ISSUE 21 –AUGUST 15, 2013

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SUNSHINE IS TRANSFORMING RUTLAND

NEW ENGLAND'S FIRST SOLAR POWERED CITY

Staff Article

"Rutland Rainbow" photo taken by John Olender,Times Argus, that appeared in "Greening Vermont" The Railgard/town art by Elizabeth Nelson.

Green Mountain Power (GMP) is undertaking several solar projects in Rutland, Vermont, two of which are especially noteworthy. The projects will help GMP fulfill its promise to make Rutland the Solar Capital of New England, with the highest solar capacity per capita of any city in the region.

The first project is College of St. Joseph (CSJ) Solar Farm. CSJ signed an agreement to host GMP's first rooftop solar farm in the city of Rutland, with a capacity of nearly 100kW.

The CSJ project is part of a larger collaboration between GMP, CSJ, Castleton College, Green Mountain College and the Community College of Vermont. The four Rutland County colleges have an agreement for a series of educational and economic development efforts, including exploration of renewable development opportunities.

Positive Energy, a solar developer with offices in Poultney, VT, and Granville, NY, will build the CSJ Solar Farm atop the college's athletic center. Positive Energy will use local labor. Materials will be American-made and largely sourced from Rutland-area suppliers. Students in the Renewable Energy and Ecological Design program at Green Mountain College will assist as part of their educational program.

The new CSJ Solar Farm will accompany Creek Path Solar Farm -- only one of many ways that solar is transforming Rutland

Positive Energy will use roof-friendly rubber feet for the solar array ballasts, made from recycled tires. Company president Joe Thomas says use of recycled materials and domestic resources,

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WHAT'S UP WITH THE WEATHER?

By G.E.T. Staff

What do you think of New England temperatures of 99º one week and 48º the next? What do you think of drought followed by 50 consecutive days of rain? What's up with the weather?

We are not alone. It is worse in other places. Today, the western United States is in the worst drought since the Dustbowl. The report for July 30 said drought was extreme or exceptional drought in 11.8% of the country, and moderate to severe drought in another 45.6%. Dry, hot weather has been continuing for many months, and with it, food crops are failing.

Temperatures in the US have been rising for many years. According to the National Oceanic and Atmospheric Administration (NOAA), June was the 340th consecutive month with temperatures above 20th century monthly averages. That means we have been twenty-eight years since the last month when temperatures worked out to be average or lower.

Even with the drought and high temperatures, there has been extreme precipitation. The problem is that rain has been falling in abnormal events, like Sandy and Irene. The percentage of the country that has seen at least one day's record rainfall during a given year stood near 10% for most of the 20th century, with no areas being as high as 20% over a period of 80 years. In the last twenty years,

however, there have been eight in which the amount was at or above 20%.

The United States is not alone in this. China has been experiencing a killer drought and heat wave for months, which has made bad air pollution much worse.

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THE TIDE IS TURNING – WE WILL WIN

By George Harvey

We are starting to see a clear set of reasons why the move to renewable power and away from fossil fuels will succeed. Here are a few, organized loosely into three groups:

Money

• Wind has achieved grid parity, meaning that it competes economically with coal, nuclear, and natural gas. It is putting pressure on nuclear and coal, and will soon put pressure on natural gas.

• Solar is achieving grid parity for installations of cooperatives, communities and individuals. This means people can produce their own renewable power for lower prices than the utilities can sell "grid" power.

• Nuclear plants are closing because they cannot compete with natural gas and wind. Kewaunee had its licenses and was in good repair, but no one would buy it, so it closed.

• Coal plants are closing because their pollution problems are expensive to fix. Some are converting to natural gas.

• Though natural gas plants are being opened, the overall pace of nuclear and fossil fuels is slower than that of renewable power. The growth of natural gas plants will eventually stop.

• Large corporations are starting to act. Last spring, GM signed a petition asking President Obama to address climate change. Google has spent over a billion dollars to provide itself with its own renewable power. These are just examples.

• Some organizations are divesting of fossil fuels holdings because of environmental considerations; others are doing so because nuclear and fossil fuel operations are uneconomical.

• Contrary to some reports, the Energiewende is succeeding. The number of energy providers has grown at a staggering rate, reaching 1.3 million organizations and households. Now, with Germany having 25% of its power coming from renewables, 37% of that power is coming from households, and 20% from farms. People who participate are not paying more, but saving money. And it looks like they will soon include a majority of the citizens.

Politics

• Every one of the 29 states with a Renewable Energy Standard saw a legislative attack to eliminate or reduce the standard. This attack was a marked failure. Lobbying by fossil fuel interests is not working as well as it once did.

• Reports and studies highlight better

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Thank you all for your help!

ABOUT G.E.T.

Green Energy Times is produced by 100% solar power, off-grid with a 3.8 kW PV system. We live and know that Energy Independence is indeed possible - with clean, sustainable renewable energy along with reducing your needs. We walk the talk!

Our mission is to create Energy Awareness, Understanding and Independence - Socially Responsible Living.
We must work together to save our planet.
Think Solar, Wind, Hydro… and energy reduction!
Solar Power works! … anywhere! under the sun!

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Green Energy Times would like to thank everyone who has submitted articles or helped in any way to make this all a reality. We want to also thank our advertisers & ask that you support them. Say that you saw them in *Green Energy Times*. Now let's all G.E.T. moving ahead towards a clean, renewable future - one where our children & grandchildren will be able to breathe & grow, live & love on this beautiful planet where we live. Thank you for reading G.E.T. Please send your comments & suggestions to: info@greenenergytimes.org

Disclaimer: G.E.T. allows space to, but does not endorse, contributed content from professionals or vendors.

G.E.T.'s Carbon Footprint Disclosure**. Green Energy TImes is printed on as high of a recycled content paper as one can get - locally. The printing process uses eco-friendly water-based inks. There are not any totally green printers in the area that we are aware of, so it would mean trucking them MUCH further to have G.E.T. published in a totally green manner, thus increasing carbon emissions, as a consequence. We chose to move from printing that used soy based inks because the soy is only used for the colors - not black, which is the most prominent color.... G.E.T.'s distribution emissions are also kept to a minimum, as well. With the wonderful help that we g.e.t. within many communities, it keeps our carbon footprint a bit lower. Hopefully our footprint is offset because we are 100% solar powered! Our Graphic designer, Amy Niebel, who owns and operates Double Plus Green, in Brookline is also Solar-powered. Because all of our employees work from home, our carbon footprint is kept to a minimum. We all grow and harvest organically and live as sustainably as possible. We DO walk our talk! ***Peace!

Letter From the Editor:
"The Times They Are A-Changing"

What a strange summer it has been -- with soaring temperatures reaching nearly 100º one week and then down to 48º at night the next ... in July, alone. Drought in the winter and spring again this year and already the start of August is too cool. Too much rain, then needing rain, seems like an all-too-familiar pattern here in the northeast. What's up with the weather, anyway? Be sure to read about it in the article that starts on the front page.

Our focus in this issue is about 'Sustainable Harvest.Harvest Season is an exciting time of year - to be able to gather from the labors of your hard work. It is the time to make ready for your winter needs, which leads us to our other focus in this issue, 'Winter Preparedness.

Now is the time to g.e.t. ready for the long winter ahead. While some of us hate to think about this, we should be thankful that we have the summer and fall not only to harvest what we have grown, but also to ready our homes and buildings for the coming winter. Insulation and weatherizing should be dealt with now. One of the two worst offenders to the rising CO2 levels in our atmosphere is from improperly sealed and insulated buildings. Today's high efficiency standards will help to cut your cost of living down considerably -- at home and work. Learn how in our Building Efficiency and Energy Efficiency sections of G.E.T. Lots of financial help is available with rebates and incentives that are covered in our Incentives and Financial sections, as well.

Solar is now on parity with the electricity "grid." It has never been a better time to reduce your cost of living by choosing to go solar. It can actually cost you less to go solar than the current cost of your electric bill. Isn't that a no- brainer? See our main Solar PV page to learn more. And read how others have gone solar, in our numerous examples in this issue.

Learn about the many options to help you to make the right choice to weatherize as well as to go solar. PACE, a means of supporting building energy improvements, is here in Vermont and it can help you now! Financial assistance is available by many means. And then we have two new solar technology companies right in the Upper Valley that are bringing the cost and efficiency of solar to new levels and that you can learn about. --. Solar farms are sprouting all over, including community solar farms that you can join. Making your contribution to clean, renewable energy allows you to take responsibility for the energy YOU use.

This all brings home the fact that we all need to be responsible participants on this planet ,no matter who we are, where we live or work, or what we do. We hope you also understand the importance of making smarter, efficient transportation choices -- the other huge offender to our rising CO2 levels.

We are facing one weather disaster after another from the results of the rising CO2 levels. Responsibility to DO something about it lies in each of our own hands. From the largest businesses, down to the 'YOU' level - is where it all starts. What have YOU done this summer to reduce your carbon footprint? Let G.E.T. know! With the information we present in Green Energy Times, you should be able to know how to help yourself, your cost of living should go down and your footprint on this amazing planet will be lowered. Let's work together and make the difference - if not for you and me then for the future of our children and grandchildren. The time is not later. The time is NOW- it is TODAY!

Thanks for doing YOUR part.

~ Nancy Rae

G.E.T. daily updates on the latest Energy News, as extensively researched by our own General Factotum, George Harvey -- is worth the time to read. It is on our website: **www.greenenergytimes.org**

Letters To the Editor:

Tammy Reiss, Unadilla, NY

The natural gas industry is inundating the public with an ad campaign with the only two issues fracking can stand on: Jobs & independence from foreign energy. "What shocks me is the fact Gov. Cuomo told the fossil fuel industry they had better step up their efforts to convince the Empire State that natural gas is our salvation," writes Tammy Reiss, Unadilla, NY. "Keep spreading the word that we can have both without polluting our country or planet".

Dear Editor,

I would like to let you know that I read Green Energy Times from cover to cover. This is THE BEST publication (of it's kind) that I have ever read.

Keep up the good work, you are making a difference.

-Have A Great Day,
Pierre Martelle, Green Mountain ZeroDraft, LLC, Williston, VT

This copy of *Green Energy Times* that you hold in your hand is FREE. We only ask that you, the recipient, do two things in exchange for this gift.

First, make some action or donation towards stopping climate change. It can be anything that your creativity, time and budget allows -- from weatherizing your grandmother's basement window to using public transportation or walking vs. driving, one more day a week or even taking that step to *'go solar.'* There is so much that each of us can do.

Second, pass this copy of *Green Energy Times* on, when & if you are done with it, to someone else who will appreciate its contents. When it's finally in tatters, we encourage the last user to use it to wrap fish, start a fire, or mulch a garden.

And if you have any ideas or suggestions for *G.E.T.*, drop us a line.

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David Blittersdorf's VIEW FROM THE TOP

Why Kill Solar Net Metering in Vermont?

For 15 years, Vermont has been a leader in developing some of the country's best laws to promote and streamline the installation of solar power. Our forward-looking net-metering laws lower project costs for homeowners, businesses and non-profits to install their own solar systems and produce their own electricity. Net-metered solar uses the power grid instead of batteries — when excess power is generated, it is put into the grid, making your electric meter spin backwards and generating a credit on your utility bill. This is good for customers, because it reduces the cost and inefficiencies of battery-based systems, and it's good for utilities, which can use the surplus power generated on hot, sunny days to offset peak power demands for air conditioning and see benefits in reducing transmission losses.

Nearly every state in the country now allows net metering. Since Vermont adopted the policy in 1998, the program has regularly been improved for customers by allowing "virtual" group net metering and improving the permitting process for small-scale systems. Over the past four years, Vermont's solar installation rate has increased rapidly, and we're now ranked ninth in the U.S. in installed solar per capita, and 11th in the nation for solar jobs.

However, there's a fly in the ointment: As of a few months ago, if you live in certain areas of Vermont, you can no longer net meter, because your utility won't allow it. Vermont legislation specifies that utilities are only required to allow net metering up to 4% of their total peak demand in 1996 or the most recent calendar year, whichever is greater. (With the capacity factor of solar, this is actually less than 1% of the utility's demand — a small fraction of its energy.) Vermont Electric Co-op and Hardwick Electric have hit this legislated 4% cap, and have stopped allowing their customers to net meter — these two utilities have opted to adhere to the letter of the law despite the fact that they could move beyond the 4% cap. Washington Electric Coop has also hit the cap, but is continuing to allow its customers to install solar anyway. Green Mountain Power, our largest utility which now serves over 70% of the state, is a strong supporter of net metering and considers any potential added cost to be tiny. According The New York Times earlier this month, in other states around the country, it's the large, investor-owned utilities that are fighting net metering as a threat to their traditional business model. Here in Vermont, our largest utility is supportive of net metering, but some of our smaller utilities are not.

Vermont has almost 8MW of net-metered solar installed to date. 8MW may seem like a large number, but it's a small percentage of the amount necessary to transition to an electrified, renewable energy economy over the next few decades. Panel prices have bottomed, and interest rates on loans are creeping up. State incentives are being reduced again and may disappear soon. Market forces mean that now is a great time for anyone interested in solar to pursue it. This isn't the time to allow a few Vermont utilities to kill solar for the people who happen to live in their service areas. In all cases, these small utilities are owned and governed by the customers whom they serve, and their customers should be aware they are being denied the option of net-metering clean, renewable solar. Whether or not you have plans yourself to pursue solar, I encourage residents of the relevant utilities' service areas to contact VEC and Hardwick Electric. Tell them you want to be able to help the world, your Vermont community and yourself by supporting solar net metering. Call, write or email: Vermont Electric Cooperative, 42 Wescom Rd., Johnson, VT 05656-9579, ph. 802-635-2331, support@vermontelectric.coop; Hardwick Electric, P.O. Box 516, Hardwick, VT 05843, ph. 802-472-5201.

David Blittersdorf is the President/CEO of AllEarth Renewables in Williston, VT — a company that specializes in the design, manufacture and installation of the grid-connected AllSun Tracker solar energy system. He is also the founder of NRG Systems in Hinesburg, VT, and the managing partner of Georgia Mountain Community Wind.

JOIN THE CONVERSATION!

RENEWABLE ENERGY 2013: COMMUNITY SOLUTIONS FOR VERMONT

It's hard to keep well-informed in the world of energy when the landscape is changing on a daily basis. "Renewable Energy 2013: Community Solutions for Vermont", held in Burlington, VT, on October 28th and 29th, is designed to give you the real facts and have you join in on the discussion. This two day conference offers both the energy basics and the nitty-gritty for those more steeped in the energy conversation.

The breadth of coverage at this conference is wide: "What's the best way to get your home to carbon neutral – how much weatherization versus biomass heating or solar powered by an electric car? How far do different electric cars travel and where are the charging stations? If there is a role for natural gas, what is it? How can your community get on track towards carbon neutral? How are wildlife organizations partnering with the wind industry to monitor projects and improve wind farm designs so these projects have as minimal an impact as possible on aviary life? Just how much energy do we use, and what does "90% by 2050" even look like (and what does that mean??)? How many acres of solar? How many wind turbines? Can we get to this level of exactness? Why isn't the old dam near your house generating energy? Why does Europe have so many more shared heating districts using biomass than we do? Can you really heat your home with pellets? Just what is a "heat pump" and do they work? How does our "grid" function – and why does that matter to Vermont and me? What are the very basic returns-on-investment if I switch my home or business to renewables? Who can help me pay for these upgrades? How should we be designing our communities so they are more walkable and bikable? Who's funding the anti-renewables message that the press is picking up these days?"

The two-day conference is flexible to meet your needs with the potential for continuing education credits for planners, architects, and weatherization and energy professionals.

Monday has reduced rates and a friendly-workers-schedule, beginning at noon and ending with the option to attend a speech by climate change activist and co-founder of the environmental group "Peaceful Uprising": Tim DeChristopher. DeChristopher's efforts to stop the leasing of public lands to oil and gas companies landed him in jail, with a motion picture now memorializing his story.

Tuesday's all day event showcases Keynote Alan Nogee, previously the head of energy programs at the Union of Concerned Scientists, while offering a full panel session on what really needs to happen to get to 90% by 2050.

The exhibit hall showcases pellet boilers, solar panels, heat pumps, electric transportation options, geothermal displays, legal and tax services, environmental consulting firms, hydro designs and more. To register, visit http://www.revermont.org/main/events/conferences/

Gabrielle Stebbins, Executive Director of Renewable Energy Vermont, speaks with WPTZ at the 2012 Annual Conference

MT. WASHINGTON AUTO ROAD ALT ENERGY SUMMIT

Event Will Showcase Full Spectrum of Both Mainstream and Newly Developed Alternative Energy Based Vehicles and Technologies on September 14-15, 2013 for Demonstrations and Drive Up Northeast's Highest Peak

PINKHAM NOTCH, NH—Given that once experimental alternative energy technologies have now become mainstream, an event with a storied history on the Northeast's highest peak is returning as the "Mt. Washington Auto Road Alt Energy Summit" on September 14-15, 2013. In this regard the Auto Road is continuing on its historic path as a proving and playground for new and evolving technologies.

Categories will include EV manufacturers, dealers, retailers, groups and associations, makers, inventors, developers, publications and related media, components/parts and services. Individuals and organizations with vehicles including cars, trucks motorcycles and bicycles or unique one-of-a-kind creations are also invited. An Energy Expo Exhibit area is planned, which will include vehicle manufacturers, related alternative energy businesses and historic vehicles which have ascended Mt. Washington by other than gas powered engines. Exhibits and information regarding other sustainable energy sources will also be featured, including hydro-electric, wind power, solar power and geo-thermal.

Event Director Ted Dillard has both a technical and practical understanding of alternative energy, as he both builds and rides electric motorcycles. "In the midst of the mid-'70s "Energy Crisis", a small group of inventors and visionaries formed a unique event with the Mt. Washington Auto Road as it's backdrop and proving ground," Dillard observed. "As we move into the second decade of the 21st Century, we're seeing many of those solutions become commonplace – nearly mainstream - in daily life. This event will celebrate those pioneers, re-affirm the Mt. Washington Auto Road's century-long commitment to responsible stewardship of public lands, and bring "Alternative Energy" solutions into the forefront of mainstream renewable energy. This event will be a landmark event in New Hampshire!" he added.

What to Expect:

- Vendors, Dealers, and Manufacturers of Hybrid, Plug-In Hybrid, Plug-In Electric and Alternative Fuel vehicles showing some of the most remarkable vehicles available today – complete with test rides.
- Information "roundtable" discussion sessions for homeowners, backyard inventors, public administrators, fleet managers and others on Renewable Energy solutions available today, and funding opportunities and resources.
- Supplies, components, parts and systems for Renewable Energy systems for homes, businesses and vehicles.
- Exhibits of unique, creative and innovative solutions for energy and transportation systems offered by inventors, students, "makers", researchers and enthusiasts.
- The Alt Energy Drive to the Summit – watch and cheer on our "Alt Energy contestants" as they make history on Mt. Washington. Everything from home-built electric bikes, cars and motorcycles to the sleekest high-performance plug-in vehicles on the road today will be on hand. Watch for some truly unusual solutions there as well, including some top-secret "unmanned transportation" research projects currently in development. Awards and categories for the Summit will reward ingenuity, creativity and dedication.

For more information about the "Alt Energy Weekend" event at the Mt. Washington Auto Road call Event Director Ted Dillard (978) 621-5178.

ZIP UP THE HILLS WITH ZOOMBIKES

By Roger Lohr

Electric bikes are great for getting to work as well as play.

Riding up hills can be tough but electric bike motors can inject the fun into bicycling as bike riding is now augmented by getting a little help up those daunting grades. Zoombikes in Middlesex, VT is a source for electric bicycles, which are a means of transportation and commuting, will help save on the cost of gas and time in traffic or parking, and is a recreation aid that takes the work out of bicycle riding to make it just plain fun. With relation to commuting to work, the cost comparison between commuting in an automobile and on an electric bicycle would reveal obvious advantages for the bike, and of course there'd be great benefits for the environment and climate change if more people would use electric bicycles for some days commuting.

For the uninitiated, to ride an electric bike is to want one. Of course, there are those bike riders, who want and love the work out for fitness and sweat to attain it, but recreationalists and commuters have different motivations. Zoombikes, an electric bicycle dealer has a few options. The Evelo line of electric mid-drive motor bikes, which provide more and a longer range of power and better hill climbing compared to rear-drive motor bikes. The Ridekick, which is a battery-driven trailer attached to the rear of your existing bicycle to push you with your thumb on a simple throttle at speeds up to 19 MPH. The trailer clicks on or off your bike in

Cont. on page 7

Electric Car Charging Stations

The locations of charging stations change quickly. We suggest you find the latest data at the US DOE's site, www.afdc.energy.gov/fuels/electricity_locations.html.

Vermont

St. Michael's College
426 College Pkwy, Colchester
Healthy Living Market and Cafe
222 Dorset St, So. Burlington
Mountain Energy of VT
Rt. 100, S. Londonderry
Lost Nation Theater
39 Main St, Montpelier
Addison Cnty Reg. Planning Comm.
14 Seminary St, Middlebury
Chittenden Superior Court
175 Main St, Burlington
City Market Onion River Co-Op
82 S Winooski Ave, Burlington
Lakeview Garage
45 Cherry St, Burlington
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4847 Main St, Manchester
Burlington Mitsubishi
1835 Shelburne Rd, South Burlington
Freedom Nissan
1095 Shelburne Rd, So. Burlington
DR Power Equipment
75 Meigs Rd, Vergennes
Green Mountain Coffee Visitors Cntr
1 Rotarian Pl, Waterbury
Vermont Law School
164 Chelsea St, Royalton
VT Dept of Bldgs & Gen. Services
133 State St, Montpelier
Maplefield's Mobile
555 Fairfax Rd, Saint Albans
Lamoille Valley Ford
222 Rte 15, Hardwick
Twin State Ford
8 Memorial Drive, Saint Johnsbury

New Hampshire

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Concord, 91 Hall St, Concord
Grappone Conference Center
70 Constitution Ave, Concord
Concord Nissan
175 Manchester St, Concord
Peter's Auto Sales
280 Amherst St, Nashua
Port City Nissan
120 Spaulding Tpk, Portsmouth
Salem Nissan 343 Main St, Salem
Somersworth Nissan
285 Rte 108, Somersworth
Nissan of Keene
544 Monadnock Hwy, Swanzey
Autoserv Nissan of Tilton
40 E Main St, Tilton
Team Nissan
70 Keller St, Manchester
Hanover Street Parking Garage
34 Hanover St, Portsmouth, NH
Berlin City Nissan
485 Main St, Gorham
Autofair Nissan
34 Portsmouth Ave, Stratham
Dyn 150 Dow St, Manchester

BREEZING ALONG E-BIKES OF NEW ENGLAND

Staff Article

Are you breezing to work on an E-bike or do you spend most of your commute sitting in traffic?

In 2006, Paul and Cathy Morlock went looking for a pair of electric bikes. What they found instead was a business opportunity. There were no E-bike retailers in New England, and this meant they would be market leaders the day they opened their shop.

E-Bikes of New England sells electric bikes, electric scooters, conversion kits, parts, accessories, and even electric skateboards. They sell custom bikes, along with about a dozen brand names.

There are bikes for enough different purposes that they can organize their inventory in that way for customers. Some bikes are for cruising, some are for climbing hills, and some are for serious work in the mountains. Some are good for college, and some are for commuting to work. Some are light and fold up for storage; some are heavy. Some have two wheels, and some have three. Some are rather ordinary looking upright bikes, and some are recumbents. If you can imagine a bike, they might just have it.

