ISSUE 11 DECEMBER 15, 2011 - FEBRUARY 15, 2012

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DOUBLE DUTY WIND IS INCREASING VERMONT'S CLEAN ENERGY

Burke's new Wind Turbine

Photo taken from the top of Burke Mountain, where their new turbine spins, looking at the Sheffield Wind Farm.

Photos: Herb Swanson/SWANPIX

By N. R. Mallery

On Wednesday, October 26, Vermont celebrated a banner day in advancing clean, sustainable, local energy production by marking the completed construction of two wind power projects.

First Wind commissioned Sheffield Wind, a 40 megawatt (MW) wind facility, which will produce enough electricity for the whole of Caledonia County. In nearby East Burke, Burke Mountain Ski Area celebrated its new wind turbine, manufactured by Barre-based Northern Power Systems. The Northwind 100 turbine at Burke is expected to produce close to 20% of the ski resort's power needs. (More about Burke Mountain on page 18)

> "We had an obligation to make Wind meet the highest standards in the country today."

Vermont Governor Peter Shumlin spoke at both ribbon cutting events. He started his speech with "Get off of our addiction to oil", and went on to say that Vermont has had a long history of leading the nation, starting with abolishing slavery and the first women's right to vote. "Clearly Vermont is a leader." Shumlin commended the efforts of these environmentally conscious advances which are helping the state to secure a clean energy future.

Paul Gaynor, First Wind CEO, who had introduced Gov. Shumlin, stated that they invested over $100 Million from start to finish on this project, due to the extra measures that were taken due to the opposition at every turn. He posed the question "Why did we take this risk?" We had an obligation to try to make Wind meet the highest standards in the country today. The people made it happen and today we are assured that all the power produced is sold to Vermont.

The 27 acre site is the most environmentally engineered of any Wind Farm that has been undertaken in the US. Beyond producing clean energy, the Sheffield Wind project has also undertaken several cutting-edge environmental mitigation and conservation measures that surpass even the most stringent industry standards. One of these measures is an intricate

Cont. on page 14

DEEP ENERGY RETROFIT IN E. CALAIS VT

Sunnybrook Farms

Project Goal: No fossil fuel, re/use materials from site, use local natural materials, heat with less than 1 chord of wood, keep traditional feel of farmhouse with new touch.

Scope of Work: Major Gut and rehab. - Disassemble 1/2 of barn and stabilize the other 1/2 – permacultural landscape

Distinctive Green Building Strategies: retrofit high performance envelope with cellulose-

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GLOBAL WARMING WILL BE IRREVERSIBLE BY 2017, WARNS ENERGY AGENCY

Dangerous levels of global warming will be irreversible by 2017, the International Energy Agency (IEA) warned Wednesday. Only immediate restructuring of the world's energy use will prevent climate change becoming permanent, the agency said.

Jessica Phelan November 9, 2011

Based on current rates of carbon dioxide emissions and fossil fuel use, the Earth's temperature is set to increase in the long term by more than 6º Celsius, the IEA warned in its World Energy Outlook 2011.

The maximum "safe" increase, according to most scientists, is 2º Celsius. Above this point, climate change becomes "catastrophic and irreversible," according to the Guardian. If the world is to limit global warming to 2º, it would have to begin permanently decreasing

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GREEN ENERGY TIMES (G.E.T.)

1749 Wright's Mountain Road • Bradford, VT 05033

t/f: 802.439.6675 info@greenenergytimes.org

Publisher/Editor/Production ..... Nancy Rae Mallery

Web Editor ..... Nancy Rae Mallery

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Advertising ..... David Stember, Burlington, VT **802.540.0379** david@greenenergytimes.org

.....Katherine Leversee, Keene, NH **603.721.6129** kate@greenenergytimes.org

..... Lauren LoSchiavo, Woodsville, NH **603.747.3839** lauren@greenenergytimes.org

..... Nancy Rae Mallery, Bradford, VT **802.439.6675**

Paul Fixx - E. Hardwick, VT **802-441-4599** paul@greenenergytimes.org

..... Rick Martin, Perkinsville, VT **802.263.5803** rick@greenenergytimes.org

..... Vicki Moore, Danville, VT **802.748.2655** vicki@greenenergytimes.org

Distribution Lauren LoSchiavo, Marty Philbrick, Bill Pearson, Alycia Moore, Cintia Morrissey, Dwayne Cormier, George Plumb, Kate Leversee, Paul Fixx, David Stember, Jessica Goldblatt, Deborah DeMouldpied

Thank you all for your help!

ABOUT G.E.T.

Green Energy Times is powered by 100% solar, off-grid with a 3.8 kW PV system. We live and know that Energy Independence is indeed possible - with clean, sustainable renewable energy.

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! Believe in this earth!

Solar Power works! … anywhere! under the sun!

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G.E.T. wants 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. Send your comments & suggestions to: info@greenenergytimes.org.

We want to hear what you are doing to make a difference!
Together we can all transition into a better brighter future for ourselves and the planet. ***Peace!***

Letters to the Editor

October 23, 2011

RE: DIY in Plainfield, VT 10.15.11 Issue of Green Energy Times
Hi Nancy,

I picked up a copy of GET while stopped for gas in White River Jct this morning.

Another great issue....

Thank you for publishing the article about our systems in Plainfield. I hope they will inspire other DIY projects.

My address, phone, and email address were not listed in the article. Feel free to give that information to anyone that inquires.

I am always happy to talk with anyone about the systems and the process of building them. I am not "in the business" of consulting and I don't charge anything for conversation.

Ed Hutchinson, 2053 East Hill Rd, Plainfield, VT 05667 ph 802 454-1131

November 18, 2011

Hi Nancy,

After almost a year of getting ignored by DPW (Direct Power and Water) not to be confused with the local, and highly respected, IPW installer. DPW is the manufacturer of my solar array pole mounts, I sent them a link to the article you published with my complaint about their product highlighted in the blue patch.

Since then they have agreed to help make the arrays perform better. We are still discussing the actual design changes, but they have agreed to several possibilities and will send the materials at no additional cost to me.

Thank you. The power of the independent press is confirmed.
Ed Hutchinson

Nov. 9, 2011

Dear editor, "I should let you know that we've received several phone calls from readers who said they saw our ad in the Green Energy Times. I've even received phone calls as far away as Minnesota from someone who manufactured solar panels. He was in the area visiting family and read the paper and called us when he got home, so their news spreads further than you might expect."

- Kim Sager, ARC Mechanical, Bradford, VT

PRESS RELEASE

G.E.T. 'GETS' 2 NEW ACCOUNT EXECUTIVES

Green Energy Times would like to announce the hiring of two new Account Executives.

Lauren LoSchiavo from Woodsville, New Hampshire will be covering the greater Upper Valley territories including Littleton, Plymouth, Hanover, NH, White River Junction on up to Wells River, Vt. She comes from a strong background in international sales and traveled extensively throughout Europe and South America attending trade shows and supporting client accounts. Additionally, she has many years of Executive Administrative experience. Lauren attended Hesser College in Manchester, New Hampshire. She moved back to the United States from Central America (Costa Rica) in 2010.

Rick Martin joins us from Perkinsville, Vermont. He will be covering all major counties in and around Rutland, Manchester, and Woodstock on down to Bennington, VT, Windsor, Claremont, NH, and areas in between. Rick is not new to the world of media production and customer relations. He has worked in the graphic design and publication industry and has a great deal of experience maintaining and developing new and existing accounts. Rick has previously held positions with such companies as Springfield Printing Corporation and Eagle Publications.

We welcome them to our staff and and we feel confident with their abilities to help you and to also help to move our region in the right direction for the clean energy future of Vermont and New Hampshire.

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Energy Awareness, Understanding & Independence!

David Blitterdorf's

VIEW FROM THE TOP

'I Don't Wanna See It!'

The debate over the aesthetics of renewables is one that I have avoided stepping into until now, because I believe that aesthetics are a matter of taste, and are therefore not a factor that should affect the much-needed update of our electrical infrastructure to rely more on distributed renewable energy. Beauty is famously in the eye of the beholder, but preparing ourselves to live in a world without ready access to fossil fuels or nuclear power is, to me, a "no-brainer." We need to do it. The urgency I feel is the result of peak oil. Either in my lifetime or my children's, as fossil fuels become harder and harder to find, steady supplies of gasoline, natural gas and heating oil will become prohibitively expensive or become disrupted. Our world needs to transition toward a new way of life that does not rely on fossil fuels, and Vermont should serve as a model for how this can be done, through a combination of conservation, efficiency, and a switch to distributed renewable energy.

However, aesthetics have become a bigger and bigger bugbear in the public debate over how to best accomplish this transition – particularly the proper siting of wind energy systems. My concern is that matters of taste are being used to muddle a clear consideration of the scientific data on the merits and capabilities of these technologies, and that people are allowing their personal emotions and desires to cloud their perception of what's important in the long term for the public good.

This was brought home to me recently at a roundtable discussion about wind energy in Vermont that was part of a December 3 conference hosted by the Vermont Energy and Climate Action Network. In this forum it seemed that a clear consideration of long-term public good was not part of the discussion, for the simple reason that "aesthetics" seemed to mean "my experience, my view, my Vermont." I was alarmed to be having a public discussion on the science of renewable energy with adults that whined, pouted and carried on like disappointed kids.

It is great for people to engage and be part of debates on our society's future. It is good and necessary to hear and address the concerns people have on producing renewable energy in our own state. However, everyone participating in such a debate has a duty to educate themselves from objective sources about the way in which we use electricity, and about what is actually feasible in terms of accomplishing this transition. My problem is that we are not having a debate based on factual information. The story that opponents to wind energy in Vermont make up is just that – a story unconnected to reality or facts. Here is their story: "Wind turbines produce hardly any electricity. They destroy the mountains. They destroy wildlife. Humans get sick from wind turbines. Nobody wants them. They do nothing to slow global warming. They don't help us to replace fossil and nuclear fuels. They are too big – put small ones in the valleys instead. Solar will solve everything. Someone else, somewhere else will provide the energy we need. We love and want windpower, just not here."

It has been easy for these narratives to catch hold among those resistant to change and unwilling to dig into the real science, economics and facts behind the technology. The truth: Wind and solar are the largest energy resources we have in our state, and large wind is one-third the cost of solar. The majority of Vermonters have a deep understanding that we have a social and moral responsibility to stop destroying the source of our life – our earth. This is as true for us in the beautiful Green Mountain State as it is for those living amidst the tar sands of Alberta, the shale-gas fracking wells of Pennsylvania, the coast of the Gulf, or the removed mountain tops of West Virginia. Vermonters understand the old ways don't work anymore. They are willing to change and look out on our mountains to see wind energy there, and be proud that Vermont will lead the nation and the world to a sustainable, renewable energy future.

What would our state look like now, and how effective would its infrastructure be, if residents had blocked the installation of electric and telephone lines and gas stations in the early twentieth century? It would undoubtedly be beautiful, but in the way a national park is beautiful – Vermont would lack Vermonters. The only people able to live here would be those vacationers able to view lack of electricity as a temporary boon, a relief from normality, not a day-in, day-out reality. These elements of infrastructure are inarguably man-made, inarguably essential to our way of life, and many would say they are also ugly. However, we don't think about them. We look at our infrastructure and don't even see it. The benefit it brings is taken for granted, as is its existence in our landscape. How can installing wind turbines and solar panels, which harvest natural resources and are capable of being de-installed at the end of a long and productive working life, be considered more ugly or less useful than Vermont's several hundred gas stations? Even towns in the heart of the Green Mountains have power lines, telephone lines, heating oil tanks and gas stations – and each one of the latter holds hundreds of gallons of toxic fossil fuel transported halfway around the world to rest in an underground tank.

The future will be different than the past, and renewable energy installations will be more visible. We will see and live with solar on our roofs and in our yards, wind turbines near our communities and wind farms on our mountains. This is a natural transition updating Vermont's working landscape, which will still remain green and beautiful.

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.

NEW ENERGY CENTER COMING TO VERMONT

BURLINGTON, Vt., Dec. 12 – U.S. Sen. Bernie Sanders and Gov. Peter Shumlin today announced a $15 million, three-year partnership with Sandia National Laboratory to establish a joint Center for Energy Transformation and Innovation to be housed at the University of VT.

"I am very proud to announce that we are bringing a very significant national lab presence to New England, by establishing the Center for Energy Transformation and Innovation right here in Vermont," Sanders said. "It is our goal that this Vermont/Sandia partnership will lead to a long-term national lab presence in Vermont, and that our state and the nation can benefit from the research conducted here for years to come."

"Vermont has served as a national leader on energy - in electric efficiency programs, in small scale renewable generation contracts, in net metering policies, and in implementing smart grid technologies statewide," Shumlin said. "This partnership with Sandia National Laboratories will further Vermont's energy leadership, helping us coordinate and focus efforts to make the smart grid work here in Vermont, so that we can share our successes nationally to help build our 21st century energy infrastructure."

The senator and governor were joined at a press conference by Sandia National Laboratory Vice President Rick Stulen, UVM President John Bramley, and Green Mountain Power Corp. CEO Mary Powell.

Sanders said one focus of the new center will be energy efficiency, a field where Vermont already is a national leader. The center also will work on sustainable energy, economic development and the implementation of so-called smart grid technology that will make Vermont the first state in the nation to provide nearly all energy consumers greater control over their power consumption.

The seed was planted for a Vermont/Sandia partnership during a 2008 trip to the New Mexico research facility by Sanders, a member of the Senate Energy and Natural Resources Committee.

Today there are 17 national labs in the United States (but none in New England) doing cutting-edge research, providing skilled jobs and generating an economic boost for local communities.

The center is a partnership between the state of Vermont, Sandia, UVM and other academic institutions, Vermont utility companies, Efficiency Vermont, and many Vermont green businesses.

In addition to UVM, other academic institutions participating in the project include Vermont Tech, Vermont State Colleges, Norwich University and Vermont Law School.

Participating utilities include Green Mountain Power, Central Vermont Public Service, Vermont Electric Power Co., the Burlington Electric Department, Vermont Electric Cooperative and the Washington Electric Cooperative.

Contact: Michael Briggs (202) 224-5141

IT IS TIME FOR SMART TRANSPORTATION!


Brattleboro, VT

Eco-minded Vermont and New Hampshire citizens can make a difference about the fastest growing greenhouse gas sector—transportation. Many individuals have made personal changes and numerous businesses are taking notice-- and actions to encourage employees to commute more efficiently. Transportation requires attention at all levels, from improving access to Ridesharing to improving the physical environment for walking, biking to schools and jobs.

There are helpful statewide and regional resources and tools to succeed in making a difference in your own community. We have a lot to do, in a short period of time, if we are to meet our future, smartly.

Growing AWARENESS OF PUBLIC TRANSPORTATION– is a critical step to smarter transportation, but also because of the struggle to simply afford to drive, en masse, as single passengers. What you can do? Start an Awareness Campaign, including local bus or van services, bus routes, and the nearest rail stations and park'nride lots. Request a packet of brochures and stickers from GoVermont, bus schedules from your transit providers and go door to door, post information on bulletin boards in schools, p.o., town offices, supermarkets, and network with friends. Use social media.

GoVermont team will help you form a vanpool and fund up to $700/month for groups interested in traveling to work together. Employers save money by this service to our employees"When you figure the cost to build more parking spaces, obtain land use and run-off water permits (and the pipes to divert rain water), snow plowing, maintaining the parking garage or lot, AND the carbon emissions the argument for affordable, convenient, public transportation is clear. Decreased gas expenses, less wear and tear on your vehicle, and with internet access available on many buses, you can catch up on assignments, or just relax.

Many communities are promoting Safe Routes to School, a federal and state supported program encouraging our youth to use more earth-friendly, safer routes to schools. Similar to the seat belt law, we can change the perception of our children's mind, by practicing use and to promote responsible habits. Offer incentives for NOT driving to school,maybe an an allowance equal to the amount of money you will save in gas and parking fees. . Share your progress with others at school functions, meetings, with teachers and parents.

TELECOMMUTING –Work from home, even if it is only a day or two a week. If you are home, you are not driving. Many companies are agreeable.If you have the tools necessary to complete your work assignments from home, ask your employer about implementing a Work-From-Home program, encourage your co-workers to join in your efforts.

BICYCLING/WALKING/E-BIKES - Middlebury & Brattleboro, Vt have made huge advances with their efforts as "Bike Friendly Towns." Remember to involve your local police department, public works department, town planning board, and other town officials. They can provide helpful information including where existing and planned bike paths are.

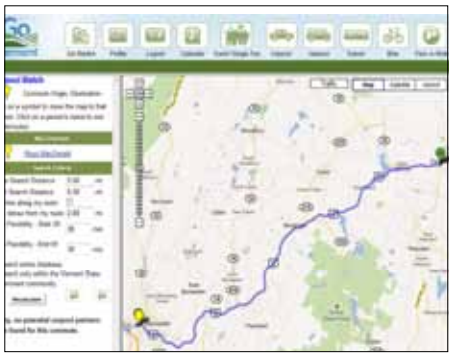
Ask for volunteer efforts by town officials to assist in clearing the initial paths, planning additional bike routes and mapping existing ones. Engage local shops for support in a campaign that will promote bicycle safety, use, and awareness.

RIDE SHARE PROGRAM/CAR POOLING – All along the major transportation corridors of New England, you will see "Park & Rides"... Everywhere you go, at almost any time of the day or night, someone else is going there too!

Your one- stop- shop to ridesharing and starting a vanpool, and to learn about how to commute smart is at www.connectingcommuters.org: It is easy to find helpful hints, links to park and ride locations, get a ride match and to track your efficient commute online in the calendar. This State of Vermont sponsored program is helping Vermonters will save money and stay in their jobs. Be Proactive! Way To Go campaign offers support, incentives and an awareness to use more earth-friendly and affordable methods of transportation. Find others where you work or play. You cannot be the only one who is traveling—to any destination.

Upper Valley Rideshare (UVRS) offers Upper Valley region commuters instant, on-line, bi-state carpool matching at www.uppervalleyrideshare.com.

We all need to lower our emissions, decrease our dependency on fossil fuels, and become energy independent, if we are to call this planet home. Remain positive despite the warnings. If there is time, there is hope. With a "Yes We Can" attitude about major behavioral changes, such as the ones mentioned in this article, and implementing clean, energy efficient technology, "Yes We Can Do It."


ConnectingCommuters.org Carpool Match

Community mini-grants of
$500: Ross MacDonald, Go Vermont Program Manager
(802) 828-5577; .macdonald@state.vt.us
Debra Sachs, Business Direct Outreach Coordinator
802 658 8487; dsachs@fando.com
www.connectingcommuters.org
www.waytogovt.org

Other helpful links

http://traversy.typepad.com/my_weblog/retail-sponsors.html
http://www.worldcarfree.net/resources/free.php
http://www.transalt.org/files/resources/blueprint/intro/credits.html
http://www.centreforsustainabletransportation.org/2009/07/revolution-will-be-human-powered.html
http://lehd.did.census.gov/led
http://crs.uvm.edu/census

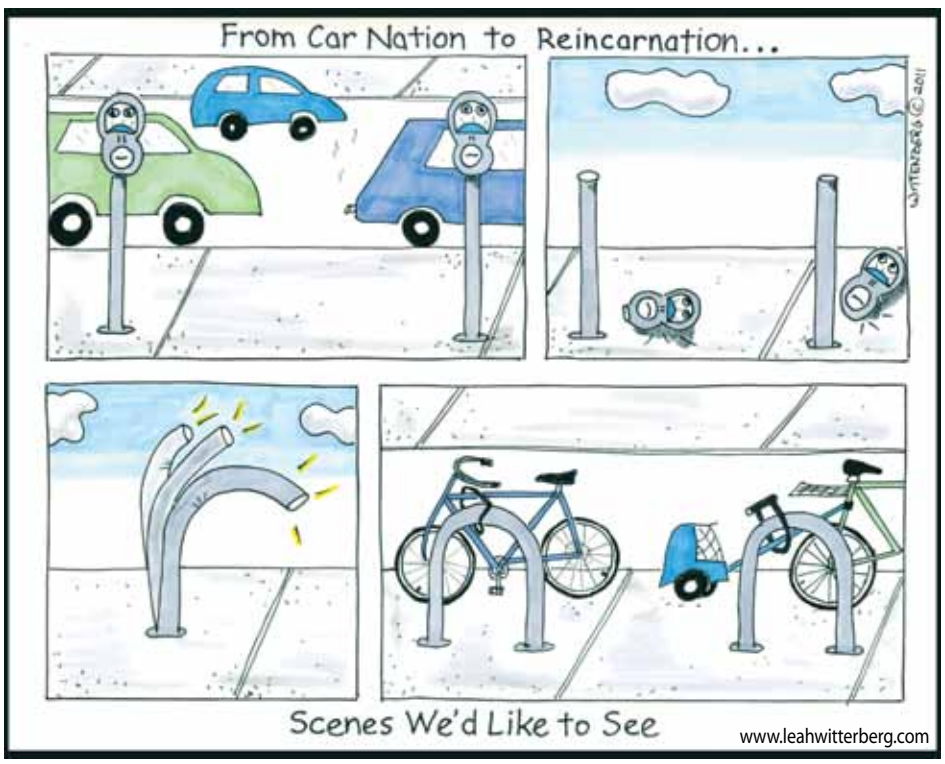
IDLE-FREE VT INC.

IDLING FACTS FROM IDLE-FREE VT

• Excessive idling can actually damage your engine components, including cylinders, spark plugs and exhaust systems. Fuel is only partially combusted when idling as an engine does not operate at peak temperature. This causes fuel residue to build up on cylinder walls that can damage engine components and increase fuel consumption. (from the California Energy Commission).

• There are more than 557,000 Vermont Car and Truck registrations (as of end of 2010). If many Vermont vehicles reduced their idling by five minutes/day, the total CO_2 emissions reduction could exceed 50,000 tons/year.
(based on calculation from Office of Energy Efficiency - Natural Resources Canada).

Break the idling habit and we all breathe easier.
To learn more, visit idlefreevt.org



COMMUTING IN THE UPPER VALLEY

Stage Coach the public transportation provider for northern Windsor and Orange counties offers environmentally friendly commuter routes along I89 & I91, shopping trips to Randolph, Rutland, and West Lebanon, and operates the Randolph Maxi-Taxi door-to-door bus service. Additionally, Stagecoach arranges rides for the elderly, disabled, and Medicaid recipients, and transports clients to partnering social services programs.
(800) 427-3553 **www.stagecoach-rides.org**

Rural Community Transportation Inc. serves St. Johnsbury. **www.riderct.org**

Advance Transit to get around Lebanon, Hanover & Dartmouth. (802) 295-1824 **www.advancetransit.com**

City Express Services Keene **www.hcsservices.org/services/transportation/cityExpress.php**

Chittenden County Transportation Authority is Burlington's bus service with links to Montpelier, Middlebury and commuter route to Milton. **www.cctaride.org**

Marble Valley Regional Transit provides transportation around Rutland with connectors to Killington a Manchester & Poultney and a commuter from Rutland to bellows falls. Service is free on Saturday for most of the City routes (Check for details). **www.thebus.com**

CT River Transit provides services in and around Bellows Falls and Springfield. **www.crtransit.org**

Green Mountain Transit Agency Provides local service in Barre, Montpelier, Grand Isle, Stowe and Lamoille connecting with commuter services. **www.gmtaride.org**

Green Mountain Railroad has day trip specials available from White River, the Champlain Valley , Bellows Falls and Rutland. **www.rails-vt.com**

Dartmouth Coach (800) 637-0123 **www.dartmouthcoach.com**

Amtrak (800) 872-7245 **www.amtrak.com** Long distance train service. Offers discounts for AAA membership and student advantage card.

Greyhound/Vermont Transit long distance bus services. **www.greyhound.com**

Cape Air connects Lebanon and Rutland to New York and Boston. **www.capeair.com**

Lake Champlain Ferries Transportation between NY and VT via Lake Champlain. **www.ferries.com**

Go Vermont provides support for car poolers. **www.connectingcommuters.org**

Upper Valley RideShare provides support for car poolers. http://www.uppervalleyrideshare.com

Ultimate web sites for getting around VT & NH: **http://goo.gl/Vdq2K** & **http://goo.gl/1DEvM**

SOLAR & SUSTAINABILITY EXEMPLARY AT CAMELS HUMP MIDDLE SCHOOL

by N.R. Mallery

Camels Hump Middle School is one of the greenest public schools in Vermont.

"The solar project here at Camels Hump is a step forward as we work to transform our energy system in Vermont and across this country," Sanders told more than 350 students who joined him to celebrate the project's completion on Nov. 4, 2011. He added "your school is doing something no other school is doing in Vermont. You are helping lead the way. What you are showing is what a community and a school can do to combat global warming, clean up our air, and move us toward energy independence and create jobs."

