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Solar Energy Policy in Canada: An Overview of Recent Legislative and Community-Based Trends Towards a Coherent Renewable Energy Sustainability Framework

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Introduction

In recent years, solar energy policy in Canada has experienced remarkable changes in the context of sustainable renewable energy approaches. New federal and provincial energy policies are allowing for the installation of solar energy devices in residential homes and businesses. This is in response to growing concerns over energy shortages and the rising electricity costs associated with energy production. In the past, solar energy policy received little attention from federal and provincial governments, despite other renewable energy programs growing in popularity. However, recent federal legislative efforts are prompting community-based initiatives to develop solar energy programs. These efforts reflect changes which are occurring in other jurisdictions, and which are influencing Canadian policymakers to pursue new options for electricity generation and transmission using solar energy.

This paper describes the recent developments of solar energy policy in Canada by examining community-based initiatives and legislation from federal, provincial, and municipal authorities. The purpose of this paper is three-fold: (1) to track legislation that has led to community-based solar programs in Canada; (2) to draw attention to the benefits of solar energy, and how this renewable approach is evolving into a coherent and sustainable framework; and (3) to encourage Canadian policymakers to support a nascent solar industry that has tremendous potential to diversify the renewable energy mix. More specifically, the application of policies for residential and commercial solar energy programs will be explored to show how solar policy is growing in Canada.

The first part of the paper generally describes solar energy, its various types, and its application in Canada. The second part discusses the legal aspects of solar energy, which includes a brief discussion of relevant legal principles and some case law from the U.S. and England - two jurisdictions having a long experience with solar energy issues. The third part outlines some of the active solar energy projects in Canada that apply solar energy policies from the U.S., Australia, and Europe, and which demonstrate how federal renewable programs are stimulating local approaches to solar initiatives. Particular emphasis will be placed on Alberta, British Columbia, Saskatchewan, Ontario, Nova Scotia and Prince Edward Island due to some recent developments in those

jurisdictions. The fourth part explains the guiding principles of solar energy policy from the Germany, Japan, and the United States, jurisdictions from where Canada draws much of its solar energy policies. Some emerging trends and recommendations will also be made based on this analysis.

What is Solar Energy?

Solar energy is defined as energy harnessed from sunlight, and using different types of technology, which can be used in various applications such as electricity generation.¹ Solar energy is produced when devices or solar collector panels absorb the direct rays of sunlight to produce heat or other forms of energy. The main factors in determining the degree of success in harnessing solar energy are the following:

- access to sunlight;
- the area of absorption as sunlight is diffuse in nature (spread out over a vast area);
- time of day, latitude, and season of the year; and
- the amount of cloud cover, which affects the rate of sunlight absorption on solar collector panels or other solar devices requiring direct sunlight.

There are four types of solar energy used in business and residential communities, including:

- Photovoltaic cells;
- Solar Thermal;
- Passive and Active Solar Heating Systems; and
- Concentrated Solar Power²

Each of these types of solar energy are installed either in buildings that are fit to utilize these technologies for energy conservation and production, or in residential homes for energy saving methods. The frequency of use of these types of solar energy depends on where the solar energy devices will be installed, whether solar technologies are available for installation by local solar companies, and whether government support

¹ John H. Minan & William H. Lawrence, *Legal Aspects of Solar Energy* (Toronto: D.C. Heath and Company, 1981), at (hereinafter Minan).

² Adrian J. Bradbrook, *Solar Energy and the Law* (The Law Book Company Limited, 1984), at 11-20 (hereinafter Bradbrook).

comes in the form of tax incentives or utility rebates for residential homeowners or businesses. Photovoltaic cells (known as PV cells), absorb sunlight and convert it into electricity through silicon-based solar panels.³ PV cells, which are organized into solar modules by semiconductors, help generate electricity. This electricity produced by PV cells is tied into existing community power grids or off-grid locations. When the photovoltaic cells do not produce enough energy, the electricity is stored in the grid as a back-up source of energy. The advantages of photovoltaic cells are that they require little maintenance, require no fuel, and produce no pollution.⁴

Solar thermal refers to the production of energy from sunlight using solar collectors for the purpose of heating of facilities or buildings.⁵ Solar thermal is generally applied for domestic hot water heating, commercial hot water and ventilation air heating, heating homes or buildings, residential uses for indoor or outdoor swimming pools, and agricultural uses for crop drying.⁶ Solar thermal is divided into passive and active forms of solar heating systems, which refers to heating a space inside a building or home. Passive solar thermal uses the entire home as a solar collector, and does not use any equipment (such as pipes, ducts, fans, or pumps) to transfer heat within the home. Passive solar thermal energy uses walls, windows, floors, and roofs to absorb the sun's rays to heat the air within the home or building. In contrast, active solar thermal systems use equipment such as focusing mirrors, metal plates, or liquid-based solar collectors to capture the sun's energy, and transfer this heat to air or water. Here, liquid-based collectors circulate a liquid (normally propylene glycol) through a heating system to act as a heat transfer solution.⁷

³ Natural Resources Canada, CanmetEnergy, online: < http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/eng/renewables/standalone_pv.html > (last visited October 9, 2009).

⁴ Ontario Sustainable Energy Association (OSEA), Solar PV Community Action Manual, online: < <http://www.cansia.ca/Content/Documents/Document.aspx?DocId=15646> > (last visited October 10, 2009). (hereinafter OSEA PV). Silicon is made for 3 types of solar PV cells: (1) monocrystalline; (2) multicrystalline; and (3) amorphous. Of the three PV cells, monocrystalline produces the most energy (per square meter), while amorphous cells produced the least amount of energy.

⁵ Ontario Sustainable Energy Association (OSEA), OSEA CANSIA Solar Thermal Community Action Manual, online: < <http://www.cansia.ca/Content/Documents/Document.aspx?DocId=15649> > (last visited October 10, 2009) (hereinafter OSEA).

⁶ *Ibid.* at 5.

⁷ *Ibid.* at 4. In Canada, liquid-based collectors are used in 99 percent of solar thermal systems.

Solar collectors are devices used to allow sunlight in through a medium (such as glass), and to absorb and convert sunlight into heat by trapping it in a defined area. In active solar homes, dark-colored metal plates are placed inside boxes that absorb the sunlight and produce heat. The challenge in solar heating systems is heat storage. In passive solar homes, heat is stored by using dense interior materials (such as masonry, adobe, concrete, stone, or water), and these materials absorb surplus heat and radiate it back into a room after dark. In active solar homes, heat can be stored either in a large tank filled with liquid that can be used to store the heat, or rock bins beneath a home. Concentrated solar power refers to the conversion of sunlight into electrical energy through the use of mirrors that concentrate sunlight on a device.⁸ Examples of concentrated solar power include three types of technology that use mirrors or other reflecting surfaces to concentrate the sun's energy: (1) Parabolic through collectors; (2) Heliostats; and (3) Parabolic dishes.⁹

Why use solar energy? There are several advantages that solar energy offers in the context of developing renewable energy policies, including:

- being renewable and infinite
- being free of emissions (including greenhouse gases)
- generating electricity (without water usage associated with fossil fuels)
- Requiring little maintenance
- having application in both residential and commercial settings

Solar energy can be used by residential and commercial users for three distinct applications: (1) heating water; (2) heating air; and (3) electricity generation.¹⁰ When considering an investment in solar energy to meet these applications (particularly photovoltaic cells), one must deal with two prominent issues: (1) the manner in which the solar system will be assessed and interact with the electricity grid and the home appliances, and (2) the manner in which the electricity will be metered (net metering)

⁸ The Concentrated Power Solar Initiative (CSPOSI), online: <<http://www.csposi.org/>> (last visited October 10, 2009).

⁹ *Ibid.*

¹⁰ Canadian Solar Industries Association (CanSIA), Solar Energy in Canada, online: CanSIA <<http://www.cansia.ca/Content/Documents/Document.ashx?DocId=16312>> (last visited October 10, 2009). CanSIA was formed in 1978 to represent the solar energy industry in Canada. See generally CanSIA, online: <<http://www.cansia.ca/Default.aspx?pagelD=134665>> (last visited October 10, 2009).

and purchased from the system owner.¹¹ But prior to these considerations, let us examine some of the legal aspects of solar energy.

LEGAL ASPECTS OF SOLAR ENERGY

There are several legal issues which affect solar energy. These legal issues can be examined in other nations which have a long history with public policy planning and development in the realm of solar energy. For the purpose of this paper, various legal issues will be discussed using legal precedents from the United States and England.

Various legal issues affecting solar energy include the following:

- Solar access
- Right to Light
- Easements
- Private Nuisance
- Promises Affecting the Use of Land
- Financial Incentives
- Municipal Zoning Bylaws and Building Codes

Solar Access and the Right to Light

Solar access generally refers one's right to collect and harness uninterrupted passage of sunlight using solar collector panels on their property.¹² A homeowner may find their sunlight blocked by a neighbor's building or by a structure that was erected on their property. Early English and U.S. common law recognized a property owner's right to light based on theoretical principles of prescriptive easements.¹³ This is where the landowner has a right to enjoyment of light and air for productive use of the land. The *British Rights of Light Act* (1959) established the common law right to light and air, and protected illumination for claimants who demonstrated twenty years of solar use.¹⁴ Prior to this period, a neighbour could destroy any solar access rights by filing an objection with the government.

¹¹ OSEA PV, *supra* note 4 at 10.

¹² Bradbrook, *supra* note 2 at 47.

¹³ Minan, *supra* note 1 at 28.

¹⁴ Office of the Public Sector Information (OPSI), online: Rights of Light Act (1959) <http://www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1959/cukpga_19590056_en_1> (last visited October 10, 2009).

These solar access rights (and the right to light) eventually found its way into U.S. legislation, but with a different effect. For example, the 1977 New Mexico *Solar Rights Act* protected a landowner's right to prohibit any blockage of their solar access by a neighbour.¹⁵ The New Mexico statute essentially draws from water law principles of "beneficial use" and "prior appropriation" in governing solar property rights. For solar access, a valid legal question could be: Can the neighbour enforce prohibitions of the solar use? To answer this question, the legal aspect of easements should be considered.

