



## Conservation Fund Project Overview Application

### Instructions

1. Review all eligibility criteria to confirm that you and your project are eligible for Conservation Fund support. Eligibility criteria is available on the Conservation Fund's website at: [powerauthority.on.ca/cfund](http://powerauthority.on.ca/cfund)
2. If you have questions regarding this application, you may reach the Ontario Power Authority by calling 416-969-6265 or by emailing [cfundinquiries@powerauthority.on.ca](mailto:cfundinquiries@powerauthority.on.ca).
3. All fields must be completed. Incomplete submissions will not be considered.
4. All answers, rationale and substantiation must be provided in this document in the space provided. Do not provide attachments, links or other references as these will not be considered in the review of your application.
5. Attach this completed document, in Word format (no PDFs) to an email and submit to: [cfundapplications@powerauthority.on.ca](mailto:cfundapplications@powerauthority.on.ca)
6. Within one week of submission, you will receive a response from the Conservation Fund confirming that your application was received, providing further information regarding the timeline for review.

### A. Key Information

<b>Project title:</b>	<b>Solar-Powered Roof Vent ("SPRV") Demonstration Project</b>
<b>Organization:</b>	<b>International Solar Solutions Inc.</b>
<b>Contact name:</b>	<b>Alec Young</b>
<b>Contact title:</b>	<b>Chief Financial Officer</b>
<b>Mailing address:</b>	<b>1348 Melwood Dr., Alvinston ON, N0N 1A0</b>
<b>Phone:</b>	██████████
<b>Email:</b>	<b>Ayoung49@isolarsolutions.ca</b>
<b>Submission date:</b>	<b>Thursday, March 29, 2012</b>

#### Disclaimer

Receipt of an application to the Conservation Fund does not constitute a commitment by the Ontario Power Authority to support the application, nor does it create a business relationship between the applicant, its partners and the Ontario Power Authority. The approval of the Ontario Power Authority's Grant Award Committee is required for the Conservation Fund to provide any financial support to any project, and the Ontario Power Authority will not provide financial support for the work of applicants performed prior to the Grant Award Committee's approval of that project. The decision of the Grant Award Committee is final and takes precedent over prior communications. Financial support from the Ontario Power Authority to an applicant to the Conservation Fund will only be provided upon execution of the contribution agreement between the applicant and the Ontario Power Authority, and only according to the terms and conditions therein. The Ontario Power Authority reserves the right to make public the names of applicants, the title and a description of their proposed project, the amount of funds applied for. All other information submitted by the applicant in their proposal application will be treated as confidential. Members of the Grant Award Committee, Business and Technical Review Committee may be Ontario Power Authority staff or external experts.

## B. Project Overview

### Conservation Category

<input checked="" type="checkbox"/> Energy efficiency	<input checked="" type="checkbox"/> Load reduction
<input type="checkbox"/> Demand response	<input type="checkbox"/> Load displacement
<input type="checkbox"/> Conservation behaviour	

### Target Market(s)

<input checked="" type="checkbox"/> Existing Homes	<input type="checkbox"/> Institutional
<input checked="" type="checkbox"/> New Homes	<input type="checkbox"/> Industrial
<input checked="" type="checkbox"/> Multi-family	<input type="checkbox"/> Agricultural
<input checked="" type="checkbox"/> Single-family	<input type="checkbox"/> Commercial
<input type="checkbox"/> Small Commercial	

### Project Type

<input type="checkbox"/> Program	<input type="checkbox"/> Strategic research
<input type="checkbox"/> Tool	<input checked="" type="checkbox"/> Emerging technology demonstration
<input type="checkbox"/> Training program	<input type="checkbox"/> Emerging technology development
<input type="checkbox"/> Community of practice	<input type="checkbox"/> Strategic opportunity

**Expected Project Duration:** 6 to 9 Months

**Contribution and Leverage:** Differentiate between cash and in-kind support to the proposed project. Please indicate if the funding is confirmed. "OPA Contribution" represents your cash request to the OPA. This request should not violate the leverage rules of the specific project category.

