SOLAR NOVA SCOTIA SOCIETY

volume 21, number 1
Spring 2011

www.SolarNS.ca

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Forging Ahead with "Prometheus"

Annual Meeting Keynote Speaker, Peter Kinley, MSE, P Eng. is President and Chief Executive Officer of Lunenburg Foundry & Engineering Limited, one of our New Corporate Members. He is also the inventor and chief engineer for *"Prometheus"*, a potential solar replacement for other heating methods that rely on fossil fuels. He presented a very interesting talk about the project methodology and the potential of the methodology.

For further information visit the Lunenburg Foundry website using the following URL www.lunenburgfoundry.com and view the section of the website devoted to *"Prometheus"*.

Historic Building Energy Issues – Final Article

Due to the receipt of two excellent articles for this edition of the newsletter, the fifth and final article by Bill Hockey, Architectural Conservation Services discussing Historic Building Energy Issues: Exterior Wall Systems will appear in the fall edition of the Solar NS Newsletter. If you have questions regarding energy conservation or other issues in your historic buildings you can contact Mr. Hockey directly at Architectural Conservation Services by E-mail: bill@archconserve.ca and you will receive a response from him.

Evaluating our solar resource

By: Cory Manuel

Nova Scotia is blessed with a generous amount of sunshine. Sure, we have our days and sometimes weeks of rain and overcast conditions, but for the most part, we do very well in the sunshine department. Countries like Japan and Germany, who are among the world's leaders in deployment of solar energy technology, have solar resources that can be considered marginal when compared to ours. We have an excellent resource, and it can never be taxed, privatized, or market cornered by a monopoly. Something we all should feel good about.

While adopting solar energy technology may seem like a new concept to many, extensive data-logging with the goal of quantifying our solar energy resource potential has been ongoing for at least the last thirty-five years. Having access to, and knowing how to interpret this information is an essential part of solar decision making. Consumers need to know that solar works and is a good investment. Without analyzing the solar resource and crunching the numbers, you are only making a guess at best.

Natural Resources Canada (NRCAN), one of our best sources of solar resource information, publishes an excellent web page here:

https://glfc.cfsnet.nfis.org/mapserver/pv/

This web page is searchable by municipality, and offers information in a concise, easy to use format. This information can be used to evaluate performance expectations and economics of both solar electric and solar thermal energy systems.

Typically, solar energy is quantified in kilowatt-hours per square meter per day (kWh/ m^2 /day). 1000W/m^2 is accepted as the nominal value of sunlight reaching the surface of the earth under ideal conditions and is therefore defined as "1 sun". A location that receives 3.42 kWh/ m^2 /day of solar energy can be said to receive 3.42 "Sun-hours" per day. Most of Nova Scotia receives a yearly average of 3.4 to 4.2 sun hours per day

For grid-tied photovoltaic systems (ie: solar electric), the NRCAN web page also presents solar information in kwh/kw units. This allows you to calculate approximately how much energy you can expect to produce per installed watt of PV. Their methodology used in deriving these numbers uses a performance ratio of 0.75, meaning they have allowed for a 25% loss in production due to inverter inefficiencies, panel soiling etc.

As an example, according to the NRCAN information, if you were to install a 1 KW grid-tied PV system in Kentville, facing true south and at a tilt angle of 45 degrees, you can expect to produce 1117 kWh of electricity per year. At our current electricity prices, that system will

produce $159.62 worth of electricity in a year. This is basic, need to know information if you are considering installing a grid-tied PV System.

Solar thermal (ie: hot water) is one of the simplest solar technologies, but is also one of the hardest to quantify. Whereas grid-tied PV systems send metered amounts of energy into an infinite battery (the grid), solar thermal sizing criteria is a lot more complicated. For Solar Thermal applications, use of the NRCAN web page information in conjunction with SRCC collector ratings can give a reasonable approximation of how much energy to expect from a solar hot water collector. Most solar thermal collectors sold in Canada bear a decal with the stated SRCC ratings for that particular collector. Without going into too much detail, investigation of the NRCAN numbers reveal that most locations in Nova Scotia fall within the “Mildly Cloudy Day” category in the summertime (about 17 MJ/Day) to the ”Cloudy Day ” category (about 11 MJ/Day) in the wintertime. This knowledge is a good starting point when evaluating performance and cost effectiveness of solar thermal energy systems.

