

Submission re: CCAP Solar Program Considerations

1. Introduction

The Canadian Solar Industries Association (CanSIA) is a national trade association that represents the solar energy industry throughout Canada. CanSIA's vision is for solar energy to be a mainstream energy source and an integral part of Canada's diversified energy mix by 2020. CanSIA also intends for the solar energy industry to be sustainable and operating in a supportive and stable policy and regulatory environment within a similar time frame. In working to accomplish this goal, CanSIA is pleased to make this submission to the Ontario Ministry of the Environment and Climate Change with regards to important program considerations for solar PV and solar heating under the Climate Change Action Plan (CCAP).

2. Ontario Climate Change Solutions Deployment Corporation

The MOECC is in the process of creating an entity known as the Ontario Climate Change Solutions Deployment Corporation (SDC) in order to develop and administer specific programs under the Climate Change Action Plan (CCAP). Solar PV and solar thermal are proven technologies that could be effectively supported through the SDC to help Ontario residents and businesses lower their energy bills and their carbon footprints while empowering them to better manage their energy needs through self-generation and fuel switching.

The investment could result in the following benefits:

Solar PV: The total cost of the solar PV incentive over 5 years would be between \$532 and \$653 million and result in a 9 MT reduction of GHGs over the life of the systems. This would facilitate the uptake of roughly 1,000 MW of distributed/net metered solar PV by individuals and businesses, create 14,500 person years of employment and approximately \$2.5 billion of economic activity over the life of the systems.¹

Solar Thermal: The total cost of the solar heating incentive over 5 years would be \$185 million and result in a 2.5 – 3.6 MT reduction of GHGs over the life of the systems. This would facilitate the uptake of roughly 300 MW of solar heating systems by individuals and businesses.²

¹ CanSIA, Distributed Generation Task Force Recommendation Report, NREL JEDI Model Economic Impacts Analysis, pg. 15.

² CanSIA, Making Solar Heating Mainstream, NRCAN RETScreen GHG Analysis, pg. 4.

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2.1 Readiness of the Ontario Solar Sector

The Green Energy Act and related renewables procurement programs has created a robust and globally competitive solar energy sector in this province. For the past 7 years the industry has largely focused on building Feed-in Tariff (FIT) and microFIT projects. Since the introduction of these programs Ontario has seen impressive growth in the amount of solar that has been connected to the electricity grid. In total, Ontario has reached over 2,200 MW of installed solar, with approximately another 500 MW in the pipeline.³ These projects have put Ontario amongst the global leaders for total installed capacity, contributed to job creation, investment, and GHG emission reductions. In short, the Ontario solar energy sector is at the ready to deliver solutions to Ontario homes and businesses through the SDC.

2.2 Timelines

Ontario's Distributed Solar Generation (DSG) industry is at a crossroads and the timing for the introduction of a SDC solar energy program is critical. The FIT and microFIT Programs are slated to end in 2017 and—effective July 1 of this year—the industry will begin the transition to a net-metering construct as the Phase 1 net metering revisions come into force under the net-metering regulation, consumers will receive credits from their local utility against their electricity bills for the power that they produce in excess of their own consumption.

The Government of Ontario has already signaled their intention to transition the DSG industry in this direction, however, the framework for how the transition will work has not yet been finalized. One of the critical components for ensuring the viability of a net metered solar industry is the creation of a transitional incentive program that will bridge the economic gap from FIT and microFIT through to a net metering framework. The SDC program could serve as the bridge to the net-metering future, ensuring the continued availability of solar energy solutions to Ontarians while leveraging the capable and increasingly cost-effective industry built up through the FIT programs.

The timing concerning the launch of a transitional incentive program is also an important factor to consider. In terms of the residential solar sector, CanSIA understands the official closure of the microFIT program will take place during the month of December 2017, however, the official date has not yet been determined. To ensure a smooth transition from microFIT to net metering utilizing a solar incentive program, CanSIA believes that there should be at least three (3) to four (4) months overlap between the SDC solar incentive program and the microFIT program. Therefore, CanSIA believes the solar incentives program should launch in September 2017. CanSIA's rationale for this overlap approach includes the following:

³ Independent Electricity System Operator, A Progress Report on Contracted Electricity Supply, Forth Quarter 2016, Pg. 11. Retrieved on June 12, 2017 from <http://www.ieso.ca/en/power-data/supply-overview/distribution-connected-generation>.

