

ECOroof

CASE STUDY



UNIVERSITY OF
TORONTO
SCARBOROUGH

COOL ROOF PROJECT SUMMARY

A cool roof is a roofing system with high solar reflectivity and thermal emissivity to reduce the urban heat island effect and can be either a coating applied over an existing roof system or a new waterproofing membrane.

Building Type: Institutional

Total Cost: \$633,700

Eco-Roof Incentive Program funding received: \$13,055

Size of cool roof: 2,611 m²

Cost per square metre: \$243

**University of Toronto — Scarborough
Campus
1265 Military Trail
Toronto, ON M1C1A4**

Tim Lang, Manager, Health & Safety,
Sustainability, University of Toronto

Spring 2011

University of Toronto — Scarborough Campus

The University of Toronto Scarborough, founded in 1964, provides undergraduate and graduate studies and the University's only co-op educational programs to more than 10,000 students. With 100+ student clubs, recreational and competitive athletic programs, public lectures, cultural events and the Doris McCarthy Gallery, University of Toronto Scarborough has been offering an endless array of learning opportunities to the Toronto community, both inside and outside the classroom, for almost 50 years.



Installing a cool roof is one example of the University of Toronto's overall commitment to social responsibility

"We decided to go with the 'cool' roof for a few reasons, those being aesthetics, reduced operating costs and marginal increase in cost over a conventional built-up roofing system. From an aesthetics perspective, this roof simply looks better and it is certainly my aim to carry this type of roof throughout the campus."

Jim Derenzis, Director of Facilities Management
University of Toronto



Call **3-1-1**



Quick Facts: Cool Roofs

- extend the lifespan of a roof by minimizing the extreme temperature fluctuations that cause wear and tear on traditional roofs;
- have the potential to reduce energy consumption on hot summer days by between .27 and 3.16 kWh per square metre of cool roof coverage;

Reference: Akbari, H. and Konopacki, S. (2004). "Energy effects of heat-island reduction strategies in Toronto, Canada." Energy 29: 191-210 (LBL Study).

- have the potential to reduce GHG emissions annually by an estimated 50 to 590 g of CO₂ equivalent per square metre of cool roof coverage;

Reference: Based on energy savings in Akbari, H. and Konopacki, S. (2004). "Energy effects of heat-island reduction strategies in Toronto, Canada." Energy 29: 191-210 (LBL Study).

- have the potential to reduce the ambient air temperature by .6 to 1.7 °C on hot summer days, thereby decreasing the urban heat island effect.

Reference: Akbari, H. and Konopacki, S. (2004). "Energy effects of heat-island reduction strategies in Toronto, Canada." Energy 29: 191-210 (LBL Study).

*The City of Toronto's Eco-Roof Incentive Program (ERIP) provides funds for green or cool roof retrofit projects on existing commercial, industrial and institutional buildings.

The program also provides funding for green roofs on new industrial buildings with a Gross Floor Area of 2,000 m² (21,528 sq ft) or greater, and new institutional and commercial buildings of less than 2,000 m².

Eligible green roof projects receive \$50 / square metre up to a maximum of \$100,000. Eligible cool roof projects receive \$2 - 5 / square metre up to a maximum of \$50,000.
Funding recipients must meet program eligibility criteria.

Building Characteristics and History

The Scarborough Campus of the University of Toronto has two concrete campus buildings constructed in 1967. The Humanities wing is a five-storey 9,217 m² building that houses offices, classrooms and a dining facility. The Recreational wing is a four-storey 8,050 m² building that houses a recreation centre and gym, an administrative office and a green roof.

Neither building had undergone significant modification since the original construction. The most significant change to either building was the switch from simple ventilation of the gymnasium to air conditioning. Chillers and boilers had been replaced or upgraded, and a lighting retrofit had been conducted at the recreation centre.

Project Description and Background

In keeping with best practises and a desire to demonstrate the University's commitment to the environment, the University opted for a cool roof when the existing roof needed to be replaced. The University's metering system makes it difficult to calculate precise energy use reductions.

Project Scope

The University obtained three quotes and chose a contractor with whom they had worked in the past and found to be reliable.

Cost Breakdown

Mobilization of project	\$ 28,208
Flat roofing work at main roof	566,272
Sheet metal work	15,883
Cash allowance	17,000
Demobilization of project	6,337
Total Cost	\$ 633,700