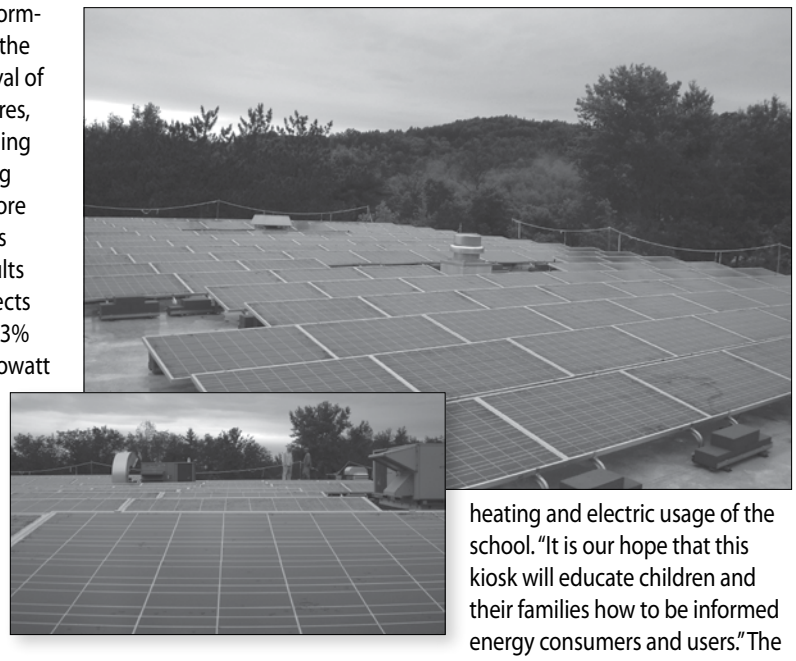
The 507 solar panels will generate over 135,000 kWh/yr – currently estimated to produce enough electricity to cover about 25% of the school's annual energy uAse and save approximately $25,000 each year in electricity costs, based on current prices. The Richmond middle school solar project is one of the biggest at any public school in New England. The panels were installed by ReKnew Energy Systems of White River Junction, Vt.

Mark Carbone, Principal, from Camels Hump Middle School told us that the "Solar array installation was funded with over $500,000 in grant money and cost the local taxpayers nothing. The array could produce enough power for the whole entire building when conditions are right. "Maybe on our best days this will happen". More accurate projections are that we will save approximately another 25% on the bill. With all this our original $84,000 electric bill, before upgrades and the installation of the solar array, is projected to decline to around $40,000".

CHMS is exemplary with other sustainable measures that they have also taken in an effort to reduce their carbon emissions:

A wood chip heater, installed in August of 1994, has decreased heating costs for the 87,000 s.f. building dramatically over the past fifteen years. Last year CHMS heated the building for approximately $.27/s.f. with 354 tons of wood chips. When compared to an oil based heating system it was projected that CHMS saved approximately $28,000 in heating costs.

In 2009, the school's electrical system was completely upgraded with removal of four high line transformers, rewiring of the building, removal of 180+ light fixtures, and the upgrading of the remaining fixtures with more efficient ballasts and bulbs. Results from both projects have shown a 33% reduction in kilowatt usage. While this lighting retrofit had a price tag of $234,000, they received $15,000 from Efficiency Vermont.



The initial investment will pay for itself in only 8 years. Because of this upgrade, the annual electric bill for CHMS has seen an approximate decrease of 25%.

An 800 s.f. school garden was built in conjunction with Richmond Elementary School, provides students the opportunity to grow a variety of vegetables for use in the school cafeterias and increase student understanding of where/how and at what costs various foods are produced. The schools are hoping to increase the garden's integration with various curriculums. One project being discussed is the CHMS health classes growing and using the vegetables to prepare healthy, locally grown meals in the cooking portion of the health program.

Local Farms are used in the cafeteria including:

- Flack Family Farm: Certified Organic Delicata Squash & Butternut Squash
- Valley Dream Farm: Certified Organic Acorn Squash & Spaghetti Squash
- Taft Milk & Maple Farm 100% Pure Grade A Dark Amber Maple Syrup
- Jericho Settlers Farm(Organic Methods) Rainbow Carrots
- VYCC Garden Program Beets

This academic year, a Kiosk will be set up at CHMS for everyone to view, real time, the heating and electric usage of the school. "It is our hope that this kiosk will educate children and their families how to be informed energy consumers and users." The solar power project will make the CHMS community aware of the impact of a non-petroleum based energy alternative.

Carbone said that "Being energy efficient is just one way we are trying to save taxpayers money at CHMS".

Camels Hump now has the largest solar array at a public school in Vermont, but significant progress has been made at other schools throughout the state in making the transformation to renewable energy systems. For example, Vermont has 47 schools that heat with efficient biomass, instead of oil.

Senator Sanders is a member of the Senate energy and environment committees. He chairs the Green Jobs and the New Economy Subcommittee. He helped secure $274,000 from the Department of Energy to pay for half of the solar panels at the Richmond middle school. The state of Vermont contributed $250,000 and Green Mountain Power, as part of its Solar on Schools program, put $20,000 toward the pilot project.

Sanders also secured funding to help 10 other Vermont schools install photovoltaic solar systems.

We extend a huge applause for Camel's Hump Middle School and look forward to this excellent example to be followed or surpassed by other schools in the near future.

BURKE MOUNTAIN PLANS FOR GROWTH

New Residential Community Showcases Energy Efficient Homes

Reinforcing its commitment to provide a true Vermont experience, Burke Mountain is unveiling plans for low-density residential neighborhoods reflecting thoughtful growth and a high degree of energy efficiency. Burke has partnered with Michael Graves, a world- renowned resort planner, known for his practical, clean designs that reflect natural surroundings. This is part of a multi-year plan to add enhancements including a new high- speed quad, additional terrain and the installation of a wind turbine.

"We are taking the lead on redefining how resort real estate will be sold in the future," said Tim McGuire, vice president and general manager of Burke Mountain. "Our sensible approach is to only release and build in very limited quantities. Our homes will be a reflection of the mountain, the local community and all the beauty this part of Vermont has to offer. In fact, this is the first new neighborhood in nearly a decade. Most importantly, the ski and ride experience will remain authentic."

Plans incorporate stringent energy efficiencies and a practical building style, differentiating Burke from other resorts. Several parcels have been identified for these low-density residential neighborhoods on-mountain.

Graves is known around the world for his architectural prowess and clever, sleek product designs. His work spans a diverse array of buildings around the world including offices, private buildings, postmodern icons such as the Portland Building in Oregon and the Humana Building in Louisville, Ky.

Burke is also examining how community farming could play a role in this development. "We hope to partner with an educational institution or agriculture specialist to begin growing and raising foods," noted McGuire. "This is already coming to life in our other business operations. During the past year, we committed to composting and using local ingredients in our restaurants wherever feasible."

Burke's plan includes strong partnerships with local businesses and services of East Burke and the Northeast Kingdom region. "There are no plans for a resort village," continued McGuire."We know Burke loyalists appreciate, and future guests will appreciate, the small town and authentic Vermont experience not found at other resort locations."

KEYSER ENERGY SELLS HOLIDAY COAL BAGS TO RAISE FUNDS FOR MISSION

Rutland, VT., December 9, 2011

Have you been Naughty? Santa is watching! Keyser Energy is proud to announce that all proceeds for their Holiday Coal Bag sales will be donated to the Open Door Mission in Rutland. This is a unique way to help raise funds to eliminate homelessness in Rutland area.

The cost is $2 a bag. Each decorative bag will have a hand full of 'real' coal and tied with a holiday ribbon. In traditional Christmas culture, coal signifies that you have been bad. But in other cultures, receiving coal is a good thing- a gift of warmth and love. Give one as a laugh or it may be the perfect gift for those naughty on your list.

"Coal isn't cold, it can be warm! And Thank you to Chris Keyser and Keyser Energy for your pledge." says Sharon Garafano Russell, the Executive Director of Open Door Mission.

The Open Door Mission is a nonprofit organization that helps those who are homeless or have no place to stay in the Rutland area. With life-skills programs, the mission helps people get back on their feet. The Mission is funded and financed by the thrift store and annual golf tournament. This year the Mission has provided over 14,000 bed nights and 37,000 meals.

Stop by one of four locations in the Rutland County. They are located at 190 West Street in Rutland; 41 School Street in Proctor; 143 Bentley Avenue in Poultney; or 5 North Railroad Road in Brandon.

For additional information go to www.KeyserEnergy.com or call Mary-Rachel Keyser. Images are available upon request. Keyser Energy is a combination of several small hometown fuel oil dealers in Rutland County. They deliver Propane, Heating Fuel Oil, Bioheat, Kerosene, Off Road Diesel, On Road Diesel and Gasoline. Our services include heating, cooling, plumbing, domestic hot water systems and solar hot water.

HERB SPIRALS: Beauty & Function in the Kitchen Garden

by Charley MacMartin

Participants in our stone wall workshops often ask about a simple stone feature to enhance a kitchen garden. Herb spirals top the list. An herb spiral is essentially a stone wall that twists in on itself, growing higher and higher towards the center of the spiral. The result is a uniquely styled raised bed that offers a range of soil depths and planting possibilities.

The design of an herb spiral is simple. To begin, mark out the full size of the circle or oblong space that the spiral will fill. Clear the area and if you'd like to increase the drainage in the area, remove up to six inches of soil and replace with a crushed gravel base. How much stone you'll need for the spiraling wall depends, of course, on how large the spiral you plan. For example, a spiral can be as small as a circle four feet in diameter. That's a good size for a children's garden so small arms can reach into the center of the planted area. On the other hand, an herb spiral can be a focal point at the center of a larger garden. Ideally, the stone you use is from your area. That cuts down on costs and reduces the amount of fossil fuels needed to create your garden. Also, as you discover more stone over your years of gardening, you can add to your spiral's height and length.

When finished, your wall will be approximately twenty-four to thirty inches tall at the center, spiraling down to 6 inches at the outside, or tail, of the spiral. Fill the spiral with a mixture of compost and topsoil, creating a bed that is deep and well-drained at the center and shallower at the tail. This varying depth allows for a range of plants in a single bed. For example, rosemary, thyme and other herbs that want well-drained conditions will be happy at the center while mint and plants that can tolerate 'wet feet' will thrive at the tail. Another possibility is to devote the entire spiral to a single crop, like strawberries. Larger spirals in a sunny location can be a home for cut flowers as well.

But how ever large and how ever planted, the chief joy of an herb spiral will be you have created something of lasting beauty and function for your garden.

Charley MacMartin builds stone walls in Vermont using traditional dry-stone walling methods. To see his stone walls, go to: www.queencitysoilandstone.com.

Planted (top) and unplanted (right) herb spirals.

STONE WALL WORKSHOPS

Stone Wall Workshops. Our introductory workshops promote the beauty and integrity of stone, focusing on the techniques for creating dry-laid walls with an emphasis on Vermont stone. Workshops run January through March and are held in warm greenhouses in Hinesburg. For price and schedule, visit the workshop link at www.queencitysoilandstone.com.

GREEN ENERGY TIMES AND DHMC

By Lauren M. LoSchiavo

Green Energy Times has received written permission to place the publication on Level 3 of the Center Court Area of the Dartmouth Hitchcock Medical Center (DHMC), also known as the 'Food Court'. Each publication that is allowed to be displayed at DHMC is carefully reviewed, and not all are accepted. Although we have been there since our first issue, we feel that this is an important step that can effect the DHMC Community. The medical center, alone, has the equivalent energy use, and population (including the patient base) of a large city. It is considered, for these reasons, to be one of the largest in New Hampshire.

DHMC continuously looks for ways to reduce their impact on the environment. We hope that our presence there and their awareness of our publication will prove to be of value to them to reduce their energy use and effect on the planet at so many levels that not only includes the building, but also the transportation required by the employees. Alternative means of transportation, including public transportation, car pooling, ridesharing, rail and even bicycle are all options to help to reduce the emissions that co me from the commuting to and from work at DHMC.

Current and future contributors in GET will now have the opportunity to reach and help, literally, thousands of people with the overall message – "We all need to become more energy efficient, eliminate our dependence on fossil fuels and combat climate change NOW."

GREEN MOUNTAIN POWER BREEZES PAST AMBITIOUS SOLAR GOAL

COLCHESTER, VT November 2, 2011

1,000 days ago, Green Mountain Power (GMP) announced an ambitious goal to install and help its customers install 10,000 solar panels in 1,000 days. GMP announced today that it has exceeded that goal with more than 26,000 panels installed or approved for installation within its service territory.

"Our customers clearly want more solar, and we are determined to help provide it," says Mary Powell, the company's President and CEO. "Local distributed generation from renewable energy has economic and environmental benefits for our customers and for Vermont. In-state development of renewable energy promotes the green economy, creating jobs, and enhancing Vermont's energy independence."

"Other than these projects, it includes all the net meter projects that our customers have installed and are getting the financial incentives for. So it is a great distributed generation success!"
- Dorothy Schnure, GMP

GMP partnered with Shelburne Farms to build a 'solar orchard'

GMP-owned solar projects include 952 panels in Berlin, 616 panels on the roof of the company's Montpelier headquarters, and 308 panels at its Westminster Service Center. The company has also partnered with its customers to build 530 panels in a "solar orchard" at Shelburne Farms, 412 solar panels at National Life Group, and 345 panels at Camels Hump Middle School. The electric vehicle charging stations at the company's Colchester offices are solar powered, and the three public charging stations at St. Michael's College, Healthy Living Market on Dorset Street, and in downtown Montpelier will also use the sun to generate electricity.

Green Mountain Power set the stage for increasing the adoption of solar energy by customers through its SolarGMP initiative, which was approved by the Public Service Board in July 2008. SolarGMP pays customers 6¢/kWh (kilowatthour) for all the solar energy they produce. GMP would rather pay its customers to produce solar power, especially during peak demand times, rather than buy expensive power from out of state.

In-state solar generation plays an important role in the mix of renewable energy because production tends to be highest on hot summer days, when air conditioning drives up the demand for electricity. "The more solar panels we have on line, the less electricity we have to buy from the New England regional market during peak times, which comes from expensive and higher carbon-emitting sources," says Powell.

In addition to solar, the company's renewable generation sources include hydro, farm methane, wood, energy from landfill trash, and utility scale wind.

About Green Mountain Power *Green Mountain Power generates, transmits, distributes and sells electricity in Vermont and is a leader in wind and solar generation. It serves more than 96,000 customers. www.greenmountainpower.com.*

WINTER MAINTENANCE FOR YOUR OFF-GRID SYSTEM

Preparation and Operation

By Alan Smith- Backwoods Solar

The winter season has arrived on schedule. For those of you in cold and snowy climates, now is a good time to review the maintenance and condition of your power system. For those of you in warm and dry climates, now is a good time to review the maintenance and condition of your power system. Better to check on your system at your convenience rather than when something goes wrong in the middle of the night in 3' of snow. Below is a checklist of considerations for your review.

Seasonal Angle

- If you have an adjustable rack mount for your panels it is worth tilting them to the ideal angle to properly capture the winter sun. An appropriate angle can make a big difference in the amount of power collected, especially during the shorter, cloudier days of the winter when sunshine is at a premium.
- The ideal angle for your panels is easily determined. Use the latitude of your location and add 15º. The result is the angle of tilt of the panels, measured up from horizontal that will yield the best harvest during the winter months. Example: Sandpoint, Idaho is at 48º north. Ideal winter angle is 48 + 15 = 63º.
- For the folks that have vacation cabins that may only be visited once a month or so during the winter, consider a steeper angle to accommodate easier shedding of snow.

Generator Tune-up

- Now is the time to do your annual maintenance. Besides the basics; oil, belts, coolant level, air filter, and spark plugs, be sure to check your owner's manual for items specific to your machine.
- Check on the starter battery. If the generator has not been run since the previous winter it is very likely that the starter battery may be dead or heavily discharged. Replace or recharge it before you need it.

Batteries

- Batteries can be kept in a relatively cold area, with a couple of considerations. The energy storage capacity of batteries in a cold climate is temporarily reduced. Instrumentation such as battery monitors can be fine-tuned to reflect a more accurate state of charge. Temperature sensors for both your charge controller and inverter/charger should also be used for optimum charging points of your batteries.
- Fully charged batteries, being used on a daily basis, will not freeze until the temperature drops to -70º F. A battery at 50% state of charge, though, can freeze in temperatures as "warm" as -10º F. Don't let the batteries get too low.
- The sulfuric acid in batteries that are being stored or lightly used will tend to stratify. This means that the water begins to separate out from the solution, resulting in layers more like water near the top of the battery and denser layers of sulfuric acid towards the bottom. If this occurs, it is very possible for the water layer to freeze at temperatures near 32º F and crack the battery casing.

Clear the snow off

- Seems obvious, right? Keep a broom or brush on a telescoping handle if needed, and clear any freshly fallen snow off the panels on a routine basis. By letting the snow sit and freeze on the panels, it will take that much longer until your panels are collecting again. It's a horrible feeling to be sitting at work, when the grey skies open up to sunshine, and you know your array is sitting at home with six inches of snow on it.

Extended Leave

Flooded lead acid batteries respond best to daily use, so we have to make the best of a non-ideal situation when the power system will be unattended for extended periods of time. Depending on your installation and equipment there are a couple of options available, and opinions on the best approach will vary. If you have an automatic generator start (AGS) function tied to your inverter/charger, and you consider your generator to be highly reliable, the inverter can be left on so that a charging source is available if the panels become covered in snow. If you do not have AGS, turn the inverter off. Turn all DC loads off. Leave the charge controller on, with the goal of supplying at least a bit of float charge to the batteries each week. If available, ask a neighbor to check your array after any major snow storm, to brush the snow off.

One school of thought suggests reducing voltage settings, to reduce water consumption, and setting the equalization to automatically occur once per month.

Tuning gear, more panels, winter behavior

The sun tends to be shy in the winter. Let's take advantage of the days it does show up. An experienced system owner will know how their system responds to normal charging and equalizing. Consider increasing the absorb time and the equalize settings on your charge controller for the winter months. Keep a notebook handy in your power room, and write-down the summer and winter settings that you find work best, so you know what to change them back to when the seasons change.

Search mode on an inverter should be enabled year-round, but especially so during the winter. A couple hundred watt-hours per day can make a big difference.

Here's a controversial tip for your consideration. You honestly can never have too many solar panels, we can all agree on that. How much is too much though? Advocates of "winter" arrays will say "more, more, more!" The idea being that if you can manage to get one good sunny day a week during the winter, you'll really harvest some good power and minimize your generator run-time and fuel use. The flip side of the coin is why spend all that extra money, when it will just result in massive overkill on system design during the summer months. It's up to you. Keep in mind that pricing on solar panels is currently at an all-time low!

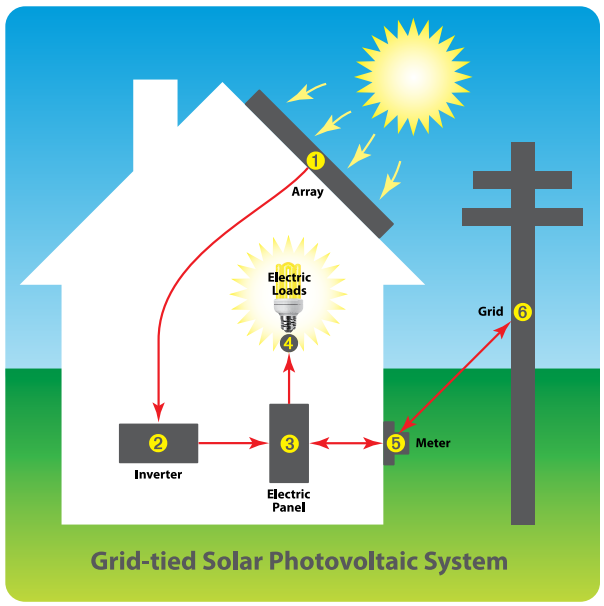
Long time off-gridders will tell you they simply change their behavior during the winter months. Leaving the coffee pot on for an hour is fine in the bountiful sunny days of summer, but the coffee maker gets turned off after 15 minutes in the winter, and the coffee goes into a thermos. Or better yet, wait until you get into work and make the coffee there! Less TV time, and more book reading cuts down on the power used. Simple conservation in several small steps can add up to a big difference in the amount of power needed during the winter.

In conclusion, it's better to take care of your system now, than to experience failures at the most miserable time imaginable. Routine maintenance and a thorough knowledge of how your system responds to your daily usage will serve you well, not only for the winter, but for the lifespan of your system as well. Stay warm and don't forget to keep your snow chains, a shovel, and a bag of sand in the trunk of your car!

HOW DOES A GRID-TIED SOLAR PHOTOVOLTAIC SYSTEM WORK?

by Tim Biebel

Photovoltaic systems provide clean electricity that has many benefits. Renewable energy is better for the environment, better for your bottom line, and is long lasting. So while it is easy to understand the benefits of clean energy, it is not always easy to understand how it is produced. Certain components required by code have been left out of the following diagram in order to provide a simplified explanation of converting sunlight to electricity and sending it out onto the grid.



Grid-tied Solar Photovoltaic System

Simply put, the photovoltaic effect is the process by which a PV cell converts light into electricity. In order to capture the sunlight and convert it to useable electricity that can be added to the grid there are a number of steps in the process. Follow the diagram to learn how sunlight is converted to electricity.

1 Array:

The array consists of one or more solar modules (Commonly known as solar panels) and each module is constructed of a series of PV cells. PV cells are made from a semiconductor material that produces a voltage or change in electrical conductivity when exposed to sunlight. Most PV cells are made from silicon and have been altered with other semiconductor materials that create loosely bound electrons that are easily moved when exposed to sunlight. When the loosely bound electrons move they are conducted as an electrical current. PV cells are connected together to create the desired voltage and electrical output per module and then modules are connected together to create the desired size for the array.

2 Inverter:

The array produces direct current (DC) electricity. This is a problem because buildings are run on alternating current (AC) electricity. In order to overcome this problem the current is run through a device called an inverter. Inverters produce AC Power from a DC power source that could be from the solar array or a battery bank. Once the power is inverted it can be sold or net metered onto the utility grid as useable power.

3 Electric Panel:

In order to receive credit for the electricity produced by the solar array it must be connected to the utility grid. This is done in two ways. First, the power from the array is fed to the electrical distribution panel found in the building or second, it is connected between the electric panel and the meter. As a result, if the system is producing more energy than is being consumed the utility meter reads the difference before the electricity is added to the grid.

4 Electric Loads:

On a sunny day the AC loads in the building are subsidized by the clean electricity the PV system is producing. On a cloudy day the AC loads are powered by the grid, but with credited energy the system has produced.

5 Utility Meter:

When a PV system is installed a meter that moves in two directions is also installed. On a building without a PV system the meter only moves in the direction that accounts for consumed electricity but on a building with a PV system the meter moves two ways. A meter that moves two ways accounts for electricity that is produced!

6 Grid:

Once the electricity is metered, the excess is added to the grid.

Green EnergyTimes thanks Prudent Living for contributing this Solar Photovoltaic information in an effort to help educate our readers. The understanding of this clean energy option can help immensely to meet our future energy needs. Prudent Living is located at 3189 US RT5, South Windsor, VT - a division of Biebel Builders. From conservation to weatherization to the installation of solar panels for electricity and hot water; Prudent Living looks at the entire picture to provide solutions for your building and energy needs. (802) 674-9155 x 106. www.biebelbuilders.com.

WILL SOLAR PRICES CONTINUE TO DROP?

MODULE PRICING

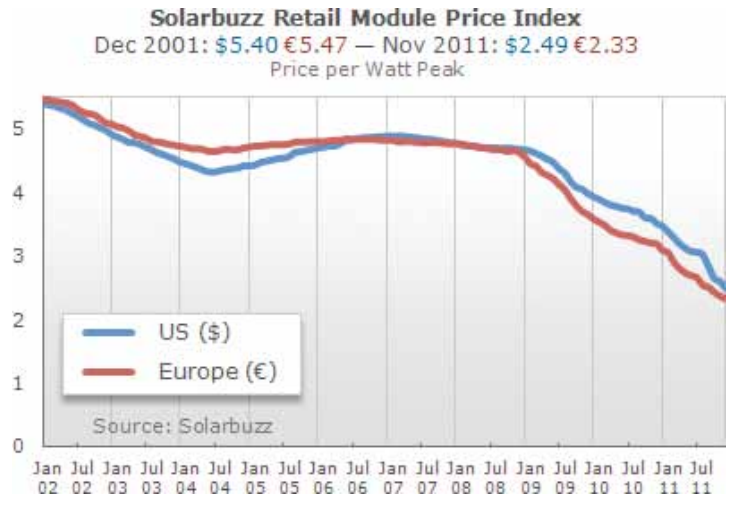
www.solarbuzz.com

Retail Price Summary - Nov. 2011 Update

There is little evidence of any slowing in retail module price drops. It should be noted that retail price moves can tend to lag factory gate moves by a month or more.

The continued drop in prices is being driven by excess module supplies coming from manufacturers that are still producing more than the market can absorb. Additionally, many do not want to miss out on the anticipated year-end demand caused by the rush to beat tariff reductions at the start of next year in Europe. In the US, there is also the rush to start installation ahead of the anticipated end to the Federal Cash Grant.

Price reductions that have taken place over the past 12 months have helped stimulate new markets, but those reductions have been twined with large cuts in solar subsidies, slowing the rate of market growth. This, in fact, is the implicit contract between the public and the industry: support for this industry will yield an economically self-sustaining solar energy source. This is exactly now what is happening. It's an example of thoroughly successful government policies around the world.



In November, there were 91 retail module price reductions and 19 increases in this survey. This is a remarkably similar ratio to the October result where there had been 86 price reductions and 18 price increases.

As a result, this month, the US index dropped a further 11¢ per watt: 3 cents driven by price drops and the balance by new lower price modules entering the survey. The European index was down 4 euro cents per watt: 3 cents were driven by price reductions and the balance by module mix changes.**Lowest Retail Prices ($/Wp)**

Currently, 245 solar module prices are below $2.00 per watt (€1.42 per watt) or 22.1% of the total survey. In October, there were 216 price points below $2.00 per watt (€1.48 per watt), which was 19.3% of the survey.

The lowest retail price for a multicrystalline silicon solar module is $1.31 per watt (€0.93 per watt) from a US retailer. The lowest retail price for a monocrystalline silicon module is $1.28 per watt (0.91 per watt), from an Asian retailer. Brand, technical attributes, and certifications do matter. The lowest thin film module price is at $1.25 per watt (0.89 per watt) from a Germany-based retailer. As a general rule, it is typical to expect thin film modules to be at a price discount to crystalline silicon (for like module powers). This thin film price is for a 100 watt module.

