



**Submission to the Ontario Power Authority  
on the Proposed Amendments to the  
microFIT Program Rules and Price Schedule**

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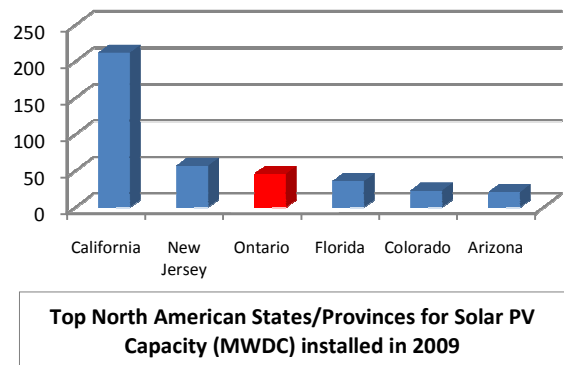
**August 3rd 2010**

## 1. Introduction

The Canadian Solar Industries Association (“CanSIA”) is a national trade association that represents more than 500 solar energy companies throughout Canada, the majority of whom are involved in the Solar Photovoltaics (“PV”) market in Ontario. CanSIA’s mission is to develop a strong, efficient, ethical and professional Canadian solar industry that is able to provide innovative solar energy solutions and play a major role as the world transitions to a sustainable future. Since our foundation in 1992, we have witnessed the evolution of the solar industry and the broadening of the market for solar technologies across Canada.

With the introduction of the Green Energy and Green Economy Act in September 2009, the Ontario Government established a platform to accelerate the deployment of renewable energy technologies and to create 50,000 new jobs in the renewable energy industry. As a result, there has been unprecedented market activity in Ontario for Solar PV largely due to the Ontario Power Authority (“OPA”) administered financial incentive programs: the Renewable Energy Standard Offer Program (“RESOP”) and the current Feed-in-tariff (“FIT”) and microFIT Programs. In particular, the FIT and microFIT Programs have been developed to incentivize electricity generated from renewable sources to improve its competitiveness with conventional sources. By providing a reliable, long term rate for renewable electricity, these programs give the industry and investors the confidence and market stability required to invest and create new jobs in Ontario.

To date, these financial incentive programs have elevated Ontario toward the top of the North American PV charts. In 2009, Ontario was ranked 3<sup>rd</sup> of all North American states and provinces for the capacity of Solar PV installed. Great momentum and capacity has been developed by the Canadian solar energy industry to attain this position.



Although to this point there is reason to celebrate the success of the PV market in Ontario, there is also reason for caution and concern about the future of the microFIT and FIT Programs in Ontario. This caution and concern is due to the unintended negative impacts arising from proposed amendments to the microFIT Program Rules and Price Schedule and the manner in which these amendments were announced without stakeholder consultations or fair notice on July 2<sup>nd</sup>.

The OPA’s proposed amendments to the microFIT Program Rules and Price Schedule include;

- Reduction from 80.2 to 58.8 cents per kWh for microFIT ground-mount Solar PV projects,
- Extension to the application processing time from 30 days to 60 days, and
- New definition for what is classified as “Rooftop” and “Ground-Mount” for Solar PV projects.

One of the key principled outcomes of a FIT Program is to ensure stability and confidence in the market so that industry and investors will invest. With the recently proposed amendments to the microFIT Program, in addition to the RESOP freeze in May of 2008, the stability of the Ontario solar market and FIT Programs have been brought into question. This has caused current and potential investors to re-evaluate their interest in Ontario and begs the larger question, “What other changes may be coming down the road?”

Trust and confidence in the Ontario market is being threatened by these changes and could prove costly as the competition for establishing local solar markets increases throughout the world. One only has to look at Spain’s solar market to see that program instability and lack of investor confidence translates into diminishing investments dollars as the flow of capital moves to more secure and stable solar markets.

In addition to the proposed amendments announced by the OPA, the solar industry is also experiencing other challenges in terms of the administrative inefficiency of the program. Delays in processing applications upwards of 6 months are making it very difficult for solar companies to operate effectively and deliver on the expectations of their customers. It is worth noting that these expectations were based on the clearly stated timelines established by the OPA. However, the OPA has been unable to deliver on these timelines creating much frustration in the industry and with Ontario voters.

The microFIT ground-mount Solar PV market has stimulated much market activity and has in turn created many small regionally-based businesses and valuable green jobs. CanSIA are concerned that these businesses and individuals will be negatively impacted if specific issues within the proposed amendments to the microFIT Program Rules and Price Schedule and the program administration are not addressed.

CanSIA has actively engaged and consulted with over fifty representatives of our corporate membership to better understand the effect that the proposed amendments are having and would have on their business and the consumers and communities they serve. These range from small regionally based installation companies to large provincial operations and from businesses that have been in existence for over 15 years to businesses that were founded as a direct response to the microFIT and FIT Programs. This document collates the voice of our members and presents CanSIA’s response to the proposed amendments.

