Climate Change

- **The reuse of heritage buildings reduces greenhouse gas emissions thereby reducing human contribution to climate change**
- **Heritage buildings are composed of low energy-intensive building materials**

Heritage conservation reduces greenhouse gas emissions

When a building is rehabilitated and reused, as opposed to demolished and replaced, there is a reduction in greenhouse gas emissions due to reduced:

- Energy use – greenhouse gases are a by-product of fossil fuel combustion
- Raw materials use – extracting and processing them requires energy use
- Waste – discarding building materials means throwing away substantial energy investments

Canada's 2002 greenhouse gas production of 23.3 tonnes per capita is almost double the Organization for Economic Co-operation and Development (OECD) average of 13 tonnes, and more than six times that of the lowest OECD emitter. In 2002, Canada was the fourth highest greenhouse gas emitter out of the 29 OECD countries.

(David Suzuki Foundation, 2005)

Sources of Greenhouse Gas Emissions During a Building's Lifetime

Stage	Input	Output
Site Preparation	Energy (Earthmoving)	Carbon dioxide
Construction	Energy, Raw Materials	Carbon dioxide, Waste materials
Use & Refurbishment	Energy, Materials	Carbon dioxide
Demolition	Energy	Carbon dioxide, Waste materials

(Building and Environment, 1999)

Rehabilitating heritage buildings reduces human contribution to climate change

A study of the Angus Technopole Building, a Montreal factory built in the early 20th century, compared rehabilitation and adaptive reuse of the building into a residential complex to demolition and construction of a new building on the same site. It illustrated that rehabilitation produces much lower emissions of two greenhouse gases, carbon dioxide (CO2) and sulfur dioxide (SO2), and requires lower energy usage (see Table).

Comparative Environmental Effects of the Rehabilitation

Environmental Effect	Rehabilitation	Demolition & New Construction
Energy Use (Gigajoules)	5,169	13,734
Global Warming Potential (CO_2 tonnes)	448	1,007
Acidification Potential (SO_2 tonnes)	2	7

(The Athena Institute, 2004)

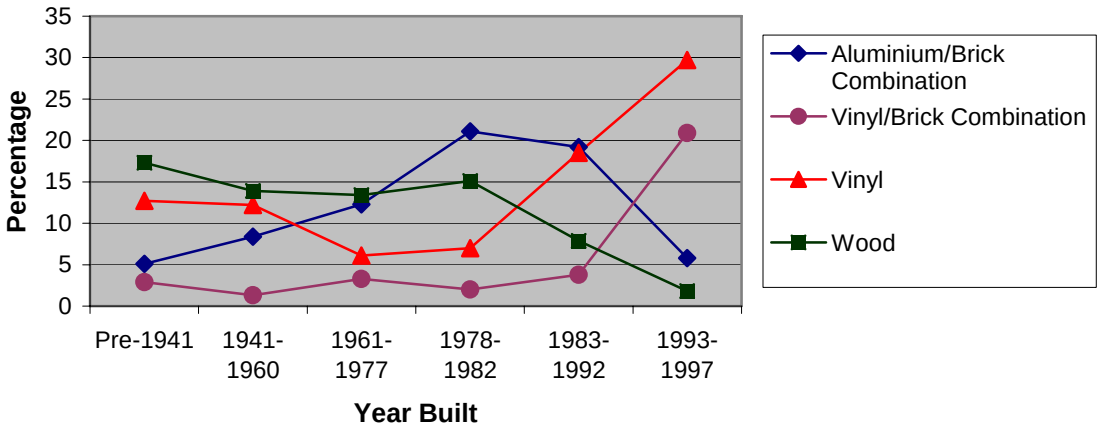
Low energy-intensive building materials exists primarily in heritage buildings

As shown in the graph below, the use of construction materials like vinyl that are highly energy-intensive (with a high level of greenhouse gas emission) has increased in new construction. The use of less energy-intensive materials such as wood or brick is declining.

Today, types of less energy-intensive materials are found primarily in heritage buildings. Since the reuse of heritage buildings usually involves the repair or replacement of these less energy-intensive materials, heritage conservation effectively reduces greenhouse gas emissions.

The Energy Required to Produce and Process Various Building Materials	
Energy Required	
Material	Mega joules per kilogram (MJ/kg)
Wood	2.5
Brick	2.5
Vinyl	70.0
(Kesik, 2002)	

Various House Exterior Wall Materials



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