Price Index Context

The module cost is around 40% of the total

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SOLAR Q&A

SOLAR UNCERTAINTY

Q&A with Howie Michaelson, Sun Catcher

There are many questions and concerns that repeatedly come up around Solar Energy and its day-to-day functioning. In this column, Howie Michaelson (who has lived in a solar, off-grid home for 14 years) will try to answer those questions in a simple, clear fashion. Please submit your questions to: **uncertain@catamountsolar.com** for inclusion in future editions!

I'm interested in a Solar Hot Water system for my home, and have gotten different designs from installers. Is it better to collect solar energy into the same tank that I have for my existing domestic hot water system or a totally separate collection tank?

There are definitely different approaches to designing Solar Hot Water systems and more than one design is likely to be applicable to any scenario. So what design you choose should take into account all the existing circumstances and equipment (age, fuel type, system location, etc.), as well as possible solar collector and storage tank locations, and choices about efficiency of the system versus overall cost. Your designer/installer needs to know all of these factors in order to make the best recommendation.

While there are many possible solar hot water (SHW) storage designs, there are 2-3 basic options normally considered for northern climates like ours. If you have an existing domestic hot water (DHW) tank that you do not want to replace, you can choose to add a separate SHW storage tank that to preheat the water supplying your DHW tank. The other basic option is to store heat from your solar collectors directly into your existing DHW tank. The first scenario is usually more expensive, but is almost always more effeciant at solar collection/storage and it potentially provides more overall hot water capacity. In general, it is the most common SHW storage design.

If you are installing a new DHW system at the same time (because you have a new house or it is time to replace your existing system), you may also consider pairing your SHW storage system with an instantaneous (or tankless) DHW system. Often this may be the most efficient and cost effective design choice. The major advantage of this combination is that the tankless heater only needs to turn on to heat the water the difference between SHW storage tank temperature and the 120-130 degrees desired for your hot water.

As with all systems, for the DHW and SHW to play nicely together, they must be designed with whatever existing system is already in place and remaining. Be sure to have your system designer explain the economic and efficiency costs and benefits of the possible choices before installing a solar hot water system tailored to your needs.

COOPERATIVELY-OWNED SOLAR IN THE MAD RIVER VALLEY

By Gaelan Brown

For about a year a group of Vermonters have been laying the ground-work for a cooperatively owned solar power system to be located in the Mad River Valley. This concept is otherwise known as "group net metering". The Mad River Valley Energy Network is now moving forward to setup an organization in which any Green Mountain Power customer could own a share of a solar PV installation, while having their share of the monthly power-production automatically credited to their GMP bill.

Our MRVE group did quite a bit of citizen-lobbying in Montpelier, with help from local VT Rep Adam Greshin and other legislators, to get changes made to the utility-laws to enable this to all happen. And Sugarbush is graciously offering to give us a free-lease on a large parcel of land for the project. We're engaged with a legal firm to setup the "company," hoping to be installing the first phase of the system (150kw to 250kw) in the spring/summer of 2012.

We have setup a website to help everyone understand how it will work and where people can also sign up to get alerts as the project moves to the next steps. www.mrve.net

There are many advantages to a group-net-metering project over installing a small-scale PV system on your property:

1. The system can have ideal tilt/positioning to maximize power production, along with a lower installed cost per watt due to economies of scale.
2. The age/condition of your roof or property does not matter.
3. You don't have to invest $20k for a typical household PV system, you can start with a smaller investment, or you can go large, depending on your power needs and budget. The minimum investment-level to participate may be as low as $1000.
4. Your share of ownership of the project is 100% transferable (if you sell your home or move, the monthly power-credits can stay credited to your home or you can take your credits with you if you are moving to another location in GMP territory).
5. It's not in your backyard, or anyone else's backyard, but it makes your property more valuable because of the energy value coming to you each month.
6. The location we have available is not in anyone's direct view-shed and does not reduce local available farm-land. It'll be located on a new septic-leach-field that has few other potential uses. Sheep-grazing in and around a solar-farm is a potential way to get additional value and ag-use out of a solar-farm, while also reducing maintenance costs to the group.
7. You'll still benefit from any and all government incentives and tax-credits.
8. Anyone in Vermont who is on GMP could be part of this group.

$OLAR ADDS VALUE TO YOUR HOME

Study Finds Solar Panels Equate With Higher Home Values

By Mark Jacobs, www.renewableenergyworld.com - October 21, 2011

In April, the Ernest Orlando Lawrence Berkeley National Laboratory released an illuminating report titled, "An Analysis of the Effects of Residential Photovoltaic Energy Systems on Home Sales Prices in California." The goal of this research was to uncover the impact of solar energy systems on the resale value of homes and answer the question, Can solar power for homes really payoff. Researchers looked at a large number of homes sold from 2000 through 2009. The brief answer to the question, "Do solar panel systems increase the market value of a home?" – is YES. While the exact dollar amount ranges, the average home retrieves $3.9 to $6.4 per installed watt of photovoltaic power. On average, a solar panel outfitted home fetches a premium of $5.5 per watt on the current market. So, if a home is for sale with a brand new 3,100 watt PV system, the seller can expect to add a $17,000 premium to the sale price of the home.

Why Do Homes With PV Solar Systems Cost More?

Some studies show that homebuyers are willing to pay more for a house if the "carrying costs" are lower. They see that they will easily recoup the extra money paid within a few years of reduced electricity bills. Other studies find that some

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THIS STOP ON THE SOLAR ROAD TOUR: SOLAR THERMAL MAKES THE CASE FOR MAINE RETIREMENT COMMUNITY

On a crisp Maine October morning, Chris Wasileski of Seacoast Management guided a cameraman through the construction site at their Oceanview at Falmouth [http://www.oceanviewrc.com/] retirement community. Wasileski, who has overseen a half-dozen solar hot water projects since 2007, explained their commitment to solar: "We have been pursuing renewable energy as part of our smart growth mission for years, but to make it work as a business there needs to be a solid economic case to go with the environmental one. That's why we love solar thermal: it offers a sweet spot with great payback and great potential."

Wasileski's guest was not the local news but Fred Greenhalgh of ReVision Energy [http://www.revisionenergy.com/], who is directing a new web video series called The Solar Road Tour [http://www.revisionenergy.com/solar-road-tour.php]. This year, inspired by a similar web video series by national solar advocacy group SEIA, Greenhalgh embarked on a road trip across Maine and New Hampshire, where ReVision Energy has installed over 2,500 systems. He and cameraman Matt Morris stopped at over a dozen sites ranging from brewpubs and retail stores to local libraries and homes.

"The point of these videos was to show that there are people all over the place going solar right now, ordinary people like you and me," Greenhalgh said. "I'm consistently impressed by the diversity of solar projects we get to work on - from conscientious homeowners to nonprofits, to businesses who want to do the right thing and save money doing it."

The day Greenhalgh was filming at Oceanview, ReVision Energy's crew was in the middle of installing 14 flat plate solar hot water collectors which will provide domestic hot water for the 27-unit expansion of Oceanview at Falmouth's main lodge. The closed-loop solar hot water system features 420-gallons of thermal storage, a custom built solar pump station, and variable speed AC pumps, which use a differential temperature controller for optimum efficiency year-round. Backup is provided through indirect fired boilers. ReVision Energy installed a similar system for Oceanview's Hilltop Lodge as well as sister retirement community, The Highlands, which also features a 540-evacuated tube system on their Cadigan Lodge, the largest solar hot water array in Maine.

"By having these systems all over our buildings, we're showing our customers, clients, and staff that we believe in solar energy, and help them to believe in it, too," Wasileski continued. "Since the Carter era, the biggest question mark with solar has been whether it is cost feasible, and I believe we're showing that it is. We look forward to a renewable energy future for everyone."

Greenhalgh agrees. "The biggest myth we still hear about solar is that it's a rich person's game - people have prices from 10 years ago in their head and haven't looked at solar again given drops in prices, availability of state and federal rebates, and the staggering increase in cost of traditional energy. We're hoping these videos will inspire people to take a serious look at solar and see if it makes sense for them."

The Solar Road Tour: Season 1 features seven videos available at http://solarroadtour.com/ [http://www.revisionenergy.com/solar-road-tour.php] and http://www.youtube.com/revisionenergy [http://www.youtube.com/revisionenergy]. SEIA's "The Solar Generation Road Trip" is available at: http://www.seia.org/cs/the_solar_generation [http://www.seia.org/cs/the_solar_generation]

COMBINATION OF STIEBEL ELTRON FLAT PLATE COLLECTORS AND VACUUM TUBES FOR DHW AND RADIANT HEAT IN A HOME

There are many choices to be made when designing and building a new home. One family, Barry and Cheri Oberpriller, in Leverett, Mass, though, knew exactly where they would start: The house was to be energy efficient.

The design started with a 2200s.f. structure. Walls were constructed with Insulated Concrete Forms (ICF). These Styrofoam concrete forms take the place of traditional removable forms. They are set in place and concrete is poured between. The forms are not removed, but serve as insulation for the walls. ICF building costs are typically greater than for traditional methods, but the very high R-value and lack of air infiltration means the payback period is typically 5 yrs, and can be as little as 3 yrs. Ceilings in the house were also well insulated. The result is an estimated heat loss of approximately 22,000 btu/hr, less than half of the average home in New England of similar size.

Plans next called for designing a heating system and domestic hot water (DHW) system that would use as little fuel as possible. Naturally the Oberprillers turned to solar thermal and radiant heat. During the heating season, solar tanks for solar thermal collectors typically store heat in the 115 to 130°F range. This is an ideal range for the low temperatures of a radiant heat loop, typically

Collector array consists of 2 Stiebel Eltron SOL 25 Plus flat plate collectors plus 2 Thermomax Mazdon 30-tube vacuum tube collectors.

Oberpriller House, Leverett, MA. Walls were constructed with Insulated Concrete Forms (ICF).

System Type: Radiant Heat & Domestic Hot Water
Location: Leverett, Massachusetts
Solar Collectors: Stiebel Eltron SOL 25 Plus and Thermomax Mazdon 30
Solar Storage Tank: Stiebel Eltron SBB 60 Plus
Pump Station: Stiebel Eltron Flowstar
Backup: Weil McLain Ultra Series 3-UE Gas Boiler
Annual Syst. Solar Fraction: 50% Heat & 90% DHW

100 to 110°F, as opposed to the higher temperatures needed for hydronic radiators.

The system installer decided to craft a hybrid system, to gain the benefit of both flat plate and evacuated tube collectors. The installation was of 2 Stiebel Eltron SOL 25 Plus flat plate collectors, 2 Thermomax Mazdon 30-tube evacuated tube collectors, and a Stiebel Eltron SBB 600 Plus 160-gallon dual coil solar storage tank. A Weil-McLain wall-hung gas boiler was installed as a back-up. A second storage tank for DHW was also installed.

On cloudy winter days, flat plate collectors typically reach temperatures of 100 to 110°F, not sufficient for a significant portion of the house's heating needs that day. Evacuated tube collectors, however, will reach temperatures 20 to 30°F warmer. On these days the flat plate collectors work as a pre-heater for the evacuated tubes, allowing the storage of water in the 120 to 130°F range. This eliminates the need for the gas boiler to burn fuel. On sunny winter days the collector combination reaches temperatures of 135 to 150°F, as much energy as a larger evacuated tube array would, at lesser cost. In addition, the flat plates can be used as a heat dump for excess heat from the evacuated tubes if necessary. In the warmest month the evacuated tubes are covered, as the flat plate collectors provide sufficient hot water for the Oberpriller's needs by themselves.

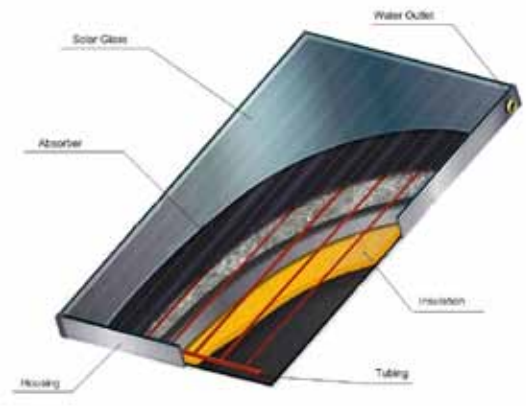
The backup gas boiler was also plumbed into the system in such a way as to reduce its use to a minimum. During the heating system the boiler is bypassed via a 3-way valve if the temperature at the top of solar tank reaches 120°F. The boiler is not back in the loop until the tank temperature drops to 100°F, which the Oberprillers have decided is an adequate temperature for a shower. During the peak solar months of April to November, the indirectly fired DHW tank is bypassed to eliminate standby losses there. The solar tank alone consistently reaches temperatures high enough for both heat and DHW.

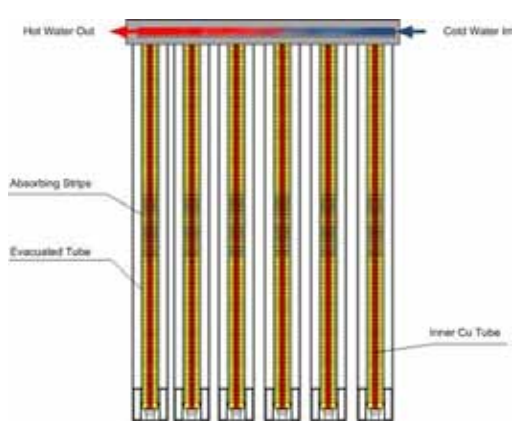
The result is that from April to November the system provides 100% of the Oberpriller's heat and hot water needs. Over an entire year the system provides 50% of their space heating needs and 90% of DHW. Just 160 gallons of liquid propane gas are needed for the house in a year, and that figure includes propane for the kitchen range and the clothes dryer.

Warm Up With Solar Hot Water !!

by Shasta Small, ReKnew Energy Systems, Inc.

Winter heating bills are just starting to roll in - you'll have a long expensive winter with fossil fuels. Our SUN is a free energy source that can clean up your dirty fuel dependence!





Types of Collectors

The most common types of solar hot water collectors on the market now are flat-plate and evacuated tube.

Flat-plate collectors (shown left) are comprised of a dark tempered glass plate, copper tubing, and insulation.

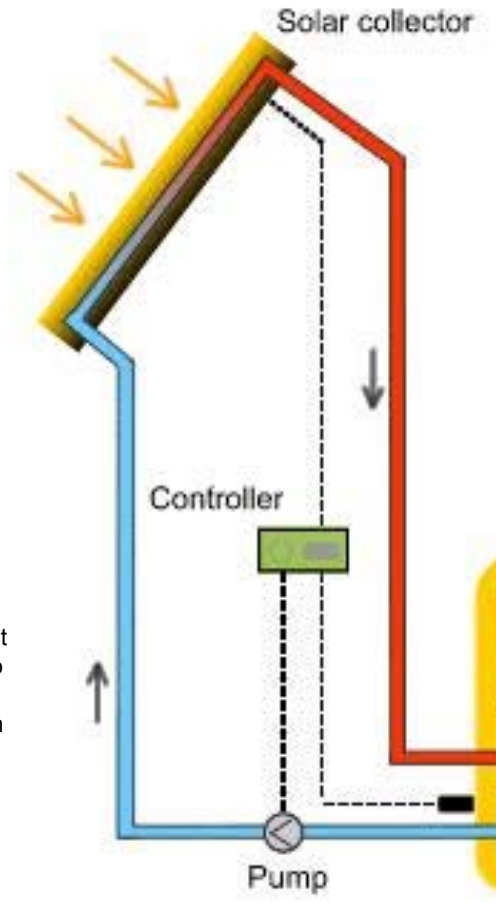
Evacuated tube collectors (shown right) are comprised of several glass tubes that contain an evacuated air space for insulation around a copper pipe.

In both cases, a non-toxic, water-glycol solution is pumped through the copper pipes, and does not freeze or pollute the water tank.

How Does It Work ?

Solar energy works here - even in the winter! All you need is clear southern exposure on your roof or on the ground near your home. When the sun hits the solar collectors, the solution running through the collector is heated and piped through a pre-heating tank. This solar hot water tank is connected to your pre-existing boiler system which will now draw water from the solar tank instead of the old cold water feed. Because the water in the solar tank is pre-heated, your boiler doesn't have to use as much fuel to heat the water up to the desired temperature.

In our region, this solar energy system can cover 100% of your hot water needs in the summer and 50% in the winter. This means your winter heating bills are cut in half! Don't worry about snow covering your collectors because they are normally installed at an angle that allows the snow to slide off. The collectors stay warm enough that any excess snow will melt away.



Show Me The Money !

A standard 2-person solar hot water system installed on your roof should cost under $10,000. State and federal incentives can reduce that to around $5,000-$6,000 out of pocket. A system this size is expected to displace about 100-150 gallons of oil or propane per year. At $4/gallon, that's $4,000-$6,000 savings over 10 years WITHOUT accounting for an increase in fuel prices. Most solar hot water systems installed in our region pay for themselves in about 8 years, and continue to provide reliable hot water for decades.

Why Should I Install Solar Now ?

NOW is the time to act! State incentive trends have shown that funds are only declining. New Hampshire's solar hot water rebate program has already been slashed once in 2011, and is scheduled to be reduced again before it is completely dry. Vermont's funds have already reached critical levels for 2011. New funding is expected for 2012, but incentive levels may be lower. Finally, the 30% Federal tax credit program will run through 2016.

The purpose of government incentives is to encourage installation of renewable energy. As more people take advantage of these incentives, there is less money to go around, and less reason for government to incentivize installations. Installing sooner will likely get you a greater rebate.

About the Author

ReKnew Energy Systems designs and installs solar hot water and solar electric systems throughout Vermont, New Hampshire, and Western Massachusetts. They provide affordable, high quality systems for homeowners, businesses, non-profits, schools, and municipalities. They work with you every step of the way to help you find financing, secure your incentives and permits, and help you understand how your system works. ReKnew is conveniently located in White River Junction, Vermont, still family owned and operated. Visit their website at www.ReKnewEnergy.com or call 1-866-312-7673.

Many thanks to Reknew Energy for their contribution of our SHW page to help create a clear understanding of how Solar Hot Water works.

WIND

DOUBLE DUTY WIND IS
INCREASING VERMONT'S CLEAN ENERGY

Cont. from page 1

system of ditches which convey runoff to 27 basins designed to catch and filter storm water. In addition, the project also features narrower roads and smaller turbine pads than most utility-scale wind projects, measures to protect wildlife—including bear and moose habitat—and the preservation of the site for recreational uses. "Our four years of perseverance were worth it. This is an endeavor for the state and community to be proud of". Gaynor concluded with "It takes a village to pull off a project like this."

State Representative Tony Klein, Chair of the House Natural Resources & Energy Committee and the Chair of the Joint House & Senate Energy Oversight Committee, spoke about the significance of the project "This project represents a huge step forward towards Vermont's sustainable clean energy future, It is very gratifying to see our energy policy, ten years in the making, finally become a reality. The site is still magnificent." He told the developers that they were "out their minds. They looked under every rock! This project will live on as support for the need for Big Oil Protection."

Located in the Town of Sheffield in the Northeast Kingdom, the Sheffield Wind project is comprised of 16 Clipper Liberty 2.5 MW turbines, and will generate enough power for about 45% of the homes. The project will diversify the portfolio of electricity generation in Vermont, and it will be integrated into the grid in a manner that increases reliability and helps reduce costs for consumers.

Proudly, Avram Patt, General Manager of Washington Electric Cooperative said "The clean energy produced from this wind project also provides long-term cost certainty, a valuable hedge to more volatile fuels, which is a direct benefit to our residential and business members throughout Central Vermont and the Northeast Kingdom."

The Town of Sheffield will receive more than $520,000 annually in tax revenues, which can be used toward local services including roads, schools, police, firefighters and more. In total, including payments and services for land, property and state taxes, and local maintenance contracts, about $1 million a year will be paid into Vermont for the life of the project.

During construction, Sheffield Wind created about 200 local jobs, and several local businesses saw an increase in business and revenue during the building of the project. Development and construction of the project required about 185,000 direct and on-site labor hours, or about 100 full-time equivalent (FTE) jobs over a full-year. First Wind and its contractors used about 50 different Vermont businesses for site work, supplies and equipment, environmental services, fuel and maintenance and lodging.

"Vermonters are embracing a clean energy future that we are proud of," says Gabrielle Stebbins, Executive Director of Renewable Energy Vermont (REV). "We celebrate new, clean Vermont-made energy."

We need to steadfastly continue in this direction. With the reality of climate change approaching much faster than expected, we should actually be saying as a friend put it ***"Oh my goodness! How many of them there turbine thingies can we fit up on that there mountain and how freakin' fast can we be a-buildin' those babies!".***

The Basics of Distributed Wind Power in Vermont

Distributed wind power is the fastest growing segment of the wind industry today.

An ever growing number of Vermont businesses, local authorities and communities are considering renewable energy projects to minimize the impact of their operations on non-renewable energy sources, reduce greenhouse gas emissions and mitigate their future energy costs. Given a reasonable wind resource, distributed wind energy can offer a cost effective and efficient solution.

Size DOESN'T matter! Aside from the obvious difference in small residential applications and large multi-turbine utility wind farms, distributed wind turbines can come in many shapes and sizes. In community settings, the driver of which size to use tends to be how that community views the balance between turbine aesthetics and the economic impact of the project. It is all about producing power at the source where it's needed.

Northern Power 100 kW wind turbine installed at Dynapower Corporation in So. Burlington, Vt.

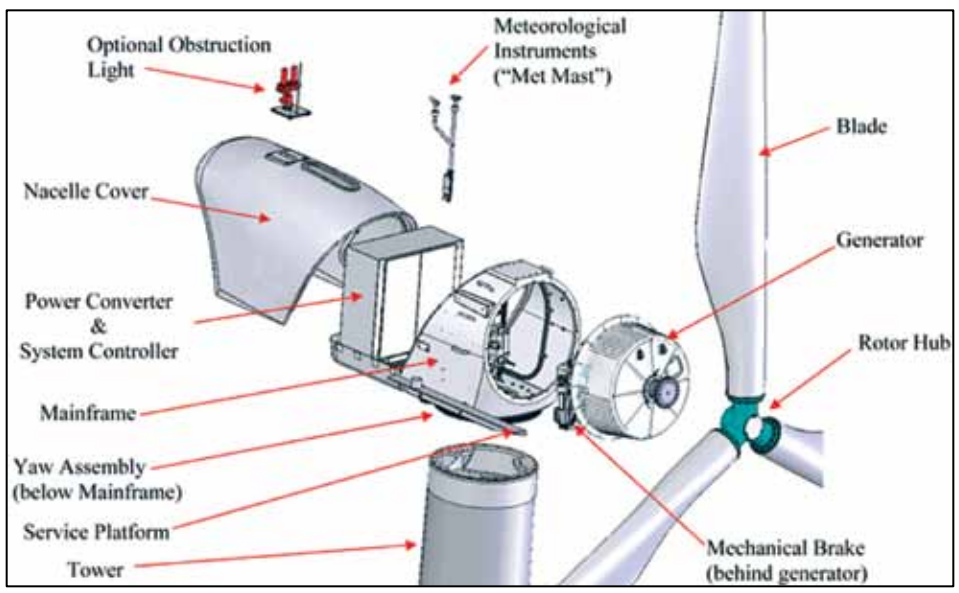
The benefits of distributed wind DO matter! Bringing wind power directly to community owned assets bring huge benefits to a wide array of stakeholders. This is why distributed wind is one of the fastest-growing segments in the global wind power industry today. The benefits of a distributed wind project can often be delivered through a small to medium sized turbine designed specifically to address the requirements of this sector. Distributed wind offers the right amount of power and reliability. A single 100kW wind turbine or a cluster of two or three – meets all the energy needs for most businesses, municipalities, schools, commercial farms or industrial sites with a low height profile and low noise levels fit neatly into local settings.

Wind Turbine Technology by Northern Power Systems - *Designed and Manufactured in VT*

When you bring wind power to the source of a large energy need, and do it in a community setting, you are engaging in community wind power.

Vermont-made wind turbine technology by Northern Power Systems is based on a vastly simplified architecture that utilizes a unique combination of a permanent magnet generator and direct-drive design. This new design delivers higher energy capture, eliminates drive-train noise, and significantly reduces maintenance and downtime costs.

All turbines capture wind. Northern Power wind turbines have a unique design that has fewer moving parts than conventional wind turbines. By minimizing wearing parts in the load path and maximizing efficiency over the full range of operating conditions, the direct drive turbines utilize an innovative gearless design and energy capture. This innovative wind turbine architecture allows for more energy, more uptime, less maintenance, and higher reliability than traditional gearbox driven wind turbines.



As shown in the image to the left, the turbine's permanent magnet generator and rotor are directly coupled and move together at the same speed. By eliminating the gearbox, Northern Power Systems has simplified the drivetrain design by radically reducing the number of moving parts and wear items. This gearless design advancement creates direct benefits in the form of a highly reliable turbine with low operating costs.

Bolton Valley Ski Resort

The proprietary permanent magnet generator is central to the wind turbine's innovative drivetrain design. Permanent magnet generators offer high efficiency energy conversion, particularly at partial load, and require no separate field excitation system. Permanent magnet generators are lighter, more efficient, requiring less assembly labor. The permanent magnet generator was also designed in conjunction with the power converter to create an optimized solution tailored for high energy capture and low operating costs.

At 100 kW of rated power, the Vt-made Northern Power 100, with its innovative gearless direct drive design, permanent magnet generator, reliability, and pleasing aesthetics is optimized to perform in low wind regimes, so you don't have to live in a wind tunnel to benefit from on-site wind power. The wind turbines begin making power at wind speeds as low as 3 meters per second (6 mph) and can provide clear economic & environmental benefits for local schools, businesses, farms and municipalities.

