ISSUE 10 OCTOBER 15, 2011

FREE!

G.E.T. It!

YES YOU *CAN* BE ENERGY INDEPENDENT!

green energy times

Creating Energy Awareness, Understanding & Independence

www.greenenergytimes.org | 802.439.6675

LARGEST SOLAR INSTALLATION IN COUNTRY

CAMPBELL SOUP IS GOING SOLAR!

*"**Campbell's solar power** efforts have both large and small initiatives. The biggest installation is going in at our Napoleon, Ohio production facility where we make all of our soup, sauce and beverage products. This will be a 60 acre installation", noted John Faulkner, Director - Brand Communications at Campbell Soup Company.*

On Feb. 8, 2011, Campbell Soup Company (NYSE:CPB) announced that it had entered into a Power Purchase Agreement (PPA) and Land Lease Agreement (LLA) with BNB Napoleon Solar LLC, a wholly owned subsidiary of BNB Renewable Energy Holdings, of Exton, PA, to construct a 9.8 mega-Watt (MW) capacity PV solar power generation system on 60 acres of the company's largest plant in Napoleon, Ohio.

Campbell will lease the land to BNB, which will own the system and be responsible for its construction, operation and maintenance. Under the PPA, Campbell will purchase 100% of the electrical power generated by the system, which is expected to provide approximately 15% of the electricity the Napoleon Plant requires annually. FirstEnergy Solutions will purchase the Solar Renewable Energy Credits

Cont. on page 8

MAKING GREEN ENERGY IN VT A REALITY

By Gabrielle Stebbins, Executive Director, Renewable Energy Vermont (REV)

The State has recently unveiled a 700 page Comprehensive Energy Plan—it's the first in several years, and is indeed, comprehensive. It explains everything you could possibly want to know about Vermont's current energy use and challenges in the state, and proposes a grand vision for 90% of Vermont's energy demand to be provided for by renewable energy, by 2050. The plan looks at Vermont's energy use from three perspectives: power (meaning, electricity), heat, and transportation.

As the new Executive Director of Renewable Energy Vermont (REV) (www.revermont.org), a non-profit representing over 300 businesses, schools, non-profits and individuals focused on increasing Vermont renewables and instate job opportunities, it is my job to read this Plan thoroughly. The plan is impressive, and the State deserves credit for undertaking this endeavor when many of our United States instead choose to ignore our impending and collective future. Indeed, the future before us is unspeakably disturbing. How many Vermonters have been deeply impacted by Tropical Storm Irene? Beware that this is only the beginning. If we continue on our current path, then we face a future of increased energy insecurity and energy price volatility, of increased environmental losses and climate-driven storms, and ultimately, a severe loss in our quality of life.

The inspiring fact is that there is a positive way forward, and not only can it serve to slow-down the impacts of climate change, it has many other benefits including the development of instate

Cont. on page 25

HISTORIC APARTMENTS IN BENNINGTON GET SUSTAINABLE UPGRADES

In 2009 the Carrigan Lane Apartments, a 17-unit affordable housing development in Bennington, used 5,600 gallons of #2 fuel oil to provide heat and hot water to residents. That number is expected to drop to about 3,800 in the upcoming winter. This anticipated savings is due in large part to the Vermont Fuel Efficiency Partnership (VFEP), which is providing funds for energy savings measures in multi-family affordable housing developments around Vermont.

Cont. on page 35

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

Design/Layout ..... Nancy Rae Mallery, Amy Niebel

Printing Valley News Lebanon, NH Using Recycled News-print & Smudge-Free Environmentally Safe Inks

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

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

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

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

Distribution Marty Philbrick, Bill Pearson, Alycia Moore, Linda Evans, Cintia Morrissey, Dwayne Cormier, Roger Lohr, Leslie Battistoni, Donna & Justice Wilson, Kate Leversee, Paul Fixx…

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 promote Energy Awareness, Understanding & Independence.
We must work together to save our planet.

Think Solar, Wind, Hydro... and energy reduction! Believe in this earth!
Solar works! … anywhere! under the sun!

G.E.T. is published bi-monthly, Feb.15, Apr. 15, Jun.15, Aug. 15, Oct. 15 & Dec.15, by NRM Advertising Company. It is free and available throughout 85% of VT & 45% of NH: the Upper Valley-St.J.down to Brattleboro,Windsor-Ludlow, Barre-Montpelier-Burlington, Stowe, Mooretown-Waitsfield, Morrisville, Hardwick, Danville, NEK, Grand Isle, Woodstock-Rutland-Bennington; NH: Woodsville-Hanover-W. Leb.-Plainfield, Enfield-Claremont, Keene-Concord-Plymouth-Laconia, Littleton, & towns in between.

If you would like to have G.E.T. available somewhere you have not seen it, let us know! You can also download each issues of G.E.T. online at www.greenergytimes.org.

We encourage you to patronize our advertisers. We strive to selectively include those that we feel can offer trust-worthy services & products. G.E.T. cannot be held responsible for advertising claims.

To advertise in G.E.T. contact Ad Reps listed above.

Editorial Policy: Green Energy Times works with a variety of writers and also publishes community submissions on various topics. We aim to publish content that is independently researched, unbiased and relevant to our audience. Submissions are subject to our guidelines. Publication is subject to our editorial judgment & schedule.

Subscriptions: $30/yr. Contact us for a subscription form or fill out the form below.

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

Sept. 29, 2011

Good day!
I was directed to you from the folks at Solarfest who said you may have some insider knowledge. We currently live off the grid, in a yurt 100% powered by solar and I want to get a solid education in solar (and all alternative energy) but when I look online I find nothing in the North East. Do you know of any such opportunities?
Peace, Margi

***Dear Margi** - now you would think this would be a simple answer, but I, too am at a standstill - there are numerous classes to become an installer, and sustainable courses at a number of colleges. I think that the most likely college will be Middlebury College. See why i am directing you in this direction when you read the article about the students and what they accomplished for a contest:*

_____

Sept. 20, 2011

Was glad to read about non-gas powered lawn mowers in the last issue. While electric mowers are definitely a step away from air- and noise-polluting gas mowers, I encourage G.E.T. readers to take the next step and purchase a 100% muscle powered reel mower. I have been mowing my lawn exclusively with a reel mower for the past couple years and am loving it.
Electric mowers still need to get their power from somewhere—in Vermont that means largely from nuclear power, dammed rivers, and burning forests. Reel mowers are 100% emission and pollution free—and they're silent. The baby foxes that live nearby just sit there and watch me cut my grass—meanwhile you can hear the roaring of my neighbors' gas mowers from half a mile away. Reel mowers come in varying sizes, so you can mow your lawn just as fast as any gas powered mower—you can even jog while you're doing it. And if you think your lawn might be too big for a reel mower—maybe it's time to think about ripping up all that grass and putting in a garden!
Josh Schlossberg, East Montpelier

***Dear Josh** - Thank you for your letter. We have certainly failed to mention the reel mowers as another option for mowing one's lawn and they, as well as push mowers, do encourage a healthier lifestyle.*
While we appreciate your concerns about where the power comes from to energize electric mowers, I think most understand that Green Energy Times is all about moving to energy independence and energizing our country with only clean, renewable energy.
Numerous Solar Powered places welcome and utilize the battery powered mowers that make the whole process go easier, ourselves included. We have vegetable & herb gardens, fruit trees, and probably more gardens than we can keep up with… BUT, we also produce a LOT of extra energy from the sun and really like to think of our battery powered riding and push mowers as a good option for using some of our excess clean renewable energy up. (If we could afford to hook to the grid we would). We prefer to call them our Solar Powered Lawnmowers.
G.E.T. encourages permaculture, as well, which can reduce the need for mowing. This is where reel mowers are very useful, indeed.
Not everyone has the perfect situation here in VT & NH to be able to physically maneuver on our hills and rough terrain. With oh so many summertime bugs and ticks, that are nice to keep to a somewhat tolerable level by mowing, larger lawns than might be ideal 'will continue to 'happen'. Athletic oriented families like to have the larger lawns for the activities involved.
In conclusion, there are some great options today that do not utilize fossil fuels to keep your surroundings suited to nearly everyone's needs. We love our quiet mowing with our lightweight 'Recharge' Lithium mowers. Reel mowers are great, too, for many situations.

October 15, 2011

Nancy,
Thx so much for including us in the Route 100 Corridor feature in the Aug. 15th Issue of Green Energy Times. I did find it, read it, and will now go back and read the rest of Route 100. We are honored to be in such esteemed company :)
All the best, Patricia Rydle

Sunshine Valley Berry Farm

CONTENTS

Green Energy Times wants to hear what YOU are doing to help to reduce your and our dependence on Fossil Fuels.

Next Issue of G.E.T. — Dec.15, 2011

Different towns will be highlighted in each of our issues throughout the year in our Sustainable Communities Section. If you think your town is one we need to know about, let us know what'd going on!

802.439.6675 • info@greenenergytimes.org

SUBSCRIPTION FORM

☼1 YR…$30 ☼2 YRS…$50 ☼3 YRS…$65

name _____

address _____

city.state.zip _____

phone _____

email _____

website _____

Offer good in U.S. only. Canada: $US 34.00. Foreign: $US 40.00
Gift subscriptions available! One year = 6 Issues!

please send check to 1749 Wright's Mountain Road
Bradford, Vermont 05033

802.439.6675
info@greenenergytimes.org
www.greenenergytimes.org
Energy Awareness, Understanding & Independence!

David Blittersdorf's

VIEW FROM THE TOP

ENERGY 'TARGET FIXATION'

I'm feeling sad today, although I am usually a happy and optimistic person. For many years, I have had a vision for humanity's future in a world with real, physical limits to growth and energy consumption. The problem is that getting there requires a paradigm shift, a major change in how we operate. The status quo has got to go. What has worked for the past few centuries no longer works, now that it has become clear that fossil and nuclear fuels are not sustainable. I occasionally feel that it will be impossible for our society to embrace change at the rate required to make this transition, but nevertheless I feel the need to keep on talking about it.

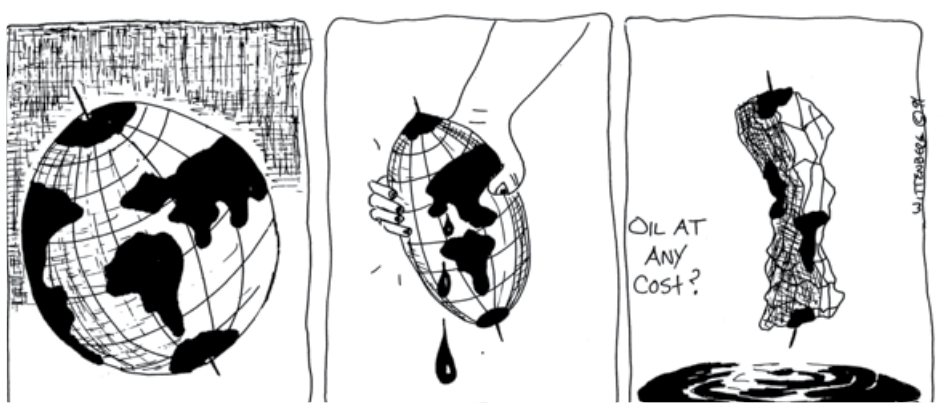
So, at the risk of sounding like a street-corner prophet of the apocalypse, I'm here to say: The end is near. Or at least the end of the status quo as we've come to know it. The era of incredibly cheap fossil fuels is over. They are expensive to mine and move, not only financially but environmentally. For hundreds of years – since the start of the coal-powered Industrial Revolution in the 1700s – these fuels have enabled us to create the most complex, energy intensive society the world has ever experienced. But all of this is drawing to a close, or a big change. I know it in my gut, and I'm sure you feel it too – the future of energy is the defining issue of our age. Meanwhile, our leaders are mired in aging systems, floundering as they try to prop up our economic system by depleting our finite energy sources with imaginary money.

Our economic and financial system was conceived and runs on the assumption of infinite resources, but we are at a decision point regarding energy. Our #1 fossil fuel in usage and in practical value is oil. Over 40% of the world's energy usage is of extracted oil. Vermont's use of oil counts for more than 50% of our total energy consumption. Rather than thinking of how to reduce energy consumption and come up with other ways of living and working, it has been easier the past decade and more to go along with a flawed idea of how to fix our finances, and spend more on meaningless stuff as a way to grow our way out of our economic problems. But all of this is just happy hour, the last round of a carefree party before we hit the unyielding brick wall of resource limits.

It hurts when you run into an unyielding object at full speed. I discovered this when I was learning to hang glide on the sand dunes of Kitty Hawk, North Carolina. I took off and kept looking at a parked hang glider to my left in the landing zone with the intent to avoid it. I kept looking at that glider. Looking. Looking. I hoped to land away from it. But guess what? I ended up crash-landing right into it. The lesson in this case was to avoid mistakenly fixing on the wrong destination, because you always will go – or fly – right where you are looking. As a society, we're experiencing "target fixation" on a grand scale. We are looking at – and fixating on – fossil and nuclear energy as the only viable energy sources. We are not scanning the horizon and seeing the big picture on energy.

The conventional wisdom in energy is the status quo – fossil fuels and nuclear power – and we keep trying to make these sources work because it's all we see. We need to look away from what we're familiar with, scan for other seriously viable possibilities and then move towards them, innovating along the way. In my opinion, our situation calls for serious and immediate efforts toward energy conservation, energy efficiency and renewables. It will not always be comfortable. By insisting on this need for serious change and trying to implement it, I and many others are upsetting a lot of people. Opponents to wind and solar, and supporters of oil, gas, coal and nuclear are mad as hell. But that's OK. We are almost at the tipping point of dramatic change. I have been saddened by the persistence of the status quo, but I am also heartened by the collective will of everyone who is becoming educated about energy issues and becoming connected with a movement to change the way our world runs, and the type of energy it runs on.

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.



WWW.LEAHWITTENBERG.COM

AMTRAK VERMONTER RETURNS

The Amtrak Vermonter train returned to service on Saturday, October 1, 2011, with both northbound and southbound trains in full operation from Washington, DC to Saint Albans, VT. The Vermonter, originally scheduled for a return to train service on September 19, was back on track only 12 days later than expected.

The State of Vermont was awarded a $52 million ARRA economic stimulus grant for the NECR line, and their construction contractors have been working all spring and summer on upgrading the rail line with grant-funded continuous welded rail (CWR), new ties, rail crossing improvements, and other upgrades. At the time of Irene, the Vermonter rail service had been replaced by chartered motor coaches to facilitate advancing the CWR project ahead of schedule, and to maintain on-time performance for Amtrak customers. The high water and flooding of Irene dealt a huge setback to the infrastructure of the host New England Central Railroad, but there were mixed blessings, as the stoppage of north-to-south train traffic allowed the CWR installation crew to increase production, while the strong, freshly-laid rail was able to survive the ravages of undermining washouts to the north in stride. Construction and re-construction crews worked 24-7 to restore service, sharing equipment, materials, expertise, and labor in one concentrated effort. It is a huge compliment to their dedication that freight rail service was restored on the New England Central Railroad, border-to-border, on Tuesday, September 20.

"The NECR did an amazing job of repairing their rail line in a short amount of time given the extent of the damage to their infrastructure," commented Brian Searles, Secretary of the Vermont Agency of Transportation. "I know VTrans staff provided assistance to their recovery efforts and I appreciate the team effort that was involved in getting the Vermonter back in service," stated Searles.

"We appreciate the understanding and patience of the passengers while our route was out of service for the project and then the hurricane repairs," stated Charles Hunter, Vice President for Government Affairs for RailAmerica. "All of the 18 train loads of continuous welded rail have been received and the last few miles will be installed during October. Thanks in part to the track outage, the High Speed Rail Project is now about 70% complete and remains on schedule for completion in 2012. We are very proud of our employees and contractors for maintaining momentum and safety on the project while completing the hurricane repairs in record time," continued Hunter.

There will be slow orders on some portions of the rail line that will initially delay the train up to a half hour from its regular schedule but the New England Central Railway (NECR) anticipates that these slow order locations will be reduced as rail work crews continue to improve the rail line. Once the ballast is fully compacted and slow orders are removed, the new continuous welded rail will permit the Vermonter to operate more quietly and swiftly, cutting an estimated 25 minutes off the Vermont part of the journey.

When did you last ride on a train? To celebrate the reinstatement of full Vermonter service, VTrans and Amtrak are continuing to offer a $12 in-state fare, one-way on any city-to-city journey within Vermont. See the foliage, meet new people, and enjoy the ride! Reservations are necessary 24 hours in advance, and be sure to use promotional code V-802. You can book your journey online at www.Amtrak.com/InsideVermont . Not traveling in the near future? Visit your closest Amtrak station and welcome back the Vermonter, as well as the NECR freight traffic – ring a bell, give a shout, wave to the train crews, and be sure to look for our updates in the media.

And PLEASE, remember to stay clear of the tracks. Trains cannot swerve or stop in a short distance.
Whether you are driving, walking, or bicycling… STAY OFF, STAY AWAY, and STAY ALIVE!

Travel Green and See The Roads Less Traveled!
Take Vermont's Trains – Take Amtrak

VTrans Working to Get You There — Vermont Agency of Transportation

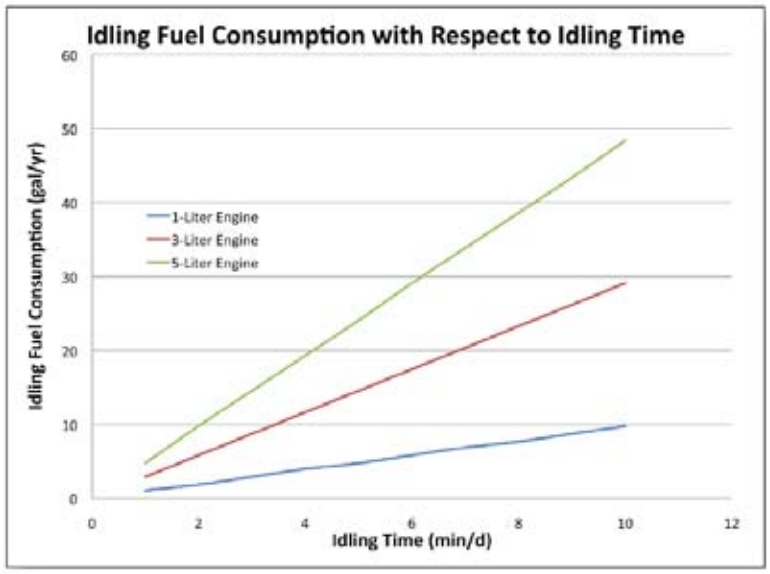
AMTRAK

IDLE-FREE VT INC.

HOW MUCH DOES UNNECESSARY VEHICLE IDLING COST?

Depending on the engine size, Light-duty Cars, SUVs and Pick Ups burn 0.15 to 0.3 gallons per hour when idling.

This U.S. Dept. of Energy Argonne National Laboratory chart calulates annual fuel consumption in gallons, per minute of idling - based on engine liter size.



A range of popular 2011 vehicle models and engine liter sizes - compare to your vehicle. Idling times & approx. annual costs - based on unleaded regular fuel price of $3.75/gallon

Chevrolet Silverado 1500: 4.3 - 5.3	Idle 5 min/day = $75-$101/yr;	Idle 10 min/day = $150-$202/yr
Ford F-150: 3.7 - 6.2	Idle 5 min/day = $68-$112/yr;	Idle 10 min/day = $136-$224/yr
Ford Focus: 2.0	Idle 5 min/day = $34/yr;	Idle 10 min/day = $68/yr
Honda Civic: 1.8 - 2.0	Idle 5 min/day = $30-$34/yr;	Idle 10 min/day = $60-$68/yr
Jeep Grand Cherokee: 3.6 - 5.7	Idle 5 min/day = $65-$109/yr;	Idle 10 min/day = $130-$218/yr
Subaru Outback: 2.5 - 3.6	Idle 5 min/day = $45-$65/yr;	Idle 10 min/day = $90-$130/yr
Toyota Prius: 1.8	Hybrid - Idling negligible	
Toyota RAV4: 2.5 - 3.5	Idle 5 min/day = $45-$62/yr;	Idle 10 min/day = $90-$124/yr

NOTE: These are idling fuel consumption costs only and do not include added costs of engine wear caused by excessive idling.

Excessive idling can actually damage your engine components, including cylinders, spark plugs, and exhaust systems. Fuel is only partially combusted when idling because an engine does not operate at its peak temperature. This leads to the build up of fuel residues on cylinder walls that can damage engine components and increase fuel consumption. - *California Energy Commission*

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**

UNSUNG HEROS GET VT 'ON THE ROAD AGAIN'

by N.R. Mallery

Now that we are again able to drive across the east-west routes across Vermont, after not being able to do so for a period of time, it is incredible to think what has already been accomplished to make this option available to us.

Taken away suddenly makes us realize how necessary our roads are. We depend on them, to just sustain our current way of life. Add the fact that the trucks need to also get through to bring supplies - like food - well, the importance gets very clear of our reliance on our roads systems here in Vt.

We all saw the pictures of Routes 4, 100, 131, 11… the list goes on. Thank goodness for the wonderful maps that were quickly made public on the VT Transportation site! The fast response to keep our lives moving forward in the face of such devastation that was endured here, is something that should not be overlooked.

I recently drove from west to east on Route 4 from Rutland to Rte 91 and was brought to tears to see and get a real sense of how serious a situation Irene caused. And yet - it is unbelievable that our transportation department was able to even get us to the point it is at today. But you are reminded all too well with the surroundings still so vivid along the edges of the roads we can now travel on…. like the framework of a bridge that was smashed and decimated by the powers of the rushing water and left it on it's side along a gorged bank… empty homes and businesses destroyed and uninhabitable - vehicles upturned .. and yet, some how, some way, we are again able to drive on roads that a short while ago were missing, with deep gorges where they not only once were, but are once again.

This is all due to the heroic action from our own Vermont Transportation Department. Here are just a few highlights of how this all happened and what is still going on:

• VTrans responded by setting up extended work-days for key personnel and established "Incident

Cont. on page 6

DUMMERSTON TO REMOVE 5 STREETLIGHTS

By CHRIS GAROFOLO / Brattleboro Reformer, September 22, 2011

The Dummerston Selectboard opted to eliminate five of the municipality's street lights, after hearing a proposal from the town Energy Committee.

The light fixtures to be removed are located at 44 Riverside Dr., Lyons St, near the Middle Road and Town Office parking lot, at the intersection of East-West and Bunker roads and Bunker and Park Lawton.

Members of the public and the Selectboard were skeptical about the other two recommendations, at the East-West Road intersection with Rt 30 and at the southern end of West Street and Rt 30, because the light provides a beacon for motorists along the roadway.

There is no current timeline to when the lights will be removed.