The purpose of this submission is to clearly illustrate the challenges and implications posed by the proposed OPA microFIT amendments. In the spirit of co-operation, CanSIA has also made some recommendations which we feel can help to maintain the long term sustainability of the microFIT and FIT Programs. These recommendations are in line with the OPA’s guiding principles: transparency, accountability and collaboration (see Appendix 1).

We appreciate the opportunity to provide our feedback both in this submission and through on-going dialogue and look forward to working closely in the future.

## **2. CanSIA Response to Proposed Amendments**

The remainder of this document is presented under the following headings:

1. Program Stability and Predictability,
2. Communication and Transparency in the OPA Review Process,
3. Economic Viability of MicroFIT Ground-Mount Systems, and
4. Application Process and Delays.

### **2.1 Program Stability and Predictability**

In order to have a successful and sustainable FIT Program and local solar market, it is essential that the market be stable and predictable so that investors and consumers can place their confidence and trust therein. We have seen successful examples of this in Germany and unsuccessful examples in Spain.

The bottom line result from the current proposed amendments to the microFIT Rules and Price Schedule announced by the OPA on July 2<sup>nd</sup> is that the stability and predictability of the Ontario Solar PV market has come under scrutiny. A freeze in decision-making now exists creating a major deterrent to investors and consumers who were once considering getting involved in both the microFIT and FIT Programs. There is now a real threat that potential investment for Ontario will be transferred to more secure solar markets throughout the world.

The cause of the perceived program instability and lack of predictability is attributable to the:

- Retroactivity of the proposed amendments, and the
- Uncertainty within the marketplace whether sudden unexpected changes may occur again.

CanSIA believes that until these two issues are appropriately addressed the integrity of the microFIT and FIT Programs will remain in question.

### 2.1.1 Retroactivity

It is estimated that there are 10,700 microFIT applications for ground-mount Solar PV projects that have been received prior to July 2<sup>nd</sup> but not yet processed. When applicants submitted these applications they invested time and money in assessing the feasibility of their projects. In turn, many Ontario-based solar energy companies invested time and resources in staff, equipment and inventory to meet demand, reliant on the published information on the microFIT Program from the OPA.

These consumers and businesses placed trust in the microFIT Program and acted in good-faith as the microFIT website clearly states;

*“If your application meets the program eligibility requirements, you **will** be sent a “Conditional Offer of microFIT Contract” within 30 days. The conditional offer will expire after 12 months.”<sup>1</sup>*

Many of these applications did meet the program eligibility requirements as published at the time and as a result many parties made the appropriate preparations in expectation of the outcomes of a well-defined contractual agreement with the OPA.

Retroactively enacting amendments to the microFIT Rules and Price Schedule sends out the message that the program is not stable or predictable and that investment in solar energy in Ontario is full of risk.

CanSIA does not believe that retroactively applying the proposed amendments to the microFIT Program is in line with Ontario’s green energy and economy goals as it will be destructive for small business and job creation in the province.

**To restore market stability and investor confidence in the microFIT and FIT Programs, and to take steps to ensure that they are embedded in the program going forward, CanSIA recommends;**

- A. REVERSE RETROACTIVITY - All microFIT Program applications received by the OPA prior to July 2<sup>nd</sup>, 2010 should be processed according to the microFIT Program Rules and Price Schedule as published at the time of submission. To clarify, all microFIT applications submitted to the OPA prior to July 2<sup>nd</sup>, 2010 should receive the 80.2 cents per kWh tariff rate. In so doing, this will help to signal to the solar marketplace that the OPA and the Ontario Government have recommitted to guaranteeing program stability.**

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<sup>1</sup> Ontario Power Authority (July 2010) MicroFIT Application Process: Step 1: Submit an application and receive conditional offer  
“<http://microfit.powerauthority.on.ca/Participating-in-microFIT/microFIT-program-overview/Step-1.php>”.

## 2.1.2 Communication and Transparency in OPA Review Process

In order to have a stable and confident solar marketplace, clear communication and full transparency is required at all times and especially when the program is being reviewed and/or modified. The recent proposed amendments to the microFIT Rules and the MicroFIT Price Schedule, has not been clearly communicated to the industry or stakeholders in advance and could have been handled in a more transparent manner. As a result, investor and consumer confidence and trust has diminished in the program.