Easements

The English common law doctrine of ancient lights has long protected access to natural light.¹⁶ A landowner (in rural or urban areas) may have their sunlight blocked by a neighbour who installs a structure or grows vegetation to unreasonable heights. Thus, in order to safeguard their right of solar access, the solar user would seek to obtain an express easement, and in many common law jurisdictions (such as Australia), express easements are recognized as an easement of light which is enforceable at law.¹⁷ The easement would be drafted to protect against shading from sunlight that is necessary for the maintenance of a solar farm or solar collector panel to produce energy on one's property. The modern application of easements is found in a homeowner's right to draw power from public utility easements for electrical transmission lines. In the United States, three types of solar easements have emerged in the law: (1) time protection easements; (2) setback and height-restriction easements; and (3) plane of protection easements.¹⁸

First, time protection easements seek to prevent shading of the sunlight on solar collector panels during certain hours of the day. With this type of easement of necessity, it is necessary to determine the length of time during each day when

¹⁵ Minan, *supra* note 1 at 30.

¹⁶ *Ibid.* at 45.

¹⁷ In *Allen v. Greenwood* (1980) Ch. 119 (C.A.), an Australian case, the plaintiff constructed a greenhouse, to which the defendant later built a fence six inches from this facility, while also parking his caravan near the greenhouse. The plaintiff sought an injunction to remove the fence and caravan, arguing that they had a prescriptive right to the amount of light required for the greenhouse to grow plants and vegetables. That is, the direct rays of the sun were necessary for the operation of the greenhouse. Although the trial court dismissed the action, the Court of Appeal reversed the decision, and stated that the plaintiff had a prescriptive right of light. The Court held that the quantum of light must be provided in a special building that is different from ordinary dwelling houses.

¹⁸ *Ibid.* at 54.

protection from the shade is required. It is understood that complete protection during all daylight hours is unnecessary, as six hours of sunlight (at the sun's zenith position) is adequate to allow proper absorption of sunlight onto the collector panels. Second, setback and height-restriction easements are designed to prohibit a neighbour from erecting any building or allowing vegetation to grow to a certain height that would block one's access to sunlight. Here, an injunction may be filed by a solar user if a neighbour ignores these height restrictions. Third, the plane of protection easement refers to areas designated as a plane in relation to the location of a solar collection panel or to a boundary line.

The solar user would maximize the amount of sunlight absorption based on a surveyor's measurement of the boundaries of the property where solar collectors can be situated. A challenge faced by a solar user, however, relates to whether or not their neighbour will grant an easement for their benefit, as a portion of their airspace over their property will be affected.¹⁹ This problem will be particularly more prominent in urban settings, as there are more neighbours to consider in a densely-populated community setting. To deal with this problem, the law of nuisance enters into the picture, despite modern solar energy policy dictating that landowners have the right to harness sufficient light without interference from their neighbour.

Private Nuisance

Private nuisance is defined as an unreasonable interference with the use or enjoyment of land.²⁰ As discussed above, a landowner using solar energy may have their sunlight blocked by an adjoining resident who installs a structure or grows long vegetation. In the context of solar access rights, private nuisance claim from a neighbour may also relate to the danger of rooftop equipment being blown off by heavy winds onto the neighbour's property.²¹ Some court remedies may recognize this situation as an actionable nuisance claim by requiring the landowner to better install their rooftop equipment or solar panels. This requirement has found its way into modern land use or zoning laws that allow solar technology to be formally integrated into the neighbourhood setting.

¹⁹ *Ibid.* at 61.

²⁰ *Ibid.* at 40.

²¹ *Ibid.*

Thus, the law of nuisance operates by providing a remedy for the solar user against their neighbours in the form of an injunction, for shading the sunlight that the solar user relies upon to produce energy from solar collector panels. In this case, a solar user must show a direct economic loss that relates to the shading of the sunlight on their property by their neighbour. Depending on the jurisdiction, there is normally a transferable property interest in sunlight. To counteract this problem of private nuisance, municipalities are enacting solar by-laws to allow individuals and businesses to install solar collector panels on roofs and walls that would generate heat and electricity.

Promises Affecting the Use of Land

The law of promises running with the land draws from property law and contracts. In the context of solar energy, a solar user may wish to protect their solar access through an interest in land (as an easement), or a promise running with the land (as a restrictive covenant).²² In modern property law relating to renewable energy, this means that promises regarding land use permit a solar user to obtain land uses achieving solar purposes such as passive or active solar thermal energy. For passive solar thermal energy, a restrictive covenant may be needed since no equipment is used to produce solar power. For active solar thermal energy, a restrictive covenant is required since equipment such as solar collectors may need to be installed on the home or building itself, or on adjoining property. The relation between solar energy and promises running with the land also means that a residential developer may include a provision in a deed that a purchaser shall not block sunlight from the rooftop of another. When the solar user sells the property, the buyer is protected by the same promise (despite there being no privity of contract).

Previous case law in the U.S. has seen solar users challenge neighbourhood associations when seeking approval for property improvements. For instance, in *Krayer v. Old Orchard Association*, a 1979 decision of the Superior Court of California, the defendant architectural committee refused to permit the plaintiff to install rooftop solar collector plates for their solar hot-water heater, after the plaintiff breached a provision that required “harmony of external length”.²³ The Superior Court of California held that the architectural committee’s refusal to permit the plaintiff to install the solar heater was

²² *Ibid.* at 34.

²³ *Ibid.* at 37.

unenforceable since the California legislation supported the public policy of encouraging solar energy systems. The installation of the solar collector panels would have violated a municipal restrictive covenant that forbids the installation of rooftop structures “unless they are installed in such manner that they are not visible from neighbouring property or adjacent streets.”²⁴ Here, the Court stressed how the use of solar equipment outweighed the municipality’s concern with the character of the property. That is, the promise running with the land (as a restrictive covenant) could be overlooked in favour of state legislation that promoted the use of renewable technologies on one’s property.

Financial Incentives

When considering the installation of a solar project, financing becomes crucial because of the unique nature of solar energy technology and equipment. One of the main barriers for homeowners or builders who are interested in solar projects is concerned about up-front costs. In response, those jurisdictions that promote solar energy policy offer direct assistance through grants or loans, and indirect assistance through tax incentives. These incentives have stimulated investment from the private sector to promote solar energy technology research and development, while fostering communities to install and utilize solar energy devices in residential homes and office buildings.

In several provinces across Canada, income tax deductions or rebates are provided for residents or businesses who decide to use electricity through energy efficient means. These measures are introduced with the aim of encouraging investors and consumers to use solar energy technology to reduce electricity costs, and to reduce their dependence on power grids that are operating at peak capacity (and which are unable to supply enough electricity due to the enormous demand for energy consumption by growing populations).

In Canada, the financing of solar energy projects come from various sources, including:

- Private or shared equity
- Federal or provincial financial incentives
- Debt financing

²⁴ *Ibid.* at 37.

- Financial intermediaries

Equity in ownership of a solar thermal project refers to funds allocated to the capital costs of a project. Private equity represents the money that an individual or business allocates toward a project, while a shared equity is money from various investors for the purpose of creating a solar thermal project (e.g. aggregated investment from members of a cooperative).²⁵ Grants and other government incentives also help solar energy projects get off the ground. In Canada, the ecoENERGY program is the only federal incentive program that supports the development of solar energy programs. The ecoENERGY program is a federal subsidy that allocates billions of dollars towards programs that participate in climate change. Debt financing refers to the provision of capital costs needed for solar thermal projects.

These renewable energy loans finance solar projects at preferred interest rates due to the long-term nature of the investment. Financial intermediaries are groups with the funding capital necessary to install medium to large scale solar projects. These groups will assume all the responsibility for installing solar systems by contracting with building owners. Here, an energy meter will be installed, and the costs of energy are calculated by a pre-determined price based on the energy produced by this system.²⁶ The solar energy system is owned by the financial intermediary, and not the building owner.

Tax incentives also represent an effective policy mechanism, and are available as property tax exemptions, sales-and-use tax exemptions, income tax deductions, and income tax credits. Tax incentives are advantageous for three reasons: (1) government agencies are directly involved in the financing and implementation of solar initiatives; (2) it benefits communities by empowering citizens and businesses to find new ways of using electricity; and (3) it stimulates investment in energy efficiency programs that promote new renewable technology and the growth of jobs in that industry. Tax incentives are available as property tax exemptions, sales-and-use tax exemptions, income tax deductions, and income tax credits.²⁷ In Canada, tax incentives begin

²⁵ OSEA, *supra* note 5 at 27.

²⁶ OSEA, *supra* note 5 at 30.

²⁷ *Ibid.* at 70. The Canadian government began providing financial incentives towards energy efficiency programs in the 1970s under the Canadian Home Insulation and Oil Substitution program, while providing rebates for solar water heating programs in the early 1980s. See generally Canadian Renewable Energy Alliance, *Financing Sources and Mechanisms for*

with an over-arching federal program, while the provincial and municipal governments adopt their own measures closely following this regime. Thus, at every level of government there are tax incentives and rebates that are being introduced as renewable energy policies to promote Canada's solar energy industry. As will be seen in various provinces, these financial incentives are stimulating great interest among industry developers, consumers, and businesses in the solar energy sector.

Municipal Zoning Bylaws and Building Codes

Buildings in urban settings are a major consumer of energy. Therefore, municipalities across Canada are modifying their building codes to promote heat exchange in the walls of old and newly constructed buildings. Those buildings that do not have double-wall heat exchangers make it difficult to transfer heat from the collector loop to the domestic water supply in those buildings. This becomes an issue in cold weather, where antifreeze is normally used to prevent freezing of indoor pipes. In various cities, manufacturers now must comply with a certification process (pursuant to municipal bylaws) to ensure that quality materials are being used to construct proper solar energy systems that promote efficient heat transfer and energy conservation.

In the past, unqualified persons would install solar technologies that would not work properly, which translated into less energy output for modified buildings or homes.²⁸ Now, municipalities across Canada enforce industry standards for the installation of solar equipment and systems. Here, installers must secure building permits from the municipality, which ultimately protects the system owner from liability in the event the solar energy system damages other persons or property. The improved standards of these solar bylaws link the municipality with federal and provincial public policies that encourage alternative energies in residential communities and businesses.