	Cash (\$)	Cash (% of total project value)	In-kind (\$)	In-kind (% of total project value)
International Solar Solutions Inc.	\$120,000	13%	\$15,000	2%
PowerStream Inc.	\$96,500	11%	\$25,000	3%
COLLUS Power	\$117,520	13%	\$40,000	4%
Green Leaf Distribution	\$90,000	10%	\$54,000	6%
Georgian College	\$1,000	0%	\$8,500	1%
Subtotal (non-OPA contribution)	\$425,020	46%	\$142,500	16%
OPA contribution	\$350,000	38%	N/A	N/A
Totals	\$775,520	84%	\$142,500	16%
Total project value (all cash costs + in kind)	\$917,520			

### C. About the applying organization

Describe the mandate and composition of the applying organization. Provide:

- a very brief history of the organization;
  - a description of your primary activities;
  - a description of how the organization is funded and staffed;
  - a description of your role in the sector.
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- International Solar Solutions Inc. (“ISSI”) is a wholly-owned Canadian company that was incorporated in June of 2011 and is headquartered in Alvinston, Ontario. The company’s Solar-Powered Roof Vent was created and patent pending by Tom Bushey (Chatham-Kent) in response to the overwhelming heat experienced in attics while performing home security installations.
  - ISSI’s primary activities involve product development, manufacturing and wholesaling
  - ISSI is funded through private equity investment and is staffed by a founding team, which is comprised of Tom Bushey (President & CEO / Product Inventor); Peter Budd (Chief Operating Officer); and Alec Young (Chief Financial Officer).
  - ISSI’s role in the sector is to develop and manufacture conservation measures that may be utilized by both customers (rate-payers) and Local Distribution Companies (“LDCs”) to achieve personal and utility/corporate conservation goals, respectively.

### 1. PROJECT CONCEPT AND RATIONALE

A. In one sentence, state the ultimate goal of this project. How will the conservation landscape in Ontario be improved as a result of this project?

The goal of the SPRV Demonstration Project is to establish the energy and demand savings potential for solar-powered roof vents, as well as to investigate potential conservation opportunities and barriers for this technology; the dual objectives ultimately being to (a) lower provincial power demand on-peak and (b) save customers money on their electricity bills.

**B. Discuss in detail the specific electricity conservation opportunity or barrier in Ontario that this project addresses (e.g. technical challenge, skills gap, etc.).**

- There are approximately 3.6 million single, double and row-style houses in Ontario; approximately 2.8 million households have central air conditioning (Source: Natural Resources Canada, "Survey of Household Energy Use 2007")
- Central air conditioner ("CAC") use represents approximately 29% of peak electricity demand by residential customers and an average of 1,000 kWh of annual consumption. Assuming CAC use of 900 hours per year, this represents 1.1 kW of peak demand per home (Source: OPA)
- SPRVs are devices used to vent attic spaces based on the hot temperatures in the attic
- The reduction in temperature in the attic space in turn reduces the requirement for CAC operation
- The product itself is relatively simple:
  - A solar panel is connected to a small DC motor and 5-blade fan
  - Each SPRV is capable of ventilating 1,000 sq. foot of attic area, so a typical home would require 2 or 3 devices
- Key variables impacting on the extent to which CAC operation may be reduced by the use of SPRVs would include:
  - Ambient temperature
  - Attic space temperature, in turn directly related to the ventilation and insulation of the attic
- SPRVs have been available in North America for at least 20 years. While there are no sales statistics available for this type of product, information found on the internet suggests that SPRVs have been installed in only a very small percentage of single-family homes. It is not clear what sales/marketing approaches (i.e., to roofing suppliers, roofing contractors, consumers, etc.) may be most effective to promote SPRVs as an energy-savings device.
- Similarly the data available with respect to the potential for energy and demand savings for SPRVs is extremely limited
  - A Florida Study (FSEC-GP-171-00, 1997) estimates the energy savings at 6% of annual electricity consumption, although this study was restricted to only one home
  - 2.8kWh in daily savings as noted in Florida based study
  - A more recent, limited test conducted by an Ontario LDC comparing two similar CAC-cooled homes found potential savings of 29 kWh per month (2.8 kWh/day x 30 days = 84 kWh) for a house equipped with SPRVs in comparison to traditional passive vents
  - Conservative estimates as to the potential savings per installation are;
    - 75 – 125 kWh in annual energy savings, which compares favourably to a Tier 1 CAC in the OPA-funded "Heating & Cooling Incentive" initiative (at 155 kWh gross/118 kWh net annual energy savings)
    - 0.10 – 0.15 kW in demand savings; 4 or 5 homes equipped with 2 or 3 SPRVs would contribute similar demand savings to a home participating in the OPA-funded "**peaksaver** Plus" initiative (at approximately 0.6 kW gross demand savings per load control device installed)

