

G.E.T. It!

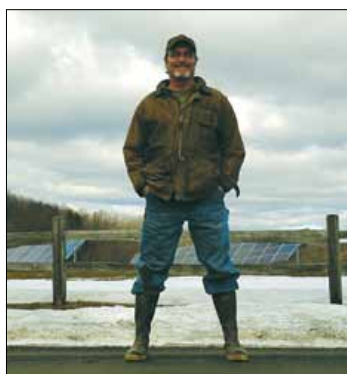
YES YOU CAN BE ENERGY INDEPENDENT!

green energy times

Creating Energy Awareness, Understanding & Independence

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Motel 6 May Leave the Light on... but Tom Bodett thinks twice about it!



You just never know what you'll find in these hills of Vermont! If you live in the southeastern corner of our state, you might find yourself in a town meeting, listening to Tom Bodett, who might be talking about his own Solar-powered life, or encouraging you to do likewise. We interviewed Tom, who is more than happy to share his sustainable lifestyle with all of you. Here are some questions we posed to him:

How long have you been solar powered? PV & Hot Water, too?

We went online with our 20.84kw array in mid-December. Even in that darkest of months it began producing more than we were using. We are planning to add solar hot water along with a pellet boiler system as the second phase of our energy project. It was too much to do all at once.

What made you decide to choose to go solar?

We've had our eye on it for some time, but not until the Federal and State tax rebates came into play did it make it feasible. With almost 40% of the actual system covered by these subsidies, the rate of return on our investment approaches 10%. That's about as good as it gets. The Fed and State tax subsidies were a very smart thing for our government to do. It enabled people like us, who could afford the price of entry, to make the leap – and many more people are. The more of us who do, the cheaper it all gets, and the more of us can do it. Call it enlightened self-interest, I suppose.

Cont. on page 36



Solar Makes a Difference In Vermont

The sun shines in Vermont. It arrives on our roofs and in our yards – a free gift from the universe.

I imagine if all of us had the will and the wherewithal to install solar to cover 50% of our residential power usage or 20% of our commercial power usage.

It is possible and profitable. If we have a roof or yard with 60% sun, we can do it. If we rent or don't have that sun, we can group net meter for solar located in some other sunny spot.

The law has been helpful. The utilities have been helpful. The non-profits have been helpful. The solar industry has been helpful.

The Vermont Energy Act of 2011 created several solar benefits. It raised the system cap from 250KW to 500KW. It provided for simplified CPG permit process for systems of 5KW or less. It raised the per-utility cumulative net metering cap from 2% to 4%. Finally, the legislature tipped their hat to a popular GMP program and mandated all utilities offer a "solar adder".

Launched in 2008, GMP decided, for those peak summer sunny daytime hours, they would rather

pay their customers a bonus for installing solar, as that is solar's prime production time, than pay another entity for expensive dirty diesel backup generators to cover peak summer demand.

Before SolarGMP the utility saw about 20 new solar systems per year said Communications Manager Dorothy Schnure. Today in just over 2 years it's increased 10-fold to 200/year. In January 2009 GMP had 66 solar customers. As of June 2011 this number increased 6-fold to over 400 solar customers. They now have about 3.5 MW installed capacity, about 1% of its total load, and GMP customers have generated nearly 3 million solar KWH in the last 12 months. And there's another 1% solar capacity in the queue to be installed and go online said GMP's Director of Customer Relations Robert Dostis. CVPS is doing quite well too with 370 solar customers.

With the purchase of CVPS, GMP will launch Rutland as a Solar City. With details to be designed by the city and the utility, the focus for Rutland Solar "is not only on deployment of more solar generation, but also building Rutland into a hub for renewable industry," said Dostis.

VPIRG is facilitating solar with their Community Solar Program. When enough townspeople say they want solar, VPIRG puts a package together. Program Director Dan Conant said "people complain that trying to go solar is confusing and expensive so we come in to help". VPIRG puts out an RFP and the winning bidder offers solar installations at an excellent price to the entire town.