As the microFIT Program Rules currently stand (version 1.4), there are two avenues for program review and reform to occur:

1. “Scheduled Program Review” where the “OPA intends to review and amend as necessary the microFIT Program, the microFIT Rules and the FIT Price Schedule at periodic intervals”.
2. Amendments “outside of a Scheduled Program Review in response to a ministerial directive, changes in laws and regulations, significant changes in market conditions or other circumstances as required”.<sup>2</sup>

The notice for amendments arising from a Scheduled Program Review is currently at least 90 days before the effective date of the amendment whereas notice for amendments outside of a Scheduled Program Review may only be posted before the effective date of such amendment (“as circumstances may permit”).

CanSIA supports the purpose of the Scheduled Program Review process and acknowledges that changes to the program may be required outside of this review process periodically. However, the allowance for amendments outside of the Scheduled Program Review, without effective notice or consultation, that can significantly alter the program will, and has, created market instability thus deterring consumers, business and investors alike.

**To restore market stability and investor confidence CanSIA recommends:**

- B. CLEARLY DEFINED CONSULTATION PROCESS - A clear and well defined process for amendments inside and outside of the Scheduled Program Review should be developed. This should involve a thorough consultation and communication campaign ensuring that full and complete notice is given to the marketplace a minimum 90 day period prior to implementation of any changes to the program. (This 90 day period should be longer for the FIT Program due to the gravity of the impacts that changes to the FIT Program could invoke). Furthermore, where possible, all future interruptions should take place outside of the construction season as interruptions to the program during the construction season can be extremely disruptive and destructive to small businesses.**
- C. GRANDFATHERING microFIT APPLICATIONS – All applications should be processed according to the microFIT Program Rules and Price Schedule as published at the time of submission. To clarify, all microFIT applications submitted in future should be time-stamped on receipt to define the microFIT Rules and Price Schedule that would apply in the event that they are made a conditional offer. This**

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<sup>2</sup> Ontario Power Authority (July 2010) “MicroFIT Rules version 1.4” <http://microfit.powerauthority.on.ca/pdf/microFIT-Rules.pdf>

**will ensure that all stakeholders will fully understand the implications of their actions at the time of application.**

- D. STAKEHOLDER FIT PROGRAM TASK FORCE - A stakeholder task group should be established to monitor the FIT and microFIT Programs, and discuss any proposed amendments on an on-going basis. The Task Force should include the OPA, Ministry of Energy and Infrastructure, Ministry of Economic Development and Trade, Ministry of Natural Resources, Ministry of Agriculture, Farming and Rural Affairs, CanSIA and other relevant stakeholders.**

## **2.2 Economic Viability of MicroFIT Ground-Mount Systems**

It is imperative for the long-term sustainability of the microFIT and FIT Programs that the payments received by generators for renewable electricity represent a reasonable rate of return. As market experience around the world has shown to date, without a reasonable rate of return, the uptake of renewable energy technologies can be extremely slow. The payments made to generators for the power they produce are therefore intended to cover typical capital and operating costs for equipment that complies with the domestic content requirements and to provide only a reasonable return on the investment of 10-11% over the term of the 20 year contract.

CanSIA has polled our membership to determine the current economics of purchasing, owning and operating a 10kW ground-mounted PV system (see appendix 2). As a result of analysis of the data we have received, CanSIA has concluded that the proposed rate of 58.8 cents per kWh would typically not cover capital and operating costs for equipment that is compliant with the current (40%) or future (60%) Domestic Content requirements and would not provide a reasonable return on the investment of 10-11% over the term of the 20 year contract. Furthermore:

- The return on investment of ground-mount systems purchased from companies that cannot achieve maximum economies of scale and aggregate a very large volume of projects would not be economical. Therefore, the small regionally based businesses that make up a large proportion of the market and have great potential for job creation and rural economic stimulation would be removed from the ground-mount microFIT Program, and
- The increase from 40 - 60% Domestic Content required per project as of January 1<sup>st</sup> 2011 is anticipated to increase average equipment prices by 10 – 20%. The return on investment of Domestic Content compliant ground-mount systems with the revenue from the 58.8 cents per kWh tariff will not favourably incentivize the uptake of Solar PV systems or contribute to meeting the goals for job creation and economic development of the Green Energy and Economy Act.

To ensure the economic viability of ground-mount microFIT projects CanSIA recommends:

- E. **RECONSIDER PROPOSED microFIT GROUND-MOUNT TARIFF RATE** – CanSIA’s economic analysis (see Appendix 2) clearly illustrates that the proposed tariff of 58.8 cents/kWh will not provide a reasonable rate of return for systems purchased from small to medium sized Solar PV installation businesses. CanSIA recommends that the microFIT Ground-mount tariff rate category reflect the realities of the marketplace being that various proponents will experience different rates of return depending on their business models. CanSIA welcomes the opportunity to work with the OPA on possible solutions for this challenge.