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- 1) Program Beta Testing: The three (3) to four (4) months overlap in 2017 can serve as a testing period for the program delivery agent (e.g. SDC, IESO, etc.). This period will allow the program delivery agent to make necessary changes, work out any kinks, and to ensure that the program implementation is properly working in advance of the official closure of the microFIT program.
- 2) Industry Transition: As companies transition to a net metering framework, officially pre-announcing the solar incentives program as early as possible (i.e. July or August 2017) and officially launching the solar incentive program in September 2017, would provide companies with greater market certainty for business planning purposes regarding capital and human resource investments.
- 3) Fair Hydro Plan Impacts: The impact of the Ontario Fair Hydro Plan has resulted in all potential net metered solar projects being uneconomical. By making net metered solar projects eligible for SDC solar incentives, coupled with a pre-announcement in July or August 2017 and a launch in September 2017, it would enable this market sector to begin operating again and support solar companies in retaining their staff.
- 4) Eliminate Double Dipping: To eliminate any concern regarding double dipping, the SDC solar incentive program can be structured in a way that prevents one solar project from taking advantage of two incentives programs, the other being the microFIT program.

Furthermore, as a backup measure, if the launch of the solar incentives must wait until January 1, 2018, due to administrative and technology implementation challenges or other reasons, it would be helpful to provide clear guidance to the industry regarding the incentive eligibility requirements. Easy to understand and pre-approved eligibility criteria could enable the solar industry to start the sales process with potential customers, even if the official solar incentive cheques or vouchers are delivered in early 2018. As such, projects sold and build during this time could be 'grandfathered' into the SDC solar incentives program.

CanSIA would also recommend that the commercial and industrial solar incentives be launched in September 2017 since the FIT program has already officially closed.

2.3 Program Delivery Entity

It may make sense for the MOECC to consider utilizing already existing agencies/entities for the delivery of certain programs. For example, the Independent Electricity System Operator (IESO) currently develops and administers a suite of conservation programs in conjunction with the provinces Local Distribution Companies (LDC) and natural gas distributors that may be well suited to accommodate programming for both solar PV and solar heating.

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Utilizing the IESO's conservation programs to deliver solar specific programming would require some modifications to some of the underlying framework that supports the IESO in program delivery. For example, in order for net metered solar to be considered as conservation, the definition of conservation would need to be expanded in the Conservation First Framework (CFF) to accommodate it. Currently the CFF would prohibit any technology that injects electricity to the grid (which net metered solar does). However, over the course of a year, a net metering system is designed to inject no more than the total electricity consumption of the load customer. This approach means a net metered customer would either lower their electricity consumption from the grid over the year, or, achieve a net zero level of electricity consumption.

Implementing solar specific programming through the IESO's conservation programs would also, very likely, allow programs to be offered to consumers more quickly as the IESO's programs, administrative capabilities, and delivery mechanisms are well established.

2.4 Province-Wide Approach to Program Delivery

If the MOECC adopted to use the IESO as a program delivery agency for the solar specific program, any program delivered by the IESO would need to be formatted as a province-wide program rather than slated for implementation by individual LDCs. A province-wide format would help ensure that the process and requirements of applying for an incentive for a solar installation would be consistent across the province. Currently, certain conservation programs are proposed and implemented on an LDC by LDC basis, rather than a province-wide basis. The individual implementing LDCs have leeway to structure the application process and requirements differently which could create confusion amongst consumers and would certainly lead to unequal access to solar programming based on which LDCs chose to implement. Further, as the forthcoming net metering regulation will be applicable in all LDC service territories in Ontario, having a province-wide incentive program would support consumer's ability to install net metering systems where technically feasible to do so.