It you are a consumer and you are thinking of integrating solar energy into your lifestyle, it is in your best interest to educate yourself about the different technologies available and how they will perform with our solar resource. These days, with ever escalating energy prices and a true “Green Revolution” taking place, the solar industry everywhere is attracting interest from consumers looking to make a sound investment into their energy future. This interest also attracts market opportunists who simply oversell the technology to anyone who is willing to buy it. The industry is rife with unsubstantiated performance claims from manufacturers and salesmen alike, who know they will never be held accountable for exaggerated performance claims. Your best defense is a firm knowledge of the fundamental principals of solar technology and an understanding of how to evaluate performance potential with your specific solar resource.

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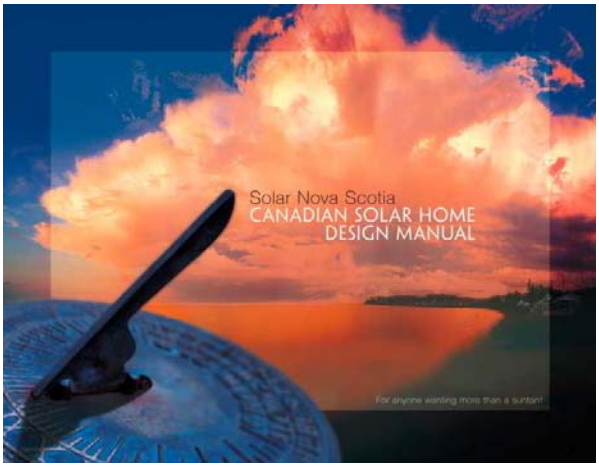
Cory Manuel is currently an Electrical Engineering Technology student at Nova Scotia Community College, NSCC. He has been a journeyman electrician for 15 years, with over two years experience in the renewable energy industry. He is working his way through school with a small energy business: Freestyle Energy Systems.



From the Chair:

In response to an outstanding need, SNS is in the process of launching a new initiative aimed at bringing together our corporate members on an Industry Committee. We have heard from provincial and municipal government representatives that they believe there is a real need to move forward with industry standards and accepted procedures for solar installations. This is being driven largely (but not only) by the Halifax Solar Community Project. To get started, corporate members of SNS had their first meeting in February to go over key issues related to that initiative. The consequent report is now published on the HRM website (www.halifax.ca/solarcity). Key issues include certification of installers, training programs and standards for solar thermal systems. Corporate members of SNS interested in working on this committee are encouraged to contact the Chair to get involved and have a say as our growing industry moves forward. E-mail: rvinson@creativesolar.ca

Upcoming Solar Shelter Courses

Solar Nova Scotia is offering practical, how-to courses on designing and building Solar Shelters, including Greenhouses, Solariums, additions and especially Solar Homes. Topics include: 1. Solar Basics; 2/3 Climate Control; 4. Site Designing; 5. Shelter Designing; and, 6. Making it Happen. This course is intended for the general public and for those in design and construction.

Registration: for courses with a phone number for registration, instructor Don Roscoe.

There's a course outline at http://solarns.ca/course.php . Up coming Courses:

HALIFAX: Bloomfield Center, Agricola St., Six Tuesdays 7-10:00pm April 5 to May 10. Register with Solar NS, by phone at 852-4758 or email at solardon.ns@gmail.com. Solar Construction Course offered on Saturday, April 9 9-5:00 at a cost of $60.00/individual, students $40.00.

BRIDGEWATER: 25 Register with Solar NS at 852-4758 at Bridgewater High School. Six Thursdays 7-10:00 April 7 to May 12. For Information and Registration call 543-2274.

The cost of the course is $90.00 for an individual, $150.00 couples, which includes handouts. An optional textbook, the Canadian Solar Home Design Manual is offered at $35.00.

A course is also offered by Andy O'Brien in the Annapolis Valley, see Solar NS website for further details.

solar nova scotia membership

mail to: Solar Nova Scotia, 83 Old Scotts Road, McGraths Cove, NS B3Z 3V2

name: _____

co. name: _____

address: _____

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postal code: _____

phone: _____

email: _____

web: _____

membership fees:

- ❑ $10.00 unwaged / retired / student
- ❑ $20.00 waged
- ❑ $200.00 corporate
- ❑ $_____ donation

Tell us what you are interested in:

- ❑ active solar
- ❑ networking
- ❑ promotion
- ❑ education
- ❑ passive solar
- ❑ technical support
- ❑ other: _____

Growing Salad Greens During the Cold Winters of Nova Scotia...