Case law in the U.S. has provided some guidance as to how municipal zoning bylaws affect solar energy. For instance, in *Katz v. Bodkin*, a municipal zoning ordinance in the state of New York prohibited the plaintiff from installing rooftop solar panels as a

Renewable Energy and Energy Efficiency (August 2006), online:
<<http://www.canrea.ca/pdf/CanREAFinancingPaper.pdf>> (last visited October 10, 2009).

²⁸ Solar Energy Society of Canada, Ten Features of Successful Solar Policies, <<http://www.>> (last visited October 10, 2009), at 7.

violation of property height restrictions.²⁹ The zoning authority denied a variance to the plaintiff because the rooftop solar panels were aesthetically unattractive. Although the solar users submitted evidence that twenty-six neighbours consented to their rooftop solar panels, the Supreme Court of New York held that the zoning ordinance (which prohibited the installation of solar panels) was unenforceable as there was a federal and state public policy that encouraged energy conservation and solar development. The New York ruling is similar to the California neighbourhood association case in *Krayer v. Old Orchard Association* on the grounds that public policy which promotes renewable energy outweighs the intent of the local municipal bylaws that seek to preserve the aesthetic character of established communities.

As a result of the New York ruling, many states in the U.S. and provinces in Canada have changed their municipal zoning bylaws to favour the residents to install solar devices that would harness energy in alternative ways. The legal aspects of solar energy thus cover a range of issues to consider for renewable energy policy. Although solar energy policy is not found in Canadian case law (mainly because of the limited application of this technology), new solar projects are spreading throughout Canada as all levels of government are introducing concrete legislation. The growth in Canadian solar policy essentially draws from the case law and pilot projects from other nations involved with solar energy development.

ACTIVE SOLAR ENERGY PROJECTS IN CANADA

Solar energy is promoted in Canada primarily through federal, provincial, and municipal initiatives involving government and academic research and development, investment programs, renewable portfolio standards, and utility programs.³⁰ For instance, Natural Resources Canada is a federal agency that is responsible for promoting solar energy research through its CANMET Technology Centre (known as CanMET ENERGY), a facility which advocates for the development of solar technologies

²⁹ Minan, *supra* note 1 at 37.

³⁰ See Table 1 for an overview of active solar energy projects in Canada.

to help distribute energy throughout Canada.³¹ CanmetENERGY coordinates various research projects with universities and industries, while participating in international committees for the improvement of photovoltaic standards, which may be applicable in Canada.³² The main federal solar policy in Canada is the ecoENERGY programs for solar retrofit, air, water, and domestic heating.³³ This federal regulatory framework is being pushed through partnerships involving sole proprietors, corporations, non-governmental organizations, not-for-profit organizations, municipalities, utilities, cooperatives, and publicly-owned businesses.

Canada's ecoENERGY Programs

At present, there are three federal programs that drive solar energy policy in Canada:

- ecoENERGY for Renewable Heat
- ecoENERGY for Renewable Power
- ecoENERGY Retrofit Program

(a) ecoENERGY for Renewable Heat and Renewable Power

In 2009, the Canadian government launched the ecoENERGY for Renewable Heat Initiative as a means to lower energy costs of homeowners.³⁴ This is a four-year program

³¹ Solar energy policy has been developed under the rubric of renewable energy programs. At present, the Canadian government's policy on renewable energy is known as the Renewable Energy Deployment Initiative (REDI), which includes solar thermal energy.³¹ Until now, Canada has invested very little in solar energy projects compared to other jurisdictions around the world. For this reason, solar energy has not received adequate support in contrast to other forms of renewable energy such as wind or biofuels. In response to the increasing demand for electricity generation, transmission, and distribution, greener alternatives to fossil fuels are being considered for new pieces of federal legislation. For instance, Canada's proposed Green Energy Act specifically addresses solar energy as part of the renewable energy framework.

³² Natural Resources Canada, Renewables, Solar Photovoltaic Energy, online:

<http://canmetenergy-canmetenergie.nrcan-nrcan.gc.ca/eng/renewables/standalone_pv.html> (last visited October 10, 2009).

³³ Natural Resources Canada, Renewable Energy, Programs and Initiatives, online:

<<http://www.nrcan.gc.ca/eneene/renren/index-eng.php>> (last visited October 10, 2009).

³⁴ Government of Canada, EcoAction, EcoEnergy for Renewable Heat, online: <

<http://ecoaction.gc.ca/ecoenergy-ecoenergie/heat-chauffage/index-eng.cfm>> (last visited October 10, 2009). The ecoENERGY for Renewable Heat program runs from April 1, 2007 to

that provides up to \$36 million to help industry, consumers, and commercial businesses to adopt or purchase renewable thermal technologies for water and space heating. More specifically, the program provides up to 25 percent of the start-up costs for commercial, industrial, or institutional solar thermal projects.³⁵ This is because solar technologies and equipment must be purchased from organizations that specialize in marketing and manufacturing such unique products.

The first example of a federal solar program is the ecoENERGY for Renewable Heat Initiative. Under this program, the Solar Hot Water Heating Program is driven by a federal investment of \$400,000.³⁶ This program is intended to benefit both home developers and homeowners by offering rebates of \$1,000.00 and \$300.00, respectively, in order to allow for the installation of solar hot water heating systems.³⁷ This is significant because a solar water heating system can provide up to 60 percent of a home's hot-water needs, thus verifying how the heating of water through solar energy represents a new renewable initiative to improve energy efficiency. To bolster this energy efficient policy, Natural Resources Canada (a federal agency) has selected fourteen organizations for large-scale residential solar hot water heating projects known as the Residential Pilot Initiative.³⁸

This \$9 million program deploys solar thermal energy projects in residential homes to increase the presence of the solar industry, while hoping to create sustainable communities that save on energy costs. When the fourteen groups were selected, contribution agreements were signed to install 8,000 solar water heating systems in

March 31, 2011. Eligible projects must be completed and commissioned within nine (9) months of the signing of a contribution agreement with NRCAN.

³⁵ OSEA, *supra* note 5 at 27. The federal government invites public participation in advancing solar energy projects. For instance, in 2007, Natural Resources Canada issued a call for Expressions of Interest from utilities, businesses, and non-profit groups that wanted to install solar water heaters in residential homes as part of a pilot project.

³⁶ Government of Canada, Government of Canada Invests in B.C. Solar Energy Program, online: <<http://www.nrcan-nrcan.gc.ca/media/newcom/2009/200941-eng.php>> (last visited October 10, 2009). The Solar Water Heating Program is a joint effort led by Bullfrog Power Inc. And Enbridge Gas Distribution and EnerWorks.

³⁷ *Ibid.*

³⁸ Government of Canada, ecoACTION, ecoENERGY, online: <<http://ecoaction.gc.ca/ecoenergy-ecoenergie/heat-chauffage/deployment-miseenoeuvre-eng.cfm>> (last visited October 10, 2009).

seven provinces.³⁹ The other federal solar program is the ecoENERGY Renewable Power program, which is a \$1.48 billion project designed to support renewable technologies such as solar energy, wind energy, biomass, geothermal, and ocean energy.⁴⁰ Under this program, businesses, municipalities, and other organizations (including power producers, provincial Crown corporations, and utility companies) are eligible to receive 1 cent per kilowatt-hour (kWh) for up to 10 years for solar projects built between April 1, 2007 and March 31, 2011.⁴¹

To be eligible in receiving benefits under the ecoENERGY Renewable Power Program, a recipient must sign a contribution agreement with Natural Resources Canada that involves a Qualifying Project for the renewable energy proposal. A Qualifying Project is a new or redesigned low-impact renewable generating facility that is located in Canada, and produces a minimum of 1 megawatt (MW) of energy capacity.⁴² Here, electricity meters must measure the amount of electricity produced and consumed by the facility, and the records produced must be monitored by a professional engineer or recognized service provider, and kept with the Qualifying Project contribution agreement.

(b) EcoENERGY Retrofit Program

The ecoENERGY Retrofit Homes Program was launched by the federal government on April 1, 2007 as part of a \$220 million project for homeowners, businesses, and industrial

³⁹ *Ibid.* The fourteen organizations selected for the Renewable Initiative pilot project include: (1) Taylor Munro Energy Systems Inc. (B.C.); (2) Bullfrog Power Inc. (Ontario and Alberta); (3) eaga Canada and B.C. Sustainable Energy Association (B.C.); (4) Enmax Energy Corporation (Alberta); (5) FortisBC Inc. (B.C.); (6) L'Agence de L'efficacite energetique (Quebec); (7) Manitoba Hydro (Manitoba); (8) Reliance Comfort Limited Partnership (Ontario); (9) Rock Paper Sun Limited (Saskatchewan); (10) Sustainable Ecologics Education Society of Canada (Nova Scotia); (11) Sustainable Ottawa (Ontario); (12) Illingworth Development Limited (B.C.); (13) Town of Vulcan (Alberta); and (14) Utilities Kingston (Ontario).

⁴⁰ Government of Canada, EcoAction, ecoENERGY for Renewable Power, online: <<http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/index-eng.cfm>> (last visited October 10, 2009).

⁴¹ *Ibid.*

⁴² Government of Canada, ecoACTION, ecoENERGY Renewable Power Program, online: <<http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/v2008/conditions-03-eng.cfm#a21>> (last visited October 10, 2009).

facilities.⁴³ This program provides non-taxable grants to homeowners and owners of rental properties who have renovated their homes to become more energy efficient by saving on electricity costs, and to promote greener technologies to improve environmental quality.⁴⁴ For homeowners, there is a two-step process to be eligible for the ecoENERGY grant. First, there is a pre-retrofit assessment from an energy advisor certified by Natural Resources Canada, and a homeowner must receive a favourable assessment prior to being eligible for the grants.

The energy advisor will conduct the home assessment, and later provide an action checklist of the necessary upgrades that would contribute to greater energy efficiency in the home. Second, a post-retrofit assessment is made by the energy advisor after the recommended upgrades are completed in the home. A homeowner may apply for a grant based on the quality of this assessment, and for solar hot water domestic heating replacements that meet acceptable standards, they can receive \$1,250.⁴⁵ The home can be detached, semi-detached, a row house, a low-rise multi-residential building of three stories or less, a mobile home built on a permanent foundation, or a floating home that is permanently moored.