3. Solar PV Program Design

CanSIA recommends that a capital cost incentive (CCI) declining block program be developed to deploy 200 MW of distributed net metered solar each year for a 5 year period, resulting in a total deployment of 1,000 MW. Each block of incentive funding could be reserved for a specific year and support the installation of 200 MW within that year. If the incentive is not utilized within its implementation year, any unused incentive would be available the following year. If the incentive for a given year was entirely consumed within that year, no further incentive would be available until the next year. Solar development could continue to occur, however, it would be ineligible to receive an incentive through the Ontario Climate Change Solutions Deployment Corporation in that year.

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CanSIA recommends that block capacities and incentive amounts be determined together as part of the program development to provide guidance to participating consumers, LDCs and distributed solar generation (DSG) developers. A multi-year incentive plan for the program would provide certainty for consumers and DSG developers by allowing them to know how many MW would be supported each year, and what the incentive level would be in any given year throughout the 5 year period. The fixed incentive amount and block capacities could be revisited and adjusted based on the experience with the program as required.

Based on a forecast for installed solar PV costs and forecasted electricity prices in Ontario, CanSIA has determined that a capital cost incentive program starting in 2017/2018 would require an initial capital incentive of between \$0.79/W and \$1.07/W, dropping to between \$0.28/W and \$0.24/W in 2021/2022. The total budget over the 5 years of the CCI program would be between \$532 million and \$652 million.

Figure 1: Capital Cost Incentive Levels

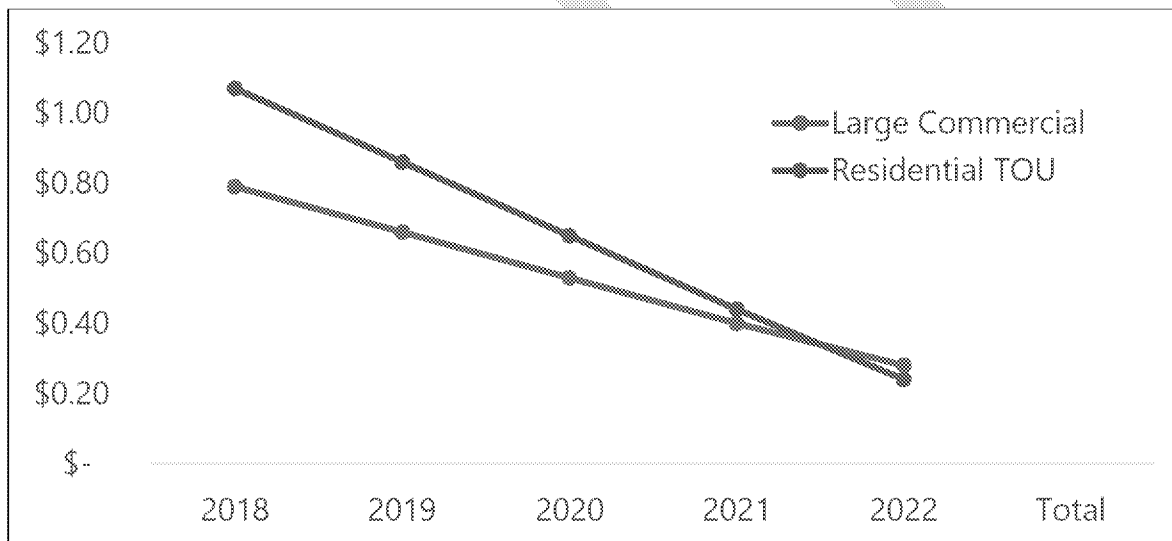


Figure 2: Capital Cost Incentive Levels

Build Year	Large Commercial	Residential TOU	Large Commercial	Residential TOU
2018	\$ 0.79	\$ 1.07	\$ 158,000,000.00	\$ 214,000,000.00
2019	\$ 0.66	\$ 0.86	\$ 132,000,000.00	\$ 172,000,000.00
2020	\$ 0.53	\$ 0.65	\$ 106,000,000.00	\$ 130,000,000.00
2021	\$ 0.40	\$ 0.44	\$ 80,000,000.00	\$ 88,000,000.00
2022	\$ 0.28	\$ 0.24	\$ 56,000,000.00	\$ 48,000,000.00
Total			\$ 532,000,000.00	\$ 652,000,000.00

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The recommended incentive levels for residential systems are based on net metering projects being settled at Time of Use (TOU) rates. It is important to note that residential incentives would likely need to increase if net metering projects continue to be settled at tiered rates.

