

Toronto Solar Neighbourhoods Initiative

Phase 1 – Riverdale Pilot Program Guidebook

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 **TORONTO** Atmospheric Fund

 **TORONTO**
Toronto Energy Efficiency Office
and Toronto Environment Office


toronto hydro
corporation



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Please Note:

This Program Guidebook is offered for the purposes of describing and sharing the program design details of the Toronto Solar Neighbourhood Initiative Pilot Program, and is not itself a legal document. Legal obligations of program participants, installers and service providers are defined in separate agreements. However, these separate agreements may require familiarity with sections of this Guidebook.

1 Introduction to Toronto Solar Neighbourhoods

1.1 Program Outline

The **Toronto Solar Neighbourhoods Initiative** is a three-phase campaign to establish a growing residential solar hot water heating market in Toronto. The City of Toronto has established aggressive greenhouse gas emission reduction targets and a significant source of these emissions is natural gas burned for space and water heating in Toronto homes. Shifting some of this fossil-fuelled load to solar energy is an important component of Toronto's overall emission reduction strategy.

Funded by a provincially-mandated contribution from the Portlands Energy Centre, Phase I of the **Toronto Solar Neighbourhoods Initiative** (TSNI) program seeks to install and monitor at least 100 residential solar hot water systems in Ward 30, adjacent to the Portlands Energy Centre power plant. Design of this phase is being overseen by the Toronto Atmospheric Fund, the City of Toronto Energy Efficiency Office, the Toronto Environment Office and Toronto Hydro.

Lessons from this pilot will assist in the design of Phase II (in 2009-2010) of the initiative – a multi-neighbourhood program with at least 500 installations. These first two phases will prepare stakeholders and the community for Phase III, which is a citywide solar thermal program to be launched in 2011.

Key characteristics of the **Toronto Solar Neighbourhoods Initiative** include:

- Multiple partners to maximize financial and knowledge resources
- Direct link to the City of Toronto's "Live Green Toronto" program
- Community-based marketing in partnership with local citizen groups
- Close consultation with local solar industry representatives
- Cross-promotion of other home and community energy efficiency actions
- Testing of a variety of technologies, marketing approaches, and financing options
- Well-supported monitoring and verification
- Analysis of results and transfer of knowledge gained to key decision-makers

1.2 Program Purpose

To offset local and regional air emissions from household energy use through installation of solar hot water heating systems and energy conservation.

1.3 Program Goals

To develop and deliver a popular neighbourhood-based residential solar thermal hot water installation program to the community of Riverdale (Ward 30: Toronto-Danforth) that will increase home energy efficiency actions and result in at least 100 solar thermal installations.

To use the knowledge outcomes of this program to develop a broader city wide Solar Domestic Hot Water (SDHW) deployment program.

1.4 Program Objectives

To test the feasibility and effectiveness of a variety of SDHW technologies, marketing, and financial approaches for promoting use of solar energy for water heating in Toronto.

1.5 Program Outputs

1. A program plan including detailed marketing, financing, installation and monitoring components.
2. Securing appropriate project partners to oversee the program management and delivery, including a community advisory committee.
3. Installation of 100 – 150 residential SDHW systems over the period of June 2008 – September 2009 in Riverdale. This would result in:
 - a. Installed solar collectors: 600 – 900 m²
 - b. Installed capacity: 420 - 630 kWe
 - c. Energy production: 250,000 – 375,000 kWh of thermal energy per year
 - d. GHG reductions from solar hot water: 75 – 110 tonnes per year
 - e. GHG reductions through the stimulation of energy efficiency in Riverdale for an additional savings of 300 - 450 tonnes per year (200 -300 homes at 1.5 tonnes per household per year)
 - f. Water usage reductions through the stimulation of water conservation in Riverdale
 - g. Economic activity: \$550,000 - \$800,000 + additional activity from energy and water conservation efforts
4. Creation of a monitoring and verification report that provides analysis of the results in accordance with stated learning outcomes as well as recommendations for future Toronto program design.
5. Creation and delivery of a communication strategy to engage and inform the community before, during and after the program implementation period.

1.6 Desired Program Knowledge Outcomes

- Identification of perceptible, objective, and financial barriers to SDHW for Toronto homeowners and ways to overcome them including:
 - Cost-effectiveness of community-based marketing strategies
 - Utilization of zero-interest loan in increasing participation
 - Utilization of additional incentive in increasing participation
 - Impact of highly concentrated installations on local consumer attitudes
- Identification of opportunities for mobilizing existing local community action on climate change in a way that builds synergy with solar thermal programs.
- Assess how interest in solar thermal energy affects the level at which participants undertake other home energy efficiency actions.
- Assessment of the performance of various types of equipment in delivering hot water in Toronto and offsetting conventional energy use.
- Assessment of the collective local emissions reductions impacts of all elements of the program, including solar thermal installations, home energy efficiency and water use reduction actions, and other community actions undertaken during the period.

