



Toronto Solar Neighbourhoods Initiative  
Final Energy Efficiency Actions Report  
July 2011

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## Summary

Solar Neighbourhoods is a City of Toronto pilot project with a goal of installing 100 solar domestic hot water systems in the Riverdale neighbourhood - Ward 30. The project was initiated in March 2008 by the Toronto Atmospheric Fund with \$400,000 in funding from the Portlands Energy Centre.

As part of the project, Windfall Ecology Centre was contracted to develop and deliver a customized home energy service which included a Natural Resources Canada approved D ecoENERGY assessment and a solar hot water assessment including a review of the home's suitability for implementation of solar hot water heating. Participants in the Solar Neighbourhoods pilot project were required to undertake an ecoENERGY assessment to access Government and City incentives and to ensure that homeowners had an opportunity to explore the full potential for energy efficiency savings and retrofits opportunities for their home.

Based on information from the energy assessments Windfall Ecology Centre completed, the pilot project achieved the following results:

- 34 homes installed solar domestic hot water systems
- 63 homes completed energy efficiency upgrades in addition to solar hot water
- CO2 savings estimated at 107 tonnes per year, or 1.7 tonnes per house per year
- NOx savings estimated at 70 kG/year

## Introduction

Established in 1998, Windfall Ecology Centre is an environmental non-profit organization and social enterprise specializing in individual and community education and activation. Through our programs and advocacy efforts, we seek to empower individuals, community groups and governments to build sustainable communities. We design and deliver on-the-ground education, awareness and direct climate change mitigation programs. Major areas of endeavor include energy conservation, renewable energy production, water protection education and leadership development.

As the exclusive Solar Neighbourhoods' ecoENERGY expert, Windfall Ecology Centre has provided a final energy efficiency actions report summarizing the results of the home energy assessments (D and E), cumulative information on the retrofit work undertaken, a summary of the incentives received and an overview of the challenges experienced. In addition, the report comments on the feedback from participants, analysis of the interest in SDHW from homeowners, general quality of the solar thermal installations observed, and general recommendations for future programs.

## Homeowner Participation

As of April 2011, the Toronto Solar Neighbourhood Initiative had a total of 107 audits completed by Windfall. The 107 audits consists of **63 completed E/F ecoEnergy audits**, 9 D audits which were not followed by an E, 25 D ecoENERGY/solar audits that did not have an E, and 10 stand alone solar audits.

Throughout Windfall's engagement with potential clients, there was a common theme of hesitation from registrants referred from TSNI. Many homeowners were not ready to commit

to having a solar assessment performed due to the initial cost and scope of the overall endeavor. It typically took several communications with the registrant to assist with their questions and concerns before booking an assessment or cancelling their participation request. Windfall Client Services tracked a list of frequently asked questions in order to help anticipate and address barriers.

### Frequently asked Client Questions

- How much money will I save?
- Who is Windfall?
- How many panels will supply half my hot water?
- What is the cost of a system?
- Do I have to do both the ecoENERGY and Solar Assessment?
- Who provides the financing?
- Are the grants tax deductible?
- Where/How do I get my grant money?
- Who is best to install my system and how long will it take?
- What happens if something breaks?

### Retrofit Measures Undertaken

Using housing data collected on the 63 homes that completed both D and E ecoENERGY assessments we have included an analysis of cumulative actions and results.

According to our report analysis a total of **34 solar hot water systems** were installed in the homes we visited.

Additional energy retrofit work to these homes included the following upgrades:

Measure	Number of Upgrades	% of all retrofits
Heating Systems	32	51
Air sealing/Draft proofing	24	38
Windows	24	38
Toilet Replacements	17	27
Attic Insulation	15	24
Wall Insulation	14	22
Hot Water Tanks (not solar)	12	19
Door Replacements	10	16
Foundation Insulation	6	10
Ventilation - HRV	1	2

A full list detailing specific client and retrofit information is included in the *Toronto Solar Neighbourhoods Database*.

