



SOL

SESCI's Quarterly Newsletter



Ten Features of Successful Solar Policies

by Frederic Pouyot

There are countless articles that elaborate on the reasons why solar energy is not as widespread and as successful as it could be. It seems that the focus on the barriers to successful solar energy applications creates a negative mindset that contributes to rationalizing Canada's lack of success with solar. The purpose of this article and others to follow is to focus on what needs to be done instead of on why things are not done. I always say that *attitude* sets the *altitude*. It is better to shoot for the stars, even if we have to settle for the moon, or actually, in this case, settle for the sun. Canada's populated areas are fortunate to have a solar resource that is in fact more abundant than Japan and Germany, the two world leaders in the adoption of solar photovoltaics (PV); furthermore, PV can actually work at higher efficiency in our colder climate. With Canada's population more spread out over this vast land than in any other industrialized country, solar thermal offers the benefit of cost-effective decentralized source energy. When appropriate financial measures are applied, such as capital cost financing through the first five to ten years of the equipment life-cycle, solar thermal is already cost-competitive with fossil fuel energy and offers the benefit of possible positive cash flows from the first year of implementation.

Canada's populated areas are fortunate to have a solar resource that is more abundant than Japan and Germany - two leaders in the adoption of solar photovoltaics

So why isn't solar more popular?

One of the generally accepted responses is that we need greater *awareness*. The problem with awareness is that if there are no strong and sustainable support mechanisms in place, awareness will just increase curiosity, but will not be enough for most people to take real and meaningful action. We have witnessed a similar predicament with the Rick Mercer advertisements for the *One-Tonne Challenge*.

Continued on Page 2

In this issue:

<i>Ten Features of Successful Solar Policies</i>	<i>1-7</i>
<i>Featured Project</i>	<i>7</i>
<i>Upcoming Events</i>	<i>8</i>
<i>Membership</i>	<i>8</i>

TEN FEATURES OF SUCCESSFUL SOLAR POLICIES

Policies need to complement awareness programs if solar is to reach its full potential in Canada. What are good policies? The first thing the author has done is to look for success stories in the solar industry, not just in Canada, but globally. Inevitably, it has been observed that sustained success in solar is accompanied by sound solar policies. In order to understand how the suggestions below were conceived, some information about the sources from which they came are provided. This article is organized around the key policies from the three levels of governments in Canada, starting at the most local level.

Awareness will increase curiosity, but will not be enough for most people to take real meaningful action

Municipal Policies

Municipal policies are possibly the most important policies as they can lay the foundation for making solar technically possible. Successful municipal solar policies can also have a ripple effect as clearly demonstrated by the solar policies of Barcelona, Spain. Barcelona mandated that solar be implemented *whenever possible*, especially on new construction projects. The steps taken in Barcelona were so successful that they were duplicated throughout Spain, prior to being adopted by the central government of Spain. Below are the three pillars of municipal solar policies.

1) Solar Access Bylaws

- Right to light: Legislation that addresses the uncertain future of solar energy and the question of a transferable property interest in sunlight. Such a property right by landowners, even though transferable, would likely facilitate solar heating and cooling systems¹.
- Solar bylaw: Mandating solar, such as the example of Barcelona.²

- No bylaws that ban solar for aesthetic reasons. While solar may be not considered aesthetically pleasing by some, the same could be said about hydro and telephone poles, parabolic antennas, chimneys, as well as many modern architectural designs that do not have any utility function. Clear municipal legislation allowing solar collectors on roofs and walls would prevent projects from being hijacked by unenlightened neighbours.

2) Road and Lot Planning

Favourable orientations: for new constructions and development, favourable orientation taking advantage of solar insolation is absolutely essential. Builders typically want to situate buildings so that a building's long side faces the road. Most of the time, this is not the best orientation for capturing maximum solar energy. Even the City of Ottawa had considered this aspect after the oil crash of the 1970's. This type of policy should be resuscitated and updated.

3) Reasonable Building Codes

- Plumbing codes that do not mandate double-wall heat exchangers. In climates such as Canada's, many solar thermal systems require the use of antifreeze, along with a heat exchanger to transfer the heat from the collector loop to the domestic water. For lack of understanding that the antifreeze used is typically food grade glycol, some building inspectors require a double wall heat exchanger, which deters potential users as it so negatively affects the performance of a domestic water system over its life cycle. A proactive legislation that specifically allows single wall heat exchangers would be highly beneficial. At a minimum, literature that addresses this topic should be created and distributed to municipal building inspectors to educate them on this issue.