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HYDRO IS HAPPENING IN VERMONT!!

by Dennis Candelora

Greetings from Pownal, Vermont, where hydro power is happening. My name is Dennis Candelora and I have been developing a small scale hydro project for the past four years. For those of you who don't know, Pownal is situated in the southwest corner of the state bordering NY and MA. We are the furthest town in the state from Montpelier and are often forgotten about. We are however being highlighted for a reason not many would expect – we are home to one of the first small-scale hydro projects to be commissioned in New England in some time.

Our hydropower project is now within months

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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!

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

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

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Letters to the Editor

May 31, 2011 Dear Green Energy Times, I'm about as "green" as it gets, but I also think that honesty is essential. Your article about the "Vermont" is less than so. I've taken the "Vermont" countless times. My elderly mother lives in Connecticut and I visit her once a month. These are the issues that you do not mention. 1. Door to door, it takes me five hours to drive to my mother's and ten hours to take the train. 2. Although Amtrak advertises "quiet cars" there is not one on the "Vermont" and the car is full of people yelling into their cell phones (I think they feel that they have to yell due to the rumbling of the train, but they really don't). 3. Even though gas prices are very high, the cost of a business class ticket is far more than the cost of gas for my Prius. 4. After several hours, the bathrooms on the "Vermont" become vile, I cannot tell you how many times I have gotten the dry heaves just from entering the "Vermont" bathroom (if the train were faster, the bathrooms would not get so bad.) So, please be honest. Sincerely, Laura Cary, South Burlington, VT

June 2, 2011 From Chris Parker Vermont Rail Action Network: "Well, she's right that the bathrooms stink (though they are better than most gas station bathrooms) and while she exaggerates the time, it does take considerably longer than driving (which will change as the track is rebuilt over the next several years). Of course you can use your time better in the process. I ride the train too, and I don't find the cell phone usage of other passengers excessive, but that's a subjective reaction. I find more and more discourteousness the further south you go - and it's much worse when you have to drive amid them. As for her bemoaning the cost of a first class ticket, I'm afraid I have no sympathy. The fact is it costs far more to drive than most people let themselves think - most people do not factor in the wear and tear that they will pay for down the line. And that's not even getting into the pollution they inflict on others or the roads, traffic enforcement, emergency services and medical costs of accidents and the cost of invading middle eastern countries that are paid for with taxes beyond the gas tax." - Christopher

November 29, 2010 Nancy, I read and enjoyed Green Energy Times for the first time recently. I have one question/ comment. On "Ask the Home Team" there was a question about using an electric dryer versus hanging out clothes in the basement. Under certain circumstances I believe that it is reasonable to hang out clothes in the basement. Our house has foam insulation in the attic and basement, but it can still get very humid in the summer - we use a dehumidifier set at 60%. This keeps it adequately dehumidified during the humid summer, and we don't get mildew or a smell of mildew. During the summer we hang clothes outside. I have a humidity gage in the basement, and I have found that it works well hanging clothes to dry in the basement in the winter when the humidity is 50% or below. We don't have to run the dehumidifier and turn it off from November to February or March. I sure wish we could turn it off all year because even an Energy Star dehumidifier uses a lot of energy. During times when humidity is over 50% I don't hang clothes inside. I would be interested in thoughts about this. Thanks - Best regards, Paul Gerke, Thetford Center, VT

May 20, 2011 Thanks for running the VbC ad in GET.

Just wanted to say GET was great this issue, once again. Such good positive stuff all in one place. Important for people to see that the way forward is all these little pieces added together - silver buckshot rather than silver bullet. Any way I could get a stack of 20 or so I can table with for Transition Town (I table semi regularly at the Farmers Mkt & will be doing COOP and maybe Burlington Farmers Mkt?)

And wanted to thank the editor for running an editor's note after the Burlington Electric Dept's infotainment, I mean article, for McNeil generating station making the clarification between electricity and heating. I know it sounds like I have a one track mind, but I chose to work on biomass issues for a specific reason: crossover between forest protection, climate change and clean energy issues, all of which I'm interested in. To me, the biomass issue is the litmus test of a politician, environmental group, publication etc to see whether their interest in changing our energy use and addressing climate change is serious or not. In my opinion, the only way to think cutting massive amounts of forests for tiny bit of electricity is somehow a positive step forward environmentally is if you are just interested in symbolic "green jobs" to get reelected or somehow beholden to the Big Timber industry's desire to continue to be bigger and more destructive than it needs to be getting bloated off taxpayer handouts-corporate welfare.