## 2.3 Application Process and Delays

The majority of microFIT applications have not been processed since submission 6 months ago contrary to the messaging on the microFIT website:

*“The OPA will review your application. If your application meets the program eligibility requirements, you will be sent a “Conditional Offer of microFIT Contract” within 30 days. The conditional offer will expire after 12 months.”<sup>3</sup>*

In addition, it appears that in many cases conditional offers have been issued contrary to the time-stamping principle with some systems (i.e. rooftop) being given preferential treatment over others (i.e. ground-mount).

These delays and selective application processing have left many in the dark without any clear communication or transparency in the process. This has been hugely frustrating for businesses that have based their business models on the timelines set out by the OPA and for consumers whose investment has been put on hold. This is especially the case for many applicants currently in the microFIT queue and the businesses that serve them that are reliant on the 40% Domestic Content requirements which expires on December 31<sup>st</sup>, 2010. As the construction season will be coming to an end shortly after the consultation period is over, many individuals and small businesses cannot survive a delay of the project over the winter season due to higher installation and business financing costs.

Furthermore, as the microFIT Program was designed to encourage participation from home-owners, farmers, institutions and small businesses, no security deposit is required for microFIT applications. This has led to the situation where many applicants have applied for multiple microFIT contracts without having completed their due diligence, obtained financing or had a strong commitment to installing a system. In addition, conditional offers issued in or after August 2010 may not be installed until 2011 and will therefore be required to meet the 2011 60% domestic content requirement. These factors may result in “fallout” whereby the 10,700 microFIT applications for microFIT that have been received, however not processed, may be reduced significantly.

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<sup>3</sup> Ontario Power Authority (July 2010) MicroFIT Application Process: Step 1: Submit an application and receive conditional offer  
“<http://microfit.powerauthority.on.ca/Participating-in-microFIT/microFIT-program-overview/Step-1.php>”.

In order to restore market stability and investor confidence, to improve the application process and address application delays, CansIA recommends:

- F. **EXPEDITE THE APPLICATION PROCESS FOLLOWING CONSULTATION** - Conditional offers for all eligible applications submitted prior to July 2<sup>nd</sup>, 2010 should be issued as soon as possible once the consultation process has concluded.
- G. **REINSTATE 30 DAY MicroFIT APPLICATION TIMELINE TARGET** - The OPA should reinstate the 30 day service period target and take steps to minimize the time taken to process microFIT applications. Furthermore, procedures should be implemented so ensure accountability for meeting this time line.
- H. **APPLICATION PROGRESS REPORTING** - Establish a method for reporting on the application progress so that the number and nature of applications are known on an on-going basis, can be tracked and the time it takes for them to be processed is available in the public domain.
- I. **MicroFIT Refundable Security Deposit** - The OPA should give consideration to setting a small refundable security deposit for the microFIT Program to deter applicants that are not committed. This should be done within the framework of a clearly defined consultation period as described in recommendation B.
- J. **IMPROVE PROGRAM MESSAGING & COMMUNICATION** - Efforts should be made to improve the communication and messaging of the microFIT Program so that individuals are more fully aware of the implications of the program rules and contractual agreements.

### 3. Conclusions and Recommendations

In summary, our response to the proposed amendments on the microFIT Program Rules and price schedule are as follows:

- A. **REVERSE RETROACTIVITY** - All microFIT Program applications received by the OPA prior to July 2<sup>nd</sup>, 2010 should be processed according to the microFIT Program Rules and Price Schedule as published at the time of submission. To clarify, all microFIT applications submitted to the OPA prior to July 2<sup>nd</sup>, 2010 should receive the 80.2 cents per kWh tariff rate. In so doing, this will help to signal to the solar marketplace that the OPA and the Ontario Government have recommitted to guaranteeing program stability.
- B. **CLEARLY DEFINED CONSULTATION PROCESS** - A clear and well defined process for amendments inside and outside of the Scheduled Program Review should be developed. This should involve a thorough consultation and communication campaign ensuring that full and complete notice is given to the marketplace a minimum 90 day period prior to implementation of any changes to the program. (This 90 day period should be longer for the FIT Program due to the gravity of the impacts that changes to the FIT Program could invoke). Furthermore, where possible, all future interruptions should take place outside of the construction season as interruptions to the program during the construction season can be extremely disruptive and destructive to small businesses.
- C. **GRANDFATHERING microFIT APPLICATIONS** – All applications should be processed according to the microFIT Program Rules and Price Schedule as published at the time of submission. To clarify, all microFIT applications submitted in future should be time-stamped on receipt to define the microFIT Rules and Price Schedule that would apply in the event that they are made a conditional offer. This will ensure that all stakeholders will fully understand the implications of their actions at the time of application.
- D. **STAKEHOLDER FIT PROGRAM TASK FORCE** - A stakeholder task group should be established to monitor the FIT and microFIT Programs, and discuss any proposed amendments on an on-going basis. The Task Force should include the OPA, Ministry of Energy and Infrastructure, Ministry of Economic Development and Trade, Ministry of Natural Resources, Ministry of Agriculture, Farming and Rural Affairs, CanSIA and other relevant stakeholders.
- E. **RECONSIDER PROPOSED microFIT GROUND-MOUNT TARIFF RATE** – CanSIA’s economic analysis (see Appendix 2) clearly illustrates that the proposed tariff of 58.8 cents/kWh will not provide a reasonable rate of return for systems purchased from small to medium sized Solar PV installation businesses. CanSIA recommends that the microFIT Ground-mount tariff rate category reflect the realities of the marketplace being that various proponents will experience different rates of return depending on their business models. CanSIA welcomes the opportunity to work with the OPA on possible solutions for this challenge.