¹ *Is the Right to Light a California Necessity?*, William R. Harris
- Support RAND Research

² <http://www.uniseo.org/image/energypages/barcelona.html>

- Building permits that do not require CSA approval of complete systems, or necessitate the hiring of expensive structural engineering firms to add certified stamps for simple residential installations. While there is certainly a need to insure the quality of equipment and installations, if a solar collector has been certified in Europe (Keymark), the USA (SRCC), or by another jurisdiction in Asia with recognized similar high standards, this should be sufficient to building inspectors. Some vendors sell residential kits which may also get CSA approval, but for larger systems or custom designed systems, the stamp of approval of an engineering firm should be sufficient, as CSA does not certify large systems.

Barcelona mandated that solar be implemented whenever possible, especially on new constructions

Examples of municipal programs:

Austin, Texas. Virtually every step of the way, Austin translated its forward-thinking energy program and policies into regulations, laws, and building codes, entrenching them in city departments. So, in 1987, when the flame flickered and key renewable energy supporters left the political scene, the programs they brought to life weren't snuffed out as well. When extra electric capacity was added to the region, energy managers quietly shifted their conservation arguments from economic to environmental grounds, justifying that the cost for conservation was well worth the effort of keeping tons of pollutants out of the air. A commission published the "Renewable Energy Development Plan", known as the RED plan. Researched and written by 80 volunteers, the plan recommended:

- Zoning laws that encouraged builders to orient homes and other buildings for maximum sun exposure during the winter, and minimum exposure during the summer.
- Requiring city owned utility to investigate and adopt technology for generating renewable energy

sources.

- New building codes requiring contractors to include renewable energy technology in buildings and install energy efficient heating and cooling systems. Utility rates changed. Austin put in place a rate structure that discourages electricity waste by all, including corporations and large users. Starting in 1981, the new rate structure scale charged homeowners and small businesses a flat rate for 500 kilowatt-hours per month. Anything consumed over that amount was billed on an inverted scale, with rates climbing along with consumption, instead of paying less as consumption increased. Giant industrial customers were charged a flat per-kilowatt rate. About three quarters of local homeowners and small businesses saw smaller electric bills as a result.

Solar Energy Use. The city of Austin is considered one of the leaders in promoting renewable energy use. The Conservation Power Plant's aggressive goal was of 200 megawatts of renewable generated electricity, including a 300 kilowatt PV plant. The project manager realized that solar-generated electricity was a perfect match for areas that make extensive use of air-conditioning in the summer. In 1986, two fully functional 300 kilowatt PV plants had been built, at a cost of US\$3 million each. The objective was for utility workers to get experience with the technology, and be ready when the cost of PV comes down. The city also encouraged a number of small scale niche applications, which proved to be more ready for mainstream commercial use than the two PV power plants. For example, rooftop PV panels generate electricity for a fifty-bed youth hostel. During the day, when demand is low, excess electricity is sold back to the grid. At night, the hostel draws electricity from the grid. On most days, the PV power generated exceeds that drawn at night from the grid. The city of Austin also installed PV on a small housing development project, and fitted a bank of PV panels on the city's new convention center. The city uses PV panels to power road and construction signs.

Working photovoltaics into the energy mix takes careful coordination between engineers, designers and power workers. In most cities, Solar power is not considered as an option because suggestions for its use is absent in design manuals.

Provincial Policies

Many of the issues in construction and energy are of Provincial jurisdiction. For example, the national building codes are left up to the Provinces to implement. Some provinces like Quebec have a utility which spans across the province while others who have more or less deregulated are scattered with a large number of regional or municipal utilities. For this reason, it is more challenging to generalize on recommendations and find common denominators for provincial policies. Nevertheless, the recommended three pillars of Provincial Solar energy policies include:

4) Performance-based incentives: the examples of Japan, Germany and Ontario. The jurisdictions that have seen the largest growth in solar, especially with PV, are the jurisdictions that have implemented performance-based incentives. With capital-based incentives, there is no guarantee that the system will actually function properly, or at all. This type of incentive often leads to price hikes for systems, creates a potential for corruption or favouritism both with the people who administer the system and with unscrupulous clients who may pocket the grant then resell the same system. While the 42 cents/kWh of the Ontario Standard Offer Contract is a step in the right direction, it is still far from the incentives offered in California (USD \$0.39 to \$0.50; equivalent to approximately CAD \$0.45 to \$0.56) and Europe (50 to 80 Euro cents, or CAD \$0.80 to \$1.30).

One way to boost the ROIs of small scale and residential PV installations above 3% would be for

the municipal and federal governments to contribute monies to the Ontario type of incentive scheme by bringing the total performance based subsidies to the \$0.50 to \$0.90 range. Upfront capital incentives may lead to the misuse and waste of public monies on systems that may not work well, or that may not perform adequately throughout their intended life. Performance-based incentives guarantee that project promoters will ensure that the systems work properly over the life cycle, while incidentally helping to maintain a good reputation for solar technologies overall.