A folding bike can provide a good example of what E-bikes are all about. E-bikes of NE carries three brands, Dahon BionX, Prodeco, and Swiss/Montague.

The Dahon BionX bikes are custom built using BionX conversion kits, according to what the customer wants. This is neither particularly expensive nor especially time consuming to install. E-Bikes of New England starts with a standard folding Dahon bike and adds the BionX specified conversion to it. The result might be the least expensive way to get an E-bike, with prices ranging up from $549.

Perhaps most people will want E-bikes for commuting and riding around town. For these people, E-bikes of NE suggests a number of different kinds of bikes for comfort cruising, commuting, or riding around campus. Their comfort cruisers include bikes for those of us who find standard bikes sufficiently uncomfortable to be off-putting. The electric feature allows such people to get exercise without taxing themselves too much, as they pedal with assistance for climbing hills.

Some of us are seriously interested in performance. E-bikes are made for those who want to ride the hills and mountains, or just for those who want to go on trips with a little help when it is most crucially needed.

The variety of brands and designs is almost overwhelming. A visitor to the E-bikes of New England website can easily spend quite a while checking out the bikes and the equipment. Renting them at the store is a great way to try them out.

E-bikes of New England is in Derry, NH. 888-809-5183. Learn more at http://www.ebikesofne.com/.

KING ISLAND, TASMANIA

A COMMUNITY ENTIRELY DEPENDENT ON RENEWABLE POWER

By George Harvey

Late last year, Tokelau, a small group of islands in the Pacific Ocean, became the first national area to be entirely dependent on solar power for its normal electric supply. It has diesel generators for backup, but these run on locally produced agricultural byproducts. The system saves the 1400 residents of the atoll an amount of money equal to about half the gross domestic product.

Now, a second island has joined Tokelau in achieving 100% renewable status – at least much of the time. King Island, which sits between the island of Tasmania and the continent of Australia, is getting all its power from renewable sources over time periods that get longer and longer, more and more often, as the system is constantly being updated.

King Island is in some ways very different from Tokelau. It has a population only slightly larger than Tokelau's, but it is spread out over a far larger area. The population density of Tokelau is about 75 times that of King Island. This means that power transmission and transportation are more important issues for King Island. Also, unlike Tokelau, which is tropical but heavily moderated by the ocean, King Island is in the temperate zone, with greater extremes of both heat and cold, so there is greater demand for energy to heat or cool.

Hydro Tasmania has taken a very active interest in developing systems for King Island, with the idea that they could be replicated on other islands and mini-grids. They have been doing a lot of research and development, working on a wide range of systems. One innovative technology is an Uninterruptible Power Supply that combines a diesel generator with a large flywheel; the flywheel keeps going, but the engine only runs on demand. Another is a Dynamic Resistive Frequency Controller that converts wind spill to raise or lower reserve and allows the diesel generators to operate at minimum load.

Power on King Island has historically been supplied by importing diesel oil to power 9MW of generators. Hydro Tasmania's goal has been to reduce dependence on diesel gradually by utilizing solar, wind, and biofuels. The diesel generators are running biodiesel. Solar PVs currently provide 96kW. There are five wind turbines, totaling 2450 kW. The biodiesel UPS, a 1.5 MW dynamic resistance frequency control, and an 800 kWh Vanadium Redox battery provide backup and load leveling.

Currie Harbor, King Island, Tasmania, Australia. Photo by Karl Barnfather

An important part of the King Island grid is a smart grid that can be used to assist response to demand from renewable power sources. Such things as water heaters are provided with power when renewable output is high, but power is reduced to them when output decreases. An important goal is to provide rapid response to changes in demand and supply

There are a number of tests being done with biodiesel. Equipment is being monitored to see what maintenance issues are likely to arise. Out of this monitoring, reports are being drafted on what modifications need to be made to equipment. At the same time, the fuel supply chain is being tested, and the economics are being studied.

King Island is providing a proving ground not only for new technology and management practices, but also a showcase for education. Utility managers are invited to visit the island to see for themselves what is being done.

ZOOMBIKES

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seconds and converts your bicycle into one that is electric-powered.

The Evelo bikes assist the rider in three variable levels providing low, medium, or high amount of assistance. The battery provides a 20-mile range (more pedaling or moderate hills impact the range) on a 5-hour charge with little efficiency loss for 450 charges. inEvelo also comes with an 18-month warranty.

Licenses are not required to use electric bikes and there is no registration needed either. They are deemed a bicycle rather than a motorized vehicle, and caring for an electric bike is as easy as a regular bike. The Evelo electric bike models are available starting at $1,995 and the Ridekick trailer starts at $699. Additional battery power for longer travel range and other product options will increase the cost of these products.

The best way to learn about electric bicycles is to demo one and find out what they are like for yourself. Learn more at www.Zoombikes.net or call 802-272-0425.

Roger Lohr is a writer, researcher, and marketer, living in Hanover, NH, who is involved with subjects including snow sports and sustainability. He's also the founder and editor of XCSkiResorts.com, @ XCSkiTravel on Twitter, and created the Hanover Idling Awareness Campaign and the NH BikeSmart program.

At Long Last... PACE!

By Johanna Miller

For several years, many efficiency and renewable energy advocates — as well as eager homeowners — have been waiting for the "Property Assessed Clean Energy" or PACE program to get underway in Vermont. For several reasons, the innovative financing mechanism has not been available — until now.

This September, Efficiency Vermont will open a 'subscription period' to homeowners in the towns that have voted to enable and implement the PACE program. That means homeowners in many Vermont communities could opt to participate in the program because of the unique flexibility of how PACE works.

PACE allows homeowners to make approved efficiency or renewable energy investments, like solar hot water or pellet stoves, without taking out a loan, and it provides flexibility for those who might not know how long they will stay in their homes, since the assessment stays with the property, not the person, if the home is sold. Unlike a traditional bank loan, the PACE program allows people to make the energy investment today and then pay back the cost of that investment over a much longer period — up to 20 years. The goal of PACE is to try to assure that people can pay their PACE assessment charges with money they save through lower energy costs, and have a little cash left over.

PACE builds upon the well-established municipal method of creating local "assessment districts" for residents to support services — such as water and sewer — and residents pay those assessments back through a monthly billing process. PACE is similar, with one important exception: only those people who play, pay. In this case, the players are homeowners who sign up for PACE to make clean energy improvements to their homes.

Another important feature of PACE is that it could allow people with limited ability to borrow money — or those who are unwilling to take on debt — to make beneficial energy improvements. For lower income Vermonters in PACE towns interested in making efficiency investments, the deal could be especially sweet this September. The Vermont Public Service Department has created the "PACE Interest Rate Buy Down Program" to offer income-eligible Vermonters access to an attractive 2.99% interest rate. While the Department anticipates all income-qualified applicants will be able to secure this rate for efficiency-only improvements, the limited funds available to buy down interest rates are first-come, first-served.

"PACE is not for everyone, but for some people it could be the best solution," said Peter Adamczyk, managing consultant at the Vermont Energy Investment Corporation and one of the state's foremost clean energy financing experts. "It offers Vermont homeowners one more option, and the opportunity to take a whole home approach, investing in both efficiency and renewables, in a convenient, flexible and affordable way."

PACE also offers promise in serving as a catalyst for achieving other important societal goals. The program could help keep more money in Vermont by creating local jobs. It could also help more Vermonters tighten up their leaky houses and move away from fossil fuels, reducing the greenhouse gas emissions that are one of Vermont's biggest contributors to climate change.

Find out more about PACE, the upcoming September subscription period and the income eligibility requirements of the limited interest rate buy down opportunity by contacting Efficiency Vermont at pace@efficiencyvermont.com or visit www.efficiencyvermont.com/pace.

Johanna Miller is the Energy Program Director at the Vermont Natural Resources Council. www.vnrc.org.

SUN-POWERED HEALTH CARE

Dr. Highland is no longer "part of the problem!"

Going solar at my medical office was a no-brainer; it was just a question of working out the details.

As a doctor, I find it impossible to separate the health of the environment from the health of the individual. New scientific studies every year are documenting the ways in which toxic substances released into the environment affect human health. This applies to chemical waste and food additives, but also to noise and light pollution and climate change.

When I built my office in Plymouth eight years ago, I designed it to be as efficient and well-insulated as possible. I chose a site with good southern exposure for passive solar lighting and heating, and used non-toxic building materials. But over the years, I became more and more uncomfortable with the fact that I was primarily using propane to heat the place. When it came to pollution and global warming, I had to face the fact that I was "part of the problem." That's when I talked to PAREI (Plymouth Area Renewable Energy Initiative).

I had been a member of PAREI since the group's start, but had not really taken advantage of all that they had to offer.

Dr. Highland's 3.4kW Solar PV system that provides all of her electricity. (inset) Dr. Jennifer Highland's Office, Plymouth, NH is close to Net Zero. She does not rely on outside energy sources.

Last summer Craig Cadieux came over to do a free site visit. I had some vague ideas about how to reduce my fuel usage, but Craig proposed a more radical approach: photovoltaic panels to generate electricity, and a new super-efficient heating system powered by electricity. If sized right, the system could cover all my heating needs and my lighting and other power needs, bringing my building close to Net Zero (no need for outside energy sources).

Four months later, after giving myself a crash course on Air Source Heat Pumps and consulting with various contractors, I now have a new heating system (which was simple to retrofit) and a grid-tied photovoltaic array at my office. I hired PAREI to install a 3.4KW ground mounted solar system. They were competitively priced and great to deal with, and I also knew that, based on their Energy-Raiser model, they would be happy to have me working alongside the crew, which reduced costs and made me more familiar with how my system works. Current incentive programs also helped to make the whole project amazingly affordable, and Sandra Jones walked me through that process and filed all the paperwork for me.

My patients are excited and curious when they see my new system, which has led to some stimulating conversations. As a business owner, I am pleased to have a system that will serve me for many years after it has paid for itself in energy savings.And I am delighted to be contributing a little more to a healthy solution in the present and the future.

PAREI installing a 3.4KW ground mounted solar system, part of their Energy-Raiser program

Sustainably Harvesting the Sun - On The Farm

Staff Article

The folks at Catamount Solar have helped more than one farm with a new kind of agricultural crop. Like all other crops, it depends on the energy of the sun to produce a sustainable harvest. Unlike other crops, it is a high-tech addition to the farm's production. It is electric power from photovoltaic panels.

Farming is not what it used to be. A farm has to be certified for its harvest to carry an organic label, and certification can be complicated. Organic farmers may need buffer zones on their property, on which organic crops are not raised, just to guarantee there are no unwelcome chemicals from other, conventional farms. More than one farmer has wondered what can be done with such land.

Solar photovoltaic panels can reduce costs or even provide an income without waste by-products that harm the environment. Best of all, they can use space that might have to lie otherwise be unused, ranging from barn rooftops to buffer zones for organic certification.

The McKnight Farm in East Montpelier, Vermont is a good example of how solar power can add benefit to the farm. It is an organic dairy with 250 cows. It cannot even raise their own straw on the buffer zone required for certification. Catamount Solar built a grid-tied, net metered PV system for the farm, putting much of it on land that would be otherwise hard to use. Now the farm is producing 100% of the power it needs from its array of nearly 100kW.


Larson Farm

The Larson Family Farm in Wells, Vermont provides another example. It is also an organic farm, but it is diversified, having other products along with dairy. When the farm got a new pole barn for hay storage, it was designed and sited to take advantage of solar power. Now the new barn has a 40kW array on its roof.

Luna Bleu Farm of South Royalton, Vermont needed a new equipment shed. They made certain it was designed and sited for solar power, and had a 17kW PV system added to it.

Not all change is bad. Now, along with the oats, peas, beans, and barley, we can harvest electricity from sunshine.


Luna Farm


Macknight Farm

ONE SMALL TOWN SPROUTS TWO INNOVATIVE SOLAR COMPANIES

Norwich Technologies - EZ-PV & SunTrap

Staff Article

Norwich Technologies has a home office in Norwich, Vermont, with larger offices in White River Junction. It is a highly innovative business that has two products. One, called EZ-PV, provides a novel approach to solar photovoltaic installations with a focus on their fixed roof mounted PV systems. The other, called SunTrap, is based on their research and development in a type of solar power, Concentrating Solar Power (CSP). The diagram shows the increased efficiency of the Norwich SunTrap compared to state-of-the-art technology.

EZ-PV team members: Troy, Joel, and Jonathan

EZ-PV is in most respects a standard modular installation of PVs. However, the engineering has reduced the cost a great deal. Standard panels are assembled using an efficient and inexpensive mounting system. The saving this system

A CSP trough system. Norwich Technologies is developing a new high-performance receiver (the heat collecting tube suspended above the mirror) called SunTrap"

provides in material and labor in manufacturing, together with the lower cost for the fieldwork of installation, makes it one of the least expensive approaches to solar power around. The claim Norwich Technologies makes for EZ-PV is that the cost is reduced by one third and the installation takes one third of the time.

CSP is typically done using mirrors to focus sunlight and makes a thermal medium very hot. The hot thermal medium can used immediately to drive electric generators or can be stored in a thermal mass for later generation of electricity. CSP can thus provide more stable, less time-dependent solar power.

Together, PV and CSP complement each other – with PV applicable at small to large scale throughout most of the world and CSP typically installed at large

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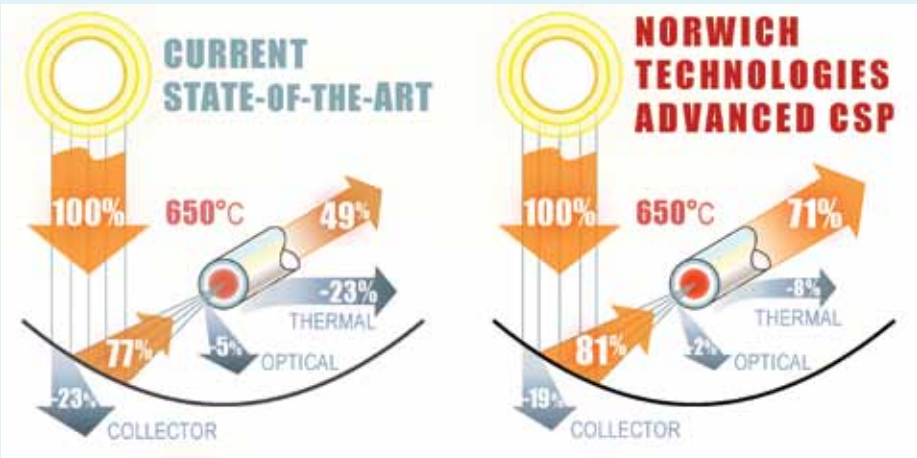

Norwich Technologies is developing an advanced receiver for CSP, called SunTrap, with improved performance. Approximate reductions in the optical and thermal losses relative to the state-of-the-art are shown.

Solaflect Energy-Suspension Trackers

Staff Article

Solaflect Energy is headquartered in Norwich, Vermont. Its product development operation is located in White River Junction. A highly innovative company, with two related products, Solaflect Energy has developed a new type of dual axis suspension photovoltaic tracker. The other is a similar-looking suspension heliostat, which holds mirrors for concentrating solar power (CSP) for solar thermal installations.

Solaflect Energy's Suspension Heliostat™ reduces the use of steel by two-thirds, and dramatically reduces costs.

Conventional trackers can be compared to 19th century designed truss bridges where iron beams are riveted together. By comparison, the heart of both Solaflect Energy products is a suspension design where flat photovoltaic panels are held in place with wires, much like the Zakim Bridge, running from Charlestown to Boston, Massachusetts. Unlike that bridge, however, the tracker has suspension wires on both sides, pulling against each other to hold the panels flat.

"A suspension design is dramatically more efficient for the structure", says Solaflect's founder, Bill Bender. He adds, " A major cost is steel. Wire reduces the amount of steel needed by approximately 65%. We call our trackers 'material efficient'." The reduction in materials produces efficiencies through the entire production, shipping and installation of the Solaflect's trackers.

The suspension system is extremely strong. In high winds, the computer tracking control gives it extra protection and the tracking system is leveled, thereby lessening the winds' effects. Solaflect's PV tracker has been thoroughly tested. For 2.5 yrs, in Cheyenne WY, one of the windiest places in the U.S., for instance, it withstood winds upwards of 100 mph.

Solaflect Energy is also developing an innovative heliostat, which holds mirrors for concentrating solar power (CSP) for solar thermal installations. Solaflect has won two SunShot Incubator awards, each for $1 million, from the U.S. Department of Energy to use in the heliostat's development. One goal of the award program is to reduce the cost of concentrating solar power to a point that it is cost- competitive with other energy sources.

Solaflect Energy has a close working relationship with students at the Thayer School of Engineering at Dartmouth College.

Learn more about Solaflect Energy at http://www.solaflect.com.

WHY SOLAR?

SAVE $$$$ – SAVE THE PLANET
INCREASE ENERGY INDEPENDENCE

Different people are interested in solar energy for different reasons. Does a solar system address the issues that are important to you?

- It's a good financial investment
- It's a good move for the environment
- There are different ways of viewing the financial value of a solar system. One may make more sense for your situation than another.
- It's like prebuying electricity
- It's like a safe, long-term investment

Installing a photovoltaic system is a bit like prebuying electricity. As with prebuying heating oil or propane, you pay up front and then you no longer have an electricity bill!

The main difference is time scale. With photovoltaics, you are prebuying 25 years, 30 years, or more worth of electricity, rather than a single season's worth of fuel. And while prebuying heating oil or propane can backfire on you once every few years, it's pretty hard to believe that the average price of electricity will drop over the lifetime of your PV system.

The pre-buy value of electricity with a PV system depends on specifics of your home, such as the slope and orientation of your roof and any shade cast by trees or other obstructions. It also depends on the value of incentives you are able to take advantage of. A few example scenarios are shown below–for sake of comparison.

If residential utility rates grow at the same trend they have followed for the past 20 years, the average utility price for electricity in Vermont over the next 30 years will be 25.4 cents/kWh.

4.8 kW PV system on a 45º roof facing true South, no shade, assuming 30-year system life.

Finance sticker price in full ($15,000) at 5% interest over 10 years

- without taking advantage of any incentives: 12.5 cents/kWh
- with Vermont incentive but no Federal tax credit: 11.1 cents/kWh
- with both Vermont incentive and Federal tax credit: 8.1 cents/kWh

Half of sticker price financed at 5% interest over 10 years

- without taking advantage of any incentives: 11.2 cents/kWh
- with Vermont incentive but no Federal tax credit: 9.8 cents/kWh
- with both Vermont incentive and Federal tax credit: 6.8 cents/kWh

Paid entirely out of pocket

- without taking advantage of any incentives: 9.9 cents/kWh
- with Vermont incentive but no Federal tax credit: 8.4 cents/kWh
- with both Vermont incentive and Federal tax credit: 5.5 cents/kWh

4.8 kW PV system on a 45º roof facing due East, no shade, assuming 30-year system life. (This system will produce 74% as much electricity as the south facing system above.)

Finance sticker price in full ($15,000) at 5% interest over 10 years

- without taking advantage of any incentives: 16.8 cents/kWh
- with Vermont incentive but no Federal tax credit: 14.9 cents/kWh
- with both Vermont incentive and Federal tax credit: 10.9 cents/kWh

Half of sticker price financed at 5% interest over 10 years

- without taking advantage of any incentives: 15 cents/kWh
- with Vermont incentive but no Federal tax credit: 13.1 cents/kWh
- with both Vermont incentive and Federal tax credit: 9.1 cents/kWh

Paid entirely out of pocket

- without taking advantage of any incentives: 13.3 cents/kWh
- with Vermont incentive but no Federal tax credit: 11.3 cents/kWh
- with both Vermont incentive and Federal tax credit: 7.4 cents/kWh

The results are even better in New Hampshire!

New Hampshire incentives are even more generous than Vermont's for a solar array of this size. If you are in New Hampshire, take any of the numbers above and knock off a cent or two per kWh.

Did you notice that an EAST FACING roof is a totally viable home for solar?

This is worth emphasizing because so many people think that only a perfectly South-facing roof will work for solar. Look again at the second example. Even a roof that is facing due East can be a financially viable home for a solar electric system.

For a PV system to represent electricity at a lifetime cost equal to that of projected utility rates, it would have to lose out on a full half of available sunlight in the Upper Valley of VT or NH (i.e., some combination of orientation, slope, and shade that prevents half of available sunlight from landing on the panels). Even an East- or West-facing roof gets more than half the day's sun, so long as there is not much additional shade from nearby trees. Similarly, a South-facing roof can deal with a fair bit of shade and still remain financially viable for solar. Clearly, you do not need an "ideal" solar-oriented house to benefit from a PV system.

Solar electric systems can be shockingly good investments

Most everyone interested in a solar array knows that the systems save the owner money over time by reducing bills from the utility. What few realize is just how good the investment in solar works out to be on purely financial grounds.

As with any investment, you start by putting in money up front and you (hope to) get a return over time. There are two important factors to consider in any investment: first, how much is it likely to return and over how much time? In other words, will you end up with a net gain? How big will that gain be, and how does it compare to the gain possible from other investments? Second, how confident can you be that those returns will actually happen? In other words, is the investment relatively "safe" or "risky"?

Regarding the risk level, it is hard to conceive of an investment that is as safe as a photovoltaic array. Corporations and municipalities sometimes go bankrupt, taking their stocks and bonds with them; banks, savings and loans, and credit unions sometimes fail, taking some or all of their deposits with them; some even fear the long-term solvency of the U.S. federal government. What nobody doubts is that the sun will keep shining. Unless and until the world pretty much ends, your solar electric system will keep on producing value for you.

How much will that value add up to? A lot. How does it compare to other investments? Very, very well.

Consider a 4.8 kW PV array in Vermont, on a roof getting good solar exposure. This is a typical-sized, residential solar electric array. After state and federal incentives, this system costs $8,340. The value of electricity generated by this system over a 30-year lifespan amounts to $36,000. The net gain is close to $28,000. To make that kind of gain by investing $8,340 in a bond, you would need the bond to pay an interest rate of 11.13%. If you can find a low-risk, long-term bond paying anywhere near that rate, snap it up! Of course, no such bond exists.

Instead, 30-year Treasuries offer a meager 3.33%, 20-year AAA municipal bonds are at 2.91%, and 20-year AAA corporate bonds are at 3.70% (composite measures via Yahoo! Finance, accessed June 11, 2013).

A Typical Solar Array

A typical solar array in Vermont or New Hampshire is around 4.8 kW. This is a measure of the capacity of the panels. The amount of electricity produced will depend on the characteristics of your property (e.g., how much shade is cast by nearby trees).

For standard, typical installations, the sticker price per watt for completed, working systems could be between $4.17 and $2.99. Factoring in the Federal tax credit brings your net cost to between $2.92 and $2.02 per watt. Additional Vermont or New Hampshire incentives push down your net cost even further, as low as $1.64 per watt in Vermont and $1.44 in New Hampshire.

For example, a 1.2 kW system (considered a "starter" system that can be expanded in the future) costs could be $2,960 in Vermont and $2,600 in New Hampshire, after accounting for Federal and state incentives. A 4.8 kW system costs $8,340 in Vermont and $6,900 in New Hampshire, after incentives.

The Process To Go Solar

1. **Contact a solar installer to schedule an on-site consultation.** They will review your roof to see if it is suitable and take insolation (amount of sunlight) measurements to be able to give you an estimate of the electrical production a solar system will provide, given your specific conditions. With this information they'll be able to provide you with a proposal, and also answer any questions you have. This might take anywhere from 20 minutes (if you are already thoroughly familiar with solar systems) to an hour or so.
2. **Take the time you need** to review all the information and make your decision.
3. If you decide to go solar, **schedule an installation date.**
4. When the installation is done, it is hooked to your utility meter and will begin to provide clean renewable power (weather permitting).
5. A representative from the utility will visit you shortly after to **confirm the installation and turn on your net metering account.** (Before that, you are still getting the majority of your net metering value, but not the "solar adder" bonus credit.)