3.1 Reasons for change from initial CanSIA Recommendations

Based on a forecast for solar PV installation costs and the cost of Electricity in Ontario, CanSIA has revised its initial assessment of the required transitional incentive level for net metered solar projects. This revised assessment is due to changes in the supply outlook for Ontario and the imposition of the Ontario Fair Hydro Plan.

3.1.1 Fair Hydro Plan

In March 2017 the government of Ontario announced electricity rate reductions for residential and small commercial customers of effectively 25%. In addition to the 8% reduction from the removal of the provincial portion of the HST, customers are expected to see a further 17% reduction on their bills starting in May 2017. The government has also committed to restricting electricity rate increases to no more than the rate of inflation over the next 4 years.

3.1.2 Supply/Demand Outlook

The supply/demand outlook used to create CanSIA's past recommendations was based on an assessment of the 2013 LTEP. In September 2016 the IESO published the Ontario Planning Outlook (OPO) which differed in certain respects from the 2013 LTEP supply demand outlook. The primary changes between the documents include:

1. The demand outlook in the OPO included the potential impact of the CCAP for electrification of space heating and transportation sectors. A mix between lower and higher demand scenarios was used for CanSIA's assessment.
2. Ontario is undertaking a significant refurbishment plan for its nuclear generation fleet. Ten (10) nuclear units are expected to be refurbished over a fifteen (15) year period. The OPO schedule for refurbishment reduced the overlap of units undergoing refurbishment at the beginning of the process and increased the length of the total refurbishment schedule.

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3.2 Potential Barriers to Uptake

3.2.1 Net Metering Regulation: Third Party Ownership and Virtual Net Metering

Currently the Ontario Ministry of Energy is considering further revisions to the province's net metering regulation. These further changes contemplate the expansion of the regulation to permit third party ownership (TPO) of net metering systems as well as the different types of virtual net metering.

The Ministry of Energy has signaled that these changes, if enacted, may not be in place until Q2 2018. CanSIA expects that if these regulatory revisions are not put in place as early as possible that uptake of solar PV under any potential incentive program could be negatively affected. Implementing changes to the net metering regulation to allow TPO and virtual net metering would increase the number/types of business models that are available in the market and open up the ability for more customers (who may not have sufficient capital to adopt solar on their own) to adopt solar.

3.2.2 Time of Use Rates

One of the largest barriers to net metering project uptake from a financing and system economics perspective is transitioning the current use of tiered rates for net metered customers to Time of Use (TOU) rates.

Currently if a load customer installs a net metering system they are required to move to tiered rates for both their electricity use as well as for the calculation of credits for exported generation. This is largely due to IT infrastructure issues between the IESO's Meter Data Management and Repository (MDMR) system, smart meters, and LDCs data input and billing systems. Tiered rates do not account for the difference in value between on-peak, mid-peak, and off-peak electricity. Under TOU, the higher price periods tend to align with the production curves of solar generation. Evolution of the TOU structure in the future is also likely to see a larger separation between the on-peak and off-peak price, which would benefit solar generation. The possible inclusion of a fourth time period for critical peaks (i.e., 1 or 2 hours a day during the summer price period) would further enhance the value of solar generation. The fixed price periods of TOU also allows for strong predictability of the benefits of solar generation for customers.

Using tiered rates for the calculation of consumed electricity and excess generation undervalues the generation of a solar system and lowers the revenue available to system owners due to that undervaluation. This undervaluation can be between 7 – 23% depending on the electricity demand of the net metering customer (e.g. depending on whether the majority of their consumption falls within tier 1 rates or tier 2 rates).

