Lakeland Agriculture Research Association

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The Verdant Element

Inside this issue:

Solar Power

Alberta receives more sunlight than any other province in the country. So why not use this free resource and reduce greenhouse gas emissions at the same time? Solar PV systems require no maintenance and use solar energy to generate electricity. The system is usually mounted on a south-facing roof or wall and is created using modules which are typically 0.6 to 0.9 meters wide and 1.2 meters high. Modules typically carry a 25-30 year warranty. It costs roughly $8,000 to $10,000 per kilowatt of installed capacity. On average, a non-conserving Alberta home consumes 7,200 kWh of electricity annually. If you installed a two kilowatt system it would cover almost 30% of your annual electrical usage. If you reduced your electrical usage by doing something as simple as using energy efficient light bulbs or replacing appliances with high efficiency models overtime you would be saving even more.

Biofuels

Ethanol and biodiesel are clean burning renewable fuels. Ethanol is an alcohol made from the fermentation of sugars from plants, grains and animal materials known as biomass. Biodiesel can be produced from a variety of fats and vegetable oils, recycled restaurant grease, animal tallow, oilseed crops, and biomass such as algae blooms. Both ethanol and biodiesel biodegrade easily and therefore do not pose an environmental risk to groundwater, surface water, or soil in the event of a spill.

Ethanol previously was only made from the carbohydrate portion of grains and plants but now can also be created from cellulose and a greater variety of plants and other biomass. Cellulosic ethanol requires more processing and time, but the cost of cellulosic feedstock such as municipal solid waste, straw, sawdust etc, is less expensive than traditional ethanol feedstock. In Canada, Iogen Corporation had a facility in Ottawa that produces over a million liters of cellulosic

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Harvesting Rainwater

I lived in an area of Australia that has been in a severe drought for the last nine years. From January to April we received only nine millimeters of rain in a time that was supposed to be our rainy season. With temperatures in the forties and cool spells in the thirties it was needless to say that the environment was favourable to drying. There we ploughed, although it did not conserve any moisture, it was needed to break through the dry cement like soil. It would take at least two to three passes to get soil that you could at least plant seed in. We were receiving 30% of our water rights, so irrigation had to be carefully monitored and water use was calculated and limited what we could grow. Water takes on a new importance when even household use is limited.

Continued on next page

Top left: Drip line irrigation for onion crop

Top right: Plastic covering irrigation drip lines to conserve moisture for a pumpkin crop

Below: Rainwater harvesting tank

Bottom left: Furrow irrigation in an onion crop, seldom used due to water loss

Rainwater Continued

Water conservation was mandatory and included re-use of grey water and harvesting rain water. On my farm we had three 22,500 liter tanks, as well as an additional 5,000 liter tank strictly for drinking water. Every roof was galvanized iron (95% efficient) and used to collect the rain water, so even the lightest rain could be utilized. Even the coastal cities such as Melbourne and Sydney, where rainfall was more adequate, the majority of residents had rain harvesting systems which were used for anything from washing of automobiles to landscaping. Public buildings were all connected to collection systems that were then used for the buildings use and public washrooms. Grey water, which comprises about 50-80% of household waste water (all water aside from toilets), is commonly used to irrigate gardens, lawns, and crops in Australia and other countries around the world. It can also be used for flushing toilets. Recycling grey water has many benefits such as recharging groundwater, nutrient reclamation (as long as detergents are phosphate free), and generates less impact on septic and treatment infrastructure.

Treat the Earth well – It was not given to us by our parents, it was lent to us by our children.

Rainwater harvesting systems have been used for more than 4,000 years and usually consist of three elements: collection system, conveyance system, and the storage system. Every system is unique and dependant on the utilization, location, and amount of rainfall. With falling water tables, polluted groundwater, and increasing instances of drought, water conservation and water security are becoming a priority issue. Rainwater is relatively clean and the quality is usually acceptable for many uses with little to no treatment and frequently meets the WHO drinking water standards. In many cases, rainwater is of higher quality than ground or subsurface water quality. In Australia my drinking water was rain water; in order to maintain quality the piping was over 10cm from the base to keep debris undisturbed, along with keeping gutters and downpipes clean, having a first flush device, a filter to remove coarse debris, as well as precautions such as screens and a solid secure cover on the tank to prevent pests from entering.