Voila! You will then be a larger part of the solution towards a sustainable future for us all.

2 kW EZ-PV roof-mounted solar array (8 Sharp panels with Solectria inverter) installed in Norwich, VT

Now is the best time ever to GO SOLAR!
Schedule a visit from a Solar Installer today!

This information was contributed to Green Energy Times from EZ-PV, a new solar installation company located in White River Junction, Vermont. The EZ-PV photovoltaic system was developed and is offered by Norwich Technologies, a company started to develop cost-saving and efficiency-improving technology for utility-scale concentrated solar power installations. We want to thank them for this contribution and wish them much success. They are a part of the Solution! http://ez-pv.com; http://www.norwitech.com.

Norwich Technologies

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scale in SunBelt areas of the world.

In CSP, Norwich Technologies' diverse advances in materials and coatings are capable of revolutionizing CSP trough receiver design. This receiver offers the prospect for reduced costs, combined with dramatic efficiency improvements at high temperatures. In addition, the technology enables significant operational and cost advances in parabolic trough CSP, which could potentially enable rapid, widespread adoption in new and retrofitted installations. Perhaps we are witnessing a hint of things to come, with increased application for CSP.

Norwich's innovative approach has earned it a $250,000 grant from the US DOE's SunShot program, which was set up to accelerate progress toward the cost target of $0.06 per kilowatt-hour through novel and revolutionary research into CSP technologies. Now, a second grant has also been awarded to further the research and development Norwich is undertaking. This has come in the form of a $150,000 grant from the National Science Foundation.

Visit Norwich Technologies: http://www.norwitech.com

SUNSHINE IS TRANSFORMING RUTLAND

Cont. from page 1

whenever possible, has always been a core operating principle of the business.

GMP hopes to complete the project this fall, and will own and maintain it under a 25-year lease agreement with the CSJ. They will credit the college for 10% of the project's output. The remaining energy will go onto the local electric grid and will be consumed by their local customers.

Just as the CSJ Solar Farm is getting under way, Green Mountain Power is beginning work on its next Rutland project. They applied for a permit from the Vermont Public Service Board to build the Stafford Hill Solar Farm, a 2.3-megawatt solar farm on the city's closed landfill.

Under the current proposal, GMP will lease the former landfill from the City of Rutland for 25 years, for $30,600 per year, with a 25-year option. They expect to put the project out to bid later this summer, and hope to build it next year.

GMP worked on the project design with Sanborn, Head and Associates, which has significant experience with solar projects on landfills. The initial thought was to make the project as large as 3MW, but after considering specifics of the landfill, it was decided the best size was 2.3MW. The project will cover about 9 acres of the landfill, with 7,800 solar panels arranged in 72 rows.

The Stafford Hill project is named for the Stafford Technical Center and Former U.S. Senator Robert Stafford. GMP intends to name its local solar farms after positive attributes of the community. Senator Stafford is considered to be one of the Senate's top all-time environmentalists.

GMP already operates the Creek Path Solar Farm, located on a former brownfield. They also purchased interest in the solar farm on the former Poor Farm off Woodstock Avenue, and recently filed for a state permit for the Solar Center at Rutland Regional, a 150-kilowatt project at the hospital.

In other efforts, GMP is building a new Energy Innovation Center in the former Eastman's Building, aiming to develop new customer programs, efficiency ideas and educational opportunities. Vermont Energy Investment Corporation and NeighborWorks of Western Vermont plan to have some staff at the EIC when it opens this fall.

Things are happening so fast in Rutland it is hard to keep up with them. As this article is being edited, Green Mountain Power announced a new project, a 75kW solar array on the roof of their electrical maintenance facility on Green Hill Lane. It is is the seventh in the GMP pipeline in Rutland.

WHY WE NEED A MIX OF POWER SOURCES

By George Harvey

It is intuitively obvious that we need baseload power plants, which can run at full capacity, 24 hours per day, day in and day out, so the light always turns on when we throw the switch. However, being intuitively obvious does not make it true. It was intuitively obvious to Queen Isabella that the world was flat.


Photo Credit: Shutterstock

Power demand varies with time. Demand is high during the day and low at night, high on weekdays and low on weekends, high during periods of heat or cold and low when it is temperate.

Thermal baseload power plants, including nuclear, coal, and some natural gas plants, cannot change their output levels easily to match changes in demand. They cannot slow down at night, and so they produce power even if no one wants it. They have to do something with it, and so they sometimes sell it for negative prices, paying people to take it away. Prices often go negative at night in some places. But they keep running, so they can charge high prices during the daytime.

On the same day, the price can range from a high of $200 per MWh to a low of negative $40. European prices have gone to negative $80 per MWh two dozen times this year, and one trade of wholesale power in Australia, late last year when a large baseload plant unexpectedly went offline, hit $11,000 per MWh.

This is hardly a picture of stability. The match of large-scale baseload power to demand is really rather poor. Sorry, Isabella.

Solar power is a daytime thing, often meeting demand highs. The wind usually blows strongest at night, but it usually blows at least to some degree all the time. Hydro is great, when the water is running. Biomass chugs along. Biogas plants can back things up, and can use natural gas in a pinch. Reciprocating engines running on biogas or biodiesel can be distributed through the countryside, and they can be turned on in mere minutes to meet demand.

Power can be transmitted from areas where the wind is blowing to areas where it is not, with a maximum distance to be cost-effective being well over four thousand miles. Grid backup has been around since the 1930s, and one New England pumped-storage facility has a capacity typical of a large nuclear reactor. Other kinds of backup that can be used are too numerous to list. Also, solar and wind can sometimes be combined on the same land with little loss in efficiency.

The University of Delaware did a computer study of a "smart grid," powered entirely by solar and wind. The study indicated that such a grid could get 100% of its power from renewables well over 99% of the time. Other studies have produced similar results.

Adding other renewable resources to solar and wind can create a diversified portfolio of generation. And this can be more reliable than the so-called baseload power systems built around large, central power plants.


This is a working Microhydro site: Scott Gentleman, Sandpoint, Idaho

SEARSBURG WIND FARM REVIEW

By George Harvey

Every year, Green Mountain Power's Searsburg Wind Farm gives tours to groups who want to see the operation up close. I went with Tom Finnell, a friend who is an electrical engineer.

My interest, of course, was in witnessing for myself the environmental impact of wind farms. In particular, I was interested in noise, mortality of birds and bats, and other effects on wildlife.

We were guided by Jeff Snyder, a meteorologist working for Northeast Wind, which contracts with Green Mountain Power to provide a number of services at wind farms. He is very knowledgeable about operations and conditions.

We started by testing the sound of the turbines from about a quarter mile away. Eight of the turbines were turning. One was down for repairs, and two had been stopped to allow tours to approach closely without requiring people to wear hard hats. From that distance, the sound of the eight turbines was sometimes more quiet than the rustling of the nearby leaves in the breeze. At their loudest, they sounded like a very distant engine. From a quarter mile, they were not as loud as cars going by 100 yards away.

When we got up close to the turbines, Tom took sound measurements. At a distance of about 100 yards, the nearest turbine was about 45 decibels. People talking nearby were much louder. At one point, I was struck by a louder mechanical sound above me, and found it to be a small plane, high up and probably over a mile away. I would say the sound of the turbines was about that of a refrigerator, and not nearly as loud as an air conditioner. They became louder as they changed direction, but were far quieter than the residential street I live on in Brattleboro, even without boom cars.

I asked Jeff about bird kills. It happens that interns were paid to record bird kills in the spring, summer, and fall of 1997, when all eleven turbines were operating. They tramped through the woods, recording all the dead birds they saw – or perhaps I should say recording all the dead birds they did not see, because they did not find any. I was also told that when the turbines were under construction, bear, moose, and other wildlife moved away, but they moved back as soon as the construction equipment left.


Maintenance personal encounter moose and bear that live among these turbines.

Jeff also told us that very few of the hills in Vermont would ever be developed for wind, because most were not well suited to it. A turbine has to be high enough to be out of the wake of other, nearby hills, but it must not be so high that it will ice up badly in the winter.

I want to thank Jeff and Tom, without whom I would not have been able to see this. This was an excellent tour, and I would recommend it to anyone interested in wind and wildlife, though tours are only given on four days per year. Information can be found at http://www.northeastwind.com/tours.

THE ARCHIMEDES SCREW TURBINE

Archimedes screw turbine on the River Dart, in England. Photo by Barry Deakin.

Every once in a while, I find a fascinating thing I had never heard of before. I had heard of the Archimedes screw pump, but recently stumbled across the Archimedes screw turbine, which was new to me.

An Archimedes screw is really just an auger, much as you might see in a pellet stove or a hand-powered flourmill. When used to pump water, it has a close fit with the trough or tube it sits in so the water does not leak too much. As the screw is turned, it moves the water; if it is tilted up, it pumps the water up. The original purpose for the invention was to pump bilge water from ships, but his invention was soon adapted for other uses.

The Archimedes turbine is exactly the same as the pump, except that it runs in reverse. Water flows into the top, and as it runs to the bottom it makes the screw turn.

There are two interesting characteristics of the Archimedes screw turbine. One is that it will operate with a remarkably low head (difference in the water height from top to bottom). The other is that fish that pass through one are highly unlikely to be hurt. Archimedes screws are actually used in fish hatcheries because they are less destructive to fry than direct handling.

When Queen Elizabeth II got renewable power improvements for Windsor Castle, two Archimedes turbines were installed on the weir at Romney Lock. They have a head of only 6 feet, 7 inches, but the screws are over 13 feet in diameter. They cost about $3 million, and produce a maximum of 300 kW. Their output totals 1.4 million kWh per year, enough to power 300 British households – or 1 castle. Their operation does not affect traffic on the Thames, and has nearly no environmental impact aside from cutting carbon emissions.

WHAT'S UP WITH THE WEATHER?

Cont. from page 1

Russia, countries on the Baltic, Canada, and other areas outside the tropics suffered at the same time. Last summer, Australian weather was appalling, with high temperatures and drought contributing to blinding dust storms. At the other extreme, we have seen record cold waves in Europe, and Norway is currently enduring the rainiest summer on record.

We do not need to study the idea that climate change is behind this, because that work is already done. The US Environmental Protection Agency has a web site on climate change, www.epa.gov/climatechange/. It has a section titled "Climate Change is Happening" where, we find this quote: "The evidence is clear. Rising global temperatures have been accompanied by changes in weather and climate. Many places have seen changes in rainfall, resulting in more floods, droughts, or intense rain, as well as more frequent and severe heat waves." Another section is "Humans are largely responsible for recent climate change."

The site also details how climate change threatens farms, businesses, and human health, of different regions of the country. It provides information on what we can do about it, including reducing energy needs, changing to renewable sources, and encouraging others to do the same.

NOAA has a site, www.ncdc.noaa.gov/

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HYDRO

HIGH HEAD, LOW FLOW

By George Harvey

Non-impoundment (often called run-of-the-river) hydro systems in New England commonly use a small water flow with a high head. They do this with a variety of turbine types. All use water under pressure from gravity, and the higher pressures mean the amount of water needed to generate a unit of electricity is relatively low.

What is "high head"? A portion of the flow of a stream is taken at a high point in a river or stream and piped to a lower point, where it is run through a turbine and reintroduced to the natural system. The difference in altitude between the intake and outflow points gives the system a high head, which means that the pressure is high at the system's lowest point. This pressure is what gives the system its power. In general, the higher the head is, the greater the power, though this is a balance since long pipes reduce the amount of power.

James Perkins, CEO of Little Green Hydro (www.littlegreenhydro.com), tells me that their smallest turbines can run on as little as 30 to 50 gallons of water per minute. A site with 175 feet of head, with a horizontal run of 1500 feet and a flow of 50 gallons per minute can deliver 25 kWh per day. Of course, much larger systems can be installed.

An important aspect of Little Green Hydro's installations is that they are environmentally friendly. The water is taken from a stream and reintroduced farther downhill without loss. The only change to the water is that it has more oxygen in it when it is reintroduced, and the only change to the stream is that the flow is reduced somewhat between the intake and outlet. The system automatically shuts down when flow is low, so it never stops the natural flow during dry periods.

Microhydro Intake for a high head low flow system.

Damage to fish and other aquatic life is minimized by a screen that keeps all but the smallest organisms out. The angle of the screen, lack of sharp edges, and constant flow of water over it combine to give fish a path to climb uphill to get by the screen, if that is what they want to do.

There are important aspects of this that we need to note. One is that the power is very reliable, except in seasons when the river or stream has insufficient flow to run it. Another is that it requires nearly no maintenance. And in addition, the electric power is derived from the system that has nearly no environmental impact.

MICROHYDRO LEGISLATION DRAGS ON

By George Harvey

Most people seem to think of hydropower in terms of big dams blocking rivers. Some of those of us who do might be happy to discover there are other ways of doing things.

One way to produce power is what is commonly called run-of-the-river hydro, though non-impoundment is probably a better term. There are different ways of doing non-impoundment, but the one thing they have in common is that they do not block the current for large reservoirs of water. I would like to focus on two of these here.

The hydro systems produced at Little Green Hydro are of a type that diverts some of the water from a stream, and reintroduces the water to the same stream at a lower point. It uses a relatively small amount of water with a high head to get power.

Contrasting with this is the Archimedes screw turbine, which typically sits at a weir, a low dam-like structure with water constantly running over the top or through an opening. It uses a relatively large amount of water with a low head (height difference of the water above the feature and below it).

There are things both these systems share. One is that they do not need to obstruct the stream or river – they only use part of the water and fish can pass through what they do not use. Another is that they are designed to be fish-friendly. Both these systems shut down when the flow is reduced, giving the natural water flow priority. They have very low environmental impact, aside from reducing carbon emissions.

Another thing both these systems share is that legislators are sitting on their hands, doing very little to nothing, while the permitting processes are so difficult and costly to be effectively abusive. There is no reason why such benign systems need to cost more to permit than they do to build and install, but it happens often.

In Vermont, we need to have special permits for non-impoundment hydro systems with little or no negative environmental impact. At the federal level, non-impoundment microhydro power needs to be permitted, when other small systems do not --which is unnecessary, unfair, and unwise.

You might think this would be easy, but it is not. It is shameful when government policy makes positive environmental work so difficult that it is not done. In fact, it is inexcusable, because it makes the law the enemy of the environment.

MONEY FOR ENERGY IN VERMONT

By Gwendolyn Hallsmith

With the damage climate change has been causing and the increasingly erratic prices for traditional fossil fuels, there is a high degree of consensus on the need to accelerate the transition to renewable energy in Vermont. Yet finding the money to do it is not as easy as it should be. The Energy Action Network, a statewide coalition of groups including Green Mountain power, IBM, Vermont Energy Investment Corporation, The City of Montpelier, state agencies, congressional staff, the Vermont Natural Resources Council, and interested citizens, has identified access to capital as a critical need for renewable energy and energy efficiency.

Why is this? Energy lending has long been seen as a sure bet by most financial institutions. The Vermont State Employees Credit Union offers preferential interest rates to people who want to use home equity loans to make improvements. The energy cost savings can pay back the loan in less than 3-5 years. So it would seem that finding capital for energy should be relatively easy, and yet it's not. Big institutional investors find most projects in Vermont to be "too small," even when their costs total in the millions.

The New Economy for Vermont: Public Infrastructure and Local Investment

There are solutions. We need more funding for energy infrastructure in Vermont – energy investments that are structured as public investments, like the current biomass district energy plant being built in Montpelier – are much more likely to succeed, largely due to the low costs of the money the city obtained for the construction of the facility. We also need ways in which investors of all sizes can invest in Vermont's economy – as small and beautiful as it is.

A State Bank (much like is currently in place in North Dakota, a state with a comparable population to Vermont), would help facilitate public investments in energy infrastructure. With a State Bank, the public would provide the financing and also reap the benefits of the returns on smart energy investments, making it possible to expand our statewide renewable energy capacity.

Local Investing can also provide start-up entrepreneurs with the capital they need to get businesses off the ground. Michael Shuman has done a lot of work to identify new ways to direct investment to local economies. He has identified 24 tools for local investing, ranging from something as simple as pre-purchasing goods and services to the more complex financial arrangements required for the new investments made possible by the JOBS Act (Jump Start our Business Start-Ups).

Vermonters for a New Economy is bringing Michael Shuman to Vermont in October to speak at a conference on October 11th to kick off New Economy Week. We are also spearheading a Town Meeting campaign to call for the state to establish a State Bank for infrastructure, energy, food, and other critical needs we have to make the state more sustainable. For more information about how you can get involved, write to vtneweconomy@gmail.com or call 802-851-7697.

THE TIDE IS TURNING

Cont. from page 1

understanding of the hazards of fossil fuels. A report from the WHO says 6.2 million deaths per year are caused by air pollution, far more than previously believed. Leaders are beginning to understand this.

• The UN is asking countries to drop subsidies for fossil fuels to help fight climate change. The effect would be to save hundreds of billions of dollars each year, cut global warming, and improve health. People are noticing.

• The Pentagon and CIA are putting pressure on reluctant politicians to support renewable power. The Pentagon is our largest investor in renewables, which save the lives of soldiers in the field. The CIA says climate change is one of the prime security threats of the 21st century.

• Political leaders are starting to understand that renewable power is more secure, employs more people per unit of energy, costs the customers less, and retains money in our economy. These make it hard to vote against renewable power.

Science and Technology

• New energy storage technologies are coming on line, which can reduce carbon emissions of natural gas plants very greatly and provide fuel for transportation. They can be powered by solar and wind.

• Studies and experience show that variable power is less problematical than we thought, and base-load power is less reliable. The implication is that we can use far greater proportions of wind and solar. Some studies indicating as much as 100% of the power, 99.9% of the time. The technology to do this is well known and only needs to be installed.

• New technologies are being developed for power generating. These include ocean current, tidal, and wave technologies, and run-of-river hydropower. There are too many others to list.

We have the tools and technology. We have the economic reasons. We are developing the political will (and politicians take note).

The bad news is that global warming will cause immense destruction. Many species will be eliminated. Many of our ecosystems will be altered radically. The bad news is that we will lose many battles.

But I feel very confident we will win the War on Climate Change. Our children will have homes and food, water to drink and air to breathe. All we need to do is act.

FEDERAL

Federal Investment Tax Credit

The federal investment tax credit (ITC) for most technologies, including solar, wind, heat pumps, and fuel cells, is 30% of expenditures. For commercial geothermal generating systems, microturbines, and combined heat and power the ITC is 10% of expenditures.

USDA Rural Development Program

USDA Rural Development Program - Rural Energy for America (REAP)

Finance the purchase of renewable energy systems, and make energy improvements; energy audits. Funding is awarded on a competitive basis; grant funding cannot exceed 25% of eligible project costs and combined loan guarantees and grants cannot exceed 75% of eligible project costs.

Applicants include Feasibility studies/ regular REAPs: agricultural producers and rural small businesses. Energy audits and renewable energy development assistance: local governments, tribes, land grant colleges, rural electric coops, public power entities. Grant must be used for Construction or improvements, purchase and installation of equipment, energy audits, permit fees, professional service fees, business plans, and/or feasibility studies. Find more at www.rurdev.usda.gov/NH-VTHome.html or call 802-828-6080 in VT or 603-223-6035 in NH

Biorefinery Assistance Program

As the call for increased production of homegrown, renewable forms of fuels has grown, so has the need to develop and produce them. USDA Rural Development offers opportunities to producers to development such fuels through the Biorefinery Assistance Program. The program provides loan guarantees for the development, construction, and retrofitting of commercial-scale biorefineries.

The Biorefinery Assistance Program was established to assist in the development of new and emerging technologies for the development of advanced biofuels and aims to accomplish the following:

- Increase the energy independence of the United States
- Promote resource conservation, public health, and the environment
- Diversify markets for agricultural and forestry products and agricultural waste materials
- Create jobs and enhance economic development in rural America

For More information go to www.rurdev.usda.gov/BCP_Biorefinery

REGIONAL

New England Grassroots Environmental Fund

Modest grants are available for community-based environmental work in CT,MA,RI,NH,VT,ME

- Must be volunteer driven or have up to 2 full time paid staff or equiv.
- have an annual budget up to $100,000
- "Seed" grants of $250-$1,000 and "Grow" grants of $1,000-$3,500
- Go to www.grassrootsfund.org/grants/ or call 802-223-4622 for more info.

VERMONT

Clean Energy Development Fund

The Small Scale RE Incentive Program, administered by Renewable Energy Resource Center (RERC), provides funds to help defray the costs of new solar thermal, wind, and photovoltaic systems.

Solar Incentives – based on rated capacity of system

http://rerc-vt.org/incentives/index.htm
http://www.dsireusa.org/incentives

- residential (including leasing)= $0.45/ Watt up to 10 kW for PV; $1.50/100Btu/ Day up to 200kBtu for ShW.
- commercial/industrial = $0.40/Watt up to 10kW 25kW for PV. $1.50/100Btu/day up to 1100kBtu/day for ShW
- special customer* = $1.50/Watt up to 10kW. $3.00/100 Btu/day up to 1500 kBtu/day for ShW. *Group net-metered projects are considered commercial
- PV and ShW efficiency Adder - adder is calculated separately and added to standard incentive subject to customer caps (eligibility requirements apply, contact RERC)
- residential = $0.15/Watt for PV; $0.55/100Btu/day for ShW. Capped at a cumulative $350 per customer.
- commercial/industrial/special customer = $0.10/W; $0.50/100Btu/day up to a cumulative $450 per customer

Wind Incentives

- residential = $1.20/kWh for each kWh up to 10,000 kWh/yr**
- Limit 1 turbine up to 10kW; incentive capped at 30% of total installed cost; systems >10kW are ineligible for incentives
- For turbines less than or equal to 5kW in rated capacity, 100% incentive payment is made at time of installation. Greater than 5 kW, 60% is paid after installation, 40% paid after 1 year of operation if targeted annual production is achieved.
- **Incentive capped at 30% of installed cost

Micro-Hydro

- residential/commercial/industrial - $1.75/3'gal/minute Capped at $8750
- special = $3.50/3' gal/minute Capped at $17500 or 50% of installed cost

***special customer category limited to municipalities, non-profit housing authorities, public schools*

All incentives are subject to availability and may change.

Visit www.rerc-vt.org or call (877)888-7372

VT TAX CREDITS

Vermont offers an investment tax credit for installations of renewable energy equipment on business properties. The credit is equal to 24% of the "Vermont property portion" of the federal business energy tax credit from 2011 to 2016. For solar, small wind, and fuel cells this constitutes a 7.2% state-level credit for systems and for geothermal electric, microturbines, and combined heat and power systems, this constitutes a 2.4% state-level tax credit. Any unused tax credit may not be carried forward.