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3.2.3 Financing / Access to Capital

One of the central barriers to adoption of solar under a net metering framework is the lack of access to capital and financing for the projects. Solar represents a relatively large up-front capital cost and it is important for both individuals and businesses to be able to secure debt at low rates to make the investment. One way the government could lower the cost of adoption is by ensuring long term financing at low rates through the implementation of some form of a Property Assessed Clean Energy (PACE) financing arrangement with municipalities. This would enable adopters to add the value of the system to the value of their home and simply pay off the system over time utilizing their normal property tax payments as a vehicle.

It must be noted, also, that implementing Third Party Ownership (TPO) and virtual net metering (VNM) under the net metering regulation would assist in increasing access to capital for solar development companies, permit better financing terms for debt, and importantly open up more cost effective ways for individuals and businesses to adopt solar (often with no money upfront).

3.2.4 Restrictions on Delivery of Incentives

CanSIA recommends that the MOECC clarify explicitly within the regulation that the Corporation will, when appropriate, provide incentives to entities that are not individuals (ex. directly to companies or corporations). For certain products and technologies, and in certain end-use scenarios, it may make more sense to provide an incentive directly to the implementing company rather than to the end-use customer. For example, under common solar PV net metering approaches such as Power Purchase Agreements (PPAs) between solar companies and customers, the customer (home or business owner), is not required to purchase a solar system upfront. Instead, the solar company utilizes its own capital for the purchase, installation, and maintenance of the system and the customer buys the generated electricity over time. Under this type of approach, the customer would not be the most appropriate recipient of the incentive as they have no upfront capital expenditure for the system. The solar company, on the other hand, incurs the upfront costs and would be best suited to receive the incentive. Under other net metering approaches, the customer may buy the system outright and is thus incurring the upfront capital cost. Under this type of approach, the customer would likely be the most appropriate entity to receive the incentive to defray the upfront cost of the system.

For all solar technologies, including solar air and water heating, the end-user of the system may be an institutional, commercial or industrial entity. For this reason, it is important that corporations, and other non-Natural Persons, be eligible to receive incentives from the program delivery agent.

3.2.5 Lack of Focus on Industrial/Commercial/Institutional Buildings

CanSIA recommends that the Ontario Solutions Deployment Corporation include programs which target institutional, commercial, industrial and agricultural buildings. According to the province's Climate

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Strategy, within Ontario the institutional, commercial and industrial building stock account for a significant portion of GHG emissions from buildings as well as from energy used within those buildings, including electricity generated from natural gas. While the Corporation would not be precluded from developing programs to target these types of buildings based on the current regulation, not including this focus as a specific mandate potentially excludes these buildings from inclusion. CanSIA also recommends clarifying that multi-residential housing (including multi-residential and social housing for low income residents is included within the category of existing and new residential buildings. This may not be required to be clarified within the regulation itself, however, should be clarified in supporting materials at a minimum.

4. Solar Heating Program Design

4.1 \$185 Million 5 Year Program: Solar Air Heating & Solar Water Heating

With support mechanisms reinstated for solar air heating, it is reasonable to assume similar rates of growth that were experienced during 2007-2010 with the Ontario Solar Thermal Heating Incentive (OSTHI) program in place. Potential deployment scenarios over 5 years are detailed below. We assume declining incentives in Years 3-5. Uptake assumptions, associated incentive payments, and associated avoided GHGs are summarized in the table below.

It is important to also note that the air heating deployment summarized in the table above is expected to avoid approximately 2.5 – 3.6 MT of GHGs over the life of the systems.

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Figure 3: Solar Heating Program Uptake and Incentive Schedule

	Solar Air Capacity Potential each Year (MW)	Installed Square Footage of Solar Air Collectors each Year (ft ²)	Solar Air Total Incentive Investment @ \$26/ft ² (\$ Million)	Solar Air GHG Offset Estimates (tonnes) Per Year* ⁴
Year 1	20 MW	400,000	\$10.4 M	5,700 - 8,000
Year 2	40 MW	800,000	\$20.8 M	11,428 - 16,000
Year 3 ⁵	60 MW	1,200,000	\$28.8 M	17,142 - 24,000
Year 4 ⁶	80 MW	1,600,000	\$35.2 M	22,800 - 32,000
Year 5 ⁷	100 MW	2,000,000	\$40 M	28,570 - 40,000
Total Solar Air Heating	300 MW	6,000,000 ft²	\$135 M	~85,000-120,000
5 Year Program Total			\$185 M	

*The 5 year program total has been increased by \$50 million to account for an associated solar water heating incentive in commercial applications, as was available under the OSTHI Program previously.