Rainwater harvesting is becoming increasingly popular (or mandatory) in many countries where water scarcity is a reality; with increasing populations, industrial and agricultural use, pollution, and urbanization. Twenty percent of the global population does not have access to safe drinking water. In places such as Israel, rainwater harvesting has allowed for the habitation and cultivation of areas with 100mm of annual rainfall. Presently in Canada rainwater harvesting is becoming more of a common practice in British Columbia and Ontario. In Calgary, a new condo development will be using collected rain water for the flushing of toilets and landscaping. Alternative water sources, water efficiency and reuse are going to become prominent issues in the future with climate change, and sustainability. It would be better to be proactive than reactive especially when water is the basis of our lives.

Alberta's Carbon Offset Market

In 2007 Alberta became the first province to legislate the reduction of Green House Gas (GHG) emissions of large (industrious) emitters. Regulated emitters must reduce their GHG's by either upgrading facilities with new technology, pay 15$/tonne of carbon dioxide equivalent for research and development of future technology, or they can purchase an Alberta carbon offset credit. How these carbon offset credits work is that if you have two companies with targeted GHG emission reduction but one company (company A) cannot reduce its emissions due to a variety of reasons such as not having the technology, but the second company (company B) can reduce both its target and even more GHG emissions, company A can then buy company B's extra GHG emissions reductions to still achieve the overall targeted reductions. The only industries capable of actually removing GHGs from the environment are agriculture and forestry. There are several protocols which allow for these industries to sell their carbon credits. Some of these protocols include: tillage management; afforestation; beef feeding of edible oils; beef reduction of days on feed; pork feeding/manure storage and spreading; biogas; and energy efficiency (pork/dairy/poultry facility process change or retrofits). Farmers however may have to aggregate their offsets as buyers are often looking for amounts that an individual would not be able to provide. All offsets must be verified by an independent third party. This is a new and developing market encouraging innovation and rethinking of our current practices. Alberta is the first province in Canada as well as North America to have a carbon offset market. There is however an international market that Europe and New Zealand employ. Further information on the Alberta Carbon Offset Market and protocols are available at www.carbonoffsetsolutions.ca or

Reuse of a bicycle as a garden decoration instead of throwing it in the garbage.

