

RENOVATING FOR ENERGY SAVINGS

Case studies

October 2004 Issue 9



Row Houses

Row houses can be found in all parts of Canada. In some regions, row houses with two or three units are also known as duplexes or triplexes. Typically built as economical housing, the average finished living space is about 150 m² (1,600 sq. ft.).

What you've got

- Two-storey building
- Unfinished full basement
- Some units have garages as part of basement

Newer "up-market" units with a finished basement can have an average floor area of about 220 m² (2,400 sq. ft.).

How it's built

Actual construction details used in your house may differ, and over the years some improvements may have been done.

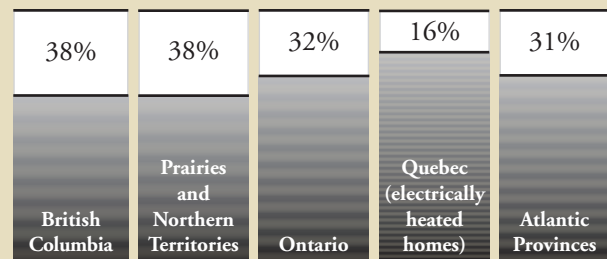
This is simply a general description:

- Exterior Walls: 2 x 4 in. stud walls with RSI 2.1 (R-12) batt insulation
- Ceiling: insulation: RSI 3.8 (R-21)

How to select energy-saving improvements for row houses. These improvements will save energy and reduce your heating bills, while making your house more comfortable to live in.

POTENTIAL ENERGY SAVINGS

If all of the recommended improvements presented here are carried out, overall energy use can be reduced as shown below. Actual energy use is affected by weather and lifestyle, so specific energy savings may vary. If you, or a previous owner, have already carried out some energy-saving measures, the actual reduction in energy use will differ. The energy savings presented here are based on computer simulations done specifically for this type of house in each Canadian region.



- Windows: double-glazed or single-glazed with storms (except for coastal B.C.)
- Original exterior doors: hollow wood panels
- Foundation: uninsulated poured, concrete or concrete block, usually unfinished

Improvements can

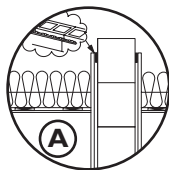
- Reduce energy use for space heating
- Reduce drafts
- Reduce summer overheating
- Reduce moisture and condensation problems
- Reduce noise from outside the house
- Reduce greenhouse gas emissions
- Improve indoor air quality
- Improve humidity levels in dry, northern houses
- Increase comfort level.

Problems and Opportunities

- Air leakage area is distributed throughout the house, but is often concentrated at the header area (where the floor framing meets the foundation wall) and at the common wall. If all air leakage paths are combined, the average row house would have a hole that is about 920 cm² (or roughly 12 x 12 in.). The leakiest units are found in B.C., with a hole about 1,700 cm².
- Row houses do not generally have an effective ventilation system to maintain proper indoor air quality. There may be a noisy bathroom fan and a kitchen range hood fan in each unit. Units built since the late 1980s, especially in Atlantic Canada, may have a “whole-house” balanced ventilation system using an air exchanger or a heat recovery ventilator (HRV).
- Many row houses will still have their original furnace or boiler. If they have been replaced, they will likely be older, low-efficiency equipment that is only about 68 per cent (or less) efficient. Units built since the late 1990s may have mid-efficiency equipment installed. Water heating is usually provided by a conventional tank.
- Many row houses are built as part of a complex, with common property and rules concerning the appearance of individual units. Depending on the regulations for your home, some recommended energy-efficiency upgrades may need approval from the condominium corporation.

Draftproof Everywhere!

- Draftproof or air seal, the top of exterior foundation walls, around window and door frames, at attic hatches and chimneys, ceiling penetrations around light fixtures and wiring, and service penetrations through the exterior walls.
- Other areas to consider include through the exterior walls and common walls between units, and floors over garages.
- The common wall between units should be tightly air sealed to maintain fire and sound resistance. Typically, there are many service penetrations for wiring and plumbing that are not well-sealed.



- There is usually a considerable amount of air leakage where the staircase is against an outside or common wall.
- In older, renovated row houses where the plaster has been removed to expose the brick common wall, there can be much heat loss upward, through air leakage at the ceiling level, but this may not be noticed because the common wall remains warm. To address air leakage problems in the common wall inspect the attic. If the interior finish of the common walls is 'furred off' from the hollow block fire wall, leaving a space between the two surfaces, seal it up. Where the walls are not 'furred off', use foamed-in insulation to seal off the hollow block firewall.
- In newer units, or in units that have had bathroom renovations, where one-piece bath or shower enclosures are installed against exterior walls, the air barrier may be discontinuous or damaged. This can be a source of great air leakage that results in significant discomfort when the bath or shower is in use. Caulk with waterproof material around the whole exposed face of the bath enclosure, including at the floor. Also, caulk at the wall/floor junction behind the baseboard to short-circuit the air leakage path in the bathroom along the exterior wall.
- An unfinished garage ceiling can be insulated, and draftproofed at the same time, by using spray-on foam insulation. It is important to pay special attention to air sealing between the garage and living space, to prevent exhaust fumes from entering the house.
- All the cracks and gaps in the foundation walls and floors should be caulked and sealed. Insulate and draftproof the basement header area with expanding spray foam to reduce drafts across the first floor.
- If there is a sump in the basement, it should have a tight-fitting cover installed.
- If this house has a walkout basement, please refer to #10 in this series: “*Homes with Walkout Basements.*”

For details on draftproofing, see *Keeping the Heat In* by Natural Resources Canada.

CMHC's

Renovating for Energy Savings series

- Issue 1 Pre-World War II Houses
- Issue 2 Post-War 1 1/2-Storey Homes
- Issue 3 Post-1960s Two-Storey Homes
- Issue 4 1960s-70s One-Storey Homes
- Issue 5 Split-Level Homes
- Issue 6 Split-Entry Homes
- Issue 7 Mobile Homes
- Issue 8 Duplexes and Triplexes
- Issue 9 Row Houses
- Issue 10 Homes with Walkout Basements
- Issue 11 Common Additions

Additional Information and Resources

CMHC Canadian Housing Information Centre (CHIC)

- ***Building, Renovating and Maintaining***
www.cmhc.ca/en/co/renoho/index.cfm
- ***About Your House Series***
www.cmhc.ca/en/co/co_001.cfm

Natural Resources Canada

- **Office of Energy Efficiency**
www.oee.nrcan.gc.ca Tel. 1-800-387-2000
- **Publications**
www.oee.nrcan.gc.ca/publications/infosource
- **Keeping the Heat In**
www.oee.nrcan.gc.ca/keep_heat_in/

Canadian Home Builders' Association (CHBA)

The impact of specific improvements for your house can also be provided by technicians and qualified trades persons. The Renovation Council of your local Home Builders' Association can provide some references, or contact the CHBA
www.chba.ca Tel. 613-230-3060

- **In Quebec, please contact the APCHQ** (Association provinciale des constructeurs d'habitations du Québec) at www.APCHQ.com tel. 514-353-9960 or ACQ (Association de la construction du Québec) at www.ACQ.org Tel. 514-354-0609
- **The Renovation Roadmap**
Website developed by CHBA, CMHC and NRCAN
www.myhomereno.com

Provincial Governments

Provincial Government departments will frequently provide detailed recommendations for your region.

Local Utilities

Your local energy utility can usually provide detailed recommendations for your region.

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