Selectboard Chairman Tom Bodett said the committee has looked for redundancies around towns to save taxpayer money and improve the lighting on Dummerston's roads. Many of the lights in Dummerston were installed in the 1930s when energy was cheaper.

The energy committee has worked with Efficiency Vermont to improve the effectiveness of outdoor municipal and public lighting fixtures. The initiative cataloged what the town currently has in place on its roadways, evaluated the need for lighting and made the proposal to eliminate any unnecessary fixtures.

Committee members also look to develop a project to replace some of the older models with new LED versions. LED is short for a light emitting diode, a semiconductor device that emits visible light when electrical current passes through it. "They are simply lower wattage, so the town would be using less energy," said Sam Farwell of the energy committee.

According to the committee's inventory, there are 30 lights on the school, 6 on the fire stations, 11 on town-owned buildings and 27 traditional mercury vapor streetlights. Seven of the 27 streetlights were considered unnecessary fixtures.

The 27 mercury vapor lights consume an estimated 11.8 MWh/yr, which generates approximately 27,500 pounds of carbon dioxide. In total, these lights cost the town about $4,165 in 2010. If all seven of the lights were removed, the total power would reduce by 25% to 8,850 MWh/yr. Additionally, the amount of CO2 would decrease to 20,625 pounds and the town's expense drops to $2,850.

Lighting in thickly settled areas and in the village center will remain, as will fixtures along routes that are popular with bicyclists and pedestrians, Howe said.

The committee has also proposed a review of having the municipality own the fixtures as opposed to the power companies for the remaining pole lights. Having the town purchase the fixtures would come with a large expense for the LED lights, but that expense is offset by rebates from Efficiency Vermont. Dummerston would have to shoulder any future maintenance costs if the fixtures were damaged.

Other towns in the area have removed streetlights in an effort to save money.

The Board of Selectmen in Chesterfield, N.H., reviewed a proposal to drop 11 of its lights operated by Public Service of New Hampshire for economic reasons. The town of Rockingham had more than 100 streetlights turned off to reduce its carbon footprint. The Rockingham Conservation Commission is now looking at switching some of the remaining fixtures to more energy efficient models.

Chris Garofolo can be reached at cgarofolo@reformer.com or 802-254-2311 ext. 275.

UNSUNG HEROS GET VT 'ON THE ROAD AGAIN'

Cont. from page 5

Command Centers", or ICCs, in the areas most affected by the floods. In less than two weeks, the agency went from having over 200 roads closed to only short portions on 6. Work will continue at an elevated pace throughout the remainder of the construction season.

- The floods displaced approx. 1700 state workers in Waterbury. They have been relocated and may be at these temporary locations for a year or more. The State is looking into a new commuter route from the Waterbury facility to the new locations to offset some of the additional costs and parking pressures resulting from these daily commutes.
- Several regional Public Transit entities were called upon to perform emergency evacuation and special transportation services. These included transferring patients from affected hospitals and assisting those with no access to the surrounding communities.
- The Go Vermont program saw an increase of more than a 100% increase in its daily web hits (from approx 120 per day to over 300) in the subsequent days after the flood. We are working with each state agency to ensure all employees are aware of the Go Vermont program and services (Automated carpool and public transit route matching, Vanpool program, guaranteed ride home, etc.).
- The Go Vermont program has also recently awarded a contract for "Direct Outreach" services, where the Go Vermont program and services are presented directly to employers and/or groups of employees and interest groups. This will be important as the program expands its reach and build on the networks of advocacy already in place.

The bottom line is that we need to all be thankful for the extreme efforts and long, hard hours that our Vermont Transportation Department put in, with their sense of community and incredible response that is putting us "on the road again"! You all are heroes that deserve tons of credit for coming so strongly to the rescue in our time of need.

SOLAR POWER SYSTEMS COMPANY OPENS IN DOWNTOWN RUTLAND

SAMESUN OF VERMONT

RUTLAND, VT, SEPTEMBER 20, 2011: Same Sun of Vermont is excited to announce the opening of our Downtown Rutland location. Same Sun, founded by Rutland Town residents Philip and Marlene Allen, sells and installs solar power systems for homes and small businesses. We exclusively use American-made products and are pleased to be creating jobs right here in Vermont. Same Sun also increases public awareness of solar technology, its community benefits and energy cost savings. A solar installation will provide at least 30 years of electricity at a cost equaling only 12 years of your current electric bill. This means you receive 18 years of free, clean electrical power. Other financial benefits can include:

- A Tax Credit equaling 30% of the installation cost
- A substantial Cash Rebate based on the size of your system
- Getting paid for the energy you produce

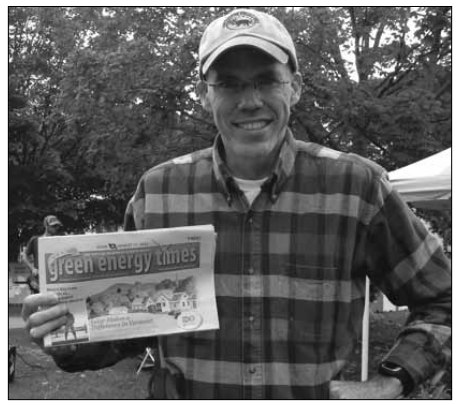
Philip Allen, Owner of Same Sun, says, "We've launched our company at a time when the cost has never been lower, and the technology has never been better. In addition, there is now an unprecedented set of financial benefits including the Federal Tax Credit, State Cash Rebate and Net-Metering Bonus."

Mr. Allen goes on to say, "All systems we design are net-metered, grid-tied, use no batteries and require no maintenance. Solar Power Systems have always been the right thing environmentally, and now, they are the smart thing financially."

Visit Same Sun of Vermont at 24 Center Street, in the heart of downtown Rutland, five doors down from the historic Paramount Theater. Our business hours are 10am to 5pm, Monday thru Friday, and by appointment. Stop in, email or call us toll-free at (855) 775-7900 to learn more and schedule a site visit. Find us online at www.samesunvt.com.

HIGHLIGHTS FROM 4TH ANNUAL L.E.A.F.

-Bradford, Vt



A full day of activities were enjoyed by visitors to the 4th Annual L.E.A.F. (Local Energy and Agriculture Festival) in Bradford, VT on September 17th . Formerly called the Local Energy Alternatives Festival, the event had a shift in focus this year, to include the importance of locally grown and produced foods.

L.E.A.F. was organized by the Energy Committee of the Bradford Conservation commission, with support from the Byrne Foundation and the Two Rivers – Ottauquechee Regional Commission, The structural scaffolding of the event included different panel presentations in the historic Bradford Academy Auditorium:

1. VT's Working Landscape, presented by Paul Costello, Executive Director of the VT Council on Rural Development, and Erica Campbell, Farm-to-Plate Coordinator of the VT Sustainable Jobs Fund;
2. Growing a Sustainable Business presented by two Bradford business leaders - Paul Sachs of North Country Organics, and Tim Copeland of Copeland Furniture;
3. Keeping PACE with Renewable Energy: New Trends in Funding & Technology, featured Howie Michaelson, of Catamount Solar; and Peter Adamczyk, of Vermont Energy Investment Corp.

Near the close of the event, Bill McKibben delivered the Keynote Address of the day, inspiring LEAF participants with his untiring work. He told us to "keep doing the good things such as this event" and "help stop the bad things, such as the proposed Keystone Pipeline".

Filling in around the "scaffolding" were re-skilling demonstrations, renewable energy vendors on the Lawns of the Bradford Academy, and a Farmers' and Artisans' Market on the lawns to the south of the Bradford Academy building on both sides of Main Street. Screenings of award winning films – "Vanishing of the Bees", " FRESH" and "BLOOM – The Plight of Lake Champlain" took place in the Old Church Community Theater.

Tours - of Bradford's Hydro Dam; of the recent energy-efficiency retrofits to the Bradford Academy building; and to the Solar Array and Cafeteria Gardens at Bradford Elementary School – informed visitors of the pro-active work already being accomplished in Bradford and inspired positive change in Bradford and other communities.

Live music provided by local musicians filled the air throughout the day and the event culminated with a delicious Sizzlin' Chicken Dinner prepared by the Methodist Church, made totally from locally grown foods.

Local merchants also participated by offering "LEAF Specials" throughout the week-end. Half of the proceeds from this year's LEAF RAFFLE were donated to the VT Farm Disaster Relief Fund that was established by the VT Community Foundation. Prizes included a battery-powered lawn mower, donated by Neuton, a solid maple night stand, donated by Copeland Furniture, a $200 gift certificate, donated by Perry's Oil, a solar-powered shed light, donated by Green Sun Solar and a Johnson Woolen Mill shirt-jac, donated by Hill's 5 & 10. Liane Allen, a member of the Newbury Energy Committee, presented information explaining the role of CO2 in climate change, and held a raffle for a 60-W-equivalent LED light bulb that uses only 8 watts of electricity.

LAKES REGION COMMUNITY COLLEGE REDUCES ENERGY OPERATING COSTS BY OVER $10,000

Laconia, NH, September 9, 2011 – Lakes Region Community College's energy bills will be down by over $10,000 annually this fall, thanks to the installation of photovoltaic technology and improved temperature control units. The new green technology will help LRCC generate its own power through solar means and use it more efficiently.

In addition to saving money, this project reduces LRCC's energy footprint by almost 2,000 gallons of heating oil per year. Pro Controls, of Bow, NH, and Revision Energy of Portland, ME completed the improvements over the summer. H. L. Turner, of Concord, NH, also conducted a comprehensive energy audit of the campus, with recommendations that could save additional money and energy through future upgrades.

Stationary, roof-mounted solar panels were installed on the College's Center for Arts and Technology academic building and a pole-mounted tracking solar system follows the suns path. Both systems are visible from Route 106 and highlight the College's commitment to energy efficiency and renewable energy. Lakes Region Community College is the only college in New Hampshire offering North American Board Certified Energy Practitioners Certification for photovoltaic installers.

The Community College System of NH was awarded a $1.3 million grant through the State Energy Program under the American Recovery and Reinvestment Act from the U.S. Department of Energy, through the NH Office of Energy and Planning. Each college in the Community College System received a portion of the funding to address energy usage and reduce long-term energy costs through targeted facilities and systems upgrades.

These cost reductions come at a time when many public entities are feeling the pinch of recent budget cuts, including a 20% cut to state funding for the state's community colleges. These infrastructure improvements will reduce operating costs, and support the colleges' efforts to keep the costs to students down.

The State Energy Program, funded by the Recovery Act, is a major investment in energy solutions that will strengthen America's economy, create jobs locally, and support the immediate use of the cheapest, cleanest, and most reliable energy technologies we have—energy efficiency, conservation, and renewable energy. ♻

WEATHERIZATION MAKES $ENSE!

Home weatherization makes sense in so many ways – it saves energy, saves money, increases comfort, creates local jobs, strengthens the local economy, reduces dependence on foreign and fossil fuels, helps protect the environment, etc.. Yet not that many people are doing it. Why and what can be done to turn that around?

These are the questions that SERG has been working on for a couple of years with Efficiency Vermont, the High Meadows Fund and others throughout Vermont. While the up front costs ($6,000 to $10,000 for a typical Home Performance with ENERGY STAR assessment and improvements) are a barrier for some homeowners, there are others with the disposable income for whom the savings from this work (typically $600 to $1,000 per year) would result in a much higher return on investment than any other place they could be investing their money now, plus all the other side benefits.

One concept that has floated to the top in these efforts to encourage Based Social comes down help promote This fall SERG is through the weatherization is called Community Marketing (CBSM), which basically to developing programs that will weatherization at the local level. testing some of these CBSM ideas Thetford Energy Challenge.

Some things we have done to "localize" this effort, include:

- Develop case studies of successful Thetford weatherization projects
- Recruit and train Thetford Home Energy Action Team (HEAT) volunteers to distribute free CFLs, discount coupons, information and resources on weatherization to all 1,200 Thetford homes.
- Organize a Weatherization Expo at the Thetford Academy gym where visitors will get to:
- Talk with local weatherization service providers,

Thetford HEAT
HOME ENERGY ACTION TEAM

- Talk with Thetford neighbors whose homes have been weatherized,
- Talk with bank representatives about financing weatherization,
- Attend workshops and see demonstrations of blower door tests, infra-red scans, spray foam, dense packed cellulose, window and door sealing, etc.
- Walk through Central Vermont Community Action Council's "Home Energy Makeover Trailer" where homeowners can see how and where weatherization measures are installed
- Watch 3 short hilarious and educational skits showing why "Weatherization IS Sexy" from Thetford's own Parish Players
- Win door prizes, including a free home energy assessment, worth $450!
- Organize a Weatherization Skillshop on Nov. 12th where participants will receive hands-on training on fundamental techniques for improving your home's efficiency
- Organize a Thetford Open Home Tour for Nov. 19th where visitors can talk with homeowners about their experience and see what measures have been installed.

Our goal for the Thetford Energy Challenge is to triple the number of homes getting weatherized in town every year, which will bring Thetford in line with meeting the statewide climate change goals. On a broader scale, we will be monitoring the effectiveness of these various programs and refining them for implementation in other towns throughout the state.

For more information on the Thetford programs contact SERG at 802-785-4126 or SERG@Valley.net, www.SERG-info.org, www.UVHEAT.org, www.VECAN.net

CAMPBELL SOUP IS GOING SOLAR! *Cont. from page 1*

from the project. Over the course of the 20-year PPA, Campbell will save up to $4 million dollars based on U.S. Department of Energy projections for the cost of electricity in Northwest Ohio. The project will also eliminate approximately 250,000 metric tons of CO2 greenhouse gas emissions in the region.

"With the signing of the agreements, the detailed design and construction of the system can now begin and we should be in operation by the end of this year," said Robert Shober, VP – Engineering. "We are excited to be hosting this facility, which when completed will consist of approximately 24,000 high efficiency solar modules, making it one of the largest such systems in the United States."

The State of Ohio demonstrated its support in October when the Ohio Enterprise Bond Fund agreed to issue $10.5 million in bonds to finance a portion of the Project. BNB is now in final contract negotiations with SunPower Corporation for the engineering, procurement and construction of the project. SunPower will install its Sunpower Tracker® system, using high efficiency solar modules. Once financing closes and all permits are secured, construction can begin in early June and will create more than 200 construction jobs in Ohio. When complete, the system is estimated to produce more than 14.7 million kilowatt hours during the first year of operation.

"This project represents the beginning of a strong future for on-site renewable power generation among major U.S. corporations," said Matthew Baird, a principal and founder of BNB Renewable Energy Holdings. "Campbell is at the forefront of large energy users who are taking action to help communities better meet their peak energy needs."

The Napoleon community should also benefit from the project. "The planned solar array will benefit the Napoleon community and our Northwest Ohio neighbors. When completed, it will have the equivalent effect, in terms of reduction of carbon, of taking 2,000 passenger cars off the road each year," said Ray Oldach, Vice President – Manufacturing at Campbell's Napoleon plant. "This project reaffirms Campbell's commitment to the Napoleon community and will help us continue to operate at world class manufacturing standards."

In addition, Campbell Soup Company will soon be publicly announcing a smaller, but still significant installation at our Sacramento, California plant. This will be a 14-acre 2 MW solar system that will provide 10% of the plant's power. They also have much smaller solar installations at our Paris, Texas and Toronto, Ontario facilities.

Campbell includes sustainability and corporate social responsibility as one of its seven core business strategies. The company's Corporate Social Responsibility (CSR) strategies are intended to make positive impacts in four key areas: Our Consumers, Our Planet, Our Employees and Our Community. To learn more visit www.campbellsoupcompany.com/csr.

BNB RENEWABLE AND ENFINITY CO-DEVELOP 9.8 MW SOLAR SYSTEM AT CAMPBELL SOUP PLANT

Exton, PA and Atlanta, GA – August 22, 2011 - BNB Renewable Energy Holdings and Enfinity America Corporation today announced plans to co-develop a portion of BNB's distributed generation (DG) pipeline in the USA. The first of several anticipated projects under this joint development agreement is the previously announced 9.8MW solar project which is under construction on 60 acres of land at the Campbell Soup Company's (NYSE: CPB) production facility in Napoleon, Ohio. The ground-mounted project is the largest commercial "inside the fence" (where all the electricity generated by the installation is utilized by the host operation) solar array currently under construction within the USA. The project is expected to be completed and operational by the end of 2011.

Under the terms of the agreement Enfinity is responsible for arranging the financing of the project and will co-manage the installation, contracts and future operations with BNB. Bostonia Partners (Boston), which is a financial advisor to BNB and specializes in renewable energy finance, established the partnership between BNB and Enfinity.

Campbell will purchase 100 percent of the electricity generated by the Napoleon, Ohio system, which is expected to provide approximately 15 percent of the soup plant's annual electricity requirements. FirstEnergy Solutions (Akron, Ohio) will purchase the Solar Renewable Energy Credits from the project. The project will eliminate approximately 250,000 metric tons of CO2 greenhouse gas emissions in the region, creating a positive environmental impact.

"This opportunity to collaborate with Enfinity marks a great milestone in the development of BNB's potential DG projects and ensures a successful completion and financing of the Campbell project", said Matthew Baird, a principal and founder of BNB Renewable Energy Holdings, "The construction of this facility marks a turning point towards larger on-site renewable generation in the USA; We look forward to developing additional projects for environmentally conscious companies like Campbell."

Rafael Dobrzynski, Enfinity's Americas CEO, commented "Partnering with BNB means that a range of synergies and complementary skill sets have been used to bring this project to fruition. Our involvement with the Napoleon Solar project validates Enfinity's strategy of focusing on large-scale DG installations; moreover, our deep experience with this type of solar project and ability to rapidly deploy capital means we can accelerate the pace of development and implementation. DG projects have continued to be an important part of our USA project pipeline."

BNB and Enfinity selected SunPower (San Jose, Calif.) to deliver the engineering, procurement, and construction services for the Napoleon solar project. The company will install its SunPower® [Oasis®] Tracker system, using high efficiency solar modules. Construction began in early June and is projected to create more than 200 construction jobs in Ohio this summer. When complete, the system is estimated to produce more than 14.7 million kWh during the first year of operation.

SOLAR PV

SOLAR PHOTOVOLTAICS

by 'Pablo'Fleischmann

Many thanks to Green Energy Options from Keene, NH for submitting the info for out Solar PV page. www.geosolarstore.com

How Solar Power might fit into your life - some commonly asked questions:

What are the basic types of solar applications and how do they work?

"Does this collector make electricity and hot water?" The simple answer is, no, you either will have a Solar Hot Water collector or a solar electric (PV=Photovoltaic) module (panel, array).A basic grid connected (grid-tie or grid intertie) system includes a solar array and a grid-tie specific inverter. PV modules typically put out low voltage (24 or 36 volts dc) and when installed in this type of system, will be wired in series to provide between 250 and 600 volts DC into the inverter, which will then provide 240 volts AC to your house and/or the grid. Inverters tend to be around 92-96% efficient and provide a very "clean" sine wave. The inverters only work when they sense grid voltage and hence, will shut down when the grid fails, surges or when the grid's frequency goes out of range. This feature, required by law, provides safety to any worker trying to fix downed lines. One of the ramifications of this feature is that when the grid goes down, your solar array does not provide any power. This reality hopefully was explained to all the solar grid-tied owners that recently were out of power for extended periods when Hurricane Irene came through, but I have heard from plenty of folks that were "reminded" of this after the fact. Grid-tied systems tend to be more efficient than battery-based systems because they only have one main task—feed as much power as possible to the grid!

Sunda Awning.jpg An "awning mount" evacuated tube solar hot water system.

Grid-tie PV systems that have batteries (grid-tie with battery back-up), basically, need an inverter that could feed to the grid, take care of (maintain) a battery bank and, through an internal transfer switch, provide power to a portion of the house when the grid fails. Hybrid systems can cost 20%-30% more and also tend to be less efficient at sending power to the grid because the battery-bank is a big resistor and becomes another priority in the system. That being said, they also give piece of mind when the power goes awry!

Grid-tie system that offsets nearly 100% of customer's household use. Three people. 4.3 kiloWatts of PV. Excellent, unobstructed exposure with an ideal 45º pitch!

However, SMA (SMA Solar Technology AG) out of Germany has created a multiple inverter system that has at least two inverters: one that is responsible only for grid connection and feed-in (the "Sunny Boy"); and one that is the battery maintainer and back-up power machine (the "Sunny Island"). During grid failure, the Sunny Island will "communicate" with the Sunny Boy and allows the Sunny Boy to feed solar into the house/batteries, if solar "help" is needed. What you end up with is a redundant system that costs quite a bit more, but functions really well. This type of "AC-coupled" system is a growing trend in the industry.

View from the roof of a home, showing Mount Monadnock in the distance.

Stand-alone, or off-grid systems are probably the root of all residential PV systems. Since the 1970's, when small PV modules became financially available to the general public, folks were finally able to get rid of our kerosene lamps! Some of us still live with "old school" systems, which often don't include inverters at all. Our 12 volt house though, requires specific appliances that are able to run on this low-voltage DC rather than the typical 120/240 volt AC household.

With the steady increase in efficiencies and functionalities of battery-based inverters, most off-grid folks live in homes that are hardly discernible from their on-grid neighbors. One thing to note though, is that it is nearly impossible to live in an off-grid solar home without some sort of supplemental power source during the limited-sun winter months. This may include a wind or hydro-electric turbine, but most often is a gas, propane or diesel generator.

Stand-alone PV systems include a charge controller between the PV array and the batteries. Charge controllers are primarily tasked at making sure the batteries don't over charge. Basic controllers are simple relays that, when a specific voltage set-point is reached, disconnect the solar from the batteries. PV modules don't really "care" if they are sending you power or not, making it easy to just disconnect if needed. Other, charge controllers take control of the power coming from the array and may modify it before sending to the battery bank. This may be as simple as pulsing the power or more complicated techniques that manipulate the voltage/current into the batteries. Newer charge controllers can actually increase useable power by 20% to 30%.

One key component in these systems is the battery storage system. For the most part, we are using hundred-year-old technology with flooded lead acid batteries—primarily using renewable-energy-specific deep cycle batteries. They require regular maitenance (typically monthly) and should be set up in a vented battery box. Most batteries will produce excess gasses and need to be stored properly. This type of battery typically last ten to twenty years. Many factors influence the longevity of a typical off-grid battery bank. With more than three decades of experience, the industry has specific recommendations for proper charging, etc.

With recent power outages, people with grid tie* systems are starting to ask, "can I add battery back-up to my existing grid tie system?"

Answer is a qualified, "yes." As described above, these AC-coupled systems require an additional inverter and a battery bank that can be connected and coupled to your existing grid and solar system. There are some design constraints, so it is does depend, somewhat, on your existing system whether or not the two systems can interact. Typically, these systems would be connected to a "critical loads" panel to power only essential loads, such as heating systems, refrigerator and/or freezers and well pumps. The size of the battery bank determines how long one can run independently and can cost thousands of dollars. Since the batteries will only be used occasionally, they may last ten to twenty years.