'Cheap' Environmental Changes

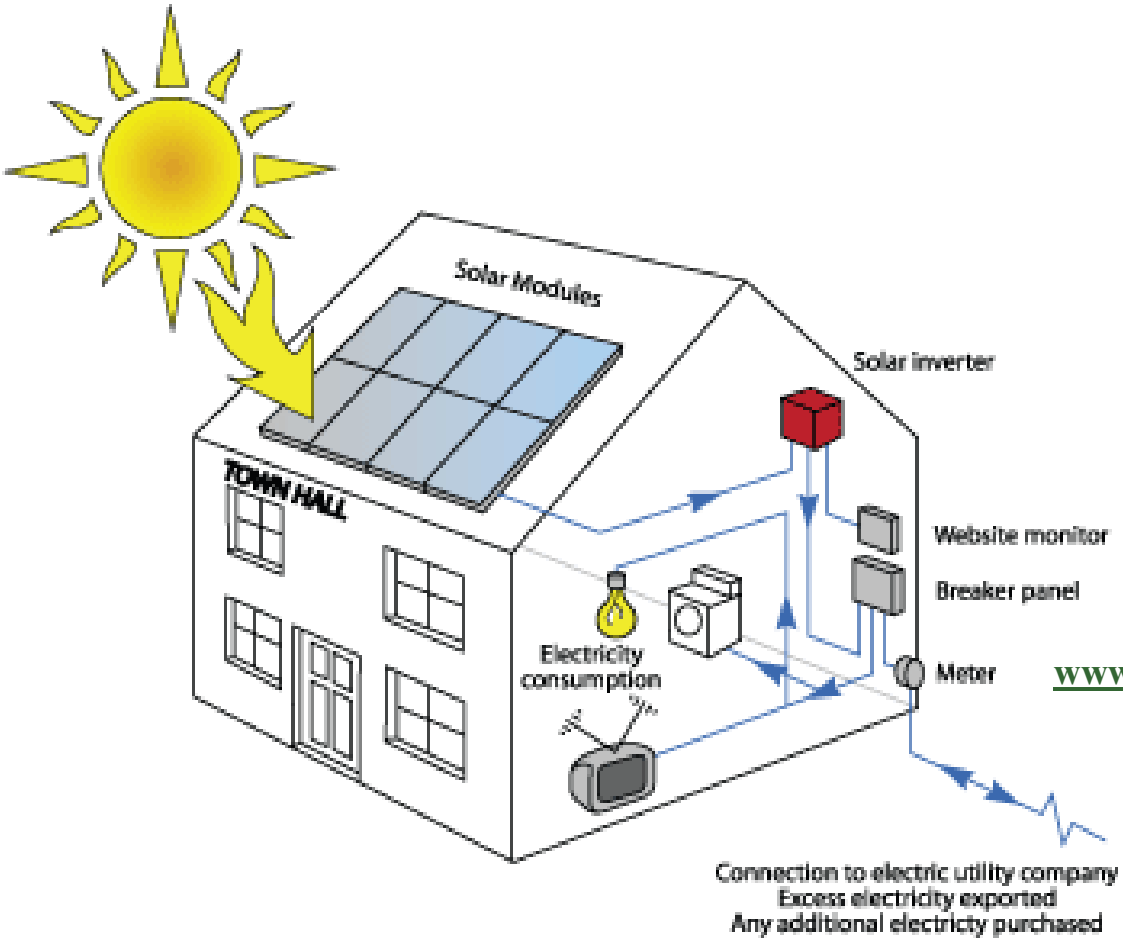
Here are some environmentally friendly changes you can do that can save you money, or are inexpensive to implement.

- Add insulation or weather-stripping
- Replace old or burnt out light bulbs with energy efficient ones
- Fix leaky plumbing
- Turn down your water heater temperature
- Start recycling! And reusing and reducing
- Begin to compost organic materials
- Turn your thermostat up 2 degrees in the summer and down 2 degrees in the winter
- Switch to reusable bags
- Clean refrigerator gaskets and vacuum condenser coils allowing the appliance to run more efficiently and use less electricity
- Turn it off; running water, appliances, lights or anything that uses energy when you are not using it
- Maintain your appliances
- Use a reusable mug (most coffee places will charge you less for coffee as well!)

Step by Step Guide to Buying a Solar PV System

http://www.climatechangecentral.com/files/attachments/stepbystep_guides/C3_StepByStep_SolarPV.pdf

1. Before you buy, take all practical steps to reduce your home electricity consumption – installing compact fluorescent bulbs, replacing old appliances with ENERGY STAR® models. The lower your electricity use, the greater the contribution of your solar PV system.
2. To find solar PV contractors in your area, check: www.ClimateChangeCentral.com/files/attachments/solarPVcontractor.pdf. Or a supplier with a membership in the Canadian Solar Industries Association: www.cansia.ca. For smaller systems it would be best to use an installer who can design and supply the system. It's recommended that you get quotes and references from at least two contractors, ask about how much experience they have in designing and installing a solar PV system.
3. Work with your contractor to properly size and design your system
4. To connect your solar PV system to the grid, you need approval from your electrical utility, such as FortisAlberta or ATCO. For more information: www.auc.ab.ca/rule-evelopment/micro-generation/Documents/Micro_Generation/Micro_Generator_ Application _ Guide_ July%2018.pdf.
5. Check with your municipality or county about the permits required.



www.lassothesun.ca

Growing Forward

Alberta Agriculture in partnership with Agriculture and Agri-Food Canada have created Growing Forward with the intent to facilitate the management of risks, increase competitiveness and profitability, retain/capture domestic and international markets, and promote the health and well being of Canadians. Currently not all programs have been released but are expected to all be available for application by April, 2010. In order to apply for funding from the Stewardship Plans (Grazing and Winter Feeding, Integrated Crop Management and Manure Management) an Environmental Farm Plan is required.