About Northern Power: Based in Barre, VT, Northern Power Systems, has been working toward electrifying the world with clean, renewable wind energy one distributed wind turbine at a time, for over 35 years. For more information: www.northernpower.com.

We want to thank Northern Power Systems for their contribution of this Wind Page Information.

NH INCENTIVES

Residential PV/Small Wind

$1.25/Watt capped at $4,500 per system (all systems must be under 5 kW)

Please call Jon Osgood at **603-271-6306** with questions

The new program budget includes approximately $425,000 in new funding for FY'12.

This program is offered through the Public Utilities Commission.

Residential Solar Water Heating

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

Please call Kate Epsen at **603-271-6018** with questions.

This program is offered through the Public Utilities Commission.

Wood Pellet Boiler or Furnace, **30% of installed system up to $6k**:

1. Thermal efficiency rating of 85% or greater
2. Particulate emissions 0.32 lb/MMBtu heat output.

Call Barbara Bernstein at **603-271-6011** with questions or **http://www.puc.nh.gov/Sustainable%20Energy/RenewableEnergyRebates-WP.html**. This program is also offered through the Public Utilities Commission.

Local Incentives

Some towns provide tax exemptions for renewables: **http://bit.ly/NHtownRenewablesTaxBreaks**.

These are offered on a town-by-town basis. The state has also 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.

Solar Hot Water, Solar PV, and Wind education only. See **http://bit.ly/NHAltEforEd**

VERMONT INCENTIVES

Lighting

While supplies last, select ENERGY STAR® qualified CFLs are just **99¢** at participating retailers*.

In partnership with Efficiency Vermont, many Vermont lighting retailers offer **special pricing and in-store coupons** on select ENERGY STAR CFLs & LEDs. No mail-in rebates to fill out, just a low price at the cash register of your favorite lighting retailers*.

Home Performance with ENERGY STAR

Ask a participating Home Performance with ENERGY STAR contractor* about available incentives for energy Efficiency home improvements.

Efficiency Vermont offers up to $2,500 in incentives for comprehensive energy Efficiency improvements, including air sealing, insulation, and heating system upgrades.

Appliances

Look for these mail-in rebates at participating retailers* or visit www.Efficiencyvermont.com.

$25 mail-in rebate - ENERGY STAR qualified Dehumidifier (available seasonally)

$50 mail-in rebate - select ENERGY STAR qualified Clothes Washers

$50 mail-in rebate - select ENERGY STAR qualified Refrigerators

$50 rebate - Second Refrigerator Retirement (includes free pick up of your old, working second refrigerator or freezer)

Heating & Cooling Equipment

$100 mail-in rebate - energy-efficient furnace fan motor and central AC

$500 mail-in rebate - energy-efficient furnace fan for oil heating system(for Green Mountain Power customers only)

$300 mail-in rebate - energy-efficient furnace fan for propane heating system(for Green Mountain Power customers only)

Additional rebates for converting from electric heating and hot water systems to natural gas systems are available. Call 888-921-5990 for more information.

Residential New Construction

Building a new home? Enroll in Efficiency Vermont's Residential New Construction Service to receive a free home energy rating and expert technical assistance throughout the construction process.

Homes enrolled in the Vermont ENERGY STAR Homes program are also eligible for the ENERGY STAR Label and up to $1,500 in cash incentives.

Additional incentives are available for Washington Electric Cooperative and Vermont Gas Systems customers. Call 888-921-5990 for more information.

Other Opportunities to Save

Look for these additional rebates and discounts at participating retailers* or visit www.Efficiencyvermont.com.

In partnership with Efficiency Vermont, many Vermont retailers offer **special pricing and in-store coupons on select Advanced Power Strips.** No mail-in rebates to fill out, just a low price at the cash register of your favorite participating retailers*.

$200 mail-in rebate - for the purchase and installation of a qualifying energy-efficient two-speed or variable speed pool pump (available seasonally)

All rebates and incentives are subject to availability, limits, and may change.
Visit www.efficiencyvermont.com or call 888-921-5990 for complete incentives and requirements.
** Find a participating retailer or contractor at www.Efficiencyvermont.com or call 888-921-5990.*

Efficiency Vermont

NHSAVES.COM - A WEALTH OF INCENTIVE INFO

For a more general idea of incentives offered through the NH gas and electric utilities, please refer to: http://nhsaves.com/. The mission of nhsaves is about people in New Hampshire doing the right thing, which means you and your electric utility, working together to save energy, reduce costs, and protect the environment.

They have info for your home:

- income eligible – home energy assistance
- NH Home Performance with ENERGY STAR®
- ENERGY STAR homes program
- ENERGY STAR appliances program
- ENERGY STAR lighting program
- National Grid Programs
- Northern Utilities Programs

Info for your business:

- small business energy program
- large business retrofit program
- new equipment & construction program

Resource Center:

Participating Utilities & Energy Information for Consumers and Business: Statewide Energy Efficiency Program Call Center: **1-866-266-2420**. This automated telephone line offers brief descriptions of all of the statewide energy efficiency programs that are available to your home or business.

On-line Lighting Catalog:

Find many energy saving products you need: catalog.nhsaves.com

Find your Utility

NH Residential Gas: Home Energy Audit

An in-home energy audit is the first step in making your home more efficient. An audit will determine your current home energy use and provide recommended measures you can make to improve efficiency and save money.

National Grid natural gas customers can request an in-home energy audit by calling:

If you live in a single family home with 1-4 units, please call **1-866-691-1707**

If you live in a multifamily building with 5+ units, please call **1-800-889-0096**

There is a $100 fee for this service, which includes diagnostic testing for air and duct leakage.

www.powerofaction.com/nhrghenergyaudit/

Northern Utilities Programs **www.unitil.com/customer-configuration**

NH PUBLIC UTILITIES COMMISSION ANNOUNCES 2011 RENEWABLE ENERGY GRANTS TOTALING $1 MILLION

The NH Public Utilities Commission recently awarded five grants to renewable energy projects, totaling one million dollars. Funded by the State's Renewable Energy Fund (REF), these grants will help fund a range of renewable energy generation systems in the commercial and industrial sectors. These projects will generate hundreds of thousands of megawatt-hours (and equivalent) for NH businesses and non-profit institutions over their lifetimes, helping to reduce NH's dependence on fossil fuels and generating increased amounts of clean, local, and reliable power.

The grants were awarded through a competitive process. The Commission issued a Request for Proposals in February 2011, and received eighteen applications requesting a total of $6.4 million. The Commission plans to release a similar RFP in early 2012, the details about which will be available at www.puc.nh.gov

The five 2011 awards are as follows:

Monadnock Paper Mills: The Monadnock Paper Mills, Inc. is awarded funds in the amount of $151,040 to rebuild a dormant hydroelectric generating unit and install flashboards on the dam crest at the Monadnock Station facility in Bennington, NH. These two investments will serve to increase the total output capacity of the facility by approximately 140 kW, thus displacing this electric load currently being pulled from the distribution and transmission grid and likewise displacing an equivalent of 17,458 gallons of oil per year. Monadnock Paper Mills, Inc. is a NH paper manufacturer and has been in operation for over 100 years, employing 161 people. This project will generate cost savings that will allow operating expenses to be available for future core business investments or on-site energy investments.

Spaulding Ave Industrial Complex: Spaulding Ave Industrial Complex, LLC, is awarded funds in the amount of $165,000 to replace the existing culvert in the tailrace that runs parallel to the Salmon Falls River with four new nine by twelve ft. culverts, thereby increasing the generating capacity of the existing hydroelectric system in Rochester, NH. Spaulding will utilize this culvert improvement to increase the generator capacity of the Spaulding Pond Hydroelectric generation system's capacity from 255 kilowatts to 300 kilowatts. This grant, leveraged with approximately $150,000 of in-kind labor and resources, was critical to the project

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RESIDENTIAL ENERGY EFFICIENCY TAX CREDITS

RESIDENTIAL BUILDERS AND HOMEOWNERS CAN QUALIFY FOR FEDERAL ENERGY EFFICIENCY TAX CREDITS

Note: If an owner of an existing home has already claimed $500 or more under this credit in previous years, the homeowner may not claim an additional credit for improvements made in 2011.

HOMEOWNER	CREDIT AMOUNT	WORK MUST BE COMPLETED BETWEEN:
Energy Efficiency Tax Credits:		
Insulation upgrades*	10% of the cost, up to $500	January 1, 2011 and December 31, 2011
High efficiency water heaters*	Up to $300 credit	January 1, 2011 and December 31, 2011
Energy efficient windows and doors*	Windows capped at $200; Doors 10% of the cost, up to $500	January 1, 2011 and December 31, 2011
High efficiency furnaces and boilers*	$150 credit	January 1, 2011 and December 31, 2011
High efficiency central air conditioners*	$300 credit	January 1, 2011 and December 31, 2011
High efficiency furnace and/or central air fans*	$50 credit	January 1, 2011 and December 31, 2011
Renewable Energy Tax Credits:		
Ground source heat pumps*	30% of project cost	October 3, 2008 and December 31, 2016
Solar electric power systems*	30% of project cost	January 1, 2009 and December 31, 2016
Solar hot water systems*	30% of project cost	January 1, 2006 and December 31, 2016
Small wind power systems*	30% of project cost	January 1, 2009 and December 31, 2016
NEW HOME BUILDER	CREDIT AMOUNT	WORK MUST BE COMPLETED BETWEEN:
Energy efficient new homes**	$2,000 credit on each qualifying home***	January 1, 2006 and December 31, 2011
Renewable Energy Tax Credits:		
Credits are the same for new homes as outlined above for existing homes.		

*specific energy efficiency requirements apply
**using less than half the energy of an average home
***consult your tax advisor to determine if your home qualifies

Source: www.energytaxincentives.org
Source: www.energystar.gov

Who is eligible for tax credits?

Builders of a new home and owners of an existing home are eligible for credits for efficiency and renewable purchases and improvements as outlined above.

What if I have already claimed tax credits on my existing home?

There is a cap for the total amount of credits a homeowner may claim from 2006 to 2011, not just in 2011. If a homeowner has already claimed $500 or more under this credit in previous years, the homeowner may not claim an additional credit for improvements made in 2011.

What are some things I should do?

- Save all your receipts and equipment documentation.
- Consult the IRS or your tax advisor.

How can Efficiency Vermont help?

- Efficiency Vermont can serve as an informational resource to Vermonters regarding energy efficiency improvements and requirements.
- We can help you identify qualifying home energy related equipment, and inform you about additional incentives and rebates available from Efficiency Vermont.
- For builders of new homes who are enrolled in the Vermont ENERGY STAR® Homes Service, we can offer technical assistance and verify required efficiency levels.
- Regardless of qualification for tax credits, Efficiency Vermont services can help you make your new or existing home more efficient.

How do I get my federal tax credit?

To learn how to apply for a residential federal tax credit, visit www.energystar.gov, consult your tax professional or call the IRS at 800-829-1040.

Efficiency Vermont

www.efficiencyvermont.com • 888-921-5990

Efficiency Vermont

FINANCING ENERGY EFFICIENCY PROJECTS

Many lenders provide special loans or financial instruments to businesses to promote cost savings though energy efficiency improvements. One example is the Vermont Economic Development Authority (VEDA) loans described below. Be sure to check with your lender for other options that may be available to your business.

Vermont Business Energy Conservation Loan Program

VEDA has low-interest loan funds for Vermont business projects that improve energy efficiency and conserve energy. The program can make loans ranging from $5,000 up to a maximum of $150,000. VEDA, in cooperation with Efficiency Vermont, is accepting applications from eligible Vermont businesses for loans to fund energy conservation projects that are certified as cost-effective by Efficiency Vermont.

Complete and up-to-date details of the program can be found on the VEDA website.

A BRIGHT NEW WAY TO SAVE ENERGY & MONEY.

LED (light emitting diode) lighting is a highly efficient way to save money and energy at your business. In select directional applications, such as spot or track lighting, LEDs can offer energy savings of up to 80% versus incandescent lighting, and more than 50% versus fluorescent or high-intensity discharge (HID). LEDs also produce less heat—reducing the need for air conditioning.

Efficiency Vermont provides standard rebates to Vermont businesses for installing new, energy-efficient LED lighting—both indoor and outdoor. Choose from screw- and pin-based bulbs for spot and track lighting, recessed downlight fixtures, street and parking area fixtures, refrigerated case lights, and more. Custom rebates and technical assistance may be available for lighting not listed on our rebate form.

LED lighting rebates include:

- LED Screw- & Pin-Based Bulbs: $16 - $40 ea.
- LED Recessed Downlight Fixtures: $40 - $50 ea.
- LED Outdoor Street & Parking Area Fixtures: $80 - $300 ea.

More lighting rebates are listed on the Efficiency Vermont website Please contact them with comments, questions or suggestions: 1-802-860-4095 • Toll Free: 1-888-921-5990

NH Public Utilities Commission Announces 2011 Renewable Energy Grants totaling $1 million

Cont. from page 16

because Spaulding will not own the investment and therefore cannot get a traditional loan to complete the project. The culvert investment will become property of the City of Rochester, who owns the bridge over the tailrace, and who is enthusiastic about working with Spaulding on this renewable energy improvement project.

Greenville Elementary School: The Mascenic Regional School District is awarded funds in the amount of $51,850 to install, own, and operate a wood pellet boiler at the Greenville Elementary School in Greenville, NH. This grant will enable the Greenville school to move beyond an oil-fired boiler, and install a highly efficient and clean-burning OkoFen Pellematic wood pellet boiler, which will be fueled with pellets sourced from a NH pellet manufacturing plant. The wood for the pellets will be likewise sourced from nearby NH forests. The Greenville school is well positioned to benefit from a wood pellet boiler, as it has already undertaken significant investments in improving the building's insulation and other energy efficiency measures.

Revolution Energy and Favorite Foods: Revolution Energy is awarded funds in the amount of $100,000 to design, develop, build, own, and operate a 140kW solar photovoltaic system on the main office of Favorite Foods, Inc. in Somersworth, NH. REF funds will be well-leveraged in this project which will utilize the federal Investment Tax Credit, a Power Purchase Agreement (PPA) ownership model, private equity, and additional financing from a local NH lending institution. It is estimated that this system will generate approximately 5,355,356 kWh's over its thirty-five year life and will help sustain and create full and part-time jobs within NH. The PPA will allow Favorite Foods, a family owned company employing approximately fifty people, to utilize clean on-site energy, while avoiding the significant up-front costs associated with emerging technologies. Additionally, the solar array and PPA combination provides long-term stable energy production in the face of rising energy costs, which will in turn assist a local business to remain in operation and competitive.

Carbon Harvest Energy: Carbon Harvest is awarded funds in the amount of $500,000 to design, develop, build, own, and operate a 1.6 megawatt landfill gas-to-energy combined heat and power (CHP) plant with heat distribution capabilities at the City of Lebanon Landfill. The electricity and heat from this system will be sold to nearby heat-using businesses, as well as to Dartmouth Hitchcock Medical Center. This $6.5 million dollar project intends to expand its scope beyond the generation of useful electrical and thermal energy to capture heat and carbon waste products to create a greenhouse and fuel cycle that would produce both food and biofuels.

Green Winter on the White Slopes

SUSTAINABILITY AT SLEEPY HOLLOW "KEEPS ON KEEPIN' ON"!

Sleepy Hollow Inn in Huntington, VT is excited to announce the addition of a solar hot water system to our inn. The system, designed by Peter Cassels-Brown of Green Mountain Renewable Energy, includes 4 solar hot water panels and has two unique features. The system is designed to have a large 500 gallons of hot water storage - which is needed in our business as we have very high use on weekends, and very low use weekdays. This allows solar hot water to be created and stored midweek and used up over the weekend at our 8 bedroom inn.

An additional feature of our solar hot water system is to use one of the dual heat exchanger coils in our hot water storage tanks to preheat our space heating system. Typical solar hot water systems only serve to heat domestic hot water. The system is expected to save us $2000 per year on fuel costs (both wood pellet and heating fuel).

On Oct. 26, 2011, Burke officially christened their newest sustainable practice: a 121' tall Wind Turbine!

Installed in August 2011, the turbine was designed and manufactured by Vermont-based Northern Power Systems. It was installed by Alteris Renewables of Waitsfield, VT. "The commitment Burke is making to combating global warming is amazing. They clearly have made the connection that we all must take action to stabilize the climate and secure the future of the VT ski industry" said Nils Behn, former director of the Wind Division of Alteris Renewables and now CEO of Aegis Wind.

Burke Mountain is one of only four ski areas in the country to have a wind turbine and the second in Vermont. It is the first wind turbine constructed on Vermont State Forest Parks and Recreation land.

At 121' tall, the blades are 35' long. The turbine is rated at 100 kW and needs only 8mph of wind to start turning. The annual average wind speed at the summit of Burke is over 19 mph. It is projected to generate nearly 20% of the mountain's electricity usage with expectations to produce just under 300,000 kilowatt hours. The energy being produced is almost equal to the energy needed for the new chairlift.

Many Vermont and local companies played a role to bring this project to fruition, including Alteris Renewables (Waitsfield), Northern Power Systems (Barre), Royal Electric (Woodsville), Tattro Construction (Jeffersonville, VT), Royal Trail Works (S. Royalton, VT), Kirby Mountain Construction (Lyndon, VT), Open Approach (Bristol, VT), Lyndonville Electric Company

The addition of the wind turbine exemplifies Burke's dedication to preserving the outdoors and to sustainability.

Sustainability Practices at Burke

Burke Mountain has always believed in doing more with less, embracing best practices for sustainability, while using resources from local businesses and farmers. This year, in addition to the recently installed wind turbine, Burke Mountain continues to enhance these systems with ways to minimize its impact on the environment such as:

- Waste Oil Re-Use – Burke's maintenance department has a waste oil re-use program in which it recycles all waste oil from resort vehicles used to supplement heating oil during the winter months to heat the maintenance building.
- Green Product Purchase Program – Burke follows strict guidelines for ordering "green" supplies which include; recycled content

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CATAMOUNT HAS GONE SOLAR!

With the recent installation of two AllSun Trackers from All Earth Renewables, Catamount Outdoor Family Center is now using the power of the sun to generate electricity for the center, the bed and breakfast, the night trail lights, and more. The AllSun Series 20 Trackers are designed for business or larger family and produce approximately 5,900 kilowatt hours per year each. The are located behind the center and the owners, Jim and Lucy McCullough suggest that you can feel free to wave hi and check them out when you ride or run by. Catamount Outdoor Family Center is in Williston VT.
www.catamountoutdoor.com

Burke Mt. Wind Supports a Clean Energy Future

Cont. from page 18

paper, paper towels, tissues, non toxic cleaning supplies, compostable service ware (plates and bowls, etc.) and does so in bulk purchasing when possible. Eco items for sale in the retail shop include reusable shopping bags, cups and mugs, and Vermont made products.

- Restaurant Operations – On-mountain restaurant facilities utilize composting and use of local/organic foods, when available. Employees are encouraged to bring in their own cups. All restaurants recycle tin cans, plastic, glass jars, bottles, plastic wrap and bulk condiments. The use of Styrofoam cups is not permitted.
- Energy Efficiency – Working with Efficiency Vermont, Burke Mountain has replaced a significant percentage of its lights with high efficiency models, including extensive use of LED lights throughout the resort.
- Recycling – Burke Mountain has a resort wide recycling effort for paper, cardboard, plastics, bottle and cans and ink cartridges for staff and guests Recycling bins are located throughout the facilities.

About Burke Mountain: Located in the heart of Vermont's Northeast Kingdom, Burke, with over 260 acres of skiing and riding, has an elevation of 3267 ft., over 2011 ft. of vertical, and 50 natural trails including over 110 acres of glades. As the primary training and race facility to over 50 ski Olympians, Burke is home to Burke Mountain Academy, an internationally acclaimed ski- focused boarding school offering a college preparatory curriculum, sending many students to compete in the Olympics and other national and international competitions.

FREEAIRE REFRIGERATION CERTIFIES ARC MECHANICAL CONTRACTORS, INC. TO HELP SPREAD "POLAR POWER"

New England-based companies join to help businesses save money on refrigeration costs and lessen their environmental footprint

WAITSFIELD, VT – Freeaire Refrigeration of Waitsfield, Vt has recently partnered with ARC Mechanical Contractors, Inc. to help businesses minimize the money spent on costly refrigeration and lessen their environmental impact. Freeaire manufactures products that can cut refrigeration costs by as much as 60% using cold outside air and an electronic controller engineered for overall system efficiency. Several ARC employees recently received training at a Freeaire training session and are now certified to install, maintain and draw energy data from Freeaire systems.

"Equipping ARC with the tools and knowledge to install and maintain Freeaire® systems will provide greater access to the energy and money savings of these systems for area businesses," said Freeaire's president and founder, Richard Travers. "Businesses in cooler climates can significantly cut costs, as well as reduce carbon emissions, by harnessing a widely available, free resource – cold outside air. Our systems were designed here and thrive in this climate."

To achieve maximum energy savings, each Freeaire system features a powerful computer called the Cooler Controller™. In any climate this computer ensures that each component of business's conventional compressor-based refrigeration system operates only as much as necessary. In colder climates, the Polar Power Package™ serves to harness cold, super-filtered outside air to be used inside for cooling, using just a fraction of the energy. The rebates currently available from Efficiency Vermont and many of New England's electric utilities provide additional incentives for companies to install Freeaire systems.

"The energy savings that can be realized by utilizing the Freeaire system are obvious," said Kevin Morrison, sales associate at ARC. "We feel we owe it to our existing customer base to expose this opportunity to them."

Founded in 1947, ARC has provided superior heating, cooling, ventilation, refrigeration and plumbing services throughout Vermont and New Hampshire, with locations in Bradford, VT and Lebanon and Littleton, NH. By being trained on how the Freeaire system works and certified in the installation process, ARC technicians are now able to install and maintain Freeaire systems.

"Freeaire is another way for us to promote sustainability in the energy industry as we seek to take advantage of every opportunity to ensure our future growth and profitability," adds Morrison. "Freeaire gives us another important tool do so, and they are a Vermont company. It doesn't get much better than that."

For more information about Freeaire Refrigeration please visit www.freeaire.com. For more information on ARC Mechanical visit www.arcmech.com.

About Freeaire® Refrigeration systems provide significant energy savings to walk-in coolers and refrigerated warehouses in any climate, at any time of year. The Cooler Controller™ eliminates unnecessary operation of individual system components. In colder climates the addition of a Freeaire Polar Power™ package allows filtered cold outside air, a natural and renewable source of energy, to do the cooling at a fraction of the cost. Freeaire systems are unmatched for efficiency and reliability in commercial refrigeration.

SMART METERS FOR SMART POWER

As part of CVPS' SmartPower®, the Company's "smart grid" solution, a two-way digital communications network will be deployed across CVPS's service territory to collect real-time and near-real time information about electricity consumption and grid conditions. The resulting information and tools can be used by CVPS and its customers to better manage electricity usage and the electricity grid.

Expanded information will provide customers with greater insights and control of electricity consumption, enabling new rates that encourage off-peak consumption and help customers manage their electricity costs. Utility operations will have more in-depth data about grid conditions and be able to use this information to improve reliability, reduce operational costs, and to support emerging technologies such as electric vehicles and small-scale renewable generation such as solar and wind.

Advanced meters, substation and distribution system automation technologies and sophisticated IT software systems will work in consort to provide new tools and information that will allow utility operations and customers to make more intelligent, cost-effective, and environmentally friendly choices. "These capabilities are expected to create significant savings, improve grid reliability, and allow CVPS to continue to meet the changing demands of the grid in the years to come", said Todd Kowalczyk, the program manager responsible for CVPS's smart grid initiatives.

Advanced Meters

Meter Installations will begin in 1Q 2012 with completion in early 2013. the approximately 180,000 existing meters will be replaced with new digital meters. The new meters will record and report usage data and power outages information at 15-minute or hourly intervals. The customer will have private access to a web page with details about billing information and their hourly energy usage, to see how much energy they use and when they use it.

As the meter deployment progresses, additional features will be added to the web portal, allowing customers to evaluate rate options based on their consumption patterns to determine the best rate option for their lifestyle. Customers will be able to understand how their consumption patterns change over time and how their consumption compares to similar homes.

Customer Benefits:

- Reliability.
- Help customers to manage costs.
- Cost-effective management of the electricity grid.
- Utility savings result from being able to remotely read meters.

For example, advanced meters will be capable of alerting CVPS when an outage occurs. Utility operations will have a better understanding of the extent of storm impacts and be able to marshal the appropriate response much more quickly and efficiently, helping reduce the duration of power outages. Detailed data can be used to size distribution equipment, to improve reliability by reducing equipment failure incidents during peak load conditions and help reduce utility costs as equipment is sized based on load conditions.

A more intelligent and connected grid will also help with the management of more small-scale renewable distributed generation installations on the grid. The technologies being deployed as part of the CVPS SmartPower® project will create the foundation for supporting the expansion of solar, wind, and other forms of small-scale, intermittent energy sources and enable future opportunities such as micro-grids, energy storage, electric vehicles and other future technologies.

Security & Privacy

Creating a smarter grid also means creating a secure grid that is more aware and resilient to cyber-security attacks. The systems that CVPS is deploying are being developed in compliance with all federal and state security standards. In addition, CVPS is working with the other Vermont utilities, the Department of Energy, and Sandia National Labs, an organization with extensive cyber-security expertise, to implement robust security measures for the technologies being deployed.

Kowalczyk said CVPS has been protecting customer data for decades and will continue to do so. There are very strict protocols, he said. "No information goes out to any outside party, without a court order or subpoena," he said. The utility will not market any information it gets from the meters.