We added a 4.5 kW system to this house years after the homeowner installed a Solar Hot Water system. They also heat with a wood-pellet boiler.

This off-grid home recently upgraded from the old 600 Watt array to an additional 2 kW. Now their generator hardly ever runs.

Why do people choose to go solar?

1. "Margaret came into the shop and said "I don't care about payback

I'm retiring soon and I just want to make sure that my future electricity costs are fixed."

Simple grid-tie systems are a good way to "lock-in" future costs and offer a guaranteed payback on your investment.

2. "A few years ago, I lost power for 10 days and had to run a noisy, smelly gas guzzling generator the whole time to keep my home functioning. I'd like to know that in the future, if the power goes out that I can have the basics keeping a few lights, the water pump, radio and refrigerator and furnace operating. A small solar system is a great way to keep things calm during power outage".

3. "It's the right thing to do. I've wanted to do this for 20 years and now that the prices have come down, I can finally fulfill my dream. And besides, it's a good investment and shows my children that I care."

4. "Fossil fuels are killing the planet and I want to be part of the solution."

5. Adding Solar to your home is a wise investment and increases the resale value of your home. Some town and city ordinances offer tax exemptions for renewable energy improvements on your home.

How much does it cost to install solar electricity?

In 2007, the national average for a simple grid-tied, resident roof-mounted system, was around $10/watt. Now it's approaching $5.00/watt! This is before any State or Federal rebates/credits. The main reason is that the price of modules has dropped precipitously. Right now the cost for a PV system has a similar payback to SDHW.

Homeowner purposely over-sized their array to accommodate a future plug-in electric car. They also have a substantial battery backup system with Xantrex Hybrid Inverters

How about solar hot water?

Depending on the size system and complexity $7500.-11K

Should I wait until the technology gets better?

The existing technology is tried and true. Inverters in grid-tie systems are typically running efficiencies around 95% (!) and have 15-25 year life (10 or 15 year warranties). PV modules have a 35-50 year life expectancy (with typically a 25 year production warranty). Newer technologies will not be available or affordable for years to come. Buying current solar technologies guarantees a payback on your investment for both you and your planet and purchasing a system now will only help advance research and development.

What are the steps needed to evaluate if solar will be cost effective at my home?

Have a good, unobstructed southern solar orientation. Solar south or true south is approximately 15º west of magnetic south. Any orientation of plus or minus 15º from solar south is promising. The key in the northeast is to have unobstructed sun between the hours of 9 am-3pm, when the sun is the strongest. Typically solar hot water systems should be on or close to the house whereas PV can be located further from the house either ground mounted or on an out building such as a barn.

Are there government incentives for installing solar?

The 2005 Energy Act provides a full 30% tax credit on the total installed cost for both solar electric and solar hot water systems. This tax credit is available through Tax Year 2016. NH and Vermont also offer rebate programs (checks in the mail!) towards PV and Solar hot water systems, often bringing the total out of pocket systems costs to 50% or less.

What will I need to do to maintain my solar system once it's installed?

Typically, PV arrays in the Northeast, may need occasional cleaning of snow, road dust or pollen, but otherwise require little to no maintenance. Grid-tie systems which have no batteries, require no other maintenance. Systems that include batteries do require periodic maintenance.

Pablo Fleischmann and Valerie Piedmont have lived in their "off grid" solar for more than 25 years of experience with renewable energy on their own homestead, which prompted Pablo Fleischmann and Valerie Piedmont to open Green Energy Options, USA Solar Store in Keene NH. Photovoltaic (PV, solar electric) systems, solar hot water, wind turbines and energy efficient heating systems can give homeowners greater peace of mind in this age of rising fuel prices and power outages. Since home energy use is one of the greatest contributors to CO2 pollution, becoming energy independent is also a significant step many of us can take in reducing global climate change. geo@usasolarstore.com

ONE KILOWATT OF POWER GENERATED FROM SOLAR PANELS PREVENTS 150 LBS OF COAL FROM BEING MINED

SOLAR POWERED GOODRO LUMBER CHALLENGED BY IRENE

by Justin Shaw

Disaster preparedness was not a motivating factor when we installed a solar array on our pine barn. We were looking for a method to control costs and save money over a long period of time. In this economic environment, the only thing that seems to be predictable is that the cost of doing business will increase along with the cost of goods. That being said, to invest in something with a long lifespan that has the potential of being a stable source of income was appealing. Federal and state financial incentives were such that the solar system might pay for itself within 7 years. In November of 2010, Prudent Living (of Windsor) installed the system which had been designed by Res-Tec Solar (of Bridgewater). There are 96 panels capable of generating 21kw of power on our south facing barn. The system is grid-tied, so power goes back into the grid if we are producing more than we are using. Since spring-time we have seen near $0 or a credit balance on our electric bill. The system can generate power on weekends, holidays, and after hours thereby making money when we aren't even open.

Our biggest challenges now are to maximize the panels' potential by keeping them clear of snow as well as to minimize our own power consumption. We have yet to come up with a safe, cost effective way of clearing snow, but the panels finally slid clear in mid-march during the first sunny, above-freezing day. The latter challenge is an ongoing one. We installed LEDs in our store's spotlights, and have plans also to eventually replace the flourescents with more energy efficient ones.

The power doesn't go off very often at Goodro Lumber: our location near the power substation guarantees this, but we found ourself without power for three days following Irene. The sound of a generator could be heard throughout the day which was powering our server, a sales computer, and a few lights. Ironically enough, our bank of 96 solar panels on our barn roof have the potential of powering our whole operation on a sunny day. However, the flood waters washed away all of the wiring that connects the panels to the grid. Their only function was to look really nice. Soon enough, they will be in use again and we will be able to watch the electric meter spin backward.

Goodro Lumber is a family owned Building Materials and Hardware located on Route 4 in Killington, VT.

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 like the idea of having my own solar system power plant, but does it real make sense financially?

Whether installing a solar system makes financial sense mostly depends on your perspective and circumstances. It is fair to say that any well designed Solar systems will pay for itself over the 25-40 year expected lifespan of the system. These days, with the lower cost of modules and continually escalating cost of carbon-based energy sources (oil, gas, coal, etc.) the payback period is getting shorter and shorter – in some cases well under 10 years. How fast a system will payback for you is buried in the details. However, depending on what the numbers for the system you purchase look like, and assumptions you make about the future cost of energy, producing your own energy often looks fairly favorable as an investment.

As it is when deciding on any long term investments, initial cost of a Solar Energy system is only one of many factors to consider. If you buy a system that is low cost up front, you want to be confident that it will both last and be largely if not completely worry free for the advertised expected lifespan. Even if there is as much as a 25 year warranty on equipment, it is hard to predict which manufacturers and installer will be around to honor that length of warranty, so it's essential to start with reliable equipment and confidence in the quality of the install. Of course, all installers make mistakes and even the best manufacturers have their Monday mornings and Friday afternoons, but experience and reputation are worth paying attention to. If the system poses significant challenges even 15 to 20 years out, that could have a substantial impact on the financial calculations used to justify the initial purchase. Having a high degree of confidence in the system equipment choices as well as the design and installation skills of your installer are at least as important as the bottom line.

Even if a solar system makes financial sense for me, how can I afford a system especially when money is tight?

Choosing to install a solar electric system at your home or business is a big decision for those who don't have a lot of disposable income. Fortunately, not only has the cost of Solar Electric system come down substantially over the last few years, but there are currently more financing options for making the investment if you don't have some or all of the capital necessary.

If there is an option to refinance a home mortgage, current rates and pricing often make it feasible to borrow enough additional cash in order to pay for a system while paying less in overall monthly carry costs due to the lower utility bills and the more favorable interest rates. This is often the case in commercial environments because of economies of scale as well as additional tax breaks available to businesses. In these instances, it can be a fairly straightforward decision to make the investment.

Another option that more people are taking advantage of is the "Group Net Metering" option. This has been discussed extensively in previous editions of the Green Energy Times, but briefly this is a mechanism that allows like-minded utility customers on the same utility to pool their resources, find an appropriate location for a system, and share the benefits in a mutually agreeable way. By partnering with others, both economies of scale and other financial incentives can make the cost of entry into a solar system much less daunting.

In the near future it is looking like the PACE program may become a reality. This is a program that provides low interest financing for energy related home investments administered through Town Tax collection. There is currently a lot of activity around setting up the system – look for information about forums and town meetings over the next several months.

There are other options for financing Renewable Energy systems which any installer should be able to let you know about, and more are cropping up regularly. In the end, which financial option you pursue, if any, will be dependent on your circumstances and interests, but Solar Electric systems are more affordable now than ever before.

BRADFORD VILLAGE APARTMENTS

Solar Retrofit & Boiler Replacement

In 2010 Realty Resources Management requested bids for a heating and solar retrofit for the Bradford Village Apartments, a 3-building, 21-unit complex, in Bradford, Vt. ARC was awarded the bid and completed the job this summer.

Realty Resources Management (RRM) wanted to maximize available energy conservation rebates. As an approved Vermont Solar Thermal Provisional Partner through Renewable Energy Vermont, ARC Mechanical worked with RRM to help them secure over $14,000 in incentives to help keep the project affordable and moving forward.

New Buderus boiler with four solar storage tanks to the left. This boiler serves two buildings in the complex

The solar design criteria that needed to be met had to provide at least 50% of the domestic hot water needed annually by the 49 apartment residents. The annual BTUs required to meet this criteria was calculated at 90 million BTUs annually, or 489,840 BTUs/day. It was determined that four, 4'x10' solar panels would be required for building C, and eight, 4'x10' solar panels would be required for buildings A&B, which are supported by a common boiler and solar system and connected by underground piping for both the domestic hot water and the space heating supply lines. The solar hot water is generated throughout the day and stored in a series of thermally-insulated solar tanks, totaling 240 gallons for building C and 480 gallons for buildings A&B. This pre-heated, stored water acts as the cold water inlet to the indirect fired water heaters installed for each building. A typical system heats 40º F ground water to the temperature that is required. The pre-heated water, which even on a cloudy day can reach 115º, is then heated to the required set point by the indirect fired water heaters that receive the additional required energy from the oil-fired boilers.

Solar Pump Station

Eight solar panels that serve two buildings in the complex

ARC replaced four existing boilers (combined 820,000 BTUs) with two boilers (one 105,000 BTU and one 180,000 BTU). The new boilers have an AFUE (Annual Fuel Utilization Efficiency) of 86%, while the old boilers had an AFUE of 78%. The boiler sizes were dramatically reduced due to weatherization of the buildings, including replacement windows, new insulation, and the addition of the solar hot water system. Prior to the installation of the solar packages, the domestic hot water generation was, by far, the largest consumer of energy from the original system. To ensure the tenants at the complex had no disruption in hot water while the project was ongoing, ARC installed a temporary boiler that suited their needs.The completed system for the buildings generated a reduction in boiler size of over 65%!! The solar system needed to provide a minimum of 50% of the annual hot water consumption, but is projected to provide 76%!!

SOLAR HOT WATER

SOLAR DOMESTIC HOT WATER (SHW) WITH A LOCAL FAMILY'S EXPERIENCE

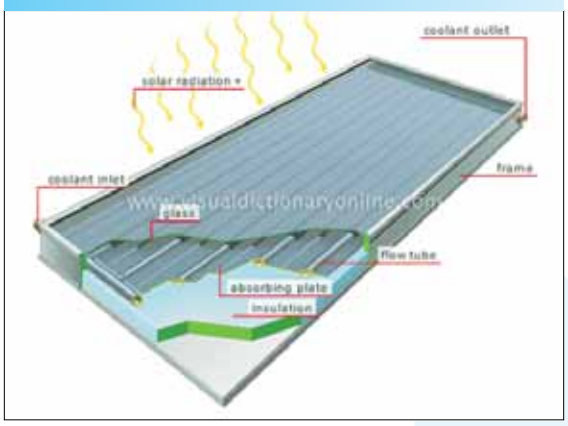
We want to thank Solar Source's John Kondos and Craig Bell for providing the Solar Hot Water material.

Solar domestic water heating (SHW) has been around since at least the 1800's and is quite common today in many countries especially near the equator. These systems don't have to deal with freezing temperatures so they can circulate water directly through the collectors. Most New England SHW systems utilize a closed loop containing nontoxic antifreeze that transfers heat to your hot water via a heat exchanger. Drainback systems are an alternative to the closed loop but require careful pitching of collectors and piping. In a drainback system water is pumped through the collectors and it drains out of the collectors when the system shuts down, providing freeze protection. Because of our demanding climate, which includes frequent freeze thaw cycles and high heat and humidity, SHW systems need compatible and proven components. Done right SHW systems will last for decades, the antifreeze will need to be changed much like in a car and the storage tank may not last depending on the water conditions, but the many systems that have operated for 3 decades in our region prove that this is a great investment if it's done right.

A SHW system is sized based on your hot water usage. The size and number of collectors and the storage tank are adjusted to meet each situation. A good rule of thumb is 1.5-2 gallons of storage for each square foot of collector area. For example, a 2-3 person household might utilize a single 40 square foot collector with an 80 gallon storage tank while a family of 4-5 might need 60-80 square feet of collectors and a 120 gallon tank. Larger or multifamily and commercial systems are designed to meet their specific hot water needs. In our climate it's important to realize that a solar water heater requires a backup heat source. While SHW may provide all or most of your hot water during sunny periods in the spring, summer and fall, it will preheat your water during the winter or extended cloudy periods. On an annual basis a residential SHW system should save about 75% of your water heating expenses.

SHW Flat Plate Collector

- Most common, 1st in 1890's
- Price increasing due to copper
- Simple design, 25+ years of service
- Very efficient for hot water needs (DHW, radiant floor and pool heating)
- Better in snow conditions



The SHW system components consist of flat plate collectors which resemble skylights, see below for collector type discussion. We use US made, high efficiency collectors from a manufacturer with systems still operating since the 1970's. Basically, a flat plate collector is an insulated aluminum box with a tempered glass surface to allow the sun's rays to heat the specially treated flat plate with copper tubing inside. The collectors are connected to a storage tank by an insulated closed copper pipe loop that contains non-toxic antifreeze, for freeze protection. The heated antifreeze is automatically circulated through the closed loop to exchange the heat to the domestic water via a heat exchanger. Other components include a controller with sensors to operate the circulator pump, an expansion tank and valves. An option is a DC circulator pump that can be powered by a PV module.

The SHW system turns the pump on when the collector temperature is 18 degrees warmer than the storage tank and shuts off when the collectors are only 5 degrees warmer insuring an adequate heat transfer. While this is a basic overview, at Solar Source we're committed to using only proven components, designed for our climate so that the system will last for decades, another reason we choose flat plate over evacuated tube collectors. Evacuated tube collectors are relatively new and a high tech alternative to the reliable, flat plate design which have incorporated high tech upgrades from insulation and glass to absorbers. Evacuated tube collectors use a series of glass tubes, each with a collector inside a vacuum to capture the heat. The tubes are relatively fragile and more expensive and while they can generate higher temperatures in the winter they are more likely than flat plate collectors to remain covered with frost or snow according to a side by side study conducted in Germany. I've used a plastic headed snow rake on my flat plate collectors for 15 years to accelerate snow shedding, that's not an option with the evacuated tubes. Evacuated tubes are more efficient in cold temperatures and in diffuse radiation, they're also lighter and easier to install. We believe that flat plate collectors are a better choice than evacuated tubes in most situations locally since they are cheaper, longer lasting, shed snow better and are more durable.

SHW with Tankless Backup

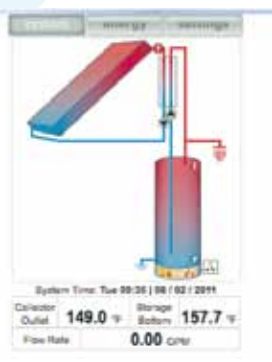
- Closed loop using non toxic anti-freeze
- automatic pumping
- controlled by temperature
- of collectors & storage

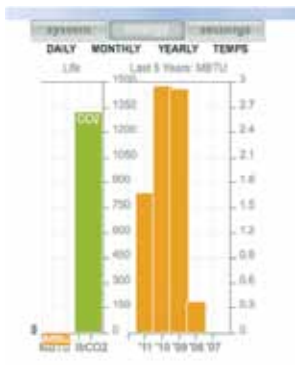
Doug &Andreas' collectors shed snow on their own.

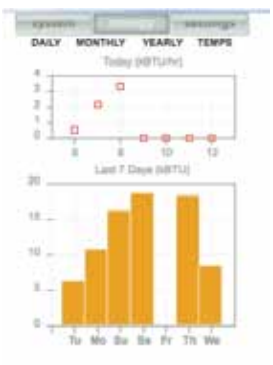
Doug, Andrea and their two daughters have had their SHW system for three years. They have two Heliodyne 4' x 8' flat plate collectors and a 120 gallon storage tank with a Bosch tank less, on demand propane back up. This is a very efficient design since the on demand unit only comes on if the solar heated water isn't above the set temperature on the gas fired unit. Doug has said he only hears the gas unit fire up occasionally from spring through fall, so this July he decided to valve off the gas unit to see how long they could go with no back up. Even with house guests visiting for a week, with a lot more dishes and laundry, they were fine. They did dishes and laundry after lunch which introduces cold water into the tank for the sun to heat all afternoon maximizing solar hot water production. They didn't need the gas heater until the rainy stretch we had in September. So even with teen age daughters and house guests it's possible to get 100% from a SHW system in the summer. Their system includes a controller with a WiFi signal that can be accessed with a PC to monitor the system performance, below are examples of the various displays that include current system status, weekly, and yearly summaries of energy produced.

SHW is a sound investment particularly for those who use significant amounts of hot water. Solar systems are eligible for a 30% federal tax credit and there are state incentives. Since the solar energy is free, a SHW system is like pre buying the energy for your water heating for decades. The system will pay for itself in a few years, depending on the cost and type of fuel you are offsetting, and then its free hot water. I like to think about that during guilt free, longer showers after a hard day's work or play.

John Kondos is a founder of Solar Source (a division of the Melanson Co.), Home-Efficiency Resources and the Monadnock Sustainability Network, whose mission is to promote credible, sustainable/ "green" practices in the region. www.solarsourcene.com







GO GREEN WITH BLUE

by Robert K. Weir, P.E.1

A typical intake installation

A day will scarcely go by when we are not reminded that renewable energy is the wave of the future for the good of the country and the creation of jobs. Typically, news reports cover solar and wind, then biofuels, LEED buildings, geothermal, and others. Perhaps at the end of the list there is a mention of some type of hydropower. Few renewable energy sources are as attractive to small rural consumers with the right sites as the renewable energy source called micro-hydropower. Still relatively unknown, "micro-hydro" utilizes innovative methodologies and technologies with an extremely small footprint, ultra-low impact and highly environmentally-friendly. From the White Mountains in New Hampshire and Vermont's Green Mountains to the Cascades of Washington there are thousands of small streams offering huge amounts of clean, renewable energy. And this is the great news about micro-hydro – NO DAM is needed!

L: A large, custom turbine house. R: Inside the large, custom turbine house

In the early days of alternative energy, many folks found it easy to purchase a couple of solar panels and some batteries and with a bit of help from their wood stoves got by quite nicely. With winter and little sunlight, the addition of computers and other electric conveniences, the need for kilowatt-hours grew. It seemed only natural that energy-minded folks would think about using some of that gravity in the water flowing down the small stream on the back side of the property to add more kilowatt hours as a clean energy input. After continued design development and new technologies, micro-hydro is now emerging as a highly feasible, cost-effective renewable energy technology, especially in mountainous, non-arid regions.

One of the great things about hydro in general is that it produces power ALL the time; 24X7! If you have water flowing over downhill terrain – the steeper the better – you have the potential to generate power with micro-hydro. The first step is to determine how much elevation differential, known as 'head', and how much flowing water, you have available. The overall process can be fairly simple and the following steps will get you going.

Determine the available head. This means finding the elevation difference from the highest point on your stream to the lowest point on your stream. This can be done with a sight level, a surveying partner and a grade stick. You could also use surveying instruments, a micro barograph or simply a tube filled with water and a survey rod to sum elevation differences.

Determine the volume of water flow. This can be as simple as measuring the stream at several typical spots to determine the average width and depth. Better yet is to find a spot where you can direct the water into a bucket to time the fill. If it takes 10 seconds to fill the 5 gallon bucket you have 30 gallons per minute available. A bit of research will show you other simple ways to determine flow.

For the intake area at one of the higher spots on your stream, select a potential point where you are going to divert and screen (harvest) the water to a pipe (penstock) connecting the diversion with the generator. Self-cleaning tilted wire wedge wire screens work well and require little maintenance. And they do not require a dam or impoundment of any type so you will not have to make any stream alterations.

From the intake, water is transported downhill in a pipe, called a "penstock", using gravity to build water pressure. The penstock is usually PVC, polyethylene, HDPE (high density polyethylene) or any other pipe available. A viable route for the penstock must be selected. In our climate, a buried penstock is superior, but not absolutely necessary, for year-round operation of the micro-hydro system.

Typical intake under the snow

At the low point of the stream, locate a spot for a small turbine house outside of the stream channel in a safe location. Environmentally-sound locations for the turbine house include but are not limited to; sites that are outside of any wetlands; away from sensitive areas, flood-prone locations, etc. The turbine house contains the turbine/generator, along with the hydraulic and electronic controls. The turbine house also includes a water return to deliver the water back to the stream.

If you have an existing solar or wind system, you will know the voltage required from your turbine/generator. Calculations can determine the best voltage output for the unit, which is usually influenced by the distance from the turbine house to the point of power use. You can easily integrate a micro-hydro system with the batteries and electronics that you had for your solar panels!

The process of designing and installing a micro-hydropower system can be intimidating, but it can also be straightforward with good planning. Making sure that any required permits are obtained prior to construction is part of the process. There are many sources for information and advice to help you with your project. In New England, you can contact the team at Little Green Hydro, LLC who will gladly help and provide you with the information that you will need to design a system that is right for you. So, if you have a likely site, why not "Go Green with Blue!" You can meet all kinds of great people who are eager to share their knowledge - and mistakes- so you are never alone. Good luck!

Bob Weir is founder of HydroScreen, LLC and the Principal Hydro Engineer at Little Green Hydro, LLC, makers of the EcoHydro System™, the first integrated micro-hydropower solution.

IT IS TIME TO START TALKING HYDRO PUMPED STORAGE IN VERMONT!

