing an outline for the paper. The experts or expert teams will then develop the background papers by examining existing research and case studies, conducting interviews and compiling other relevant information. The Secretariat will coordinate this work and provide research, writing and editorial assistance to the research experts or teams as needed. It will also arrange for and assist in coordination between research teams.

A public symposium will take place in Seattle, Washington on 1-2 May 2007. During the symposium, the authors of the draft background papers will present them to the public and discuss them with the Advisory Group in a closed session. The Secretariat will also post the background papers on the CEC web site for public comment. In addition, various aspects of the project will be presented at a workshop or workshops that the Secretariat will sponsor in Mexico in early 2007. Following the Spring 2007 public symposium, the authors will finalize the background papers, including peer review.

The Secretariat may also conduct interviews and other surveys and it may issue a call for information on its web site or engage in other information gathering efforts. If this is done, the Secretariat will coordinate closely the Advisory Group and with the experts in order to avoid duplication.

4. The Background Papers

4.1 Paper One – Green Building Market Penetration in North America: Achievable Benchmarks and Associated Positive Environmental Impact

This paper will present a vision of building performance in North America by building type and region in 2015 and 2030 based on aggressive but achievable uptake of green building practice in the construction of new buildings and renovation of existing buildings. This vision should show the positive environmental, social and economic benefits that would be associated with achieving specific performance benchmarks (e.g. energy and water savings, reduction in greenhouse gases, increased productivity, new markets and employment opportunities, etc.). The basic data sets needed for this paper include:

- (1) Estimates of the current building stock (residential and non-residential, size, in an appropriate set of sub-categories, by North American sub-region) in North America, along with projections for the total building stock in 2015 and 2030 (existing stock + new buildings – de-constructed buildings);
- (2) Estimates of the baseline environmental performance of the existing building stock at appropriate baseline years (e.g. 1990 and 2000), in terms of selected environmental criteria (energy consumption and related air emissions; water consumption; land conversion; etc.);
- (3) Environmental performance targets or benchmarks (e.g. energy consumption per unit area, water use, waste production, etc.), by building type and North American sub-region, for 2015 and 2030, assuming aggressive uptake of green building practices in the construction of new buildings and renovation of existing buildings. This will be a focal point of this paper;
- (4) Estimates of the “building wedge” (i.e. the contribution of the building sector, as compared to the contribution from other sectors such as transportation) for key environmental criteria such as greenhouse gases, at the baseline year and in 2015 and 2030.
- (5) Data on improvements in worker health and productivity, as well as the health of residential occupants, resulting from green features.

The market penetration scenarios and performance goals will be examined in the context of the long-term environmental and economic trends for specific regions of North America. These trends include demographics, energy price scenarios, water availability issues, disposal capacity issues (particularly in Mexico), greenhouse gas emissions and global warming.

In identifying performance benchmarks, this paper will also examine how green building can help improve the environmental and economic well-being of North America by such means as improving productivity, reducing demand on electricity grid, reducing demand on water resources and waste water treatment plants and supporting local economies.

4.2. **Paper Two** - Toward Sustainable Financing and Strong Markets for Green Building

Studies have shown that the economic benefits of green buildings are likely to include: energy and costs savings, reduction in time finding tenants, higher rents, reduced turn over, and lower environmental or health risks. This paper will review existing studies, identify existing data and information gaps, and examine how financing and the market acts as both a driver and a barrier to green building. It will provide observations on how financing mechanisms and the markets could evolve to support an aggressive but achievable uptake of green building practice in the construction of new buildings and renovation of existing buildings. In addition to providing a general overview, this study will explore these issues from four different perspectives:

1. The Major Actors

Although studies have shown the economic benefits to building green, not everyone benefits financially from green building. Who benefits from green building? What are the financial incentives and disincentives to building green? How do these incentives and disincentives act as drivers or barriers to the key players in the development process? How can leases and other mechanisms mitigate financial disincentives?

2. Real Estate Valuation Models

This section will examine whether the high performance characteristics of green building translate into high real estate values for developers and investors using conventional real estate valuation models. It will look into new and evolving models and how they account for green building features. It will examine whether differences exist in the valuation approaches taken in Canada, Mexico and the United States and how those may affect green building.