Customer Choice

CVPS's smart grid program is founded on a guiding principle that provides customers with better ways and greater choices for managing their electricity consumption. Customers can choose to take advantage of a wide array of the new tools and information available, may choose to participate in a more limited way, or if customers are adverse to wireless metering in their homes, with CVPS's approved opt out tariff can choose to opt out of the wireless technology, but will be unable to take advantage of certain AMI-based benefits like TOU rates, in home displays to better understand power usage patterns, and automatic outage detection.

Customer Outreach

In conjunction with its smart grid program, CVPS is currently conducting extensive customer outreach to help make customers aware of the capabilities that a smarter grid will enable and answer questions about CVPS SmartPower®. Kowalczyk, the CVPS program manager, said that " The campaign is as much about listening to our customers as it is communicating details about the new technologies." Additional information about CVPS SmartPower® can be found on CVPS's web site at: www.cvps.com/ProgramsServices/smartpower/index.asp

COMPOST POWER COMBUSTION


Mound - Beginning


Mound - Half done

FREE HEAT for Homes, Greenhouses…

Editor's note: this article is a follow up to one that ran in G.E.T. in 2010 while this concept was in an earlier stage of "experimental." As Gaelan Brown stated, "G.E.T. is carrying the torch that Mother Earth News first lit on this topic in their article about Jean Pain in 1980."

Cecil Smith of Haverhill, NH plans to use a different form of solar energy to heat his home this winter. He is capturing the solar energy stored in wood, by composting it, instead of burning it, to generate a 24/7 supply of hot water for his radiant-floor heating system. After heating his home this winter the by-product will be a large pile of high-value organic compost.

"It's just one of those ideas that makes so much sense that I decided to just give it a try," said Smith, who operates the solar-power installation company Polar Solar. "I know it's experimental and I'm not 100% sure it's going to work through the whole winter. But the input from Compost Power and Vermont Compost gave me the support I needed to go for it."

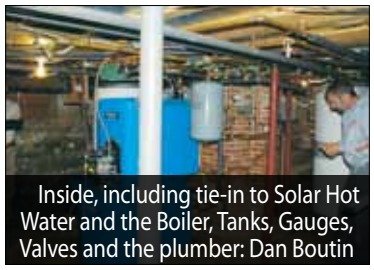
Smith is one of about a dozen people in the Northeast and Midwest US, and Quebec, who will be attempting to heat homes, domestic water and greenhouses with water heated by a compost-mound this winter. French farmer Jean Pain first pioneered the promising but still experimental concept in the 1970s, but he died young and the idea fell by the wayside in the 1980s. Since 2009 a group of tinkerers, plumbers, compost-experts and engineers in Vermont have been experimenting to adapt the concept to the local climate through the non-profit Compost Power Network at www.CompostPower.org.


Mound in Action


Internal Temp: 160º

"Cecil has what might be the first compost-heated home in North America," said Jason McCune-Sanders, an engineer who is active with several Compost Power projects. "We still have a lot to learn in order to maximize the output of these systems but we're seeing promising results."

This past summer Smith took a "how to" course at Yestermorrow Design Build school in Waistfield, Vermont, with a curriculum put together by members of the Compost Power team. Smith then got design-build guidance for his project from Compost Power and Vermont Compost supplied the fresh bark-mulch blended with some partially mature compost referred to as "hot mix."


Inside, including tie-in to Solar Hot Water and the Boiler, Tanks, Gauges, Valves and the plumber: Dan Boutin

In October Smith built a Compost Power mound in his backyard in one day by himself with the help of a small tractor. A small circulation pump moves water from his house through pipes buried in the ground, through the mound-loop returning 120-140-degree water to a storage-tank in his basement, which feeds his radiant-floor heating system.

According to Smith's measurements, (temp-gauges on the water-lines/tank, and a flow-meter on the circulation) Smith is collecting approximately 15,000 btu/hour with 120-140 degree water coming from his system, which is like having a small wood-stove burning at full-bore 24/7.

Since the value of the compost 12 months later should be higher than the cost of building the system, any amount of energy collected can be seen as "gravy."

Smith's 40 cubic-yard compost power mound of shredded bark-mulch is about 22' in diameter and eight' tall, and contains 1200' of 1" tubing coiled in layers distributed throughout the mound.

A critical factor to ensure success is that aeration has to be "engineered" into the foundation-layer of the mound, to ensure that air can get underneath the material and passively aerate the system to eliminate the need for "turning" to keep the compost process active. Aeration can be achieved by installing perforated pipes or by layer of pallets wrapped in fabric in the foundation to pull in outside air, before spreading the compost and heat-exchanging water-lines.

Jean Pain's documented work and Compost Power's experiments have shown that a properly-built system can generate steady heat for 12-18 months. There are many different types of "feedstocks" that can work, including bark-mulch, fine-grain wood-chips, or a mixture of sawdust and wood-chips or manure.

A do-it-yourself Design Guide can be found on www.CompostPower.org, and reports on the performance of previous projects will be updated regularly. The contributors to the Compost Power Network, including Cecil Smith, welcome anyone who is interested in getting help or advice on a project to contact them. Smith's website is www.polarsolarnh.com and his email address is polarsolar1@yahoo.com.


Cecil & Suzette Smith, owners - alongside the Stiebel Circulating Storage Tank

WHAT IN THE WORLD WOULD YOU WISH FOR THIS HOLIDAY SEASON?

The house we bought came with a propane fueled forced hot air system. Our heating bills were $800 -$1000/month with the thermostat set at 55º. The following year we had a wood burning insert installed in our zero clearance fireplace, which reduced our heating bill to $250/month. However that appliance really had a hard time keeping the home above 55º and the seven days we lost power during the ice storm it put out no heat because the blower required electricity. Than after three years of use, the electrical components in the wood burning insert started to fail. The manufacturer and installer had no real answers as to how to fix the insert without replacing the whole appliance. Buying a new insert plus the cost of installing was not an option for me.

A few years ago while traveling through Strasburg, France, I saw my first masonry type stove in an old castle and my awareness began. I started to research my options for heating my home in Feb. 2011, when the wood burning insert started to fail. I was reluctant to demolish the large "fireplace" in my home to make room for other means of heating my house. After much discussion with most of the heater masons in New England I finally found Roywood Masonry Heaters, LLC, who were willing to accept this complex project.

After a lot of head scratching and planning the project went forth. The process was fun, challenging and at some points stressful due to the nature of retrofitting my existing fireplace but came together nearly flawlessly. Now with the heater complete and in use it has surpassed all of my expectations. Our home is never below 65º and we are not even close to burning our max pounds of wood per day. As we sit in our living room without any chills we regularly use our oven which my wife fondly refers to as the magic oven, due to the fact that it is always on for no added cost. The oven is built into the back of the masonry heating, facing the kitchen - a wonderful extra benefit! I hope more people become aware of this wonderful technology as society moves into the future of limited fossil fuels and spiking commodity prices. The best part of having a masonry heater with a local fuel source is the comfort and peace of mind knowing that we will cook, be cozy and warm, and not have to worry about what Old Man Winter may throw at us.

Thank you, Royce and Woody! Sincerely, the McQuades

About Masonry Heaters.

The technology of the masonry heaters has been around since the Romans invented their hypocaust- a technique they created to heat their tile/masonry floors from underneath. This use of a heated thermal mass was further perfected in the northern European countries.

The coniferous forests of Scandinavia would have been exhausted if the local craftsman hadn't come up with a more efficient means of burning wood. The efficient way masonry heaters burn wood also means that less particulates and greenhouse gasses are created. Burning wood efficiently for three hours while masonry stores and later radiates heat means less work, less biomass consumed, less pollution and more comfort from radiant heat that feels like sunshine. This newest of technology has only been more popular for four hundred years and if you go in a hardware store in Denmark, you will find a whole isle dedicated to masonry heaters. It has only taken about 370 years for them to be installed by a few North Americans who want to live warm, more cheaply and pollute less.

DEAR EARTHTALK: *Is it true that gas furnaces cost less to run and burn cleaner than their oil counterparts? If I make the switch, how long should I expect it to take for me to pay back my initial investment? And are there any greener options I should consider? — Veronica Austin, Boston, MA*

It is true that natural gas has been a more affordable heat source than oil for Americans in recent years. The federal Energy Information Administration (EIA) reports that the average American homeowner will pay only about $732 to heat their home with gas this winter season (October 1 through March 31) versus a whopping $2,535 for oil heat. While the price of natural gas has remained relatively stable in the last few years, oil prices have been high and rising thanks in large part to continued unrest in Middle Eastern oil producing countries. Just two years ago the average winter home oil heating bill was $1,752.

While oil prices are likely to remain high and volatile in the foreseeable future, most energy analysts agree that pricing for natural gas, much of which is still derived domestically, is not expected to rise or fluctuate substantially in the U.S. any time soon. According to EIA economist and forecaster Neil Gamson, the U.S. already has a glut of natural gas and expects even more domestic production to come online soon as drillers are set to open up the Marcellus Shale in Pennsylvania and New York to more gas development.

Only about eight percent of U.S. homes are on oil heat today. Most are in the Northeastern U.S. and were built back in the day when oil was the cheapest way to keep toasty through the long winters. Many utilities have since put gas lines into neighborhoods that didn't have them in the past, opening the door for homeowners to switch out old inefficient oil furnaces for more efficient gas units.

The federal government's 30 percent tax credit (capped at $500) for upgrading to a high efficiency furnace expires at the end of 2011 but will likely be extended in one form or another into 2012. In the meantime, some states, municipalities and utilities offer their own incentives and low-interest loans on upgraded, high-efficiency furnaces. Check what's available in your area via a zip code or map-based search online at the website of the Database of State Incentives for Renewables and Efficiency (DSIRE). Regardless of incentives, gas furnaces tend to cost less than their oil counterparts anyway, but installing one from scratch will incur an extra thousand dollars or two to run a gas line to it from the street. If natural gas continues to be substantially cheaper than oil, the fuel cost savings alone would pay back the up-front equipment and infrastructure investment within five years in most cases.


Credit: iStock/Thinkstock

Only eight % of U.S. homes use oil heat today. Natural gas is both cheaper and has lower carbon emissions than oil, though it is still a fossil fuel and its green-friendliness is overstated. Most eco-advocates would rather see a shift to truly renewable heating sources like geothermal or solar.

Environmentally speaking, gas has lower carbon emissions than oil, but hydraulic fracturing ("fracking")—the highly controversial gas extraction method increasingly employed today (drillers inject water, sand and chemicals at high pressure underground to break through rock and access the natural gas)—takes a heavy toll on surrounding ecosystems and regional water quality. Most environmental advocates would rather see people transition to truly renewable heating sources like geothermal or solar. If you're going to the cost and trouble of switching out an oil furnace for something new, a geothermal heat pump may cost more ($7,500 and up) than a new gas heating system but will save big bucks and emissions in the long run. For those in reliably sunny areas, a solar heating system will cost even more up front but can deliver similar long term economic and environmental benefits.

CONTACTS: EIA, www.eia.gov; DSIRE, www.dsireusa.org.

KEEPING WARM THIS WINTER

With winter quickly approaching and heating oil prices nearing $4 a gallon, thousands of Vermonters are realizing the devastating effects. The reality is oil prices have soared. In Vermont, heating oil prices have jumped 34 percent to $3.83 a gallon. As Bernie Sanders reported "We cannot allow rising heating oil prices to force more of our neighbors into poverty" Electric prices have risen, as well.

What can you do?

Here are some ideas that others are doing with success:

- The most important thing you can do is to seal and insulate your home to today's standards. See our Seal & Insulate and Energy Efficiency sections in this issue of Green Energy Times for many suggestions of ways to help.
- Learn how to save with your fuel costs in our Transportation section.
- Then, consider how to take care of your energy needs with clean renewable energy technologies on the Solar PV, Solar Hot Water and Wind pages. Now is the time to make it happen.

Your cost of living will go down and you will help to assure a clean future for us all.

Buildings are the leading source of greenhouse gas emissions! We must learn to make buildings energy efficient!

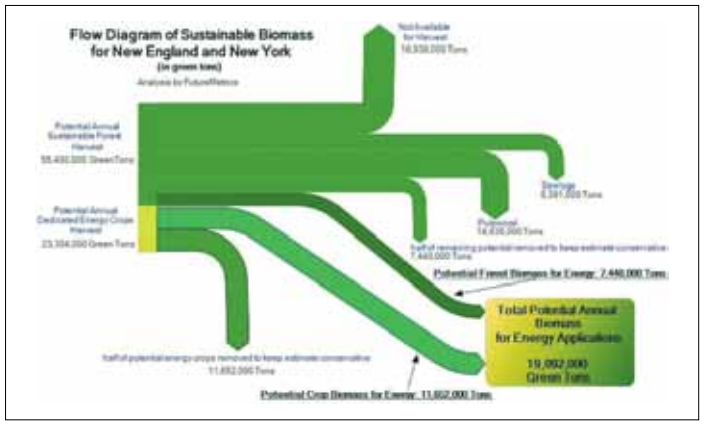
BIOMASS HEATING, FAR FROM "ECO-BLING", CLOSE TO PERFECT

TARM BIOMASS®
Innovative Leaders in Alternative Heating Solutions

The term biomass as it relates to alternative energy means different things to different people. Many will think about corn based ethanol or the experimental efforts to produce cost competitive cellulosic ethanol. Others might think about burning wood chips to generate electric power. However, the most efficient and sustainable use of renewable biomass uses the complex, but well known biomass chemical conversion process known as fire for producing heat or combined heat and power (CHP).

While fire certainly isn't forgotten, its ability to tap the sun's stored energy in trees and other plants is often taken for granted. Today's modern boilers, furnaces, and stoves are working quietly in the basements and boiler rooms of buildings around the countryside producing many billions of renewable British Thermal Units (BTU). For readers who tend to think about renewable energy only in Kilowatt hours, a Kilowatt hour is approximately 3,400 BTU. A cord of Northern hardwood contains about 20 million BTU, depending on the species. This means that a cord of wood contains just less than 6000 Kilowatt hours of energy. This is the equivalent of about a 10 month supply of electricity for an average New England household. That's powerful. It turns out that plants and trees are amazingly effective at solar conversion and storage, that is, if they are used sustainably.

Today's biomass heating machines are one of our most forgotten or at least misunderstood alternative energy technologies. What is so great about these new machines? To start with, there is no other biomass technology that comes close to an 85% total efficiency. As with other known renewable energy technologies, biomass heating won't fill all of our needs, but it can play an important role. According to "Heating the Northeast with Renewable Biomass" www.biomassthermal.org it is possible to convert 18.5% of Northeast homes to biomass heating sustainably. It is important to note that this is probably not possible with low conversion efficiencies as are realized when wood is burned to produce power.



The new biomass machines also produce very few harmful aerosol particulates compared

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Biomass Heating, Far From "Eco-Bling", Close to Perfect

Cont. from page 22

to old stoves, fireplaces, and outdoor boilers that have become synonymous with wood burning. Automation has made the newest appliances adequate replacements, not adjuncts, but replacements for oil and gas appliances.

In New Hampshire and Vermont about 465 Million gallons of heating oil are used each year. At $3.65/gallon, that equates to just over 1 Billion dollars per year, of which nearly 800 Million dollars are exported out of the United States. In these economic times, wouldn't it be nice to have those dollars back at home creating thousands of jobs? Due to the hidden nature of biomass heating appliances, they will have a hard time competing with solar and wind as a visible badge of greenmanship. For those who appreciate the benefits of using a local fuel, creating local jobs, enhancing the value of forestland, and most importantly, saving money, biomass heating is a smart choice for discerning environmental stewards.

BOOK REVIEWS

by N.R. Mallery, publisher of Green Energy Times

Navigating the Coming Chaos - A Handbook For Inner Transition

Review by N.R. Mallery 11.24.11

While Carolyn Baker's words can be quite disturbing, in Navigating the Coming Chaos - A Handbook For Inner Transition, it is worth the read. Carolyn quotes James Gustave Spelth's assertion that "We need to be reminded of the nightmare ahead… we will never do the things that are needed unless we know the full extent of our predicament."

She continues with a blog piece from Michael Greer: "…the thing that most people in the industrial world are going to want most in the very near future is something that neither a revitalization movement nor anything else can do. We are passing from an age of unparalleled abundance to an age of scarcity, economic contraction, and environmental payback.... the end of the age of abundance isn't happening because of changes in consciousness; it's happening because of the laws of physics.... a predicament that we will have to live with, one way or another, for a very long time... there is no bright future ahead..."

"But for mathematical cosmologist and physicist, Brian Swimme, the issue is not preventing or avoiding cataclysm but rather, attentively responding to it. 'Cataclysm is happening, but the choice before us is whether we will participate consciously.'"

We are now presented with unprecedented and daunting challenges with our energy, environment and economics. Navigating the Coming Chaos can be likened to a toolkit that outlines the inner preparedness we need to attend to, as we begin a journey down a path we have not taken before.

From inevitable violence, collapse of relationships with our government and those we have grown to rely on, transitioning will include involvement with new relationships within communities and the psychological and emotional catastrophes that follow the massive denial among the masses that still currently exists. Baker warns that "in a chaotic, collapsing world, neighborlessness may well become lethal. We should be cultivating connections with neighbors and others in our communities… whether or not our neighbors understand the collapse of industrial civilization is far less important than whether or not we have formed cordial relationships with them… seize the opportunity to share food, plant community gardens, create opportunities for working together to mutually support each other and the immediate vicinity around us.

The book covers unthought of topics such as Creating Livelihood for Means and Meaning; Finding Home in a Volatile, Uncertain World; Embodied In a Disembodied World; Emotions: Becoming a Warrior of Vulnerability; Befriending Grief and Depression in The Coming Chaos; Managing Fear, Anxiety, and Terror; From Despair to Impassioned Inspiration; Cultivating Compassion Amid Chaos; Courage - Compassion Embodied and Fulfilled; The Joy of Mindful Preparation; The Skillful Use of Inner Transition Tools; and on to Beyond Survival and Preparing For Not Knowing. Interactive Journals at the end of each chapter encourage participation as well as Exercises and Practices to assure the resilience that we can all benefit from.

As Andre Angelantoni, founder of Post Peak Living wrote: "This is an invaluable tool for people who are committed to creating a fulfilling life no matter what the future brings."

Editor's Note: On pg. 73, Baker argues that Vermont did not meet her needs to prepare for the coming chaos, due to geographical challenges, not enough sun and lack of a sense of community. Being 100% solar powered and unable to use all of the energy my system makes, I do not agree and since Irene's devastation, that community spirit certainly proved otherwise. Rural living does present challenges, but also affords the ability to live even more sustainably as they did in pre-industrial times - only with modern technologies to make life easier. Preparing now for the 'coming chaos' will be a challenge that must be taken seriously. Procrastination is not an option.

RECOMMENDED READING

Visit **www.chelseagreen.com** to order these books or other sustainable books from Chelsea Green Publishing:

Buildings of Earth and Straw by Bruce King, P.E.
Confronting Collapse by Michael C. Ruppert
Energy Free - Homes for a Small Planet by Ann V. Edminster.
Fresh Food from Small Spaces by R. J. Ruppenthal
Future Scenarios - How Communities Can Adapt to Peak Oil and Climate Change by David Holmgren
Gaia's Garden A Guide to Home-Scale Permaculture by Toby Hemenway
Living Above the Store -Building a Business That Creates Value, Inspires Change, Restores Land & Community by Martin Melaver
Navigating the Coming Chaos - A Handbook for Inner Transition by Carolyn Baker
Simple Food for the Good Life - Random Acts of Cooking and Pithy Quotations by Helen Nearing
Small-Scale Grain Raising, 2nd Edition by Gene Logsdon

CHELSEA GREEN PUBLISHING
the politics and practice of sustainable living

Time's Up! An Uncivilized Solution to a Global Crisis by Keith Farnish
The Biochar Debate by James Bruges.
The Carbon-Free Home by Rebekah Hren, Stephen Hren.
The Organic Farmer's Business Handbook by Richard Wiswall
The Passive Solar House by James Kachadorian.
The Transition Timeline- For a Local, Resilient Future by Shaun Chamberlin
Wind Energy Basics, 2nd Edition by Paul Gipe.
A Solar Buyer's Guide for the Home and Office by Stephen & Rebekah Hren.
Passive Solar Architecture - Heating, Cooling, Ventilation, Daylighting, and more, Using Natural Flows by David A. Bainbridge and Ken Haggard
Perennial Vegetables - From Artichokes to Zuiki Taro, a Gardener's Guide to Over 100 Delicious, Easy-to-Grow Edibles by Eric Toensmeier

THE ENVIRONMENT IS IN PERIL

How do you respond to people in your daily encounters that don't believe in sustainability or that the environment is in peril?

I am sure most of us have had this struggle with work associates or family/friends. I would love to hear how you approach this issue.

Larry Furman • This is a really good question. On one hand, I'm more interested in talking to people who are open-minded than people who won't consider facts. On the other hand, it's all about framing the issue. I have also found that people make decisions emotionally, then look for facts they can use to rationalize those decisions. But if they spend hours each day listening to Limbaugh, Hanity, and the other weavers of fantasy, then they will not respond to a few seconds of rationality from me. Yet, people who are concerned with issues of national security can appreciate arguments for solar, wind, hydro, and efficiency. People who don't like the idea of subsidies for wind and solar shouldn't like the idea of subsidies for coal, oil, nuclear, or frakking gas (frakked-up gas). They also understand the Lazard studies that show wind and geothermal cheaper than coal and nuclear, and understand that the costs of solar are dropping. just like the costs of computers. Then there's sarcasm. When I say "After 100 days in Texas when the temperature was over 100, it's a good thing global warming is a myth. If it was real, it'd be really hot." they laugh and start to think (that ends when they turn on Limbaugh, and the others). I also said "we could solve this problem simply be redefining the Farenheit scale. If we revise 100 to mean 70, then when it's 100 it wont feel so hot - it'll only be 70." The ludicrousness of the argument stops them dead in their tracks. Most of the time they look at me like I have 3 heads, but some of the time it puts a crack in their wall against reason. But mostly I realize that whether they are short-sighted, foolish, reckless, or maybe scared, their beliefs don't matter. We will get more big storms, more big hurricanes and tropical storms hitting Massachusetts and Vermont, more heavy snows coupled with shorter winters and thinner ice (and more snow-mobilers crashing thru thin ice), more oil well / ocean / beach disasters like the Deepwater Horizon, more coal disasters like Kingston and Upper Big Branch, more nuclear disasters like Fukushima and near-disasters like Fort Calhoun The best we can hope to do is adapt. I'm a cup-half-full kind of guy, so I'm optimistic.

WILL SOLAR PRICES CONTINUE TO DROP?

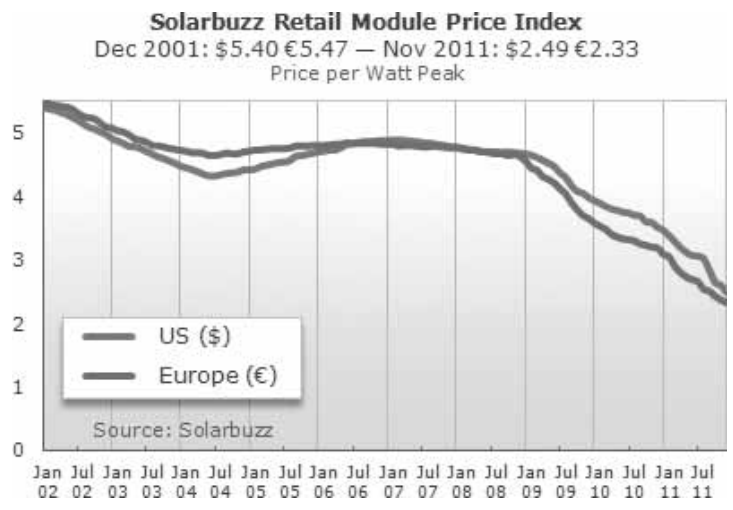
Cont. from page 10

installed cost of a solar energy system. Prices are based upon the purchase of a single solar module and are exclusive of sales taxes.

Please note the retail price averages as there are manufactured costs reflected in this article as well. One thing that we want to stress to the end user in general is the large influx of modules being manufactured by lesser known companies. Research and decisions on modules should be based on several factors:

1. Quality & performance;
2. Strength and history of the company manufacturing the modules (are they going to be around for 25 years to support a warranty);
3. Where the module is manufactured;
4. Would the company use this module in their own systems and stand behind it?

Quality components make for a stronger PV industry and greater consumer trust. This is the direction we want the industry to go, and hope that the influx of sub-par components doesn't erode consumer confidence through in the field failures.



GREEN GURU DECEMBER 2011

Occupy a Better World

From the balcony, on Wall Street, the chuckling 1% observes the thousands of ma rchers, as they clink their glasses of champagne. "We'll see how long this lasts when Winter gets here; These spoiled kids don't have any clear demands, they don't even have any leaders" "why don't they just get a job?"

They laugh as one pours the last few drops of the bottle down to the crowd. "See we are sharing-we care!" They turn away, certain that if they just ignore these crazy anarchists, eventually they will go away and things will get back to normal.

The 1% has it right. But it's not the protestors that are going away. They no longer have a "normal" to go back to. The economics are no longer normal, nor is the climate. Many can't even get unemployment benefits, and were themselves on the balcony not long ago.

Lose your job, healthcare, home, car, your 401k, your unemployment, and your self esteem - a new kind of "freedom",with nothing left to lose. Get pepper sprayed or beat up a little - "ouch" is no longer an adequate response.

If gathering in a park, street, building or a bridge and saying "We're mad as hell and we're not going to take it anymore" meets with derision, dismissal, and misunderstanding, what do we do next?