1.7 Other Program Outcomes

- Facilitate the development of the solar hot water industry in Toronto
- Increase public awareness and knowledge of solar hot water in Toronto
- Improve solar hot water policy development at the municipal, provincial and national levels

1.8 Key Indicators of Success

The program developers have identified the following critical success factors that will be used to evaluate the success of the program:

- Number of solar audits delivered
- Number of home energy efficiency audits delivered
- Number and capacity of SDHW systems installed
- Amount of conventional fuel displaced by solar equipment

- Amount of conventional fuel displaced by home energy efficiency actions
- Number of collaborations with community groups
- Number of homeowners who requested information on the program
- Number of homeowners who carry out a self-assessment or obtain a system quotation
- Number of contractors who participated in the program
- Number of different SDHW products offered and installed in the program
- Number of SDHW systems installed
- Percentage of solar fraction achieved (per system and total)
- Energy savings achieved (per person, per household and total)
- Greenhouse gas reductions achieved (per person, per household and total)

1.9 Program Partners

The Toronto Solar Neighbourhoods Initiative is a joint initiative of:

- The Toronto Atmospheric Fund
- The Energy Efficiency Office – City of Toronto
- The Toronto Environment Office – City of Toronto
- Toronto Hydro

The program partners work closely with Live Green Toronto – an initiative of the Toronto Environment Office.

The program administration is housed in the Energy Efficiency Office, with a temporary program office located in Riverdale.

1.10 Incentive Structure

Customers will be provided with two incentive options for a residential SDHW system that meets the customer, equipment, and site requirements outlined in the following sections.

Option 1: Rebate – an upfront incentive of \$1,000

Option 2: Loan – an upfront incentive of \$500 plus a zero-interest loan with up to a 10-year term for the system balance [see Section 2.3].

The incentive is paid to the contractor and is deducted from the price that the customer pays to the solar contractor.

1.11 Program Boundary Areas –Riverdale

Phase 1 of the program is limited to homes in Ward 30 (Toronto-Danforth).

Ward 30 boundaries are:

- North – Danforth Ave
- West – East bank of the Don River
- South – Lake Ontario
- East – Coxwell Ave, Greenwood Ave, and Leslie St.

Exact boundaries and profile of the ward can be found at:

<http://www.toronto.ca/wards2000/ward30.htm>



The ward has approximately 15,000 single, semi-detached, row and duplex houses.

Potential customers from outside this area will be placed on waiting list for inclusion as the program expands.

2 Qualifying Project Processes

This section outlines the processes and responsibilities for the various project stakeholders through the completion of projects in the TSNI program from the time the purchaser makes the initial inquiry to final system commissioning and rebate payment from the TSNI administrator.

2.1 Project Steps with Customer Involvement

The following outlines the steps that the customer is involved in.

Step 1 – Initial Inquiry

The first step will be for the customer to carry out a self-assessment of the potential of solar hot water on the home. The details on how to carry out a solar hot water site assessment (downloadable checklist) are on the program website.

It will be the intent of the program to list on the program website information on:

- How to determine the home's hot water consumption
- An estimate of the savings from a SDHW system
- Tips on how to reduce both hot water energy and water consumption.

This will provide preliminary information on to the homeowner on whether solar is a good option to consider for the property.

Step 2 – Home Energy, Water and Solar Assessment

The next step is to carry out an independent energy assessment of the home. A full home energy efficiency assessment by a certified home assessor is required to qualify for the federal ecoENERGY Retrofit-Homes Program's SDHW system grant of \$500 and the Ontario government's matching grant of \$500. There is an estimated cost to the homeowner of \$500 for the before (D) and after (E) assessments. The Ontario government supplies a rebate of \$150 towards assessment costs. A qualified assessment firm will be selected to carry out assessments for Solar Neighbourhoods participants, which will include a solar and hot water assessment. The homeowner should contact the TSNI administrator in order to register for the program and schedule an assessment.

Step 3 – Customer contacts an Eligible Solar Contractor

If the home assessment indicates that the home has good solar potential, the next step in the process involves the customer contacting **TSNI Participating Solar Contractors** to obtain quotes for a SDHW system. As part of the quote the contractor will supply to the customer a completed **RETScreen Analysis Report**, which will estimate the energy savings of the proposed system. The customer can either contact solar contractors directly or join a **Community Solar Buyers Group** that will help facilitate the purchase of several systems from a single solar contractor as well as assist in overcoming perceptible and knowledge barriers. The **TSNI Participating Solar Contractors** listing and information on solar buyer groups are available on the program website.

Step 4 – Customer Signs an Offer to Purchase

In this step the homeowner has accepted the quote from either an independently selected contractor or the buyer group's selected contractor. The contractor fills out a **Program Application Form**, which both the customer and contractor must sign. This form along with a completed RETScreen Simulation is then submitted to the program administrator who will review and approve the project for Solar Neighbourhoods support. Copies of the approval will be sent to both the contractor and customer within 30 days of submission of properly completed documents. If the homeowner is applying for the loan incentive option, they should also fill out the online loan application from our financing partner at the same time as the **Program Application Form** [more details on the loan program can be found in Section 2.3].

Step 5 – Project Approval and Deposit Payment

Upon approval of the Program Application by the program administrator, the Customer should pay the Contractor the agreed deposit amount. If the Customer has been approved for a Solar Neighbourhoods loan, the deposit amount (as listed on the **Program Application Form**) will be released from the lending agency directly to the Contractor. If the project is not approved by the program administrator, the Customer and Contractor will be notified, and the Customer will be released from their contract with the Contractor if they do not wish to carry out the installation without Solar Neighbourhoods incentives.