An article by Silvana Castillo, North Wallace, Nova Scotia.

This article really illustrates the power of harnessing the energy of the sun to provide a great interior "outdoor" environment during the harsher times of the year in Nova Scotia - Editor.

For the last 13 years, we have enjoyed fresh herbs and green salads during the winter produced in our passive solar greenhouse. We also have a modest income from selling salad greens to friends and two local food establishments. We are talking about cold hardy greens; our favourites are arugula, corn salad (mache), mustard greens, claytona, peppergrass, coriander, curled endive, shallots, parsley and celery leaf. We also have perennial herbs such as sorrel, garlic chives, thyme, rosemary, winter savory, spearmint and anise (and grass for the dog and cats!). In the spring, we also use the greenhouse for growing seedlings to plant in our outdoor gardens.

The 20 by 40 foot passive solar greenhouse is built of hemlock wood sitting on a four-foot deep cement foundation. The south facing roof (on a 35 degree angle), and knee wall is made of a three-layer sheet of polycarbonate purchased at Halifax Seed.

The east and west sides are built using recycled double-pane glass. The inside north wall has a brick facade that serves as a heat storage. Our estimated cost of building the greenhouse by the end of 1998 was $22,000, including the water system.

We practice biodynamic farming techniques on our land, and in the greenhouse. After working on the design of the greenhouse, we were clear that we wanted to grow plants in the ground, and thus every year we focus on building up the soil in the beds of the greenhouse. We plant the greenhouse in the fall, and harvest all winter long.
At the end of the growing season, in the spring, we let some of the plants bloom and we collect seeds for the next cycle, thus slowly selecting seeds for cold hardiness. In the summer, we mulch the beds with leaves and let the soils in the greenhouse rest. We also try to use the greenhouse as a self - sustaining unit, collecting rainwater, using compost teas, housing a barrel of composting worms, and composting leaves in the corridors.

Why this greenhouse works well, is a combination of factors. The most likely reason for its success is the fact that we grow plants in the ground; the soil is very alive with a diversity of worms, insects,

frogs, snakes, salamanders, etc.; there is a well-established balance and we do not have major problems with pests or diseases. Aphids could be a problem in the spring if we are not careful to monitor the humidity in the greenhouse.

Our main challenge is condensation and keeping the wood dry at the base of the structure. The original design did not include a way to release excess heat from the top of the roof, and the only thing we have now is a bathroom fan that operates

with a humidity meter. This fan is connected to a chimney pipe originally installed for a wood stove (which we didn't use, so don't be mislead by the pictures thinking there is additional heat provided to the greenhouse; it works only with the power of the sun).

This greenhouse is more than a place for growing food; it is a garden and a sanctuary, with a hammock and a plaza for sitting and enjoying music, the warmth and smell of herbs and of the earth. On a sunny afternoon, when the temperature outside is minus 10 degrees centigrade, the temperature in the greenhouse can be as much as 25 degrees centigrade. The lowest temperature we have ever experienced inside the greenhouse is –10 degrees centigrade. This happens when the weather is extremely cold and overcast for several days, and the plants can look wilted.

However, once the sun comes up, the greenhouse rapidly warms up and the plants come back to life. As long as the soil doesn't freeze, the plants can survive and thrive.

With health and good nutrition being a priority in these times, it would be wonderful to see this kind of solar technology adapted to other situations, such as schools, nursing homes, hospitals, etc. The health benefits from eating fresh food with vitality, and from working in a garden and connecting with the soil, are enormous. Also, being able to spend time in a warm place during the cold winter days is invigorating. Government institutions would be wise to invest in self-sufficient projects such as this.

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A native of Guatemala, Silvana is a freelance consultant in international community development. Before moving to Nova Scotia in 1995, she worked for CARE USA in several countries around the world. With her partner Heather they are dedicated to the caring of a 100 acre farm of orchards, vineyards, gardens and woods in North Wallace. On their land, they apply concepts of dowsing, Stone Age farming and biodynamic agriculture.
Questions and comments are most welcomed, please write to:
silvanacastillo@ns.sympatico.ca