For more information please contact Growing Forward online: www.growingforward.alberta.ca or call 310-FARM (3276)

OR LARA at 780-826-7260

Environmental Farm Plan Workshop

Come and learn what your environmental farm plan can do for you, and learn about the Growing Forward program.

Risk is inherent everywhere, an Environmental Farm Plan with help you identify and manage risks through assessment and planning. An EFP is needed to apply for Growing Forward stewardship funding. At the workshop you can start a new EFP or finish an existing one.

March 19, 2010

Ashmont Agriculture Society

1:00 to 4:00 pm

To register please call LARA at 780-826-7260 or Evonne Zukiwski at 780-656-3730

Websites of Interest:

AB Ag Stewardship Funding

* www.growingforward.alberta.ca

Climate Change Central—Carbon Offset Solutions

* http://carbonoffsetsolutions.climatechangecentral.com/
* http://www.climatechangecentral.com/

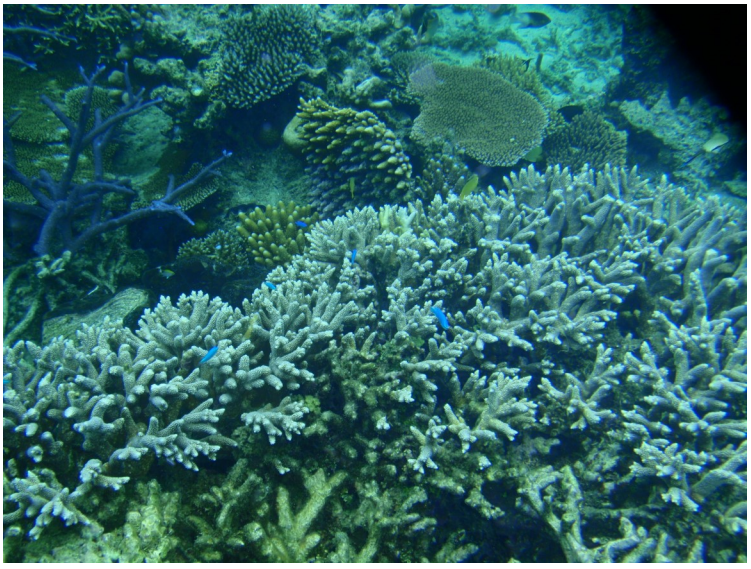
Solar Power

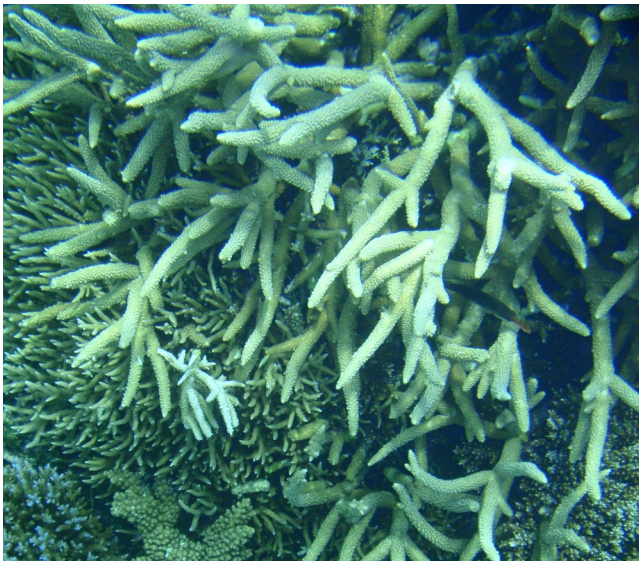
* www.lassothesun.ca

Climate Change

Climate change may seem like a concept that does not really impact us, especially in the winter months when temperatures are very cold. But that cold is part of climate change, having this year experienced record lows. Stronger and more frequent storms, higher floods, less snow north and more droughts south, melting glaciers and rising sea levels are also becoming more noticeable and recurrent. Sea ice is declining and in 2007 the Northwest Passage was ice free. All the pipelines, roads and infrastructure in Northern Canada are becoming unstable as the permafrost thaws. The lack of sea ice is having effects on polar bears and arctic fox populations, as well as the indigenous way of life. The arctic is warming at a rate twice that of the rest of the earth. Snow and ice reflect approximately 90% of solar energy whereas open water captures about 94% of the sun's energy. This in turn warms up the oceans at an alarming rate. Corals which provide habitat for 25% of all marine life are extremely sensitive to small changes in temperature. As the ocean warms, oxygen becomes depleted and results in corals to become bleached. Places such as the Great Barrier Reef in Australia have suffered mass coral bleaching and consequently is damaging for many species that are at risk, such as marine turtles, several species of fish, and sea birds. Oceanic acidification is also becoming a prominent issue affecting calcification processes which allow shellfish and corals to form shells and plates. Our forests are being threatened with diseases and pests such as the pine beetle. With the temperature increasing the pine beetle infestation is moving further north. Having suffered the effects of a drought last summer, farmers have recently seen how hard it is to plan their crops and pasture management from year to year. Climate change has far reaching impacts which can affect our economy, infrastructure, health, lifestyle, environment and the inhabiting wildlife all of which will become more apparent in the near future.