Step 6 – Installation

This step involves the system installation, the building permit inspection, the system commissioning and the first step of the Inspection Report. Installation should not begin before receipt of the notice of approval for TSNI funding. The installation must be completed within 90-days of the date of project approval. Prior to the installation of the SDHW system, the contractor must obtain the proper building/plumbing permits.

Step 7 – System Commissioning and Inspection

Upon satisfactory completion and commissioning of the installation and after the contractor has reviewed the operation and maintenance requirements with the customer, the contractor, with the assistance of the customer, will complete the **System Commissioning and Inspection Report** (Form E) and submit it along with a copy of the **building permit** to the program administrator. If the customer has selected the Solar Neighbourhoods rebate-only option, they pay the Contractor the cost of the system less the TSNI rebate and the deposit that has already been paid. If the customer has selected the Solar Neighbourhoods loan option, they pay the Contractor the cost of the system less the TSNI rebate and loan amount (if there is a difference between the two).

Upon receipt of the properly completed project completion documents the program administrator may notify an independent inspector to carry out a system inspection (these will be carried out for the first three systems installed by each Contractor). The Inspector will verify correctness of the contractor completed **System Commissioning and Inspection Report** and submit a signed copy to the TSNI program administrator. If the system fails the inspection verification the contractor will have 30 days from time of notice to provide corrective action. This is outlined in section 5. If the completed System Commissioning and Inspection Report is not submitted within 30 days, the program administrator will contact the customer to help facilitate its completion.

Step 8 – Solar Neighbourhoods Rebate and Loan Payments

Upon receipt of the properly completed **System Commissioning and Inspection Report** and the **Customer Feedback Form** (Form F), and successful independent inspection when required, the program administrator will process the Solar Neighbourhoods rebate payment within 30 days. It is important to note that the rebate is paid to the contractor and not the customer. The TSNI administrator will notify the lending agency and they will release the remainder of the loan directly to the Contractor.

Step 9 – ecoENERGY “E” Assessment

Once the homeowner has completed all planned energy efficiency retrofits, the homeowner should contact the ecoENERGY assessor to schedule their E Audit in order to receive their incentives from the federal and provincial governments. All retrofits must take place within 18 months of the initial D audit in order to qualify.

Step 10 - Monitoring

The monitoring requirements for the system are outlined in section 4.3. A selected number of customers will have their SDHW systems advanced monitored by the TSNI program and they will have access to the results (either on a website or as a separate report).

Step 11 – Project Review and Evaluation

After one year the TSNI program administrator will contact the customer to complete either a telephone survey or a site inspection. If the customer has been selected for advanced monitoring they will have the option of purchasing the monitoring equipment or have it removed. All advanced monitored systems will have a site inspection at the end of the first year.

2.2 Project Steps with Contractor Involvement

Step 1 – Submit Contractor Participation Application and Product Participation Applications

Interested Contractors should submit the **Contractor Participation Application** (Form A) and **Product Participation Applications** (Form B) for each product they intend to install under the Solar Neighbourhoods program.

Step 2 – Attend Contractor Training Workshop

The Contractors are required to register for and attend a 1-day training workshop. The training workshop provides an overview of the TSNI Guidebook, forms, requirements and resources. The workshop also outlines the requirements and methodologies to be used for the RETScreen analysis, the shading analysis, siting requirements, inspection checklist and project metering, and the specific guidelines for metering equipment installation.

Contractors should designate a **Program Supervisor** to attend the workshop and serve as an interface with the TSNI Administrator. An installer who has completed CanSIA's Solar Hot Water System Installer (Level 1) certification program (a "**Certified Installer**") must supervise all TSNI-funded SDHW system installations, must carry out the system commissioning, and must sign the **Project Inspection Form**. These **Certified Installers** are required to attend the training workshop.

Step 3 – Customer contacts an Eligible Solar Contractor

Customers will contact **TSNI Participating Solar Contractors** to obtain quotes for a SDHW system after they have completed their home assessments. As part of the quote the contractor will supply to the customer a completed **RETScreen Analysis Report**, which will estimate the energy savings of the proposed system.

Step 4 – Customer Signs an Offer to Purchase

In this step the homeowner has accepted the quote from either an independently selected contractor or the buyer group's selected contractor. The contractor fills out a **Program Application Form**, which both the customer and contractor must sign. This form along with a completed RETScreen Simulation and Shade Analysis is then submitted to the program administrator who will review and approve the project for Solar Neighbourhoods support. Copies of the approval will be sent to both the contractor and customer within 30 days of submission of properly completed documents.

Step 5 – Project Approval and Deposit Payment

Upon approval of the Program Application by the program administrator, the Customer should pay the Contractor the agreed deposit amount. If the Customer has been approved for a Solar Neighbourhoods loan, the deposit amount (as listed on the **Program Application Form**) will be released from the lending agency directly to the Contractor. If the project is not approved by the program administrator, the Customer and Contractor will be notified, and the Customer will be released from their contract with the Contractor if they do not wish to carry out the installation without Solar Neighbourhoods incentives.

Step 6 – Installation

This step involves the system installation, the building permit inspection, the system commissioning and the first step of the Inspection Report. Installation should not begin before receipt of the notice of approval for TSNI funding. The installation must be completed within 90-days of the date of project approval. Prior to the installation of the SDHW system, the contractor must obtain the proper building/plumbing permits.