EFFICIENCY VERMONT

Lighting (must be ENERGY STAR)

- CFLs - select ENERGY STAR qualified spiral and specialty CFLs are just 99¢ at participating retailers
- LED's – bulbs with special pricing/ coupons at register while supplies last at participating* retailers

Home Efficiency Improvements

- improvements: air sealing, insulation and heating system upgrades - up to $2,000 in incentives - using participating* contractors Additional $500 Savings until extended to 12/31! (see p. 25}

Appliances (must be ENERGY STAR)

- Seasonal Dehumidifiers - $25 mail-in rebate
- Clothes Washers - $40 rebate for CEE Tier 3 qualifying models, $75 rebate for ENERGY STAR Most Efficient
- Refrigerators - $40 rebate for CEE Tier 2 Refrigerators, $75 for CEE Tier 3 & ENERGY STAR Most Efficient
- Working second refrigerators or freezers are potentially eligible to be picked up. $50 incentive to retire old units.
- Clothes Dryer –rebate for replace electric with natural gas (contact EV*)

Heating/Cooling

- heating & hot water systems – see EV*
- energy efficient central AC and furnace fan motor - $100 mail-in rebate
- central wood pellet boilers (excluding outside wood systems) - $1,000 (See announcement on page 25)

Residential New Construction

- enroll in Residential New Construction Service – up to $1,500 in incentives and free home energy rating and expert technical assistance throughout construction and eligible for ENERGY STAR label
- Washington Electric Coop and Vermont Gas Systems customers may also receive additional incentives (contact EV*)

Other Opportunities To Save

- Advanced Power Strips – special pricing/ coupons at register at participating retailers*
- Pool Pump (2-speed/variable speed) - $200 mail-in rebate (seasonal)
- Meter Loan – borrow "Watts Up" meter to measure the electric consumption of your appliances

**all rebates/incentives subject to availability, limits and may change – for complete incentives and requirements, and for participating retailers/contractors, visit efficiencyvermont.com or call 888-921-5990*

NEW HAMPSHIRE

Renewable Energy Incentives Offered Through the NH Public Utilities Commission

Commercial Solar Rebate Program

Program open to non-profits, businesses, public entities and other non-residential entities

Rebates for solar electric/thermal projects 100kW (or thermal equivalent) or less

- Solar PV = $0.80/Watt D/C up to $50,000
- Solar thermal = $0.07(or$0.12 for systems of 15 collectors or fewer) per thousand-Btu per year, up to $50,000

Contact jack.ruderman@puc.nh.gov

Residential Solar PV Rebate Program

- $0.80/watt capped at $3,750 per system, whichever is less. Systems must be under 5kW. Subject to funding availability.

Contact jon.osgood@puc.nh.gov

Residential Solar Water Heating Rebate Program

- $1500 - $1900 per system based on annual system output

Contact barbara.bernstein@puc.nh.gov

Wood Pellet Boiler or Furnace

- 30% of installed system up to $6k
- Must meet thermal efficiency and particulate emissions standards

Contact barbara.bernstein@puc.nh.gov
www.puc.nh.gov – Sustainable Energy or tel. 603-271-2431 for more information and current program status

Local Incentives

Some towns provide property tax exemptions for renewables – visit www.bit.ly/NHtownRenewablesTaxBreaks

- These are offered on a town-by-town basis.
- The state also has passed PACE (property-assessed clean energy) enabling legislation which will allow towns to use the PACE mechanism to finance clean energy projects through property taxes.

Visit http://www.nh.gov/oep/programs/energy/pace/index.htm for more information.

NH Electric Cooperative's Solar Incentive

- is 25% of the project cost up to $20,000.

The NH Electric Coop

- incentive program covers up to $1000 of the air source heat pump space heaters.

PAREI

To explore the possibility of a solar installation. Plymouth Area Renewable Energy Initiative. www.plymouthenergy.org

www.nhsaves.com

NH Home Performance with ENERGY STAR

Sponsored by all NH electric and natural gas utilities in partnership by the U.S. Dept. of Energy. Fuel-blind eligibility using the Home Heating Index (BTUs of heating fuel / conditioned square feet / heating degree days). Must provide at least 12 months of heating fuel history. Once qualified, eligible homes get a $450 value comprehensive energy audit for $100 (rebated if improvements installed), and 50% instant rebate for eligible weatherization improvements up to a $4,000. **Visit www.nhsaves.com/residential/retrofit.html for more information and an online Home Heating Index calculator**

NH ENERGY STAR Homes

Incentives for builders of new homes who meet ENERGY STAR guidelines. Incentives include HERS rating fee paid by the utility, rebates for ENERGY STAR lighting, appliances and heating systems, and $800 - $4,000 additional incentive depending on the HERS score.

Visit www.nhsaves.com/residential/homes.html for more details.

NH ENERGY STAR Appliances & Lighting

Mail-in rebates for ENERGY STAR-rated clothes washers ($30), room air conditioners ($20), room air purifiers ($15) and smart strips ($10).

Visit www.nhsaves.com/residential/es_appliance.html for more information and rebate forms.

Instant rebate coupons ranging from $1 to $7 for ENERGY STAR-rated CFL and LED

While we at Green Energy Times try to keep things up to date, incentives are always changing. Be sure to check with the appropriate sources for the latest information.

light bulbs purchased through qualifying NH retailers.

Visit www.nhsaves.com/residential/es_lighting.html for more information.

nhsaves Lighting and Efficiency Catalog

Extensive catalog of efficient lighting products, from stylish lamps to hard to find specialty bulbs. Catalog includes other efficiency items such as smart strips, power monitors, and water-conserving devices

Offered at discounted pricing for NH electric utility customers, and fulfilled by EFI.

Visit catalog.nhsaves.com/ for an online version of the catalog.

Other NH Electric Utility Programs

See also individual utilities for additional programs and variations. NH electric utilities may offer low or no interest on-bill financing for energy efficiency projects.

Visit www.nhsaves.com/resource/ for individual utility contact information.

Business Programs

Includes programs for: small and large business, new equipment and construction, seminars, lighting incentives and catalog, and low and no interest financing programs.

Visit www.nhsaves.com/ for information about NH business incentives for electricity efficiency.

NH Weatherization Assistance Income-Eligible Programs

Home Energy Assistance and NH community action Weatherization Assistance Program. Financial assistance paying fuel bills, and free weatherization improvements for qualified applicants. Funding from U.S. Dept. of Energy, NH utilities and Greenhouse Gas Emissions Reduction Fund (RGGI).

Visit www.nh.gov/oep/programs/weatherization/index.htm for application criteria, FAQs and local program contacts

MASSACHUSETTS

Commonwealth Solar Hot Water (SHW) Programs

Applicants must be served by National Grid, NSTAR, Unitil (Fitchburg Gas and Electric), WMECO or a participating Municipal Light Plant community.

- Residential Rebate: $25/per collector X the SRCC thermal performance rating of the collectors (pls refer to kBTU/panel/day for Category C, Mildly Cloudy climates)
- Metrics for typical SHW system for 2-4 people, 2-panel roof-mounted plus 80 gal solar tank: materials/installation costs = $10,000, MA CEC rebate = $1100, MA State Tax Credit (use only once) = $1000, Federal Tax Credit (30% system cost) = $3000, Net Cost = $4900

Visit **www.masscec.com/index.cfm/page/Commonwealth-Solar-Hot-Water/cdid/1176/pid/11159#shwresources**

MassSave Heat Loan SHW

Through this loan program customers may also borrow at 0% interest the costs for a SHW system

Efficiency

After conducting a free residential Energy Audit, residential customers are eligible for up to $25,000, commercial loan up to $100k at 0% interest heat loan with terms up to 7 years to cover the following energy efficiency improvements: attic-wall-basement insulation, high efficiency heating systems, high efficiency domestic hot water systems, solar hot water systems, 7-day digital programmable thermostats, Energy Star replacement windows

Available only to utility customers of Western Mass Electric, National Grid, Berkshire Gas, Nstar, Unitil and Cape Light Compact Visit **www.masssave.com/residential/heating-and-cooling/offers/heat-loan-program Please call 866-527-7283 to schedule a free home energy assessment.**

Commonwealth Solar PV Programs

www.masscec.com

Commonwealth Solar II, offered by the Massachusetts Clean Energy Center (MassCEC), provides rebates for the installation of grid-tied photovoltaic (PV) systems at residential, commercial, industrial, institutional and public facilities.* Commonwealth Solar II rebates are available to electricity customers served by the following Massachusetts investor-owned electric utilities: Fitchburg Gas and Electric Light (Unitil), National Grid, NSTAR Electric and Western Massachusetts Electric. In addition, customers of certain municipal lighting plant (MLP) utilities are now eligible including Ashburnham, Holden, Holyoke, Russell, and Templeton. Commercial projects are eligible for rebates for PV projects less than or equal to 15 kilowatts (kW) in capacity and the rebate will be based on the first 5 kW only. Funding is released in "blocks" every quarter. All rebate applications must be approved BEFORE the project installation begins.

Rebate amounts are based on the total PV system size per building, regardless of the number of electric meters in use and certain other characteristics of the project. The proposed Commonwealth Solar II rebate levels for residential and commercial PV systems are:

- Base incentive: $0.40/watt
- Adder for Massachusetts company components: $0.05/watt
- Adder for moderate home value: $0.40/watt (applicable to resid. projects only), or
- Adder for moderate income: $0.40/watt (applicable to residential projects only)
- Natural Disaster Relief Adder, only for projects completed in the Springfield area impacted by June 1, 2011 tornado: $1.00/watt

The rebate is available to the system owner, which may or may not be the host customer. In the case where the system owner is a third-party owner serving a residential host customer, the project is treated as a commercial project (and eligible for the commercial rebate amounts only). Solar renewable-energy credits (SRECs) associated with system generation belong to the system owner and may be sold via the Department of Energy Resources (DOER) SREC program. Note: appropriate, approved tracking must be utilized in order to qualify to sell SRECs. MassCEC reserves the right to conduct post-installation inspections of PV projects prior to approval for payments.

MA State Income tax credit for residential solar hot water or pv systems are eligible for a one time 15% off system cost, capped at $1000 max tax credit. • No sales tax on solar hw or pv systems.

• There is no increase in property tax assessment for residential hw or pv systems for 20 yrs.

Database of State Incentives for Renewables & Efficiency: www.dsireusa.org

ROUND UP OF NH ENERGY LEGISLATION FOR 2013

BY NH STATE REPRESENTATIVE IAN RAYMOND

This year, the state legislature referred 32 bills to the Science Technology and Energy Committee: 24 were relative to energy, and 12 of these became law.

SB98 allows for group net metering. A "host" can set up an electric generation facility (including CHP) that generates up to 1 megawatt of electricity, and sell that power to a group of customers located anywhere within the same electric distribution utility as the host. This uses a principle similar to individual net metering, except that a host can install a facility larger than their personal needs and sell the excess power. There is potential here for a landowner with a good solar or wind resource to install a generation facility and provide renewable energy to customers in areas lacking those resources. It also provides more distributed energy generation throughout the grid, which benefits everyone.

HB542 and SB148 are relative to the electric Renewable Portfolio Standards. HB 542 raises the allowable total peak generation capacity from less than 5 kilowatts, to 10 or fewer kilowatts for solar and wind power—a capacity that is more in line with today's homeowners' electricity consumption.

SB74 deals with an exemption for entities that furnish hot water through a district energy system, allowing them to not fall under the jurisdiction of the Public Utilities Commission. This allows municipalities, businesses, etc., to install district heating systems and offer a "net metering" system for thermal energy. Entities within the district can use the thermal energy to heat their buildings, or manufacturers can feed their waste heat into the system and receive credit, thereby lowering their cost of doing business. This law will provide opportunities in areas throughout New Hampshire to install, for example, biomass plants that supply more affordable heating, particularly in areas that have no access to natural gas and are dependent on expensive fuel oil.

SB191 creates a 10-year state energy strategy that will focus on renewable energy and review current state energy policies.

HB306, HB630, and SB123 deal with the Regional Greenhouse Gas Initiative. This lowers the cap on greenhouse gas emissions. There will be fewer allowances available for auction, and each allowance will be worth more. Utility Core energy efficiency programs are supported by a $1 per allowance contribution from RGGI, so these programs will get less funding with fewer allowances. This legislation directs 15% of the efficiency dollars to low-income programs, and up to $2 million towards municipal programs. The remaining RGGI proceeds get rebated to all ratepayers.

HB374 clarified an existing law that allows electric utilities to invest in distributed energy generation projects, such as the solar project installed at Exeter High School by Revolution Energy. This bill passed unanimously through both the House and Senate. Clarifying this law should allow more projects to benefit from this finance mechanism.

SB179 clarifies the definition of renewable generation facilities for the purpose of Payment In Lieu Of Taxes (PILOT program). I worked diligently on this bill to make changes that will allow Waste To Energy projects to continue contracting with municipalities under a PILOT, but waste to energy will no longer be defined as "renewable", since plastics and other waste fuels are derived from non-renewable and polluting sources.

HB568, HB569, HB580, HB586, HB166, HB449, HB484 were retained in committee. These bills deal with siting and/or need of new electric transmission lines (affecting the Northern Pass project) and electric generation facilities (including wind turbines). There has been a great deal of testimony and controversy over these bills, but rather than legislate specifically on individual projects, the House and Senate passed Senate Bill 99 requiring a study of the Site Evaluation Committee (SEC) and the process used for siting or approving these projects, along with revising the regulatory criteria on which they base those decisions. The SEC goes through a very tedious and thorough process done by a committee of professionals with different fields of expertise. The SB99 study will guide the SEC in the rulemaking process and update the criteria that are used, making for a more effective site evaluation proceeding and outcome.

The State budget allowed for the sweep of $16 million from the Renewable Energy Fund into the general fund. This money comes from ratepayers and is intended to advance clean renewable energy technologies, not to be used to plug holes in the budget.

Be sure to contact your legislators with any ideas you have that will move us to a more sustainable clean energy future.

NH APPROVES GROUP NET METERING STATUTE RSA 362-A

Solar is soaring in New Hampshire. The recent passing of Group Net Metering is a real game changer for the state! "The PUC is currently in the process of determining how to best implement the group net metering statute RSA 362-A," reports Barbara Bernstein from the Sustainable Energy Division, NH Public Utilities Commission. Stay tuned for more info. Barbara.bernstein@puc.nh.gov http://www.puc.state.nh.us/.

A SMALL DISTRICT HEATING SYSTEM IN BRATTLEBORO

By George Harvey

Jason Cooper Management is operating a new small district heating system for five buildings in Brattleboro, with a total of twenty units. The core of the system is a single boiler run on wood pellets, in the same building as the business offices.

The boiler was first tied to eight units that stand side by side on the south side of Elliot Street. That done, work soon began on extending it to serve two buildings, totaling twelve units, on the opposite side of the street.

The town had to approve

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Pellet delivery for a small district heating system, for 5 buildings of 20 units.

A SMALL DISTRICT HEATING SYSTEM IN BRATTLEBORO

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the plan, because it involved digging a trench across the street. The town gave the permit on the condition that the new pipe had to go below all four of the other pipes known to have been laid under the street, as well as any others that might be found. There turned out to be seven others, which the town duly noted and marked on the maps. The lack of information about previous installations contributed to the fact that the trench was open for nearly a week.

I took a tour of the basement of the largest of the five buildings. Though it contained all the heating equipment for the building, it looks about as empty as any basement I have ever seen. Pipes come from across the street and rise at a shallow angle to a header, which has separate valves for each heating loop in the system. The heat supply for the building next door goes through these pipes as well.

In addition to pipes connecting to the pellet boiler, each building on the district heating system has its own backup heat source. The backup boiler in the building I visited doubled as a source for hot water when the pellet boiler was not operating. Of course, any time the main boiler operates, the backup one is entirely off.

The other buildings in the district heating system operate in a similar manner. Each has its own backup heating unit, and each has its own hot water.

There are a number of electronic controls and monitors in the system, and these tie back to the business office. A central computer processes and holds data about the system and how it is operating. Any problems with the system are noted by the system. If there is a problem that requires immediate attention, even if a backup unit just comes on, the system computer sends a text message to the phones of the appropriate people.

The district heating system made it possible to switch twenty units from oil heat to pellets, which are a renewable fuel. These units had used 10,000 gallons of oil each year. At the same time, the design of the district heating introduced efficiencies that permitted a total reduction of 30% in the amount of energy used.

When I asked Jason whether his intent was to save the planet or to save money, he said it was to do both. When I said, "So it does save you money," he replied, "You can say that again!"

AN AFFORDABLE STRAW BALE SR. HOUSING PROJECT

By Stephen M. Frey – AIA, LEED AP

Vermont's first straw bale affordable senior housing project has been built in Holland, in Vermont's Northeast Kingdom. Becky Masure, project manager for the affordable housing non-profit, Rural Edge, says, "The Page Holland Senior Housing project helps seniors retain their independence while they remain in Holland close to their extended local community of family and friends."

Detail of post & beam wood frame, strawbale and window opening Photo credit: Stephen Frey - Arocordis Design

Evelyn Page, now deceased, donated land from her family's nearby farm and funding in memory of her late husband to Rural Edge. Over the last few years, energy efficient construction methods have become increasingly expensive for them, often making it difficult to achieve the affordability goal. With this project, Rural Edge is testing a new approach and new ideas.

Straw bale appealed to the owner for a number of reasons such as helping with fire-resistance, insulation capability of the straw, savings on labor costs, availability of local talent in the area to build this way, carbon-footprint reduction, low-embodied energy, chemical- and allergy-free composition. Enduring comfort, durability, and beauty of straw also inspired Rural Edge to try this approach. So they asked the architects to consider straw bale as a possibility after reviewing other choices.

Interior view of living space after air-sealing between post & beam and exterior wall. Photo credit: Becky Masure - Rural Edge.

Ward Joyce Design, with Arocordis Design as a collaborator, designed the project. Ina Hladky provided structural engineering. They designed two single-bedroom apartments with a shared common area, an entry porch, and separate unit porches facing south. The building sits on the edge of a hillside site. Taking architectural form cues from nearby farm buildings, the bent uplifting roof reaches south towards dramatic rolling farmland vistas. Built on a cost-reducing frost-protected concrete slab, the builder installed empty sleeves designed into the slab for future installation of on-site solar electric PVs with the potential for greater self-reliance.

The architects sited the building facing the long way, south-to-north orientation for passive solar heating. Operable awning and casement windows naturally ventilate each unit and common area. Ceiling fans circulate air in the living spaces.

A small parking area serves building residents and visitors with a winding drive leading to nearby Page Road. Eventually as the site is finished, the owner will install and maintain pathways around the building along with a small vegetable garden and edible landscaping to provide fresh food for residents.

Uncontrolled moisture is the natural enemy of straw bale construction, so the architects paid close attention to strategies reducing exposure to wind driven rain and snow. Extensive roof overhangs shed water away from the plaster and stucco walls. A two-foot-high double-stud pony wall forms a base on which the non-structural straw bales rest. The pony wall is cellulose-insulated. Straw bales extend up to the underside of an I-joist framed cellulose insulated sloping roof clad in gray EPDM.

InSoutheast view showing with unit porches and shared common area bumpout Photo credit: Stephen Frey - Arocordis Design

Lee Cooper of Back 2 Basics Builders, the general contractor, built a post-and-beam frame, with 18 inches of straw bale surrounding it, to support the roof. The builders installed air fins made of ½" Homosote, finished with air-sealing tape fit into specially detailed slots in the wood frame helping to reduce heat loss at joints between materials. Natural clay-based paint coatings and wood coatings were used along with other easy-to-care-for interior finishes such as polished concrete floor.

New Frameworks Natural Building is the straw bale consultant, with Ben Graham and Deva Racusin working on the project. Ben helped the architects with the unique detailing of the straw bale enclosure system. Deva provided construction administration assistance during the straw bale installation and assisted Lee Cooper

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Strawbale Project Insulation and Energy Summary

Windows	Energy Star qualified, double insulated, argon-filled
Concrete slab	Insulated, (R15) 3" Slab edge, (R18) 4" Full below slab
Exterior Walls	(R28) Straw bale/post & beam / (R64) cellulose/knee wall
Ceilings and roof	(R55) 16" blown-in cellulose; 24"
Hyrdonic boiler	Energy Star qualified, radiant slab, three zones
Primary Fuel	Propane
Combustion Air	Sealed combustion/direct vent, no ducts
Hot Water	Indirect-fired storage tank (heated by hyrdonic boiler)
Ventilation	Exhaust fan systems in bathrooms, programmable timers.
Lighting	Energy Star qualified lighting (80% of fixtures)
Appliances	Energy Star qualified electric refrigerator, clothes washer.
Future renewables	Extra conduit sleeves in concrete slab for future systems

Many thanks to our sponsors:
New Frameworks Natural Design Build
RuralEdge a Community Development Corporation

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with straw bale enclosure construction and air-sealing work.

Rural Edge is seeking certification from Efficiency Vermont for the project, as a Vermont Energy Star Home Project. Efficiency Vermont provided invaluable technical assistance during construction. This includes such inspections as blower-door testing, some of which are currently under way. These help prevent energy losses that might result from unnoticed air leaks that might develop during construction. Energy Balance, of Montpelier, Vermont is the energy consultant.

This innovative renewable ready project offers a natural building alternative for putting "affordability" back into affordable housing. When entering the building a "Truth" window graces the entry hall revealing the straw bale wall system to help educate. Time will tell what sort of impact the Page Project will have on Rural Edge's overall affordability approach and other's around the state.

Author Stephen M. Frey, AIA, LEED AP, is owner and architect at Arocordis Design in Montpelier, VT, an architecture, interiors, and workplace design firm. His website is www.arocordis.com. He frequently collaborates with Ward Joyce, AIA from Ward Joyce Design.

Did you know?

The average homeowner saves over $1000 a year on electricity by installing solar panels on their roof. That's including the cost of solar panels.

ENERGY-EFFICIENT WINDOWS

IMPROVING THE ENERGY EFFICIENCY OF EXISTING WINDOWS

The awnings on this home shade the windows and generate electricity. Photo: ©iStockphoto/jhorrocks

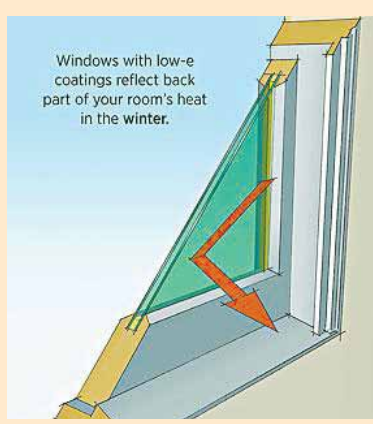
Windows can be one of your home's most attractive features. Windows provide views, daylighting, ventilation if they're operable, and heat from the sun in the winter. Windows provide our homes with light, warmth, and ventilation,. But they can also be weak spots in your home's thermal envelope, and can negatively impact a home's energy efficiency, accounting for 10% to 25% of your heating bill by letting heat out.

During the summer, your air conditioner must work harder to cool hot air from sunny windows. Carefully selected window treatments such as awnings, shades, curtains and landscaping or building shade can give your air conditioner and energy bill a break.

If your home has single-pane windows, consider replacing them with double-pane windows with high-performance glass—low-e or spectrally selective coatings. In colder climates, select gas-filled windows with low-e coatings to reduce heat loss. In warmer climates, select windows with spectrally selective coatings to reduce heat gain.

While you can reduce energy costs by installing energy-efficient windows in your home, if your budget is tight, energy efficiency improvements to existing windows can and may just be the best option in the end.

If you decide not to replace your windows, you can improve the energy efficiency of existing windows by adding storm windows, caulking and weatherstripping, and using window treatments or coverings.



Adding storm windows can reduce air leakage and improve comfort. Caulking and weatherstripping can reduce air leakage around windows. Use caulk for stationary cracks, gaps, or joints less than one-quarter-inch wide, and weatherstripping for building components that move, such as doors and operable windows. Window treatments or coverings can reduce heat loss in the winter and heat gain in the summer. Most window treatments, however, aren't effective at reducing air leakage or infiltration.You need to caulk and weatherstrip around windows to reduce air leakage with both existing windows and also if replacing or in new construction.

