SOL
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We are hoping you will support our Newsletter by submitting articles. You can submit articles from your area of expertise for publication that are relevant to our cause.
You can get permission from people that wrote other articles. You can also find some information and do research on a certain topic and put your research in your own words. You could contact someone that has done a great article and get them to submit theirs.
We welcome articles on solar energy and wind power topics especially. If your name was misspelled in the email please email the editor at: bruce@techonfoot.com

Demonstration Trailer from SESCI Edmonton

Click on the link below and it will take you to the page where the article is.

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____ I would like to volunteer on one of SESCI's projects. Please contact me.

What areas are of major interest to you?

___ Solar Electric ___ Passive Solar Construction ___ Water Power ___ Solar Water Heating

___ Wind Power ___ Solar Space Heating ___ Conservation ___ Energy Efficient Building

___ Biomass ___ Electric Cars ___ Other: _____

THE BENEFITS OF MEMBERSHIP

- Receive notification of all of the great SESCI programs, seminars, and classes
- A 10% discount on solar society sponsored classes and workshops.
- Support the wonderful work of the Solar Energy Society
- Receive the Newsletter electronically

All mailings are sent by e-mail.
We do not share member email addresses with anyone.
Please print this and give it to potential new members

Solar House to Demonstrate Canadian Innovation on World Stage
by Maun Demchenko

A state of the art adaptable solar house is being developed to compete in this year's **Solar Decathlon,** an extremely high profile event to be held on the National Mall in Washington in October of this year, on the site of the recent Presidential inauguration. The entry represents one of only two Canadian university teams in the competition. Team North - a partnership of the University of Waterloo, Ryerson University and Simon Fraser University aim to deliver the winning design.

Their mission is to develop North House – a compelling, marketable solar powered home for people with active lifestyles – while growing Canada's next generation of engineering and design leaders. They envision the combination of green building, solar and interactive technologies as a powerful vehicle for reducing energy demand, building a conservation ethic and increasing the quality of life for all Canadians.

To showcase this project and Canadian innovation, North House aims to bring their design to the Vancouver 2010 Winter Olympics following the **Solar Decathlon** Competition in Washington D.C. This will provide a key opportunity to demonstrate Canada's commitment to sustainability and the advancement of alternative energy sources.

The **Solar Decathlon** brings attention to one of the biggest challenges we face - an ever-increasing need for energy. As an internationally recognized event, it offers powerful solutions - using energy more efficiently and using energy from renewable sources.

The Solar Decathlon has several goals:

To foster development and facilitate widespread adoption of solar-powered homes that demonstrate solar technologies in marketable applications.

To educate the student participants - the "Decathletes" - about the benefits of energy efficiency, renewable energy and green building technologies. As the next generation of engineers, builders, and communicators, the Decathletes will be able to use this knowledge in their studies and their future careers.

To foster collaboration among students from different academic disciplines - including engineering and architecture students, who rarely work together until they enter the workplace.

To promote an integrated or "whole building design" approach to new construction. This approach differs from the traditional design/build process because the design team considers the interactions of all building components and systems to create a more comfortable building, save energy, and reduce environmental impact.

To demonstrate to the public the potential of Net Zero Houses which produce at least as much energy from renewable sources, such as the sun and wind, as they consume. http://www.solardecathlon.org/faqs.html#eh Even though the home might be connected to a utility grid, it has net zero energy consumption from the utility provider.

The Solar Decathlon competition is very prestigious - 20 Universities have been selected from around the world out of well over 80 applicants. Being in the competition involves building a full scale house (max. 800 sq. ft.) on the Mall in Washington and having the house compete in ten 'events' that measure the quality and performance of a solar powered home. In 2007 there were over 200,000 visitors to the event. This year the numbers will be even higher, expectations of up to 10,000 people per day will see the house and 647 million media hits are projected. In light of the new Obama administration and its emphasis on alternate energy, the event is expected have an even higher profile.