- F. **EXPEDITE THE APPLICATION PROCESS FOLLOWING CONSULTATION** - Conditional offers for all eligible applications submitted prior to July 2<sup>nd</sup>, 2010 should be issued as soon as possible once the consultation process has concluded.
- G. **REINSTATE 30 DAY MicroFIT APPLICATION TIMELINE TARGET** - The OPA should reinstate the 30 day service period target and take steps to minimize the time taken to process microFIT applications. Furthermore, procedures should be implemented so ensure accountability for meeting this time line.
- H. **APPLICATION PROGRESS REPORTING** - Establish a method for reporting on the application progress so that the number and nature of applications are known on an on-going basis, can be tracked and the time it takes for them to be processed is available in the public domain.
- I. **MicroFIT Refundable Security Deposit** - The OPA should give consideration to setting a small refundable security deposit for the microFIT Program to deter applicants that are not committed. This should be done within the framework of a clearly defined consultation period as described in recommendation B.
- J. **IMPROVE PROGRAM MESSAGING & COMMUNICATION** - Efforts should be made to improve the communication and messaging of the microFIT Program so that individuals are more fully aware of the implications of the program rules and contractual agreements.

### 3.1 Closing

In closing, CanSIA believes that the microFIT Program has significant potential for contributing to Ontario's green energy and economy future and will do so if the program proceeds in line with the recommendations in this submission and the OPA's guiding principles (see Appendix 1).

CanSIA appreciates the opportunity to provide input during the OPA consultation period and looks forward to working closely in future.

Should you have further questions or comments please contact Elizabeth McDonald, CanSIA President, at [emcdonald@cansia.ca](mailto:emcdonald@cansia.ca).

## Appendix 1. Guiding Principles of the Ontario Power Authority

*Transparency: We carry out our work with openness and integrity.*

- *Our processes and outcomes are open and clear to both internal and external stakeholders.*
- *We treat our business partners with fairness and integrity.*
- *We strive to earn the trust and respect of all those with whom we deal.*
- *Our communications both internally and externally are clear, candid, open and reliable.*

*Accountability: We take responsibility for our actions.*

- *We carry out our responsibilities fairly and with integrity.*
- *We can be held accountable for our decisions.*

*Collaboration: We work together toward common goals.*

- *We combine our strengths to achieve our goals.*
- *We use our internal and external resources as effectively and efficiently as possible.*
- *We encourage and reward the contributions of everyone on the team, communicating and celebrating our successes clearly.*

*Flexibility: We adapt quickly and effectively to changing circumstances.*

- *We evaluate circumstances objectively and understand the need to respond to changes in our environment.*
- *We are able to alter our course when and where needed.*
- *We balance short-term needs with our long-term goals.*

## Appendix 2. The Economics of microFIT Solar PV Ground-mount Systems

In response to the proposed amendments to the microFIT Price Schedule, this section presents the results of consultation undertaken with our membership to determine the economic performance of fixed- and dual-axis 10 kW microFIT Solar PV ground-mount Systems.

There is a very diverse range of Solar PV technologies and system components currently available in Ontario. There are also significant variances in system cost and performance from one system to the next and in solar irradiation and climatic conditions from one site to the next. For these reasons, defining a standard ground mount Solar PV system cannot accurately represent all possible system configurations and performances that currently (and could potentially) exist in Ontario.

The example that is presented in this document is representative of a typical quality microFIT Ground-mount system installed by a small regionally-based installation company, operating with sustainable business practices, that installs between 10 and 50 such systems per year.

The assumptions that define this system are presented under the following headings:

- a) Capacity,
- b) Performance,
- c) Initial Costs,
- d) On-Going Expenses, and
- e) Return on Investment.

### a) Capacity

The installed capacity of microFIT ground-mount Solar PV systems is rated by the name-plate capacity on the inverter and in order to qualify for the microFIT Program, must be equal to or less than 10 kW (AC). In order to maximize a microFIT system's output, modules with a total installed capacity of 10 – 12 kWp (DC) are commonly employed with 10 kW (AC) inverters.