3. Capital and Operational Funding Issues

Institutions commonly separate capital funding from operations. This section will look at how the separation of capital and operational funding can drive institutions toward selecting buildings which require lower capital funding but higher operating costs, without regard to the overall life cycle cost of the building. The consequences can be reduced environmental performance and productivity.

4. Other Issues

This section will identify other issues that may affect financing and the markets, such as tax issues, metrics for measuring performance, the lack of performance and financial data, and environmental risk factors, such as energy and water, which may factor into discount rates and insurance underwriting.

4.3. Paper Three - Institutional Approaches to Foster Green Building in North America;

This paper will explore the growth and future potential of the green building movement from three different perspectives. It will look at how governmental and non-governmental programs act as both drivers and barriers to green building and what steps could be taken to achieve the market penetration scenarios outlined in paper one. It will provide examples of successful green building practices and recommendations regarding key elements of successful regulatory and incentive programs at all levels of government.

1. The role of green/sustainable building organizations and rating systems

In the United States and Canada, green building organizations have played a critical role in providing metrics for measuring performance, educating developers and builders, evaluating governmental programs, promoting market differentiation, and increasing the demand for green buildings. In Mexico, a number of efforts have been underway to improve the energy and water efficiency of buildings.

This paper will provide an overview of different organizational efforts in Canada, Mexico and the United States to look at buildings from an environmental point of view and to find ways to improve their environmental performance. It will review the role of organizations as well as major universities and other non-governmental efforts. It will include a comprehensive overview showing the key attributes the green building rating systems currently in use in North America.

2. The role of government programs

This section will look at how different systems of urban planning may effect the development of green building. It will also look at federal governments, states, provinces, counties, and cities which have developed regulations or incentives programs for green building. These programs are designed to raise standards (e.g., adopting of green standards as project requirements), reduce costs (e.g., through lower fees, development charges, quicker permits, other incentive programs), enhance revenue (e.g., density bonuses) and remove barriers (e.g., to the adoption of new technologies and better practices).

This section will explore how different levels of governments act as leaders in building green and how policies and programs can act as drivers and barriers to green building. This paper will also evaluate the public

and private benefit of green building and review how those benefits should inform regulatory and incentive programs.

3. Relationship between sustainability and building codes

The idea of addressing cumulative environmental impacts of the building sector through building codes is relatively new. Currently, building codes throughout North America govern nearly all aspects of buildings and their components and systems. Some codes impose energy, sewage systems and water-efficiency requirements. Recently, some people have advocated the idea that building codes can be used to address environmental impacts away from the actual building sites or which address the cumulative environmental aspects of buildings sector.

This section will examine the relationship between sustainability and building codes by examining how building codes can facilitate or act as barriers to green building.

4.4. Paper Four - Greening Residential Buildings in North America

This paper will review green housing initiatives in Canada, Mexico and the United States. Green housing programs can help lower resource requirements, lower environmental impact and improve comfort. Some studies indicate that green features can also improve the value and profitability of housing. This paper will survey green housing efforts in the three countries. Specifically, it will examine:

1. The projected housing stock in 2030 (or another mutually agreed on date) in each country. Identify different types of housing. This also would be part of Paper One;
2. An overview of the resource demands by the housing stock in each country;
3. The role of the governments and the private sector in each countries' finance system;
4. Federal, state and community-based efforts to build green housing;
5. Current systems to finance and assess the financial viability of green housing;
6. Drivers and barriers to the development of green affordable housing; and,
7. Efforts to overcome barriers.

The authors of this paper will use the information provided above and the outline below, submitted by Conafovi, Mexico's National Housing Develop Commission, as a starting point for developing the final paper's outline. See Attachment C.

11. Paper Five - Survey of Issues and Opportunities in Mexico

Much less information and few (in any) surveys are available regarding green building in Mexico. In working with the research teams, there may be a need to conduct a survey about different issues and opportunities for green building in Mexico that may go beyond the typical information gathering techniques available for any of the background papers. Consequently, the Secretariat will consider and work with key stakeholders on the possibility of conducting a survey in Mexico beginning in early 2007.