The coverage of the 2007 event was incredible to see - refer to the link on *YouTube* explaining the project by various media agencies.

http://ca.youtube.com/watch?v=_GTttNkTALU&feature=related

To learn more about the competition go to: http://www.solardecathlon.org/

Financing this project in the current economic climate has been a definite challenge. The DOE only provides each team with $100,000 US seed money. The budget to build the house and transport it to Washington and back will be well over a million. While the North House team has obtained grants from several government sources that have kept us going through the design and development phase, there is a great need for financial and in-kind support to actually construct and transport the building to Washington.

Richard King, the Director of the Solar Decathlon Project from the US Department of Energy (DOE) in Washington will attend the events on the 11th and 12th where he will be making a presentation on the scope and significance of the competition. The North House design will be on display as well as examples of the innovative building strategies being developed and employed by the North House Team.

The significance of this project for recognition of new sustainable building practices in Canada on a world stage is tremendous. Not only will the house be on the National Mall in Washington, but we are also working on displaying it at the 2010 Olympics in Vancouver. Finally, we are planning to have the prototype be on permanent display for future research opportunities, changing pieces of the house as new innovative technologies become available.

The Objectives of North House

Showcasing North House as an exemplar of green construction and solar powered living
North House stands out from other Solar Decathlon entries by addressing both energy efficiency and occupant behaviour in the home. We seek to make the benefits of this approach apparent for visitors, and to distinguish it from other Solar Decathlon entries for competition judges and professionals.

Increasing public awareness of the benefits of solar technologies
Solar technologies are relatively new and unfamiliar to most people. We will use North House as an environment for teaching the public about solar technologies, how they can be used in new and existing housing, and their benefits for different audiences and applications. In doing so, we aim to transform negative perceptions of solar technologies vis-à-vis personal comfort and social acceptability.

Increasing public awareness of energy independent living
North House will showcase the latest in energy efficient technologies, materials and will demonstrate how design can promote low energy use lifestyles.

Building partnerships that support North House and lead to longer term research initiatives
Effective research necessitates the involvement of key stakeholders and access to resources that allow for the exploration necessary for innovation work. We will build a network of partnerships that increase the impact of our work, facilitate knowledge transfer, and provide training and support for North House's realization. In doing so, we will highlight the role of the Solar Decathlon as a catalyst for university-industry partnerships, and work to grow those relationships into longer term research initiatives.

Promoting the talents of Waterloo, Ryerson and Simon Fraser University students and faculty
The University of Waterloo, Ryerson University and Simon Fraser University are leading the charge to develop Canada's next generation of leaders in sustainable engineering and design. We will showcase the unique abilities of our team to define critical research objectives and deliver results.

Encouraging market development and research by exposing new business opportunities
North House's unique fusion of green building, solar and interactive technologies points the way to a range of new business opportunities. We seek to encourage market development and create demand for further research by exposing opportunities to our partners, and by bringing those parties into dialogue.

Building an internal culture of collaboration that supports cross-team research objectives
Team North brings experts from a variety of organizations, research and professional disciplines together. We seek to build a culture of collaboration that creates new knowledge and yields benefits that can't be realized through individual action alone.

Winning at the Solar Decathlon
Last but not least, we want to have the best house on the Mall on October of 2009.

For more information, please contact:
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Northhouse Mountains

Solar Energy: Ready for Immediate deployment
by Frederic Pouyot

The next decades will see one of the largest technological shifts in the way people use energy, and this shift has already started. Looking back at history, humanity has already had a number of major transitions when it comes to energy. We initially relied on the energy of people, made use of animals, wind (sailboats, early wind turbines) and water (water mills). Then we started to use steam to power mechanical engines and boats. We then started to turn that energy into electricity. For the last century fossil fuels were used for these engines and electrical turbines (wood, then coal then oil). Since the middle of the 20th century, many countries turned to nuclear. None of these transitions ever happened in a clear cut manner, and while some phased out quickly, long overlap typically existed.

Every time a technology emerged to the point of taking predominance, it was not because the previous technology had disappeared, but because the overall benefits of the new technology were clear. Horses were replaced by automotives because the latter were less expensive or offered a better payback, but because they had a perceived superior value and overall utility. Same thing with nuclear energy over coal electrical plants, and with most functional devices whose design has improved with time. We live in houses and not cheap wood cabins for the same reason.