**In order to account for an optimized system output from a microFIT system, the system defined in this section totals 11.04 kWp (DC) (comprising forty eight 230 Watt crystalline modules) and a 10 kW inverter (AC). This has been done to maximize the microFIT revenue received by the system.**

### b) System Performance

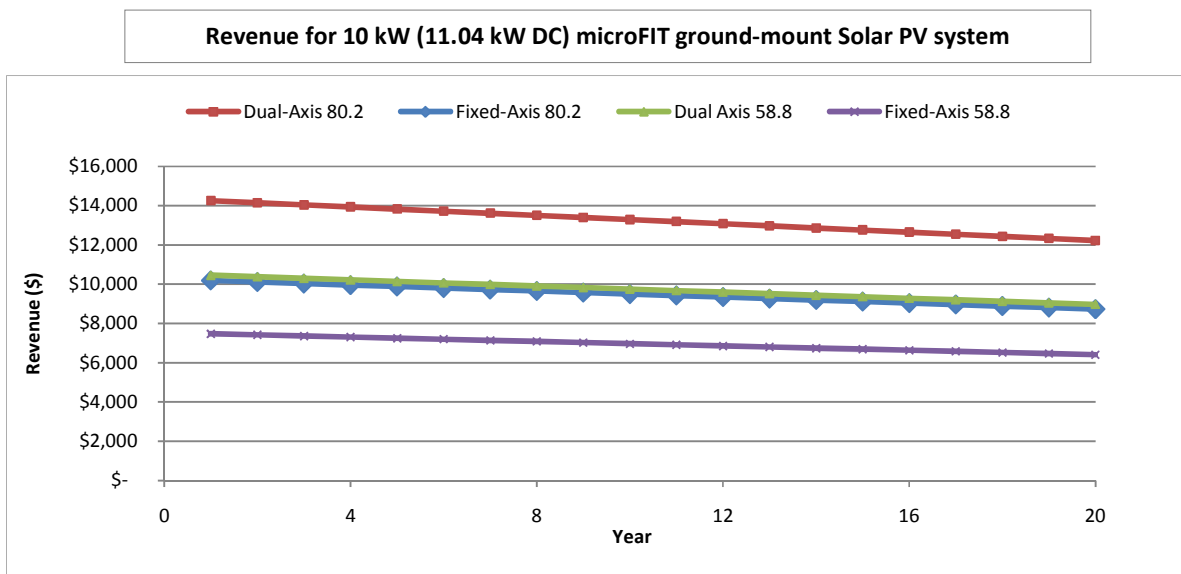
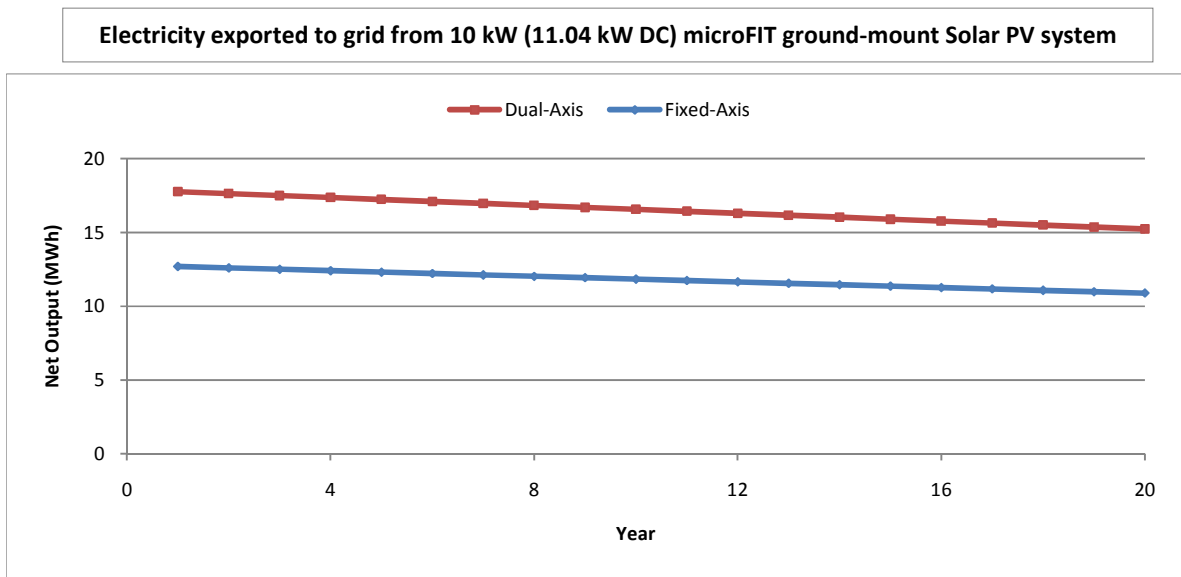
Based on recorded field data of existing installations currently operating in Ontario, we determined that net generation outputs of 1,150 kWh/kWp for fixed systems and 1,610 kWh/kWp for dual axis tracker systems (increase of 40%) are typical for quality systems installed at good sites in Ontario.<sup>4</sup>

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<sup>4</sup> Output will vary across the province: locally due to the opportunities and constraints of the sites and also regionally due to factors such as levels of solar irradiance and topography.