Just start ignoring the oligarchy, who exist thru our support. Dismiss their hold over you. Stop feeding them and they will go away. Vote with your wallets and your feet -stop supporting the things that you wish to change. The Tweet revolution used so successfully around the Middle East, ushers in a new opportunity of instant messaging manifestos-unparalleled in history to create radical transformation - We now have it in our hands to shut down the privileged oligarchy - neatly and swiftly. The propaganda and the conditioning gives us the mistaken impression that we could "have it all" too. The truth is that, like a sad game of Monopoly, it's become a hamster wheel. Keep passing go, keep handing off your dough. After a while you realize, once the leverage is established, you can't get off the board. Your only security is landing in jail.

Better to start a different game altogether. Let's occupy this idea- another way.

Possible? Finally. It's happening now. We're actually holding the ball, never realized that we are keeping the things going that we say we are against, like war, starvation, regrettable energy and environmental practices. As Pogo said, "We have met the enemy and it is us" but as Gandhi also said "We can be the heroes we've been waiting for".

So now what? Do we become co-opted by a certain political persuasion that says they "get it now" and will represent us in the great election to come? Maybe. Maybe there is no real difference in party ideology, when the same people own both sides of the aisle, often, the same people that sell arms to both sides in the war. And sell disease every night on TV and cures for them all as well.

A step by step guide:

Identify and immediately dismiss the companies that advertise those programs on the networks that advocate "The Extreme Oligarch Agenda". Keep a list handy by the radio, (and TV if you watch it) Tell two friends in your social network or tell twenty. This is the single most important step. Do it before the Powers that be can shut down the internet. Stop feeding them. They will get the message Real Quick!

Beware of propaganda and Greenwash. A lot of corporate "persons" will put on a Green Suit and a Red White & Blue hat. Don't buy it. Stop buying the things you don't want.

Not sure who they are? Pick up a copy of "The Better World Shopping Guide" - the baddies are all listed: Banks, Energy, Food, all the stuff we use.

Start buying what you want! Better World lists the good guys, too! Let the "market" decide! (you and I!) Credit Unions, Renewable Energy, Local food, and even alternative media!

Get the idea? Go get 'em and tell those "friends" of yours that you "like" this Better World.

Will it be perfect? No, but it will be in progress, and a heck of a lot more cozy than standing out in the cold and wet, waiting for the privileged 1% to "share". Tell the 1% to kiss it where the Sun doesn't shine!

$OLAR ADDS VALUE TO YOUR HOME

Cont. from page 11

consumers, in general, are just willing to pay more for the social status of "going green." The motivation of the seller to raise the cost is fairly obvious – to recoup the cost of the solar installation, of course. On average, the study found that homes retrofitted with PV systems paid $5/watt, while new homes with PV systems paid $4/watt. In many cases, home sellers were actually reluctant to raise the asking price, given the sluggish market conditions.

Does Size Matter?

Researchers looked at 40,000 PV system homes and 150,000 non-PV homes to see how much more the average PV system home brought in and what characteristics a PV home vs. a non-PV home had. They found the average non-PV home sold for $584,740, compared to the average PV home which sold for $660,222. Researchers admit that the average PV home happens to be younger by two years, bigger by 200 square feet, has 0.3 more bathrooms and 0.06 more acres, and has a 3,100 watt / 1.5-year-old photovoltaic system – so there are multiple factors that could account for the $75,482 price difference. Researchers note that, most telling of all, was the finding that the average PV home appreciated by 3.2 percent, whereas the average non-PV home *depreciated* 1.4 percent. It seems that homes that incorporate solar panel systems into their layouts are on the cutting edge and viewed as more valuable to their overall communities.

The Lawrence Berkeley National Laboratory did an excellent study on this in California, however there is information that can be carried nationwide.

FARM-WAY INC - GETTING GREENER

By Skip Metayer

Many things influenced us in the decision to go solar almost three years ago. Be it from our customers that were pursuing or were involved in some aspect of green energy themselves, to the expansion only a couple of years earlier of our retail store of approx. 70% increase, which resulted in much more energy consumption with the additional utilities encompassed {air handling, heating, cooling and lighting}. These things along with our own growing concern of our environment led us to take the step towards dissolving a large portion of our impact at our community level though at the time the economy was on the decline.

We are still, after just shy of three years, extremely excited about this venture we have taken, and by our customers comments, so are they.

Construction of this system began in mid October of 2008, and had begun collecting power from our system by the beginning of January 2009.

Farm-Way and "Vermont Gear", our retail web site, with the help of the "Vermont Clean Energy Development Fund, have invested over $450,000 in our solar panel project from the Gro Solar company in White River Junction, Vt. Grant money from the Vermont Clean energy fund helped get this project off the ground and was received in May of 2008.

The 308 panel system is in a our adjacent field, leaving room to expand the system in the future to perhaps compensate for 100% of our electrical utility needs. Our estimated payback is expected in approximately 10-15 years.

We are generating approximately 58 kW of power, which is equivalent to 43% of our electrical power consumption. We have accumulated readings of up to 66% of our power being generated by our system in the months of April and May, 2010, and 54% this year.

Thus far we have produced equivalent to the energy to power 16 homes for 1year, or the energy to power 1,602 computers for 1 yr , or the energy to operate a TV for 1,447,664 hrs. We also have saved 359,520. lbs of CO2 greenhouse gases - the equivalent pollution an average passenger car emits over 36 yrs.

Lifetime of our solar system data states we have produced 44% of our consumption , which is very nice to know the calculations prior to installing the system proved to be correct.

Our utility usage is approx.$33,000/yr. With our solar production, we save over $14,000 annually towards this cost .

Environmentally, our system allows our local electrical service to avoid 76,000 lbs of carbon dioxide/yr, equivalent to 11 passenger cars for a year or annually planting over 1500 tree seedlings and growing them for 10 yrs. This will also allow reductions from the utility power annually of NOX @ 84 lbs and sulfur dioxide @200 lbs.

To help raise awareness , and promote education, a public video monitor at our entryway provides continually updated views of the systems output and information on the benefits of solar. We have also linked our web site to the data and output information in real time, as it happens, on our web page.

We are extremely excited about this endeavor , and even more so as we watch our compensation for utility power that is being generated with this pasture of power...

Our future plans are already in progress, by becoming more energy proficient with the help of" Efficiency Vermont", by upgrading to more energy efficient lighting in our main store and our adjacent "County Gifts and Furniture" store, entailing the replacement of over 75 fixtures, using 60% less energy. We installed 200 L.E.D replacements for florescent lighting tubes last year, from www.leddynamics.com {made in Vt !} LEDs are the most efficient light source known to mankind, next to the sun, lasting up to 100,000 hrs, 10x longer than conventional illumination, and 80% more energy efficient than standard lighting.

Dedicated to protecting the environment, it is our strategy to seek improvements throughout our business operations to minimize our impact on the local and global environment by conserving energy and other natural resources; reducing waste generation; recycling and purchasing recycled products; and reducing our use of toxic materials. We also give preference to suppliers whose products follow our strategy above.

Farm-way has also become a "Vermont Business Environmental Partner", and is taking many steps to do our share in protecting the environment by recycling refuse materials with "zero sort", upgrading our lighting to more energy efficient versions , using recycled paper, and practicing standard energy reductions in electricity usage.

WEATHERIZATION 101 AT THETFORD ENERGY EXPO

By Bruce E Landry, 5 Star Energy Tech

On Nov. 5th SERG and Thedford HEAT sponsored the Home Energy Expo at Thetford Academy. Bob Walker did a great job organizing this event. 5 Star Energy Tech was asked to participate in sponsoring this important event, which we gladly did. It was nice to meet up with some old friends in the business and meet the folks of Thetford. I spent most of the day talking to everyone at my table about how houses work from an energy point of view and what an energy audit was.

The audit gives us the information we need to make recommendations to improve the energy efficiency of your home. Every house comes down to basic thermal physics. Warm air moves to cold air. Cold air enters the house through wind and negative air pressure in the lower half of the house and warmer air leaves the house in the upper half with positive pressure. The solution is simple in theory, stop the air flow and increase the insulation performance where we can. The application is not that simple because every house has a story and no two houses are the same. (How many renovations have occurred and that bump out doesn't look original to mention a few).

Since air sealing is a new concept, very little if any has been done in most homes and many places are finished living spaces and are not cost effective to do. That is why it takes a company, trained and certified that understands how houses have been toggled together over their lifetime. We bring in a blower door to test the house tightness and locate the big holes and an infrared camera to compare the slightest temperature variation on the exterior walls. We do pressure diagnostic on interior walls switches and outlets to see if the wall cavity is leaking to the attic. Do you have a moister issue? Is mold growing in places that you rarely visit, like in that crawl space?

Documenting information from the blower door test

Viewing thermal imaging from the infrared camera;

Before we do any of those tests we inspect your heating system. What good is a tight energy efficient home if the heating system is leaking carbon monoxide or running well below efficiency or the draft is not working properly?

We, at 5 Star Energy Tech, audit your whole house as a system. Energy reports reflect how efficient your house is and recommendations are made where there may be improvements. We have worked on houses from the early 1800s to as recent as 2010. We look forward to working on yours.

Thanks for stopping by and asking questions at the energy expo.

IMPROVING YOUR WINDOWS FOR MAXIMUM COMFORT & OPTIMAL EFFICIENCY

By Bob Bacon

This is the First in a Series of articles by the author: "The Sustainable Operation and Care of Buildings"

The important function that windows play in building performance: the role that windows play in affecting the comfort and quality of our lives.

Since northern New England's building stock is the oldest in the country, a great number of our region's windows are old, single glazed and either very loose fitting or, or they're inoperable because they've been painted shut. But, precisely because these original windows are very old, they are usually very well built, very attractive, and very valuable assets, making them excellent candidates for improvement, restoration, and preservation rather than replacement.

Where do we start, and what exactly are we trying to improve? To be clear, what we're interested in improving is the performance of the "hole in the wall" into which our 'window' was installed. We put holes in the walls of our buildings to provide us with light, ventilation, views, and access; then we install 'windows' and other devices into these holes to regulate and 'control' the invited transfer of light, air, vision and movement through the opening while achieving weather-tightness, security, safety, energy efficiency, and privacy…all in an a manner that is ideally attractive, flexible, durable and long-lived. This is a tall order in a cold climate such as ours but we can accomplish all of these things if we think of the solution as an 'assembly' of components that work together rather than as a single window 'product.'

For most of us, the rising costs of heating fuels have made reducing heat loss our top home-improvement priority; and if we've already insulated our walls and ceilings as best we can we're now faced with reducing heat loss through our door and window openings. Although a thorough energy audit can estimate the costs, fuel savings and relative payback of various home improvement options.

As a general rule, eliminating air movement through the opening with simple repair and weather stripping is almost always the most prudent and cost effective first step. Once these relatively easy and inexpensive convective heat losses have been eliminated, the next step is to improve the "R" value (or insulative value) across the opening to reduce conductive heat losses. These options generally include adding "supplemental" panels or layers of material to the opening such as 'storm' windows, a second layer of glass to the sash, insulated curtains and shades, and/or transparent interior insulation panels. Deciding among these options requires that we evaluate the characteristics of each option against the performance goals mentioned earlier. For quick reference, the Table "A" below compares the functional attributes of several of the most common generic options and Table "B" illustrates many of the "quality-of-life" attributes.

But, what about improving the opening's performance by replacing the entire window with a new, double or triple pane unit with Low 'E" glass that is fully weatherstripped and clad for low maintenance? In rare cases where the original wood sash has rotted beyond repair or restoration, full replacement may be the best option, but this improvement strategy is often not the most cost effective or performance enhancing option. Vinyl replacement windows, for example, have been very heavily marketed for their low maintenance and relatively low initial cost, but they have consistently proven to be very poor investments because thermoplastics don't stand up well to the weather resulting in a very short useful life. Quality wood windows, both clad and unclad, have proven to be much more durable and long lived than plastic, however, wood sashes are vulnerable to rot from persistent exposure to moisture. The outside of windows on the building's north side may not receive enough sun to fully dry the wood after rain and snow, while the inside of windows may remain wet throughout the winter because of repeated condensation on the inside of the glass. Composite materials such as fiberglass are impervious to rot and stand up well to the elements but since the walls and trim around the windows are still made of wood, fiberglass windows don't solve the underlying problem of moisture build up from condensation.

Replacement windows, even those with dual glazing and Low E glass, are not the solution to eliminating condensation. Moisture vapor condenses into a liquid when warm moist air comes into contact with a cold surface and, since glass is a very poor insulator because of its density; it remains cold compared to a comfortable room temperature – that's why even expensive replacement windows will 'sweat' in cold weather. The solution is to prevent warm, moist air from coming into contact with cold surfaces.

The densities of glass and of cold air are also the causes of uncomfortable cold air movement next to the inside of otherwise new and well-sealed windows. In cold weather glass continues to extract heat from the adjacent interior air which, as it becomes heavier, falls resulting in an uncomfortable "draft" near the new window. Since improving our comfort and reducing the maintenance caused by the stains and rot of condensation, replacement windows may not be the best solution.

In our next article we will discuss the common types of windows and discuss how to operate them to achieve maximum comfort with minimal energy use.

Bob Bacon is the Planning and Design Consultant and President of Window Improvement Masters, Orford, New Hampshire.

VAMPIRES STRIKE AGAIN… *AGAIN!*

How to Reduce Vampire Load

What is vampire load?

Vampire load, also known as stand-by power or phantom load, refers to the electricity that is used by home electronics and appliances when they seem "off" or are in standby-mode. Most people think that when you turn something off, it turns off completely and stops drawing power. Unfortunately, that's not true in the case of many electronic devices. Examples include TVs, VCRs, DVD players, stereos, game consoles, laptop computers, desktop computers and monitors, anything with a remote, a charger, or a clock display.

Why are vampire or phantom loads so scary?

Home electronics products, such as televisions, computers and monitors, DVD players, digital video recorders, and audio equipment, account for about 15% of household electricity use. For example, game consoles, like the Xbox 360 or PlayStation, draw 120-150 watts of electricity when in use – but they can also use up to 150 watts of electricity when they're supposed to be off. This can add up to more than $100 per year on your electric bills. That's scary!

Six ways to fight vampire load

- Use an Advanced Power Strip. The Advanced Power Strip takes care of vampire load for you, so when you turn your TV off, you can have your entire home theater–your DVD player and game consoles–turn off, too. Use an Advanced Power Strip for any cluster of electronics you want to control with the flip of a single switch or the click of a remote control.
- Unplug your devices. For small accessible electronics, just pull power cords out of the outlet if they're not in use.
- Reduce your demand. See if there are electronics in your home that you no longer use at all, or use very infrequently. How about that old VCR that you no longer use?
- Don't leave chargers plugged in. Your cell phone charger, iPod charger, laptop charger, etc. keeps drawing electricity even if they are not charging a device. So if your phone or other device isn't attached to your charger, pull the charger out of the wall.

- Choose ENERGY STAR® and save. ENERGY STAR qualified electronic products offer the same features and technologies as non-qualified products, but they use less energy, and this saves you money on your electric bill.
- Measure your electronics power consumption. You can measure how much electricity your electronic devices use with the Watts Up electric meter. With this information, you'll be better able to identify the connection between your appliance use and the amount of your electric bills. Borrow a Watts Up electric meter from Efficiency Vermont. http://www.efficiencyvermont.com

Tip: Some local libraries also loan Watt meters. They are very eye opening regarding what it is that raises your electric consumption!

LESS FRESH AIR LEAKS INTO TODAY'S TIGHTER HOMES LESS FRESH AIR LEAKS INTO TODAY'S TIGHTER HOMES

In the not-so-distant past, most homes leaked so badly that the air inside would be exchanged on a regular basis with no help whatsoever. The leaking and changing of air in a home often contributed to venting radon gas, and bringing fresh air into the home, but not necessarily removing the gas to safer levels or creating better indoor air quality.

Today, with higher insulation levels and the use of housewraps that are properly installed, the leaking is much reduced.

- Sealing of homes has reduced built-in air exchange, trapping more radon gas within homes, so additional systems must be incorporated.
- Most residential air conditioning/ heating systems are not designed to bring in fresh air, but recirculate the air within the building.

Conforming to EPA guidelines is easy

Installation of the remediation system is relatively low-cost when compared to the cost of building a home or undertaking a major renovation. The amount of work required to make a home conform to the EPA guidelines for radon remediation is very small, and not difficult.

With more people incorporating green building techniques, many builders are responding and including the remediation systems in their projects.

Radon is:

- A naturally occurring gas formed by the decay of uranium that is found in nearly all soils.
- A known carcinogen as classified by the World Health Organization (WHO), the National Academy of Sciences, the U.S. Department of Health and Human Services, as well as EPA, because of its proven links to lung cancer in humans.

Health issues and exposure concerns:

- When a home or any other structure is built, radon is trapped within the structure after it enters the building through the basement, crawl space, or slab through holes or cracks or piping.
- Levels between or above 2 and 4 pCi/L are recommended by the EPA to be remediated.

Remediation of radon:

- Remediation systems are similar if they are installed during construction or retrofitted. You must create a void either by installing gravel or a system of open piping below the slab, and install either a passive or mechanical vent to the exterior. All cracks and gaps must be sealed in the slab to ensure that radon is not seeping into the home.
- Many states require a licensed radon remediation contractor to design and install the system.
- In new construction, a system is installed to exhaust the gas from beneath the basement or main slab to the exterior, properly sized to keep the levels below the recommended level of 4 pCi/L.
- For an existing structure, testing must be performed to determine if remediation is required. A testing canister is placed within the structure for three days. The canister is then removed and tested in a laboratory to determine the level of radon within the structure. If the levels are determined to be too high, a licensed radon contractor can design a system to remediate the radon. A second three-day test must be performed after the installation of the venting equipment to determine if the levels are below the required maximum.

More information on EPA's radon website: www.epa.gov/radon/.

Radon is the most potent carcinogen in your home

You cannot see radon gas. And you cannot smell it or taste it. But it may be a problem in your home. As the only gas in the decay chains of radioactive heavy metals, radon and its floating radioactive products can easily get into human body by inhalation. Whenever you breathe in air containing radon, it increases your risk of getting lung cancer. The National Academy of Sciences and the Environment Protection Agency (2003) estimate that in the U.S., radon in homes causes 21,100 lung cancer deaths each year.

Radiation is called the "complete carcinogen" because, unlike chemical carcinogens, it alone can initiate, promote and propagate cancer. The primary site of radioactive exposure to most people is their home. The average person receives a higher radiation dose from radon at home than from all other natural or man-made sources combined.

Radon is a proven and very potent "Class A" carcinogen. Safety limits on toxins or carcinogens in food or water are set at levels thousand times less lethal than what is the risk from radon in an average American home. "Radon in homes causes more deaths than fires, drownings and airplane crashes combined." (EPA)

After smoking, "radon is the second leading cause of lung cancer." (Surgeon General) Among non-smokers, radon is the No. 1 cause of lung cancer deaths.

***Take note:** Children are more susceptible to radon!*

HBRA ANNOUNCES BETTER HOMES AWARD WINNERS

On Tuesday, October 18, 2011 the 34th Annual Home Builders and Remodelers Association of Northern Vermont's (HBRANV) Better Homes Award Banquet was held at the Sheraton Hotel and Conference in Burlington. Over 375 people involved in the homebuilding business attend this year's banquet. This banquet, known as the "Academy Awards" for the Home Building Industry, highlights builders for projects that they submit to the program.

Most Innovative Design Build - Tom Moore Builder, Inc., Underhill Center

Lifetime Achievement Award was given to Jim Dousevicz, Dousevicz, Inc. based in Essex Junction, Vermont.

Builder of the Year Award was given to Ward Smyth of Turtle Creek Builders Ltd. based in Waitsfield.

Remodeler of the Year was awarded to Joe Meccia of Joseph Meccia Builder LLC of Huntington.

Associate of the Year was given to Jeff Gephart of VermontWise Energy Services.

CATEGORY WINNERS WERE:

- **Best Landscaping** - Morning Dew Landscaping & Stonework, Richmond
- **Commercial:** New/ Renovation - Vorse Construction & Design, Inc., Colchester
- **Condominium** - Peregrine Design/Build, South Burlington
- **Residential Renovation Under $100,000** - Resourceful Renovator, Jericho
- **Residential Renovation $101,000 - $250,000** - Sandra Vitzthum, Architect, LLC, Montpelier
- **Residential Renovation $251,000 - $400,000** - K Puls Management, LLC, Bristol
- **Residential Renovation over $401,000** - K Puls Management, LLC, Bristol
- **Single Family Home Under 2,000 Square Feet** - South Village Communities, LLC, S. Burlington
- **Single Family Home 2,001 – 3,000 Square Feet** - Roundtree Construction Inc., New Haven
- **Single Family Home Over 3,000 Square Feet: Cost Under $500,000** - Hayward Design Build, Colchester
- **Luxury Home $500,000 - $1,000,000** - Bickford Construction Corporation, Williston
- **Luxury Home Cost Over $1,000,000** - Perkins Smith Design Build, Shelburne
- **Best New Kitchen** - Beacon Hill Builders & Associates, Morrisville
- **Best Renovated Kitchen under $50,000** - Neal Speer Construction Company, Inc., Swanton
- **Best Renovated Kitchen over $50,000** - Kitchens by Design, Georgia
- **Best Bathroom: New / Renovated** - Kitchens & Interiors International Design, Shelburne
- **Best Feature** - Leach Construction of Vermont, Jericho
- **Best Design Feature** - DPF Design, Inc., White River Junction
- **Most Innovative Design Build** - Tom Moore Builder, Inc., Underhill Center
- **Best Builder Website** - Crowley Construction Co., Inc., Colchester
- **Best Associate Website** - Curtis Lumber Company, Williston
- **Most Innovative Marketing Piece** - Craig Hervey Housewright Construction, Inc., Newbury
- **Environmental Excellence Award** - Yandow Green Builders, St. George
- **Energy Efficiency Award** - Tom Moore Builder, Inc., Underhill Center

For a complete listing of this year's winners visit www.vtbuilders.com

The Home Builders and Remodelers Association of Northern Vermont is a trade association, comprised of 500 members, who build, remodel homes, or supply products and services to the home building industry.

The Association is a leading advocate for the affordable construction of housing to all Vermonters.

SMYTH NAMED VERMONT BUILDER OF THE YEAR

Turtle Creek Builders of Waitsfield, Vermont is proud to announce that Ward Smyth, head turtle, has been awarded Vermont's prestigious 2011 T. Wayne Kondor Builder of the Year.

The T. Wayne Kondor Builder of the Year Award, named after the late Wayne Kondor, was developed to highlight a builder that is involved in the Vermont Homebuilders and Remodelers Association, as well as his/her community.

Ward has been an active member of the Vermont Homebuilders and Remodelers Association (HBRA), serving as President of the Association in 2010. Ward also is a founding member of the Green Council, Government Affairs and Education Committees at HBRA. As a strong supporter and proponent of the building trades, Ward regularly testifies on building issues at the Statehouse in Montpelier, has been interviewed by various media outlets and has served on study committees as an expert in the residential field.

Throughout Ward's community he is not only recognized for his round red spectacles but for his tireless efforts serving as vice-president of the Valley Art Foundation. Ward participates in the famous Warren Fourth of July parade and sponsors many local events including the Mad Marathon. He raised his two children in Warren and resides in Fayston with his wife Nancy.

Turtle Creek Builders is a hands-on custom home building and remodeling firm based in the Mad River Valley and serving all of central Vermont. They specialize in 'green' building practices in both the building and the construction process. Ward Smyth was the first builder in Vermont to be designated "Certified Green Professional."

MILK PAINT

One may think that using milk to paint with is a very strange concept. But think of this- just try drinking a glass of milk and then leaving the glass on your bedside table or next to the kitchen sink. The next morning the milky residue has hardened and is not easy to remove. Milk is a strong binder, especially when mixed with crushed limestone, the basic binder in one of the world's earliest paints, milk paint. Some of the oldest painted surfaces on earth, including cave paintings in France and items in King Tutankhamen's tomb, were colored with a simple composition of milk, lime, and earth pigments.

Because the original formulas for milk paint were so simple to make and use, it was, for thousands of years a durable, major form of decoration throughout the world. Formulas varied greatly, and produced varied results, but it was always a combination of milk protein (casein), lime, clay and pigments used. The colors on those early cave paintings in France, even though exposed to the open air for centuries, are as vivid today as they must have been all those years ago.

In Colonial America, itinerant painters roamed the countryside, carrying pigments with them, which could be mixed with a homeowner's own milk. Practically every household had their own cow or goat, and each community had its own lime pit. Even though many examples of early American furniture painted with some form of oil paint exist, the look associated most widely with the country homes and furniture of the 17th, 18th, and 19th centuries is that of the soft velvety, rich colors of milk paint.

This scene didn't change much until after the Civil War. In 1868, the first patent was given for the metal paint can with its tightly fitting top, and the commercial paint industry was born. For the first time, paint could be manufactured in great mass, packaged in the new patented cans and shipped to stores throughout the country.

But this kind of operation does not lend itself to the use of milk paint. Made from natural milk protein, it can spoil just like whole milk. Therefore, from the very beginning of the commercial oil paint industry, up until 1935, the only paint sold commercially was oil-based paint, to which lead, mildewcides, and other poisonous additives were added. Latex paint followed, which also contained additives and preservatives.