Step 7 – System Commissioning and Inspection

Upon satisfactory completion and commissioning of the installation and after the contractor has reviewed the operation and maintenance requirements with the customer, the contractor, with the assistance of the customer, will complete the **System Commissioning and Inspection Report** (Form E) and submit it along with a copy of the **building permit** to the program administrator. If the customer has selected the Solar Neighbourhoods rebate-only option, they pay the Contractor the cost of the system less the TSNI rebate and the deposit that has already been paid. If the customer has selected the Solar

Neighbourhoods loan option, they pay the Contractor the cost of the system less the TSNI rebate and loan amount (if there is a difference between the two).

Upon receipt of the properly completed project completion documents the program administrator may notify an independent inspector to carry out a system inspection (these will be carried out for the first three systems installed by each Contractor). The Inspector will verify correctness of the contractor completed **System Commissioning and Inspection Report** and submit a signed copy to the TSNI program administrator. If the system fails the inspection verification the contractor will have 30 days from time of notice to provide corrective action. This is outlined in section 5. If the completed System Commissioning and Inspection Report is not submitted within 30 days, the program administrator will contact the customer to help facilitate its completion.

Step 8 – Solar Neighbourhoods Rebate and Loan Payments

Upon receipt of the properly completed **System Commissioning and Inspection Report** and the **Customer Feedback Form** (Form F), and successful independent inspection when required, the program administrator will process the Solar Neighbourhoods rebate payment within 30 days. It is important to note that the rebate is paid to the contractor and not the customer. The TSNI administrator will notify the lending agency and they will release the remainder of the loan directly to the Contractor.

2.3 Loan Incentive Option Process

If approved for the TSNI loan incentive option, the customer will be granted an interest-free loan. No interest shall be paid on the loan except if the Customer is in default as defined in the loan agreement. If this is the case, the customer will be required to pay interest on the outstanding balance of the loan. The TSNI loan option will be administered by TSNI's Lending Partner. The loan will be paid directly from the Lending Partner to the Contractor in two payments: a deposit after the SDHW project has been approved, and the remainder of the loan amount after the system has been commissioned and passed inspection. Details of the loan option procedures are outlined as follows:

TSNI Loan application: Once a TSNI eligible homeowner has selected a Contractor and SDHW system, the Contractor and homeowner sign an installation contract and fill out the **Solar Neighbourhoods Program Application**, and submit a copy to the TSNI administrator. This application indicates whether the homeowner has selected the Rebate or Loan Option, and the price of the SDHW system. The homeowner then applies for a TSNI loan online (if they do not have access to the internet, borrower may apply in person at the TSNI office and TSNI personnel will assist them with the application). The homeowner and program administrator will be notified of loan approval within 48 hours. If the loan and/or project are not approved, the Borrower may be released from their SDHW installation contract with no penalties if they do not wish to go forward with the project without TSNI incentives.

Loan terms and requirements: The maximum loan amount allowed is \$10,000 or the total system price minus the \$500 TSNI rebate, whichever is less. The term of the loan is anywhere from 6 months to 10 years. Repayment is calculated simply as amount borrowed divided by length of loan term. (Example: Borrowed = \$3,000, Loan term = 5 years; Monthly payment = $\$3,000 / (5 \times 12) = \$50/\text{month}$). The borrower may pay the loan in full early or make extra payments at any time without penalty.

The homeowner must have a minimum "Beacon Score" [to be determined by the Lending Partner] to be approved for a TSNI loan. Borrowers must confirm ownership of the home by declaration included in loan application and agreement. The Lending Partner will search property titles to confirm ownership before loan is approved.

Pre-authorized direct payment (PAP) from the borrower's bank account must be signed at the time of loan application. Signed borrowing documentation is delivered to local TSNI office (138 Hamilton St., Toronto, ON M4M2E1). Proof of ID must be provided at signing of loan documentation as per government regulations and verified as to application information by TSNI office personnel.

Loan Payout: Upon loan and project approval, Lending Partner advances deposit (up to 30% of total system cost) to the Contractor. The Contractor applies for a building permit, completes installation, and

commissions the system. Contractor and homeowner then sign **System Commissioning and Inspection Report** and return it to the TSNi administrator. The program administrator confirms that all relevant paper work is in place and advises Lending Partner weekly of approved advances and names of borrowers and Contractors. Upon confirmation from TSNi of successful system installation and inspection, the remainder of loan funds are released to the Contractor by the Lending Partner. At the same time, the program administrator releases the TSNi rebate of \$500 to the Contractor.

3 Project Eligibility Criteria and Requirements

The information outlined in this section defines the requirements and obligations of various program stakeholders for the implementation of projects under the TSNi program.