Warmer winters can cause a greater resurgence of pest populations which can be detrimental to plant and tree species. The bottom left picture is the Great Barrier Reef in Australia, home to an abundance of corrals, fish, sea birds, and many other species. To the bottom right we can see evidence of corral bleaching. Other areas in the Great Barrier Reef have experienced far greater damage than this.





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Sustainable farming encompasses a wide range of practices and principles; combining environmental stewardship with profitability and ensuring that the family farm will be there for generations to come.

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Biofuels Continued

ethanol per year using straw. The advantage of cellulosic ethanol is the use of wastes as feedstock as well as using feedstock that is not used for human food consumption and associated with the fear of rising food prices or shortages.

Above: A small scale biodiesel generator in Germany

An alternative to ethanol is biobutanol. It can be produced similarly to ethanol using fermentation of biomass. Biobutanol derives more energy than ethanol, it also evaporates more slowly and can be transported by pipeline unlike ethanol (which can absorb water molecules and is slightly corrosive). Ethanol plants can be converted to produce biobutanol relatively economically. In 2007 British Petroleum (BP) made biobutanol commercially available in the United Kingdom.

Biodiesel is formed from fats and oils in a reaction with an alcohol in the presence of a catalyst and the removal of glycerin and water. Biodiesel is commonly blended with petrol based diesels at 2-20%. It can be used entirely by itself in compression-ignition engines without any major modifications. Currently it is widely used in Europe. Biodiesel has a higher cetane number and higher oxygen content than diesel, resulting in lower emissions and improved ignition. Biodiesel contains no sulphur which reduces toxic emissions. It also has greater lubricating qualities than normal diesel which increases longevity and reduced wear on an engine. If changing over from petrol-diesel to biodiesel extra caution has to be taken with the fuel filter as biodiesel is a mild solvent and will remove built-up sediments left from regular diesel in the tanks and fuel lines. When switching it is recommended to check and replace filters with the first few tanks of biodiesel.

Biofuels have had increasing popularity since the early 1980s, but have seen technological advancements and large industry growth in the last decade. With concerns over fuel shortages, greenhouse gas/global warming, health and environmental issues the need for alternative fuels is rising. Governments will have a large role in the promotion and growth of Biofuels with stringent environmental standards being set and commitment to reducing greenhouse gases; however economic incentives may have to be introduced for companies to be able to compete with the fossil fuel industry.