

IEA SHC Task 27: Moving The Market Towards Energy-efficient Fenestration Products In Canada

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Introduction

As part of the Government of Canada's overall commitment to the reduction of greenhouse gas emissions and the mitigation of climate change through reduced energy consumption, the sale of energy-efficient products in Canada is being encouraged through various means. This paper will briefly outline Canada's efforts with regards to fenestration products. Research has shown that roughly 25% of the heat loss in a building envelope can be attributed to windows, doors, and other similar products. This percentage can be greatly reduced through the use of currently available energy-efficient technologies. It is estimated that about 40% of the total factory-built windows sold in Canada today is considered to be energy-efficient. The goal is to significantly increase that percentage by 2010.

The Canadian Market

The fenestration market is large and complex. It is estimated that there are two to three thousand manufacturers in Canada ranging from very small "garage" operations to manufacturers who export to many different countries. Annual sales in Canada, alone, amounts to over six million square metres of glass area annually. There are also many different fenestration products available to serve different needs. These needs are based on 1) building type (residential, light commercial, or commercial); 2) area of installation (example: heated versus unheated spaces); 3) market type (new construction or retrofit); 4) regional preferences (examples: aluminum windows in Quebec, triple-glazed products in Manitoba); and 5) climatological realities. To meet these needs, the products are designed, supplied, installed, and marketed differently in the various regions of Canada. In addition, many products are designed to excel in the larger American market that tends to emphasize solar control over solar gain. Therefore, establishing a baseline of energy efficiency for fenestration products in Canada is challenging.

Approaches To Change

As with many other products, there are a number of ways to bring about change in the marketplace both voluntary and mandatory:

1. Labelling / Endorsement Programs.
2. Advertising and Promotion.
3. Incentives.
4. Regulations.
5. Codes and Standards.

In Canada, the voluntary approach is usually preferred to shift the market, however, mandatory methods may be used when the voluntary approach does not achieve the objective. Voluntary initiatives are also often used to initiate change in the market place while mandatory restrictions such as regulations and building codes can be employed to ensure the market doesn't "slide back" once the voluntary measures have ended. With respect to windows and doors, there have been a number of voluntary initiatives that have achieved only limited success and one attempt at implementing a regulation.

Voluntary Programs

In the past ten years, the Canadian federal government has supported and promoted two major voluntary programs which have been primarily aimed at the residential window and door sector. Natural Resources Canada (NRCan) sponsored a labelling and certification program through the Canadian Window and Doors Manufacturers Association (CWDMA) and an installation certification program through the Siding and Window Dealers Association of Canada (SAWDAC).

There have also been other programs such as the government of Manitoba's support for the use of triple glazing in the late 1970s and early 1980s, Ontario Hydro's incentive program to promote the sale of energy-efficient windows in the early 1990s and the B.C. Hydro Power Smart Program that currently endorses windows and doors that meet its energy-efficient criteria for British Columbia. These programs have had limited success in the promotion of energy-efficient fenestration products.

Regulation

Windows and Doors are expressly written into Canada's Energy Act which was passed into law in 1992. This act provides the framework to enact regulations regarding the energy efficiency of manufactured energy-using products (examples: refrigerators, furnaces, air-conditioners, etc.) and applies to products that are traded across provincial boundaries or imported into Canada.

Using the Act to regulate fenestration products is tricky since the wide range of applications requires different minimums and approaches. In addition, the Energy Act was designed to regulate products at the

manufacturing level. Since many fenestration products are assembled on the job site, this is a further complicating factor.

In October of 2001, NRCan made a proposal to regulate the thermal performance of factory-built windows, skylights, and entry door systems. The proposal called for a minimum Energy Rating (ER) of -13 for residential windows and sliding glass doors, a U-value of 2.6 for non-residential windows, and a U-value of 3.1 for flat-glazed skylights.

Subsequently, NRCan decided to delay the implementation of a regulation because of issues that arose both technical and non-technical. NRCan undertook a research project to evaluate the technical issues which is just now concluding. For example, a 20% solar gain reduction factor to account for shading has been proposed for the ER equation and the standard will likely be amended in the spring of 2003. Other technical issues raised such as overheating in homes that have windows with hard coat low emissivity glass were found to be unsubstantiated.

The major non-technical issued stemmed from the fact that regulations under the Energy Act are only applicable to inter-provincial trade and imports into Canada. Since the window industry in Canada is very regionalized, many manufacturers would not have to incur the expense of regulation and would still be able to offer less expensive, less efficient products. Several of the provinces have energy acts of their own so a coordinated effort with them would help to lessen the market inequities but, to date, only one or two provinces have been interested.

Codes and Standards

Since building codes are applied directly to the building, they can be used to institute minimums for installed fenestration products such as site-built windows and entry systems. They can also be used in provinces and municipalities where a federal regulation would not apply to factory-built products.

In Canada, building codes are the jurisdiction of the provinces. Canada has a Model National Energy Code but, as with regulations, many of the provinces have been very reluctant to adopt any requirements for fenestration products due to resistance by both the fenestration and construction industry.