Alberta

In a province that relies heavily on fossil fuels for oil and gas production, Alberta promotes alternative renewable energy through its Micro-Generation Regulation, as a means to allow residents to generate their own power from renewable sources.⁴⁶ Introduced on February 1, 2008, the Micro-Generation Regulation is defined as generation of electricity with a maximum capacity of 1 megawatt (MW) or less being

⁴³ Natural Resources Canada, Grants Under ecoENERGY Retrofit – Homes, Questions and Answers, online: < <http://oee.nrcan.gc.ca/residential/personal/retrofit-homes/questions-answers.cfm?attr=4#intro1> > (last visited October 10, 2009). See also Natural Resources Canada, Office of Energy Efficiency, ecoENERGY Retrofit Grants and Incentives, online: <<http://oee.nrcan.gc.ca/corporate/retrofit-summary.cfm>> (last visited October 10, 2009).

⁴⁴ Service Canada, ecoENERGY Retrofit – Homes, online: <<http://www.servicecanada.gc.ca/eng/goc/ecoenergy.shtml>> (last visited October 10, 2009).

⁴⁵ For instance, for a solar heating system upgrade, a homeowner may receive \$1,625 for replacing an existing space or water heating system. See generally Natural Resources Canada, Grant Table for ecoENERGY Retrofit – Homes, online: < <http://oee.nrcan.gc.ca/residential/personal/retrofit-homes/retrofit-qualify-grant.cfm?attr=4> > (last visited October 10, 2009).

⁴⁶ Alberta Utilities Commission, Rule 024 – Microgeneration, online: <<http://www.auc.ab.ca/rule-development/micro-generation/Pages/default.aspx>> (last visited October 10, 2009).

connected to a grid using renewable sources.⁴⁷ When consumers generate their own renewable power, they will be credited for any excess electric energy produced. This policy has helped Alberta introduce several wind energy projects, but new solar energy projects are underway in community-based settings.

For example, the Drake Landing Solar Community (located in the Town of Okotoks in southern Alberta) consists of 52 single-family homes that are serviced by pre-insulated piping, and serve as a showcase for future large-scale solar projects.⁴⁸ Here, 800 solar panels are mounted on garage rooftops, which generate around 1.5 megawatts (MW) of thermal solar power. For long-term energy needs, a district system stores abundant solar energy underground during the summer months, and later distributes the energy to each home for space heating needs during the winter months. Homes are heated when the thermal storage tanks (located in an energy centre) move heat to the homes through insulated pipes. For short-term energy needs, the energy centre contains thermal storage tanks, which collect energy from a solar collector loop running from the solar collectors fixed on detached garages.⁴⁹ The Drake Landing project began operation in June 2007 as a result of the federal CanmetENERGY program (in partnership with governmental agencies and private industry), and showcases how future large-scale solar projects, while reducing greenhouse gases.⁵⁰ This project uses a multi-disciplinary approach involving the Town of Okotoks, utility companies, and home developers.

British Columbia

⁴⁷ *Ibid.* Subsection 1(1)(h) of the Micro-Generation Regulation defines “micro-generation” as: (1) using exclusively renewable sources of energy; (2) intended to meet all or a portion of the consumer’s electricity needs; (3) at the time of construction, is sized to the load; (4) has a total capacity of 1 MW; and (5) is located on the consumer’s site, owned or leased by the consumer.

⁴⁸ Cassidy Johnson & Lisa Dignard-Bailey, *Implementation Strategies for Solar Communities*, online: See Figure 1. Solar panels absorb the sun’s energy and heat a glycol solution running through insulated pipes in what is known as a collector loop, which connects to the solar collectors. The heated glycol travels along the garage roof, down to the underground through a trench system until it arrives at a heat exchanger within the community’s energy centre. The heat exchanger then transfers the heat to the water stored in a storage tank. See generally *Drake Landing Solar Community*, online: <<http://www.dlsc.ca/how.htm>> (last visited October 10, 2009).

⁴⁹ See Figure 2.

⁵⁰ *Drake Landing Solar Community*, online: <<http://www.dlsc.ca/>> (last visited October 10, 2009). The Drake Landing Solar Community has received 2 sustainable community awards from the Federation of Canadian Municipalities and the United Nations Environment Program, respectively.

In British Columbia, provincial sales tax exemptions are provided for consumers and businesses using renewable energy equipment to conserve energy.⁵¹ This energy conservation provincial sales tax exemption takes 7.5 percent off the final price of all new solar photovoltaic panels and solar thermal collector panels.⁵² Moreover, the creation of the federal Solar Hot Water Heating Program in the Okanagan and Kootenay regions enables new homeowners to obtain rebates of \$1,000 to help install solar hot water heating systems, while existing homeowners may receive a \$300 rebate for installing solar hot water devices in their homes.⁵³

Community solar initiatives have also been established such as the CanSIA BCSEA Thermal Community Action.⁵⁴ This is a program led by the B.C. Sustainable Energy Association (BCSEA) under the auspices of the Canadian Solar Industries Association (CanSIA), which supports solar programs in various communities across Canada (and in partnership with the federal government). Here, the BCSEA works directly with communities to install solar photovoltaic systems and solar thermal projects. A net metering program allows homeowners who wish to install photovoltaic systems to tie this power into existing utility power grids.⁵⁵ Another solar project can be found in the Osoyoos Desert Centre, where federal funds in 2008 helped this facility purchase equipment for the installation of a solar heating system.⁵⁶ The Canadian government earmarked \$20,000 to this facility in the hopes of promoting solar technologies in this tourist-driven area that promotes the protection of rare species. Overall, these solar programs can supply a large part of a home's hot water needs, cut water and heating costs, and reduce emissions from each home.

⁵¹ Canadian Solar Industries Association, Provincial/Territorial Government Incentives, online CSIA: <<http://www.>> (last visited October 10, 2009). The Innovative Clean Energy Fund is a provincial program funded by British Columbia's Ministry of Small Business, Technology, and Economic Development. See generally British Columbia, Ministry of Small Business, Technology, and Economic Development, Innovative Clean Energy Fund, online: <<http://www.tted.gov.bc.ca/ICEFund/Pages/default.aspx>> (last visited October 10, 2009).

⁵² OSEA, *supra* note 5 at 29.

⁵³ Government of Canada, "Government of Canada Invests in B.C. Solar Energy Program", online: <<http://www.news.gc.ca/web/article.engl.do?m=/index&pid=450659>> (last visited October 10, 2009).

⁵⁴ Canadian Solar Industries Association, Community Initiatives, online: <<http://www>> (last visited October 10, 2009).

⁵⁵ OSEA, *supra* note 3 at 42. See also B.C. Sustainable Energy Association, online: Net Metering <<http://www.bcsea.org/learn/get-the-facts/renewable-energy-technologies/solar-power>>.

⁵⁶ Government of Canada, Western Economic Diversification Canada, online: <http://www.wd.gc.ca/eng/77_10158.asp> (last visited October 10, 2009).

The City of Vancouver

Large cities such as Vancouver are promoting solar energy policy through its bylaws. On June 10, 2008, the Vancouver City Council introduced infrastructure bylaws by adding height requirements for “roof-mounted renewable energy technologies”.⁵⁷ Here, homeowners and businesses planning to install roof-top solar devices (such as solar photovoltaic panels or solar thermal collectors) must apply to the Director of Planning for any building height increase. Submission requirements for solar energy technologies include written proof for the roof-mounted technology, and a drawing that shows the design and placement of the solar device installation. In July 2008, Vancouver also enacted energy efficiency bylaws for buildings under its Green Homes Program.⁵⁸ These bylaws include new building requirements that allow for the installation of solar windows, in-home energy display meters, heat recovery ventilators, and solar-ready devices.

Saskatchewan

In 2006, a provincial government report recommended how Saskatchewan should develop renewable energy policy by encouraging renewable energy portfolio standards, net metering, financial incentives to consumers and industry, new building codes, and the establishment of the Office of Energy Conservation.⁵⁹ In Saskatchewan, there are two financial incentives that promote solar energy projects: (1) Green Technology Commercialization Grant and (2) Sustainable Communities Grant.⁶⁰ The Green Technology Commercialization Grant promotes commercial efforts to create new green technologies in small or medium-sized enterprises. This grant program also allows non-profit organizations, non-governmental groups, academic researchers, and

⁵⁷ City of Vancouver, online: <<http://www.vancouver.ca/commsvcs/Bylaws/bulletin/R007.pdf>> (last visited October 10, 2009).

⁵⁸ City of Vancouver, Green Homes Program, Introduction, online: <<http://vancouver.ca/commsvcs/CBOFFICIAL/greenbuildings/greenhomes/>> (last visited October 10, 2009).

⁵⁹ Peter Prebble, Renewable Energy Development and Conservation in Saskatchewan (December 2006), A First Report on Making Saskatchewan a Canadian Leader in Energy Conservation and Renewable Energy Development, online: <<http://www.cicorp.sk.ca/energy-development-conservation/ren-ene-dev-con-report.pdf>> (last visited October 10, 2009).

⁶⁰ Deloitte, Incentives for Going Green, online: <http://www.deloitte.com/view/en_CA/ca/services/tax/greenincentives/index.htm> (last visited October 10, 2009).

municipalities to partner with these business enterprises to commercialize green products such as solar energy devices.

The Sustainable Communities Grant provides up to \$100,000 in funding for non-governmental groups, communities, and aboriginal organizations.⁶¹ When applying for this provincial grant, an applicant must disclose a project workplan and budget. The project workplan must indicate a timeline, along with the core objectives that affect a community both environmentally and economically. The project budget must outline all expenses incurred on materials, supplies, and equipment that develop green programs. In Saskatchewan, the Energy Star Rebate for New Homes is tailored for residents who build or purchase a newly constructed ENERGY STAR home between April 1, 2007 and March 31, 2008.⁶² Here, residents are eligible to receive up to \$2,400 in rebates for the installation of solar domestic hot water heating systems. A retrofit program known as the EnerGuide for Houses program is tied to the federal ecoENERGY Retrofit Initiative, and allows residents who qualify for this program to receive \$1,500 from both federal and provincial funds for the installation of solar domestic hot water heating systems.