**C. How will your project's activities and outputs address the electricity conservation opportunity or barrier outlined above? What solution is this project designed to develop?**

- The SPRV Demonstration Project will address the following:
  - Obtain reliable estimates of the potential for energy and demand savings for SPRVs installed in CAC-equipped homes based on independent testing, and as well based on an analysis of consumption data for existing installations (PowerStream, COLLUS Power and other Ontario LDCs have supported the installation of SPRVs in approximately 500 homes since Q4 2011)
  - Address conservation opportunities and barriers in *retrofit* homes for a variety of sales/marketing approaches
  - Address conservation opportunities and barriers in *new* homes



- The outcome of the Project would be the development of a business case and go-to-market strategy supporting the inclusion of SPRVs in existing and future Residential CDM Programs

**D. What is innovative about your approach and how does your project represent an advance in the state of the art? Also explain how your project compares to other initiatives/ technologies already deployed/piloted in Ontario and elsewhere.**

- What is innovative about the product is that it is a retrofit unit for existing passive vents installed on the roof of a house, meaning costly and inconvenient measures that may be attributed to other similar products (cutting new roof holes, oversized/overweighted product, etc.) are avoided.
- Current OPA-funded residential/consumer CDM programs or initiatives focusing on space cooling include:
  - "Heating & Cooling Incentive", with rebates of up to \$400 for energy-efficient CACs
  - "**peaksaver** Plus", offering free load control devices (programmable thermostats and switches) as well as in-home displays to affect CAC usage
  - Residential New Construction, Low Income Program in more limited ways
- SPRVs could be accommodated within any or all of these CDM programs or initiatives
- As noted in Section 1B, the potential energy savings from SPRVs may be roughly comparable to that of a Tier 1 CAC in the OPA-funded "Heating & Cooling Incentive" initiative
  - Savings achieved for an SPRV could be comparable to that of an energy-efficient CAC, at substantially less cost to the consumer (the cost to purchase and install an SPRV can be as low as approximately \$300 per unit)
- In comparison to the load control devices used in the OPA-funded "**peaksaver** Plus" initiative, load control is achieved at all times, as the SPRV is always "ON" and working to reduce attic air temperature
- As with other energy-efficient technologies that are new or not widely used, it may be necessary to offer rebates or incentives for the purchase of this product in order to achieve market acceptance
  - Consumer rebates ranging from \$25 to \$200 for this product are currently available in at least 6 states in the US, including California and Texas

## 2. PROJECT PLAN

**A. In no more than ten sentences, outline the project plan.**

The foremost objective is to establish a detailed research path (proposals under review) that will deliver measured and verified temperature and energy consumption reductions data. This data can then be used to develop a hypothesis of the energy savings realized in both micro and macro market adoption. Upon development of the hypothesis, consumption data from LDC installations in 2011 will be made available and analyzed to determine upper and lower margins and degrees of certainty.