The fact the GET has made this effort to be clear about the distinction between big biomass power and small wood heating, I feel comfortable making efforts to get the publication out there more ...

- Thanks, Josh Schlossberg

June 1, 2011 Is anyone in your community, or have you ever heard of anyone, trying to build a magnetic generator to power their home? I'd like to go off the grid and there is an unbelievable amount of information out there it's a bit difficult to rate what's real and what's a scam. Any help or ideas would be great! - Thanks, Dan Cambridge, VT

June 10, 2011 In reply to a letter we rec'd from readers who questioned the benefits of using electric lawnmowers after reading our front page article in the May 15, 2011 Issue. We apologize that we are not able to locate the letters to reproduce, but we also received this response. (Personally, being 100% solar powered, the use of electric lawnmowers is not just an additional benefit to be able to charge the mowers with clean solar energy, but also that there are no emissions, which outweighs any use of fossil fuels. There are many instances that the old style push non electric mowers work for, but for those of us that prefer to use more of a mower, I can't recommend battery powered lawnmowers enough - esp when using lithium batteries.

From a reader: People seem to misunderstand the emissions benefits of electric cars, lawn mowers, etc. They worry that using coal-fired power plants to charge a car or mower will create more pollution than using a gasoline powered one. I think this is because people recognize that coal is the most-polluting fossil fuel. But electric motors are much better at turning energy into motion, so they need much less power to make the same car move a given distance, or to run the same lawn mower.

There is more to the story than just the type of fuel used. Energy use occurs within a system, so you have to consider the whole process from start to finish to understand whether or not one choice is less damaging than another. The emissions from gas-powered vs coal powered cars, for example, have been well studied. According to the Union of Concerned Scientists, "... even if [battery powered electric vehicles] are recharged with electricity from power plants that use fossil fuels, they are up to 99% cleaner than conventional vehicles and can cut global warming emissions by as much as 70%." Since lawn mower engines are much less efficient than car engines, electric mower savings would be even greater.

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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. — Oct.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!

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Think of it this way: using an 8 watt LED light bulb when your electricity comes from a coal plant is still less polluting than using a 100 watt incandescent light bulb powered by a natural gas plant. If you left both bulbs on for 4 days, the LED powered by coal would emit 17.7kg of CO2, and the incandescent bulb powered by natural gas would emit 26.6kg of CO2. Coal is more polluting, but using less of it can result, overall, in less pollution than using more energy from a lower-emissions fuel source.

We must continue working to shift our energy production away from fossil fuels altogether. But we can do that while also taking actions to reduce CO2 emissions, overall. An electric car or an 8 watt LED will pollute even less if it's powered by solar, wind or other renewables, but we don't have time to wait for the perfect energy mix - we must start cutting emissions now, even if doing so means shifting some of our energy use to existing coal plants. The goal is cutting CO2 (and other warming gases), and we need to take ALL of the steps that will get us there, rather than skipping some steps while waiting for others to be done.

And remember, the most CO2 savings comes from not using energy at all. So using natural light during the day, turning things all the way off when not in use, skipping the air conditioning if your health is not in danger, and not driving the car when you can wait and combine trips (or better: walk, bike, carpool, etc.) would be better than using any kind of light bulb, car, or lawn mower. Eliminating most of the lawn would help, too - the less you need to mow, the less your mower will emit."

Cont. on page 6

LARGEST SOLAR ARRAY IN VERMONT

Largest of its Kind in North America

SOUTH BURLINGTON, Vermont . . . July 27, 2011 . . .

The touch of an iPhone—which brought the last of 382 solar trackers into position perpendicular with the sun—marked the commissioning of the largest solar installation in Vermont and the largest installation of its kind in all of North America.

Manufactured just four miles from the site of the solar farm, 382 AllSun Trackers produced by Williston-based AllEarth Renewables make up the 2.2 MW farm. The pole-mounted trackers use innovative GPS and wireless technology to actively follow the sun throughout the day, producing more than 40 percent more energy than fixed solar.