Closed loop and open loop pumped storage hydro. Vermont's peak load is 1,100 MW, but did you know that just south of Brattleboro there is a 1000 MW hydro plant? and just south of Bennington-there is a 600 MW hydro project? These are open-loop hydro pumped storage plants. Closed loop plants basically require two 1 km. diameter ponds-like two big bathtubs-separated vertically. At night when there is almost no draw on the grid-you pump up; during the day-let the water flow down. It is time to start talking hydro pumped storage in Vermont! Watch a great video animation here: http://www.eastcoastmetrology.com/case-studies.html

From Lori Barg, Community Hydro, Plainfield, VT 802-454-1874 , www.communityhydro.biz

FERC APPROVES FIRST HYDROELECTRIC PROJECT IN COLORADO UNDER SMALL HYDRO AGREEMENT

Sep 15, 2011 -- Federal Energy Regulatory Commission Documents and Publications/ContentWorks

The Federal Energy Regulatory Commission (FERC) today approved the construction of a hydroelectric project in Colorado, the first issued since FERC and the state of Colorado signed an agreement last year to simplify procedures for the development of small-scale hydropower projects. As a result of the streamlined procedures, the approval of today's project was completed in two months.

The Meeker Wenschhof hydroelectric project, to be located on an existing irrigation pipeline near the town of Meeker in Rio Blanco County, would consist of a powerhouse containing one generating unit with an installed capacity of 23 kilowatts and an average annual generation of 100,000 kilowatt hours. FERC approved the project in a two-month time span.

In signing the memorandum of understanding (MOU) with Colorado in August 2010, FERC said it had seen rising interest among entities seeking to develop small, low-impact hydropower projects. Federal surveys have identified several hundred potential small hydropower projects of smaller than 5 megawatts (MW) in Colorado with a combined capacity of more than 1,400 MW. These projects have the potential to make a significant contribution to meeting Colorado's energy needs while helping to satisfy Colorado's new Renewable Energy Standard and create related business opportunities.

"Small hydro is a renewable resource that has tremendous potential," FERC Chairman Jon Wellinghoff said. "FERC and Colorado have shown their commitment to moving these projects forward knowing that, ultimately, it will benefit consumers and help create jobs. It's a win-win for everyone."

The MOU signed by FERC and Colorado agreed to the following: Colorado will develop a pilot program to test options for simplifying and streamlining procedures for authorizing conduit exemptions and small 5MW or less exemption projects while ensuring environmental safeguards.

FERC just issued a license within two months!! This happened because Colorado signed an MOU with FERC, to streamline the process. FERC is encouraging other states to sign a similar MOU. Ask Governor Shumlin to sign a similar MOU with FERC http://www.ferc.gov/legal/maj-ord-reg/mou/mou-co.pdf. This suggestion not been incorporated in the VT energy plan-yet!

From Lori Barg, Community Hydro, Community Hydro, Plainfield, Vt 802-454-1874 www.communityhydro.biz

WIND

THE CLEAN TRUTH ABOUT WIND POWER

Northeast Wind

Electricity generated by wind turbines does not require burning fossil fuels or emitting harmful pollutants into our atmosphere – in fact, the fuel is free, clean, plentiful, and renewable. On the other hand, fossil-fueled power plants emit millions of tons of sulfur dioxide, oxides of nitrogen, and carbon dioxide each year. These pollutants are a cause of global warming. Running a single 1-MW wind turbine can displace 2,600 tons1 of carbon dioxide in one year (equivalent to planting one square mile of forest). For context, the five permitted wind projects in Vermont will have a total installed capacity of approximately 150 MW… which is also enough to power just about every household in Windsor County.

Local Wind projects keep energy dollars in state and provide a steady income through lease payments to the landowners. Wind projects also pay significant property taxes and into the state's Education Fund taxes each year. Wind energy development, construction, and operation creates local jobs. Unlike oil, the wind is not affected by international conflicts or embargoes, making it immune to supply problems or price shocks associated with fossil fuels.

Wind power is an important part of our renewable energy future, and there is a great deal of support and movement in the efforts to make it happen. In fact, 90% of polled Vermonters supported (74% strongly) a wind farm being built where visible from where they live.2 Still, there are some who for various reasons oppose it and frequently raise misguided claims. Counteracting global climate change is of the highest importance, and so our discussions must be based on reliable scientific fact. When the facts are thoroughly vetted, wind power emerges as a clearly beneficial technology.

Reliability and Efficiency

Unlike other power plants, wind energy systems require minimal maintenance and have low operating expenses. Modern wind turbines are very reliable and are available to generate electricity approximately over 95% of the time. Wind turbines generate electricity from a fuel that is free and will never run out, but which isn't available all the time. "Capacity factor" is an often-misunderstood term that is sometimes confused with efficiency. It is the comparison of the actual energy produced to what would be produced if the wind was blowing 24 hours a day, 365 days per year. The capacity factor is influenced by the wind resource available at a particular site. Unfortunately, this term is often over-simplified, confused, and used to criticize wind (and other) technologies

So, what happens when the wind stops blowing? Not a lot really, as electricity continues to be provided by other forms of generation. Our electric system is mostly made up of large power stations – in New England, these are typically natural gas fired turbines, and the system is able to cope when one of these large plants goes down. Wind is a "mustrun" resource so when the wind is blowing the clean power that is generated flows into the system, replacing the need for other (polluting) generation to run at the same time. Power supply flows onto the grid in balance with demand and the regional electric system ("grid") is used to deal with fluctuations in demand, such as when people come home from work and turn on the lights, appliances, or, in many cases, heat their homes.

Safety

Wind turbines are sited carefully, with safety being a primary concern. Construction or operation issues are easily containable within a small area, and minuscule when compared to the ecological disasters associated with oil, gas, and nuclear power.

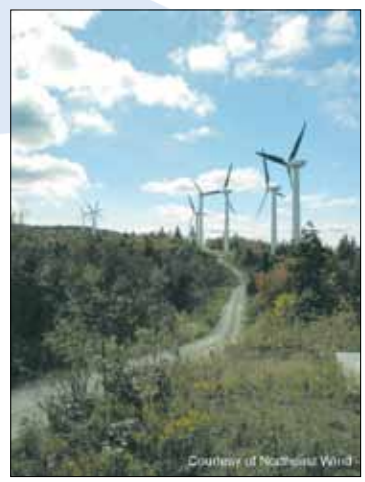
There is potential for annoyance to humans or impacts in the form of shadow flicker (the effect of rotating blades passing between the sunlight's path and the viewer), or sleep deprivation from sound generated by the blade passing the tower if wind turbines aren't sited carefully or without proper study. To minimize these impacts, sound studies are carried out with noise receptors placed at multiple locations, and shadow flicker effects are mapped precisely with state-of-the-art software.

At 350 meters (approximately 1150 feet) away, the sound of a wind turbine registers at the same decibel range as a quiet bedroom or rural night-time background, and shadow effects may occur a small number of hours per year. Each of these issues and many other aspects of a project are carefully reviewed by the Vermont Public Service Board.

Wildlife

While roads and concrete foundations need to be constructed to install wind turbines, revegetation along the edges of both thrives soon after construction. Moose, bear, deer and small animals are often spotted at the Searsburg facility, and after a walk through the woods surrounding the turbines, it is hard to escape without evidence of this on your shoes.

Birds and bats are known to collide with turbines, as they do with other tall structures. Older California wind projects raised concerns about raptor impacts because they had lattice towers, shorter, faster spinning blades and were built in areas with sensitive raptor populations. The National Academy of Sciences estimated in 2006 that wind energy is responsible for less than 0.003% (3 of every 100,000) bird deaths caused by human (and feline) activities. Similarly, wind turbines account for only a small number of bat fatalities each year. However, due to the affects of white nose syndrome on bat populations in our region, pre- and post-construction bat studies are carried out as part of wind project development. Careful siting and assessments early-on make it possible to avoid or minimize impacts to wildlife.



The energy we consume has to come from somewhere, and we must make a decision: do we continue on our current path until it is too late to mitigate the effects of global warming and damage to our environment, or do we act immediately to steer ourselves in a sustainable direction. As more wind energy appears in our region, we are creating jobs, burning fewer fossil fuels, and moving towards a more promising future.

For more information about wind energy, including peer-reviewed studies and educational fact sheets, please visit http://www.northeastwind.com/resources/facts-aboutwind- power.

1. 2004 EPA non-baseload CO2 emissions rates (EPA dGrid2006 Version 2.1, April 2007)
2. Vermont's Energy Future, Vermont Department of Public Service (http://cdd.stanford.edu/polls/energy/2008/vermont-summary.pdf)

GMP AND NPS AWARD WIND TURBINE

COLCHESTER, VT September 19, 2011 - Green Mountain Power is pleased to announce that Northlands Job Corps of Vergennes has been selected to host the first wind turbine installation of the Green Mountain Power & Northern Power Systems Community Wind Partnership to promote local wind power.

"This is just the first of what we hope to be many Vermont-made community-scale wind turbines in our state," said Mary Powell, president and chief executive officer of Green Mountain Power. "Distributed generation, where customers and communities produce their own electricity, is going to play an increasingly important role in our energy future. We want to help our customers realize this future in the easiest and most cost effective way possible."

Northlands Job Corps' Center Director, Jim Linday is enthusiastic about hosting this first turbine. "Job Corps centers and all large facilities need to be progressive in looking at alternative ways to generate power and save energy. We're proud to be in partnership with Green Mountain Power to develop alternative ways to reduce our carbon footprint."

The Northlands Job Corps was selected from more than 60 applicants to host the turbine because of its excellent wind resource, its public service mission, close proximity to distribution voltage 3 phase power lines, and a parcel size sufficient for permitting.

"Designed and manufactured in Barre, Vermont, the 121 foot tall NPS 100 turbine is ideally suited to a community setting. The turbine is similar in height to a church steeple or a water tower," said John Danner, President and CEO of Northern Power Systems. "Our next-generation design creates an extremely reliable, quiet and safe turbine that enables successful distributed energy generation."

The turbine at the Northlands Job Corp site is expected to generate annually the

Cont. on page 18

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**

PACE 2.0 UPDATE AND QUICK START

Vermont's Property Assessed Clean Energy (PACE) law encourages homeowners to install energy improvement projects by removing the high up front cost barrier, and then attaching the payments to the property tax bill instead of to the current owner. Towns are the legal representative between the program and the property owner, and Vermont bill 2011 H-056 was passed last May to minimize their financial risk and streamline the procedure. As now planned, towns will collect applications from homeowners once or twice a year, and submit the projects to Efficiency Vermont, who will aggregate the requests to maximize economies of scale, which will be done in the short term by a line of credit, and long term potentially by issuing a bond. The town then places a lien on the affected homeowner's tax bill and includes the special assessment charge on future tax bills.

Bill H-056 updates to PACE include:

- the PACE lien is now junior to existing liens and mortgages
- commercial property is not eligible for the program
- no agreements can be written until the program starts on January 1, 2012
- the PACE lien survives foreclosure and the town collects arrears the same as unpaid taxes
- payments can be made as scheduled or prepaid in full with no penalty
- costs of the program will be covered by the participants only
- establishment of a reserve fund administered by Efficiency Vermont to cover losses by a 2% charge on the projects
- establishment of a backup reserve fund from RGGI monies equal to 5% of PACE projects in a given year and capped at $1 million
- evaluation of projects by Efficiency VT for cost, savings, carbon impacts, and cash flow, and then approval of the request

A town must vote to establish a PACE district, and with the help of Senator Bernie Sanders, VEIC has set up a Quick Start initiative to help energy committees get the question on the ballot for town meeting next March. This includes financial, technical, and legal services, model documentation and community education materials. To participate in Quick Start a town must send a signed letter

Cont. on page 17

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 HELPS HOMEOWNERS AND BUSINESSES WITH FREE FLOOD REPAIR ASSESSMENTS, AIR SEALING, APPLIANCE REBATES AND MORE

Efficiency Vermont is working with contractors and community-based organizations to help residents and small businesses rebuild after Tropical Storm Irene. Services from Efficiency Vermont for flood-damaged structures include:

- Free flood repair assessments and air sealing by certified contractors, including moisture assessments, blower-door tests to identify areas of air leakage, air sealing, combustion safety testing to determine carbon monoxide levels and recommendations for rebuilding safely and energy efficiently;
- Enhanced weatherization and appliances replacement for low-income Vermonters, in collaboration with local weatherization assistance programs;
- Special custom "Button Up" workshops scheduled around the state, to help Vermonters rebuild safely and energy efficiently, in partnership with the Central Vermont Community Action Council (CVCAC);
- Incentives of up to $1,000 to help Vermonters replace and upgrade heating systems and hot water heaters, in cooperation with the Vermont Fuel Dealers Association; and
- Customized incentives for businesses on equipment replacement as well as structural repairs.

In addition, Efficiency Vermont continues to offer residential incentives of $25 - $100 to assist with the purchase of energy efficient refrigerators, clothes washers and dehumidifiers.

"Vermonters have been doing a tremendous job recovering from Irene," said Jim Merriam, director of Efficiency Vermont. "Efficiency Vermont is here to help them do so in a way that helps meet immediate needs, while also strengthening our communities for the future." To further help flood-damaged communities, Efficiency Vermont and CVCAC are offering a special version of the popular Button-Up Vermont do-it-yourself workshops in September and early October. These free workshops (dates and locations to be announced) will deal with drying walls and basements, addressing mold issues, and improving building and heating system efficiency.

"VFDA members are busy fixing heating equipment that was damaged by the storm," said Matt Cota, Executive Director of the Vermont Fuel Dealers Association. "In many instances, a new high efficiency system or hot water heater is a better choice than fixing what is currently in the basement. Thanks to these incentives, these systems will be a little easier to afford."

PACE 2.0 UPDATE AND QUICK START

Cont. from page 16

of intent to VEIC, (who can provide a sample letter), but this does not commit the town to holding a vote or creating a PACE district. VEIC will also provide help setting up programs in a town, such as identifying demand, establishing program criteria and documents, pooling administrative overhead with other towns, community education, and loss protection. 13 towns have now passed PACE, and almost 50 more are signed up for Quick Start. A Quick Start forum will be held at Vermont Law School on October 15.

Vermonters now pay almost 60% more than the US national average on their home heating bill, or about $800 million a year on heating oil and services. The up front cost of a weatherization or renewable energy project is one of the major obstacles to changing this. The typical Home Performance with Energy STAR project costs about $7500, and after a $1700 incentive payment from Efficiency Vermont will cost the homeowner $5800. The average savings from these projects is $800 to $1100 a year, or a payback period of about 6 years at current energy prices. PACE not only removes the initial $5800 cost but spreads the payments out over up to 20 years, which results in a payment that costs less than the original energy cost and gives a positive cash flow right from the start. (There is no requirement that a project have a positive cash flow for PACE, but sale of a property will probably suffer if property costs are larger than they would normally be, even though a PACE lien does not have to be paid off for a sale like a bank lien does.)

For more information please contact Peter Adamczyk, Energy finance and development manager at VEIC: at 802-488-7631, or padamczyk@veic.org

A list of eligible projects can be found at http://www.veic.org/Libraries/Resource_Library_Documents/eligibleprojects.sflb.ashx

Vermont PACE information is at www.veic.org/PACE , and national information is at www.pacenow.org

(27 states and Washington DC have passed legislation)

GEOTHERMAL ENERGY: THE WORLD'S GREENEST HEATING AND COOLING SYSTEM

Even Phillips Petroleum Is Using It!

Would you like to be free of the oil heat company, declare yourself a friend of the earth, and put to rest forever your worries about staying warm in winter?

The answer to your dream is at hand. An energy efficient, cost effective, and environmentally friendly heating/cooling system—a geothermal heat pump—is the greenest way to heat and cool your home.

Geothermal heat pumps take advantage of the nearly constant temperature of the Earth to heat and cool buildings. The shallow ground, or the upper 10 feet of the Earth, maintains a temperature between 40° and 60°F. This temperature is warmer than the air above it in the winter and cooler in the summer.

In the winter, the heat pump removes heat from the heat exchanger and pumps it into the indoor air delivery system. In the summer, the process is reversed, and the heat pump moves heat from the indoor air into the heat exchanger. The heat removed from the indoor air during the summer can also be used to heat water, providing a free source of hot water.

Geothermal heat pumps use much less energy than conventional heating systems, since they draw heat from the ground. They are also more efficient when cooling your home. Not only does this save energy and money, it reduces air pollution.

Who Says Geothermal Energy is the Best Choice?

Geothermal energy is recognized as the most efficient and greenest heating/cooling method by opinion leaders in government and private sectors.

These are the facts you need to know about geothermal energy.

An EPA study of energy efficiency concluded geothermal energy is the most environmentally friendly heating/cooling system.

The United States National Renewable Energy Laboratory concluded that geothermal energy is more efficient and cost-effective (http://www.nrel.gov/learning/re_geo_heat_pumps.html) compared with conventional residential systems.

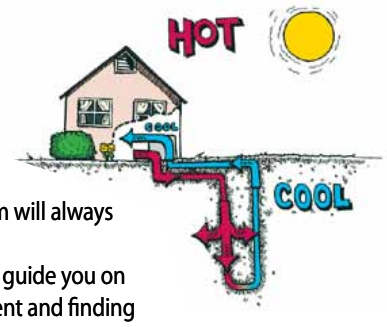
A Stern School of Business (NYU) study concluded that wind and geothermal are more efficient than any other forms of renewable energy. (http://www.sustainablebusiness.com/index.cfm/go/news.display/id/18588)

Available everywhere in the United States, geothermal energy can be found underground virtually anywhere.

Geothermal cost savings can be increased by geothermal energy incentives, (http://www.dsireusa.org/) from federal, state, local, and utility sources.

The U.S. Department of Energy and EnergyStar concur that geothermal is one of the most efficient and comfortable sources of heating and cooling. (http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=HP)

Energy and cost savings of geothermal heat pumps will vary by region and type of conventional system they're compared with. But the energy cost of geothermal versus conventional HVAC systems will always be lower — and the geothermal system will always be greener.



EnergyStar can guide you on selecting equipment and finding installers in your area. The Department of Energy Consumer's Energy Guide has data on geothermal system return on investment. (http://www.energysavers.gov/your_home/space_heating_cooling/index.cfm/mytopic=12640)

What Do Owners of Geothermal Systems Think?

GeoExchange.org is an excellent website, full of information and answers for all your geothermal questions (and a whole bunch of questions you didn't even know you had!). Among other interesting statistics, you'll discover that up to 95% of geothermal system owners would recommend installing such a system in the home. That's reflected in a number of online users' and owners' forums, including where you can experience the viewpoints of geothermal system owners.

Recent large-Scale Projects

Not only is geothermal a smart choice for homeowners, commercial applications are growing throughout the country, too, reinforcing that these systems are smart investments.

• The West Philadelphia Enterprise Center uses a geothermal heat pump system for more than 31,000 square feet of space. (http://www.renewableenergyworld.com/rea/tech/geoheatpumps)

• Retail giant IKEA recently opened a new store in Colorado and is controlling the climate (both heating and cooling) in it with geothermal. (http://www.nrel.gov/news/features/feature_detail.cfm/feature_id=1520)

• And, if those instances aren't compelling enough, look at what oil giant Phillips Petroleum is using! (http://www.geoexchange.org/index.php?option=com_phocadownload&view=category&id=8:commercial-case-studies&Itemid=292) An innovative geothermal heating and cooling system installed in a Phillips 66 service station and convenience store in Prairie Village, Kansas, followed by two similar successful installations in Dallas, Texas and Oklahoma City, Oklahoma, has prompted the Phillips Petroleum Company to adopt geothermal systems as a new design standard for all their company owned service stations. The Prairie Village installation uses geothermal systems for driveway ice melting, warm water for car washes, and radiant heat for car wash bays. It also links the store's refrigerators, walk-in freezers, and icemakers to the system.

Geothermal systems are paying off for businesses and residential applications, and not only in out-of-pocket savings on carbon-based energy usage, but in longterm, environmental savings, too. It's a win-win situation whose time has come. ♻

GMP AND NPS AWARD WIND TURBINE

Cont. from page 18

same amount of energy used by 20 average Vermont homes and offset over 65 tons of CO2. The turbine will be group net-metered, with the Job Corps receiving 10% of the energy generated from the turbine and Green Mountain Power using the rest. Green Mountain Power will own, operate, and maintain the Northern Power 100kW (the NPS 100) permanent magnet direct drive (PM/DD) distributed wind turbine on the Northlands Job Corps campus.

Northern Power Systems will provide web-based monitoring of the turbine enabling Northlands Job Corps and others in the community to view the clean, renewable power and other environmental benefits being created by the NPS 100 in real time. Installation of the turbine is expected to be completed by the end of the year.

"We are very excited to do this project in Vergennes with an exemplary community organization like Northlands Job Corps," said Ms. Powell. "GMP-NPS Community Wind is unique in that it uses local technology and local companies to generate local renewable energy and local jobs. There's an important role for renewable companies like Northern Power in Vermont's energy future, and we're happy to help bring that future to fruition."

The contractor selected to erect the turbine is Engineers Construction. Encore Redevelopment is serving as project manager.

About Green Mountain Power

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

About Northern Power Systems

Northern Power Systems has been working for more than 30 years toward electrifying the world with clean, renewable wind energy one wind turbine at a time. The company's next generation wind turbine technology is based on a vastly simplified architecture that utilizes a unique combination of a permanent magnet generator and direct-drive design. This revolutionary approach delivers higher energy capture, eliminates drive-train noise, and significantly reduces maintenance and downtime costs. Northern Power Systems is a fully integrated company that designs, manufactures, and sells wind turbines into the global marketplace from its headquarters in Barre, Vermont with additional offices in Massachusetts and Michigan, USA, and Zurich, Switzerland. For more information, please visit www.northernpower.com/community-wind

Sustainable Keene

KEENE: A GREEN MUNICIPALITY

By Garett Kopczynski

Keene, NH is a valley-nestled small city that has been in existence for an appreciably long time (at least by American standards). Possessing a long past of industry and civic orientation, Keene has been able to weather the storms of the centuries by keeping focused on what matters: its community values. In 2000 Keene steadfastly started on a path of "sustainability" as it applies to Keene's relationship to the environment on a macro and micro level. This was reinforced by the flood of October 2005 that raised many questions about climate change and ways Keene could really make some lasting changes. Ecologically, Keene started to see itself in the larger picture and this meant starting to discuss how to make a change. This has led to some interesting projects that the municipality has undertaken to maintain its level of stewardship of the community.

Water Treatment Facility hydro turbine

Energy retrofit project for the City: as part of its efforts to address energy use and efficiency, the City had Honeywell inventory its energy and heat use, and went with a recommendation to retrofit many aging or inefficient systems. Many of these changes had a significant impact on the way the City uses energy. The installation of new boilers, sealing buildings, or merely putting in sensors that detect if someone is using a room all help cut down on energy costs and overall carbon emissions.

Biofuel for the City fleet: Keene adopted early on the use of biofuels with its City fleet of vehicles, and has been using these fuel alternatives now for many years.