These systems thus result in 12,696 kWh (AC) and 17,774 kWh (AC) exported to the grid, representing capacity factors of approximately 14.5 % and 20.3 % respectively, in the first year of operation.<sup>5</sup> **(NB: These systems are rated 10 kW (AC) and 11.04 kW (DC). Output is in the region of 10% higher than the system assumed in the OPA model).**

To account for module performance degrading overtime, a 0.75% degradation factor has been applied to module performance annually. This degradation factor ensures that modules do not drop below the level that many are guaranteed for: 80% for 20 years. The electricity exported to the grid and resultant revenue received from the specified system is as presented in the following graphs.



<sup>5</sup> Capacity Factor = Electricity Exported to the Grid / (8,760 \* System installed Capacity (AC)).

**c) System Initial Costs**

As previously mentioned, there is no standard cost for a fixed- or dual-axis microFIT 10 kW (11.04 kW DC) ground-mount Solar PV system due to the diversity of the available technologies and components and the varying length of time their installation requires.

The cost of the fixed- and dual-axis microFIT 10 kW (11.04 kW DC) ground-mount Solar PV systems to the end-user specified in this economic analysis was found to be in the region of (see following table):

- **\$85,000 (\$96,000 incl. HST)** for fixed-axis systems, and approximately
- **\$107,000 (\$121,000 incl. HST)** for dual-axis systems.

**Initial Costs for fixed- and dual-axis 10 kW (11.04 kW DC) microFIT  
Solar PV Ground Mount Systems**

	Fixed-Axis CAD\$	Dual-Axis CAD\$
<b>Labour and Equipment Costs</b>		
Labour (system installation)	5,299	8,059
Modules	25,944	25,944
Inverter	8,000	8,000
Racking	7,176	16,560
Balance of System (including equipment rental, concrete, wiring, meter, conduit, etc.)	7,507	9,936
<b>Total Cost for Equipment and Labour</b>	<b>53,926</b>	<b>68,499</b>
<b>Other Development Expenses</b>		
LDC Account Set-Up Fee	150	150
Interconnection	1,200	1,200
Electrical Safety Authority (ESA) inspection	380	380
Building Permit	300	300
<b>Total Development Expenses</b>	<b>2,030</b>	<b>2,030</b>
<b>Total Costs</b>	<b>55,956</b>	<b>70,529</b>
Gross Margin on Labour and Equipment (35%)	29,037	36,884
<b>Total System Cost to End-User (excl. HST)</b>	<b>84,994</b>	<b>107,413</b>
HST (13%)	11,049	13,964
<b>Total System Cost to End-User (incl. HST)</b>	<b>96,043</b>	<b>121,377</b>

**d) On-Going Expenses**

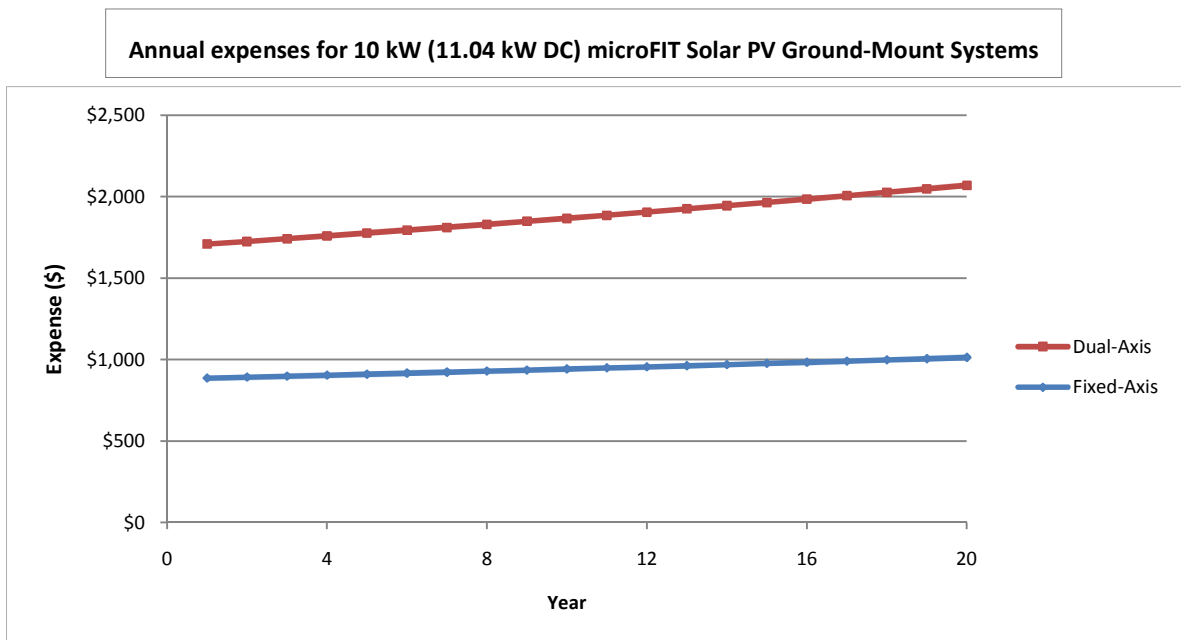
As PV modules do not have moving parts they tend to operate without the requirement for much maintenance throughout their lifetime. It is recommended that for system optimization, the array is periodically inspected and in some areas snow removal and cleaning may be regularly required.