3.1 Customer Requirements

1. The customer must be the owner of the property upon which the SDHW systems will be installed. Acceptable documents showing proof of ownership include: property tax bill in the name of the owner, deed or any other satisfactory evidence of ownership.
2. The program is to support the use of single family residential solar hot water systems. This would include projects on detached, semi-detached and row houses and low-rise residential buildings of three storeys or less (with a footprint of less than 600 square metres). Potential projects that do not fit this residential definition can request a review.
3. The systems will be installed on homes in Ward 30 with boundaries outlined in section 1.8. While the first phase of this program is designed for this one neighbourhood it is the intent to expand the program to other Toronto neighbourhoods as the program evolves in phase II and III. Potential customers from other areas of Toronto who are interested in participating may contact the TSNi program administration to be placed on a mailing list for notification of program expansion.
4. The customer has read and agreed to the terms of the Program Application Form.
5. The customer agrees that the TSNi administrator may include a description of the project, including services provided, project costs and energy savings, in reports, studies, and other documentation required in the course of the program.
6. TSNi may request access to the property in order to: (i) inspect and review the SDHW system during and after completion; (ii) evaluate the operation of the system; (iii) install meters to monitor energy savings and to read such meters; (iv) check on the operation of the meters; (v) remove the meters.
7. The customer indicates a willingness to work with TSNi to promote the program through media releases and other marketing materials made available to the public.
8. The customer consents to being surveyed by the TSNi administration and complete a **System Performance Report** after one year of operation.
9. The customer, by accepting the contractors purchase offer, agrees to sign the **Project Inspection Form** and complete the **Purchase Feedback Form** upon the successful commissioning of the SDHW system.
10. This program is designed for retrofit applications however new construction will be considered on a case-by-case basis.

3.2 Solar Contractor Requirements

3.2.1 Inclusion on the List of Eligible Solar Contractors

To participate in the TSNI program, eligible solar contractors must qualify and be listed with the TSNI administrator. Contractors must submit the **Solar Contractor Participation Application** (Form A) and **Product Participation Application** (Form B), along with product, insurance and warranty documentation. The Contractor shall maintain insurance and provide evidence of current coverage showing TAF as an additional insured. To remain eligible, a company must resubmit this information annually by January 31. This annual submittal is required even if the information identified in the company's prior submittal has not changed. In addition, a company must submit updated information any time its reported information has changed. The updated information must be submitted to the TSNI administrator within 30 days of the change of any reported information.

Contractors are required to register for and attend a 1-day training workshop. The training workshop provides an overview of the TSNI Guidebook, forms, requirements and resources. The workshop also outlines the requirements and methodologies to be used for the RETScreen analysis, the shading analysis, siting requirements, inspection checklist and project metering, water efficiency, and the specific guidelines for metering equipment installation for each type of SDHW system.

Contractors should designate a **Program Supervisor** to attend the workshop and serve as an interface with the TSNI Administrator. An installer who has completed CanSIA's Solar Hot Water System Installer (Level 1) certification program (a "**Certified Installer**") must supervise all TSNI-funded SDHW system installations, must carry out the system commissioning, and must sign the **Project Inspection Form**. These **Certified Installers** are required to attend the training workshop. Prior registration is required, and the training is free of charge.

TSNI Eligible Solar Contractors will be listed on the TSNI website.

3.2.2 General Solar Contractor Requirements

Detailed requirements and documentation are outlined in the **Contractor Participation Application** (Form A).

1. The contractor shall have all necessary licences to operate a business in Toronto.
2. The SDHW systems that the contractor markets to customers in the TSNI program must be outlined in the **Product Participation Application** (Form B). The contractor will only market SDHW systems that meet the requirements set forth in section 4.1 to TSNI customers.
3. The contractor will obtain all necessary local building/plumbing permits prior to initiating the installation of the system.
4. The contractor will ensure that all installations conform to **CAN/CSA F-383: Installation Code for Solar Domestic Hot Water Systems**.
5. Upon commissioning of the system, the contractor will ensure that the customer is familiar with the operation and maintenance of the installed SDHW systems.
6. The contractor will provide the customer with a system operation and maintenance manual and ensure that the customer is adequately knowledgeable in the monitoring and maintenance requirements.
7. The contractor will provide the customer with written warranties as outlined in section 4.2.

8. The contractor must assist in scheduling inspections and TSNI administrator (or its representative) site visits such that either the contractor and/or the customer is present during the site visits.

9. The contractor shall be responsible for installing program monitoring equipment on the customer's SDHW system as outlined in section 4.3. If the system has been selected for advanced monitoring then the additional costs are covered by the TSNI administration and not the customer.

10. Contractors must be current corporate members in good standing in the Canadian Solar Industries Association (CanSIA). This requirement reduces the risk of project problems as the contractor must abide by CanSIA's Code of Ethics and the association provides peer enforcement measures to deal with unethical behaviour.

11. Without limiting any liabilities or obligations of the contractor, the contractor shall obtain and keep in effect during the term of its participation in the program the following minimum insurance coverage:

- Workplace Safety and Insurance Board worker insurance
- Commercial General Liability Insurance of not less than \$2,000,000 per occurrence

Contractor must have its insurer provide TAF with an insurance certificate prior to the commencement of the work to ensure that the above-stipulated coverage is in effect and showing TAF as an additional insured.

12. The contractor shall employ at least one **Certified Canadian Solar Hot Water System Installer (Level 1)**. CanSIA offers the Canadian Solar Hot Water System Installer Certification Program, information on the program is available here - <http://www.cansia.ca/certification.asp>. A certified installer must act as the project supervisor for all SDHW systems projects and must carry out the system commissioning and sign the **System Commissioning and Inspection Form**.