When Charles Thibeau was researching old milk paint formulas in the early 1970's to provide an authentic finish for his Colonial reproduction furniture, he came up with a formulation that remained true to the natural ingredients found in these old recipes, using the milk protein in a powdered form. He found that he could simply add water to the mixture and just mix up what he needed at the time, eliminating the need for preservatives or other chemicals to keep the paint fresh. This was especially important when, after being interviewed for a Yankee Publications' book about the forgotten arts in 1974, Thibeau's phone started ringing off the hook with requests for this old fashioned milk paint. And thus, The Old Fashioned Milk Paint Company was born and Thibeau was able to ship his formula far and wide in a convenient powder form. Not only does his milk paint provide the warmth and colors of Colonial America, it remains all natural, 100% biodegradable, with no harmful VOC's.

by Anne Thibeau, The Old Fashioned Milk Paint Co., Inc.
Milk Paint - Natural Option with a Long History

DEEP ENERGY RETROFIT IN E. CALAIS VT

Cont. from page 1

taking advantage of balloon framing, heat/hot water/cooking systems integration, root cellar/food storage

Architect/Designer: Ben Graham/initial room layout scheme by Gene Lauer/Nicko

Rubin (landscape)

Builder: Ben Graham

Subcontractors: Iron Horse Standing Seam. Nicko Rubin of East Hill Tree Farm for landscaping. And Alfred Larrabee on excavation. Andy Shapiro is mentoring me on the energy design. Murphy's Cell Tech is doing the cellulose. Working with two solar installers for hot water and PV: Solar Specialists and Greenworks Solar Store.

Plumbers: John McDougal and John the Plumber. **Electrical:** Jan Ruta. Chimney Care is renovating the chimney.

Michael Cuba of Knobb Hill Joinery give us an evaluation of the barn.

Website: www.naturaldesignbuild.us

Additional Comments - Quotes from Ben's blog

THURSDAY, SEPTEMBER 1, 2011

SBF#9 What makes it a Deep energy retrofit.

In the last couple years this element has really become an interesting challenge for me. After a couple of years of immersing myself in energy geek world, I get to bring a lot of retrofit ideas together with a lot of freedom because of the depth to which we gutted the farmhouse. Interestingly, the old balloon framing style has helped with the fact that we are leaving the exterior skin on and insulating to the inside, which is typically the least favored option in terms of how to add insulation to the walls. I should say that this retrofit favors natural materials over petrol and chemical based ones.

So a deep energy retrofit for me means increasing energy efficiency by over 75%. To achieve this we are installing:

1. A continuous air barrier - ADA-sheetrock on the interior.

All electrical on exterior walls will be run on interior of sheetrock in wood chases.

2. 12" of cellulose in the walls(R42).
3. R20 on the foundation perimeter and floor.
4. A thermal envelop that minimizes thermal breaks.
5. R5 or better windows.
6. R80 ceiling with cellulose.

The energy analysis will be done under the mentorship of Andy Shapiro who will be bringing many years of experience in understanding the modeling of energy and moisture in the new design in order to make a predictable outcome.

Heat will be from passive solar and wood with an electrical heat pump for backup and hot water will be supplied by the cookstove and solar panels. PV panels will eventually supply electric power.

The Margin Flame View cookstove is on site. With a thermostatic damper on the combustion air supply, that will be ducted in thru 3" pipe to the dedicated air intake port.

Small fans will be located in wall ports to move the hot air from the east side of the

house to the west. 2nd floor vents will let the hot air up to the 2nd floor.

This constitutes the primary heat supply. For more visit: benjaminfranklingraham.blogspot.com/ or: ecologicalhousene.blogspot.com/

For more information about this project contact: Ben Graham Natural building/design services/consulting. 802.454.1167 bfg@naturaldesignbuild.us www.naturaldesignbuild.us

About Benjamin Franklin Graham: Ben is an architectural designer by trade with a Barch from the Rhode Island School of Design. He is also a third generation woodworker and housebuilder, learning homebuilding first-hand from his grandfather. He has been at the front of developing the natural building movement in Vermont and the northeast since 2000 as a professional contractor and an organizer for the network of natural builders in the northeast - NBNE (www.nbne.org) His advocacy work has brought him attention in books, newspapers, TV and conferences. Ben also serves on the Plainfield Planning Commission and is actively engaged in developing planning models for sustainable community living.

GLOBAL WARMING WILL BE IRREVERSIBLE BY 2017, WARNS ENERGY AGENCY

Cont. from page 1

its consumption of fossil fuels from 2016 onwards, the IEA said. Meanwhile energy from alternative sources such as wind, wave, solar and nuclear would have to increase dramatically, as would energy efficiency.

IEA chief economist Fatih Birol told the Wall Street Journal: "The door to reach 2º is about to close. In 2017 it will be closed forever." Even if countries deliver on all the pledges so far made to reduce emissions, the report said, the global temperature will still rise by 3.5 degrees Celsius, an increase that would trigger sea level rises, drought, floods and heat waves.

Nothing in the IEA's analysis indicates that the kind of fundamental changes it is calling for will be delivered. According to its figures, CO2 emissions rose by an "almost unprecedented" 5.3% in 2010. The biggest source of emissions growth was the use of coal, particularly in China and India.

Halting emissions increases would mean investing an extra $15.2 trillion in clean energy by 2035, the IEA estimates. Given the current financial situation, that commitment would come as "a very big surprise," said Birol.

The IEA's warning (read full report next) comes shortly before the United Nations is due to start its next climate change conference in Durban, South Africa, at the end of November. http://www.globalpost.com Recommended reading from GlobalPost: 7 Deadly Stories: The cost of global climate change.

IEA warns that Unsustainable Energy Future would have Far-reaching Consequences

The world is locking itself into an unsustainable energy future which would have far-reaching consequences, IEA warns in its latest World Energy Outlook

09 November 2011 London - Without a bold change of policy direction, the world will lock itself into an insecure, inefficient and high-carbon energy system, the International Energy Agency warned as it launched the 2011 edition of the World Energy Outlook (WEO). The agency's flagship publication, released today in London, said there is still time to act, but the window of opportunity is closing.

"Growth, prosperity and rising population will inevitably push up energy needs over the coming decades. But we cannot continue to rely on insecure and environmentally unsustainable uses of energy," said IEA Executive Director Maria van der Hoeven. "Governments need to introduce stronger measures to drive investment in efficient and low-carbon technologies. The Fukushima nuclear accident, the turmoil in parts of the Middle East and North Africa and a sharp rebound in energy demand in 2010 which pushed CO2 emissions to a record high, highlight the urgency and the scale of the challenge."

In the WEO's central New Policies Scenario, which assumes that recent government commitments are implemented in a cautious manner, primary energy demand increases by one-third between 2010 and 2035, with 90% of the growth in non-OECD economies. China is the world's largest energy consumer - nearly 70% more energy than the US by 2035, even though, by then, per capita demand in China is still less than half the level in the US. The share of fossil fuels in global primary energy consumption falls from around 81% today to 75% in 2035. Renewables increase from 13% of the mix today to 18% in 2035; the growth in renewables is underpinned by subsidies that rise from $64 billion in 2010 to $250 billion in 2035, support that in some cases cannot be taken for granted in this age of fiscal austerity. By contrast, subsidies for fossil fuels amounted to $409 billion in 2010.

Oil demand rises from 87 million barrels per day (mb/d) in 2010 to 99 mb/d in 2035, with all the net growth coming from the transport sector in emerging economies. The passenger vehicle fleet doubles to almost 1.7 billion in 2035. Alternative technologies, such as hybrid and electric vehicles that use oil more efficiently or not at all, continue to advance but they take time to penetrate markets.

The use of coal – which met almost half of the increase in global energy demand over the last decade – rises 65% by 2035. Prospects for coal are especially sensitive to energy policies – notably in China, which today accounts for almost half of global demand. More efficient power plants and carbon capture and storage (CCS) technology could boost prospects for coal, but the latter still faces significant regulatory, policy and technical barriers that make its deployment uncertain.

Fukushima Daiichi has raised questions about the future role of nuclear power. In the New Policies Scenario, nuclear output rises by over 70% by 2035, only slightly less than projected last year, as most countries with nuclear programs have reaffirmed their commitment to them. But given the increased uncertainty, that could change. A special Low Nuclear Case examines what would happen if the anticipated contribution of nuclear to future energy supply were to be halved. While providing a boost to renewables, such a slowdown would increase import bills, heighten energy security concerns and make it harder and more expensive to combat climate change.

In the New Policies Scenario, cumulative CO2 emissions over the next 25 years amount to three-quarters of the total from the past 110 years, leading to a long-term average temperature rise of 3.5°C. China's per-capita emissions match the OECD average in 2035. Were the new policies not implemented, we are on an even more dangerous track, to an increase of 6°C.

"As each year passes without clear signals to drive investment in clean energy, the "lock-in" of high-carbon infrastructure is making it harder and more expensive to meet our energy security and climate goals," said Fatih Birol, IEA Chief Economist. The WEO presents a 450 Scenario, which traces an energy path consistent with meeting the globally agreed goal of limiting the temperature rise to 2°C. Four-fifths of the total energy-related CO2 emissions permitted to 2035 in the 450 Scenario are already locked-in by existing capital stock, including power stations, buildings and factories. Without further action by 2017, the energy-related infrastructure then in place would generate all the CO2 emissions allowed in the 450 Scenario up to 2035. Delaying action is a false economy: for every $1 of investment in cleaner technology that is avoided in the power sector before 2020, an additional $4.30 would need to be spent after 2020 to compensate for the increased emissions. http://www.iea.org e-mail IEAPressOffice@iea.org

ENERGY EFFICIENCY AT YOUR LOCAL HARDWARE

CARBON MONOXIDE

Carbon monoxide poisoning is a very real threat. It is a poisonous gas that kills approximately 500 people in the US alone every year. Sources of the gas can include malfunctioning appliances including furnaces, stoves, ovens and water heaters that operate by burning fossil fuels such as natural or liquefied petroleum (LP). To help keep your family safe and secure this holiday season have a qualified service professional inspect your fuel-burning appliances at least once a year and Install UL certified CO alarms outside of sleeping areas and near all fuel-burning appliances.

MORE WAYS TO REDUCE YOUR ENERGY:

"Jack's True Value Hardware Store", Keene, NH

Submitted from Rick Tullock, proprietor.

- Change the filters in your heating system; the average lifespan is about a month. Clean filters make a furnace much more efficient.
- Caulk the cracks! Go into your basement on a sunny day and see how many places the lights comes through. Feel for drafts around window panes.
- Unplug appliances when they are not in use. Electronics use power all the time, called a "phantom load". Turn off power strips, pull plugs on washers, dryers, microwaves, toasters, etc.
- Always turn off the lights!

NOTE: An employee of Jack's Hardware, Matt Wheeler, said that his wife had a mission to lower their electric bill and DID turn off and unplug unused stuff for a month. Their bill dropped from $100-$120 the previous month to $75-$80. That's a **LOT!**

Aubuchon Hardware, Keene, NH

Submitted from Brian, Assistant Manager.

- Consider solar-powered holiday lights (we actually have these on our house, btw, they're great!)
- Solar-powered motion-activated lights for the exterior of your home or garage.
- Switching to CFL or LED lights bulbs, theoretically last up to 9 yrs.

Fireside True Value Hardware, Brattleboro, VT

Submitted from Glenn St John, proprietor

- Window pellet units are popular this season. Install in your window just like an air conditioner and heat up to 750 sf. Perfect for living room or dining room areas, and a good way to offset the cost of heating oil.

LED HOLIDAY LIGHTING

Choose ENERGY STAR® LED Holiday Lighting

As Vermonters make preparations for the winter holidays many of us put up strings of holiday lights (also referred to as Christmas lights or decorative light strings). Light-emitting diode—or "LED"—holiday lights offer a quality alternative to incandescent lights and they will save energy and money this holiday season. While energy-efficient LEDs can be more expensive to buy than their incandescent counterparts you will make up the extra costs over time on your energy bill.

Replace Your Old Light Strings with ENERGY STAR Holiday Lighting

Don't just add to your tangle of old incandescent light strings; replace them with LED holiday lights to start saving energy. ENERGY STAR LED bulbs can save 90% or more in utility costs, operate at cooler temperatures, and have an operational life span of roughly 20,000 hours (enough to last for 40 holiday seasons).

ENERGY STAR LED holiday lights can be found at most local hardware, home improvement, and discount stores. You can also purchase LED holiday lights online. Remember to look for the ENERGY STAR label when buying decorative light strings.

Wondering if you can recycle those old light strings?

Check with your local solid waste district to see if they provide recycling options. There are also online recycling programs that offer coupons toward the purchase of new LED holiday lights such as HolidayLEDS.com.

Advantages of LED Holiday Lights

- Save energy and money. ENERGY STAR LED bulbs can save 90% or more in utility costs.
- Long lasting. LED holiday lights last for up to 20,000 hours, that's enough to last for 40 holiday seasons.
- Safety. LED holiday lights are cooler than standard bulbs, reducing the risk of fire.
- Durability. LED holiday lights are more durable than incandescent bulbs, with lamps typically made out of solid plastic rather than glass.
- Added convenience. LED lights do not suddenly "burn out," which makes replacing dead bulbs in a string of lights unnecessary.

More Tips

- Turn off holiday lights when you leave home or go to bed.
- Set your holiday lights on a timer to assure that you do not pay for extra hours of running time.
- Save even more by reducing the importance of lights in your holiday decoration or eliminate decorative holiday lighting altogether.

CHANGE YOUR LIGHT BULBS

Oakes Brothers Building Supply partook of Efficiency Vermont's New Light Enhanced Rebate Program that will allow them to reduce their lighting energy costs.They recently replaced 369 fixtures, including T-12 fixture Ballasts and tubes as well as replacing the 250 Watt Halogens outside with 26 Watt LED's.

The process is very straightforward: To retrofit the lights requires changing the magnetic ballasts to electronic high efficiency ballast and replacing T12 bulbs to T8 and the new tubes will fit right in.

At present, Efficiency Vermont can help to save up to 40% on costs for the fixtures. The anticipated electricity savings of $8,000 annually is a pretty good incentive beyond the ones from the program!

ATTIC INSULATION

With home heating fuels at or near all time highs, a few hundred dollars in insulation can turn into many more hundreds in savings on heating fuel. Since heat rises, most heat is lost through poorly insulated or under insulated ceilings/attics. In addition, a properly insulated and vented attic can safeguard against costly repairs caused by ice dams. It is very important to keep the surface of the roof cold so that ice dams don't form. Contact a professional for more information.

The Microbial Home: Sustainable Kitchen of the Future?

http://www.yankodesign.com/2011/10/21/the-microbial-home/

The Microbial Home is an integrated cyclical ecosystem where each function's output is another's input. In the project the home has been viewed as a biological machine to filter, process and recycle what we conventionally think of as waste – sewage, effluent, garbage, waste water.

The Microbial Home project suggests that people should move closer to nature and proposes strategies for developing a balanced microbial ecosystem in the home. "Designers explore solutions which are by nature less energy-consuming and non-polluting," says Clive van Heerden, Senior Director of Design-led Innovation at Philips Design. "We need to push ourselves to rethink domestic appliances entirely, how homes consume energy and how entire communities can pool resources."

Microbial Home concepts

The Microbial Home is viewed as a cyclical biological machine where wastes like sewage, effluent, garbage, wastewater are filtered, processed and recycled to be used as inputs for the various home functions. The project includes various aspects like a Bio Digester Island and Larder in the kitchen, Urban Beehive, Bio-light, Apothecary, Filtering Squatting Toilet and Paternoster Plastic Waste Up-cycler.

Five lifelike models of the concepts within the Microbial Home domestic ecosystem were shown to the public at the Piet Hein Eek gallery during Dutch Design Week: Oct. 22-30, 2011.

Bio Digester Island Designer: Philips Design

The Bio-digester island, a kitchen island that consists of a methane "digester" which converts bathroom waste solids and vegetable trimmings into methane gas which is then used to power a series of functions in the home.

Central hub in the Microbial Home system.

- Consists of a methane digester, which converts bathroom waste solids and vegetable trimmings into methane gas that is used to power a series of functions in the home.
- The hub is designed as a repositionable kitchen island, including a chopping surface with vegetable waste grinder, a gas cooking range, a glass tank that shows energy reserves and glass elements showing pressure, volume and readiness of compost sludge.
- Materials used in the design are copper, cast iron, glass and bamboo.
- 'Bio-gas' is produced by developing a culture of suitable bacteria living on organic waste material from the home.
- The gas from the methane digester is fed to a cooking range and gas mantle lights.
- Water pipes are preheated by the digester and channeled to other components.
- The digester needs a constant supply of waste material and water.
- The dehydrated sludge residue from the digester can be safely removed and used as compost.

All image credits: ©Philips Design - Microbial Home Project

Larder

- The larder is a system designed to keep 'living food' fresh, by using natural processes (as opposed to dead food in the refrigerator).
- The larder consists of an evaporative cooler and vegetable storage system built into a dining table.
- Twin-walled terra cotta evaporative cooler is at its center, the compartments and chambers vary in wall thicknesses and volumes, and are designed to keep different types of food at different optimal temperatures.
- The outer surface of the cooler is warmed by hot water pipes, which have been pre-heated by the methane digester in the Microbial Home system.
- Above the table is a ceramic garden and larder where vegetable groups are grown and stored on the basis of their symbiotic chemistry.
- The table is made from reclaimed wood, supported by a cast iron structure that consists of water and gas pipes.

Urban beehive is a concept for keeping bees at home. The beehive is designed to allow us a glimpse into the fascinating world of these industrious creatures and to harvest the honey that they produce.

Paternoster Plastic Waste Up-cycler

- A concept for a domestic plastic waste up-cycler that uses mycelium to break down plastic packaging waste.
- The paternoster waste up-cycler concept utilizes the properties of fungi that have powerful enzymes and decomposing power.
- A mycelium attached to plastic, would have the ability to decompose and metabolize the plastic.
- In this concept the plastics are ground into small chips and mixed with a fungal starter culture in a glass canister, which is slotted into a compartment of the 'paternoster' system.
- A hand-cranked conveyor moves the canisters along a circuit within a dark cavity. Each week plastic grounds are mixed with mycelium.
- It takes several weeks to break down the plastic or other waste material.
- At late stages in the cycle the contents are exposed to daylight (via an aperture) and air allowing the mycelium to sprout delicious mushroom fruit, ready to eat. The decomposing waste can be molded into shapes.
- The paternoster is made out of plywood and copper, and uses off the shelf bottles and containment canisters.

WAYSIDE RESTAURANT EARNS VERMONT GREEN RESTAURANT DESIGNATION

The Wayside Restaurant has been renovating and upgrading its operation for the past 10 years, to become compliant with the high standards required to become a Green Restaurant". This year, they reaped their rewards by being awarded a designation that only 5 restaurants in the state have received. Karen and Brian Zecchinelli, proprietors of the well-known Wayside Restaurant in Berlin, are proud of this designation and have plans to do more… (Stay tuned).

Lt. Gov. Phil Scott, left, and Peter Crawford, second from right, director of the state's Environmental and Regulatory Assistance Program, present "green restaurant" designation to Karen and Brian Zecchinelli, owners of the Wayside Restaurant in Berlin.

To receive this designation, the restaurant had to first meet eight core environmental standards and then develop an Environmental Action Plan to further reduce the environmental impact of its business operations. The process to reach the Vermont's Green Restaurant Status is outlined at www.vbep.org/restaurant.html. According to Brian Zecchinelli, "The Wayside will continue to focus on waste reduction, water and energy conservation, pollution prevention, transportation efficiencies and sustainable promotion." He hopes that his example is one that the many restaurants in our state will follow.

Among the many ways that the Wayside Restaurant and Bakery help the environment is through their composting program that was introduced to them by a former employee who was a student at Montpelier High School. He was already familiar with the process through CVSWMD's School Composting Program, and showed them how easy it was to compost. Approximately 1,000 customers are served every day. Consequently, the volume of scraps that need to be composted was somewhat intimidating at first. Due to the commitment of the kitchen and wait staff, the whole process has now become second nature to them all. They sure don't miss the messy trash bags of the past, Brian assures us, and feels great, knowing that they have reduced their carbon footprint. This 'green status' is definitely commendable. Green Energy Times wants to extend a big Kudos to everyone there at the Wayside!

If you are among the few that are not familiar with their location on Rte. 302, between Barre and Montpelier, it is time to search this Green Restaurant out. They carry Green Energy Times at the owner's request - so stop by to find copies of the newest issues of Green Energy Times and know that you can feel good when you grab a "green" home-style bite to eat from the restaurant or the bakery… Be sure to congratulate them and tell them about the initiatives you. too, have implemented in your own life - We should ALL have a story to tell!

THE LOCAL BUZZ, LESSONS IN EFFICIENCY

One of the many challenges facing businesses in a down economy is the high cost of electricity. The Local Buzz is a small café and local foods market located on Bradford's Main Street. The small downtown restaurant boasts the best coffee and tea in town and is a frequent meeting place for moms with kids, local business people and their clients and numerous social groups.

The goal from the start was to be a place where customers could taste the difference when eating freshly prepared foods made from locally grown and produced foods. Vermont Coffee Company out of Middlebury roasts beans for The Local Buzz. Numerous tea varieties come from Vermont Tea and Trading. Fresh smoothies are made by hand with Vermont Cabot yogurt. Maple, honey and fresh bagels are all sourced within 30 miles of the cafe. The Buzz serves sausage and farmstead cheese from Robie Farm in Piermont. The bread is baked fresh in a home-bakery in Piermont, NH and the eggs and cheddar cheese are strictly Vermont.

The dining room also has local roots. From the café tables made locally at Copeland Furniture, to the chairs that were donated by supportive community members, to the maple coffee table created by Keith Michelson Designs and the custom-built counter by Duke Bassett, The Local Buzz kept their eyes close to home.

The Buzz serves a full menu for breakfast and lunch out of a small back-room kitchen. "We started on a shoestring," explains Co-Owner Terry Duchesney, "so we didn't choose our appliances with electrical efficiency in mind." Heading into their first summer of operation the restaurant found that their electric bills were high and the space was difficult to keep cool.

"We realized that the freezer where we displayed local meats for sale in the market was actually heating our building," Duchesney recalls. So they pulled the market meats into a smaller freezer and removed the late-model merchandising freezer. "We noticed immediately that the air conditioner was running less and the café was more comfortable." And while the small downtown business has not been able to carry a large inventory of local meats and ice cream, they have appreciated the change in the electric bills.

After this success, the café set about to institute efficiency practices in all its operations. All lighting was replaced with compact fluorescent bulbs. The staff began to collect coffee grounds to be composted. Customers and staff now strive to recycle all paper waste & plastic containers.

The Buzz also connects with local farmers to send its food waste to be used for pig food, even though "Composting, recycling and collecting food waste for pig feed meant adding a few steps into our daily closing routines," explained Co-Owner Sarah Copeland Hanzas.

Efficiency is a work in progress according to staff at The Buzz. It is clear that the time spent saving energy and resources offers rewards in the long run. "Somebody once told me, 'the cheapest kilowatt of electricity is the one you never had to buy'," Copeland Hanzas says. "And that principal of conservation has driven all our efficiency practices."

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**

U.S. Department of Energy (DOE) Energy Efficiency & Renewable Energy: . Guide to energy efficiency - **www.eere.energy.gov/consumer**

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-**

Use cloth napkins and recycle your dishes - wash them!

HOW TO INSTALL A TANKLESS WATER HEATER

Install a tankless hot water heater and save up to 50% on home energy bills

April 4, 2008 at 1:39PM by Ben Hewitt

Install a tankless water heater (aka on-demand or instantaneous water heater)

Items needed: One on-demand water heater, miscellaneous plumbing bits including copper pipe (1/2" and/or 3/4"), pipe cutter, propane torch, solder

You can cut your hot water bill in half. Yes, I said "in half." As in 50%.

Photo Credit: Rinnai

Tankless water heaters, like this one from Rinnai, are generally sleek.

If you're not comfy a) handling power tools b) operating flaming torches and c) soldering copper water tubing together, you ought to just call a plumber. Try not to faint when he hands you the bill; it's very rude.

But lets assume you can do all this stuff with one hand tied behind your back whilst juggling a dozen rotten eggs. In which case, you'll first want to shut off water to your current hot water tank (there should be a valve; if there's not, you got problems), drain the tank (there's a spigot on the bottom; you can attach a garden hose and run it out your basement door onto the neighbor's lawn), and tear it out.

What should you do with your old tank? Well, if your day job involves selling used cars or self-improvement videos, you might be able to off load it onto some sucker via Craigslist. Otherwise, you'll probably have to pay someone to take it away.

Installing your new tankless heater is simply a matter of bolting it in place, then installing the vent (it's probably a power vent, whereas your old heater likely had a stack vent, so you're going to need to wire it in. This is a good time to call someone who has experience playing with electricity). Next, run the new water lines. Gosh, doesn't that sound simple?

Cont. on page 35

GUIDE TO ADVERTISERS:

Ingredient of the Month

PHALATES

By Larry Plesent

And this month's ingredient of the month is…pthalates! Pthalates, (pronounced thalates) is a large family of molecules used in a variety of industries. Pthalates are used to flavor cheap whiskey, and they are what makes plastics flexible. The rule of thumb is; the more clear and flexible the plastic, the more pthalates it contains. So stretch wrap and clear water bottles contain a lot of the stuff. PET #1 plastic, which is considered safe for food, drugs and cosmetics, (and the ubiquitous water bottles) is also full of the stuff.

Pthalates were not a part of our collective chemical exposure before this century. However, every modern human is now full of them. Pthalates do not cause cancer. Rather, they seem to act as cancer enhancers, speeding up breast cancer cell mitosis (the rate the cells divide) as much as 40X. Note: this is not 40% - this is 40X the cancer cell's normal rate of reproduction!

If you are watching your chemical load, this is an easy one to avoid. Stay away from prepackaged processed food and plastic water. Do not microwave or freeze plastics. Eat a lot of fresh, homemade food…like kale!

Regular readers of this column know that I promulgate a kind spiritual/molecular view of the world. As one cultivates this perspective it becomes clear that all things biological and chemical exist in a balance. I like to think of it as yin/yang on steroids. So it stands to reason that if cancer enhancers exist, so do cancer erasers. Since we already know that that we are being exposed every day to cancer enhancers and cancer creators, it is more important than ever to counter this onslaught with known tumor inhibiting molecules.