Electric powered maintenance cart: The City uses an electrical cart with equipped solar cells to carry equipment around the downtown area and transport maintenance staff.

Solar cells on the City Hall roof: as part of the energy retrofits the City also put a rack of solar cells on the roof. This helps offset energy usage at City Hall, and sets a good example for others in the community to consider doing the same.

Big Belly solar recyclers: by utilizing a grant from the Northeast Resource Recovery Association (NRRA) the City has been slowly upgrading its existing waste disposal bins on Main St. These upgrades come in the form of a solar powered compactor known as a "Big Bell" that handles trash and recycling, reducing the amount of times it needs to be emptied.

Main Street LED lights: as part of an effort to drastically cut energy costs and improve the downtown lighting, the City replaced existing decorative High Pressure Sodium lights with LEDs. These have resulted in remarkable energy savings, improved safety and visibility, and make the beautiful downtown shine.

Hydro turbine at the Water Treatment Facility: using American Recovery and Reinvestment Act (ARRA) funds, the City installed a hydro turbine at its Water Treatment Facility. Utilizing the pressure created by water entering the plant downhill from a reservoir, the City is able to generate enough electricity to offset what is used, as well as create a small amount of revenue in energy sold back to the electrical grid.

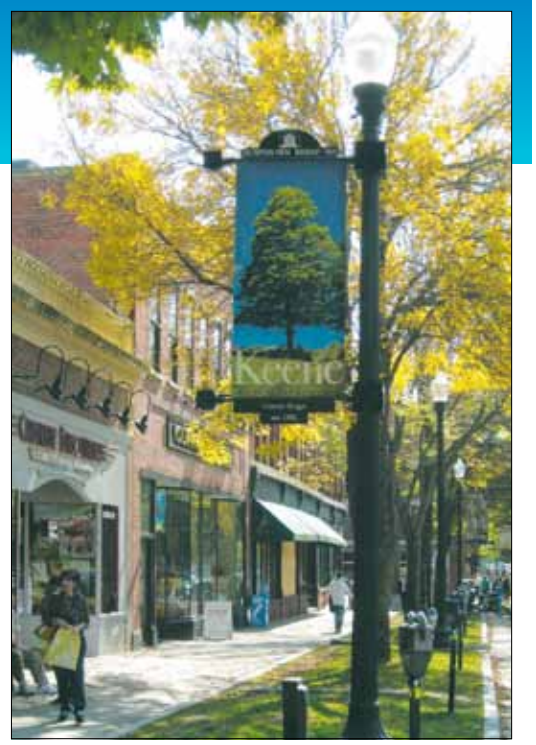
E-waste recycling program: the City identified that its electronic waste should be handled in a way that is most considerate of people and environment, and implemented a system to ensure this happened. All electronics are picked up by a certified company that attempts to sell it for reuse. Anything that does not get purchased is recycled in a way that ensures the materials do not escape into the environment.

Methane gas generator at capped landfill: an earlier project, the landfill was capped in the 90's and the methane gas generated is used to power and heat the facility. There are some projects in development that may utilize some of this system to grow food in greenhouses with the assistance from the EPA's "Climate Showcase Communities" grant.

Keene Master Plan: the Keene Comprehensive Master Plan (CMP) project is a community master plan developed in a high level of collaboration with the community. Having utilized input techniques that get constructive feedback, the City now has an extensive document outlining the way it should be developing towards the year 2020 according to the citizens. Much of the plan focuses on environment and sustainable living, reflecting the deeper ingrained ecological values and the commitment of Keene.

Solar panels on top of City Hall

Solar recycler



Geothermal heating at the Public Works Facility: during construction of the new Public Works Facility, thermal heating was installed, drawing heat up from the earth using pumps. This was deemed an excellent way to heat the facility by using what the earth already provides.

All of these projects were developed with the same intention: bettering the community. The City has shown it is not afraid to try innovative things, but also willing to embrace smaller ideas. The 'low hanging fruits' are just as vital as the grander project, and the changes put in place begin to permeate the consciousness of the City. Its identity now is a positive one, and Keene is starting to achieve recognition for its sustainable efforts. Rather than this being an exception though, Keene is where other communities are seeing as the norm. This is wonderful news for the environment. ♻

THE SUSTAINABILITY PROJECT—AN OVERVIEW

The Sustainability Project (TSP), a 501(c) 3 nonprofit educational organization based in the Monadnock Region, promotes a love of nature, environmental stewardship, and caring communities. The group is guided by a belief that diversity, inclusion and compassion are fundamental to the long-term wellbeing of the planet and its inhabitants.

Incorporated in 2000, The Sustainability Project was born out of the love for forest and a vision of a world in harmony with nature. Currently, the group is six years into an all-volunteer effort to create a wheelchair accessible nature center in the Emerson Brook Forest, Gilsum. "Everyone deserves to have access to the beauty and healing qualities of the forest" according to founder and director, Valerie Piedmont. Valerie maintains that humans are essentially more human in the natural world and she envisions a time when every community has a beautiful open space for people to gather in celebration and for the serious work of caring responsibly for the planet.

The Sustainability Project hosts monthly com-

Cont. on page 22

CLIMATE CHANGE

Keene Cities for Climate Protection Committee (CCP)

The CCP Committee was officially created in 2000 by the City Council. The committee's objective is to aid in the reduction of greenhouse gas emissions by assisting the City to implement the adopted climate action plans within the community, as well as to provide public education and outreach and advocate for changes in climate change policy at the State level.

CITIES FOR CLIMATE PROTECTION COMMITTEE

The purpose of the cities for climate protection committee's 'mission statement' is to aid in the reduction of greenhouse gas emissions and increase the community's adaptive capacity to the expected impacts of a changing climate in order to protect the viability of the community and to protect public health, safety, and welfare. For further information contact Mikaela Engert, City Planner at 603-352-5474

MONADNOCK SUSTAINABILITY ACTION PLAN

The Monadnock Sustainability Action Plan has been developed as a basis to advance the work of municipalities, businesses, non-profits, institutions, and citizens in the Monadnock Region toward reducing dependence on imported fossil fuels for energy and improve the environment and

Cont. on page 35

Look for Part II "Thermal Strage Applications" in the near future in Green Energy Times!

THE SUSTAINABILITY PROJECT—AN OVERVIEW

Cont. from page 19

munity work days and a "BioBlitz" natural resource inventory in the Emerson Brook Forest as well as programs and workshops focused on permaculture, map and compass orienteering, beekeeping, star gazing, building bat houses, herbal remedies, mushroom cultivation and identification and other skills for sustainable living.

The group's annual programs include The Seed Celebration & Seed Exchange (Feb); The Wholesome Foods Pancake Breakfast at the Gilsum Rock Swap (June) and The Crescent Moon: A Community Celebration of Earth-Inspired Art (Autumn). Each of these events provides an opportunity for people to network and to experience being part of a vibrant community.

Ongoing programs of the organization include:

1. The Monadnock Community Gardening and Seed Saving Initiative (MCGSSI). Meeting monthly, April through September at a different garden, the group's goal is to improve food security by creating a network for people to share gardening ideas and resources;
2. The Mediated Home Share Services (MHSS) program works toward better meeting our community's need for affordable housing by: encouraging unique and mutually beneficial home sharing situations; offering a process designed to match housing needs with available housing; and offering mediation support services as a proactive approach to housing disputes.
3. The "Houses of Healing" inmate support group at the Cheshire County Correctional Facility. Most incarcerated people are those dealing with alcohol and substance abuse, mental health issues, developmental disabilities and poverty—all systemic social problems that can be solved. The issue of incarceration is key to a sustainable future.

Designed for continuous learning and growth, The Sustainability Project, also supports new program concepts, initiatives and collaborations in line with its mission, goals and objectives. This year, The Sustainability Project sponsored: The National Model Forest Policy Program (MFPP) to improve forest management practices along the Ashuelot River Watershed in light of climate change; The Friends of the Northern Elementary Schools Before and After School Program, providing nurturing support and educational activities to children in Gilsum and Sullivan; and Project Venture, a proven drug, alcohol and risky behavior deterrent for adolescents in the Hinsdale/Winchester area.

Individuals or groups with program ideas that might benefit from The Sustainability Project's fiscal sponsorship or organizational structure are encouraged to contact the program development committee at info@emersonbrookforest.org. A program proposal form can be found online at www.emersonbrookforest.org. ♻

LOCAL HOME OWNERS TAKE CONTROL OF THEIR ENERGY FUTURE

By Joe Milliken - Technical References
By Brian Hernon

CHESTER, VT. - As another winter season approaches and energy prices continue to rise, people are looking for alternative energy options to avoid the volatility of conventional fossil fuels. As there are many conventional and alternative energy options available to homeowners today; it can be difficult to know where to start.

Bruce, Evan, and Kathy Parks of Chester, VT recently invested in a unique alternative energy system integrating two local and renewable sources of energy: wood pellets and the sun. "It really started back in April with the recognition that heating oil prices continue to rise out-of-sight," Bruce Parks said. "Then, after doing a little research, my wife and I decided to have a complete energy audit done on our home, to figure out what the best option might be." The Park's energy audit provided a comprehensive analysis, complete with infrared photos of the Parks' home and a list of recommendations to help make their heating more efficient. "With the results of the audit, solar water heating was recommended to take advantage of the southerly exposure of our house. We also learned that our boiler was near the end of its life, therefore, a wood pellet boiler was our best option."

After researching pellet-burning systems and local energy companies, the Parks chose HB Energy Solutions of Springfield, VT, who offer a unique piece of pellet equipment: the Pellergy Burner System. This wood pellet burner can be adapted to a wide variety of applications, including steam heating, greenhouse and warehouse heating, as well as forced hot water heating on a residential or commercial scale.

HB Energy Solutions Installers Setting Collectors In Place

Completed Domestic Solar Hot Water Panels

From Left to Right: Dual Coil Solar Storage Tank, 4 ton bulk wood pellet bin with flexible auger, Pellergy Controller (mounted on bin), Solar Pump Station, High Efficiency Pellergy Boiler

"We love the fact that the Pellergy system is built locally in Vermont, and that wood pellets are carbon neutral," Parks added.

The Pellergy Burner system was mated to a high efficiency triple pass oil boiler. The new system only runs when there is a need for energy, known as a cold start boiler. Many heating systems run constantly to maintain a certain temperature, whether or not it is even needed. You don't leave your car idling for hours in case you want to drive it later, so why should your heating system be any different?

The Parks' pellet boiler is fed automatically from a 4 ton bulk wood pellet bin located in their basement. Bulk wood pellets are delivered by specially designed trucks which employ either an auger or pneumatic based system to convey the pellets to the desired storage device. While increasing the initial cost of the system, the bulk bin greatly improves the convenience and automation of the entire system. This bin also has an access hatch for periodic maintenance and to allow the use of bagged pellets if desired. This system can also be fired with oil, if the home was going to be left unattended for several months etc. and is completed by an automated call out feature to alert the Parks family if their system requires attention.

To offset the amount of pellets needed throughout the year, a domestic solar hot water system was also installed and integrated by HB Energy Solutions. The Parks' residence was a great solar candidate thanks to a clear southern exposure. A roof was built over the upper deck to provide a base for the Stiebel Eltron flat plate collectors. Previously, a lot of energy was spent on air conditioning to overcome the passive solar gain on that part of the house. Now that energy is being utilized to heat up to 70% of their domestic hot water annually. The energy absorbed by the flat plate collectors is stored in a 108 gal. dual coil water storage tank. A dual coil tank means there are two heat exchangers to accept energy. In this installation, the bottom coil supplies energy from the solar collectors. During periods of cloudy weather or high amounts of hot water usage, the Pellergy boiler will automatically supply energy through the upper coil as needed. Domestic hot water (cooking, bathing etc.) can account for 20% or more of the average household's annual fuel costs.

This local family's investment stands to show others what is available. When addressing the energy needs of today, there is no single answer. It will take a complimentary integration of sustainable options to reach our energy goals. This well designed system proves that point, by embracing the renewable stability of wood pellets, and by utilizing the least expensive fuel there is: the sun. ♻

LOWELL WIND UPDATE . . . *A LEARNING EXPERIENCE*

By N.R. Mallery

Aerobic composting now has a proven tool to help reduce energy dependence, create economic Green Mountain Power's Lowell Wind Project had already been termed 'a learning experience'. Last week, after construction had started, ANR put a 'Stop Work' Order on the project temporarily.

Why? Because the storm water system that was still in the process of being built did not adequately handle an unforeseen 4" rainfall that occurred recently. (We have certainly had our share of them this year). While the stop order was in place, crews worked to strengthen the stormwater systems. Once ANR and GMP were satisfied, the order was lifted on October 12. GMP's Dorothy Schnure told us that they "got a little bit ahead of themselves. We need to and have always built to the highest standards and will move forward doing exactly that. We agree with this order and are now moving forward, holding to the highest environmental standards possible".

21 Vestas Wind Turbines will be installed, which will produce 63MW of electricity.

To clarify the rumor that this project would be 'blowing off the mountaintops', like they do with dirty, polluting coal, we were assured that they would NOT be blowing off any mountaintops. Not one! *Whew!* In fact from the road or from a distance it will barely even be noticeable that anything has changed except for wind turbines that will serve to bring roughly 180,000 MWh per year of clean, renewable energy to our state. There will be some necessary leveling that will require some blasting so that the roads and the turbine pads can be built. *Whew, again!*

Just as with any building site, during the construction period, there will be some disturbance at the work areas (which has been authorized by state and federal environmental regulators) - but a year from completion, the grass will be growing and look like our other mountain tops where you see lush green pastures throughout our beautiful state - but with some working art in motion.

It will also be necessary to do some blasting for the road up to the ridge line. The material from the blasting will be 'recycled' by using it for the road itself. *Very Nice!*

134 acres of trees will need to be cut, unfortunately, but to mitigate this, GMP is conserving more than 1,000 acres that will never be able to be developed, as well as conserving more than 1,000 acres more for fragmentation mitigation. Assuredly, there will be no bears going hungry or starving.

In other countries, wind turbines gently spin along the horizon, an incredibly thrilling sight, in itself, understanding that they represent good changes for that our future.

Rumors can cause confusion and deviations. Green Energy Times thought it was time to present these facts. It is always best to go to the source before forming opinions. Then, an educated opinion or decision can then result. For concerns, please contact Dorothy Schnure at GMP: 802.655.8418.

Visual Simulation from Burton Hill Road, Irasburg, Vermont

Existing Conditions from Burton Hill Road, Irasburg, Vermont

Photo credits: Kingdom Community Wind - Prepared by LandWorks, Middlebury, VT

CHELSEA GREEN BOOK REVIEWS

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

Passive Solar Architecture - Heating, Cooling, Ventilation, Daylighting, and More Using Natural Flows

by David A. Bainbridge and Ken Haggard

Wow! My mind is filled with visions and dreams, knowledge and ideas! How can I possibly describe the value of this book? I wish I could just spend a week - without distraction, among only the people that really want to plan for a sustainable future. I planned to highlight pages that I want to go back to with a couple of sticky notes, but have now placed ½ of a pad of sticky notes all through it. There obviously is a lot of information that I wish I could share and is worth reading, which is the only solution - to get the book yourself.

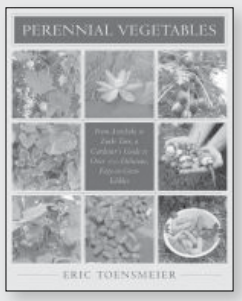
As with the authors, it reminds me of my journey, when I finally decided to walk my talk and take the steps to 'go solar' - off-grid and to live a truly sustainable lifestyle. At that time, I found the Real Goods Source Book to be an invaluable asset to learn how to make it all happen. While I will still recommend that book often, the examples, pictures, designs, charts, graphs, along with real life examples of other that are doing it - probably make this book even more valuable. It was a bit disgruntling to not see any examples from the northeast, though. (I guess we will leave that to Green Energy Times to do!) There are many sustainable developments here in VT, NH, and MA, ME and even NY. I wonder how they compare?

We have much to learn from the Sustainable Cities such as in Davis, CA, Los Osos, CA, Austin, TX and New Hopell, Berea, and Whitesburg, KY.

This book creates an urgency for 'now' and is especially meaningful as we rebuild from the hurricane Irene's devastation. From the stormwater run off measures to the responsibilities of each individual homeowner and building owner for how we need to prepare for our changing future that scientists comfirm definitely includes 'climate change'!

Perennial Vegetables - From Artichokes to Zuiki Taro, a Gardener's Guide to Over 100 Delicious, Easy-to-Grow Edibles

by Eric Toensmeier



Did you ever stop to think that many vegetables are actually perennials? What a great time-saving thought! It generally seems that the flower gardens can handle a bit of neglect and in actuality, a good deal less work than the vegetable garden - now that i AM thinking about it!

So this leads me to loving the ideas and information in this book - Toensmeier's engaging exploration of the reality of this option that we have, is a great answer to that move towards Permaculture. It also makes sense as another way to try to save some time and work and yet still have wonderful vegetables on hand without having to plant again and again each year. Of course - there will be some veggies that do require doing so, for the simple love of them or for sustainability (save those seeds!)… but this is a great start to free up a bit of time in one's life.

Perennial vegetables are perfect as part of an edible landscape plan or permaculture garden. The author profiles more than a hundred species, with dozens of great pictures and illustrations, and is filled with valuable growing tips, recipes, and resources. Perennial Vegetables is actually a groundbreaking and ground-healing book that will open the eyes of gardeners everywhere to the exciting world of edible perennials. I wish that i had read it back in 2007 when it was first published. The information is timeless and worth learning about, even to a greater degree today. Consider it as highly recommended, after learnin about it through a Permaculture friend, from Terra Perma Design and am grateful for having found it. You will, too.

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 & 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
Simple Food for the Good Life - Random Acts of Cooking and Pithy Quotations by Helen Nearing

CHELSEA GREEN PUBLISHING
the politics and practice of sustainable living

Small-Scale Grain Raising, 2nd Edition by Gene Logsdon
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.

GERMANY'S GREEN DRIVE SUBDUES 2013 POWER PRICES: ENERGY MARKETS

By Lars Paulsson - Sep 22, 2011 12:33 PM ET

A surge in renewable energy in Germany is pushing power prices for 2013 below next year's level even as natural gas, coal and emissions rise.

Electricity for 2013 was 45 euro cents (61 cents) a megawatt-hour cheaper than next year's contract today after the gap widened to as much as 1.25 euros at the start of last week, broker prices on Bloomberg show. The country, Europe's biggest power consumer, will build 7,000 megawatts of solar and wind capacity in 2013, 32 percent more than the additions planned for next year, according to Societe Generale SA.

Germany is installing more wind turbines and solar plants to offset halted atomic production while limiting emissions from fuels such as coal and gas, which typically determine power prices. Industrial users in Europe's biggest economy are buying supply for next year as Germany's biggest utility EON AG has already sold almost all of its electricity for the period, helping keep 2012 prices at a premium.

"Much of this premium has to do with new power plant projects coming online, both traditional coal and gas plants and renewable energy," Sigurd Lie, a senior analyst at Nena AS in Oslo said in a Sept. 14 e-mail. Lie has studied Europe's power markets for more than a decade.

Germany will build 9,600 megawatts of power generation capacity in 2013 and retire 3,200 megawatts of thermal plants fueled using coal and natural gas, Societe Generale's head of energy research Emmanuel Fages said in slides e-mailed Sept. 15.

Solar, Wind Share

The country got a record 20.8 percent of its electricity from renewable sources such as wind, solar, biomass and hydro in the first half of the year, the country's BDEW utility association said Aug. 29. Still, renewable energy is a less reliable form of production as it relies on fickle sunshine and wind while thermal and nuclear plants are able to generate around the clock.

The next-year contract rose to a two-year high of 60.90 euros a megawatt-hour on May 31, the day after Chancellor Angela Merkel's coalition endorsed a plan to close eight nuclear reactors following the disaster at Japan's Fukushima Dai-Ichi atomic plant. It was at 56.85 euros at 6:30 p.m. in Berlin today, its lowest close since Aug. 18. The 2013 contract traded at 56.40 euros.

The forward price curve, with 2013 prices at a discount to next year, is "justified, especially because of the prevailing new build of renewable generation," Peter Krembel, head of power, carbon and cross commodity trading for continental Europe at RWE Supply and Trading GmbH in Essen, Germany, said in a Sept. 13 e-mail.

Autumn Buying

Industrial users traditionally buy supplies for next year during the autumn, a further impetus to push 2012 prices higher.

"We are in an intensive period of contracting right now," Per Lekander, UBS AG's London-based head of global utilities research, said by e-mail on Sept. 15.

The later-dated of the two front year power contracts in Germany was last cheaper in 2008, when energy traders deemed the commodity rally unsustainable as Lehman Brothers Holdings Inc. collapsed, Krembel said. The next-year contract traded at a record 90.80 euros on July 7 of that year.

Coal prices for 2013 are 3.6 percent more expensive than for next year. Natural gas for next winter in the U.K., Europe's most liquid market, is 3.8 percent more expensive than for the six months through March 2013 while European Union emissions permits for 2013 are at a 7.3 percent premium to next year. A situation whereby later-delivery contracts cost more than earlier ones is known as contango.

'Bit Fishy'

"I think it's a market anomaly and a bit fishy because forward fuel markets and CO2 are in their normal contango," Lekander said. "I would be really surprised if this is still the situation in six months. It's more likely to do with hedging and the utilities having sold less of 2013 power."

Dusseldorf-based EON sold 90 to 100 percent of its 2012 German, Benelux and French power by the end of the second quarter. It had sold less than 60 percent of its 2013 power, according to slides posted on its website on Aug. 10.

RWE AG (RWE), the nation's second-biggest utility, said a day earlier it had sold more than 30 percent of its 2013 German power as of June 30. Georg Oppermann, a spokesman at EON, declined to provide more recent figures. Harald Fletcher, an Essen-based RWE spokesman, declined to provide an update on the company's hedging.

As Europe's largest economy slows and reduces energy demand growth, the buffer of spare capacity is widening, Lie at Nena said. Local utilities including Stadtwerke Munchen GmbH are building wind parks that can earn more than double the market rate for electricity.

Solar Panels

Some of the country's 40 million households are installing solar panels on rooftops that earn more than five times the wholesale day-ahead power price under so-called feed-in tariffs. The nation will add 6,000 to 7,000 megawatts of solar power this year, on top of last year's install of 7,400 megawatts, according to Bloomberg New Energy Finance.

"The installed solar base in Germany is growing rapidly thanks to continued feed-in tariff support," Jenny Chase, a solar analyst at Bloomberg New Energy, said today by e-mail. "We expect this to weigh on power spot prices, particularly because renewable energy has priority grid access and near-zero marginal cost."