Cold Weather Window Tips

- Use a heavy-duty, clear plastic sheet on a frame or tape clear plastic film to the inside of your window frames to reduce drafts.
- Install tight-fitting, insulating window shades on windows that feel drafty after weatherizing.
- Close your curtains and shades at night to protect against cold drafts; open them during the day to let in warming sunlight.
- Install exterior or interior storm windows, which can reduce heat loss through the windows by 25% to 50%. They should have weatherstripping at all movable joints; be made of strong, durable materials; and have interlocking or overlapping joints.
- Repair and weatherize your current storm windows, if necessary.

Warm Weather Window Tips

- Install white window shades, drapes, or blinds to reflect heat away from the house.
- Close curtains on south- and west-facing windows during the day.
- Install awnings on south- and west-facing windows. Highly consider using solar pv panels as an awning, doubling your benefits.
- Apply sun-control or other reflective films on south-facing windows to reduce solar heat gain. This is more effective if you live in the south, but is generally not recommended in the northeast.

Long-Term Savings Tip

Installing high-performance windows will improve your home's energy performance. While it may take many years for new windows to pay off in energy savings, the benefits of added comfort, improved aesthetics, and functionality can offset the cost.

Watch for more information about windows in our next issue of Green Energy Times

OPTIMAL INSULATION OPTIONS FOR HIGH PERFORMANCE- PART 1

By Jon Haehnel

If you are considering building new or a major renovation I hope you will put some thought into the shell (or enclosure) of your building. Here are the top 3 reasons to consider an optimized building enclosure:

New construction and major renovation is THE time for an optimized enclosure. While everything is wide open the incremental cost to build and verify an optimized enclosure vs. a typical enclosure is low. Build it in while it is cheap and easy because the long term trend for energy costs is steadily uphill and once the finishes are in place your opportunity to improve the enclosure is gone.

Save on Mechanicals. I know this approach doesn't please mechanical contractors but the fact remains that if you can get the building load low enough you can install less/smaller mechanical systems and the money saved on mechanicals will more than pay for the optimized enclosure. This concept has always been true for larger buildings but more difficult for homes because you could only scale back the mechanical systems so far (you can't buy half a furnace or 2/3rds of a fan). In recent years the options have really opened up for homes so you can purchase really small mechanical systems that will meet the needs of a low load home.

Anticipating renewable energy if you plan to power some or all of your building with renewable energy now, or in the future. The optimized envelope will keep loads low so your renewable electrical, heating or cooling systems can be smaller. Super, SUPER important: build a low load home today even if you can't afford renewable energy yet. This is classic cart before the horse problem that I see people make all the time - renewable energy is so visible, so sexy and not to mention shiny that they want to go there first.

OK,OK you're convinced -- you will include an optimized enclosure in your new construction or renovation project. Just gimme the best one. THE best. What is it? Well…there are many good options and the best option really depends on your situation. In the next issue of Green Energy Times we will discuss the design considerations that will help you define your situation and then we will rate different insulation systems based on those design considerations.

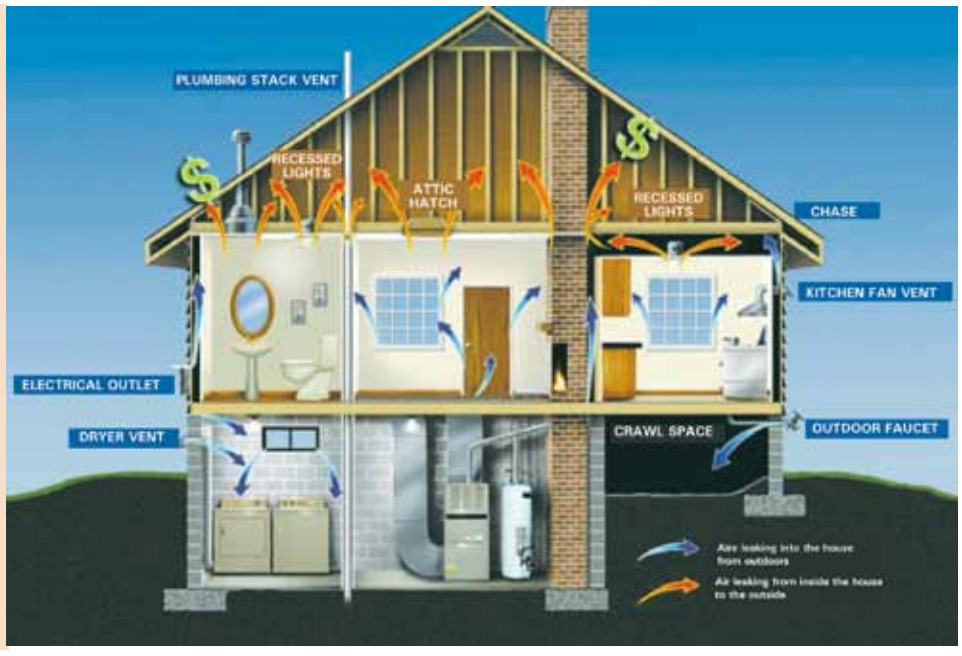
In the meantime, I'd like you to consider this word of caution: high performance enclosures run at tighter tolerances. Example: your grandpa could get the Ol' 53 dodge running with a couple wrenches and a swift kick to the fender and yet the same strategy does not apply to your 2012 hybrid. Why is this? Simplicity works but it tends to be less efficient than it could be. Optimized systems – like the hybrid- are more complex, they run with tighter tolerances. The same is true with optimized enclosures – they run with tighter tolerances. So this means there can be fewer mistakes in an optimized enclosure. The flashing, siding, vapor barrier and air barriers really have to work or there can be problems like mold, rot, stale indoor air, pipe freezes, and/or ice dams. Optimized enclosures really do work to save energy and increase comfort but they have to be carefully designed and installed.

Jon Haehnel has tested the building enclosures of over 100 buildings, some as large as a city block. Jon also teaches blower door and energy auditor classes for Vermont Technical College. Jon's firm Zero by Degrees LLC is based in Fairlee VT.

Complexity of building design as shown by this complicated roofline is one of the design factors we will discuss in the next installment of "Optimal Insulation Options for High Performance."

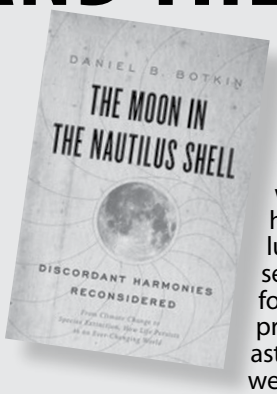
Common Household Air Leaks

- Behind Kneewalls
- Attic Hatch
- Wiring Holes
- Plumbing Vent
- Open Soffit (the box that hides the recessed lights)
- Recessed Light
- Furnace Flue or Duct Chaseway (the hollow box or wall feature that hides ducts)
- Basement Rim Joists (where the foundation meets the wood framing)
- Windows and Doors



THE MOON AND THE NAUTILUS SHELL

Book Review by George Harvey



Daniel Botkin tells us right off that there have been two traditional ways of looking at nature. One is mythological, and the other is rational and based on science – and unfortunately, neither works.

The problem with mythology is that it is not necessarily a reflection of reality. People who live with nature all the time still get it wrong. To illustrate the idea, he tells the true story of crickets being tried in court in the Middle Ages for causing widespread crop damage – they were found innocent because they were only acting out God's punishment for the sins of the farmers.

Unfortunately, the rational approach has its own pitfalls. Botkin writes, "There is a kind of ecological uncertainty principle: The more you try to explain all the details, the more likely you are to make quantitative errors that lead you astray. The more details you seek to include, the greater the chance of errors that will lead you astray. Yet, if you make your model (your theory) too simple, you are likely to miss the very qualities that determine what actually happens." He illustrates this with several stories of forest and wildlife preservation gone astray because they were set up based on imperfect science.

Central to our scientific understanding is the idea that there is a "balance of nature." Botkin questions this idea, showing that nature is really rather chaotic, and this is true without regard to the time frame. Based on this new understanding, he questions both the concept that nature can be closely managed and the idea that it should be allowed to take its course.

Without understanding that nature is not static, that change is constant in natural systems, that ecosystems undergo both evolution and rapid change, it is not possible to set good management policy. Laws and regulations based on constant models of natural system fail time and again. Some forest projects fail to protect the forests. Some wildlife conservation efforts have ended with animals they were protecting nearly dying out.

The essential message in The Moon in the Nautilus Shell is that nature is not simple, and a simple-minded approach to nature cannot say much about it of value. On the one hand, both mythology and incompletely considered science fail, but on the other hand, complete consideration is not really possible. What is needed is a flexible kind of super-rational reasoning, based on the understanding that ecological systems change and that management and laws require flexibility.

This is a readable, easily understood, and entertaining book. I recommend it

SEA LEVEL RISES NOT LETTING UP ANYTIME SOON

Since sea level measurements were first recorded, in 1870, global averages have risen almost eight inches. The annual rate of rise has been 0.13 inches over the past 20 years, which is close to twice the average from the previous 80 years. Future estimates for sea levels vary according to region but most Earth scientists agree that sea levels are expected to rise at a greater pace than during the last 50 years.

Predicting the amount of rise is an inexact science and depends on many factors including climate change and ice sheet flows. The U.S. National Research Council predicts a possible sea level rise of between 22 and 29 inches over the 21st century in the U.S. Sea levels are anticipated to continue rising for centuries.

According to the U.S. Environmental Protection Agency (EPA), land elevation changes also have a large impact on the effects of rising water levels. Subsidence (sinking) or uplift (rising) of the land can help determine the relative sea level rise. The EPA's relative sea level estimates, assuming a two foot global sea level rise by 2100, are 2.3 feet at New York City, 2.9 feet at Hampton Roads, Virginia, 3.5 feet at Galveston, Texas and one foot at Neah Bay in Washington state.

The main factors contributing to sea level rise are thermal expansion (created by an increase in ocean water temperatures) and the melting of ice caps and glaciers. Human activities, such as the burning of fossil fuels, combined with natural activities, have contributed to the rise of the earth's surface temperature over the past century. According to National Geographic, about 80 percent of this additional heat is absorbed by the oceans. The above factors are well studied, but more research is still being done on how climate change will impact large ice sheets in areas such as Greenland and the Antarctic. An extra foot of sea level rise could be a possibility depending on what happens with these larger ice sheets.

Most Earth scientists agree that future sea levels will rise at a greater pace than during the last 50 years. Coastal communities will suffer the most, as flooding from rising water levels will force millions of people out of their homes. Pictured: flooding in Marblehead, Massachusetts caused by Hurricane Sandy on October 29, 2012. Photo Credit: The Berkes

Even small changes in sea levels can have adverse effects on coastal areas. Erosion, flooding of wetlands, aquifer and agricultural soil contamination and habitat loss for fish, birds and plants are all problems resulting from rising sea levels. Also, higher sea levels usually mean more destructive weather events as storm surges get bigger and more powerful and devastate everything in their way. Coastal communities will suffer the most, as flooding from rising water levels will force millions of people out of their homes.

As for what can be done, reducing our collective carbon footprint is no doubt the first and most important step. Individuals should drive and fly less, walk and bicycle more and take advantage of public transit. But sweeping policy changes will have the most impact: A recent commitment by the Obama White House to require coal-burning power plants and other large industrial operations to minimize greenhouse gas emissions should finally help get the United States started on the right track, but many wonder if such moves represent too little too late.

Contacts: U.S. National Research Council, www.nationalacademies.org/nrc; EPA Climate Change Future, www.epa.gov/climatechange/science/future.html; National Geographic Sea Level Rise, ocean.nationalgeographic.com/ocean/critical-issues-sea-level-rise/.

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NEW DOE SUPPORT FOR ENERGY EFFICIENCY

The U.S. Energy Department is currently welcoming new state and local governments to join the Better Buildings Alliance and Better Buildings Challenge. These programs aim to enhance commercial building programs and provide access to technical assistance.

The programs works to keep up to date on energy efficiency developments and provide examples of successful program strategies. Better Buildings Alliance and Better Buildings Challenge participants can access these types of information through the vast industry knowledge and experience represented in these programs.

NH CORE Utilities Energy Efficiency Incentives

The New Hampshire CORE Utilities (Liberty Utilities, NHEC, PSNH and Unitil) have introduced a new energy efficiency incentive program designed to assist residents with the purchase and installation of new or replacement ENERGY STAR-qualified heating, cooling, and water heating equipment.

To be eligible for the mail-in incentive program, applicants must have a residential electric account at the location where the equipment will be installed. This program is limited to residential customers, and covers products purchased and installed on or after April 1 and through December 31, 2013 and is available on a first come-first served basis, while funding is available. Visit the program website for a status of available funding by utility.

Eligible equipment includes:

- Heating-Furnaces, hot water boilers, combo boilers with on-demand hot water, and steam boilers;
- Cooling-central air systems, air source heat pumps, and ductless mini-split heat pumps;
- Water heating-Tankless, standalone storage, indirect, and heat pump;
- Heating control-Seven-day programmable thermostats, and after-market boiler reset controllers.

For more information, visit www.nhsaves.com/heatingcooling, or contact your local utility.

Reduced Cost Energy Audits from Liberty Utilities

Liberty Utilities is offering a special promotion of a $450 blower door home energy audit for just $50 from now until August 31, 2013. This offer is good for the following two groups:

For the first 50 qualified Liberty Utilities natural gas customers heating with natural gas.

For the first 10 qualified Liberty Utilities electric customers heating with ANY fuel type.

This is a $50 savings off this year's Home Performance with ENERGY STAR program energy audit regular price of $100. To determine if your home qualifies you complete the Home Heating Index application atwww.NHSaves.com/home-heating. If your home has an Index rating above 8, the site will display a link to an enrollment application. To be considered for this special promotion, please write "$50 Energy Audit

Request" next to your signature on the application. Those who have the energy audit completed as part of the Home Performance with ENERGY STAR program may also qualify for a 50% instant rebate, up to $4,000, on all qualified insulation and air sealing work. For more information please see www.libertyutilities.com/efficiency or email NHSaves@libertyutilities.com. If you have 5 or more units in your building, please call 1-603-328-2799 for additional rebate information.

ENERGY INSIGHTS – DIGGING DEEPER

MAKING YOUR OWN RENEWABLE NATURAL GAS

By Paul Scheckel

Last issue, I covered our off-grid home's energy use and monitoring systems. Hopefully, you read the first half of the story about how we dramatically reduced our water heating energy consumption through efficiency after being shocked by a high propane gas bill. This second installment of that story follows along my general advice to "reduce your use, then produce." You can read about the details of these systems and processes in my latest book, The Homeowner's Energy Handbook. Half the book is about "deep" home energy efficiency strategies, half is devoted to renewable energy topics, and it includes some great DIY projects.

To recap, the efficient water heating system consists of a drain water heat recovery unit plumbed into our water drain pipe to capture heat from water that would otherwise go down the drain; an on-demand water heater replaced the older storage tank heater; and an electric water heater uses excess solar electricity to pre-heat the water before being delivered to the on-demand unit. We then tried to be acutely aware of ways that we may waste hot water. One habit we were guilty of was waiting around for hot water to get to the faucet, but then impatiently turning it off before it arrived.

But I didn't stop there. After living without utility power for 20 years, I've taken the phrase "off-the-grid" to a new level. To be clear, off-grid living is not for everyone and I certainly don't recommend it unless you have some practical or personal motivation to move in that direction. I wish merely to point out some ways in which nature can provide for us, as long as we are willing to do a little work and don't get greedy. I look at it as a kind of philosophy, a path you can travel for any distance you wish. Of course, you don't need to be off-grid to enjoy the benefits of renewable energy.

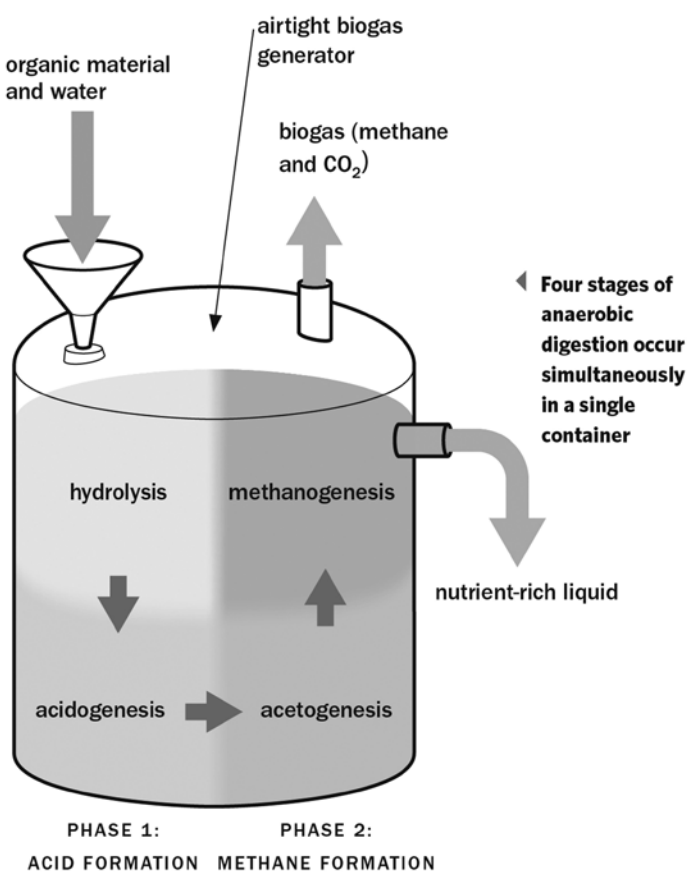
After taking steps to reduce our use, I began to think about how to make my own renewable natural gas and take us further off the "fossil-fuel grid." Biogas is the combustible by-product of the decay of organic matter. It is similar to natural gas, and can be used in place of natural gas or propane (bottled gas). You may be familiar with the energy available in biogas if you've ever passed a landfill where a flame is burning on top of a pipe or chimney. The gas can be piped off and used in a burner to heat air or water, or can be used to create electricity in a generator once the engine has been modified to burn the gas.

Biogas is primarily methane gas, and you may have read that cows are contributors to climate change. This is because methane is a constituent of cow farts. All animal farts contain methane, cows just happen to make lots of it. You can produce biogas by mimicking the guts of a cow, and controlling the operation for production and capture of the gas. The process of making such a biogas "digester" is fairly simple. First, mix water with organic material such as animal manure or vegetable material, and close it all up in an airtight container. Maintain the temperature within the container so that it's similar to the temperature inside an animal (around 100°F). In a week or two it should start to generate biogas.

There is a secret ingredient though. You'll need a starting culture containing microbes called methanogens to get the whole process started. Cow manure is a great source of methanogens, and (like a sourdough starter) you need only add it once to your biogas digester. Recipe development is important too. The recipe is similar to making compost, so if you've had success with composting, you'll have success with biogas if you take the right steps. The main difference between making compost and digesting material to make biogas, is that compost requires oxygen to aerobically decompose organic material, while digesting requires an oxygen-free (anaerobic) environment to produce gas. The effluent left over from the digester can be composted, so you can still use your organic wastes to build soil – the waste just takes a side trip through the digester so that you can harvest energy.

In a practical sense, it will be difficult to find enough material in an average home to produce useful amounts of biogas. You'll need a plentiful and steady source of material so that you can consistently feed the digester. All the details including recipe development and do-it-yourself plans and parts list to build your own digester and safely use the biogas you generate are available in The Homeowner's Energy Handbook. Good luck and be safe!

Paul Scheckel is an energy efficiency and renewable energy consultant and author of The Homeowner's Energy Handbook. He lives in Calais and is a partner at Shelter Analytics. Visit Paul at www.nrgrev.com



CHEAPER LEDS

BE WISE IN YOUR CHOICES

by Bob Sparadeo

If you are looking to replace your incandescent bulbs before they eventually become unavailable, you probably have questions. Should I buy Compact Fluorescents (CFLs) or look into LEDs? To get started, the iconic screw-in lightbulb is actually referred to as the A19 type. In addition to light, they generate a fair amount of heat. In fact, only 5% of the power consumed by the conventional incandescent bulb creates visible light. That is why the US government is looking to eventually curtail their use. The 2007 Energy Independence and Security Act was passed which will phase-out certain wattages, so if you're heating your plumbing or a chicken coop, knowing about the phase out is helpful.

CFLs are smaller versions of fluorescent tubes with the electronic driver built into the base of the bulb. They can take a long time to come on and warm up, and there are health concerns. There is toxic mercury in the gas and in the phosphors lining the inside of the curly glass tube, sometimes hidden inside a traditional looking bulb shape. Mercury is a known hazardous chemical and neuro-toxin. Mercury does not filter from the body once you are exposed. Be careful and please dispose of CFL bulbs properly. You will need to use special care to safely clean up if you break one. (See http://EPA.gov/CFL for more on this.) Despite the safety issue, most hardware stores have shelves full of CFLs.

More efficient choices are built using LEDs. How efficient? A 60 watt incandescent produces about 800 lumens. An LED bulb producing the same light output uses under 10 watts. Once you start adding up all the bulbs in your home, you can see there will be significant energy savings.

As a culture, we Americans seem to place a high value on immediate gratification and are conditioned to look for the lowest price. Beware, as with many products, today's LED market is flooded with risky, inferior lighting products from the Far East that color shift and have shorter lifetimes. See this link for info on recall of half million LED A19 bulbs due to possible fire hazard. http://www.cpsc.gov/en/Recalls/2013/LED-Light-Bulbs-Recalled-by-Lighting-Science-Group/.

So the lowest price is not always the best value.

Recently, I was moving my daughter into her new apartment in Boston which had a few CFLs. I wanted to replace them with good quality LED bulbs so I went to the local big box store only to find more CFLs. I ventured further to Home Depot and found a suitable 60 watt equivalent made in America (CREE) that uses only 9.5 watts and was what I considered affordable, around $12 (40 watt version is under $10). Granted, I had to take the long view, which isn't instinctual. But the energy savings of more than 80% will save her money once we move the LED bulbs to her (eventual) own home and the bulb's rated life-time gives her 22.8 years (@ 3hrs/day) to find one.

I never really thought I'd be planning on taking the light bulbs when she moves next, but why not?

You still have some time to come to your own conclusions on how you'll deal with the incandescent phase-out. Weigh your immediate up front costs with energy savings over time, safety and the eventual availability issue of incandescents to chose what works best for you.

LEDs will in fact be the way we illuminate our lives in the future because of their efficiency, long life and reliability. Before you invest, assure the bulb is properly designed and built, Instead of instinctively reaching for the cheapest. Remember, if you chose wisely you'll safely save energy for the next twenty years. Ask yourself "Do I want it cheap or do I want it to work?"

LEDdynamics is a local LED developer and manufacturer based in Randolph, VT. Green Energy Times would like to thank Bob Sparadeo for so kindly responding to our request for this article. www.LEDdynamics.com.

100% Clean Renewable Energy: Pear Energy makes it available for everyone

The home, whether it's a studio apartment or McMansion, is an energy drain. According to the U.S. Environmental Protection Agency (EPA), electricity and heating are two of the three largest generators of carbon emissions in the average household. There are many simple tasks that you can change to help reduce your family's carbon footprint: turn off computers when not in use – they can use 10 to 40% of power on standby, adjust the thermostat down in the winter and up in the summer, turn off lights when not in use, and so on. While these sound simple, there's another solution that will immediately reduce the household's carbon footprint -- by 33% -- switching to 100% clean, renewable energy.

While installing solar panels or wind turbines might be out of the question for most — there's a new company, Pear Energy (www.pear-energy.com), which provides a service for anyone in the United States to get renewable energy without having to put up panels or a wind turbine. Pear Energy works with its customers' existing utility relationships and with solar or wind farm cooperatives. The clean energy is pumped into the electric grid in the amount exactly equal to the customer's electric usage. So, instead of wasting those dollars on "dirty energy," Pear Energy customers use their energy dollars to pay for 100% clean energy.