Working photovoltaics into the energy mix takes careful coordination between engineers, designers, and power workers

5) Net-metering: easy, standardized and fast procedures. One of the ways one can maximize the investment in a solar system is to make it work even when there is no local load. This is a problem with off-grid systems as the batteries can only economically store a limited amount of energy. With grid-connected systems, there is a need for legislation that will let users carry forward any excess balance. Currently, some utilities that offer net-metering do not allow customers who accumulate excess energy credits in the summer to carry them forward into the winter. This significantly decreases the benefits of connecting to the grid.

Jurisdictions that have seen the largest growth in solar have performance-based incentives

Federal Policies

One of the major issues with energy policies in Canada is that unlike in many countries with successful solar markets, solar policies do not have a real place to call home. Many of the success solar markets have a ministry dedicated to energy efficiency, renewable energy, and this ministry is often associated with sustainable development or environment, not with a ministry that is 95% focused on the exploitation of various minerals, uranium, oil and gas, and forestry. For this reason, promotion of solar and related policies has always the department's poor child, with minuscule budgets in proportion to the rest of the department. The first step to muscled federal solar policies would be to create a new ministry or agency independent of Natural Resources Canada, and to move all the staff to that new entity that could be called something like the Ministry of Clean Energy and Sustainable development.

6) Sustainable Long-Term Incentives: Any incentives introduced in an effort to support the adoption of Solar energy technologies must not be "stop and go" incentives which only promote cycles of boom and bust. There is nothing more disrupting to the Solar technology industry than the recurrent uncertainty about the capital cost incentive programs such as the previous *REDI* - now being re-branding as *ecoEnergy*. As long as incentives are dependent on the colour of the party in power, solar business will not know on which foot to dance. Rather than the unstable market created by capital cost incentive programs (i.e. grant programs), a healthy sustainable business environment could exist where Solar business, given the proper supporting level playing field and environment, could develop its walking muscles, instead of being carried forever on the baby industry carriage that are the ineffective grants schemes provided so far. Capital cost incentive grants can also be compared

to the genetically-modified grains given to African countries when they are better helped by programs which encourage sustainable agriculture and a self-sufficient economy.

7) Low Administrative Incentives: Unlike with grant programs, tax rebates have less potential for leading to subjective treatment of preference to some companies with government being lobbied by influential industry players. Grants also have a history of misuse and abuse by the industry, sometimes resulting in rising price for solar installations. Grants require a lot of unproductive administrative money – often 20 to 30% - time and money that would be better used on efforts to develop the infrastructure for deployment, such as training and certification or performance based incentives. Also, tax rebates to solar energy users do not cost energy departments anything. With tax rebates, the client assumes the time and cost for most of the paperwork while NRCan government employees, who had been occupied with the administration of grants, are now available to apply their time in other areas that can make a difference to develop solar in Canada.

8) Energy Performance Loans – Canada's financial institutions should follow the lead of US Fanny Mae and the Energy Efficient Mortgage Program. One of the best possible ways to finance a solar system for a residential client would be through a low-cost energy mortgage extension, to be financed over the life cycle of an installation. This type of facility is available to municipalities who can pay 1.25 % below Canada bond rate for some energy improvements. Canada Mortgage and Housing Corporation (CMHC) could administer this type of residential loan, and the Business Development Bank of Canada could do the same for business loans.

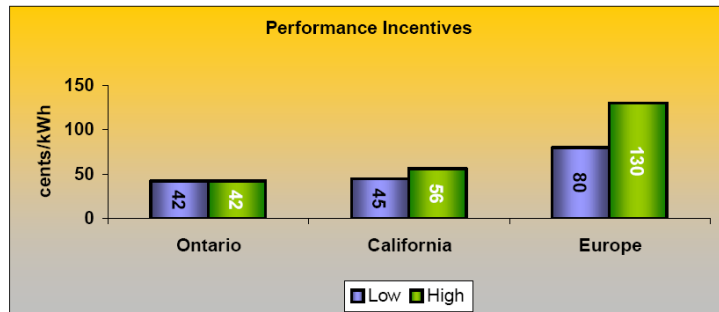
9) National Regulatory Compliance: Look to the examples of Israel, Greece and Spain. Many of the countries that have the highest ratio of solar installed per capita have regulations where solar is mandatory, pure and simple. At the minimum, Canada should make it mandatory that all architects provide designs that are rated from a passive solar viewpoint, should implement passive solar for new building design and any HVAC professional should be mandated to propose an option for using solar water heating when technically feasible, as this is required by the government of Spain.