Unfortunately, Windfall is unable to provide specific data on the amount of expenditures individual homeowners made on energy retrofits, as this information is not tracked and available to us.

However, we are pleased to report that the total incentive (grant) amounts received by participants for making energy efficiency upgrades through the ecoENERGY program amounts to \$111,045. The average incentive amount received per participant totals \$1763.

## General Observations

The majority of the participants in the program were considered “early adopters” - those who are motivated to action through concern for the environment. Typically, the first participants were also in a stable financial situation where making the upfront investment costs in a solar thermal system was not a barrier. However, we believe that the ecoENERGY grants combined with the additional program incentives and low-interest financing provided the necessary catalyst to initiate the process.

There was a significant variance in the factors that determined the feasibility of installing a solar thermal system in a home. Factors ranged from questions in the structural integrity of the roof, to shading issues, to the number of residents in the home and behavior patterns. Household priorities and the age of residents also played a role in determining whether or not to install a system.

In general, Windfall Energy Advisors observed satisfactory levels of workmanship in the solar thermal installations. Additionally, homeowners were well educated in how their systems worked and what maintenance was required for sustaining performance and ongoing efficiency.

The Solar Neighbourhoods pilot program experienced a myriad of challenges and significant delays to the overall times lines, but at the same time moved the solar thermal industry forward in terms of process and regulation, developing skilled contractors and technicians, and providing a working model of a community based approach to energy and renewable energy adoption.

## Environmental Impacts

Total CO<sub>2</sub> savings among the 63 retrofits analyzed are estimated at 107 tonnes per year, or 1.7 tonnes per house per year, and 70 kg/year of NO<sub>x</sub>.<sup>(1)</sup> Most of these savings are from building envelope upgrades or mechanical equipment upgrades. On average these savings can be expected to persist for approximately 20 years.

While the primary goal of the program was the promotion of solar hot water installations, a secondary goal was to stimulate participants to undertake additional retrofit measures in their homes. While 34 of the 63 participants did install a solar system, many other measures were installed, resulting in extensive additional savings. For example, the average space heat savings in the 63 retrofits is 22% - all from retrofit measures taken in addition to the solar DHW systems.

The solar DHW systems are tracked based on the rated solar heat contributions from the certified solar systems, and emission reductions are computed from those savings. The solar systems are estimated to be providing 17 tonnes per year of carbon dioxide emission reductions of the 107 tonnes overall. In other words, the solar promotion generated 17 tonnes per year of CO<sub>2</sub> reductions, and leveraged over six times more savings from other retrofit measures undertaken by the homeowners once they joined the program.

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<sup>(1)</sup> Carbon dioxide emission factors used are 1.88 kg CO<sub>2</sub>/m<sup>3</sup> of natural gas, 0.75 kg CO<sub>2</sub>/kilowatt hours of electricity. Factors used for nitrous oxides are 0.0015 kg/m<sup>3</sup> of natural gas (from EPA-AP42).

## Future Recommendations

Based on the slow uptake of the program and general feedback from our clients and program partners, Windfall would like to offer the following recommendations for program improvement.

In an effort to streamline communications and alleviate confusion in future we recommend a “single window access” to the program. With a single contact point, an interested participant would be able to register, book an assessment and receive all the necessary information in a concise, timely and organized manner.

In addition, Windfall believes that there is a need and opportunity to establish a more comprehensive marketing plan in the initial stage of the program design. The key to success in this type of program is a community based marketing approach with clear messaging and strategic, innovative educational opportunities.

Lastly, it is imperative to offer easily accessible incentives to reduce financial barriers when encouraging the adoption of major housing upgrades and renewable energy installations.

In closing, it was clearly demonstrated throughout the project that an exciting technology such as solar hot water can be entry point for increasing awareness surrounding energy efficiency, renewable energy and climate change mitigation. With this heightened awareness, homeowners will make more informed decisions about the actions they take in their daily lives leading to more sustainable homes and communities.