

Solar Photovoltaic Systems for Municipalities

Since the approval of the Feed-in-Tariff program ⁽¹⁾ in September 2009, sizeable rooftops have become a fiercely sought-after property in Ontario. Investors would like to install solar photovoltaic (PV) systems to earn 20 years' income. Many municipalities have become busy in issuing building permits and related guidelines for these activities.

Given a rectangular roof top space of 5,130 sq ft, one may choose to install a solar PV system up to 65kw DC (or 50 kw AC). Depending on the location, the system will generate annual FIT revenue of \$50,000 to \$59,000 each year, or \$9.8 (Toronto) to \$11.5 (Thunder Bay) per sq ft per year.

The question is: if municipalities should invest directly in solar electricity generation systems for an income, at least to cover the increasing energy costs, and to make their property more environmentally friendly.

Financial Evaluation ⁽²⁾

In order to perform an evaluation on the return from investing in a solar photovoltaic system, we have made these prudent assumptions,

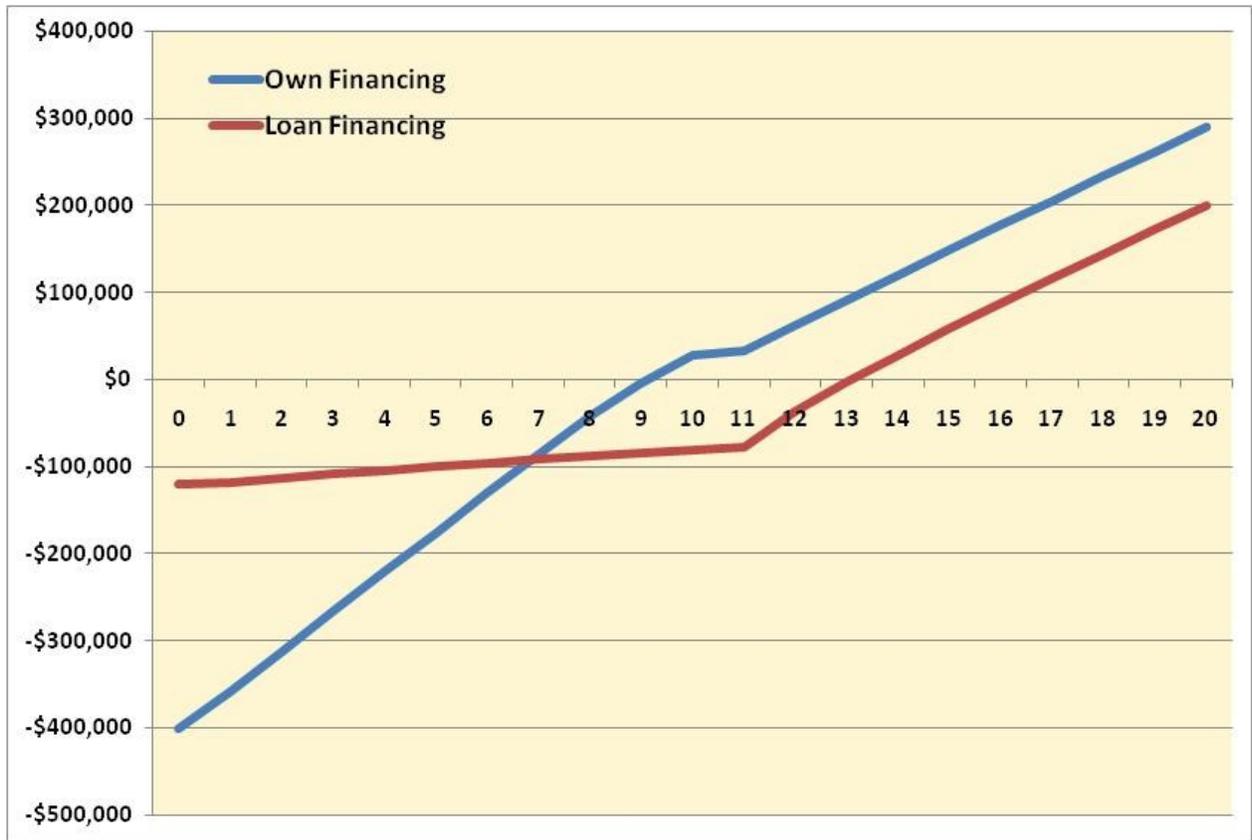
- a) the municipality building locates in or near Toronto, which generates the lowest solar electricity;
- b) conventional solar photovoltaic system, costing \$8/watt (AC), is used; and
- c) the system has no residual value by year 20th.

The outcome can be much improved, if the location is different; or if the cost has come down; or if a cheaper technology, such as thin film, is used; or if the value after the FIT contract is included. Post FIT contract values refer to the system continued to be used to generate energy, carbon credit (which is now given up to Ontario Government) or extension of the FIT contract.