With inverters on each tracker to boost energy performance, the project is the largest solar installation to use such a configuration in North America.

Attending the commissioning were more than 75 local contractors, engineers, suppliers, developers, parts fabricators, manufacturers, and other workers that had a direct hand in building the project.

"This project not only produces renewable energy from the sun, it creates a lot of local clean energy jobs," said David Blittersdorf, CEO and founder of AllEarth Renewables. "We've innovated and refined our AllSun Tracker so it can be affordably used to power homes or businesses, and at the same time make up a utility-sized farm like this project in South Burlington."

Part of the state's innovative Standard Offer program, the farm will sell an estimated 2.91 million annual kWh of power generated by the installation to Vermont's Sustainably Priced Energy Development (SPEED) Program. The Standard Offer was established as part of the Vermont Energy Act of 2009.

Vermont Governor Peter Shumlin, Lt. Governor Phil Scott, and Speaker of the House Shap Smith also spoke at the event.

In June, AllEarth Renewables' CEO was named by Business Week as one of 25 of "America's Most Promising Social Entrepreneurs." The company, which employs 26, earlier this month announced a partnership with four solar installers to provide distribution throughout Vermont.

About AllEarth Renewables, Inc.

AllEarth Renewables is a Vermont company that specializes in the design, manufacture and installation of complete grid-connected solar renewable energy systems that lessen dependence on nuclear and fossil fuels and reduce greenhouse gas emissions. The company's goal is to provide turnkey products that harness the power of the sun for homes and businesses while creating sustainable, well-paying jobs. www.AllEarthRenewables.com

VERMONTERS UP FOR CIVIL DISOBEDIENCE

The White House is considering approving the Keystone XL pipeline that would slice straight through the heart of America, carrying Canada's dirty Tar Sands with it, all the way down to Texas. This would endanger our country's clean and wild rivers, our farms and healthy communities, and most dangerous of all would light the fuse for the biggest carbon bomb on the planet.

But there's good news: the pipeline cannot be built without a "presidential permit" from the Obama Administration. With this in mind, droves of Vermonters are heading down to DC to join waves of demonstrators from all across the country taking a stand against the Tar Sands. David Stember, associate publisher of Green Energy Times and 350-Vermont organizer was recently asked by a local reporter to comment on why he's participating in this direct action and even willing to get arrested in the process.

His answer below, in addition to explaining the concern many feel about this unprecedented pipeline, also explains why Green Energy Times will continue covering activism and legislation aimed at ending our dependence on fossil fuels.

David: First of all, I've never done anything like this, or ever been arrested before for that matter. But in the face of both growing aggression by big business and big government, and the gathering storm of global climate change, the time has come for sensible people to step in and do whatever it takes to stop the runaway freight train of fossil fuel extraction.

Clearly, we've been addicted to easy energy and big profits from fossil fuels for so long now that those who've been benefiting from it's production, whether in business or government, are going to go to any lengths to keep this income stream flowing, even if it means wringing the last drops out of the land while recklessly destroying the ability of our planet to sustain life as we know it.

Little or nothing of consequence is happening today in our national government that points to any degree of awareness or conscience about these risks. Furthermore, all the excitement and progress around renewable energy, though a wonderful plan if the future is governed by responsible people, adds up to zero value for preventing further climate change impacts, if we do not stop operations like the Tar Sands, Big Coal, and other similar mega-scale GHG emitters. Bailing the boat out with a bucket is useless when ignorant profiteers and their political minions are still setting tsunamis of pollution into motion. Facing these insurmountable financial and political odds, the only way we the people can deal with this situation in the short term is by putting our bodies in front of this train to attempt to halt this crisis. Trite but true: If not now, when? If not us, who?

So, what are the choices, really? If getting arrested, or taking any similar action can bring President Obama to a remembrance of his promise to stop this level of insanity, how can any of us avoid this responsibility to show up and be counted, whatever the personal cost. Increasingly, I can't and won't avoid this fight, and am just so relieved and grateful that other sensible people from all over the county, including many wonderful friends and neighbors from the amazing state of Vermont, feel the same way I do, and are willing to join in solidarity for this cause.

The prolonged civil disobedience begins Aug. 20.