The Solar Heating Initiative for Today (SHIFT) is a new provincial program that helps consumers, businesses, and industries to heat water and air using solar energy sources.⁶³ This program is directly linked to the federal ecoENERGY for Renewable Heat Program, and matches funds by providing up to 50 percent of the project costs for new solar equipment installations.⁶⁴ That is, if a consumer or business applies for the SHIFT program, they must submit a joint application with the federal ecoENERGY for Renewable Heat Incentive. Along with these applications, consumers or businesses

⁶¹ Go Green Saskatchewan, Green Initiatives Fund, Sustainable Communities Grant Application Fund, online:

<<http://www.environment.gov.sk.ca/adx.aspx/adxGetMedia.aspx?DocID=1609,1608,1607,94,88,Documents&MediaID=824&Filename=Sust+Comm+App+Form+-+Feb.+8'08.pdf&l=English>> (last visited October 10, 2009).

⁶² *Ibid.*

⁶³ Government of Canada, ecoACTION, Solar Heating Initiative for Today (SHIFT), online:

<<http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/heat-chauffage/sk-shift-eng.cfm>> (last visited October 10, 2009). SHIFT is funded by the government of Saskatchewan and it is delivered through a partnership of the Saskatchewan Research Council and Natural Resources Canada.

⁶⁴ Smart Science Solutions, Solar Heating, online: <

http://www.src.sk.ca/html/research_technology/energy_conservation/solar_heating/> (last visited October 10, 2009).

must provide a project budget with their project engineer or technology supplier. To be eligible for funding, the type of solar collectors must conform to the List of Accepted Collectors, which is a government-approved list of quality solar collectors that may be installed in homes or buildings.⁶⁵ This is another example of how Canadian regulatory standards are being improved to deploy quality solar energy projects in communities. The SHIFT program provides this funding for new solar water heating systems to large businesses, multiple-unit residential buildings over three stories, and public institutions such as schools, hospitals, municipal, and provincial facilities.⁶⁶

Another program known as the Net Metering Program allows individuals who produce energy using a renewable energy source to offset the cost of electricity that would have been consumed without solar power.⁶⁷ Net metering is essential for determining costs associated with consumption of electricity by examining the interconnection with an existing grid network. This program is administered by a utility power company known as SaskPower, and is done through a process known as net metering, which is a method to quantify electricity by calculating overall usage of home or business electricity consumption, taking into account electricity used from the community grid and the installed solar system.⁶⁸ Here, the net metering system uses a forward/reverse flow meter to subtract the amount of electricity fed into the power grid from the amount of electricity imported from the grid to the solar user. The net metering system is found in other Canadian provinces such as Ontario, but is different from Alberta's microgeneration policy which actually pays the owner who produces excess electricity using renewable sources.

⁶⁵ Government of Canada, EcoAction, List of Accepted Solar Collectors, online: <<http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/heat-chauffage/v2008/collectors-capteurs-eng.cfm>> (last visited October 10, 2009). Accompanying the joint applications for the SHIFT program and ecoEnergy federal program, applicants must also submit two consent forms for natural gas and electricity.

⁶⁶ Smart Science Solutions, Solar Heating, online: <http://www.src.sk.ca/html/research_technology/energy_conservation/solar_heating/> (last visited October 10, 2009).

⁶⁷ Canadian Solar Industries Association, Provincial/Territorial Government Initiatives, online: CSIA <<http://www.>> (last visited October 10, 2009).

⁶⁸ OSEA PV, *supra* note 4 at 10. SaskPower is the chief supplier of electricity in Saskatchewan. See generally SaskPower, Profile, online:

<<http://www.saskpower.com/aboutus/corpinfo/corpinfo.shtml>> (last visited October 10, 2009).

The Saskatchewan Research Council (SRC) uses provincial funds from its Green Strategy policy of up to \$300,000 per year during a four-year period to support the installation of new meters.⁶⁹ Here, a one-time fee of 25 percent of start-up costs will be paid by the SRC for projects with generating capacities of 100 kW or less, including solar photovoltaic projects that comply with local utility's net metering policies, and where contracts are entered into with local electric utilities. SaskPower's Environmentally Preferred Power program allows the company to partner with independent power producers to build and maintain small-scale generation projects that utilize solar power with up to five megawatt capacity.⁷⁰

Ontario

Ontario is developing very aggressive solar energy policies for consumers, businesses, and industry. On May 14, 2009, the Government of Ontario passed Bill 150, known as the Green Energy Act, in an effort to promote the use of renewable energy for consumers and businesses.⁷¹ Under the Renewable Energy Standard Offer Program, this legislation gives interested parties priority grid access when using renewable sources of power from wind, solar, biomass, biofuels, water, and geothermal energy. A feed-in-tariff is a subsidy scheme where the owners of solar power systems receive a guaranteed fixed price from the utilities for the electricity fed into the grid.⁷² The Act also allows any solar energy producer to connect to a grid in order to allow reasonable returns on investment, and it sets a fixed feed-in-tariff rate for power sources for projects under 10 megawatts (MW) operating under 20 years. Feed-in-tariffs will be provided as 44.3 cents to 80.2 cents per kilowatt hour for solar energy programs.⁷³ These tariffs represent a

⁶⁹ *Ibid.*

⁷⁰ Centre for Energy, online: Promoting Solar Energy <<http://www.centreforenergy.com/AboutEnergy/Solar/Overview.asp?page=6>> (last visited October 10, 2009).

⁷¹ CanREA, "Ontario Poised to Lead North America on Renewable Power", <<http://www.canrea.ca/site/2009/05/ontario-poised-to-lead-north-america-on-renewable-power/>> (last visited October 10, 2009). The Green Energy Act is also known as the Green Energy and Green Economy Act (2009). The Green Energy Act repeals the Energy Conservation Leadership Act (2006) and the Energy Efficiency Act. See generally Bill 150 (Legislative Assembly of Ontario), 1st Session, 39th legislature (Chapter 12, Statutes of Ontario, 2009). Renewable energy sources refer to any naturally occurring process, including wind, solar, water, biomass, biogas, biofuel, geothermal, tidal forces, or any other energy source prescribed by regulation.

⁷² Nitel, Glossary, online: <<http://www.nitolsolar.com/englossary/>> (last visited October 10, 2009).

⁷³ Feed-in-tariffs will be provided at 44.3 cents to 80.2 cents per kilowatt hour (kWh) for solar energy programs.

market mechanism to allow renewable generators to be paid for the electricity they produce. In most jurisdictions, tariff prices are established at a rate that enables developers to cover the cost of their projects, and to earn a reasonable return on their investment.⁷⁴

Under section 11(1) of the Green Energy Act, a Renewable Energy Facilitation Office allows a Renewable Energy Facilitator to enforce the development of renewable energy projects across Ontario.⁷⁵ Here, the Renewable Energy Facilitation Office serves as an example of an administrative agency which is required to promote renewable energy projects by working with proponents of renewable energy to guide them through approval processes and procedures, and by providing such groups with relevant information relating to requirements to build renewable projects in local communities.⁷⁶ Section 11(3) provides that this office should alert proponents of renewable energy of any impending federal requirements. In this way, the provincial body integrates their activities with local groups who support renewable energy by helping them comply with existing federal requirements for funding of alternative energy projects such as found under the ecoENERGY Programs.⁷⁷

Various sections of the Act promote solar energy-related projects. For instance, section 9 of the Act authorizes the provincial Minister of Energy to enter into agreements in order to promote energy conservation and efficiency.⁷⁸ In particular, this section establishes standards for energy and water conservation for the construction of solar-friendly buildings under subsection 34(5) of Ontario's Building Code Act (1992).⁷⁹ A new subsection 34(6) of the Building Code Act requires the Minister of Energy to conduct reviews of building codes over a 5-year interval, while another new provision under section 34.1 requires the Minister of Energy to establish a Building Code Energy Advisory

⁷⁴ Frederic Pouyot, Proposal for an Act Granting Priority to Renewable Energy Sources to Manage Global Climate Change, Protect the Environment, and Streamline Project Approvals (January 16, 2009).

⁷⁵ *Green Energy Act*, R.S.O. (2009), s. 11(2). In Ontario, this is referred to as Bill 150.

⁷⁶ *Ibid.*, s 11(1).

⁷⁷ *Ibid.*

⁷⁸ Ontario Green Energy Act, online: <
http://www.greenenergyact.ca/Page.asp?PageID=1224&SiteNodeID=202&BL_ExpandID=44>
(last visited October 9, 2009).

⁷⁹ *Building Code Act*, R.S.O. (1992), s. 34(5).

Council to enforce appropriate standards for energy conservation within buildings being constructed throughout the province.⁸⁰

Ontario's Electricity Act (1998) also bridges provincial and municipal governments to work in a multi-disciplinary fashion towards renewable energy enhancement. The provincial Minister of Energy may direct local utility companies to design renewable energy programs and reimburse the direct costs incurred by municipalities on these projects. As section 4.7 of this Act states:

The Minister may direct the OPA (Ontario Power Authority) to develop programs that are designed to reimburse the direct costs incurred by a municipality in order to facilitate the development of renewable energy generation facilities, transmission systems and distribution systems and the funding may include funding for infrastructure associated with or affect by the development of the facilities or systems.⁸¹

Thus, the provincial government gives financial support to municipalities, and works with Ontario's major power authority to streamline requirements for renewable programs in such municipalities. More specifically, funds are provided to municipalities for the building of the infrastructure that is necessary for the installation, use, and maintenance of renewable technologies such as solar heating systems. Several solar energy projects are underway in Ontario.⁸² First, the Ontario government has approved construction of the largest solar farm in North America near Sarnia, Ontario.⁸³ This project involves one million ground-mounted solar panels with an installed capacity of 40 megawatts (MW), enough to power approximately 6,000 homes.

Second, renewable energy cooperatives are forming to promote solar energy. For instance, the Toronto Renewable Energy Cooperative (TREC) has introduced SolarShare, which is a community-based solar program offering members to purchase shares for a photovoltaic (PV) system that is connected to the grid, and where power is

⁸⁰ *Ibid.*

⁸¹ *Electricity Act*, R.S.O. 1998, s. 4.7.

⁸² In Toronto, the Woodgreen Community Housing Project was officially opened in September 2008, which powers 34 percent of a 170-unit building's hot water system. See generally Centre for Energy, Frequently Asked Questions – Solar, online: <http://www.centreforenergy.com/FAQs.ByCategory.asp?Template=About_Energy_Solar&q> (last visited October 10, 2009).