The two major sources of operating expenses for a PV system can be inverter replacement and in the case of tracking systems, tracker maintenance and repair.

Inverters typically have a warranty of 10 – 15 years but when exposed to extreme temperatures, some inverters on the market could be expected to require replacement before this time. In order to account for maintenance and inverter replacement, we suggest an expense and contingency fund of \$30 per kWp (DC) increasing at a rate of 1.5% per year.

Further to this, due to the moving parts in dual-axis tracking systems, additional maintenance, repair and contingency costs are incurred for tracking systems. For this, we have adopted a figure of \$70 per kWp (DC) increasing at a rate of 1.5% per year.

In addition to the maintenance and contingency expenses, there is also further on-going expenditure associated with the Local Distribution Company account fee (<\$100) and insurance (ranges from \$400 – 1,000). The following graph presents the on-going expenses for microFIT Solar PV ground-mount systems.



## e) Return on Investment

In order to calculate the return on investment for the systems described in the previous sections, two end-users were considered: an individual and a business. This was done to account for the reality that only businesses can claim back the 13% HST on project cost whereas individuals cannot. The following assumptions were also made:

1. Project financing in line with figures adopted by OPA: 70% equity, 30% debt, 7% debt rate, 20 year term.
2. Residual value of system (10% in year 21).
3. Double declining depreciation rate.
4. Personal income tax rate of 16.5% and business tax rate of 28%.

The return on investment from the specified systems are as presented in the following table.

**Results from economic analysis of Fixed- and Dual-Axis Ground-Mount Solar PV Systems**

Owner	System	Tariff	System Cost to End User	Pre-Tax Returns (%)	After-Tax Returns (%)
Domestic (Not Business)	Fixed-Axis	0.802	\$ 96,043	6%	6%
Farm/Business	Fixed-Axis	0.802	\$ 84,994	12%	11%
Domestic (Not Business)	Fixed-Axis	0.588	\$ 96,043	-9%	-9%
Farm/Business	Fixed-Axis	0.588	\$ 84,994	-3%	-3%
Domestic (Not Business)	Dual-Axis	0.802	\$ 121,377	9%	8%
Farm/Business	Dual-Axis	0.802	\$ 107,413	14%	13%
Domestic (Not Business)	Dual-Axis	0.588	\$ 121,377	-8%	-8%
Farm/Business	Dual-Axis	0.588	\$ 107,413	-2%	-2%

These results clearly show that the return on investment from systems that receive the 80.2 cents per kWh is in the region of 6 – 13% (average 9.5%) but that these systems would not make any return on the investment at the proposed 58.8 cents per kWh rate.

In order to achieve a 10-11% rate or return with the 58.8 cents per kWh rate, the total cost to the end-user would have to be in the region of \$60,000 for the fixed-axis system and in the region of \$80,000 for the dual-axis system. Installed costs such as these are not common and cannot be achieved by small installation businesses (and are impossible if the system is subject to HST). Furthermore, when the minimum domestic content level increases from 40% to 60% on January 1<sup>st</sup> 2011, the cost of compliant modules, inverters and other system components may increase average system cost. In this event, the potential economic viability of systems at the proposed 58.8 cents per kWh rate would be further diminished.

For these reasons, adopting a rate of 58.8 cents per kWh for ground-mount microFIT Solar PV projects would eliminate any incentive for the adoption of Solar PV technology, remove small businesses from participating in this market and negatively impact job creation and rural economic development from the ground-mount Solar PV industry.