3.3 Solar Home Site Assessment

Need for an Independent Energy Assessor/Inspector

Experience in other jurisdictions, particularly in Europe, has shown that early successes in residential solar domestic hot water (SDHW) deployment are dependent on a number of key factors including:

- Proper evaluation of the potential for effective solar energy generation at a proposed site;
- Integration into a larger effort to ensure that the house is maximizing a full range of its energy and water efficiency opportunities;
- Independent verification that the installed SDHW system is properly installed and operating according to original projections.

The program administration will partner with one home energy audit firm to deliver the following:

1a. EcoENERGY Home Assessment – With the exception of those clients who have already undergone a home audit, an ecoENERGY Home “D” Assessment will be required for participants of the TSNI program, to promote overall home energy efficiency action. The assessment would also allow the homeowner to qualify for \$1,000 of funding from the federal and Ontario governments, as well as additional financial incentives associated with the TSNI program.

Given that we are hoping to achieve approximately 100 solar installations, it is estimated that a minimum of 200 ecoENERGY Home “D” Assessments will be required in the period of June-October 2008.

1b. Solar Hot Water Site Assessment – This, in most cases, will be done in conjunction with an ecoENERGY Retrofit-Home Program assessment performed by TSNI's Assessor. See Form H for a copy of the **Solar Hot Water Site Assessment Form**. This will provide the potential customer with an evaluation of their home's potential to use SDHW, an estimate of the savings from a system (using RETScreen or a similar simulation program), and opportunities to reduce their hot water consumption. The Assessor would also explain the TSNI program and various funding opportunities available for the

installation of a SDHW system. For customers that have previously completed an EcoENERGY “D” audit (or previously received a grant) the solar home audit will be offered independently and would be necessary for participation in the TSNI incentive program.

2. Solar Inspection – Upon completion of the solar system installation by an authorized solar contractor the program administrator will contact the program’s home energy assessment firm or the **Solar Project Inspector** to carry out the Solar Inspection. This may be carried out independently of the ecoENERGY “E” Assessment to allow for the completion of other improvements that qualify for the ecoENERGY grant, and to expedite the TSNI incentive program. The Solar Inspection will be done on the first 3 systems for each solar contractor. If the contractor has successfully passed at all 3 inspections then the contractor’s future projects will only be spot-checked.

As such we estimate that a minimum of 30 to 40 Solar Inspections and 100 EcoENERGY “E” Audits will be required.

3. Summary and analysis – Summary and analysis of all home energy efficiency actions undertaken by TSNI participants, including information on expenditures and incentives received by the group as a whole.

We assume that not all household energy efficiency actions will be completed by the end of the TSNI delivery period, and as such we would require an interim report in the fall of 2008 followed by a final report in fall of 2009.

Required Qualifications of the Solar Home Assessor/Inspector

The energy assessment firm shall:

Be licensed by Natural Resources Canada to deliver the EcoENERGY Retrofit – Homes energy evaluation service in central Toronto;

- Have capacity to deliver 200 EcoENERGY “D” Assessments and 100 Solar Assessments during the TSNI delivery period (June to September 2008) as well as 30 to 40 solar inspections and 100 EcoENERGY “E” assessments.
- Has shown knowledge of solar thermal technologies and deployment issues in Canada;
- Has shown proficiency in carrying out solar site assessments or is willing to make auditing staff available for training in this area;
- Is proficient in RETScreen or other similar solar thermal energy modelling software.
- Demonstrate an excellent customer service record.
- Be able to collect, aggregate and analyze data on the actions taken by a specific group of clients.

Completion of CanSIA’s Canadian Solar Hot Water System Installer Program or similar programs (such as offered by NABCEP) would be considered an asset.

The energy assessment firm is required to send their home inspectors (who will carry out the services) to a one-day workshop developed by the program administration on solar audit and inspection procedures and issues.

4 Equipment & Site Eligibility Requirements

4.1 Eligible Product Requirements

Specifications of products Contractors wish to include under TSNI must be detailed in the **Product Participation Application** (Form B). One **Product Participation Application** must be submitted for each SDHW system type that the contractor plans to market in the program.

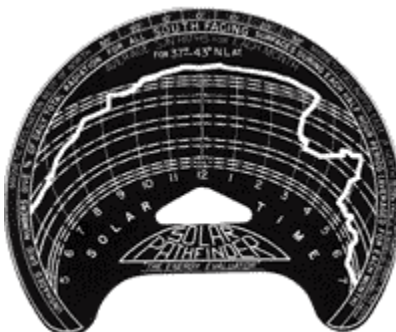
All eligible SDHW systems will receive a \$1,000 rebate or a \$500 rebate with no-interest financing for the remainder of system costs, depending on which option the homeowner selects.

The following criteria outline specific requirements of the solar equipment.