Electricity has been studied by English physician William Gilbert since 1600, In the late 1870s the American, Thomas Edison developed and built the first electricity generating plant in New York City.

Solar water heating became popular in North-America in the 1920s. While Solar Photovoltaics (PV) were discovered at the beginning of the 20th century, the costs of solar energy had dropped, as predicted, by 1990. But costs of fossil fuels had also dropped, so solar has been completing with a falling baseline during this time.

Solar Energy demand has grown consistently by 20-25% per annum over the past 20 years, and this growth has been accelerating in the last few years, with some markets growing at 50% per year, and others showing a growth completely off the chart. For example, while the total installed capacity in 2007 was less than 6 MW, 2009 should see tens of MW coming online (Optisolar Canada alone has plans for at least 40 MW). There are a great number of reasons which explain why solar is one of the set of renewable energy technologies that provides a formidable "utility" and will continue to show an explosive growth.

First of all, solar is now mature and well understood. While there will be still some incremental technical improvements with, most improvements will be on efficiencies of productions and installation and financing than with the intrinsic technologies. There are now strict norms and standards for solar equipment and certification for installers, and the industry is now easing over the steep part of the learning curve. People have learned the lessons from the false start of the late seventies for solar water, and Canada is ready to leverage on the intense R&D that has happened over the last 60 years in solar PV. Since manufacturing is ramping up at a dizzying pace worldwide, will Canada buy from elsewhere or manufacture at home?

Solar is viable in Canada. Canada's populated areas are blessed with a solar resource that is in fact more abundant than what is available to world's leading countries such as(Germany) and solar thermal (Austria). The fact is that solar power makes technical sense in Canada. As a country with the lowest population density in the world, as one with the most scattered patterns of land use (urban crawl), solar is appropriate. Solar is the most widely available form of energy in Canada, and is particularly appropriate in a decentralized model of energy production. Unlike wind energy or hydro power, the resource is everywhere, and while some areas receive a lower radiation, the difference from the worst to the best location is only a 56% increase, whereas it can be 300% for wind.

Solar water heating make more sense in Canada than in many other countries, even compared to warmer regions. While mild climates may be able to use cheaper solar equipment, their need is much less as the water comes out of the ground warmer. In Canada, a glazed solar panel will produce more usable heat (more kWh of usable heat) which provides a higher justification for solar.

Also, solar water equipment can be used to heat space, which represents at least 2 to 3 times the energy required for domestic water. With the recent advances in cost effective long term heat storage, Canadians can now use effective comb-systems that can heat both domestic water and their homes.

Solar PV technologies actually can outperform in the cooler Canadian climate. While crystalline silicone (c-si) PV works more efficiently in colder environments, new thin film technologies can actually produce up 20% more energy than 2nd generation c-si during the hottest days. Thin film also has the ability to work in diffuse light, such as on hazy humid or smoggy days which are becoming more and more common in the summer. Last, when used with a tracker or set close to a vertical angle, thin film can catch 20 to 50% more sunlight in the winter thanks to reflection from snow. The same can be expected from solar thermal panels installed vertically and (close to the ground or on a flat roof) for the main purpose of heating space.

Solar thermal energy already offers air heating at 2 to 5 cents/kWh thermal, water heating at 5 to 10 cents/kWh and in Ontario, especially with the Green Energy Act, solar PV will offer returns in the 9 to 12% range. What is more, third generation PV is now reaching the market with the promise of low cost and improved efficiencies.

Solar is economically viable. When considered as an investment in the same category as real estate, or when compared to money trusted to banks for retirement, solar actually provides greater economic returns. Solar is a good bet from a risk management perspective. For building occupants, solar "insures" they can get energy in case of failure of the public energy system. For the governments, solar provides a local source of energy which does not contribute to the trade deficit like imported fuel.

After building owners implement energy efficiency, they will find that solar energy is the next logical step to consider. Even if 20 to 50% of the buildings may not have the appropriate space to install solar panels, this leaves a very large market.