To contact the reporter on this story: Lars Paulsson in London at lpaulsson@bloomberg.net
To contact the editor responsible for this story: Stephen Voss at sev@bloomberg.net

GERMANY CONTINUES EXPORTING ELECTRICITY--RENEWABLES DRIVING DOWN POWER PRICES--DESPITE CLOSING REACTORS

September 27, 2011 By Paul Gipe

Recent data shows Germany continues to export electricity despite closing seven nuclear reactors.

Meanwhile Bloomberg reports that continued renewable energy expansion in Germany is driving down power prices.

Germany's bureau of statistics reports that the country exported more electricity than it imported during the first half of 2011. This puts the lie to widespread rumors circulating in North America that Germany is closing its nuclear power plants by relying on imports of electricity from its neighbors.

Though the bureau of statistics notes that the margin of exports over imports has decreased from 2010, Germany sold 4 TWh more electricity than it bought during the period. Germany consumes more than 300 TWh every six months. The surplus for export represents about 1% of consumption.

In the first half of 2010, Germany exported nearly 11 TWh more electricity than it imported.

Bloomberg reports that Germany is expected to add 7,000 MW of wind and solar generating capacity in 2013, exceeding the installations projected for 2012. This massive expansion of renewable energy generating capacity is affecting the futures market for fossil-fuel fired generation.

Bloomberg quotes their own in-house expert as saying "The installed solar base in Germany is growing rapidly thanks to continued feed-in tariff support," according to Jenny Chase, an analyst at Bloomberg New Energy. "We expect this to weigh on power spot prices, particularly because renewable energy has priority grid access and near-zero marginal cost," she added.

See Bloomberg: Germany's Green Drive Subdues 2013 Power Prices: Energy Markets
Paul Gipe 661 325 9590, pgipe@igc.org, www.wind-works.org

SENATOR BERNIE SANDERS
United States Senator for Vermont Sanders.Senate.gov

SANDERS PROPOSES ENERGY EFFICIENCY FINANCING ON UTILITY BILLS

WASHINGTON, Oct. 13 – Sen. Bernie Sanders (I-Vt.) chaired a hearing today on how utilities can help customers use savings on their monthly power bills to finance energy-efficiency improvements at homes and small businesses.

"It is a simple and straightforward concept, and it presents a huge opportunity to cut energy bills, create jobs, and slash greenhouse gas emissions and other pollution," Sanders said at the outset of a hearing by the Senate green jobs subcommittee.

In addition to the energy savings and environmental benefits, Sanders also cited studies showing that investments in energy efficiency and sustainable energy create more jobs than investments in fossil fuels.

"When you have a program that cuts energy bills and makes small businesses more competitive, creates jobs, and slashes greenhouse gas emissions, that is a win-win-win, and Congress should support these efforts," Sanders said.

He announced at the hearing that he will introduce legislation to support and expand "on-bill financing," the term describing initiatives already in place in 17 states where utility-run financing programs let customers pay for the projects in installments on their electric bills let small businesses and home-owners access funds to make energy improvements pay for themselves over time.

"In Vermont, we have led the nation in energy efficiency, and actually cut electric consumption by 14 percent over the last 10 years compared with projected demand," Sanders said.

"I am pleased our governor's new energy plan endorses on-bill financing as a way to help Vermonters access the funds to make our homes and businesses more efficient and move us toward more solar and geothermal and sustainable energy. "

MAKING GREEN ENERGY IN VERMONT A REALITY

Cont. from page 1

renewable jobs, improvements in air and water quality (and therefore improvements in human health), and establishing Vermonters in an energy landscape in which we are less vulnerable to the variable costs of fossil fuels. This positive way forward includes an aggressive deployment of instate renewable projects – large, small, and in-between. It involves increasing electrical renewables projects like wind and solar, while also sustainably increasing our use of biomass for heating our homes. It involves aligning our transportation infrastructure with advances in how the energy grid communicates, also known as "Smart Grid", so that when electric cars are available and more affordable, Vermont is ready to transition away from a fossil fuel based transportation system. It involves increasing cowpower at our farms and removing technical barriers to the development of biodiesel and biofuel.

Of course, one of the largest obstacles along this path is how to pay for the energy transformation we need to enact. The challenge is not that there is not money (for there is), but that the upfront cost for many renewables systems is beyond what many of us can afford, and lenders are gun-shy. Helpfully, the Comprehensive Energy Plan proposes several methods to address paying for Vermont's energy transformation. The next step now is to develop an implementation plan for how to make the ideas in the Comprehensive Energy Plan, become a reality. Ultimately, it is not a matter of if our energy landscape will transform, but when and how this transformation occurs. REV members believe Vermont can make this transition by focusing on in-state renewables deployment in coordination with efficiency measures. It won't be easy - it will take tremendous effort and require significant change for all. But it's worth it. Get involved by learning more at www.revermont.org, or by submitting comments to the state about the Comprehensive Energy Plan *(the Summary is less than 30 pages)*, available here: http://www.vtenergyplan.vermont.gov/ ♻

ECONOMICS OF EFFICIENCY AND RENEWABLES

By Peter Troast

Renewable energy options: photovoltaics, solar water heaters, geothermal heat pumps, small-scale wind turbines … are all increasingly affordable, attractive options for reducing carbon footprints and energy bills, reducing our dependence on traditional energy sources.

But when we look at potential energy upgrades for our homes and businesses, it's important to keep in mind a few other factors;

1. **Electricity is just part of the picture.** For most cold-climate homes, the biggest source of energy consumption is space heating. Space heating, in turn, is largely fueled by oil and natural gas. Barring a wholesale conversion to an electric heat, which can be expensive, many renewable energy sources will do little or nothing to reduce the amount of oil and gas that your home consumes.
2. **Increased efficiency = lower cost for renewable installations.** Should you decide to invest in renewables, the scale of your investment will depend on the amount of energy your home consumes. If you can cut your home's energy consumption in half with low-cost measures, you reduce the investment necessary to take your home to net zero in half (think: 1 solar panel vs. 2), you've made a good investment.
3. **Return on Investment (ROI) is typically stronger for energy efficiency.** An air sealing project might be a $1,000 investment upfront, and it could realistically save you somewhere around $500/yr. This would give you roughly a 2-yr ROI. A wind turbine in your back yard, on the other hand, might cost somewhere in the ballpark of $15,000-$20,000. Even if it brings your electricity costs down to 0, that $15-20K investment will take a while to pay for itself. *Editors Note: What is missing from this equation is that you would also no longer have an electric bill from a power company, while also building credits from the excess power that you generate yourself. This offsets the cost and makes the ROI even sooner. When does a power company EVER offer you a ROI or an end to those monthly bills coming in?*
4. **Energy Efficiency improvements have benefits other than lowering utility bills.** Typical energy efficiency improvements include sealing air leaks, upgrading insulation, sealing leaky ducts and other building improvements that have benefits far beyond reduced energy bills. Each of them has a strong ROI, and each will reduce your carbon footprint and lower your energy bills. But they will also reduce drafts, make your home warmer in the winter and cooler in the summer, and potentially increase the health and longevity of your house.

- Peter Troast is CEO and Founder of Energy Circle www.energycircle.com

MINERAL WOOL - INSULATION

by Ken Welch, NWWVT

A few years ago a learned man, I hold in high esteem, planted a seed in my head.

The man was John Straube PE. Affiliated with the Building Science Corporation of Vancouver, British Columbia.

The seed was an introduction to the weatherizing material known as mineral wool.

Being a curious sort and trained in the craft of Green home rehabilitation, I became very interested in the various ways we could use this material to make our homes more energy efficient, quieter and comfortable.

Mineral Wool is a generic term for two products, Rock wool and Slag wool; both are manmade, derived from Basalt and other minerals. This fibrous insulation is manufactured by blowing air or steam under pressure through melted rock or slag which is a recycled product taken from foundry waste. The slag is also mined out of landfills for use in the wool.

Mineral wool has low embodied energy from the manufacturing process and being up to 75% recycled material makes it a dark shade of green and a product used with confidence.

It is equivalent to cellulose in R value and installation costs but trumps cellulose in is resistance to moisture wicking.

It is widely used in commercial buildings for insulation and sound attenuation; it isn't used much in VT until recently.

Being an integral part of the Heat Squad home energy efficiency program, I work with a number of BPI Home Performance Contractors throughout the region and habitually suggest they begin using this product.

Most don't because they have already invested in foam and cellulose systems and are reluctant to change.

Eric Solsaa of Solsaa Building Solutions of Rutland Vermont was not, equipping himself with a mineral wool sprayer and has not regretted it. He has used it on several commercial and residential projects including churches and apartment houses.

His installations consist of a continuous application of slag wool slurry up to 10" thick, providing air sealing, insulation and a fire barrier essential for commercial work.

This green product does all of the above and eliminates the need for the foams and fire coatings that are more commonly used.

The biggest advantage is lower cost and in knowing that the product is safe and has far less environmental impact than the foams and certainly the intumescent paints that are nasty and full of known carcinogens.

One customer wanted an alternative to the intumescent paint system because of his knowledge of these products and did not want them in his building.

Eric ended up applying 6" of slag over 1" of two part foam to seal, insulate and fireproof the basement walls at less cost with an infinitely safer product.

I would be interested in hearing from my readers about any thoughts or experiences about using mineral wool, let me know. Stay well! …until the next time.

BENEFITS OF SPRAY FOAM INSULATION

Fact: Buildings are the leading source of greenhouse gas emissions! This is because of improperly insulated and sealed structures, which also means that you are wasting a lot of money to heat and cool these buildings - most worrisome is probably your home… but commercial buildings are certainly not exempt.

Solution: A building 'envelope' is a total system of construction with materials and design components that control the temperature, movement of air, and moisture both into and out of the building. A building's insulation, air barrier and vapor barrier all need to work together to achieve a more stable, comfortable and healthier indoor environment.

before/after of a typical North Country stone foundation

A spray foam insulated building outperforms fiberglass insulation, becomes a superior air barrier, and redefines traditional, and perhaps, outdated building practices of attic and crawl space ventilation, to achieve an energy efficient building 'envelope' - a tightly sealed unit.

The Department of Energy reports that heating and cooling account for approximately 56% of the energy used in the typical American Home. Air moves in and out of a home through every hole, crack and seam. Approximately one third of air infiltrates through ceiling, walls and floor openings.

Spray foam reduces this air movement and reduces energy consumption through air control. There is no better home insulating material that can seal your home from air and moisture intrusion, save on costly utility bills, strengthen your home, and protect your family's health from dangerous mold, airborne pollutants, and allergens than Spray Foam insulation.

Benefits of Spray Foam Insulation:

- High insulation R-Value
- Excellent thermal and acoustical properties
- Adds structural strength to the building by 300%
- Environmentally friendly
- Reduces energy consumption resulting in money saved
- Closed cell acts as an air barrier and vapor barrier
- Class 1 fire rating
- Eliminates condensation, moisture and mold
- Has zero food value for rodents or insects
- Insulates air gaps in one application

New NH and VT building codes require meeting certain R-values in roof systems that are achievable by spray foam installation. To be sure you achieve the desired results, it is recommended that you hire a 'certified spray foam installer' and preferably one who is 'BPI certified'. These certifications ensure that your installer has knowledge of the building as a whole and what methods of installation are needed to assure the best outcome.

With winter's approach and the greenhouse gas emissions still rising, the urgency to get those leaky attics, foundations, rim joists/ box sills and crawl spaces insulated before winter sets in are more important than ever. An immediate benefit for addressing this issue is money in your pocket and not to the fuel companies!

Russell Haney, from Superior Spray Foam is indeed one installer that you can trust to have the expertise and training that qualifies that the job should meet your expectations. Michelle Haney told us that " he has been an entrepreneur for most of his life, sucessfully starting and running several businesses. His focus has always been on his customers and providing superior products and services. Russell IS a 'Certified Spray Foam Installer and is BPI Certified, with many residential and commercial projects completed." He lives with his family in Bath, NH. He can be reached at (603)728-7880 or on the web at **www.superiorsprayfoam1.com**

The average American home spends about half its energy costs in heating and cooling the home. Investing in energy efficient window treatments may be a very wise decision to make! There are many options available, ranging from making your own to purchasing custom fit insulating shades or quilts. No matter which way you choose, you are probably looking at significant energy savings of 10-25% or more.

THAT'S NOTHING TO SNEEZE ABOUT!

NEW RESIDENTIAL BUILDING ENERGY CODE NOW IN EFFECT

Montpelier, VT – Commissioner Elizabeth Miller announced today that the newly revised Residential Building Energy Code is in effect as of October 1, 2011.

Commissioner Miller states, "As new building construction and renovations in existing buildings take place in Vermont, the new Residential Building Energy Codes will help ensure we are continuing to move to more efficient and sustainable homes. Building new homes to the 2011 Residential Energy Code will yield increased energy savings of 10-20% over the previous Energy Code. This means less energy consumption, fewer emissions, and lower energy bills for Vermonters." Commissioner Miller expects a similar, if not greater, impact with the new Commercial Energy Code which is on track to take effect in early January 2012.

The 2011 Vermont Residential Building Energy Code, officially called the "Residential Building Energy Standards" (RBES), was initially adopted by the Vermont legislature in May 1997 and updated in 2006. The legislation provides for regular review and updates to the provisions in the Code by the Department of Public Service. The Code has applied to all new residential construction in Vermont since it first went into effect July 1, 1998. The 2011 Residential Building Energy Code is based on Vermont amendments to the 2009 International Energy Conservation Code and is a minimum standard of energy efficiency that now applies to all alterations and renovations for existing homes as well as new construction.

The Department is also currently in the process of completing a statewide energy code compliance study that will outline a realistic approach for achieving 90 percent compliance with the Energy Codes by February 1, 2017. The study will address how to best implement on-going training related to Energy Code updates, unified Energy Code enforcement measures, a process to evaluate and report annual rates of Energy Code compliance, and short and long term funding mechanisms for implementation.

Residential Energy Code handbooks, certificates and technical assistance are currently available at no cost. The handbook puts all the information you need to know about Vermont's Energy Code for residential construction into one publication. For additional information or a hard copy of the RBES handbook and certificate contact the Department of Public Service Planning and Energy Resources Division at 802-828-2811 or visit the website at http://publicservice.vermont.gov/energy/ee_resbuildingstandards.html. For free technical assistance and training opportunities contact the Energy Code Assistance Center toll free at 855-887-0673.

Single-Family and Multi-Family Homes ~ Fast-Track Compliance Method				
Component	Package 1	Package 2	Package 3	Package 4
Ceiling R-Value	R-49	R-38	R-30+10	R-28 cont.
Above-Grade Wall R-value	R-20 or R-13+5	R-20+5 or R-13+7.5	R-20 or R-13+5	R-21 cont.
Floor R-value	R-30	R-30	R-30	R-30
Basement/Crawl Space Wall R-value	R-15/20	R-15/20	R-20 cont.	R-15/20
Slab Edge R-value	R-15, 4ft.	R-15, 4ft.	R-15, 4ft.	R-15, 4ft.
Heated Slab R-value (Edge and Under)	R-15	R-15	R-15	R-15
Window and Door U-value	0.32	0.32	0.30	0.32
Skylight U-value	0.55	0.55	0.55	0.55

Below is an overview of the changes to the Residential Building Energy Standard 2011 from the previous energy code.

1. RBES 2011 applies to additions, alterations, renovations or repairs to existing buildings and building systems.
2. New guidelines for air sealing and insulation installation.
3. Ducts must be located in conditioned space or insulated to the same level as the surrounding space.
4. Maximum duct leakage requirements set. Duct tightness must be verified, unless located within conditioned space.
5. Programmable thermostats required except with radiant floor heating systems and space heaters.
6. All combustion equipment that is not directly vented must establish draft without spillage under worst case conditions within two minutes.
7. 50% of lamps in permanently installed lighting fixtures must be high-efficacy lamps.
8. New insulation and fenestration requirements.
9. New log homes package introduced.
10. No HVAC trade-offs allowed.
11. New guidelines for mechanical system equipment sizing.

Additional information on the Residential Building Energy Standard is available on our website at: http://publicservice.vermont.gov/energy/ee_resbuildingstandards.html

MIDDLEBURY COLLEGE SOLAR DECATHLON WINS BIG WITH NET ZERO ENERGY HOUSE!

By Katie Romanov

On Saturday Oct. 1, after a week and a half of operating our home, Self-Reliance, and being evaluated in the 10 decathlon contests, Team Middlebury College was awarded fourth place in the U.S. Department of Energy (DOE) Solar Decathlon 2011. The Solar Decathlon is a biennial competition that challenges twenty collegiate teams from around the world to design and build net zero energy houses that are attractive, affordable and entirely solar-powered. Team members constructed Self-Reliance for the first time this past summer in Middlebury, Vermont, then disassembled it into two floor modules and six roof modules for transport to Washington D.C., and reassembled the home in West Potomac Park on the National Mall for the competition.

In addition to winning 4th place overall, our student-led team took 1st place in three of the 10 decathlon contests: Communications, Home Entertainment and Market Appeal. Team Middlebury College also placed fourth in the Architecture contest and 5th in Affordability, gaining the most juried contest points of any team.

Team Middlebury College was the first undergraduate liberal arts team to be accepted as a finalist into the Solar Decathlon competition without partnering with another institution. We are extremely proud that we performed as a top contender amongst teams from technical architecture and engineering institutions. We dreamed of finishing in the top five overall and being the little engine that could. We did it!

More positive feedback came for the student-led Middlebury College team that Saturday evening when the Project Manager, and team founder, Addison Godine '11 was greeted with the Outstanding Decathlete Award from the DOE. He was recognized for his active participation in the measured contests, in depth understanding of day-to-day team standings, and overall embodiment of the innovative spirit of the competition. "It was the icing on the cake," Godine smiled.

In our original schematic design proposal, we described our vision of reinventing the New England farmhouse, a long-standing American symbol of home. With no idea of how we'd fare against other submissions, and an added application phase due to a surplus of proposals, we eagerly awaited a response from the DOE. On April 6, 2010, the announcement came. We were in! Enthusiastic screaming ensued… until a student stood up and said "Let's get to work!"

Over the past year and half leading up to this year's Solar Decathlon, we worked long hours and with tedious hard decisions as our team continued to grow. Over 85 students from more than 25 different majors played an active role in the project. We drew on chemistry majors to do our materials research and English majors to write our fundraising materials, turning our perceived limitation as a liberal arts school into our greatest strength. Our interdisciplinary background encouraged us to take a unique approach towards the engineering challenge of creating a 100% net-zero energy home by incorporating our appreciation for the humanities into an integrated design process.

Structure Efficency:

Self-Reliance's engineering strategy is to reduce energy needs with passive systems like insulation and creating a tight thermal envelope before supplementing with active technologies such as solar panels. This both reduces the cost of the systems and keeps them simple for a family to operate and maintain. As a result we paid special attention to the insulation; we picked cellulose, which is a 83% recycled material and uses 50% less energy to produce than spray foam. As a result our walls have an r value of 42 and ceilings 74. Our windows are triple-pane and argon-filled, and with an r-value of 7 will actually gain us more heat over the course of the the year than they loose due to solar heat gain.

Solar Power:

We have 30 SunPower 225 solar panels on our roof, which comprise a 6.7 kW array. The panels are some of the most efficient on the market today at 18.1% efficient. The solar hot water system is a Solar US SL-20 Vacuum Tube Hot Water Collector and can heat water up to 50 degrees above ambient.

Production vs Consumption:

The expected power production of the the course of the year is 8000 kWh and the expected yearly consumption for an average american family of four in the home is 6500 kWh. This projects that Self-Reliance will generate 1500 kWh more than it needs over the course of the year.

Team Middlebury College accepts first place in Communications Contest, Fri. Sept. 30 (Left: Solar Decathlon Founder & Director Richard King, Right: REC Solar Development Director and award announcer Ryan Park

Phil Gordon '11, Yen Le '12, and Astrid Schanz-Garbassi '12 rejoicing in Market Appeal victory, Sat. Oct. 1

Team Middlebury College celebrates 4th place in Architecture Contest on steps of Capitol Visitor Center on Wed. Sept. 28

Ben Brown '11, Addison Godine '11.5, Peter DiPrinzio '13 and Carson Cornbrooks '11 (left to right) stand with Senator Bernie Sanders on the deck of Self-Reliance after giving him a tour.

Secretary of Energy Stephen Chu visits Self-Reliance and Jesse Catalano '11 explains our VT heathermore slate countertop, Sat. Oct. 1

Our design was crafted around our target client: a young New England family of four. With a maximum of 1,000 sf of finished floor space to work with, and the goal of having a separate children's bedroom, we allocated space efficiently. Space was maximized with our southern-facing gable roof and an added loft for storage and multipurposes. A greenhouse-wall was integrated into the kitchen, allowing family members to grow their own produce from seed to plate. Local natural materials that are healthy for both the inhabitants and the surrounding environment reduced the embodied energy for overall construction. With a tight thermal envelope, we employed passive techniques and simple active systems, linking to a user-friendly interface for parents and kids to observe their energy usage. Demonstrating that solar-powered homes can be comfortable and appealing for families was one of our team's top priorities at the 2011 Solar Decathlon.

To finish first in the Market Appeal Contest, jurors noted that Self-Reliance's "Durable finishes and life-cycle approach to material selection will also appeal to the market. The operational costs would be low in a region with traditionally high energy requirements." Exceeding requirements, we prioritized the use of locally made cellulose insulation made from 83% recycled newsprint -- healthy for the home's inhabitants and the surrounding environment.

The Home Entertainment Contest consisted of cooking dinners in our home, operating appliances and hosting a movie night. For the two dinner parties, we prepared and shared Vermont inspired meals with fellow decathletes from other teams. We were pleased to score 98.56 out of 100 available points in that category.

The Communications contest jurors described our team's efforts last week: "Middlebury College wowed jurors with its video walkthrough, website and engaging tour. The truly authentic Middlebury College team demonstrated balanced talent across the entire communications competition, making renewable energy technologies accessible to the public."

It was incredible sharing our home with over 15,000 visitors on the National Mall. Now it's time to bring the house home, where it will continue to be as an educational tool that demonstrates the livability and affordability of solar-powered homes.

Self-Reliance recently returned to the Middlebury College campus for final siting. Boreholes have already been drilled for a geothermal system and the permanent foundation is currently under construction. The College will use the house for special interest housing, where students will apply to live on a per semester basis. Our home will serve as an environmental outreach center for dinners, speakers and events open to both the campus and the local community.

To learn more about Self-Reliance and Team Middlebury College, visit our web site at http://solardecathlon.middlebury.edu.

PIPPIN HILL FARM & VINEYARDS

Gorgeous and green, lavish yet lean, winery & wedding venue with a virtually no waste weathertight shell

In North Garden, VA, an extraordinary example of efficiency by today's standards was taken into consideration with the development of the entire 20,000 sq. ft. of Pippin Hill Farm. The skills of George Abetti, owner of GeoBarns, LLC, from our own White River Junction, VT, left his imprint in an impressive example that we hope is taken into account when other projects requiring large facilities are being considered.