4.2 OSTHI Program 2007-2010; the Creation of a World-Class Industry in Ontario

In Canada and Ontario, solar air heating is the most widely used solar thermal technology in the commercial, industrial, and agricultural sectors as a result of its cost-benefit metrics and widespread applicability.

Ontario has a clear success story in solar thermal policy; the OSTHI program ran from 2007-2010 and supported close to 1,000 solar air and solar water heating technologies in the commercial, industrial and agricultural sector.

The program was prescriptive and had a straight forward structure, as detailed below:

1. Incentives were paid up-front to the end user on a per square foot (or per square metre) basis for eligible solar collectors.
2. All commercial, industrial, institutional, and agricultural buildings were eligible, in either retrofit or new build.

⁴ Assuming average offset of 1 tonne of CO₂/ 50-70ft² of solar collector area

⁵ Assume incentive could be declined to \$24/ft² in Year 3

⁶ Assume incentive could be declined to \$22/ft² in Year 4

⁷ Assume incentive could be declined to \$20/ft² in Year 5

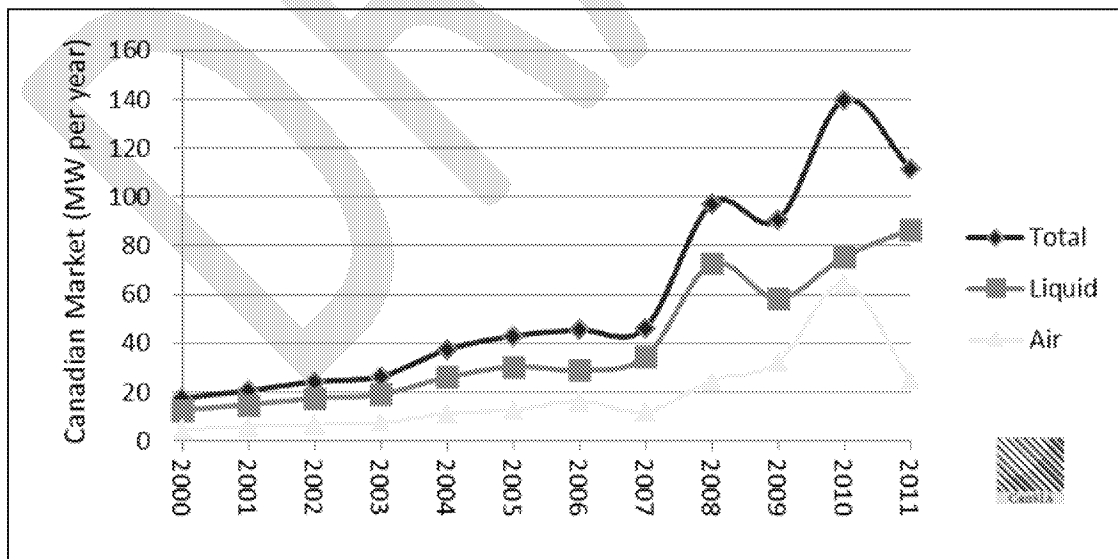
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3. A RETScreen® or a SWIFT (Solar Wall International Feasibility Tool) analysis had to be submitted along with the application which would detail the size of the proposed project, the energy performance, and the GHG reductions. (Note: RETScreen® and SWIFT are programs developed by Natural Resources Canada (NRCan) that are based on monitored data).
4. The end user would receive an acceptance letter from the program, and then they had a certain period of time in which to complete the project.
5. Close out documents included a certification from the end user that the system had been installed and all associated costs had been paid. A commissioning report had to be completed by a P. Eng. verifying the installation and showing the square footage of the project in order to calculate the final incentive that would be paid to the end user.

