



BACKGROUND

The City of Toronto chose to install a 12.5 kW_t Solar Water Heating System at Fire Station 231 to evaluate the performance of the technology and to showcase the City's environmental leadership. Installed in December 2006, the system is reducing the Fire Station's natural gas use for hot water heating.

MONITORING

Installed on site are two Kamstrup Multical 601 heat meters. One installed on the DHW line between solar tanks and auxiliary heater (Solar Energy Delivered) and the other on the piping connecting solar tanks to the solar heat exchanger (Solar Energy Collected).

FINANCIAL

The project received a grant from Natural Resources Canada's Renewable Energy Deployment Initiative. The remaining portion was financed through the City's Capital Budget.



STATUS

Although performance indicated normal operation for 2008/2009, both hot water consumption and delivered energy were reduced at Fire Hall 231 for 2010 and 2011. The system performed particularly poorly during the 2010/2011 winter. The reduction in hot water consumption along with reduction in delivered energy should be investigated further.

For more information, contact:

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Fire Station #231

12.5 kW_t Solar Water Heating System



Project Overview

Project Owner: City of Toronto
Location: 740 Markham Road, Toronto, ON
Building type and use: Fire Station
System type: Solar Domestic Hot Water
System power rating (kW thermal): 12.5
Installation date: December 2006

System Configuration

Total Gross Collector Area (sq. meters): 17.892
Total number of Collectors: 6
Collector Manufacturer: Thermo Dynamics
Collector Model: G32-P
Number of Collectors: 6
Thermal Storage Tank Manufacturer: Rheem
Thermal Storage Tank Model: ST120 (435 litres)
Number of Thermal Storage Tanks: 2
Collector Fluid: Water
Array Angle: 45 degrees from horizontal
Azimuth: 15 degrees East
String Configuration: Drain-back with 6 collectors in parallel

Annual Performance

2008/2009 Actual Performance: 654 kWh_t/kW

Financial

System Cost (including tax): \$40,631
Grants: \$20,484
Annual Savings: \$335*
Cost per kW (before grants): \$3,251
Simple Payback (before grants): 121 years

Environmental Benefits

Estimated emission reduction: 2.1 tonnes CO₂e /yr**

* based on a natural gas price of \$0.35 per m³

** based on 1.879 kg CO₂e /m³

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