1. In all cases, systems must be installed in conformance with the manufacturers' specifications and with all applicable electrical, plumbing and building codes and standards.
2. All system components (collectors, piping, valves, tanks, pumps, insulation and controllers) must be new and must not have been previously placed in service in any other location or for any other application. Rebuilt, refurbished, or relocated equipment are not eligible to receive TSNI incentives.
3. Solar collectors must conform to **CAN/CSA F378 - Solar Collectors**. Collectors must be listed in:
 - a. **The Canadian Directory of Solar Water Heating Products** (<http://www.cansia.ca/CanadianDirectoryOfSolarHotWaterProducts.asp>)
 - or
 - b. **The NRCan List of Acceptable Collectors** (<http://ecoaction.gc.ca/ecoenergy-ecoenergie/heat-chauffage/collectors-capteurs-eng.cfm>)
4. The SDHW system must either be:
 - a. Certified to **CAN/CSA F379.1 – Packaged Solar Domestic Hot Water Systems**;
 - or
 - b. Designed by a professional engineer with an engineer's stamp on the drawings. The TSNI program will provide assistance to contractors to have one standard system obtain an engineering approved set of drawings and appropriate documentation which is acceptable to Toronto Building.
5. All installed systems must meet freeze protection requirements set forth in CAN/CSA F379.1. Freeze protection must not be done by using electric resistance heaters.
6. Contractors are responsible for ensuring they use only make, model and size components listed in the Product Participation Application. Failure to do so will be considered a Fatal Violation as outlined in section 6.

4.2 Site Eligibility and Requirements

1. All sites must undergo a RETScreen Feasibility Analysis undertaken by the contractor. The hot water energy load and solar collector data to be used will be found in the document **Input Data for RETScreen Simulation** (Form K) on the TSNI website.
2. Contractors are required to use a Pathfinder, Solmetric SunEye, or similar device to determine shading at the site. A computer analysis is recommended. The shade profile (from bottom, centre of array) must be submitted with the **Program Application Form**.



An example of a site solar shade profile.

3. All systems must meet a calculated minimum Solar Fraction of 40% of the annual load (if year around) and 80% if seasonal as calculated in the RETScreen Analysis with daily solar radiation data adjusted to account for shade profile for the proposed installation site.

4.3 Warranty Requirements

1. All systems must have a minimum warranty of the following:

- Solar collectors: 10-year manufacturer's warranty
- Tanks: 5 years
- Balance of system components: 1 year
- Installation labour and workmanship: 1 year

2. Standard warranty information must be submitted with the Contractor and Product Participation Application forms.

3. Warranty documents must state the warranty coverage period and type (i.e. pro-rated), a clear description of item covered by warranty, who the warranty is with and the warranty approval process. Warranty information will also be required for each submitted **Program Application**.

4.4 Metering Requirements

The TSNI has two levels of operation and performance monitoring. Basic monitoring is required for all SDHW systems and its cost is to be included into the system price offered under the program. Advanced monitoring is an extended monitoring program for selected systems and the cost is covered by the TSNI.

4.4.1 Basic Metering

The following is required on all SDHW systems:

1. Pump run time meter (for all systems that use a pump to circulate heat transfer fluid through the solar collectors)

- The pump run time is to be in hours and shall not be resettable.
- This shall be used to compare operating hours with other systems installed in the program.

2. Pipe thermometer on the solar return line

- This shall be a surface mount (with insulation) or probe type thermometer (digital or analog read out) to read the actual temperature of the heat transfer fluid
- This shall be used to confirm operation of the system.

3. Solar tank thermometer

- This shall be a probe type thermometer (digital or analog read out) to read the actual temperature of the potable water in the solar storage tank
- If the system is seasonal (i.e. tank is on the roof) then the thermometer must have a remote readout accessible in the living space of the homeowner.
- This shall be used to confirm operation of the system.

The cost of this equipment shall be included in the system price offered to customers in the TSNI program.

All solar contractors are encouraged to promote the use thermal energy (or heat) meters on the potable water line so that the homeowner has increased awareness of the savings achieved using the system.

At the end of one year of operation the customer is required to complete a **System Performance Report** (see Form J) and submit to TSNI.

4.4.2 Advanced Monitoring

At least three systems installed by each contractor will be advanced monitored. Systems will be selected for advanced monitoring based on location, site and customer profile and type of SDHW system to ensure data is collected from a diverse population of systems. The monitoring plan is designed to promote quality control by ensuring that installations of each participating contractor are included. As part of the monitoring strategy, TSNI will implement metering protocols that will capture the necessary information for calculating actual energy savings for each of the main SWH system typologies available in the program.

Performance monitoring is required to fulfill a basic requirement of the Phase I of the TSNI: to ensure that the installed systems perform according to expectations and provide the estimated savings.

Metering and monitoring equipment will include the following:

1. Data logger/Communications module
2. Flow meter at the cold water supply
3. Temperature sensors at the cold water supply, solar storage outlet, and hot water draw
4. Pump run time meter

The TSNI Program will cover the cost of the metering equipment for advanced monitoring.

The contractor and customer will be notified in the approved **Program Application Form** if the system will be advanced monitored.

The installation of the data acquisition hardware and sensors will be done by either an independent third party or TSNI program staff.

Advanced monitoring will be carried out for one year. At the end of the monitoring period the customer will have the option to purchase the monitoring equipment or TSNI program staff will remove the equipment.

TSNI administrator will perform an RFP or RFQ for Metering Hardware and System Performance Data Acquisition Services in a time frame to allow metering equipment (i.e. in-line flow meters and other required sensors) to be installed within a reasonable time after program rollout. TSNI administration will coordinate installation of metering equipment with the contractor and customer.

5 Project Inspection

The inspector will complete the **Project Inspection Report** (see Form E) during the inspection site visit and provide a copy of this Report to the contractor and customer at the completion. It is recommended that the contractor's certified solar installer be present when the inspection occurs (but this is not mandatory). The completed **Project Inspection Report** will serve as notification of the project's compliance to program requirements.