Built and designed by Geobarns in collaboration with many others, the 20,000 sf facility was built in a mere seven months with a waste coefficient on the shell of one half of one percent--using inexpensive and almost exclusively natural non-manufactured materials - in spite of the 40' free spans buildings and code required 100 lb./SF floor systems.

Other sustainable features include:

- All of their heat and approximately 90% of their A/C comes from the 8 Geothermal wells ~350' each, with a total of 15 Tons of capacity.
- The facility has an extensive recycling operation and sources seasonal and local foods in partnership with local farmers for pairing with their wine tasting.
- The rainwater catchment serves not only as irrigation for the 3,000 plant vineyard, and also feeds the courtyard fountains and the rills that ring its perimeter before returning to the storage tanks....aerated and refreshed with running in the sunlight.

Catchment rills with candles in them

- Specially developed ventilation systems are built into the cupolas to directly exchange heated interior air in the hot months with the cooler air outside using the cooler air before dawn.

Cupolas with direct fan activated vents

- Vermont Natural Coatings were used exclusively on the main venue floor.

Main venue wood floors with VNC finishes

- The septic system is based on aerobic bio filter processing--with plants naturally breaking down wastewater into treated effluent at half the cost of a conventional system...with no chemicals...only organic plants doing their job.
- A narrow driveway meandering through pastures of grazing cows and the vineyards above them provide an old world ambiance more akin to southern France a hundred years ago…
- Passive solar heating of its southern exposure benefit the warmth of the views that grow from this feature
- Recycled cellulose insulated walls. R-22 in walls, very tight in the framing…R-38 ceilings.

Pippin Hill is located on an innovative green "preservation development" called Bundoran farm just south of Charlottesville VA, where 88% of the 2,300 acres are set aside in perpetuity for active farming with the remaining acreage for only a hundred home sites. The homesites are situated in the least agriculturally valuable zones of the farm. Wildlife and flora abound, making it a slice of pastoral heaven, only 15 minutes from downtown Charlottesville and the UVA campus: Bundoran Farm: Charlottesville, VA Land For Sale | Albemarle County Farms & Land For Sale

R-22 Cellulose walls

Pippin Hill at night

This is an exquisite example that sustainable country life still exists. Building for our future sustainability was taken assiduously into account in the construction of Pippin Hill nearly every step of the way. It certainly highlights the way to a path that we should all follow for the future of our planet, and ourselves….with the recognition that beauty and scale for a large commercial enterprise can be built at low cost with minimal impact on the environment—and that "gorgeous and green" and "lavish and lean" need not be contradictions in terms.

By N.R. Mallery

PLAINFIELD RESIDENT'S DIY RENEWABLE ENERGY SYSTEMS

by Ed Hutchinson

I picked up a May 15th copy of GET at a seminar at Yestermorrow and just got around to reading it.

We live in Plainfield VT. I am a retired computer techy.

Starting in 2008 I have built 3 solar DIY systems (and also a wind turbine and Pellet stove installation). I built a 1.3kW battery backup system with twelve 106W panels and two 3kW Outback "FX" inverters and controls (and a 1kW SW Wind Whisper 200 turbine). That system has 22kWh of battery storage. The array powers "essential loads" during daylight hours (automatically programmed to revert to the grid at night) and to provide automatic backup if the grid fails. The system generates about 1450 kWh/yr for those loads. The array is oriented just east of south (to favor early morning, when the batteries may be depleted from overnight service) and are pitched at 55º vertical to favor winter. In the summer the system produces more energy than the "essential" loads can dissipate (unless I program for deep cycle battery discharge at night, which would reduce battery life) so winter orientation saves grid energy and batteries, but wastes potential summer generation.

The turbine is at a very low 30' height and contributes only about 15% of the total generated, but often at night and during the short winter days when the solar system output is minimum. That helps to keep the batteries charged and reduces the need for charging from the grid. The total consumption by the protected loads (a deep well pump, a boiler, a pellet stove, some lights, computers, the solar hot water system, and refrigeration) is probably something over 3000 kWh/yr and the system supplies a bit under half, but the great value is backup when the grid drops. Initially the Whisper was contributing much less, but a DIY modification that increased very light air performance quadrupled the output at this marginal site.

Another project is a 100 s.f. (three 4x8 AE-32 panels) solar hot water array that provides all of our hot water for about 6 months of the year and substantially "preheats" 40º well water during the winter months. I plan to add two more panels (originally bought 5) to get to almost 100% solar hot water and add "shoulder season" radiant floor heating in the spring and fall (or even in winter, on days when the hot water system needs to dump heat). Excess heat in the summer may be used to heat beds for tomatoes, peppers, beans, and other plants that would prefer to be growing in Mexico (Radiantec suggestion).

Last Year I built a 5kW grid tied PV array that uses 22 Schott 230W panels and a 6kW SMA grid tied inverter. It has been in operation since last Dec 4th and has been producing more electricity than we use since the middle of March. As of Oct 8th the system has generated 5435 kWh (almost 5 tons of CO2 equivalent). It is hard to estimate the total output for the first year but I expect it will be about 6,000 kWh. We have a wonderful site. The arrays are "fixed" at 190º mag azimuth (astronomical south), and 45º elev., (optimum for equinox at this latitude). The pole mount arrays could be adjusted for summer and winter elevation, but the increased production doesn't seem worth the effort. Adjustment for summer might make some sense. In the winter even doubling a small output is still a small output, and the gain is estimated at only about 25%.

I have high praise for Radiantec of Lyndonville and the Washington Electric Coop that were very helpful to a DIYer. AltE Store (web based from Mass) was also helpful with design information and tech support, and Affordable Solar (ww web from AZ) supplied the Schott panels that I particularly wanted to use, and at a very good price. Solar Biz (ww web from NM) supplied several items that I could not find anywhere else. I tried to buy as much as possible from local suppliers (like Barre Electric – also quite helpful) but most of the materials are not available locally.

None of these projects were eligible for VT incentives because I am not a certified installer, but were eligible for some federal tax credits.

I intentionally used very expensive panels (Schott poly 230's). For one, because I think they may be the best poly panels built by anybody, and secondly because they were made in the US. But the cost for the panels was about $2.20/W. At the time that was a very good price (Affordable Solar, NM).

The same with the SMA inverter (both made by German companies in the US).

I used Independent Power and Water DPW TPM-12 pole mount racks (also from NM) and am not pleased with them. They are so flimsy that they bend in fairly light winds. They are "rated for 90mph but in moderate winds they are scary. If I had seen one up close before purchase I would not have used them. Glass doesn't bend so the movement is not a good thing. They were only about $2,500/ pole for two poles (2500W each) not counting the vertical pole and the concrete work, so were fairly cheap compared to other pole mounts but still 20% of the total cost of the system. I wanted pole mounts in case I ever want to increase the output by 30% with tracking systems. WattSun Trackers would have been a nice choice but at $7,500 +shipping each would have raised the cost of the system by $10,000 and amounted to about half of the total cost.















NOT JUST AN ORDINARY COMPANY

Omega Optical Cares For the Planet!

Omega Optical is an international company based in Brattleboro. They make optical filters for the science and film industries.

This socially responsible company has developed a very comprehensive and robust resource recovery / recycling program. It is this program for which they have won the 2011 Governor's Award for Environmental Excellence. The founder and president, Bob Johnson, in June, 2011, announced the launch of our sustainable purchasing , buy-recycled program. They received the award at the state house on June 30th.

Doing much more than recycling office paper, cardboard and bottles/cans, they have a zero-waste by 2014 mission!

Peg Eves, manager at Omega Optidal said: "We send an absolute minimum of material to the landfill. We keep a registry of a multitude of our used resources on Vermont Business Materials Exchange www.VBMX.org. We provide household recycling services for our employees, we store hard-to-recycle-material (H2Rc) instead of landfilling it, we send our #5 plastic to Preserve Company who produce recycled products exclusively. We send our bottle caps to Aveda Company who recycle them in making their product containers , we send all of our "waste "paper to a composting facility (Martin Farms) in Greenfield MA. We use plastic bags minimally and we reuse any plastic bags we must utilize. We publish news of program progress and activities and of the recycling industry in general in our weekly newsletter. We have our own custom made wooden recycle and trash bins (rather than plastic)."

All of this, and more, is possible because they have buy-in from the president and the director of facilities. The issue is important enough to the company that they employ a Resource Recovery and Sustainability manager. In the five years since they started the program, a majority of the Omega community has changed their habits on behalf of the planet. Employees volunteer time and energy supporting the program – building bins, sewing clothe bin inserts.

They really take our environmental stewardship very seriously and are an example for us all.

You can find information about their 40-year-old company at www.omegafilters.com.

SAFE HOUSEHOLD CLEANING PRODUCTS

Here are some cleaning tips you can try at home:

1. **Alcohol:** Isopropyl alcohol is a great disinfectant and nontoxic once it dries. Dilute alcohol to remove dirt and stains from surfaces like countertops or the floor. As a rule of thumb, dilute ¼ cup rubbing alcohol with 1 gallon hot water.
2. **Baking soda:** This inexpensive product is a great substitute for scouring cleansers. Use it to scrub the tub, sink, and even the kitchen floors. As an added bonus, it deodorizes as it cleans. Sprinkle it into your carpets to remove pet odors; it's even safe to use on upholstery! It can also replace your toxic metal polishes or be used to scrub out the litter box.
3. **Borax:** This product is found in the laundry aisle. Use as directed with your usual laundry detergent to get your clothes and pet bedding really clean in the washing machine. It can also be used to scrub the tub and tiles in your bathroom, and even kills fleas! Borax is a naturally-occurring mineral made of very sharp granules. Sprinkle some into your carpet, rub it in with a broom and then just vacuum it up.
4. **Drain cleaner:** Commercial drain cleaners are incredibly toxic. For a natural alternative, pour half a cup of baking soda and half a cup of white vinegar down the drain, and then cover it with a dinner plate. After half an hour, run hot water to see if the clog has dispersed. If not, try again, and then use a plunger. If that still doesn't work, use a commercial drain cleaner or call a plumber. Do not, under any circumstances, try the natural method after using a commercial cleaner. The resulting fumes can be toxic.
5. **Cornstarch:** Cornstarch does a great job of cleaning rugs, windows, and even polishing some metals.
6. **Mineral oil:** Replace your toxic wood polish with mineral oil. Add a teaspoon of lemon juice for a fresh smell. Mineral oil is flammable, so keep it away from open flames.
7. **Potpourri:** Some store-bought potpourris contain chemicals that are harmful to pets, as do all scented candles and air-freshener sprays and plug-ins. Instead, put cinnamon sticks and cloves or cinnamon tea (don't forget to add water!) on the stove over low heat for about half an hour. Only do this while you're home – don't forget and leave the house with the stove on.
8. **Salt:** Use coarse salt as a scouring powder. Salt that is dissolved in a tiny amt of water is a great tooth cleaner, too.
9. **Steam:** There are quite a few handheld steam cleaners on the market today, and since they use only heat and water to clean and disinfect, the result is completely safe. Dry cleaning is extremely toxic!
10. **Steel wool:** Plain steel wool and a little elbow grease will clean food that's stuck on pots and pans. When camping sand works great to get soot off - from the BBQ Grill, too.
11. **Vinegar:** A vinegar/water solution is great for cleaning the bathroom, kitchen, and windows. It will also clean rust stains.

Sustainable Harvest

CAITLIN GILDRIEN: BUILDING RESILIENCY

Reprinted with kind permission of the Burlington Free Press

As we field calls, collect and disseminate information and try to gauge the full impact of Irene, the Northeast Organic Farming Association of Vermont (NOFA Vermont) office keeps coming up against a few questions that have been hard to answer: What do farmers do now?

How can their communities support them best?

What should they do differently next year and in the future?

It was a tough year even for farms that weren't flooded by Irene; one well- established vegetable farmer told me that if this had been their second year rather than their second decade of farming, they' d give up, even though they hadn't been flooded.

As global climate change makes large weather events like Irene seem more likely, farmers across the state are taking stock and digging in.

One model that seems to be holding up is Community Supported Agriculture (CSA). Part of the philosophy of the CSA is that by signing up early in the season for a share of the farm's produce, CSA members sign up for some of the risk as well.

For some CSA members this year, that meant that when their farm lost its field, they lost much (or even all) of the diversity of produce they'd hoped for in the last weeks of a summer share. Though some farms may offer refunds for the remaining weeks, absorbing some part of this loss is one of the best ways for community to truly support local farms when they need it most.

Of course, consumers can't take sustained losses any more than farmers can, which begs that final question: What to do differently next time?

And more specifically, how can we make our food system more resilient to changing weather and a challenging economy?

There aren't easy answers to this question, though some philosophies of small-scale organic farming apply:

• A diversity of crops can help mitigate the impact of any single disaster by staggering planting and harvesting times;

• Healthy soil may be more resistant to erosion;

• Creating a relationship with consumers helps ensure support for a farm through the good times and the bad.

The number and diversity of Vermont's farms is also a strength already in place.

Having different kinds of farms - vegetable, livestock, orchard, maple - spread out across the varying topography and geography of Vermont, selling to many different local and regional markets - CSAs, farmers' markets, restaurants, institutions, online, and wholesale shipping - means that even if individual farms or accounts fail, the system as a whole can more easily rebound.

However, Irene has shown us clearly that the question of how to build resilience into Vermont's food system needs a much closer look. At NOFA Vermont, we plan to explore this issue in depth at our next Winter Conference in February 2012; we hope that farmers and consumers throughout the state will take up the discussion in their own communities.

Caitlin Gildrien is the outreach coordinator for the Richmond-based Northeast Organic Farming Association of Vermont. She also farms, with her husband, at Gildrien Farm in Middlebury.

Common Misconceptions About Cloth Diapering

By Abby Copeland

I'll admit, I hate throwing things away. But more than that, I hate shopping. Especially to replace something I've just thrown away! So when I was pregnant with my first child four years ago, I was determined that I would use cloth diapers. It was a perfect fit! In spite of the misconceptions about cloth diapering, we found it worked for us. Like most other parts of parenting, there were hurdles and surprises, but today I simply can't imagine the expense and the waste of using disposables.

Yet, the misconceptions remain. Here are the most common ones and how we found them to be false:

It's too time consuming. I'm not sure what part of having a baby isn't time consuming, but putting a load of laundry in and then switching it over a while later really wasn't a big issue. I mean, yes, there is gathering the dirty diapers, and yes there's putting them away once they're all clean and dry, but the rest of it is largely unattended laundry time. A couple of strategically placed diaper pails where you do most of your changing and a basket for the fresh diapers saves time and clutter. For people who hate doing laundry, having a few extra diapers in the line up will give you a little more time between washing. Plus, cloth has come a long way since days of diaper pins and rubber pants. These days you can get diapers with great features like Velcro, adjustable snaps, All-in-One styles, and pocket styles, so it doesn't take any extra time to change a cloth diaper.

Handling cloth diapers is gross. Again, this comes down to having the right equipment in the right places. Most people envision their mothers or grandmothers dunking dirty diapers in the toilet, but thankfully this is no longer the reality for cloth diapering parents. Most families have a dry pail or a "wet bag" (a waterproof bag that zips closed and is designed to hang off a door knob or line your pail) to hold the dirty diapers. You can even get little wet bags to use when you're out and about. A diaper sprayer is a cool little device that hooks into the plumbing of the toilet and mounts to the side so you can spray the diaper off into the toilet. When it's time to wash, turn your pail or bag upside down into the washer and close the lid.

Having to wash diapers is just bad for the environment as disposable diapers are. The bottom line is that an adult flushing a regular toilet 5 times a day uses about the same amount of water as doing a load of laundry. Municipal waste water treatment facilities and private septic systems are designed to handle this kind of waste. It takes around 80,000 pounds of plastic and over 200,000 trees a year to manufacture the 18 billion disposable diapers that are used in this country each year. Each of those diapers, along with untreated feces and urine end up in our landfills, which take hundreds of years to break down and can leach pathogens and chemicals into our ground water supply.

Cloth Diapering is expensive. This notion is totally short sighted. Sure, it may only cost you $9.95 for 36 Newborn Huggies diapers, but if you change your baby every 2-3 hours, you'll burn through that package in less than a week and be off to buy more. You will likely spend up to $2800 for diapers and wipes by the time he or she is potty trained. $800 of this will be spent on wipes alone. Cloth diapering, including diapers, wipes and laundering, will cost between $400 and $1300 depending on the type of cloth diaper you choose, how many you have and how often you wash. What's more, you can use these same diapers on your next child and when your diapering days are over there is a resale market for gently used cloth diapers.

Out of all the hurdles we have faced as first time parents, cloth diapering was hardly a bump. And if we're ever brave enough to become second time parents, we already have all the diapers we could ever need.

ENERGY USAGE FOR SOCIAL NETWORKING

Dear EarthTalk: What is the environmental impact of so many people now using sites like Facebook and spending so much time online? -- Bob Yearling, Paris, TX

The environmental impact of so much online time really boils down to energy usage, which in turn affects the amount of greenhouse gases we pump into our atmosphere. For one, each of us can help by limiting computer time (whether surfing the 'net or not) and shutting them down or putting them into sleep mode when we aren't using them (this can be automated via the computer's power management control panel). Also, when shopping for a new computer, consumers and businesses alike can opt for models certified by the federal government as energy efficient with the Energy Star label. If all computers sold in the U.S. met Energy Star requirements, Americans could pocket $1.8 billion annually in saved energy costs and reduce greenhouse gas emissions by an amount equivalent to taking some two million cars off the road. Individual responsibility aside, the creation and management of more efficient data centers by the major online hubs—especially as we enter the age of "cloud" computing whereby most of the software, content and services we look to our computers for resides online and is served to us as-needed—is what can have the biggest impact. Google, Facebook, and Amazon.com are already deeply committed to the cloud computing model, with Microsoft, Yahoo and others following suit accordingly. For its part, Google has been a real leader in the building of green data centers, even powering them with renewable energy. The company recently released environmental footprint scores for several of its data centers. While the energy usage required to run its cloud services (Google Search, Google+, Gmail and YouTube) seems huge in the aggregate—it used 260 megawatt hours to power its data centers in 2010—it boils down to only 7.4 kilowatt hours worth of energy annually per user. Google reports that to provide an individual user with its services for a month uses less energy than leaving a light bulb on for three hours. And because the company has been carbon neutral since 2007, "even that small amount of energy is offset completely, so the carbon footprint of your life on Google is zero." In an April 2011 report entitled "How Dirty is your Data?" the non-profit Greenpeace examined energy sources for the 10 largest IT companies involved in cloud computing, finding Apple, Facebook and IBM especially guilty of getting significant amounts of power from coal-fired power plants. (Facebook had come under fire earlier this year when reporters uncovered that the company planned to buy electricity for its brand new eco-friendly data center in Prineville, Oregon—one of the greenest such facilities ever designed and constructed—from a utility that derives most of its power from coal.) Yahoo, Amazon.com and Microsoft scored best in use of renewable alternative energy sources for cloud services. In the long run, analysts think that the widespread shift to cloud computing will be a great boon to the environment. A report released in September 2011 by Pike Research, "Cloud Computing Energy Efficiency," predicts that because of the shift to cloud computing and increasing efficiencies, data center power consumption will decrease by 31 percent between 2010 and 2020. CONTACTS: Energy Star, www.energystar.gov; Greenpeace, www.greenpeace.org; Pike Research, www.pikeresearch.com.

The environmental impact of so much online time really boils down to energy usage, which in turn affects the amount of greenhouse gases we pump into our atmosphere. Google, which has been carbon neutral since 2007, has been a real leader in the building of green data centers, even powering them with renewable energy. Photo Credit: Jurgen Plasser/Flickr

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. Subscribe: www.emagazine.com/subscribe. Free Trial Issue: www.emagazine.com/trial..

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

CLASSIFIED ADS

E-mail to: info@greenenergytimes.org. 50 words/$20. Due 10.22.10. Call: 802.439.6675

2011 ENVIRONMENTAL ACTION CONFERENCE

Saturday, October 29, 2011. All day.
Vermont Technical College, Randolph, VT.
Over 25 workshops covering the most pressing issues facing Vermont. There will be dozens of experts representing different environmental fields and the opportunity to network. For more information, www.VTEnvironmentalAction.org.

THE GREENER MOUNTAINS EVENT

Saturday, November 5, 2011. 10 am - 4 pm.
Holiday Inn on Route 7, Rutland, VT.
The Rutland Economic Development Corporation, is hosting its second annual Greener Mountains event to showcase environmentally friendly home improvement strategies, energy efficiency products, new technologies and local food programs. Attendees will be able to talk with vendors, taste and try products, and learn the latest developments. This event is a project of the Rutland County Energy Challenge. For more information, contact Mary Skaza, 773-9147.

PEARL STEAM ENGINE

Generate electricity, power machinery or marine applications. www.PearlEngine.com"
Email: pearlengine@gmail.com

SOLAR HOT WATER WORKSHOP

A two day training for building professionals interested in the art of solar hot water design & installation. REV Solar Thermal partnership and AIA CEU Credits available. Visit www.bsr-vt.org for more details or call 802.825.5957. Workshop dates: Dec. 27 & 30 2011. A unique gift for a solar oriented loved one.

BATTERIES FOR SALE

Lead Acid Deep Cycle Three (3) Rolls T 12-250 Lead Acid Deep Cycle Batteries. 1 year old. Make an offer! nrmallery@gmail.com. 802.439.6675

JOB - ADVERTISING REP

Earn $ while learning from your experiences. Green Energy Times is looking for a self-motivated candidate that is self disciplined. A passion for Energy Independence and Reduction of our carbon emissions with determination to fight climate change beneficial. Experience with sales is a must. Send resume to: info@greenenergytimes.org. 802.439.6675. Serious inquiries only!

JOB - DELIVERY PERSON(S)

Please inquire at Green Energy Times - Must have dependable vehicle. Covering VT & NH. Must be reliable and available six times a year. Please call 802.439.6675.

SOLAR POWERED APT. FOR RENT

SOLAR POWERED APT. for RENT on small farm. Situated on 26 secluded acres with 360º Mtn views.fully equipped cabin apartment with an open floor plan… Compost toilet. Recycling. Great outdoor shower-heated with an on-demand system! Walk to hiking trails. Kayaking, swimming, great restaurants, shopping, farmers markets in surrounding towns. This is a green vacation! We really believe in doing what we can to make our footprint on this earth as small as possible. Fresh organic eggs & veggies available in season. A Smoke-Free Environment! Ask for our E-brochure: nrmallery@gmail.com bradford, Vt. Inquiries for semi-permanent residence also considered for the right person(s). 802.439.6675

USED BOOK FOR SALE

Mushrooms of North America by Roger Phillips - the most comprehensive mushroom guide ever, with over 1,000 color photographs. Out of print. Like new. Will sell for $20 to the first caller. You pick up or add postage to send. Inquire at nrmallery@gmail.com 802.439.6675.