⁸³ Centre for Energy, Frequently Asked Questions – Solar, online: <http://www.centreforenergy.com/FAQs.ByCategory.asp?Template=About_Energy_Solar&q> (last visited October 10, 2009).

sold to the province of Ontario at 42 cents per kilowatt-hour under the Renewable Energy Standard Offer Program.⁸⁴ Thereafter, members receive dividends in proportion to the number of shares per kilowatt-hour produced. This example of a solar cooperative scheme demonstrates how Ontario's Green Energy Act allows citizens to buy into a photovoltaic solar energy system that would save them money on electricity consumption.

Third, a pilot financing project known as PowerHouse has also been created in the regions of Peel and York to allow zero-interest loans of \$50,000 to be provided for residents to install alternative and renewable energy technologies in their homes.⁸⁵ As part of this initiative, both photovoltaic and solar thermal projects are eligible for funding, which is operated by Hydro One and Enersource. Fourth, a rural-based solar initiative is found in the Northern Ontario Heritage Fund: The Small Business Energy Conservation Program, which covers various solar hot water projects for restaurants, solar air heating in manufacturing plants, and solar pool heating for hotels.⁸⁶

In terms of financial incentives, the Ontario government introduced the Solar Energy Systems Rebate Program as a means to return the Retail Sales Tax (RST) paid on solar energy systems to homeowners or builders, who install the energy systems into residential premises.⁸⁷ The rebate applies to components that are required to operate a solar energy system, including solar collector panels (photovoltaic or thermal), charge converters, wiring, pumps, tubing, heat exchangers, and energy storage tanks. The rebate can be claimed by the owner of a residential home or multi-residential building, or a builder who proves that the solar system is installed by the builder prior to the sale of the newly-constructed home or multi-residential building. This rebate scheme was

⁸⁴ OSEA, *supra* note 5 at 22. Canadian cooperatives operate under the Canada Cooperatives Act (1998, c.1). These groups are different from corporations in that each member has an equal vote in the decision-making process. Despite this, however, cooperative profits are dispersed based on the size of individual member investment. So, it is possible for one member with twice the investment to make twice the profit. In Ontario and Quebec, cooperative regulations impose a condition whereby the cooperative must do 50 percent of their business with members of that community.

⁸⁵ *Ibid.* Applicants may apply for a provincial sales tax (PST) exemption for 3 percent rebate off the total cost of any new residential solar thermal system. The PST rebate is typically in the range of \$170 - \$240.

⁸⁶ *Ibid.* at 28. See generally <http://www.mndm.gov.on.ca/nohfc/Default_e.asp>.

⁸⁷ Government of Ontario, Ministry of Revenue, Solar Energy Systems Rebate Program, online: <<http://www.rev.gov.on.ca/en/refund/sesr/>> (last visited October 10, 2009).

introduced under the auspices of Ontario's Electricity Pricing, Conservation and Supply Act of 2002, which was enacted to stabilize the price of electricity for Ontario consumers, and compensate users for any excess costs above 4.3 cents per kilowatt hour (kWh).⁸⁸

The City of Toronto

In August 2006, Canada's largest solar photovoltaic (PV) system was installed at Exhibition Place in Toronto, a facility that has a capacity of 100 kilowatts (kW).⁸⁹ This is an example of a solar project that is funded by the Federation of Canadian Municipalities Green Municipal Fund, which is a fund established by an association of municipalities concerned with urban planning.⁹⁰ Zoning requirements in the City of Toronto offer a showcase of various forms of solar energy issues.⁹¹ Prior to March 2008, Toronto zoning bylaws did not permit renewable energy devices to capture and utilize energy. At present, however, any homeowner may produce energy using renewable energy sources, provided that the character of the property is preserved.⁹²

Toronto's zoning bylaws also provide that when a solar energy device is located on a building that is considered a dwelling unit, it is subject to the zoning requirements for the building on which the device is installed. If not located on the building, the solar energy device is still subject to zoning requirements of adjacent buildings or the main building

⁸⁸ Electricity Distributor's Association, online: <<http://www.eda-on.ca/eda/edaweb.nsf/54b504a8dbdd00ab852567fd004de8a5/2eec6ace9e9272a885256d4e004d037c?OpenDocument>> (last visited October 10, 2009). The Electricity Pricing, Conservation and Supply Act of 2002 was enacted on December 9, 2002, in response to concerns over large increases in electricity costs in the summer of 2002. See generally Ontario Energy Board, History of the OEB, The Electricity Pricing, Conservation, and Supply Act of 2002 online: <<http://www.oeb.gov.on.ca/OEB/About+the+OEB/History+of+the+OEB>> (last visited October 10, 2009).

⁸⁹ Plug Into the Sun! The 4th Annual Canadian Solar Buildings Conference (June 25-27, 2009), online: <<http://www.solarbuildings.ca/c/sbn/docs/conf2009/SB-Detailed-Conference-Program-2009.pdf>> (last visited October 10, 2009).

⁹⁰ FCM.ca, FCM's Green Municipal Fund, online: <<http://gmf.fcm.ca/gmf/>> (last visited October 10, 2009).

⁹¹ City of Toronto, online: <http://www.toronto.ca/building/pdf/renewable_energy_flyer.pdf> (last visited October 10, 2009).

⁹² The City of Toronto, Proposed Bylaw Would Permit Renewable Energy Generation On All Properties (January 11, 2008), online: <<http://wx.toronto.ca/inter/it/newsrel.nsf/11476e3d3711f56e85256616006b891f/2cc7080f1b8232e9852573cd0066642f?OpenDocument>> (last visited October 10, 2009).

such as a commercial building. In June 2008, the City of Toronto and Toronto Hydro (a utility company) launched the Solar Neighbourhoods Initiative.⁹³ This program offers financial incentives for solar hot water installations made by residents living in the Toronto-Danforth area.⁹⁴ This program is part of a broader municipal policy known as the Live Green project, which advocates solar hot water programs by involving a community advisory committee

Nova Scotia and Prince Edward Island

Nova Scotia has three rebate programs that promote solar energy efficiency: (1) Commercial/Industrial Solar Hot Water & Solar Hot Air Rebate; (2) Residential Solar Hot Water Rebate; and (3) Residential Solar Air Rebate.⁹⁵ In these programs, the government of Nova Scotia provides 10 percent on top of the 25 percent federal contribution for commercial, industrial, and institutional solar thermal projects.⁹⁶ A solar incentive program known as the Renewable Heat Loan Program is also available to those residents who plan to install solar air and solar domestic hot water systems.⁹⁷ This program provides loans of up to \$5,000 at an interest rate of 6 percent, and where the loan is paid back at \$90 per month regardless of the loan balance.⁹⁸ There is also a provincial sales tax exemption (similar to B.C. and Ontario) on small-scale renewable energy equipment, including solar thermal and solar photovoltaic systems.

Prince Edward Island (PEI) also offers a provincial sales tax exemption by taking 10 percent off the final price of newly installed solar thermal and solar photovoltaic collection systems.⁹⁹ As an example of debt financing (which meets the capital costs of installing solar technologies), the PEI Alternative Heating Loan Program provides up to \$5,000 loans with a 6 percent interest rate for the purchase and installation of

⁹³ Live Green Toronto, Renewable Energy, online: <http://www.toronto.ca/livegreen/home_energy_renewable.html> (last visited October 10, 2009).

⁹⁴ The City of Toronto, Toronto Solar Neighbourhood Initiative, online: <<http://www.toronto.ca/taf/solar.htm#tsni>> (last visited October 10, 2009).

⁹⁵ Canadian Solar Industries Association, Provincial/Territorial Government Initiatives, online: <<http://www.>> (last visited October 10, 2009).

⁹⁶ OSEA, *supra* note 5 at 29.

⁹⁷ Canadian Solar Industries Association, Provincial/Territorial Government Initiatives, online: <<http://www.>> (last visited October 10, 2009).

⁹⁸ *Ibid.*

⁹⁹ OSEA, *supra* note 5 at 29. See also Prince Edward Island, Energy Efficiency <<http://www.gov.pe.ca/envengfor/index.php3?number=1012183&lang=E>>.

alternative heating systems that reduce fossil fuel consumption, including for solar air and water heating systems.¹⁰⁰

DRAWING SOLAR ENERGY FROM OTHER JURISDICTIONS

Canadian solar energy policy is influenced by three other jurisdictions with well-developed solar energy policies and projects – Germany, Japan, and the United States. Each of these nations has developed modern concepts of solar energy policy, including: (1) the provision of financial incentives; (2) new technologies such as photovoltaic cells and solar panels; (3) feed-in-tariff programs; (4) creating municipal building codes to promote energy efficiency; and (5) reducing the impact of high electricity costs through a multi-disciplinary regulatory framework. These concepts are found in Canadian public policymaking with respect to solar energy and broader renewable energy projects. Therefore, it would be helpful to briefly examine these jurisdictions.

Germany

Germany has a long history in developing solar energy policy, both for photovoltaic systems and solar thermal heating systems. Much of Germany's success in driving solar energy policy depends upon federal subsidies that encourage local community initiatives. In 1991, the Solar Roofs Program was launched as a scheme to provide homeowners with financial incentives to install photovoltaic systems as a means to consume power at reduced utility costs.¹⁰¹ Each participant was provided with a loan of 6,230 Euros per kilowatt, and the goal was to install 100,000 photovoltaic systems throughout Germany.¹⁰²

The Solar Roofs Program ended in 2004 with the successful installation of the required number of photovoltaic systems. In addition to these efforts, the German government

¹⁰⁰ OSEA, *supra* note 5 at 30. See also Natural Resources Canada, Clean Energy International, Alternative Heating Loan Program, online: <http://www.cleanenergy.gc.ca/international/project_e.asp?item=278> (last visited October 10, 2009).

¹⁰¹ Breakthrough Institute, Soaking Up the Sun: Solar Power in Germany and Japan, online: <http://www.thebreakthrough.org/blog/2009/04/soaking_up_the_sun_solar_power.shtml> (last visited October 10, 2009).

¹⁰² *Ibid.*

supported a “feed-in-tariff” program that integrated solar technologies with existing community power grids in helping supply electricity to homes and businesses. The feed-in-tariff program is part of the country’s renewable energy laws that provides a guaranteed price to consumers for 20 years at higher-than-market prices for electricity generated (an approach which found its way in Ontario’s feed-in-tariff policy). More specifically, the feed-in-tariff program allows a tariff to be reduced by 5 percent every year to those who utilize solar energy.