If there is a project deficiency or project or program violation then the **Project Deficiencies** section of the **Project Inspection Report** will be completed. If the contractor is not present at the site during the inspection the completed report will be sent to the contractor within 7-days. If there has been a violation, the contractor will take the corrective action and arrange for an additional inspection to occur within 30 days of receipt of a notice of deficiency.

If the contractor does not make the corrections and does not obtain subsequent approval from the Inspector within 30 days, then this will be deemed a breach of the contractor's obligations under the program guidelines. Additional inspection costs (beyond the 2nd visit) will be the responsibility of the contractor and will be deducted from future program payments.

TSNI Administration will inspect a minimum of 3 installations per contractor. The inspection report is a quality assurance measure designed to guarantee that systems are installed and functioning properly prior to rebate payment.

6 Contractor Project Violations

Failure to comply with program requirements may result in contractor expulsion from the program. Violation notices will be issued for fraud, gross oversizing, and unresolved system operational problems, including failure to resolve project deficiency notices in failed Inspection Reports and continued and/or repeated customer complaints.

Systems that fail inspections will be given 30 days to make corrections to bring the system in compliance with program requirements. If corrections are not made within 30 days, a violation will be issued to the Contractor.

Contractors will be removed from the Eligible Contractor List and will be ineligible for further participation in the TSNI program if they violate criteria identified below. There are two levels of violations: fatal and non-fatal.

6.1 Project Fatal Violations

Fatal violations will result in immediate termination of the contractor as an eligible program contractor and removal from the eligible contractor list.

1. Failure to use SDHW systems approved by the TSNI administration.
2. Failure to use at least one certified SDHW Installer per installation.
3. Misrepresentation of system performance, operational characteristics, purposefully improper completion of shade analysis or RETScreen Analysis
4. More than two non-fatal violations in six consecutive months
5. Failure to fix any non-fatal violations within 30 days.
6. Misrepresentations or incorrect information supplied on the **Contractor Participation Application** or **Product Participation Application**.
7. Failure to obtain a Building Plumbing Permit for an installation.

6.2 Project Non-Fatal Violations

The following will be considered Non-Fatal Project Violations, which will result in notification of the contractor of the violation and requires corrective action within 30 days. Any non-fatal project violation that is not fixed within 30 days will be considered a fatal violation. The 30-day corrective action period may be extended if the contractor provides reasonable reason.

1. Warranty work not completed within 30 days
2. Written customer complaint regarding the contractor's work.
3. Misrepresentation or incorrect information on the **Program Application Form** or the **System Commissioning and Inspection Report**
4. A **Project Deficiency Notice** on the **System Commissioning and Inspection Report**.

6.3 Contractor Performance Review

The TSNI administrator will convene a Contractor Performance Review meeting with a contractor that has been charged with a Fatal Violation. The meeting will outline the reasons that the contractor has been charged with a Fatal Violation. The contractor will have 15 days to respond to the charges. The TSNI administrator will notify the contractor within 30 days of the performance review decision. All decisions by the TSNI administrator will be considered final.

7 Definitions and Acronyms

Certified SDHW Installer - Also referred to as the “installer.” A CanSIA certified SDHW installer employed by a TSNI participating Contractor.

Community Solar Buyers Group – A not-for-profit community group established to bring together local residents interested in researching and purchasing solar photovoltaic and/or SDHW systems as a group.

Contractor – A SDHW Contractor who sells and installs SDHW.

Customer – A TSNI participant who purchases a SDHW system through a TSNI eligible Contractor.

EcoENERGY – A federal program run by Natural Resources Canada to promote energy efficiency in buildings through home energy assessments and financial incentives.

EcoENERGY Assessor – A home energy assessor who is qualified to perform ecoENERGY “D” and “E” assessments, and claim for federal rebates for energy efficiency retrofits on the homeowner’s behalf.

EEO – City of Toronto Energy Efficiency Office

Eligible Solar Contractor – Also referred to as a “TSNI Participating Contractor.” A contractor that has applied for and been approved for participation in the TSNI.

NRCan – Natural Resources Canada.

Program Supervisor – The employee whom the contractor has identified in the *Contractor Participation Application* as the primary contact for the TSNI program; the person who signs off on the Inspection Report on behalf of the contractor.

Project – A SDHW installation undertaken by a TSNI participant.

RETScreen – A renewable energy modelling and analysis software package from NRCan.

RISE Again – A community solar buyers group operating in Riverdale.

SDHW – Solar domestic hot water.

Solar Fraction (SF) – The fraction of a home’s hot water energy demand met with solar heating.

Solar Neighbourhoods – Marketing name for TSNI.

Solar Project Inspector – An independent inspector hired by TSNI who will verify proper system installation.

TAF – Toronto Atmospheric Fund.

TSNI – Toronto Solar Neighbourhoods Initiative.

TSNI Administrator – or administration – name of the program delivery agent.

8 Program Forms

The following program forms are available online and from the Solar Neighbourhoods office.

Form A: Contractor Participation Application

Form B: Product Participation Application

Form C: Contractor Participation Agreement

Form D: Program Application Form

Form E: System Commissioning and Inspection Report

Form F: Customer Feedback Form

Form H: Solar & Hot Water Site Assessment Form

Form J: System Performance Report

Form K: Input Data for RETScreen Simulation