The program functioned extremely well; it was straightforward and easy to administer, and it was successful in creating significant project uptake. (And it has been cited as a model by the US Solar Energy Industries Association in discussion with several States on Solar Thermal Programs)

The results from the OSTHI Program are clear and illustrative; the solar heating market developed significant momentum and capacity from 2007 to 2010 due to this program. Solar air heating deployment in Canada peaked in 2010 at over 60MW, of which over 40MW was in Ontario. The growth was the result of the OSTHI Program, and when the program ceased to exist in 2011, the industry capacity declined immediately and has remained at a much lower level.

Figure 4: Canadian Solar Heating Market Activity (2000 – 2011)



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5. Consumer Protection

An important aspect of delivering any incentive program is ensuring a high standard of consumer protection for customers. The MOECC will also need to consider the balance between establishing their own practices and protocols in this regard, and relying on those that have already been established by government, regulators, and the private sector. An important parameter in this consideration is the time that would be necessary to establish new standards and protocols versus relying on those that are pre-established.

In 2016 CanSIA implemented a series of consumer protection resources with the aim of increasing consumer confidence and enhancing industry professionalism, thus contributing to the long-term growth and sustainability of the solar industry throughout Canada. After extensive consultation with our membership, CanSIA implemented three resources for ensuring consumer protection, each of which are described in the sections below. These resources are meant to provide consumers with additional confidence when making the decision to go solar and when evaluating the benefits of working with companies who are members of CanSIA.

If the MOECC implements an incentive for solar PV and thermal technologies, the MOECC may want to consider leveraging the CanSIA Consumer Protection program. Leveraging CanSIA's Consumer Protection program could take the form of requiring all qualifying projects be installed by a CanSIA member. Each member has agreed to abide by CanSIA's Code of Conduct and will be subject to CanSIA Resolution and Disciplinary Resolution Process. Implementing this requirement would assist in creating a higher standard of consumer protection for customers. To learn more about the CanSIA Consumer Protection program see the sections below or visit www.cansia.ca/consumer-protection.html.

5.1 Solar Business Code of Conduct

The Solar Business Code of Conduct contains provisions for how CanSIA members shall conduct themselves in their interactions with consumers, what information they need to make available, and best practices for advertising and marketing. The *Solar Business Code of Conduct* has been implemented as a required condition of membership within CanSIA to ensure that consumers can rely on the same standards of service from all our members.

The Solar Business Code of Conduct was developed with reference to similar consumer protection resources utilized by the US Solar Energy Industries Association (SEIA).

5.2 Going Solar Guide

Going Solar: A Guide for Consumers is intended to help consumers navigate various solar options and help identify the right solutions for their particular circumstances. Whether a consumer is buying a solar system outright or entering a long-term agreement with a solar company, this guide aims to help

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consumers understand the basics of solar energy, investigate important considerations for items such as home insurance, and identify what questions to ask their solar professionals.

5.3 Complaint Resolution and Disciplinary Policy

The Complaint Resolution and Disciplinary Process sets out the process for how CanSIA will handle complaints and information regarding members that may lead to disciplinary action. The *Complaint Resolution and Disciplinary Process* is intended to allow CanSIA, our members, and consumers to reach a mutually satisfactory resolution to any complaints that may arise. However, if a mutually satisfactory resolution is unattainable, CanSIA, in the form of non-renewal, suspension or expulsion of a member, can exercise disciplinary authority over a member related to non-adherence to the *Solar Business Code of Conduct*. A standard form has also been released that consumers can use to identify alleged non-compliance with the *Solar Business Code of Conduct* to CanSIA. CanSIA then utilizes this submission to engage directly with our member companies in order to reach a resolution to the complaint.

5.4 Recommendation

CanSIA recommends that the MOECC solar incentive program should require projects be installed by a CanSIA member. Again, CanSIA members are obligated to abide by CanSIA Solar Business Code of Conduct, which in turn is backed up by CanSIA's Complaint Resolution and Disciplinary Process. Should a member be suspended or expelled due to violations per the CanSIA Code of Conduct - if no mutually satisfactory resolution is reached - this would prevent this company from benefiting from the MOECC solar incentives program and in turn protect future consumers from this company.