Although the cost to make a smarter energy choice may be higher than conventional energy, it is an investment in the future and one that Pear Energy states is equivalent to "around a cup of coffee a week." It's only 2¢ per kilowatt-hour more than what their customers currently pay their utilities, a price that decreases to

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IS PROPANE GREEN?

By George Harvey

We at Green Energy Times spend a lot of time and energy trying to get people to decrease their carbon footprints and pollution emissions. We try to lead in this, living the lifestyle we promote. My last car was a Prius, and I learned to drive it so that I consistently got better gas mileage than the DOE said I could expect. I also buy 100% cow power. Our editor, Nancy Rae Mallery, generates 100% of her electric power from PVs and still looks for better ways of saving the planet. Green Energy Times is published as much as possible by renewables power. We are serious about this.

Propane is a fossil fuel. We might be expected simply to oppose its use, but reality is not always simple. As fossil fuels go, propane is very clean. It is far cleaner than oil or coal, and it has a much smaller carbon footprint. That makes it rather like the Prius, which also uses fossil fuel, but not as much of it as other cars. We believe other solutions superior to propane will come, but they are not yet readily available, so propane is often the best available choice. As it happens, Nancy Rae uses propane for backup heat; I use it for heat and cooking, though the thermostat is turned down below what some people would tolerate.

The problem with propane and natural gas is not so much that they are burned, but that they travel on a one-way trip from the ground, where they have been sequestered, to the atmosphere. Fracking complicates this, but most propane is not produced by fracking.

In the future, propane can be replaced by an identical renewable product, because propane can be synthesized from biogas or other sources. Theoretically, synthetic propane and natural gas can both have carbon footprints that are virtually non-existent. As these become cost-effective, dealers who are concerned about the environment will almost unquestionably carry them, eventually contributing to the decline of fossil fuels and their emissions.

100% Clean, Renewable Energy

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1.5¢ more per kilowatt hour above 1,000 kilowatt hours of electricity.

With offices in Amherst, MA and Miami, FL Pear Energy views itself as a different kind of company: no hidden charges, no cost to switch or switch back, no contracts and no service interruptions. Perhaps most unusual, Pear Energy takes fighting climate change and building the Green economy to a new level by investing 50% of its profits to organizations working towards the same cause.

Building the green economy is – and will continue to be - a major new source of job creation. The basic facts are simple. When we invest, say, $1 million in building the green economy, this creates about 17 jobs within the United States. By comparison, if we continue to spend as we do on fossil fuels and nuclear energy, we create only about 5 jobs per $1 million in spending. That is, we create about 12 more jobs for every $1 million in spending - 300% more jobs - every time we spend on building the green economy as opposed to maintaining our dependence on dirty and dangerous oil, coal, natural gas, and nuclear power.

Making the switch to 100% renewable energy through Pear Energy takes only minutes and there are no interruptions. Homes and businesses in the Massachusetts, New Hampshire and Vermont areas have already made the switch to Pear Energy. Whether you put up solar panels or buy renewable energy through a company like Pear, there is no reason to add to our environmental problem by throwing on that light switch or using your computer.

COLBY-SAWYER COLLEGE'S FIRST WIND TURBINE TURNS HEADS

By Anurup Upadhyay

Colby-Sawyer College's first wind turbine was installed in front of the Susan Colgate Cleveland Library/Learning Center on Saturday, July 13. The 50-foot tall Skystream 3.7 is a residential scale unit and the power it generates will feed back into the main electrical system, helping to offset the college's energy use.

Colby-Sawyer is one of the first institutions in the area to install such a turbine, according to co-founder Jeff Goodman of the New Hampshire-based company Wind Guys USA. "I'm impressed with the college's green leadership," he said. "The turbine is a great tool to educate students and community members on what [one] can gain from heavy wind power."

Equipped with a 24/7 web-based monitoring system with real-time access to data, students will have the ability to learn about how the technology works, and to calculate return on investment and the turbine's impact on sustainability. A grant from the Margaret A. Cargill Foundation made the project possible.

"The data can be used in many classes – certainly in business courses, as renewable energy and energy conservation have become major components of most businesses," said Colby-Sawyer College's Sustainability Coordinator Jen White '90. "Our Environmental Studies and Environmental Sciences students will benefit as well. We hope to have a class on renewable energy systems in the future, too." The turbine, at an average windspeed of 12.5 mph, can produce 400-450 kWh per month and offset more than 6,000 pounds of global warming pollutants every year. It joins a demonstration-sized solar panel display that was installed on campus last year as a precursor to Colby-Sawyer's 517-panel photovoltaic array that ranks among the largest in the state.

The proposal for the installation of demonstration-sized renewable energy projects on campus was co-developed by White and Environmental Studies major Andy Chase '13. Power generated by these energy projects will offset the college's energy consumption and feed back into the main electrical system of the college. In addition to its green impact, visible projects like the wind turbine or the pole-mounted solar panels will allow the college to communicate its commitment to sustainability and open new marketing possibilities.

Left: The 50 ft tall Skystream 3.7 can produce 400-450kWh per month. Above: Going up!.

During the instillation project, White shared her enthusiasm for the college's many sustainability projects. "I'm really excited about the turbine," she said. "It is great to be able to offer students tangible access to these new energy technologies." Environmental Studies major Phurchhoki Sherpa '15 witnessed the installation and said the wind turbine will add more impact to the college's sustainability initiative. "Now that we have the turbine right on campus, students will be even more conscious of their own energy consumption," she added.

About Colby-Sawyer and Sustainability at the College

Colby-Sawyer College is a comprehensive college that integrates the liberal arts and sciences with professional preparation. Founded in 1837, Colby-Sawyer is located in the scenic Lake Sunapee Region of central New Hampshire.

The wind turbine was installed as part of the campus-wide initiative to eliminate the college's greenhouse gas emissions, integrate sustainability into the curriculum and overall educational experience, and achieve the shared vision of personal well-being, social justice, financial security and environmental stability for the college and the larger community. Colby-Sawyer's goal of achieving a carbon-neutral campus by 2050 was established in its Climate Action Plan and approved by the college's Board of Trustees on May 7, 2010. Milestones along the way include a 50 percent reduction in emissions by 2015 and a 70 percent reduction by 2020.

For more information about Colby-Sawyer College's green initiatives, programs and progress, visit www.colby-sawyer.edu/assets/pdf/SustainabilityTimeline.pdf.

Anurup Upadhyay is a Business major at Colby-Sawyer College and a student writer for College Communications.

SUSTAINABLE FARMING IS SERIOUS BUSINESS
JERICHO SETTLERS FARM-THIS IS HOW YOU DO IT!

The Jericho Settler's Farm team: Mark, Christa, Asa, and Hazel, in front of their Group Net-Metered 34kW Solar system. They harvested 54,000kWh of energy in 2012., (left inset) 2,000 hens lay 700 dozen organic, 'solar' eggs a week., (right inset) Cows and calves living the good life, while grazing in 100% organic pastures at Jericho Settlers Farm.

By N. R. Mallery

No farms = no people. Farms need to move towards sustainability in order to keep our civilization alive. This is something that Christa Alexander and Mark Fasching take to heart in on their farm, as they clearly support 'Keeping it Local'!

Jericho Settlers' Farm was founded in 2002. The name was chosen because they live on two of the earliest settled farmsteads in Jericho Center, Vermont -- the Chapin Homestead settled in 1783 and the Brown Family Homestead circa 1800.

Two acres of hoophouse production in their nine hoophouses extend their ability to grow and harvest through the winter.

Continuing the tradition of raising healthy food on a diversified family farm, Jericho Settlers Farm IS their family. Christa grew up on the farm in Jericho, and her parents still live there. Mark is a transplant from a small diversified dairy farm in Washington State. The couple made Jericho their home in 1999, and started the farm in 2002. Now, the next generation plays and occasionally works on the farm; Asa joined them in 2005, and Hazel in 2009.

The family farm philosophy is to provide a thriving local food system, which is essential to a sustainable community. Christa says, "We strive for real work in which we find joy, wonder and accomplishment each day, as well as the continuous opportunity to learn and meet challenges. Our aim is to provide real nourishment for families in the community."

The family farm grows over 75 types of certified organic vegetables and herbs. Twenty acres of gardens are used for an all-year CSA program for the Burlington area. A pick-your-own garden gives CSA Members a chance to gather basil, dill, parsley and flowers. Growing and harvesting from nine hoop houses covering two acres extends their ability to harvest of salad greens, bok choy mustards, scallions, arugula, mesclins, and spinach to the entire winter. They have 15 tons of storage foods for November to April, including carrots, garlic, leeks, and winter squash. This allows them to sell quality, organic, locally grown vegetables until May. Amazingly, this creative family farm even harvests potatoes in May by starting them in the hoop houses and planting early.

Jericho Settlers Farm also raises 100% grass-fed beef and lamb, pasture raised pork and chicken, and farm fresh eggs. They raise 2,000 hens who lay 700 dozen solar eggs a week. They have meat birds, pigs, and lambs, raised in partnership with neighbor, Chuck Lacy. Animals are bred naturally on site, and have their offspring in the pasture. The manures are used for fertilizer.

Egg eggs are sold within 25 miles of farm - keeping it local - "No need to sell anywhere else. Plenty of people who eat right here. Marketing local is important, not selling product to other parts of the country. It doesn't make sense for us to push product out of the area - not all people are growing their own - I wish they did - that is what they should be doing - growing own food."

This is such an incredible example of a real, sustainable food system.

But, the harvest is not just food production! Jericho also harvests energy from the sun. A Grid tied - Group Net Metered solar system installed by AllEarth Renewables in 2012. It has six AllSun trackers with a total capacity of 34kW, producing 54,000 kWh/yr. The power is shared with their parents' house on the farm, their house up the road, AND Jericho Center Country Store, meeting half the store's energy needs!

Asked why they decided to go solar, Christa replied, "Everything here is solar-based - growing food and livestock. We have always been interested in limiting our fossil fuel dependence. We currently do have to use fuel for 2 tractors - but are considering converting them to electric. Solar reduces our need for fossil fuels. We are learning more about biodiesel options and maybe we will end up with some big algae fields."

http://www.jerichosettlersfarm.com/ http://www.greenlanterndevelopment.com http://www.allearthrenewables.com/

SOLAR ECONOMICS FOR SOLAR PV AT JSF - installed for Free!

- Green Lantern Capital (GLC) and Jericho Settler's Farm (JSF) entered into a lease arrangement. GLC paid for and owns the system. JSF's monthly payment to GLC is less than their former electric bill. Net metering credits are applied to the utility service accounts of JSF and others in their Net Metering group, reducing their bill. JSF's monthly payment to GLC is slightly less than the total value of the net metering credits. JSF has an option to purchase the system at a greatly reduced price after six years.
- This case included a $19K grant from the Renewable Energy Resource Center (through the Clean Energy Development Fund).
- The investors on the project are mission-driven and support renewable energy.
- JSF gets a solar system installed for free, some immediate utility savings, and a future purchase option that will save them even more money from the avoided costs of electricity.

Shop Area Farmers Markets

A farmers' market is a physical retail market featuring foods sold directly by farmers to consumers. They typically consist of booths, tables or stands, outdoors or indoors, where farmers sell fruits, vegetables, meats, and sometimes prepared foods and beverages. Farmers' markets add value to communities as a benefit to both the farmer and the consumer. Supporting local saves energy, money , time, and the planet. Support your local Farmers Market!

VERMONT

Bradford Farmer's Market. Every Saturday 10-2. Open year round! Located on the front lawn of the Bradford Academy Building. Bradford, VT. Vendors include, veggies, meats, soaps, crafts, baked goods, lunch, events, jewelry, jams, pickles & more! 802-222-4495. Email: hellobradfordfarmers@gmail.com

Dorset, VT Farmers' Market. May 12 - October 13th. Sundays. 10am-2pm. Rain or shine. HN Williams General Store, Rt.30 Dorset VT. (802) 353-3539.
Email: marketmanager@dorsetfarmersmarket.com

Jeffersonville, VT Farmers' and Artisan Market. June 19-Oct. 2nd. Wednesdays 4:30-Dusk. Rain or Shine. Route 15 &108S, behind the Cupboard Deli. Please access the market to park in the adjacent field between the Cupboard Deli and Aubuchon Hardware. (802) 999-8486 Email: debnevil@gmail.com or like us on Facebook.

Jericho Farmers Market @ Mills Riverside Park. June 6-Sept. 26. Rain or Shine. Thursdays (except July 4) 3:00-6:30 pm. Rte 15, between Jericho and Underhill, VT. (802)343-9778.
Email: JerichoFarmersMarket@gmail.com

Manchester, VT Farmers' Market. May 30 - Oct. 10th. Thursdays, 3-6 pm (rain or shine). Adams park, Rt. 7A downtown Manchester Center. (802) 353-3539. Email: mfmvt@yahoo.com

Peacham, VT Farmers Market. June 13 through Oct. 3rd. Thursdays 3 - 6 pm. Peacham Academy Green, 555 Bayley Hazen Rd., Peacham, VT (802) 592-3161. Email: janealper@gmail.com

NEW HAMPSHIRE

The Farmers' Market of Keene, NH. Offering a wide variety of locally produced farm fresh produce, dairy, meat, delicious baked goods, maple syrup, plants, unique crafts, and more! Located at Gilbo Ave. behind Margarita's restaurant. Open 9 am - 1 pm Tuesdays and Saturdays May-October. For more information: Email: keenefarmersmarket@gmail.com, www.facebook.com/keenefarmers. http://harvesttomarket.com/farmers-market/Keene-Farmers-Market-NH.

Laconia, NH Farmers Market located at City Hall parking lot, Beacon Street Extension, Laconia, NH is celebrating its 40th season; offering local farmers and producers, vegetables, fruits, unique gifts, baked goods, meats, seafood, bread, eggs, herbs, dog treats, honey, maple syrup, jams. Saturdays, June 15 thru September 28; 8:00 until noon. The market accepts EBT and credit cards.
Call 603-267-5326. Visit www.laconiafarmersmarket.com.

Newport NH Farmers' Market. Located on the Town Common at intersection of Rt. 10 and Rt. 11 on N. Main St in historic downtown Newport, NH. Organic produce, prepared foods, meats, eggs, cheese, crafts/art, and so much more. May 31-Oct. 11, Fridays, 3-6 pm. www.NewportBuyLocal.com (603) 865-9841.
Email: newportfarmersmarket@comcast.net

Peterborough, NH. Fresh Chicks Outdoor Marketplace, every Monday 11-2, on the grounds of Monadnock Community Hospital. Produce, plants, dairy, lobster, meats & poultry, baked goods, ice cream, kettle corn, fairtrade coffee beans, artisan crafts, music, fun!

Plymouth, NH Community Farmers' Market. Located at 263 Highland Street, Plymouth, NH. Every Thursday from 3:00 to 6:00 PM (rain or shine). May 30 to Sept. 5. Variety of local foods, crafts and local specialty products. Local # 536-3823

Tilton, NH Farmers' Market, Every Friday 3 - 7pm, July 5 - Sept. 27, Over 30 Local Producers with fruits, vegetables, dairy, baked goods, seafood, body-care and prepared foods. Live music and family entertainment. Location: Tanger Outlet Center, 120 Laconia Rd, Tilton, NH, Exit 20 from I-93. www.tiltonfarmersmarket.com.

HARVESTING OIL SEEDS INTO BIOFUELS – IN THE NORTHEAST

Canola Field

Field of Sunflowers

What is Biodiesel?

America is the largest biofuels producer in the world -- accounting for 48% of global output. Nearly a billion dollars a day is spent on oil imports each day in the US - to power our transportation systems and industries. A strong biofuels industry could meet much of our demand.

Biofuels are made from organic materials, or biomass, grown in our own fields and forests. A booming biofuels industry would also keep a lot of the money we spend on imported oil in the country, plus it would reduce our dependence on foreign oil and create jobs in rural america. In fact, we can use home grown biomass to replace or supplement almost every product that comes from a typical barrel of crude oil -- gasoline, diesel, jet fuel, and other consumer products like plastics. These bio-products can all be made locally.

The Billion Ton Update study done by the US Dept. of Energy found that U.S. potential biomass resources could produce about 85 billion gallons a year - about 1/3 U.S. oil we use!

America is already using biomass that comes from agricultural and forest operations across the country. These are non-food plants grown specifically for energy and their high energy content - crops like switchgrass, or fast growing hybrid poplar trees, and energy crops can also be grown on marginal, degraded, underused agricultural land, helping farms expand and become more productive.

Agricultural waste can even be converted into biofuel. Farmers can gather and sell cornstalks and wheat straw to be converted into biofuels, making their lands even more profitable -- from non-edible plant material left over from crop harvest that can been collected from farm land, instead of going to waste.

The path to Sustainable Farming starts locally, with similar goals to those of State line Farm in Shaftsbury, Vermont.Stateline is currently working with five local farms to make their own fuel, from their own organic raw materials that they sustainably grow and harvest. John Williamson is in charge of their biofuels program and explains the actual process:

So, how do you take plants and make them into fuels and other products?

Harvesting Sunflowers

No matter what kind of plant you start with, the first steps are to break them down. Machine and processing equipment specific to the various biomass crops harvests, bales, grinds, and condenses these raw plants into energy ready materials. Finally they can be further broken down, and made into biofuels ready for use.

The Process at Stateline Biofuels:

1. The biodiesel process at State Line Biofuels begins with oil seed which is dried and stored.
2. Next, it is fed into a mill, presses oil from the seed and separates the remainder of the seed as meal.
3. The oil is put into settling drums to remove sediment and remaining particles.
4. The settled oil is moved into a 300 gallon tank, where it may be mixed with filtered waste vegetable oil.
5. After any mixing, the oil is moved to a 400 gallon reactor tank with a jacket through which hot water can be circulated to heat it to 120-130 °F.
6. Alcohol and a hydroxide, such as lye, are combined in a separate mix tank. The hydroxide is hazardous and requires careful handling. The hydroxide is added through a hatch on the top of the mix tank.
7. The solid hydroxide is dissolved into the alcohol by mixing vigorously.

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Solar Grain Dryer

A crop of oilseed ready for extraction

THE VERMONT FOOD SYSTEM ATLAS

A Clearinghouse Website to Advance Our Local Food System

By Rachel Carter

The Vermont Farm to Plate Network is weaving together all components of Vermont's food system to strengthen the working landscape, build the resilience of farms, improve environmental quality, and increase local food access for all Vermonters. It's made up of over 250 organizations encompassing farm and food system businesses, educational institutions, nonprofit organizations, and government agencies working together to implement the state's Farm to Plate Strategic Plan—possibly the most comprehensive food system plan in the country and the first in New England.

Coordinated by the Vermont Sustainable Jobs Fund, both the Farm to Plate Network and Strategic Plan can be accessed in full detail at the Vermont Food System Atlas—a new, online collective food system inventory:
www.vtfoodatlas.com

The Vermont Food System Atlas features thousands of agricultural resources to help connect Vermont farmers to food processing businesses, specialty food producers, educational institutions, nonprofit organizations, consumers and state government. Farmers and agricultural producers can use the Atlas to build economic partnerships based on production, distribution, marketing, and outreach goals. The Atlas also features thousands of food system resources including stories, videos, job listings, data, and a map searchable by people and places, region, keyword, and food system categories.

John Cleary of Cleary Family Farm in Plainfield recently created a profile in the Atlas. "As a diversified farmer, I anticipate being able to use the Food System Atlas as a single source to connect with all the resources available to help me farm successfully. Improving farmer access to technical assistance programs,

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FALL SEEDING FOR AUTUMN ABUNDANCE

By Gwenael Engelskirchen, High Mowing Seeds

The publisher's garden, Fall 2011 Photo Credit: N. R. Mallery

Growing is an act of faith. Faith because you plant these seeds, tiny embodiments of life, small parcels of potential, and you trust that with the proper conditions and care, they will grow. Even in the height of summer, when our fields are frantic with growth, we can slide our attention briefly to focus on planning for harvests in the waning light of fall.

There are many crops that can be planted in mid-to-late-summer for fall harvests. Crops like carrots, broccoli, cabbage, kale, and cauliflower thrive under fall's cooler growing conditions and can withstand light—and in some cases even heavy—frosts. However, timing is essential in ensuring a successful fall harvest.

Determining Planting Dates

As a first step, it is important to know the date of first frost in your growing area. If you don't already know when this is, talk to other growers or check out a previous blog article on Fall Planting Guides By Region. It is also important to remember that plants' growth rates slow down as the days get shorter; crops that you had a hard time keeping up with in the spring will be noticeably slower to mature in the fall.

Virginia Cooperative Extension has a handy formula to help you determine when to plant for fall harvest:

- Take your first frost date for your area
- Subtract the number of days from seeding or transplanting outdoors to harvest (this is the days to maturity)
- Subtract the number of days from seed to transplant if you start your own seed
- Subtract the average harvest period (this is the length of time you expect to be harvesting your crop)
- Subtract the Fall Factor (about two weeks)
- This equals your fall planting date

So, for example, if we say that here in Northern Vermont, our first frost date is October 1st and we want to figure out when to plant broccoli for fall harvest, we could approach it like this:

If the days to maturity for broccoli is 48 days from transplant, we need to add another 4 weeks, or 28 days, for the time from seed to transplant. Let's say 21 days for the harvest period.

- 48 days to maturity
- 28 days seed to transplant
- 15-20 days harvest period
- 10-14 days Fall Factor

So, about 100 days before October 1st means that you'll want to seed your fall broccoli around June 15th.

Some Suggestions for Fall Harvesting are: Spinach, Lettuce and Radishes. Quick growing carrots. Cold tolerant Cabbage -- several frosts or freezes only make its flavor sweeter. Broccoli. Kale will tolerate cold temperatures and frost sweetens it. Mulching can hold Leeks in the field through much of the winter.

Cold frames and Row Cover can extend the growing season. Happy Fall Planting!

Source: High Mowing Seeds: www.highmowingseeds.com/blog

Amy Todisco – Green Living Now

EXTEND YOUR GROWING SEASON WITH FALL CROPS

If you love growing vegetables, then I bet you'll really enjoy extending your harvest with fall crops. I don't know about you, but when the temps start to cool, I get rather sad thinking that the next summer is so long away. One way to beat the end of summer blues is to grow some fall crops. Some plants can tolerate a light frost (with their roots still in the ground) and become even tastier and contain more nutrients than the same crop grown in the summer, like spinach. Something about the freezing process seems to trigger the plant to store more nutrients, and it sure does taste good. There is still time to plant, but get started right away.

Here are some things that you should know:

Soil Preparation: If you did plant a garden, remove all spent plants—they will only put your new plants at risk for disease and other problems. Add more compost and organic fertilizer to the soil, such as Cheep Cheep, dried chicken manure, http://www.norganics.com/products/fertilizers/cheepcheep.html

Plant your seeds in the soil directly, twice as deep as you would in the spring, and cover with some kind of mulch, such as straw. This helps protect them from the direct heat of the summer sun and will help them germinate better.

What to plant? The best fall crops are: swiss chard, kale, beets, carrots, lettuces, radishes, broccoli, spinach and Bok (or Pok) Choy.

Dealing with frost: One of the biggest challenges with fall gardening, like spring planting, is frost. Temperatures below 25ºF will kill just about everything in the ground, except maybe carrots, especially if they are mulched.