Japan

Japan is another country that places importance on solar energy policy. In 1974, Japan started the New Sunshine Project under its Ministry of International Trade and Industry (MITI) as a means to develop solar energy sources.¹⁰³ The New Sunshine Project is a program that encouraged the development of new energy technologies. In 1993, Japan’s newly formed Ministry of Economy, Trade, and Industry (METI) launched another version of the New Sunshine Project, which built photovoltaic systems and modernized the domestic infrastructure for solar energy.¹⁰⁴ Strong legislative efforts in 1994 led to the establishment of Basic Guidelines for New Energy to build alternative energy sources in Japan.¹⁰⁵ On July 1, 2008, Japan launched its Renewable Energy Policy Platform in order to study and promote renewable energy programs.¹⁰⁶ Under this policy, new forms of renewable energy are advocated through a consortium of groups (led by the Institute for Sustainable Energy Policies) to help establish clear targets for renewable energy programs, public education about renewable energy, and to reduce barriers in the marketplace.¹⁰⁷

¹⁰³ Japan Ministry of Economy, Trade, and Industry, online: <<http://www.meti.go.jp/english/aboutmeti/data/ahistory2009.html>> (last visited October 10, 2009).

¹⁰⁴ ASCE Research Library, New Sunshine Program – Comprehensive Approach to the 21st Century, online: <<http://scitation.aip.org/getabs/servlet/GetabsServlet?prog=normal&id=JLEED9000122000003000093000001&idtype=cvips&gifs=yes>> (last visited October 10, 2009).

¹⁰⁵ CAT.INIST, New Sunshine Project and New Trend of PV R & D Program in Japan, online: <<http://cat.inist.fr/?aModele=afficheN&cpsidt=3142613>> (last visited October 10, 2009).

¹⁰⁶ Japan For Sustainability, online: <<http://www.japanfs.org/en/pages/028554.html>> (last visited October 10, 2009).

¹⁰⁷ Institute for Sustainable Energy Policies, About Us, online: <http://www.isep.or.jp/e/Eng_isep.html> (last visited October 10, 2009).

In 2009, METI announced a new policy known as the New Purchase System for Solar-Power Generated Electricity that would promote energy security in Japan.¹⁰⁸ This policy requires electric utility companies to purchase excess electricity generated from solar power energy sources at specified prices. This policy will begin on November 1, 2009, and generally draws from the Law of the Promotion of the Use of NonFossil Energy Sources and Law No. 72 of 2009 (known as the Effective Use of Fossil Energy Materials by Energy Suppliers).¹⁰⁹ By 2015, the Japanese government plans to launch its first solar satellite into the Earth's orbit, using solar panels to capture solar rays and transmit this energy back to Earth-bound solar stations.¹¹⁰ Technology is being developed for this 1-gigawatt (GW) solar power station, which is estimated to cost around \$21 billion.¹¹¹ Although the costs involved in transporting equipment and technology to space will be substantial, there is support from the Japanese government to start researching this initiative.

United States

The United States has drawn much of its solar energy policies from the European Union and Japan to promote more energy independence and renewable projects. In the 1970's, major solar initiatives were introduced as solar access ordinances in cities such as Los Angeles, San Diego, Albuquerque, and Cincinnati. These ordinances would serve various purposes, including: (1) removing restrictions that were adverse to solar access development; (2) introducing municipal building codes for solar orientation; and (3) preventing neighbours from erecting structures or growing vegetation that would shade an adjacent property owner's solar devices.¹¹² Specific legislative measures encouraged the installation of solar energy devices in communities for homeowners, such as California's Solar Rights Act of 1978, which states: "Any covenant . . . which effectively prohibits or restricts the installation or use of a solar energy system is void and unenforceable."¹¹³

¹⁰⁸ Japan Ministry of Economy, Trade, and Industry, online: < http://www.meti.go.jp/english/press/data/20090831_02.html > (last visited October 10, 2009).

¹⁰⁹ *Ibid.*

¹¹⁰ EnergyBoom.com, online:< <http://www.energyboom.com/solar/final-frontier-japans-21-billion-solar-space-post> > (last visited October 10, 2009).

¹¹¹ *Ibid.*

¹¹² Minan, *supra* note 1 at 57.

¹¹³ *Ibid.* at 39.

In 1978, the first federal tax incentive was introduced in the Energy Tax Act, which provided a 15 percent tax credit to solar manufacturers and users in both commercial and residential settings.¹¹⁴ From this federal statute, solar energy policies were gradually being incorporated into state energy programs. In recent years, the federal Department of Energy's Solar Energy Technology Program, which is intended to promote cost-effective solar energy projects such as photovoltaic systems, concentrated solar power, and low temperature solar collectors.¹¹⁵ In 2005, the Energy Policy Act introduced income tax incentives for solar energy systems installed by commercial or residential users, giving up to 30 percent tax credits for solar energy projects. Moreover, tax deductions were introduced for commercial buildings that reduce annual energy consumption by 50 percent when compared to the American Society of Heating, Refrigerating, and Air Conditioning engineering standards.¹¹⁶ In 2008, the U.S. government introduced the Investment Tax Credit (ITC) as a means to encourage commercial and residential use of renewable-based solar energy programs.¹¹⁷ The ITC initiative reduces the tax liability for individuals and businesses who plan to invest in solar technologies and application.

The most recent legislation introduced by the Congressional Senate that is on point with building renewable energy is known as the American Clean Energy Leadership Act of 2009.¹¹⁸ This Act seeks to promote clean energy technology, energy efficiency, energy innovation, and workforce development. Similar to Canada's ecoENERGY programs, section 262 of the Act deals with state energy efficiency retrofit programs as a means to

¹¹⁴ Solar Energy Industries Association, Federal Issues – The Investment Tax Credit (ITC), online: <http://www.seia.org/cs/solar_tax_policy> (last visited September 13, 2009). The Solar Energy Industries Association (SEIA) is a national trading association for the solar energy industry in the United States. See generally Solar Energy Industries Association, About Us, online: SEIA <http://www.seia.org/cs/about_SEIA> (last visited October 10, 2009). See also Minan, *supra* note 1 at 69.

¹¹⁵ U.S. Dept. Of Energy, online: <<http://www.energy.gov/energysources/solar.htm>> (last visited October 10, 2009). The Solar Energy Technology Program is administered by the Office of Energy Efficiency and Renewable Energy. The program is aimed at educating the public about solar energy resources and options.

¹¹⁶ Kevin J. McIntyre, Martin V. Kirkwood & Jason F. Leif, *Energy Policy Act of 2005* (LexisNexis, 2006) at 206. The tax credit provision for solar energy projects is found in section 1.13(2)(j)(i), while the tax credit provision for commercial building energy efficiency is found in section 1.13(2)(j)(ii).

¹¹⁷ Solar Energy Industries Association, Federal Issues – The Investment Tax Credit (ITC), online: <http://www.seia.org/cs/solar_tax_policy> (last visited October 10, 2009). This program is part of the Emergency Economic Stabilization Act of 2008, which was enacted on October 1, 2008.

¹¹⁸ U.S. Congress, 111th Congress, online: <http://energy.senate.gov/public/_files/END09B90_xml.pdf> (last visited October 10, 2009).

encourage state financial support for those using solar energy devices in homes and businesses. Section 241 of the Act goes further to address greater energy efficiency in building codes, where national model building energy codes must be updated by the Secretary every three years to achieve overall energy savings.

In 2009, the American Recovery and Reinvestment Act extended consumer tax incentives originally enacted under the Energy Policy Act of 2005.¹¹⁹ For example, under the Home Energy Efficiency Improvement Tax Credit, a consumer who purchases and installs energy-efficient products such as windows, insulation, doors, roofs, and heating or cooling equipment can receive a tax credit for 30 percent of the start-up costs (and up to \$1,500) for a solar energy device.¹²⁰ Supplementing this program is the Residential Renewable Energy Tax Credit, where consumers who install solar energy systems (including solar water heating systems), can receive a 30 percent tax credit for systems placed in the home prior to December 31, 2016.¹²¹

California

California is the most progressive state when it comes to the promotion of solar energy policy, so much that the U.S. Department of Energy launched its Million Sun Roofs Program in California as a means to provide \$1.5 million to help homeowners install photovoltaic systems.¹²² This program is a response to California's energy crisis in 2000 and 2001, where the state experienced a severe shortage of electricity. In January 2006, California's Public Utilities Commission (PUC) approved the California Solar Initiative, which is a state program that allows for the allocation of \$3.2 billion to small-scale solar energy projects over the course of 11 years.¹²³ The Solar Initiative involves several components, including: (1) consumer rebates; (2) expanded net metering; and

¹¹⁹ U.S. Dept. Of Energy, Consumer Energy Tax Incentives, online: <<http://www.energy.gov/taxbreaks.htm>> (last visited October 10, 2009).

¹²⁰ *Ibid.*

¹²¹ Database of State Incentives for Renewables & Efficiency (DSIRE), Federal Incentives, Policies for Renewables and Efficiencies, Residential Renewable Energy Tax Credit, online: <http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US37F&re=1&ee=1> (last visited October 10, 2009).

¹²² U.S. Dept. Of Energy. Known as SB 1, the Million Solar Roofs Bill was introduced by Governor Schwarzenegger on August 21, 2006, to complement the California Solar Initiative. This program took effect on January 1, 2007.

¹²³ California Public Utilities Commission, About the California Solar Initiative, online: <<http://www.cpuc.ca.gov/puc/energy/solar/aboutsolar.htm>> (last visited October 10, 2009).

(3) new home mandates.¹²⁴ The objective of the California Solar Initiative is to install 1 million solar roof tops on homes, or produce 3,000 megawatts (MW) of solar electric power.

This program represents the largest investment by a state government in the United States to trigger the most comprehensive solar energy policy framework. Consumer rebates will be provided to prospective homebuyers and existing homeowners for the installation of solar energy projects. California's New Solar Homes Partnership is another program that offers an incentive package where large-scale homebuilders offering solar energy systems as a feature on new homes would receive \$2.60 per watt of electricity from solar power.¹²⁵ Operating under the California Solar Initiative, solar users may qualify for federal income tax credit of up to \$4,000 (U.S).¹²⁶ The new home mandate requires solar energy to be part of a standard option for new homebuyers by 2011.