Many of the countries that have the highest ratio of solar systems installed per capita have regulations where solar is mandatory

10) Quality Standards: As interest in renewable energy technology is growing, there is great risk that many companies, attracted to the industry by the opportunity to make a “quick buck” will blossom overnight. Looking back at what happened in the late 1980’s, you may recollect the explosion of solar business, followed by the disappearance of 80% of them with more difficult times, while customers were left with nobody to service their systems, burning solar’s good reputation for at least the decade that followed. It is thought that if there had been more stringent entry standards into the industry and for those who could be authorized to install systems, we would not have experienced this situation. Competition would have been such that no system would have sold at a very low cost that does not allow for any maintenance, and the select group of companies in the market would have been only the more committed, serious and qualified. Federal governments have a strong role to play in order to protect consumers with high quality standards in both products and systems and in the service side of the market.

- Products and systems: It is very important for federal programs to support solar manufacturers who are established and are known to deliver quality products. Solar Keymark is the quality label for solar thermal products in Europe. In the US, and some extent in Canada, solar collectors typically have to be SRCC approved to receive grant money. In Canada, Bodycote can test products for CSA or SRCC. Since CSA only certifies solar water kits, not collectors, Canadians can get engineering firms to certify large scale systems. Other criteria that should be considered relates to manufacturing processes. For example, some factories are ISO 9001 approved, which is an indication that they have rigorous processes.

- Education and installer certification: One of the reasons why Solar got a bad reputation is that during the last Solar boom of the 1970’s and early



1980’s, too many unqualified installers put up solar systems that never worked properly. While it is important that high-quality, certified equipment be installed, the best equipment may not operate if the installer has not been properly trained and demonstrated that he/she has the necessary competencies. Manufacturer’s certification is better than nothing but manufacturers are not professional educators, and may not have the ability to deliver the comprehensive type of training required to design complex and larger systems. Also, manufacturer’s training is typically rushed through in as little as a few hours, or perhaps as much as a day or two.

Following the initial training, there is no knowledge control and evaluation, so there is no guarantee that the participant actually understood what was presented.

This is why the Canadian Solar Industry Association (CanSIA) has developed a certification process for installers as a positive step forward in ensuring a community of qualified installers. As an alternative, installers who can not wait for CanSIA installer training exams (usually offered at the CanSIA Forum each November) can also attempt the certifications from the North American Board of Certified Energy Practitioners (NABCEP). Willis College is also working on offering installers the opportunity to take Solar installer certification exams at some of the 40+ Prometric testing sites across Canada, and is extending the invitation to all Canadian public Universities and Colleges to become an associated testing site for solar installers.

About the author: Frederic Pouyot is the director of the Clean Energy Institute of Willis College and he is also the head of a solar engineering firm GPEKS Constructions Inc. Frederic has been involved with the Solar Industry since 1984, and has worked solar on projects worldwide. He has written many technical papers for various building and solar organisations. Frederic is a Federal candidate for the Green Party in the Hull-Aylmer riding.

The views expressed in this article are those of the author and do not necessarily reflect the views of the Solar Energy Society of Canada

FEATURED PROJECT

A plan to build North America's largest photovoltaic solar farm has been approved by the Ontario government. More than one million solar panels on four farms outside Sarnia, Ont., are expected to provide the province with 40 megawatts of power by 2010.

The government awarded the contract through Ontario's Standard Offer Program, which pays 42 cents per kilowatt-hour for electricity generated from solar energy systems.

The project would be the largest in North America using photovoltaics. It's also larger than any other existing solar farm in the world (although a number of projects underway would surpass or equal its size, such as the construction of a 40-megawatt project in Germany already underway). The Sarnia solar farm was one of 14 new alternative energy initiatives announced by the government to add more than 107 megawatts of power to the grid.

For more information: www.energy.gov.on.ca



Photo courtesy of www.energy.gov.on.ca

UPCOMING EVENTS



June 10—13, 2007

**32nd Annual Conference of the Solar Energy Society of Canada and
2nd Canadian Solar Buildings Research Network Conference**

Calgary, AB

www.solarbuildings.ca

June 19 –20, 2007

EECO 2007 Environment & Energy Conference

Toronto, ON

www.eeco2007.com

June 21 –23, 2007

Intersolar 2007

Freiburg, Germany

www.intersolar.de

July 8 – 12, 2007

Solar 2007—American Solar Energy Society

Cleveland, OH

www.ases.org

Sept. 18—21, 2007

**Solar World Congress 2007—International Solar
Energy Society**

Beijing, China

www.swc2007.cn

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