As for standards, there are two Canadian standards for evaluating the thermal performance of fenestration products: the CSA A440.2 Thermal Performance of Windows and Other Fenestration Products Standard, and the CSA A453.0 Thermal Performance of Swinging Door Systems. Both have minimum thermal performance levels but they are relatively weak as the industry as a whole must agree to any published standard.

ENERGY STAR^a

In May, 2001, Natural Resources Canada exchanged letters with the U.S. Department of Energy and Environmental Protection Agency authorizing

the government of Canada to administer and promote the international ENERGY STAR symbol for energy efficiency in Canada. The concept is simple for the consumer. When they see the symbol on a product, they know that it is energy efficient. There are a number of products currently being labelled ranging from home appliances to heating and cooling equipment to consumer electronics. Many products are residential although a number of commercial products will be added in the near future. The voluntary endorsement program is well known in the U.S., and, to a lesser extent, in Canada.

In the U.S. there is a program for windows and doors which has been quite successful. An initial proposal for qualifying criteria for windows and sliding glass doors in Canada is currently being circulated with a planned implementation date of April 1, 2003. As in the U.S., Canada will be divided into zones based on Heating Degree Days (HDDs). Each zone will have a specific qualifying criteria. The proposal also calls for two paths of compliance. One is through a U-value maximum and the other through an ER minimum. The dual compliance path will allow both those products that emphasize solar gain or thermal resistance to qualify.

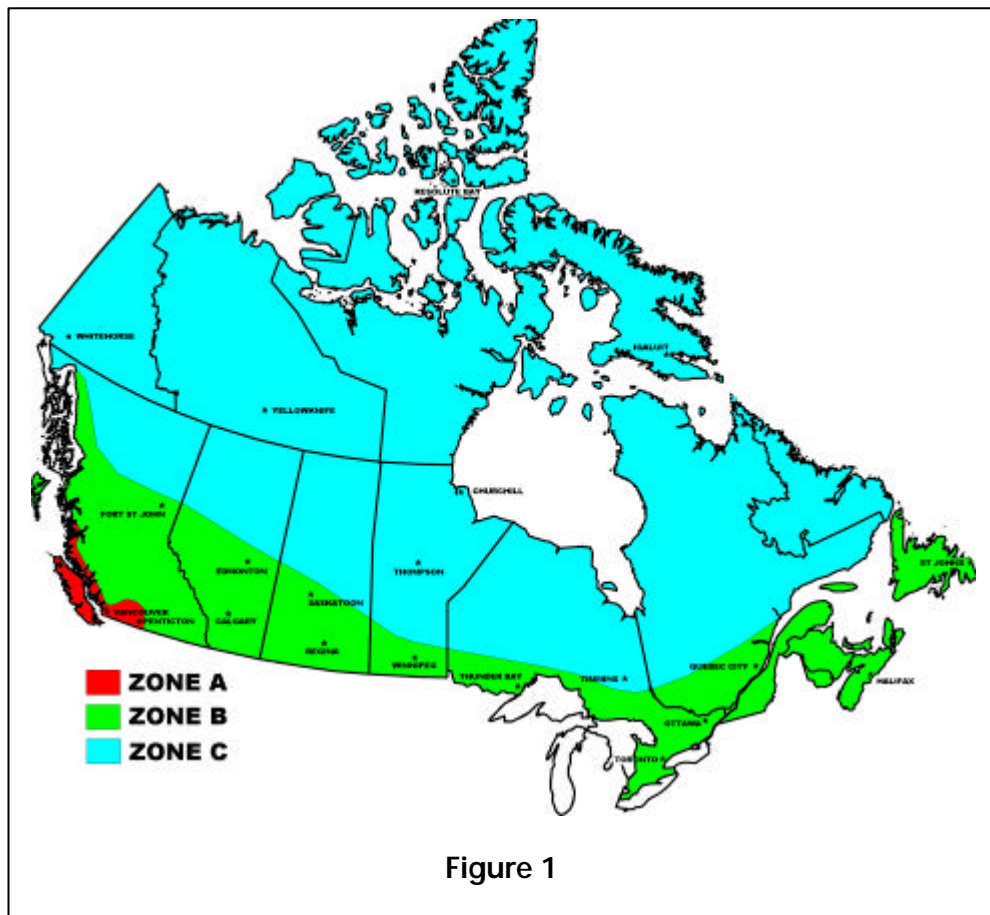


Figure 1

Zone	HDD	U-value Max	or	ERop Min	ERfx Min
A	≤3500	2.0	or	-18	-8
B	>3500 to ≤6000	1.7	or	-13	-3
C	>6000	1.4	or	-9	+1

Conclusion

Where other voluntary programs have had limited success, it is anticipated that ENERGY STAR will be very helpful in moving the market towards energy-efficient fenestration products in the residential and light commercial sectors. ENERGY STAR covers a range of product and is heavily promoted in the U.S. so the chances of consumers in Canada seeing the symbol is far greater than if it was a strictly Canadian only program for windows. Incentives may also be used in the near term to encourage participation by industry in Canada. Regulation has also not been ruled out, especially to support the ENERGY STAR criteria. In the future, NRCan will likely be pushing for code adoption of minimum thermal performance standards for fenestration products in both the residential and commercial sectors.