A 50kw (AC) system may cost about \$400,000. The payback period is 9.15 years, with 6.5% internal rate of return per year, on an after-tax basis (assuming 30% tax rate). The cumulative after tax net cash inflow, if financed by owner, will total \$290,000 in 20 years (or discounted to \$131,199 to today's dollars). Debt financing may change the payback and cash flow scenarios, as shown in the graph below.

This demonstrates that the investment in a solar photovoltaic system has become financially viable.

Also, one has to allow for the roof replacement cost, in case of an aged roof, since solar photovoltaic system could last for 40 to 50 years.



Funding the Capital Cost

The Ministry of Energy and Infrastructure described that “Ontario’s proposed Feed-in Tariff (FIT) Program is a guaranteed funding structure that combines stable, competitive prices and long-term contracts for energy generated using renewable resources.”

In order to fund the initial capital costs, there are certain programs that municipalities may leverage on. The Municipal Renewable Energy Program of Ontario, also managed by OPA, supports municipalities for extra costs associated with new renewable energy projects once their project has received a building permit. The Green Municipal Fund (GMF) established by the Federation of Canadian Municipalities (FCM) supports municipal initiatives across Canada that benefit the environment, local economies and quality of life, by way of grants and below-market loans. In addition, Canada Mortgage and Housing Corporation (CMHC) also provides low-interest / long-term loans for those proponents with FIT Contracts that are municipal government led or include a municipal government partner.

Traditional loans with banks, financial lease, joint investment, or leasing the roof space to renewable energy investors, are all possible avenues, depending on the financial condition and preference of the municipalities.

Other Applications in the City

A flat roof top is one of the ideal places to install a solar photovoltaic system. In a city, there are other creative possibilities.

Solar PV panels have been used as noise barriers along highways and railways. If a highway or railway with a noise barrier has an east-west orientation, these barriers offer very good opportunities for the installation of large PV systems. The PV panels not only generate clean electricity, but they also shield the noise and provide a visual upgrade for the barriers.

Green roof helps to limit rainwater runoff, conserve energy, reduce the urban heat-island effect and extend the life of roofing materials. Installing solar panels on the same roof space, creating a solar green roof, provides partial shade for the plant life, and at the same time generates electricity for an income.

A parking lot covered with solar PV panels harnesses the sunlight to generate energy and provide shading spots for cars. Plug-in charging terminals can be made available under the solar parking canopies for the future use of electric cars.

These examples create additional value from a solar PV system. In spite of potentially higher costs, they may make the projects more appealing for funding purposes. It also demonstrates the ability of municipalities in leading to integrate the solar PV technologies into the daily life of the cities.

Benefits to the Community

The FIT program encourages the application of renewable energy sources. The purpose is to reduce our reliance on fossil fuels, to combat the global warming problem, while at the same time to create job opportunities. Solar photovoltaic, being the simplest form of renewable energy source, is effective in helping to reduce the production of greenhouse gas. A 50kw system will reduce over 1,300 tons CO₂ over its warranty life of 25 years.

Have a solar photovoltaic system on the municipal property is a demonstration of support to the renewable energy and to a sustainable future. It helps to create a green image to the city, and to create more green jobs.

A solar photovoltaic system will attract more attention and traffic. The education and information provided are positive reinforcement to the community.

After the FIT contract, the solar photovoltaic system would still be fully functioning. It can be used to generate electricity for the facilities. Or, if OPA renews the FIT program, the system can continue to generate feed-in-tariff revenue.

Summary

The FIT program of Ontario provides a reasonable return to solar system investors. With careful structure of financing and selection of suitable solar professional, it can be an opportunity for self storage investors and property owners to capture the return and the intangible benefits of installing a solar photovoltaic system on their property.

Note:

- (1) Please refer to the website of Ontario Power Authority: www.opa.com.
- (2) All numbers and tax rates used in the analysis are for reference only. They may be different in actual situations.

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Isabel believes solar energy is the renewable energy source in the future. As a co-founder of SIS Solar Ventures Ltd. in Toronto (website: www.sissolarventures.com), Isabel has been actively involved in the evaluation of the financing impact of the FIT program and other public subsidies, as well as of the return and financing strategies for solar photovoltaic system application in Canada. She supports her clients in making informed and educated decisions in this new technology. She welcomes further discussion in this area.

SIS Solar Ventures Ltd. is a solar photovoltaic system developer in Ontario, offering complete solar photovoltaic solutions to property owners. SIS Solar Ventures Ltd. is a pre-qualified vendor in solar PV project solution of OPA (Ontario Power Authority), and is a member of CANSIA (Canadian Solar Industries Association). The best way to reach Isabel is by email: ic@sissolarventures.com.