In the current economic context, the development of the increased use of solar energy represents for governments the best bang for the buck to help the economy recover as investment in green infrastructure. New investment in transportation mega projects is certainly not an investment that provides better ROI than green energy investments. While maintaining roads and bridges certainly offers a utility in the sense that it is a matter of public safety, investing in green energy is also a matter of public safety as it move us away from toxic and dangerous fuels (the particulates, GHG and radiations are all a lethal threat to public health). Unlike with road and bridge repairs, green energy also offers a Return on Investment. While the construction of roads and bridges provides temporary jobs, solar energy provides long term sustainable jobs. Indeed, investment in solar infrastructure creates manufacturing capacity which can find an outlet in Canada initially, but also in a very fast global market.

When compared to nuclear or large scale hydro, solar is superior from a financial, economic, and environmental point of view. According to CanSIA (Canadian Solar Industries Association), solar PV creates between 30 to 185 jobs per MW for small scale projects and the German government cites 15 to 30 jobs per MW for large Utility scale projects. Solar water heating provides 5 to 9 jobs per MW equivalent. A nuclear facility employs 1 to 2 person per MW, natural gas close to 1 job per MW and Large hydro provides job ratios comparable to nuclear and natural gas. Coal power plants provide an average of 0.5 to 0.6 job per MW, with 34% of that only in the power plant operation and the balance in extraction and transport.

So it is clear that when compared to traditional energy production, solar energy is a more labour intensive sector that generates a wider variety of jobs, from construction labourers to high-wage and high-skilled jobs in: research and development; from design to manufacturing; construction and installation small or large or utility scale projects and their operation and maintenance. Of all renewable energy technologies, only biomass is more labour intensive than Solar.

Germany with a population of 82 million has developed a solar workforce of 30,000 in solar alone. With a population of 33.6 million and 1.4 million people out of work in early 2009, solar energy can offer the greatest job opportunities to over 10,000 people and grow at a growing rate of 30% per year.

At an low value of $40,000 per job, this represents an economic development of 400 Million in direct wages alone and well 1 to 2 billion in total initial annual economic development.

In order to break the last barriers to the massive deployment of solar energy in Canada, SESCI is working to provide municipal financing for solar projects. To find out more, go to www.sesci.ca

About the author: Frederic Pouyot is the President of the Solar Energy Society of Canada Inc., and is the CEO of GPEKS (www.gpeks.com). 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 organizations.

Cellulose Insulation
by Bruce Donovan

While people may debate the question of global warming, it is common sense to use products that have minimum impact on the environment. Insulation, by its very nature, is environmentally friendly because it decreases the amount of energy used to heat or cool a building. Cellulose insulation is one of the greenest products in the world. It is made from paper which is a renewable natural resource. It diverts considerable waste from landfills. Cellulose insulation not only limits greenhouse gas emissions during manufacturing, but also prevents waste paper from releasing environmentally harmful gases as it decomposes.

Cellulose insulation usually contains more than 85% recycled, natural cellulose fibre made from newsprint. It is injected with the safest of fire retardants and pest repellents to make it the safest and most environmentally friendly insulation available. Although some fire retardants are suspected of being toxic to humans we seldom know at present which ones are actually put into insulation. People should ask for a Safety Data Management Sheet for the insulation to find out the chemical name of the fire retardant and its toxicity. Cellulose forms a perfect fit in your walls or attic without leaving large spaces. It locks up the air better than fibreglass batts because it has higher R value when packed somewhat. Ceiling with improper vapour barriers and insulation in attics can cause major heat loss. With proper attic insulation much of this heat loss can be eliminated.

Cellulose is a very efficient insulation on the market, quite a bit better then loose-fill fibreglass. Comparing these two as R-value per inch it looks like this: fibreglass loose-fill: 2.5, cellulose 3.8, fibreglass bats: 3.2. Because of the rising cost of electricity, oil and natural gas some proponents of more insulation claim you can pay back the cost of cellulose insulation in about 7-8 years if adding R40 in the walls and R60 in the ceiling. Because of the way cellulose fills in spaces it provides excellent sound proofing. The Netzero houses in Edmonton are insulated with cellulose impregnated with starch to R56 in the walls and R100 in the ceiling. The starch makes the cellulose stiff and prevents sagging.

Cellulose insulation on the right
Fibreglas insulation on the left