How to protect against frost? If you water the day that a frost is expected, the water in the soil will actually help prevent frost from reaching the plant. I know, sounds counter intuitive, but it really does work. Some large scale growers, such as Florida orange companies, use light mist water sprayers to keep their orange trees from freezing.

Cover the crops with a row cover or mulch before the sun goes down to lock in some heat. Row covers only protect plants by an extra 2 degrees. You can use more than one, but be sure to hold them down with rocks, or something to prevent the wind from taking them off.

Cold frames and unheated greenhouses can help protect crops from frost too.

What to do if creatures start dining on your Fall produce? If you don't have a fence around your garden (and that doesn't keep everyone out anyway unless it's a cage type of fencing), you can try putting bird netting on top of the plants. At the organic farm where I live, we had woodchucks chomping down the beautiful broccoli plants we have in a cold frame greenhouse. I suggested using the bird netting to deter them, and it worked.

Preserving produce: Hopefully you've been freezing and dehydrating, and will be canning your garden harvest. What's better than a homemade spaghetti sauce frozen or canned from last season's produce in the middle of winter? I've made delightful tasty tomato based sauces with onions, garlic and herbs from the garden. And, blueberries in the freezer for pancakes? Yum.

Happy gardening … and eating!

Amy Todisco is an accomplished author on issues relating to health, sustainability, and organic gardening. She has co-authored a best-selling book, How To Easily Grow Organic Food Almost Anywhere and has been featured on Vermont Public Television and in numerous other media. You can learn more about her at greenlivingnow.com.

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educational workshops, and financing opportunities will help Vermont farmers grow and develop new markets. In my role as a fieldman for Organic Valley, the Atlas will help me connect new and existing farmers with market opportunities offered by our farmer-owned cooperative," shares John.

All Vermont farmers and food producers as well as other businesses and organizations connected to the state's food system are invited to create a FREE profile on the Atlas: www.vtfoodatlas.com/atlas/register

As a growing interactive directory with more than 5,000 individual food system profiles and web traffic increasing daily, the Atlas provides free marketing exposure to Vermont farm and food businesses and organizations. Any user can locate services and support not easily found on the internet from compost suppliers to funding opportunities. Anyone who creates a profile on the Atlas can post events, jobs, and news for free, anytime. The Atlas offers farmers the opportunity to connect with folks from all over the state to help build relationships and develop business partnerships. With farmers at the heart of Vermont's food system, news from around the state helps showcase the great work taking place to strengthen Vermont's food system.

The Vermont Farm to Plate Network is not only working to grow Vermont's food system but is also helping build a vibrant food system for the Northeast. Network members are active participants in the Northeast Sustainable Agriculture Working Group (NESAWG) and the Food Solutions New England (FSNE) Network. Vermont is also playing an important role in helping other states develop food system plans. The Food System Atlas helps bridge Vermont's multi-faceted local food efforts and programs to a statewide level to prepare Vermont for its vital role in creating a robust regional food system.

Visit the Atlas: **www.vtfoodatlas.com**.

Rachel Carter is the communications director at the Vermont Sustainable Jobs Fund, a non-profit organization created by the Vermont Legislature in 1995 to accelerate the development of Vermont's green economy.

BIOFUELS

Cont. from page 30

8. The alcohol-hydroxide mixture is transferred to the reaction tank and mixed with the vegetable oil. The biodiesel reaction, called transesterfication, is done by circulating the new mixture until the reaction is complete.

Biodiesel Storage Tanks

Bio-fuel Reactor

9. The products of the reaction, biodiesel and glycerin, are pumped to a 500 gallon settling tank with a conical bottom, where they separate with gravity.

10. The glycerin is removed off the bottom of the tank. The remaining fuel can then be tested for quality, passed through a final filter and used to power the farm's machinery.

Homegrown biomass feedstocks are indeed creating jobs in rural america, generating clean renewable fuels and reducing our dependence on foreign oil.

Sources: http://energy.gov/public-services/vehicles/biofuels

The Biofuels Process and photos graciously provided by John Williamson, State Line Farm, statelinefarm@yahoo.com and Chris Callahan, Callahan Engineering, (518) 677-5275 chris@callahan.eng.pro.

THE LOOMING CRISIS IN AGRICULTURE

By George Harvey and N.R. Mallery

The world population, now about 7 billion, is expected to increase to 9.3 billion by 2050. To be adequate for 9.3 billion people, agricultural production will have to increase by 60%.

The US Energy Information Agency predicts the use of energy will increase by 56% over the same time. Between fuel and petrochemicals used in fertilizers and pesticides, agriculture now uses 19% of our fossil fuels. This makes food prices strongly linked to the price of oil, so as the price of oil rises, so will the price of food. The UK Department of Defense is warning that the price of oil could hit $500 per barrel by mid-century.

Agriculture accounts for about 70% of the use of fresh water. Water demands for people are growing. Some experts warn that most of our aquifers could be permanently polluted by fracking operations.

Meanwhile, the ability of our land to support agriculture is declining. This is due partly due to climate change, partly to minerals from irrigation building up in the soil, partly from over-use of chemical fertilizers while ignoring the organic needs of the soil they do not supply, and partly because of buildups of pesticides. We have already lost about 20% to 30% of all agricultural land use.

Drought on a farm in Hawaii, 2011. This drought is still going on. USDA photo.

Farm in Campbell Hall, New York, flooded by Tropical Storm Irene, 2011. Photo by Daniel Case.

Honeybees and other pollinating insects are dying. Many causes are suggested for the losses of bees, but we should note that the most commonly used pesticides for growing corn are also the deadliest chemicals known for bees. These chemicals are persistent and remain in the food and soil.

It is not surprising that leaders in science and government are saying we are approaching a "perfect storm" for food production.

Various organizations, including the Food and Agriculture Organization of the United Nations, have worked on the problem. Unfortunately, while they have recommendations for national governments, they do not tell us much about what individuals should do.

The first thing to remember is the adage, "Think globally, act locally." In addition, there are a few rules to put into practice:

• Protect the soil. Do not use chemical fertilizers or pesticides. Get to know other options. Carbon farming rotates grazing animals so the plants they feed on can recover fast. Biochar shows some promise as a permanent, safe enhancement for soil fertility. Certain fungi improve the soil in gardens, improving fertility and making tilling unnecessary.

• Reduce the use of pesticides and find other methods for pest control. These range from introduction of benign insects, such as preying mantis, to spraying with natural pesticides, such as pyrethrin - but learn how to keep bees safe from them.

• Decrease use of fossil fuels, and increase efficiency. Use local fuels such as biodiesel, if possible.

• Take care with chemicals. Dispose of them in ways that keep them out of the soil. Even some fertilizers are bad for the soil in the long run. Also, check soil for lead.

• See if alternate growing is suitable for you. These range from forest gardens to aquaponics.

• Try new types crops, suitable to a changing climate.

• Grow vegetables on windowsills, porches, and small green houses. Some apartment buildings allow tenants to plant gardens.

• Grow sprouts, which are highly nutritious.

• Use locally produced seed, grown for local conditions and developed according to changes in those conditions.

• Save seeds. Join or start seed saving organizations.

• Get involved in community gardens, cooperative gardens, and community greenhouses. If necessary, start them

• Support local agriculture.

One of the things in news reports is the idea that it takes a century to build a millimeter of topsoil. Local farmers have shown that soil can be grown far faster. Things are not as bad as they are made out to be, and this is especially true when local people work for local independence.

LEAD CONTAMINATED SOILS - SOMETHING TO BE CONCERNED ABOUT

Unsafe levels of lead contaminate soil in hundreds of neighborhoods around the U.S. where lead smelting facilities operated between the 1930s and 1960s. Children under the age of six are especially vulnerable to lead poisoning, which can severely affect mental and physical development. Pictured: Rusty remains at an old lead smelting mill. Photo Credit: Simon Bowen

In April 2012, USA TODAY published a series entitled "Ghost Factories," a report on an investigation into lead contaminated soil in hundreds of neighborhoods around the U.S. where lead factories once operated. The investigation addressed the lack of action taken by the U.S. Environmental Protection Agency (EPA) to test and clean up these sites despite having been warned in 2001 about the dangerous levels of lead contamination around the areas of these old facilities.

The factories, which used a process called smelting to melt down lead, were in operation from the 1930s until the 1960s when they began to shut down. While the factories themselves may now be gone, their toxic legacy remains, as they have left behind significant amounts of poisonous lead particles in surrounding soils. The lead particles are particularly dangerous for children who live and play in these areas. "Lead poisoning occurs when lead builds up in the body, often over a period of months or years," reports the Mayo Clinic, adding that even small amounts of lead can cause serious health problems. "Children under the age of 6 are especially vulnerable to lead poisoning, which can severely affect mental and physical development [and] at very high levels... can be fatal."

Environmental scientist William Eckel warned government officials of the dangers of old lead factories in his research article "Discovering Unrecognized Lead-Smelting Sites by Historical Methods," which was published in the American Journal of Public Health in April of 2001. Eckel used EPA databases along with lead industry directories to compile a list of more than 400 possible factory sites around the country that may have been unknown or forgotten over time. In an effort to create some urgency for federal regulators, he paid to have the soil around eight of the sites tested and all but one exceeded the EPA's hazard level for residential areas. More recent soil tests done by USA TODAY revealed that all 21 areas that were examined in 13 states had potentially dangerous enough lead levels that children should not be playing in that dirt. This meant, of course, that cleanups of these sites had not been done.

In response to Eckel's findings and the USA TODAY series, EPA has initiated work with states to survey the majority of the sites on the 2001 list, although records for many of the affected areas are incomplete. "I am convinced we have addressed the highest-risk sites," reports Elizabeth Southerland, director of assessment and remediation for the EPA's Superfund program. She says her agency is open to reassessing sites that may need another look thanks to more recent information uncovered by USA TODAY.

Unfortunately, ongoing federal budget woes mean that resources are severely limited. In fact, the EPA lacks funds to complete even previously scheduled Superfund remediation projects. In the meantime, individual homeowners can determine whether or not they live near a former lead smelter and can apply pressure to local authorities accordingly. USA TODAY has posted a free online map to help people figure out exactly where the danger zones might be.

Contacts: USA TODAY "Ghost Factories," http://usatoday30.usatoday.com/news/nation/lead-poisoning; "Discovering Unrecognized Lead-Smelting Sites by Historical Methods," www.ncbi.nlm.nih.gov/pmc/articles/PMC1446633/pdf/11291377.pdf.

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Ingredient of the Month

By Larry Pleasant

ADDLE THOSE BUGS!

Fifty consecutive days of rain is reaping a whirlwind of pesky insects ready to put a dent into YOUR summer fun. With black fly/mosquito/deer fly/cluster fly season upon us all at once, many people are reaching for those bug off sprays. What ARE insect repellents and how do they work? And how concerned should you be about the occasional reactions people have to commercial products?

Insect repellents are a type of pesticide that must be registered with the EPA at both the State and Federal levels. Even 100% natural bug-off sprays made without artificial chemicals are considered registered pesticides by our Federal government. Insect Armor, a much beloved natural product made by Vermont Soap was unceremoniously recalled and pulled from the market for not being a registered pesticide. *"Insect Armor is like an herbal suit of armor to protect you from pesky flying insects…"*

We renamed it Citronella Camping Spray, *"Camping Spray is an herbal perfume to keep your campsite fresh…"* and have had no issues with the EPA since.

Flying insect repellents work by addling CO2 and heat sensors attached to antennae on the insect's head. They work by temporarily blocking the receptors, over stimulating the receptors, or tricking them into "seeing" CO2 everywhere.

I like the word addle. It is an old-fashioned word that means "to confuse or to render one unable think clearly". And that is exactly what volatile odorificants (translation: molecules that have aroma) often do to flying insects and ticks. They addle those sensors so the bugs can't find you. Thing is, natural odorificants usually only work for about a half hour or so before they need to be renewed. Good for the manufacturer, but less so for the user.

I've been Africa Testing a new Vermont Soap product called Camping Lotion, scheduled for release next year. This takes the exact same time tested blend of essential oils we perfected in Insect Armor and put them into a slow release organic coconut oil base. It seemed to remain effective for about 3.5 hours in my experience with the malaria and dengue carrying mosquitoes of Monrovia, Liberia.

DEET or N,N-Diethyl-meta-toluamide, a former insecticidal spray used in the 50's, is a Vietnam tested and proven insect repellent. It appears that insects simply do not like the aroma of DEET and go away. Similar molecules are also found in Lavender, Eucalyptus and thujone containing plants such as Wormwood.

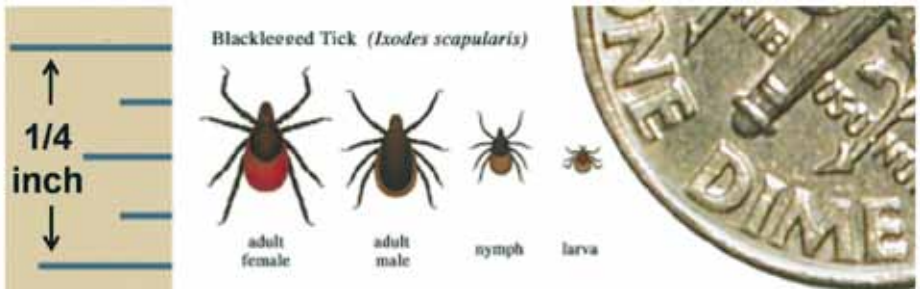
Hyper-active or ADHD people, or those prone to nervous system disorders or seizures would do well to avoid prolonged skin contact with DEET as should anyone with asthma or toluene sensitivities. If you are on medication ask your Pharmacist or Doctor if DEET reacts with your meds. If you are pregnant PLEASE avoid using DEET! Apply DEET to non synthetic clothing only as it is a solvent that can dissolve a number of materials; including many plastics.

Children are more particularly at risk from overexposure to DEET. The younger the user, the more caution one should take to avoid skin and lung contact.

I like the smell of essential oils but my asthma rebels at the mass market bug off sprays. This may or may not be due to the DEET, but it most certainly is tied to the solvents and carriers used to deliver DEET to the user. This alone provides ample motivation for Vermont Soap to formulate the most powerful and effective camping products possible.

It is important to remember that Nature is the consummate chemist. Nothing is created without its antithesis. Dinosaur poop get processed by dinosaur poop bacteria. Good thing or we would still be knee deep in dinosaur poop! Insects have been around for 250 million years or more and plants have been creating molecules to repel them for just as long. Only humans are foolish enough to create new and novel chemicals with barely a thought to their long term effects on our eco-system world that sustains us. Maybe we should change our species name from Homo Sapiens, h*umans the most wise* to Homo Practicus, *humans that make stuff.*

This is the Soapman reminding you that Nature has all the answers; but you have ask the right questions and then be quiet enough to hear the reply.



Deer ticks in various stages of development. US CDC photo.

MOSQUITO-BORNE DISEASES ON THE UPTICK – THANKS TO GLOBAL WARMING

If by pollution you mean greenhouse gas emissions, then definitely yes. According to Maria Diuk-Wasser at the Yale School of Public Health, the onset of human-induced global warming is likely to increase the infection rates of mosquito-borne diseases like malaria, dengue fever and West Nile virus by creating more mosquito-friendly habitats.

"The direct effects of temperature increase are an increase in immature mosquito development, virus development and mosquito biting rates, which increase contact rates (biting) with humans," she reports.

To wit, the U.S. Centers for Disease Control and Prevention (CDC) reported a record number of West Nile virus infections in the continental U.S. in 2012 with some 5,674 documented cases including 286 deaths. The virus uses insects as hosts where they reproduce and then are transmitted to humans via mosquito bites; it can also be transmitted via blood transfusions, organ transplants and breast feeding.

While it's still far less common, U.S. cases of mosquito-borne dengue fever—also known as "breakbone fever" for the feeling it gives its victims—rose by 70 percent in 2012 as compared with 2011. The CDC reports 357 cases of dengue fever in the continental U.S. in 2012, up from 251 in 2011. The majority, 104, was in Florida, but New York had 64 and California 35. Most of the infections were imported on people travelling to the U.S.—Puerto Rico played host to 4,450 dengue fever cases in 2012, up from only 1,507 in 2011. But some of the cases in Florida likely came from mosquito bites there. The virus behind dengue fever thrives in tropical and subtropical environments. The increased warming predicted for the southern U.S. along with increased flooding means dengue fever will no doubt be spreading north on the backs of mosquitoes into U.S. states that never thought they would have to deal with such exotic outbreaks.

West Nile and dengue fever aren't the only mosquito-borne diseases on U.S. public health officials' radar. Chikungunya, which hitches a ride on the ever expanding Asian tiger mosquito and can cause high fever, fatigue, headache, nausea, muscle and joint pain, and a nasty rash in humans, comes from tropical Africa and Asia. But cases have started appearing in Western Europe in recent years and are expected to make it to the U.S. East Coast

Cont. on page 37

Photo Credit: U.S. Department of Agriculture

According to Maria Diuk-Wasser at the Yale School of Public Health, the onset of human-induced global warming is likely to increase the infection rates of mosquito-borne diseases like malaria, dengue fever and West Nile virus by creating more mosquito-friendly habitats.

RESOURCES

Efficiency VT This is a must go to site for immeasurable amounts of info. **www.efficiencyVT.com**

SEIA/ Solar Energy Industries Association: The SEIA Tax Manual to answer your solar related tax questions. **www.seia.org**

Dsireusa.com: www.dsireusa.com Renewables & Efficiency. Find state, local, utility, & federal incentives for renewable energy & energy efficiency.

IREC/ Interstate Renewable Energy Council: RE educational info. **www.irecusa.org**

NABCEP/ North American Board of Certified Energy Practitioners: This organization that tests & certifies PV system installers. Individuals are Certified, companies are not. **www.nabcep.org**

NESEA/ Northeast Sustainable Energy Assoc.: www.nesea.org

New Hampshire Sustainable Energy Assoc. NHSEA Focused on N.E. US, for consumers & industry- RE & clean building info, events. **www.nhsea.org**

New York Solar Energy Industries Association/NYSEIA www.nyseia.org

Clean Power Estimator: www.consumerenergycenter.org/renewables/estimator

Find Solar: www.findsolar.com

Energy Star Federal Tax Credits: www.energystar.gov/tax credits.

Tax Incentives Assistance Project (TIAP): www.energytaxincentives.org

American Solar Energy Society (ASES): www.ases.org

Energy Efficiency & Renewable Energy Clearinghouse (EREC): eetd.lbl.gov/newsletter/CBS_NL/nl6/Sources.html

Federal Energy Regulatory Commission (FERC): www.ferc.gov

National Association of Energy Service Co. (NAESCO): www.naesco.org

National Renewable Energy Laboratory (NREL): www.nrel.gov

www.susdesign.com/tools.php Online info for solar benefit with house design. i.e. window overhangs, sun angle & path…

NFRC independent rating & labeling system for the windows, doors, skylights **www.nfrc.org**/

NH Office of Energy and Planning: www.nh.gov/oep/programs/energy/RenewableEnergyIncentives.htm

Energy Efficiency & R/E Clearinghouse (EREC): eetd.lbl.gov/newsletter/CBS_NL/nl6/Sources.html

Federal Energy Regulatory Commission(FERC): www.ferc.gov

Solar Living Source Book: www.realgoods.com

Home Power Magazine: www.homepower.com

Solar Components: www.solar-components.com

Backwoods Solar: Specialty: solar, off-grid - **www.backwoodssolar.com**

Solar Systems: NEsolar.com

National Solar Institute: www.nationalsolarinstitute.com

NeighborWorks® Alliance of Vermont: Low-cost energy loans - **www.vthomeownership.org**

Energy Guide: Unbiased advice about today's energy choices. Find ways to save, lower your bills & help the earth's environment - **www.energyguide.com**

Home Energy Saver: Interactive site to help you identify & calculate energy savings opportunities in your home. A lot of great information! - **hes.lbl.gov**

American Council for an Energy-Efficient Economy: Consumer guide to home energy savings - **aceee.org/consumer**

VT Energy Investment Corporation (VEIC): nonprofit organization that issues home energy ratings for new & existing homes. 800-639-6069 - **www.veic.org**

SmartPower: www.smartpower.org

Greywater Info: www.oasisdesign.net/greywater

Weatherization, Energy Star & Refrigerator Guide: www.waptac.org

Buildings Energy Data Book: buildingsdatabook.eren.doe.gov

The Office of Energy Efficiency & Renewable Energy (EERE): develops & deploys efficient & clean energy technologies that meet our nation's energy needs - **www.eere.energy.gov**

VPIRG: understand the clean energy resources available to VT - **www.vpirg.org/cleanenergyguide**

Track the Stimulus Money: www.recovery.gov/Pages/home.aspx

Dept. Public Svc. (CEDF): publicservice.VT.gov/energy/ee_cleanenergyfund.html

Renewable Energy World: www.renewableenergyworld.com

Renewable Energy VT: www.REVermont .org

The Energy Grid: www.pvwatts.org

350-Vermont: General group that coordinates a variety of statewide actions.
To join this group go to: **groups.google.com/group/350-Vermont**

Vermont Tar Sands Action: Group working to stop the XL Pipeline and any other developments stemming from the Alberta Tar Sands.
To join this group go to: **groups.google.com/group/vt-tar-sands-action**

Fossil Fuel Freedom: Group working to make Vermont's energy plan 100% free of fossil fuels:
To join this group go to: **groups.google.com/group/fossil-fuel-freedom-**

Consumer Guide to Home Energy Savings, Heating, Appliances, Refrigerator Guide, Building Envelope, Driving: http://aceee.org/consumer

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GUIDE TO ADVERTISERS:

COMPOST AGAINST CLIMATE CHANGE IN YOUR GARDEN

By Clare Innes

Record heat, record rainfall; droughts, floods; new invasive species, a bumper-crop of garden-eating bugs. Sound familiar? Welcome to the climate change era in Vermont.

With a little compost and elbow grease, you can fortify your soil to help your lawn and garden plants withstand the weather extremes that have become the new norm.

What's so great about compost? It's packed with everything plants need to thrive. Add compost to your soil and, in return, compost heaps on the benefits.

Real Compost - Photo by Kessner Photography

Unlike many synthetic fertilizers, high quality compost integrates slow-release nutrients as well as living microbes into your soil. Nutrients include nitrogen, phosphorous, and potassium, as well as micronutrients such as manganese, copper, iron, and zinc, which play an important role in your plants' ability to extract additional nutrients from the soil.

You can't see the critters who do all the work to break down food scraps and yard debris into compost, but just one handful of high quality compost contains more microbial life than there are people on the planet. This complex web of microbiology enables efficient nutrient uptake by plants and helps them out-compete potentially harmful bacteria, fungi and other critters. Compost can literally bring depleted or damaged soil back to life, resulting in strong root systems and happy plants.

Many of these hardworking micro-critters live on in your soil after you have added compost, taking up residence in your plants' roots to help transfer compost nutrients directly to the plants. This means that those nutrients won't wash away into our waterways and contribute to algae blooms in ponds and lakes

Compost's benefits extend far beyond essential nutrition. It also adds structural elements to enhance your soil's water-holding, drainage, and air filtration capacity. Good soil structure depends almost entirely on organic material to hold it all together. Compost's spongy crumbs of humus and fine fungal strands are tailor-made for this job. When it rains, compost-enhanced soils will absorb enough water to keep plants healthy until the next rain. When it pours, those same soils need to keep that water moving so enough air reaches the roots to keep your plants from suffocating. That's a complicated balance that most soils can't achieve without a little microbial and structural boost.

