Choosing an energy efficient house

(NC)—During the balmy days of spring and summer, the last thing anyone wants to be reminded of is the inevitable return of winter, the other fact of life in the northern hemisphere.

Many Canadians develop a mental block to snow, sleet and howling northern winds as soon as the last down-filled jacket is stored in spring. However, if you are shopping for a new house this spring, keep the memory alive, at least *until you are satisfied that the dwelling* is energy efficient.

Choosing an Energy Efficient House: A buyer's guide, published by Canada Mortgage and Housing Corporation, answers common energy questions. The booklet aims to make energy-conscious house hunters aware of the elements of energy efficiency and where they can be found in the dwelling.

There are five components that work together to create the energy efficient home: insulation, airtight construction, controlled ventilation, passive solar heating and an efficient heating system.

When these factors interact properly, fuel consumption can be up to 80 per cent less than the conventional house. The well-designed, well-built energy efficient house is also draft-free with even temperature distribution. It will be cooler in the summer, warmer in the winter, quieter, less dusty, and maintain a comfortable level of humidity.

CMHC's guide will steer you clear of the pitfalls of poor construction or design. These include higher-than-necessary construction costs, overheating in spring and fall, poor air quality, condensation build-up on interior walls and windows, and a house that may be more expensive to heat than expected.

Although there are no guarantees of energy performance, Canada's building industry is responding to the energy needs of homeowners. You can ensure a well-built, energy efficient home by asking the builder or seller about the five factors of energy efficiency.

Insulation

First determine the insulation levels recommended for different areas of the house by local building codes (these will vary according to regional climate). The value of the various types of insulation are assigned RSI units which measure the resistance to heat loss. Compare recommended levels with those actually used.

Take a good look at the insulation to see if it is properly installed. Check that it is evenly distributed throughout the house, but kept clear of chimneys, ventilation features, electrical wiring and plumbing penetrations.

If buying a home with a cathedral ceiling or flat roof make sure there is enough room for insulation and ventilation between the insulation and the roof deck (normally 300-500 mm).

The energy efficient building will have higher levels of insulation in exterior walls than its conventional counterpart.

Good construction means the avoidance of thermal bridges, that is, areas where heat can bypass insulation and escape through building materials. Studs, floor joists and masonry walls can act as energy-conducting thermal bridges.

In the basement, walls should be insulated right to the floor and foundation soil well-drained to reduce heat loss and prevent frost heave.

Ideally, insulation is applied to the outside as it keeps the wall warm and frost free. Check that the above-ground wall area has been covered by a protective material.

Floors over unheated garages or crawl spaces should also be insulated. Many builders insulate the basement slab to increase the amount of comfortable living space available in the house.

Airtightness

The energy efficient house does not rely on insulation alone. Airtight construction - keeping warm air in and cold air out - is also a major factor to consider.

In extremely cold or damp climates, airtight construction is vital because frost and condensation can build up, often causing structural damage to the house.

Normally, a depressurization test is performed on a house to determine how "tight" it is and where leaks are located. Before you buy, ask the builder if this test was carried out and what the results were.

Airtightness is achieved when a sound air-vapour barrier is constructed throughout the house. Sometimes described as a large sealed bag, this barrier stops interior and exterior air from passing through the walls and stops water vapour from entering the wall from inside the house.

A word of caution: once construction is completed, it is impossible to tell if the air-vapour barrier has been installed correctly without tearing apart finished walls. Because of this, it is vital they buyer check depressurization test results.

Controlled Ventilation

In an airtight house, a controlled ventilation system is necessary to provide a constant supply of fresh air and remove excess humidity, odours and indoor contaminants.

Water vapour produced by day-to-day activities such as showering, cooking - and even breathing - cannot escape an airtight house. If humidity levels are high, condensation forms on the coldest surface available, resulting in the growth of mildew and wood rot.

Ventilation will guard against a "stuffy" home and clear out household smells. More important, a properly installed system prevents the build up of chemical contaminants that cold be hazardous to the occupants of the house.

During spring and summer, ventilation is provided simply by opening the window. Each room should have a window that can be opened to ensure cross-ventilation and fire safety. During the winter, open windows are an energy waste. Exhaust fans used in combination with a fresh-air supply system in the airtight house provide a good flow of air. Often devices are installed to recover heat from warm air exhausted to the exterior.

Windows need not be the energy drain they often are in most houses. If properly placed, they can be a free source of solar energy. If not, they can turn your home into a sauna during the heat of the summer.

An energy efficient house has most of the windows facing south, to take advantage of solar heat in the winter. However, more than 7 per cent southern glass exposure could result in overheating if no shade is provided by an overhang from the roof.

Check for glazing of vertical windows for the best use of the sun. Vertical windows block the summer sun, hanging high in the sky. In winter, vertical windows let the sun, which is lower, into the house.

Most windows in Canada have double or triple glazing, which means there is more than one layer of glass with an adequate (at least 12 mm) layer of air between each pane.

If the first four components are working properly, the heating system in an energy-efficient house will be smaller than the norm. In theory, it is possible to build a house so energy efficient it requires heat only from the sun, occupants and appliances.

However, most Canadians are not prepared for the expense the construction of such a house involves. Instead most rely on a conventional heating system like a furnace, distribution system and thermostat.

Many furnaces on the market today feature energy saving designs, although these may cost more than conventional systems. If a conventional system has already been installed, check that it has an external supply of combustion air.

The forced-air heating system is preferred in the energy-efficient house. It ensures that air is moved throughout the house and can be designed so that passive solar heat is distributed evenly.

If the builder tells you a heat-pump has been installed, look forward to a cool summer. Those devices extract heat from interior air and transfer it outdoors during the summer. In the winter, they work in reverse; taking heat from the outside air and using it to heat air inside the houses. Heat pumps might not be a wise choice in colder areas of the country, however.

The energy-efficient home is comfortable to live in year round. The tips provided in CMHC's buyer's guide will help you compare energy-saving features as you house hunt this spring. The guide, Choosing an Energy Efficient House, costs $3. To order, quote name and the number NHA 5662. Send cheque or money order to CMHC Publications, 682 Montreal Road, Ottawa K1A 0P7.