Turns out we are in luck. Cancer inhibiting molecules exist all around us. You can find them in fresh organic produce such as the cole (kohl) crop family that includes cabbage, broccoli and kale. Try to eat some every day if you can. Black cumin seed oil from Egypt is another. My personal favorite is a common weed that grows throughout Vermont called Wormwood. Wormwood contains a molecule called artemesinin that is being studied for its cancer inhibiting properties. For more information about this see www.cancereraser.org

So it turns out your hippie grandmother was right. Fresh, organic local food IS healing and processed plastic food…well...

There was a comedian that once said, "Listen to the words". After all, who was it that put the con into con-venience!

This is the Soapman advocating that we all Eat More Kale!

HOW TO INSTALL A TANKLESS WATER HEATER

Cont. from page 34

It is, as plumbing goes. It's just that, you really want to know what you're doing when you're "sweating joints," which sounds like it could land you in the slammer, but is really just plumber speak for joining copper with solder. If you don't have experience with this lost art, it just ain't worth the headache of a leaky hot water system. Lecture over.

The cool (bad pun alert) thing about on-demand hot water heaters is that they heat the water only when asked. Your current "capacity" heater keeps a huge blob of water (probably 30 gallons or more) hot all the time. If you don't draw hot water for, say, the eight hours you sleep each night (you do get at least eight hours of sleep, don't you? You do realize that anything less is detrimental to your health, right?), it don't matter: Your heater is still keeping it warm, just waiting for you to crack the tap. An on-demand heater won't heat the water until you ask it to; when you do, it springs into action with an enormous flame that literally heats the water as it passes through on its way to your shower head.

Got it? Yeah. Get one. It's one of the quickest and easiest energy pay-offs in the modern world.

Editor's note: On-demand water heaters typically come in gas-fired or electric models. Most greens advise for the gas-fired versions, which are more energy-saving overall. Tankless heaters tend to be a bit more expensive than conventional models upfront, but pay for themselves over time. See some brands here.

About Ben Hewitt: Ben Hewitt is a freelance writer who lives off the grid with his family in Vermont. He is the author of "The Town That Food Saved"(Hardwick, VT). Ben Hewitt blogs at WickedOutdoorsy .com.

Today's efficient washing machines make cold water washing a smart option for a lot of good reasons -- from reducing energy bills to helping clothes last longer. Plus, the heat used to create hot water can lead to five times as many greenhouse gas emissions than when clothes are washed in cold water.

Sustainable Thetford

Way to GO, Thetford! Thanks for all you are doing... leading the way!

By Joel Legunn - Background material provided by SERG

Thetford, Vermont sits on the Connecticut River one exit north of Hanover on I-91. Although surrounded by, and in easy reach of all the activities and amenities in the Upper Valley—the educational, cultural and medical facilities of Dartmouth, as well as the businesses, services and other cultural venues in the Hanover-Lebanon area and beyond—Thetford still reflects the characteristics of a rural community. Home to a variety of farms, including three that are organic, local general stores, a large furniture factory, several small businesses, telecommuters and home businesses, its has few commercial overtones.

However, like other similar areas in Vermont, it is a rural setting with some of the oldest (and consequently, least energy efficient) housing stock in the nation. Thetford has 1190 homes today. According to a survey done by the Thetford Historical Society, there were 197 houses built before 1858 that were still standing as of 1960. In the two decades since 1990, 194 new houses were built—with 87 of these being built in the last 10 years. In between, this leaves about 800 houses that range in age from about 20 to 150 years. Given the age spectrum that Thetford houses span, it can reasonably be assumed that a good number of them are energy inefficient.

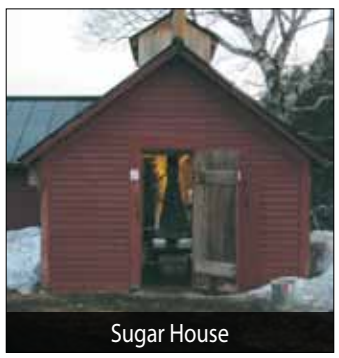
Enter SERG and the TEC

•1989: Bob Walker, authored EarthRight's Guide to Town Energy Planning in Vermont, to help towns assess and plan their energy use. He spent several years building energy efficient homes, including his own.

•2002: Non-profit Sustainable Energy Resource Group (SERG) formed, to educate homeowners about energy conservation, improve energy efficiency, use of renewables and raise community awareness about local energy problems and solutions.. They form and consult with town energy committees, and homeowners. Early efforts resulted in the first two town energy committees in Vt—the Thetford and Norwich Energy Committees. There are now over 100 town energy committees throughout VT and NH.


School House

•2007: Workshops developed for homeowners on how to save energy in the home. Thetford, Putney and Montpelier's, were so successful that in the following year the Central Vermont Community Action Council (CVCAC) got a grant to work with SERG and Efficiency Vermont to develop the Button-Up Vermont Home Energy Saving Workshops, which are now entering their 4th year.


Sugar House

Thetford emerged as the perfect laboratory for innovative energy-related projects that have subsequently been implemented in other towns, developing numerous energy projects such as compact fluorescent light (CFL) sales, a town streetlight initiative, and home energy-saving workshops.

CFL Sales. SERG and TEC sold 1,690 CFLs at annual town meetings, and hands out educational information on energy conservation. Lifetime savings estimated at 461,800 kWh, $89,265 in electric costs and 530 tons of CO2 emissions.

Lights Out. In 2005 a third of the town lights were removed and entered into a protracted Public Service Board docket with CVPS that ultimately required CVPS to allow for town ownership of street lights. This year, Thetford got a federal stimulus grant to upgrade lights to LEDs and it forced CVPS to provide a more favorable rate for town ownership. Seven more lights were removed. In total, by cutting our lights from 44 to 22 and upgrading to LEDs, we will cut our electric use for streetlights by about 86%, saving more than 15,000 kwh/yr!

Thetford Center Community Center. In 2009, SERG got a $12,000 Vermont Community Climate Change Grant to work with TEC and community volunteers to weatherize the Thetford Center Community Center (TCCC). SERG and the Thetford Community Center Association raised an additional $12,000 support for the project.

This volunteer-assisted weatherization project was a huge success. Blower door tests performed prior to and at completion of work showed a reduction of air infiltration by almost 80% volunteer air sealing measures resulted in about 70% reduction in infiltration, with dense-packed cellulose reducing infiltration another 10%. Insulation improvements included 2" of foam added to the basement walls, 16" of cellulose added to the attic, and the 4" walls, which previously had no insulation, were dense-packed with cellulose. In addition, a high-efficiency condensing furnace was installed.


Cedar Circle Organic Farm

In all, 55 community volunteers contributed over 490 hrs of labor over 12 workdays retrofitting and weatherizing, including perimeter excavation and drainage, foundation repair and electrical upgrades, including installation of a range hood and bath fan for ventilation.

In addition to volunteers who learned weatherization skills on the job, numerous professionals volunteered their skilled labor and contributed materials, resulting in a very cost-effective and educational project.

Thetford HEAT

In 2011, SERG and the TEC recruited and trained 50 volunteers as the Thetford Home Energy Action Team (HEAT) to promote home weatherization in town. This fall, they engaged in a town-wide "Door2Door" canvassing campaign distributing free CFLs, information on energy efficiency initiatives and resources for making upgrades. Volunteers also conducted a home energy survey and offered help in calculating the energy efficiency of the homes visited. Results to date include:

•650 homes visited (out of 1100 homes)—60% of homes in town
•240 home energy use surveys completed
•158 CFL's installed
•31 coupons given out for replacing refrigerators with Energy Star upgrades
•37 coupons given out for replacing washing machines with Energy Star upgrades
•49 Energy Star coupons worth $150 each toward energy efficiency improvements given out

Case studies of two Thetford homeowners who had successfully weatherized their homes were conducted - one reduced energy use by about 40% and the other by 46%. Results were distributed to every home in town and the homeowners presented their results to visitors at our Thetford Home Energy Expo and an Open Homes Tour.

One goal for the Thetford HEAT initiative was to triple the number of homes that get weatherized every year in Thetford, which would put us on par with the state climate action plan. We will continue tracking results from these efforts for 3 yrs to identify how many homeowners weatherized their homes, what savings resulted and what drove homeowners to make these improvements so the project can be successfully replicated in other communities.

TEC Community Education Programs

TEC sponsors a number of programs that foster public education on energy issues, and stimulate Thetford residents to participate in weatherization projects Some of these are:

•Warmth in Winter—an annual movie and lecture series
•350 Challenge at the Thetford Elementary School
•Books, DVDs, watt-meters and other educational resources provided by SERG and TEC to the town library
•Monthly energy-saving tips published in the town newsletter
•Home energy workshops
•Local food workshops—raising chickens, improving soil, fencing, a root cellar tour, which ultimately led to the formation of the Pompanoosuc Agricultural Society that focuses on developing infrastructure to promote local food growing, harvesting, storing and processing.

Our Energy Future

TEC plans to track homeowner weatherization and energy savings for the next three years, implement the PACE program in Thetford next year, and continue promoting weatherization and renewables projects. And we are currently planning our annual Warmth in Winter series—movies and lecture discussions on energy-related topics.

Partial response to a recent survey taken on the Thetford List Serve revealed that at least seven homes in town have been retrofitted with solar devices. Five of them generate hot water, one is for passive solar heat, and one is for solar electric. With the availability of PACE next year, TEC and SERG look forward to guiding more Thetford homeowners on projects that result in energy efficiency upgrades, and the addition of renewables. Although PACE is a loan program, homeowners can still apply for federal and state initiatives to reduce their out-of-pockets costs for the whole project.

Citing all the positive outcomes resulting from the combined efforts of SERG and TEC, Bob Walker said that "although excess energy use, green house gas emissions, and climate change are global issues, the solution to these problems may be more effectively addressed by numerous independent grassroots efforts like those we have right here in Vermont," noting that, "we're running out of time, and we can't wait for the government to make up its mind!"

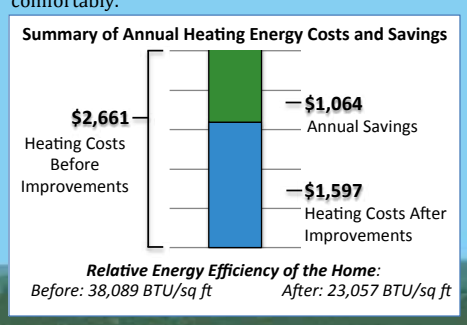
The Biddle Home: Saving Energy and Money On Your Own

Rick and Jody Biddle were concerned about the high energy costs, huge ice dams and window condensation in their Thetford Center home. As a skilled carpenter, Rick decided to make their home more energy efficient. So last year he participated in Efficiency Vermont's "Do-It-Yourself" (DIY) program that offers financial assistance to homeowners who hire a participating Home Performance with ENERGY STAR® contractor to test the home, develop a list of needed improvements and provide guidance as Rick completed the work.

Rick applied spray foam and cellulose insulation in the attic, air sealed the attic hatch and recessed lights, added foam board insulation on the basement walls, installed a high-efficiency condensing boiler and added a wood stove. He also replaced a few leaky windows and doors and even added solar hot water and electric panels. The Home Performance contractor tested out at the end and verified that Rick had reduced air leakage by 50%. Last year Rick and Jody's fuel use was cut by 40%.

As for the DIY program, Rick says, *"The initial energy audit was extremely helpful in getting me going in the right direction. By all means, go for it – enroll in this program and get a realistic appraisal of your capabilities."*

Rick did much of the work by himself and contracted out some of the work. In all, the improvements (not including the solar systems & Rick's labor) cost about $7,650 and are saving a little over a $1,000 in fuel per year. So after the $2,235 they received from Efficiency Vermont, they should recoup their investment in about 5 years, and they are living much more comfortably.



Efficiency Vermont's DIY program offers homeowners up to $2,500 for improvements they install under the guidance of a participating Home Performance with ENERGY STAR contractor.

For more information about the DIY program, go to *www.efficiencyvermont.com/homeperformance* or contact Efficiency Vermont at 888-921-5990.

Thetford HEAT Home Energy Action Team

Thetford Case Studies compiled by Sustainable Energy Resource Group
For more information on Thetford HEAT or other SERG programs contact
802.785.4126 • SERG@valley.net • www.SERG-info.org

SERG

MOROCCAN PUMPKIN WITH ALMOND COUSCOUS

As seen on www.greenenergytimes.org - http://www.meatlessmonday.com/category/this-mondays-menu/

Pumpkin is seasoned with fresh ginger turmeric, cayenne and cinnamon, then tossed with raisins and dried apricots in this gourd stew. Chickpeas, carrots and potatoes pick up the Moroccan spices beautifully and make this stew hearty, especially when served atop couscous and toasted almonds. This recipe comes to us from Trudy of veggie.num.num. Serves 6

For the almond couscous:

- 2 cups couscous
- 3 1/2 cups low sodium vegetable broth
- 1/2 cup dry, roasted almonds, chopped

For the Moroccan pumpkin stew:

- 2 tablespoons olive oil
- 1 onion, sliced into wedges
- 1 teaspoon fresh ginger, finely diced
- 1 teaspoon tumeric
- 1/2 teaspoon cayenne pepper
- 1 cinnamon stick
- 3 carrots, roughly chopped
- 3 potatoes, diced
- 1 20 ounce piece of sugar pumpkin, skinned, seeded & diced
- 2 cups canned chickpeas, drained and rinsed
- 2 ounces raisins
- 2 ounces dried apricots
- 20 fluid ounces low sodium vegetable broth
- 1 tablespoon harissa paste*
- 1 tablespoon lemon juice
- 2 tablespoons fresh parsley, roughly chopped
- 2 tablespoons cilantro, roughly chopped

*A middle eastern spice mix found in the spice section of most grocery stores.

To make the almond couscous: Bring the vegetable broth to a boil in a saucepan over medium-high heat. Add the couscous, stir, cover the saucepan with a lid and take off of the heat. Set aside for 2-3 minutes, uncover and fluff with a fork. Transfer to a bowl, add the almonds and drizzle lightly with olive oil. Toss until just combined. Set aside until the pumpkin stew is ready.

To make the Moroccan pumpkin stew: Place the oil in a large frying pan over medium high heat. Add the onion and cook for 3-4 minutes, or until the onion becomes soft.

Add the ginger, turmeric, cayenne pepper and cinnamon stick to the pan. Turn heat down to medium-low and cook for 1 minute more, or until the spices become fragrant.

Add the chopped carrots, potatoes, pumpkin, chickpeas, raisins and apricots to the pan. Cook for 1-2 minutes more, stirring constantly to ensure the ingredients are evenly distributed.

Add the vegetable broth to the pan and bring to a gentle simmer. Partially cover and simmer for 25-30 minutes, or until the vegetables are soft and the pumpkin is beginning to break up.

Season the pumpkin stew with the harissa paste and lemon juice. Add the parsley and cilantro, reserving a little for garnish.

Divide the couscous and pumpkin stew into 6 portions. Serve the Moroccan pumpkin stew over the couscous, sprinkle with the reserved parsley and cilantro and enjoy.

MEAT CONSUMPTION HABITS

EarthTalk® E - The Environmental Magazine

Q: I heard that the less meat one eats, the better it is for the environment. How so?

- Jason K., Sarasota, FL

A: Our meat consumption habits take a serious toll on the environment. According to the Environmental Working Group (EWG), the production, processing and distribution of meat requires huge outlays of pesticides, fertilizer, fuel, feed and water while releasing greenhouse gases, manure and a range of toxic chemicals into our air and water. A lifecycle analysis conducted by EWG that took into account the production and distribution of 20 common agricultural products found that red meat such as beef and lamb is responsible for 10 to 40 times as many greenhouse gas emissions as common vegetables and grains.

Livestock are typically fed corn, soybean meal and other grains which have to first be grown using large amounts of fertilizer, fuel, pesticides, water and land. EWG estimates that growing livestock feed in the U.S. alone requires 167 million lbs of pesticides and 17 billion lbs of nitrogen fertilizer each year across some 149 million acres of cropland. The process generates copious amounts of nitrous oxide, a greenhouse gas 300 times more potent than carbon dioxide, while the output of methane—another potent greenhouse gas—from cattle is estimated to generate some 20% of overall U.S. methane emissions.

David Pimentel of Cornell University's College of Agriculture & Life Sciences says that the grain currently fed to some 7 billion livestock in the US could feed nearly 800 million people directly.

"If all the grain currently fed to livestock in the United States were consumed directly by people, the number of people who could be fed would be nearly 800 million," reports ecologist David Pimentel of Cornell University's College of Agriculture and Life Sciences. He adds that the seven billion livestock in the U.S. consume five times as much grain as is consumed directly by the entire U.S. population.

Our meat consumption habits also cause other environmental problems. A 2009 study found that 4/5 of the deforestation across the Amazon rainforest could be linked to cattle ranching. And the water pollution from factory farms (also called concentrated animal feeding operations or CAFOs)—whereby pigs and other livestock are contained in tight quarters—can produce as much sewage waste as a small city, according to the Natural Resources Defense Council (NRDC). Further, the widespread use of antibiotics to keep livestock healthy on those overcrowded CAFOs has led to the development of antibiotic-resistant strains of bacteria that threaten human health and the environment in their own right.

Credit: Digital Vision/Thinkstock

Eating too much meat is not good for our health, with overindulgence linked to increasing rates of heart disease, cancer and obesity. Worldwide, between 1971 and 2010, production of meat tripled to around 600 billion pounds while global population grew by 81%, meaning that we are eating a lot more meat than our grandparents. Researchers extrapolate that global meat production will double by 2050 to about 1.2 trillion lbs/yr, putting further pressure on the environment and human health.

For those who can't give up meat fully, cutting back goes a long way toward helping the environment, as does choosing meat and dairy products from organic, pasture-raised, grass-fed animals. "Ultimately, we need better policies and stronger regulations to reduce the environmental impacts of livestock production," says EWG's Kari Hammerschlag "But personal shifting of diets is an important step."

CONTACTS: EWG, www.ewg.org; David Pimentel, www.vivo.cornell.edu/entity?home=1&id=5774; NRDC, www.nrdc.org. EarthTalk® is written and edited by Roddy Scheer and Doug Moss and is a registered trademark of E - The Environmental Magazine (www.emagazine.com). Send questions to: earthtalk@emagazine.com.

Compost nearly anything that will rot. It not only dramatically reduces your actual trash, but makes a nutritious addition for your gardens.

Green Product Reviews

By Dr. Erin Winter, MD

PRODUCT REVIEW FOR SOLMATE SOCKS

Solmate Socks are crafted in a family owned knitting mill in a small town in central Vermont from recycled cotton yarns. The yarn is created by recovering the scraps from the production of other cotton products and they only use recycled yarn, certified by Made in Green and Oeko-Tex. This means that all of their socks are certified free from harmful substances, which is good for our health and the health of our planet! I like that they have also committed to an environmentally preferable products purchasing policy, supporting suppliers that also believe in conservation and recycling and are an official Vermont Business Environmental Partner.

Solmate Socks' motto is "Life's too short to wear matching socks!" Each pair comes in a matching color scheme but with varying patterns. I have gotten many compliments on these socks, especially when they peek out of the bottom of my boring, blue hospital scrubs! Since it always seems like socks go missing, their children and infant socks are even sold with an extra! I only wish the adult pairs did too! They are comfortable and I would rate them as a low to moderate warmth sock as they are only made with cotton and a little bit of nylon and rayon for stretch. These are best worn at work…, but likely not with your ski and snowboard boots!

Order a pair from www.socklady.com or find them in one of your local stores using their store finder on the website. I especially like the new Winter Celebration series!

HOW TO MAKE ALOE VERA SHAMPOO

Commercially available shampoos are often filled with synthetic chemicals that that can cause reactions in sensitive people, as well as some chemicals being potentially environmentally harmful. As a result, many people have turned to homemade recipes for cleaning their hair, utilizing simple and naturally derived ingredients.

Aloe vera, succulent plant prized for its skin-soothing properties, is used as the base of one such classic homemade shampoo recipe. Learning how to make aloe vera shampoo will allow you to exercise complete control over what goes into your hair-cleaning products.

STEPS:

1. Assemble the ingredients. Making aloe vera shampoo requires only four ingredients: Liquid castile soap, aloe vera gel, glycerin, and vegetable oil. All of these ingredients can be purchased at health food or natural medicine stores. The aloe vera gel can either be purchased in bottles or harvested directly from the leaves of the plant, from which it can be scooped out with a spoon. In addition, you can add a few drops of essential oils to the shampoo. This will add fragrance to the shampoo; some herb oils, such as rosemary, will also help alleviate specific problems like dry, damaged hair.

2. Mix the four ingredients together. Measure out 1/4 cup (60 ml) each of castile soap and aloe vera gel, 1 teaspoon (5 ml) of glycerin, and 1/4 teaspoon (1 ml) of vegetable oil. Add each of these ingredients to a mixing bowl and stir them gently together with a spoon or whisk. Add a few drops of essential oil if desired. This mix makes about half a cup (120 ml), but the amounts can be altered to make more or less shampoo.
   Always shake the bottle well before using the shampoo, as the ingredients can settle out over time.

TIPS:

Reuse bottles from other products to store your shampoo.

Aloe vera shampoo works particularly well for dry hair, and it can help relieve dry, itchy scalps and dandruff.

Because of the chemical nature of soap (versus synthetic detergents), you may find that a film is left on your hair after shampooing even after thorough rinsing. This film can be easily removed with an acidic rinse such as lemon juice (for blonde hair) or apple cider vinegar (for all other hair colors).

Check the ingredients on the brand of liquid castile soap carefully--some brands contain paraben preservatives that slowly leach formaldehyde to stop the soap from spoiling, and others even contain detergents instead of pure saponified oils.

http://www.wikihow.com/Make-Aloe-Vera-Shampoo

Green Tips

by Deborah DeMoulpied, Bonafide Real Green Goods

Indoor Air Quality

As winter settles in, the indoor air quality (IAQ) in homes generally worsens. As home owners make efforts to minimize air leakage and make their castles more energy efficient, the ability to get a fresh air exchange decreases. Studies show that organic pollutants can be 2 – 5 times higher inside homes. But there are some things you can do to improve your IAQ this winter:

1. Install the best filters you can on your heating system or air exchange system, typically HEPA filters; change frequently and don't skimp.
2. Clean the floor regularly, preferably with a central vac; use a wet mop instead of a dry mop or broom.
3. Use your exhaust fans when cooking or showering.
4. Use green cleaning products that do not emit chemicals; vinegar and baking soda get most things clean.
5. Minimize new furniture, paint, and carpets with VOCs (volatile organic compounds). Winter is not the time to do a home renovation.
6. Open the windows once in awhile; outdoor air is cleaner than indoor air!
7. Burn only clean burning candles like 100% beeswax or 100% soy; both without artificial fragrance (there is no such thing as pure essential oil in lilac!) Inhaling fumes from burning paraffin candles is the equivalent of inhaling diesel fumes.
8. Avoid using artificial fragrances found in conventional room sprays, plug-ins, air wicks, diffusers, dryer sheets, cleaning products, and perfumes as they release phthalates, a hormone disruptor, into the air.
9. Avoid smoke from wood stoves and fire places.
10. Have your home tested for radon.
11. Leave your shoes at the door to keep dirt and germs out.
12. Fill your home with house plants to help clean the air.

Watch for more helpful tips from Deborah of Bona Fide Green Goods, in our Feb. 15th Issue.

Bona Fide Green Goods
35 South Main St., Concord, NH 03301
603-224-9700 | 877-744-9744
www.bonafidegreengoods.com
www.facebook.com/bonafidegreengoods
www.twitter.com/BonaFideGreen

Interiors green Shots!

THE HOME AND LIVING STORE

By Jessica Goldblatt Barber

December: Holiday gift ideas - in the spirit of the returning daylight - What are simple useful gifts that will light up the lives of our loved ones. Here are some of my thoughts Darn Tough-wool socks keep your loved ones warm and dry while supporting a local VT company, wool production, natural materials... on that note wool long johns are a wonderful gift too. Culinary salts form around the world, fair trade baskets filled with locally made goodies like soaps, jams, syrup... and remember to support you local shops this season, buy USA made when possible as this helps keep economy vibrant.

January: The Bedroom. Winter is long in this part of the world, although it may be debated which month feels the longest there is no doubt that January is a doozy, with the holidays behind us and February and March still ahead, It's great time to sleep and to create a chemical free space in the bedroom. To start choose natural fiber curtains or shades, if possible, have bare wood, tile or cork floors and use area rugs made from untreated wool. Introduce a few plants to naturally filter the air, when re-painting use natural paints like Milkpaint, Biosheild or use a natural clay finish like American Clay plaster. Furniture should be crafted from real solid wood and avoid pressboard and plywood, mattresses and bedding should be made from natural and organic materials which breathe to help keep your sleep system dry and clean. Avoid synthetic fabrics and foams made from petroleum-based elements which outgas chemicals and harbor dust mites. Eliminating or reducing toxins in your bedroom is a great way to create a nighttime healing space.

February: Get up get out enjoy the snow! Spring is soon on the horizon and we can begin to think about the summer garden, order seeds and plan summer projects but don't forget to get out and enjoy the crisp clean feel that winter offers - ski, walk, snowshoe... And, if traveling to warmer climates or western ski areas this winter, remember before you leave to unplug all non-essential appliances, turn H2O heater to lowest setting, turn the heat down and choose resort destinations that take energy and "green" considerations into mind.

Jessica Goldblatt Barber is the owner of Interiors Green, The Home & Living Store, located on Main Street in Bethlehem NH. For more info, stop by or visit www.interiorsgreen.com