Many people till 1 to 3 inches of compost into the first six inches of soil in existing gardens in the fall when putting their gardens to bed for the season, or in the spring before planting. Sprinkle ¼ to ½ inch onto existing lawns and flower beds. When building new gardens, use a ratio of 1 part compost to 2 parts regular soil. Here's a handy equation to help you figure out how much you'll need:

Area (square feet) x Depth (in inches) x 0.0031 = amount of compost needed (in cubic yards)

So let the rains fall, the sun bake and the cold winds blow. Come what may, compost will give your garden the structure and diversity it needs to fend off whatever the seasons bring now and for generations to come.

If you have any questions, check out the CSWD website at cswd.net.

Clare Innes is the Marketing Coordinator, Chittenden Solid Waste District. E-mail: info@cswd.net, Hotline: 872-8111.

CARPETS, CHEMICALS ...OPTIONS?

Modern day carpets, in all their plush and stain-resistant glory, are wonders of technology and help make our homes and workplaces more comfortable. But the typical carpet, made from petroleum-based synthetic fibers, contains dozens of chemicals and gases, including volatile organic compounds (VOCs) and other potential toxins—and they can compromise indoor air quality for years on end and cause dangerous reactions in the sensitive among us, including little ones and the elderly. Fortunately today there are many green options when it comes to carpeting and alternative floor coverings. Green Depot—the nation's leading supplier of environmentally friendly building products, services and home solutions with 13 retail stores nationwide—sells a lot of wool carpeting, which is typically all-natural, renewable and is the most logical option for those who want the look and feel of real carpet without the chemical impact. Wool carpeting is pricier than synthetic, but those seeking peace-of-mind might not mind paying a premium. Some leading makers of all-natural wool carpeting include Bloomsburg, Earth Weave, Helios, Natural Home and Woolshire. Wool is also a great material for rug pads, as it dampens sound, inhibits mold and provides insulation. Green Depot's favorite is Whisper Wool Underlayment. Some other choices in all-natural carpet include sisal, coir and seagrass—though these all-natural materials tend to be harder than traditional carpeting and as such might take some getting used to underfoot. Contempo Floor Coverings is one of the leaders in this up-and-coming segment of the flooring industry. Another green option is carpet tiles, because small sections rather than entire carpets can be replaced when stains or other problems occur. One particularly green carpet tile manufacturer is FLOR, whose products are made with renewable, recycled and recyclable content. The company also takes back its old carpet tiles for recycling and reconstitution into new recycled fibers and backing materials. FLOR's products use some synthetic materials, but most styles meet or exceed the Carpet and Rug Institute's "Green Label Plus" standards for low VOCs. Greenfloors.com offers yet another option for synthetic carpeting made from recycled and recyclable materials, while Mohawk's Aladdin carpet is made from recycled PET soda bottles. While carpeting in one form or another is no doubt the softest option, cork flooring is also warm and somewhat cushy. Cork is inherently green because it's made from the bark of the cork oak tree which grows back every three years with little to no fertilizer or pesticides needed. It's also resistant to mildews, molds and other unwelcome microbes. Cork flooring is also a nice choice to "warm up" kitchen and bathroom floors. U.S. Floors offers a wide variety of cork and other sustainable flooring options. Of course, keeping tidy is also key to a healthy indoor environment: Frequent vacuuming of rugs and cleaning of flooring can help reduce exposure to toxins like lead and pesticides that can be tracked in from outside. Using doormats and removing shoes when coming inside can also help mitigate such risks. Contacts: Green Depot, www.greendepot.com; FLOR, www.flor.com; The Carpet and Rug Institute, www.carpet-rug.org; Greenfloors.com, www.greenfloors.com; U.S. Floors, www.usfloorsllc.com.

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Interiors green Shots!
THE HOME AND LIVING STORE

NON-TOXIC CARPET CLEANERS

By Jessica Goldblatt Barber

Non-toxic alternatives to commercial carpet cleaners can help reduce indoor air pollution, and create a safer environment, especially for those in close contact with the floor, such as children and pets. Effective and affordable carpet cleaning products can be made from just a few common kitchen ingredients.

First, why are many traditional carpet cleaners bad for us? Carpet cleaning products use chemicals similar to those used by commercial dry cleaners. Some of the ingredients found in commercial carpet cleaners include formaldehyde, pesticides, acids, disinfectants, lye (sodium hydroxide), ammonia, chlorine. These chemical solvents and detergents dissolve dirt without soap and water, but give off strong and harmful vapors, creating indoor air pollution that can cause headaches, sneezing, irritation to nose, lungs and eyes, asthma attacks, coughing, congestion, fatigue and are hazardous to the health of humans and pets.

Here are some alternatives!

Powdered Cleaners: Baking soda naturally absorbs odors and moisture from the carpet, making it an affordable and easy-to-use non-toxic carpet cleaner. To remove greasy stains, sprinkle baking soda, corn starch or corn meal across the carpet and let it sit for at least 30 minutes before vacuuming. To counteract odors, add crumbled bay leaves, ground cloves or a few drops of lavender essential oil to the mixture.

Liquid Cleaners: To disinfect and remove light stains, spray the area with a solution of equal parts white vinegar and water, allowing the mixture to sit several minutes before rinsing with warm water and non-toxic castile soap, or any other all-natural, vegetable oil-based soap. Full-strength club soda removes red wine stains from carpet if treated early, before the stain has a chance to set. Create a non-toxic cleaner by combining baking soda, water and castile soap. As a non-toxic alternative to commercial aerosol carpet cleaners, mix 1/4 tablespoon of castile soap with 3 tablespoons of water. Whip the mixture, gently rub it into the stain with a brush and then rinse with warm water.

Steam Cleaners: Even plain water, when used in a steam cleaner, can thoroughly clean any carpet. These specialized vacuums use heated and pressurized vapor to sterilize and reach deeply into carpet fibers. Pour a mixture of equal parts water and vinegar into the cleaner's reservoir. For tougher stains, use more vinegar, but test the solution on a small area first to make sure it will not discolor the carpet. Use the steam cleaner as directed by the manufacturer's instructions. When dry, the vinegar smell will disappear. If any odors linger, sprinkle some baking soda over the carpet, let it sit for a few hours, and then vacuum.

Homemade Carpet Cleaning Foam: Mix 1/4 tbsp. vegetable oil-based soap with three tbsp of water and whip with an eggbeater to make a nontoxic alternative to the aerosol carpet cleaning foams. Most grocery and drug stores will have at least one brand of vegetable-based soap. This cleaner can be used in the same manner as the commercial foam; just apply to the stain with a brush, let it set for about five minutes, gently rub the stain with a cloth, and then rinse well with water.

Homemade Steam Cleaner Solution: Fill your steam cleaner with the recommended amount of water and then add a scoop of OxiClean and one cup of vinegar. This will clean and deodorize your carpets.

General Stain Removal: For carpet stains, a 50/50 solution of white vinegar and water mixed together in a spray bottle can be used after blotting a stain. After spraying onto the carpet, let the solution set for about five minutes before blotting the carpet again. Club soda is an old remedy for removing wine stains from the carpet; poured on full strength and blotted with a towel, it will lift most stains before they have a chance to set.

A growing number of commercial non-toxic home cleaning products are also available, as more healthful and environmentally responsible alternatives. Your use of these products helps promote the growth of green businesses which are contributing to a sustainable economy.

Jessica Goldblatt Barber is the owner of Interiors Green, in Bethlehem NH. www.interiorsgreen.com

TIPS FOR KEEPING MY DOGS AND CATS HEALTHY

Believe it or not, our pets may be exposed to more harsh chemicals through the course of their day than we are. Researchers at the non-profit Environmental Working Group (EWG) found that pet dogs and cats were contaminated with 48 of 70 industrial chemicals tested, including 43 chemicals at levels higher than those typically found in people. "Just as children ingest pollutants in tap water, play on lawns with pesticide residues or breathe in an array of indoor air contaminants, so do their pets," reports EWG. Since they develop and age seven or more times faster than children, pets also develop health problems from exposures much faster, EWG adds.

Pets ingest pollutants and pesticide residues and breathe in an array of indoor air contaminants just like children do -- and since they develop and age seven or more times faster than children, pets develop health problems from exposures much faster. Photo: Hemera Collection

"Average levels of many chemicals were substantially higher in pets than is typical for people, with 2.4 times higher levels of stain- and grease-proof coatings (perfluorochemicals) in dogs, 23 times more fire retardants (PBDEs) in cats, and more than five times the amounts of mercury, compared to average levels in people," reports the group. Their 2008 study looked at plastics and food packaging chemicals, heavy metals, fire retardants and stain-proofing chemicals in pooled samples of blood and urine from 20 dogs and 37 cats tested at a Virginia veterinary clinic. "For dogs, blood and urine samples were contaminated with 35 chemicals altogether, including 11 carcinogens, 31 chemicals toxic to the reproductive system, and 24 neurotoxins," adds EWG. This is particularly alarming given that man's best friend is known to have much higher cancer rates than humans. A 2008 Texas A&M Veterinary Medical Center study found that dogs have 35 times more skin cancer, four times

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Organic Foods, Clothing, Products, & Organic Agriculture

Organic production may still represent only a small fraction of agricultural sales in the U.S. and worldwide, but it as been growing rapidly over the last two decades. According to the latest global census of farming practices, the area of land certified as organic makes up less than one percent of global agricultural land—but it has grown more than threefold since 1999, with upwards of 37 million hectares of land worldwide now under organic cultivation. The Organic Trade Association forecasts steady growth of nine percent or more annually for organic agriculture in the foreseeable future.

Credit: iStockPhoto

Changing perceptions about just how much healthier organic foods are than non-organic foods are impacting the growth of the sector. But even if the personal health benefits of eating organic aren't significant or clear, the environmental advantages of organic agriculture still make the practice well worth supporting.

But despite this growth, no one expects organic agriculture to top conventional techniques any time soon. The biggest hurdle for organics is the added cost of sustainable practices. "The cost of organic food is higher than that of conventional food because the organic price tag more closely reflects the true cost of growing the food," reports the Organic Farming Research Foundation (OFRF). "The intensive management and labor used in organic production are frequently (though not always) more expensive than the chemicals routinely used on conventional farms." However, there is evidence that if the indirect costs of conventional food production—such as the impact on public health of chemicals released into our air and water—were factored in, non-organic foods would cost the same or as much as organic foods.

Other problems for organic foods include changing perceptions about just how much healthier they are than non-organics. "Many devotees of organic foods purchase them in order to avoid exposure to harmful levels of pesticides," writes Henry I. Miller in Forbes. "But that's a poor rationale: Non-organic fruits and vegetables had more pesticide residue, to be sure, but more than 99 percent of the time the levels were below the permissible, very conservative safety limits set by regulators—limits that are established by the Environmental Protection Agency and enforced by the Food and Drug Administration."

He adds that just because a farm is organic doesn't mean the food it produces will be free of potentially toxic elements. While organic standards may preclude the use of synthetic inputs, organic farms often utilize so-called "natural" pesticides and what Miller calls "pathogen-laden animal excreta as fertilizer" that can also end up making consumers sick and have been linked to cancers and other serious illnesses (like their synthetic counterparts). Miller believes that as more consumers become aware of these problems, the percentage of the agriculture market taken up by organics will begin to shrink.

Another challenge facing the organic sector is a shortage of organic raw materials such as grain, sugar and livestock feed. Without a steady supply of these basics, organic farmers can't harvest enough products to make their businesses viable. Meanwhile, competition from food marketed as "locally grown" or "natural" is also cutting into organic's slice of the overall agriculture pie.

Organic agriculture is sure to keep growing for years to come. And even if the health benefits of eating organic aren't significant, the environmental advantages of organic agriculture—which are, of course, also public health advantages—make the practice well worth supporting.

Contacts: Organic Trade Association, www.ota.com; OFRF, www.ofrf.org.

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MOSQUITO-BORNE DISEASES

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at anytime. Likewise, Rift Valley fever, which brings with it fever, muscle pain, dizziness, vision loss and even encephalitis, was limited to Kenya only a decade ago but today has spread across the entire African continent and is expected to make an appearance in Europe and the U.S. soon.

While researchers are hard at work to find vaccines against these diseases, concerned Americans can take some basic precautions to minimize their chances of getting mosquito bites. Keep screens on all the windows and doors in the house that can open. Outside, wear long pants and long sleeved shirts when possible and cover up with an insect repellent—the U.S. Environmental Protection Agency (EPA) says only those formulations containing the chemical DEET have been proven effective but there are plenty of all natural alternatives out there. In the meantime, our best defense against these diseases may be keeping our carbon footprints down, as the less global warming we cause, the less we'll have to deal with an onslaught of tropical mosquito-borne diseases.

Contacts: Maria Ana Diuk-Wasser PhD, publichealth.yale.edu/people/maria_diuk-3.profile; CDC Mosquito-Borne Diseases, www.cdc.gov/ncidod/diseases/list_mosquitoborne.htm.

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WHAT'S UP WITH THE WEATHER?

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climate-monitoring/. There, we can track how things are warming up. A chart at the site shows that as of July 30, 2013, only 43.4% of the United States was not experiencing a drought. We might mention a drought monitor site, www.drought.gov/drought/.

Other federal agencies are active. The Pentagon is working on energy security and is one of the biggest investors in renewable energy in the country. The Central Intelligence Agency has issued a report, saying climate change is one of the biggest threats to national security for the 21st century.

Various state agencies have weighed in on the subject as well. Productive web searches include:
Vermont ANR climate change
New Hampshire DES climate change
Massachusetts climate change report
New York DEC climate change
Connecticut DEEP climate change
Rhode Island Climate Change Commission

The governor of Maine vetoed a bill to study climate change for his state.

GREEN ENERGY TIMES FINDS COLLEAGUES WITHIN GREEN ALLIANCE

Green Energy Times has expanded distribution into the New Hampshire coastal region, which has led to also finding like-minded organizations with which we can network and share information and content. We are excited to have found colleagues in the Green Alliance, and look forward to working with them.

By Jim Cavan

Environmental activist and journalist Sarah Brown launched the GA in 2008 to connect green-minded consumers with local businesses committed to sustainability, benefiting both. The GA's first two businesses, Simply Green Biofuels and Purely Organic Lawn Care, seemed to have little in common. Nevertheless, what the two did share served as an inspirational template.

"What the three of us quickly realized was that, even if they touted two totally different products and targeted different customer bases, the commonality of the business' green focus meant the two could effectively cross-promote," recalls Brown. "Once we realized that, it became obvious that getting as many green businesses as possible would result in more customers for everyone involved."

Other high profile businesses soon joined, including the Portsmouth Brewery, Acorn Organic Salon, Cornerstone Tree Care, Bob's Clam Hut, and SEA Solar Store. By 2009, there were 30 partnering businesses. By early 2012, that number nearly tripled, representing a wide variety of businesses – restaurants, construction companies, yoga studios, alternative energy outfits, retailers, nonprofit organizations, and more.

"It's hard to believe that just a few years ago we were all working out of my living room," says Brown. "But at the same time we all felt that the Seacoast was one of those unique regions that would be receptive to this kind of creative collaboration between businesses and the community, and luckily we've been proven right so far."

Brown says that increasing their consumer base remains the biggest challenge. Members pay $35 a year for a "green card," to get discounts at all 100 businesses. The price of the green card can be quickly recovered in the discounts.

The GA's dynamic is mutually reinforcing. The more businesses join, the more opportunities appear for consumer members to save; the more consumers sign up, the more incentive there is for prospective businesses to join. End result, again, is a simpler path towards a sustainable future.

A key strategy has been emphasis on a broad base of sustainable businesses. This includes businesses some consumers do not connect with environmentalism. They can understand green aspects of a solar energy company or a restaurant specializing in local food, but might wonder about how companies like Portsmouth Atlantic Insurance and Newmarket Dental could be considered green.

Newmarket Dental's Nathan Swanson says his business is saving over $20,000 a year on marketing and advertising through GA membership. He adds that he sees new Green Cards every month; new customers stay on partly because of discounts and partly because they understand the GA partners are a commitment to sustainability.

Brian Yurick, owner of Home Town Technology Consultants, the GA's 100th Business Partner, says part of the appeal of joining was a shared small business perspective. He says "They're like my own personal PR firm and local advocate, and to the extent that I try to bring that same level of trust and service to my clients, I know I made the right choice to join."

The Green Alliance Team: Tricia Dinkel, Jim Cavan, Becky Holt and Sarah Brown, founder of Green Alliance.

"We're definitely proud," says Brown. "But we're already thinking about that next Business Partner, those next dozen consumer members – that critical mass that will help take green commerce to the next level here on the Seacoast."

To learn more visit www.greenalliance.biz

HANNAFORD SUPPORTS ENERGY EFFICIENCY AND SOLAR

NEW STORE IN BRADFORD, VT OPENS

Hannaford Supermarkets is indeed taking some great responsibility for their footprint on the planet. But, please continue to also support your local Farmer's Markets, organized by your neighbors who offer the freshest picked or packed around! They also help to reduce the wasted packaging necessary for larger companies.

Bradford, VT -- Hannaford's newest supermarket. Photo credit: D. Averill

Staff Article

Hannaford Supermarkets began doing business in 1883 as a fruit and vegetable cart in Portland Maine, and have grown to over 180 stores in New England and upstate New York. Fifty of these are in Vermont and New Hampshire. It is not just about business and numbers, however. They started supporting the United Way in 1929, and have acted positively for their communities ever since.

Hannaford's new Bradford, Vermont store replaces an older one and increased the size from 13,000 square feet to 35,000. The staff increased from 48 to 85. Nevertheless, it is still not just about the business and numbers. The Bradford a store makes a green statement.

The chain developed its environmental approach based on a LEED Platinum certified prototype store on Cony Street in Augusta, Maine, with such features as a 41kW solar array -- the largest in Maine at the time. Building the store to a high level of performance, and operating it over the course of some years, the company came to understand what environmental measures represented the most effective use of their investment.

This approach is being extended to other stores, with a view to getting LEED certification wherever possible. A large number of measures taken in Augusta are being put into additional stores, as well. Measures such as the solar PV array on the roof in Augusta, are being incorporated where it makes practical sense to do so, such as the 25kW solar array in Williston, Vermont.

Incorporated in the new store included using waste heat from the refrigerating system to help heat the store, advanced water systems for rest rooms and storm drainage, efficient lighting, advanced refrigeration with doors for efficiency, reflective roofing material, use of local materials where possible, VOC-free paint, iceless seafood cases, more sustainable in-store packaging, and others. The aim was to achieve the impressive LEED Bronze certification.

One important thing for the local communities is that Hannaford tries consistently to support local independent producers. One program is to give local producers a special Close to Home status. A producer who is able to provide multiple outlets with sufficient quantities of their goods on a consistent basis can enter into a relationship with the chain, though there are a few qualifications that need to be met. Customers who want specific locally produced farm goods can ask a store to carry them, however, and the local managers can do business directly with local farms.

Doors on cases help with energy efficiency. Note sign (inset) with an energy tip

Green Tips

By Deborah DeMoulpied, Bona Fide Green Goods

Preserving Your Harvest - Safely

It's harvest time…yeah! But unfortunately… all at once. What do you do with 35 zucchini, 4 bushels of green beans, 8 pounds of broccoli, 12 quarts of blueberries, or more food than you can possible eat? You "put them up" of course.

Putting up or processing food is a way to preserve the food for future use. Canning (it's really in jars) is popular but freezing and drying are also good methods. This is all well and good, but it's time to take a look at what that food is actually contained in during that long time on the shelf or in the freezer. Is it safe?

Let's start with canning. Glass is best and no problem to find. It's the lids that continue to be a problem. All metals lids (not the old ones lined with real ceramic) are lined with some kind of plastic, most of them with BPA (or BPA substitute) in various amounts. A few of the companies will not disclose the ingredients which presents nothing less than a red flag. Recent research repeatedly finds that all plastic leaches some kind of endocrine disrupting chemical despite being BPA free. In a few words…there is no safe plastic. So even if your lid claims to be BPA free, unless it is ceramic or glass, it doesn't mean it is safe.

Is the lid a big deal? After all, the food does not touch it, right? Au contraire… the food splashes up on the lid at high temperatures during the canning process. Is this really a big deal? We don't know. To date, there are no studies on BPA levels in home canning. We do know there is plenty of BPA in canned foods but that is food that has been sitting in the lined can. Everyone has to decide their own risk-comfort level.

Freezing food is more of a concern since so much of it is in plastic bags or plastic containers. There are some good sturdy glass containers but the food is often susceptible to freezer burn. Most people use the sturdy zip lock freezer bags. Granted these bags are not pvc plastic and probably not loaded with phthalates but based on plastic research, they all will leach endocrine disrupting chemicals to some degree. The general rule of thumb is, the more clingy or pliable the plastic is, the more toxins it contains.

Drying foods is another preserving method worth talking about. Besides the old fashioned hang and dry method, most people use a dehydrator. Most dehydrators are plastic and most of that plastic is BPA. However, there are stainless steel and wood framed non-electric dehydrators are the market as the perfect alternative. (Note from editor: "I use the non electric version and cover it lightly with a cotton cloth and let the sun and wind do yet another great job").

It seems then the biggest concern remains the plastic issue. Since all plastic leaches, albeit some in small amounts, should we be so concerned? Research continues to emerge that the smaller amounts of endocrine disrupting chemicals create more hormonal disruption than larger amounts. So yes, there is potential for harm. But we just don't know. We do know that these amounts causing harm are well below the level the EPA and FDA have set as safe standards. The precautionary principle may be in everyone's best interest.

Here are some things to consider for safer food preserving methods:

1. Use glass jars, old glass lids (or new ones by Weck) and rubber rings
2. Freeze food in glass containers. Place containers in a reused plastic bag to prevent freezer burn.
3. Line freezer bags or containers with parchment paper. Since parchment is coated with silicon (which is safe) the food won't be touching the plastic.
4. Dry foods in a stainless steel or wood-framed dehydrator thereby avoiding plastic contact.

Deborah deMoulpied is owner/founder of Bona Fide Green Goods, an earth friendly department store in Concord, NH. Bonafidegreengoods.com won a Webby Awards Green Honoree in 2011. Deborah is also faculty of the Anticancer Lifestyle Program, teaching patients about environmental toxins and healthier solutions.

TIPS FOR KEEPING MY DOGS AND CATS HEALTHY

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more breast tumors, eight times more bone cancer, and two times more leukemia per capita as humans. And according to researchers from Purdue University, cancer is the second leading cause of death for dogs, with about one in four canines succumbing to some form of the disease. Meanwhile, hyperthyroidism—a condition which many think is on the rise in felines due to chemical exposures—is already a leading cause of illness for older cats.

In its Pets for the Environment website, EWG lists dozens of ways for pet owners to ensure that dogs and cats are as safe as possible in this dangerous world we inhabit. Among other tips, EWG recommends choosing pet food without chemical preservatives such as BHA, BHT or ethoxyquin, and looking for organic or free-range ingredients rather than by-products. As for drinking water, EWG suggests running tap water through a reverse osmosis filter—either faucet-mounted or pitcher-based—before it goes into a pet's bowl to remove common contaminants. Also, replacing old bedding or furniture, especially if it has exposed foam, can prevent pets from ingesting fire retardants. From avoiding non-stick pans and garden pesticides to choosing greener kitty litter and decking material, the list of tips goes on. Taking steps to ensure a safer environment for pets—some 63 percent of U.S. homes have at least one—will mean a safer world for humans, too. EWG concludes that our pets "well may be serving as sentinels for our own health, as they breathe in, ingest or absorb the same chemicals that are in our environments." Contact: EWG Pets for the Environment, www.ewg.org/PetsfortheEnvironment

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"Unless we 'Save Our Planet Now' … Nothing else we do … No matter how wonderful … matters."

-- Peter H. Bauer, Solutions for The Environment