In parallel, research will be conducted for to determine the most effective means of introducing the product to

- consumer markets;
- home improvement chains (retail markets);
- roofing contractors (supply chain markets);
- And new home builders.

In addition to verified effect on energy consumption and strategic market analysis, we seek to determine how to make a more robust and efficient product design, that addresses any technical or esthetic limitations identified throughout the studies.

**B. Describe each of the major task areas for this project (e.g. program design, development of training, measurement and verification, research, communications, knowledge transfer, etc.).**

SPRV Testing

- SPRVs will be installed in a home and performance parameters will be compared to a similar home equipped only with passive attic vents
  - Attic temperature
  - Attic humidity
  - CAC electricity consumption (metered separately)
- Testing will also address the impact of the amount of attic insulation in these homes

Data Analysis

- Consumption data pre and post installation will be analyzed, to support the controlled testing described above

Market Research – Consumer/Retail

- Interviews and surveys will address items such as:
  - Annual sales potential
  - The attractiveness of energy conservation as a product benefit
  - The attractiveness of other/secondary product benefits (eg: reduction of temperature in attic space will directly increase shingle life; in winter, greater air circulation will reduce moisture accumulation and mould growth)
  - The potential need for product rebates/incentives in relation to purchase/installation cost

Market Research – Roofing Contractor

- Interviews and surveys will address items such as:
  - Annual sales potential
  - Key product features/attributes (e.g., warranty might be important here as related to the warranty offered on the installation)
  - The challenges in selling energy conservation as a benefit
  - The potential need for product rebates/incentives in relation to selling price

Market Research – New Home Builders

- Interviews and surveys will address items such as:
  - The attractiveness of this product to achieve energy efficiency standards
  - The potential need for product rebates/incentives in relation to purchase/installation cost

**C. Describe each of the major deliverables that will be provided to the OPA as part of this project.**

- Validated estimates of the energy and demand savings offered by SPRVs
- An understanding of opportunities and barriers to conservation via different sales/marketing approaches
- A perspective on possible rebates or incentives that may be required to support SPRVs in the marketplace

### 3. PROJECT TEAM & PARTNERS

A. In this section, please outline the composition of the project team and list any project partners. Discuss the role that each person and organization participating in the project will play. Include the applicant organization in this table. If a 3<sup>rd</sup> party is not yet part of the team, please identify the accountability they will be responsible for and enter TBD for the name and organization.

PROJECT TEAM		
Project team member	Organization and job title	Major accountability
Alec Young	ISSI – CFO	Research and Proposal Development
Tom Bushey	ISSI - CEO	Research and Product Innovation
Peter Budd	ISSI - COO	Research and Proposal Development
Paul Bonwick	Green Leaf Distribution - Proprietor	Research and Proposal Development
Ryan Manchee	Green Leaf Distribution – Business Development	Research Lead/Proposal Development and market identification
Abby Stec	Green Leaf Distribution – Managing Director	Research and strategic market identification
Ed Houghton	COLLUS Power – President and CEO	Promotions partner
Bill Wylie	PowerStream - Manager, Business Processes and Special Projects	Proposal Development Partner
Ron Sky	Georgian College - Professor, Engineering Technology	Research Partner
PROJECT PARTNERS		
Organization	Project role (e.g. participant, funder)	Financial or in-kind contribution (indicate if confirmed). Please note that if you are invited to submit a proposal your partner must confirm their contribution in writing to the OPA.
COLLUS Power	Installation/promotions partner and data evaluation	Financial and in-kind
PowerStream	Data Analysis, Support to Market Research	Financial and in-kind
Georgian College	Research Partner	Financial and in-kind
Green Leaf Distribution	Distribution Partner	Financial and in-kind
TBD	Market research partner	
TBD	Integrated performance measurement and verification partner	
TBD	Installation partners	