GUIDE TO ADVERTISERS:

Ingredient of the Month

Shea Nut Butter – Nature's Hand Lotion

By Larry Plesent

Just below the Great Sahara Desert lies a broad swath of the African Savannah lands. Outside of the rainy season, this is one of the harshest, driest, dustiest places on earth. Brutal sun, wind, and the Hamatan dust take a terrible toll to exposed skin.

Women of this region long ago learned how to extract an oil from the kernel of the nut of the Shea tree. Because it is solid at room temperature this became know as shea butter. While most people use shea butter as a valuable food oil, a few women and men began rubbing it into their skin at night.

In January and February of 2004, my partner Sandy Lincoln and I did a survey of shea butter extraction techniques and marketing methods in Upper Guinea for USAID. We met, and talked with hundreds of people. Every once in a while I would spot a person who looked younger than everyone else. It was hard to place their age. I would single out these people and asked if they rubbed shea butter into their skin. They would often hesitate and blush - it was their secret!

Fresh shea butter made by traditional methods is full of all kinds of botanical goodies like allantoin (found in aloe and comfrey), and circuminoids (anti-cancer compounds found in cumin) and catechins. We recommend applying shea butter at night, so it has time to soak into the skin. Use as lip balm, ointment, salve base, soap additive, wrinkle cream and more.

Useful for burns, all dry and irritated skin conditions (except for Poison Ivy, Oak etc., which contain irritating oils that need to be removed with Tea Tree Castile Liquid Soap). Recommended for wrinkle smoothing and prevention, and for the treatment of sun damaged skin.

Please remember that rare individuals with both a Type B Latex allergy and a Nut allergy can react to shea butter. Vermont Soap in Middlebury, VT has developed a process to remove the irritating latex from the oil thus rendering it hypo-allergenic. Always test new products on your inner forearm for a half hour to test for reactivity.

MONADNOCK SUSTAINABILITY ACTION PLAN

Cont. from page 19

human health in the region. This Plan was created out of the work of the Cool Monadnock project. It was developed through a three-year collaborative process. Due to this inclusive process, it reflects the priorities and concerns of local citizens as well as best practices in energy conservation planning. It is intended to serve as a point of departure for Local Energy Committees/Commissions, local planners, and municipal authorities, as well as concerned citizens and businesses, to chart a course toward energy independence and seek out resources and partners to further their energy conservation goals.

This regional climate and energy action plan is designed to serve as a practical guide for parties working on behalf of municipalities and local energy committees, residential groups (including civic organizations, faith communities, etc.), businesses and non-profit organizations, and educational institutions, as well as cross-sector groups, to easily identify and implement actions to reduce their energy demands. In a predominantly rural region, the importance of collaborative efforts between different sectors of a community, as well as among several communities, cannot be over-emphasized. The diverse voices consulted in development of this plan advised repeatedly that creating these partnerships could provide a powerful foundation to increase the networks and knowledge base necessary for effective projects, to create markets of scale, and to demonstrate demand for particular local policies that enable these energy conservation projects.

Chapter 1 provides a succinct summary of the three-year work plan that culminated in the drafting of this plan. Chapter 2 describes the process of gathering public input into the plan. Chapters 3-6 contain the list of suggested "actions" of this plan, broken down by sector (Municipal, Residential, Business, Education). There are sub-sections within each sector that organize energy-conservation actions by categories such as the built environment, transportation, natural resources, and financial tools. People looking for suggestions on how to take action on specific topics can quickly scan the sub-headings to find the most relevant actions. Many of the suggested actions are linked to web resources with more information about how to carry out that specific action. More info available at: http://www.greenmonadnock.com/ ♻

HISTORIC BENNINGTON APTS GET SUSTAINABLE UPGRADES

Cont. from page 35

"We measured heating oil consumption in all of our rental properties and the Carrigan apartments were our worst performing buildings," said John Broderick, executive director of Regional Affordable Housing Corporation, which owns and manages Carrigan Lane and other historic properties in Bennington and Arlington. "We are very grateful that VFEP funds were available. This year, I almost can't wait to see our fuel bills."

Through VFEP, The Carrigan Apartments has received new replacement windows and doors, air-sealing of basement and attic spaces with two-part spray foam, and new solar domestic hot water systems. The measures are expected to generate at least 25% energy savings in the next heating season and for many years to come.

"Historic buildings are tricky," said Bill Morrissey of Weatherization Works, the Rutland-based insulation contractor selected for the Carrigan Lane project. "They didn't have two-part spray foam back in the 1850's, but they didn't have oil at $4.00 a gallon either. We're bringing a very modern technology into very old buildings and extending their lifespan and efficiency."

Preserving the historic nature of the buildings, which were added to the National Register of Historic Places in 1998, was especially complicated. Windows needed to be matched to closely resemble originals; solar panels had to be installed so as not to be seen from the main street; and original historic from doors were weather-stripped, instead of replaced. "In the end there were some compromises that allowed us to make substantial energy improvements and still maintain the historic integrity of the buildings," broderick said.

"This project demonstrates that solar panels can be installed just about anywhere," said Karen Lee of Solar-Pro, the Arlington-based solar contractor for the Carrigan project. "This was not the easiest project we've done. We installed panels on slate roofs, piped down through existing chases into a basement that was dug before 1860. It was complicated, but in the end went smoothly. It shows that this technology can work just about anywhere."

To be selected, each VFEP project had to project at least 25% energy savings. This projection was made by using a customized screening tool developed by Scott Campbell, the director of VFEP. "The Campbell Tool is remarkable -- it factors in fuel and electric consumption, size, air leakage measured from blower door tests – and kicks out percentages for projected energy savings," Broderick said. "I can't wait to get the data from after the next heat season to see if we achieved the projection.

The VFEP initiative (www.vfep.org) is supported by the Vermont Housing and Conservation Board, the Regional Greenhouse Gas Initiative, and Efficiency Vermont. ♻

Sustainable Harvest

APPLE CORPS GROWS MONTPELIER

by Glenn Scherer

Vermont is famous for its productive farms. But one of the state's newest is proving especially bountiful. For the third year running, the Vermont State House lawn has produced a bumper crop of beans, peas, cabbage, kale, lettuce and more.

The first of its kind in the nation, the Vermont State House Food Garden exists as twin crescent-shaped beds opposite the Capitol steps. The 420 sq. ft. garden has yielded over 1,200 lbs of the finest organic produce since 2009 for Vermonters in need. This summer, fruit trees and berry bushes were added, enlarging the space to over 700 sf.

The state, though extremely supportive of the project, hasn't had to spend a dime on the garden. Instead, it is planned, planted, and harvested by the APPLE Corps, the Association for the Planting of Edible Landscapes for Everyone. This citizen's group was formed in January 2009 as part of Transition Town Montpelier. (Transition Town is an international movement to foster local self-sufficiency in preparation for global economic instability, climate chaos, and peak oil).

APPLE Corps volunteers Abe Abdo and son Rajai harvest State House lettuce, summer 2011. Photo by Glenn Scherer.

Joann Darling, APPLE Corps State House volunteer head gardener, harvests garlic scapes. Photo by Glenn Scherer.

National Life Group Community Garden volunteer project manager Karen Johnston with mid-August harvest. Photo by Glenn Scherer.

All tools, seeds, and starts for the State House Garden are donated by generous Vermont businesses including High Mowing Organic Seeds, Littlewood Farm, Gardens of Seven Gables, Guys Farm and Yard, Gardener's Supply and many others. Montpelier High School students have nurtured dozens of State House lettuce starts three years running.

Beginning with just seven members, APPLE Corps now has nearly a hundred volunteers. The group has also extended its reach, creating the 2,400 sf. National Life Group Community Garden (which also feeds Vermonters in need), and a small herbal garden at Montpelier City Hall. Plans call for new food gardens in Hubbard Park and at Montpelier churches. This fall, National Life invited APPLE Corps to create a 1-3 acre farm on its property.

All of the food grown by APPLE Corps volunteer farmers is donated to the Montpelier Food Pantry, the Central Vermont Community Action Council food shelf, or local church soup kitchens.

The critical importance of such gardens was vividly demonstrated during Tropical Storm Irene. When the Northfield Food Pantry was devastated and unable to deliver food to local citizens, APPLE Corps immediately diverted its produce there.

The mission of APPLE Corps is to inspire and educate Vermonters to grow their own food, both at home and on public lawns and open spaces, and to create edible landscapes following the principles of organic gardening and permaculture. APPLE Corps projects feed Vermonters in need.

If you're interested in being an APPLE Corps volunteer, contact Carl Etnier (carl@etnier.net) or come to the group's next meeting at Montpelier's Kellogg Hubbard Library, Tuesday, October 25th at 6pm.

SOLAR POWER IN THE SHADE

Jonathan Teller-Elsberg

If your property includes a lot of shade, you might think of solar power as out of your reach. While the physicists and engineers work on new technologies that push the PV envelope, low-cost options are already available to capture the diffuse sunlight of shady areas and put it to good use. The method is roughly 2.5 billion years old: photosynthesis.

As anyone who has walked in the woods knows, many plants are able to grow in dim light. Indeed, retail plant nurseries commonly have areas set aside for shade-tolerant species. What the nurseries rarely do is promote or identify those species that also produce edible products. If you have a shady patch and thought you could never get a harvest from it, here's a list of shade-lovers to try.

Hostas (Hosta spp.): yes, hostas—those ubiquitous denizens of shade gardens everywhere—are edible. A common veggie in their native Japan, hostas are generally harvested as spring shoots before the leaf uncurls, or for the petioles (stalk) and central rib of young leaves. When steamed just long enough to wilt, those I've tried taste rather similar to asparagus. Because virtually all hostas available in the US are heavily hybridized, they are not the same as the varieties harvested in Japan (mostly from species H. sieboldiana, H. sieboldii, and H. montana) and taste quality will vary from type to type.

Wintergreen (Gaultheria procumbens): these low shrubs are native to New England and produce sweet berries that hang on the plant through winter. Their western cousin, salal (G. shallon) grows larger. Both are noteworthy for tolerating strongly acid soils and their willingness to grow beneath evergreens.

Ramps aka wild garlic (Allium tricoccum): another native to New England, ramps have recently become the early-spring darling of foodies. Overharvesting threatens some populations, so establishing a patch in your back forty has the added benefit of protecting diversity in the wild. Be aware of the possibility of confusing ramps with the deadly poisonous lily-of-the-valley (Convallaria majalis).

Hosta shoots ready for harvest. Gather shoots at this or younger stage, before the leaves have unfurled. Photo by Jonathan Teller-Elsberg.

Gooseberries (Ribes uva-crispa): though these will produce more heavily in sunlight, gooseberries and other Ribes species (currants and jostaberries) will still bear fruit in a fair bit of shade. Popular and widely grown in Europe, they remain a mystery to most Americans, which is a shame. Note that some states restrict the planting of Ribes species, so check with agricultural authorities before acquiring and planting these.

Magnolia vine aka Sandra berry (Schisandra chinensis): a deciduous, woody vine (like grapes) native to northern China and nearby regions, magnolia vine not only produces highly nutritious berries, but its young leaves are also edible as cooked greens. Nearly all magnolia vines are either male or female, so you'd need at least one of each to get berries. However, there exists one cultivar, 'Eastern Prince,' which is self-fruitful. (Some online sources caution that single-sex plants are sometimes mislabeled as 'Eastern Prince,' so seek full information if buying this.)

Other possibilities for shady food production exist—not only from plants, but mushrooms as well—and early adopters of renewable energy are just the sort of people to help get the word out that we can harvest (delicious!) solar power in the most unlikely spots.

Jonathan Teller-Elsberg is a permaculture consultant in Norwich, Vermont, specializing in the design of edible landscapes for small properties in the Upper Valley. His website is www.TerraPermaDesign.com.

Sustainable Harvest

COMMUNITY GARDENING IN A TRANSITIONAL COMMUNITY

Article by Sharon Garry and Daniel Hoviss

Transition Putney operates on the concept of building community resilience and self reliance. The Putney community garden was the first project that Transition Putney undertook; it was born from the desire to grow food in the open spaces with plenty of sunlight, in community with plenty of people, and in cooperation with other farmers and growers for help, guidance and plants. Standing in a field of grass in late spring of 2010 a group Transition members decided to "go for it" after a rallying pep talk from Howie Prussack of High Meadow Farms.

The farmers market and the community garden share the field on sundays.

The one acre field was marked off, and with plowing help from Howie, and rotovating by Jemma Pentland, and Margie Levine, from the Putney School; we were off with 22 plots the first year plus and what turned out to be 2 additional large community plots. The community plots were planted with tomatoes, eggplant, cabbage, corn and other stuff for the Putney Food Shelf and the VT food bank that first year.

The gardens off right away and grew (with plenty of hand delivered water , organic compost, lots of work) into a big, beautiful, lush productive cornucopia allowing us to provide donations of fresh organic produce to the local Putney food shelf and the Vermont Food Bank.

In our second year now we have thirty-eight members and forty-six plots in cultivation. For a nominal annual fee, members get a sunny 9x20' area of fertile land. The Transition group supplies a list service to help with coordination, free compost and free wood chip mulch for plots and paths, farmers drop off free plants for us to grow amazing organic vegetables all season long. Garden coordination is a three way team, with semi regular meetings of a larger group of garden members.

To join, gardener's must agree to take good care of the plot, using only organic amendments, (no chemicals or harmful pesticides), put in a certain number of hours each season assisting with community garden chores, such as mulching and weeding the pathways and helping with the composting, watering systems…etc. For this effort you get to meet your neighbors, work outdoors, learn about and grow your own healthy vegetables, breath clean air, and soak up warm sunshine while surrounded by lovely flowers, grown by members of your community. There are often weekly gatherings to share gardening tips and ideas, and a group meal while working together to build a more sustainable and enjoyable way of living.

During this harvest season we have had weekly potlucks out at the garden using mostly grown on site ingredients for our meals.

There is no better feeling than enjoying a nutritious, delicious locally grown food, knowing that we provided the majority of what we are eating. When we share this feeling with a community of like-minded people, we are sharing a way of life that creates small changes in our own priorities and our understanding of what is important.

Not everyone can fully grasp the power behind this, but as we grow food in community, so will the understanding and belief that sharing a space and working out all the issues that come up will give us the tools to expand our own self reliance, to give our Community the strength to recover from a time that may be remembered as one of the most challenging in our history!

WILD EDIBLE OF THE MONTH

by Annie Mc Cleary

This season we are seeing bumper crops of edible wild fruit including elderberry, chokecherry, chokeberry, highbush cranberry, wild raisin, hawthorn and wild apple. Wild apples, perhaps the most abundant and under-utilized wild edible, are featured in the recipe below, including instructions on making and canning applesauce, passing on the experience and wisdom of my neighbor Pat, who has been homesteading and canning for almost 60 years, and makes the best applesauce ever!

Wild Applesauce with Highbush Cranberries

Collect wild apples, quarter and take out any bad spots. No need to peel or core; the sweetest part of the apple is around the seeds. Cook on lowest heat in a little water until mushy. Be careful not to scorch. If you like, throw in some highbush cranberries (Viburnum trilobum) which add a light pink color to the applesauce. Run the cooked mixture through a Foley food mill. If needed, add a tiny bit of stevia or maple syrup to taste.

Water bath method of canning applesauce - according to Pat. When Pat was raising her three children, she put up around 180 qts of applesauce each yr. This year so far, she has put up over 60 qts and she has 35 left in the basement from last yr. Pat says the best applesauce is a mix of several different kinds of apples, wild and cultivated.

Wash canning jars, domes and lids in hot soapy water. Boil the rims and domes for 10 minutes. Use all quarts or all pints – don't mix quarts and pints in a batch in the canner – the pints tend to float around. Fill jars with the sauce, leaving ¾" headspace. Poke out any bubbles with a knife. Wipe the rims of the jar with a clean wet towel. Put on the domes and tighten the rims only 'finger' tight – tight enough but not 'wrist' tight. Place the jars in your canner so that they are not touching. Add water which is about the same temperature as your applesauce, filling the canner to 1" over the top of the jars. Bring up to a boil and boil for 20 minutes, adjusting for elevation. I live at 1200' and add 5 minutes to that processing time. Once you remove the jars from the canner, let them sit undisturbed for 18-24 hrs to be sure they seal. Store jars with rings removed in a cool dark place.

Annie McCleary is the director at Wisdom of the Herbs School in East Calais, Vt.
www.wisdomoftheherbsschool.com

HIGHBUSH CRANBERRY *(Viburnum opulus)*

Uses: *Ethnobotanic: The bark of highbush cranberry yields a powerful antispasmodic (whence the origin of one its American common names, crampbark). The water-soluble preparation (containing a bitter compound called viburnine) has been used for relief of menstrual and stomach cramps and asthma. The antispasmodic properties apparently were discovered independently by European, Native American, and Asian peoples. The action of this agent from highbush cranberry closely resembles that of black haw (Viburnum prunifolium).*

Highbush cranberry is used as an ornamental plant and valued for its edible fruits. The fruit is commonly gathered from wild stands in late August

Description

General: *Honeysuckle family (Caprifoliaceae). Native shrubs to 4 m high, with upright, spreading, arching branches. Leaves deciduous, opposite, ovate, 5-12 cm long, deeply 3-lobed, coarsely toothed, with 1-6 large glands near the petiole apex, becoming yellow-red or reddish-purple in the fall. Flowers white, in flat-topped clusters 7-10 cm broad, with flowers of two different types, those in the outer ring sterile, showy, with expanded corollas 1-2 cm broad, the inner flowers much smaller, fertile, with yellow anthers. Fruit berry-like (a drupe), globose, bright red, 8-10 mm in diameter; stone single, strongly flattened. The common name alludes to the resemblance in fruit between the highbush cranberry and the cranberry of commerce (Vaccinium macrocarpon).*

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site **plants.usda.gov** *or the Plant Materials Program Web site* **Plant-Materials.nrcs.usda.gov**

Sustainable Harvest

Green Product Reviews

THE ORIGINAL GREENPAN

For the most part, we use our cast iron pans for cooking but my husband was constantly complaining about our eggs sticking. So for Christmas last year, I found an eco-friendly, healthy non-stick pan- the Original GreenPan. This pan is not cheap BUT it is safe and healthy to use. Most non-stick pans use PTFE, a nasty synthetic substance that breaks down in high heat, releasing toxic fumes. Yuck. PTFE is also nasty to manufacture. GreenPan does not use PTFE, instead using Thermolon technology, a healthy alternative made with minerals. The cookware is also made with upcycled stainless steel and aluminum for the handles and bodies, along with minimal, recyclable packaging.

We use the 24 cm open frypan from the london collection. I have found that, when cooking eggs (which is what we use it for the most), you don't even need to use oil or butter! I tend to add just a little olive oil since I like the taste and then use it over and over without washing throughout the week. Also, you don't need a high heat but can use over a low heat, similar to cast iron. A quick wash off with hot water and just a touch of soap and it's clean! I have never had any food stick or burn, even if I add cheese to my eggs! This is a great product and worth the investment!

Green Tips

by Deborah DeMoulpied, Bonafide Real Green Goods

Usually around Columbus Day, people are jolted into thinking seriously about getting ready for winter. If you're one of those who didn't dwell on your "to do" list this summer, here is a "green" list of basic tips for getting ready before the snow flies.

1. In case you aren't into canning or are becoming tired of it by now, freezing is a great option. Even all those extra zucchinis can be simmered lightly and frozen for soup stock later on. Herbs can be dried easily in the microwave or a warm oven. Don't let all your hard work go to waste!
2. Tree leaves make great mulch for shrubs, perennials, or garden beds. Or, mix them into your compost for much needed "browns".
3. Now is the time that rodents and bugs try to infiltrate your home in order to escape the cold. Sometimes how they get in is a complete mystery, but most home owners want them out. Bugs are usually easy to capture, but rodents can present a challenge. Good humane rodent traps are available in different sizes, while poison is not recommended since it can be toxic to other forms of wildlife, including humans.
4. Consider your home's energy efficiency before you start noticing drafts. Sealing your home is the number one thing a person can do to prevent energy loss. Even new homes should be inspected for new cracks and leaks. Testing your home with a blower door test will give you an idea of just how bad your home leaks. Even without this test, be sure to check and seal outlets, switches, baseboards, around doors and windows, and where joints come together, like chimneys to siding.
5. If you have an attic, how do you access it? Is it a pull-down door or a square opening in the ceiling? These access points are huge sucking holes but can easily be buttoned-up for winter. Place multiple crossing layers of insulating material above the opening, extending beyond the opening if you can. On the inside of the home, you can also seal the opening with a plastic shield for an added barrier. Be sure to avoid PVC plastic which off-gasses toxic chemicals (and usually has a smell).
6. Have your furnace cleaned as soon as possible to maximize energy efficiency. Be sure to put in new HEPA filters (to catch allergens and smaller particles) to improve indoor air quality. Consider changing the filters throughout the season, and even more often if you have pets.

Next time, we'll talk about indoor air quality…until then, stay warm!

Interiors green Shots!

THE HOME AND LIVING STORE

By Jessica Goldblatt Barber

- October, November, December: Winters chill is nearly upon us here in the North country. Here is a winter preparedness checklist to help save energy this season:
- Check the air pressure in your tires. Cooler temperatures lower tire pressure and that, in turn, lowers fuel efficiency.
- Clean and test the furnace.
- Move furniture or any obstructions from vents, baseboard heaters, registers on the floor or radiators so that air moves freely.
- Vacuum the refrigerator coils to keep the compressor running efficiently,
- Check the seal on the door, try closing it on a dollar bill. If you can pull the bill out easily, it's time to replace the gaskets.
- Clean the ducts and area behind the dryer.
- Check windows for proper caulking.
- Check doors for weather stripping and replace as necessary
- Check electrical outlets, especially on outside walls - light fixtures are prime places for cold air to leak into your home.
- Check for water leaks both inside and outside.
- Clean wood stoves and chimneys.
- Wrap the water heater in an insulating blanket.
- If you have a ceiling fan, reverse the direction ... the fan should be run in a clockwise direction (stand under the fan and if you feel a breeze, reverse the direction so that air is being drawn upwards). This pushes the air up against the ceiling and down the walls, to gently re-circulate the warm air without creating a cooling "wind chill effect.
- If your home has no sidewall insulation, place heavy furniture like bookshelves, armoires and sofas along exterior walls, and use decorative quilts as wall hangings. This will help block cold air.
- Bring in any houseplants that have spent the summer outdoors. They'll help clean the air.
- Before packing away those summer clothes, go through them and determine which items to keep, which items to repurpose into something else (cleaning rags, craft projects, etc.) and which to donate.

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