Emerging Trends and Recommendations

It is clear that solar energy is becoming a viable alternative energy in Canada, and serious efforts are being made to improve the technology of solar energy devices. For instance, solarwalls are a new form of technology where metal solar collectors are mounted vertically on the south-facing walls of buildings.¹²⁷ This system of solar orientation uses solar energy to preheat ventilated air, which is distributed inside a building with a fan and ducts to provide domestic heating. Another emerging idea is the Solar Power Satellite (SPS) where solar power plants in orbit above the Earth would

¹²⁴ Environment California, California's Million Solar Roofs Initiative, online: <<http://www.environmentcalifornia.org/energy/million-solar-roofs/fact-sheet2/legislation>> (last visited October 10, 2009).

¹²⁵ Cassidy Johnson & Lisa Dignard-Bailey, Implementation Strategies for Solar Communities, online: CanmetENERGY <http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/fichier.php/codectec/Fr/2008-171/2008-171_TR-J_411-PVPSTR_johnson_dignard_e.pdf> (last visited October 10, 2009).

¹²⁶ *Ibid.*

¹²⁷ Solar Update, Country Profile: Canada's Solar R & D Energy Strategy, <<http://>> (last visited October 10, 2009).

convert sunlight into electricity, and beam the energy directly to ground-based receiving stations that would connect with existing grids.¹²⁸

The concept underlying the SPS program is that sunlight is more intense in the Earth's orbit when compared to the Earth's surface, and therefore harnesses more energy. Moreover, the sun shines continuously in the Earth's orbit, and is not affected by clouds or changes in climate – both factors of which are essential in determining solar access, and hence the amount of energy produced by solar technologies. Although this endeavour may be costly, perhaps joint efforts between space agencies, researchers, and the federal government can develop research programs that would improve upon these innovative approaches. In Canada, a recent joint research project between the National Institute for Nanotechnology and the University of Alberta has produced improved plastic solar cells in the hopes of reducing the high costs and shortage of silicon.¹²⁹ This nanotechnology team estimates that plastic solar panels will be mass produced as the next generation of solar technology plastics.

When considering the development of solar energy policy in Canada, the following recommendations are made for policymakers:

- Introduce legislation exclusively for solar energy at all levels of government
- Long-term mandatory targets for developing solar technologies across Canada
- Applying large-scale solar projects to build more solar communities
- Increased compatibility of solar energy with the existing electricity sector in all provinces
- Mandatory review cycles for building codes and solar equipment standards
- Increasingly drawing from international developments in solar energy policy

Conclusion

Solar energy policy shows great promise in Canada. In several provinces and municipalities there is a genuine effort to promote solar energy policy at the community level, which draws largely from an over-arching federal eco-ENERGY program that provides financial incentives to trigger investment and interest in the solar energy

¹²⁸ Space Canada, Solar-Based Power Satellites Overview, online: <http://www.spacecanada.org/index.php?page=solar_power_satellites_> (last visited October 10, 2009).

¹²⁹ National Research Council Canada, Announcements – Nanotechnology Researchers at NINT and the University of Alberta Make Solar Energy Advance, online: <<http://www.nrc-cnrc.gc.ca/eng/news/nint/2009/02/27/solar-energy.html>> (last visited October 10, 2009).

industry. After reviewing the most recent solar energy policies in Canada, it is apparent that a multi-disciplinary regulatory framework is emerging that includes the federal, provincial, and municipal governments (including the Federation of Canadian Municipalities), utility companies, home builders, academic research institutes, and private industry stakeholders.

But these programs in Canada largely inherit policy from solar programs launched in the renewable sectors of Germany, Japan, and the United States. In moving from an unregulated industry to one with more defined guidelines and procedures, the Canadian government is beginning to play a pivotal role in making solar energy a viable alternative form of energy. Thus, the success of solar energy policy in Canada largely depends on supportive government policy instruments that support community-based programs. Recognizing that fossil fuels are a finite resource, and that energy costs in Canada are rising, there are compelling reasons to promote solar energy. Hopefully, legislative advances in all levels of government will continue to transform solar energy from being an untapped specialized technology to a permanent fixture in Canada's communities that foster sound renewable energy policy and planning.

Table 1: Active Solar Energy Projects in Canada

| PROVINCE | SOLAR PROGRAM | YEAR | CHARACTERISTICS | LEGISLATION |
|-------------------------|---------------------------------|---------|--|-------------|
| British Columbia | Solar Hot Water Heating Program | 2008 | Rebates up to \$1,000 for solar hot water systems | None |
| | Osoyoos Desert Society | 2008 | \$20,000 funds for installation and equipment | |
| Alberta | Drake Landing Solar Community | 2007 | 52-unit solar community housing project connected to underground storage tanks | None |
| Saskatchewan | Energy Star | 2007-08 | Up to \$80,000, or | None |

| | | | | |
|-----------------------------|---|-----------|--|----------------------|
| | Rebate for New Homes | | \$2 million for multiple corporate installations | |
| | Solar Heating Initiative of Today (SHIFT) | 2007-2011 | | |
| Ontario | Toronto Living Green Project | 2008 | Financial incentives | Green Energy Act |
| | Woodgreen Community Housing | 2008 | 134-unit solar hot water community | Toronto project |
| | SolarShare | 2008 | Photovoltaic system | Toronto project |
| | PowerHouse | 2008 | Interest-free loans of up to \$50,000 | Peel and York region |
| Prince Edward Island | Alternative Heat Program | 2006 | Tax incentive | None |
| Manitoba | Green Energy Equipment Tax Credit | 2009 | Solar Thermal Energy Systems (solar collectors, heating systems) | None |

Figure 1: An Example of a Multidisciplinary Framework in the Drake Landing Solar Community (Okotoks, Alberta)¹³⁰

¹³⁰ Cassidy Johnson & Lisa Dignard-Bailey, Implementation Strategies for Solar Communities, online: <http://canmetenergy-canmetenergie.nrcan-nrcan.gc.ca/fichier.php/codectec/Fr/2008-171/2008-171_TR-J_411-PVPSTR_johnson_dignard_e.pdf> (last visited October 10, 2009).

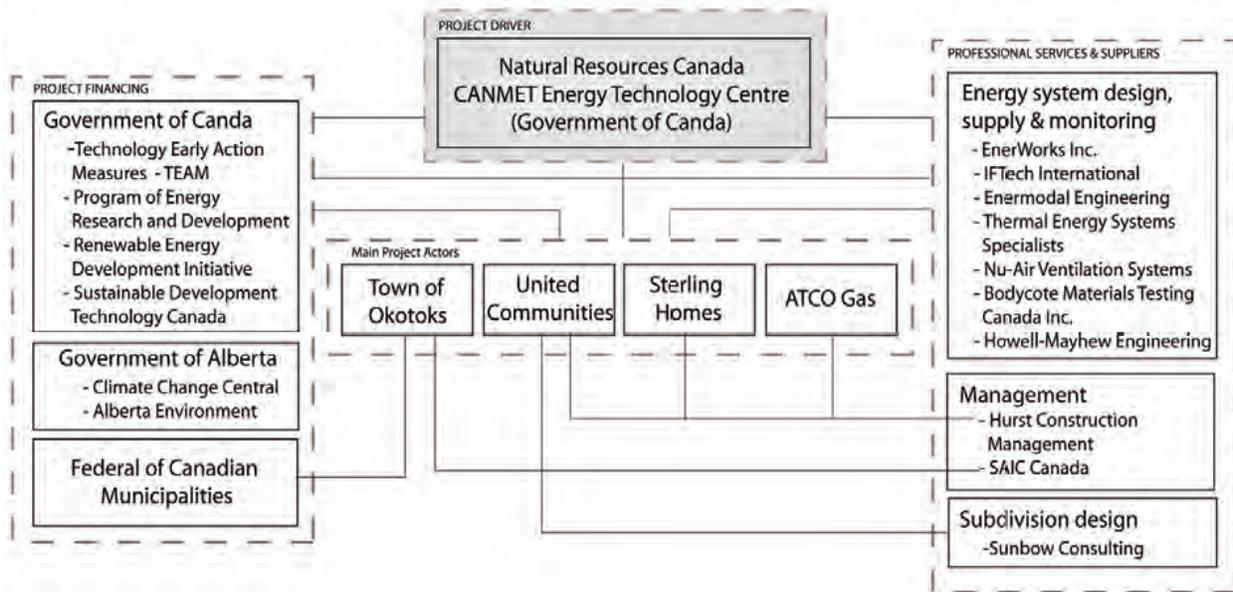
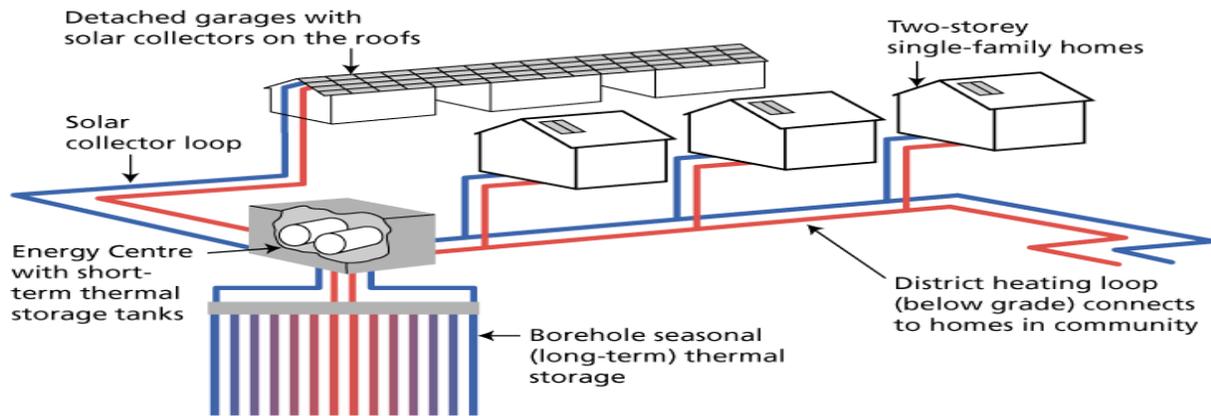


Figure 2: Drake Landing Solar Community (Okotoks, Alberta) – Solar Energy Storage¹³¹



¹³¹ *Ibid.*