350-Vermont is organizing a Vermont caravan, scheduled to leave for Washington Aug. 28.

For more information about the Tar Sands action go to www.350VT.org



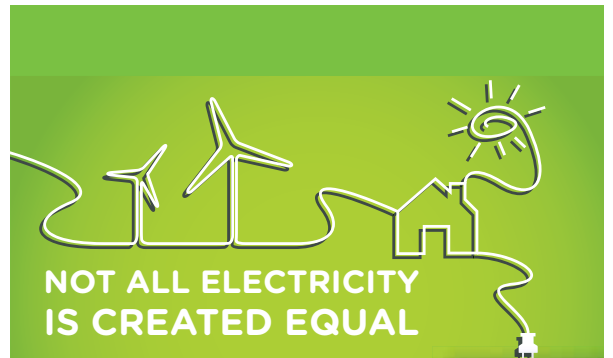
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Photo credit: Engineers Construction



Photo credit: All Earth Renewables



Take a closer look at what runs through a Green Mountain Power line. Behind the electrons, you'll see an abundance of renewable generation, the passion of dedicated employees, a commitment to Vermont-based wind and solar development, customer choices about the source of generation for their electricity, and the promise to make the environment and our communities better every day.

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ELECTRIC BIKES ARE HERE!

Suddenly there's good weather and out come the bikes. Except mine's electric with pedal assist. I use it daily to go to work, get some groceries, and do local errands with even a weekly trip to the laundromat. Living less than 2 miles from town, this makes it an ideal form of transport for me. A full battery charge, which can last up to 20 miles, costs...5 cents for a recharge.

You don't have to have a license, plates or insurance as long as your machine can be called a bicycle-it has pedals. Which means you can go anywhere a bike can. They are a quiet non-polluting people friendly form of alternative transportation.

Electric bikes are offered as conversions for an existing bike with a do-it-yourself kit or complete new electric bikes ready to go. The kits are easily seen on the internet on E-Bay. A typical kit costs on average \$250-300 with batteries an additional separate purchase. It should be noted that virtually

all modestly priced electric bikes, kits and components come from China. This is because China has a huge market-they sell over a million electric bike kits and bikes a year domestically.

And then there are the prebuilt ready to go bikes. They have numerous

advantages including a complete engineered package and some dealer back-up. These ready-made bikes range from a little over \$300 on up to well over a thousand. Be prepared to spend at least \$500+ for anything decent and carefully check out the specs.

Pay attention to battery voltage, type of battery and amp hour ratings.

The most common electric bike motor is the motor in hub type. These feature a gearless, brushless motor built right in the center of the wheel hub. There are no chains or belts. The slim motor is the size of a pie plate and comes installed in a bike wheel with rim and spokes. Some




China has a huge market. They sell over a million electric bike kits and bikes a year domestically.



kits even come with a tube and tire already installed. So the motor is encased in the hub and your existing wheel/tire assembly is replaced by the new hub motor wheel. With that comes the electronic controller which is the brains and your twist throttle to regulate speed. Most kits do come complete with a wheel, electronic controller, wiring and a throttle. Some even include a rack to mount your battery.

For those looking for basic, clean non fossil-fueled transportation for doing local errands it's hard to beat and I recommend it highly. You can still pedal and get all the exercise you want. Some use their electric power just for hills and heavy loads like groceries. The web has lots of stories about folks commuting 10 miles to work each way rain or shine. And loving every minute of it.

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UPPER VALLEY RIDESHARE NOW OFFERING INSTANT ON-LINE RIDE MATCHING

Upper Valley Rideshare (UVRS) is now offering Upper Valley region commuters instant, on-line, bi-state carpool matching. Beginning immediately commuters can create their own commuter account, enter ride searches for a single day need such as when your car is being serviced, an event that others may be traveling to, and on-going regular commutes to work or school. Participants will receive match results instantly for carpool partners, transit choices where applicable, and in some cases, bike and walk routes. Another convenient feature is the ability for participants to access their personal commuter page through Face Book or smart phones.

"The new tri-state commuter service (New Hampshire, Vermont & Maine) is especially helpful in our bi-state region where many people live in one state and commute to another", says Susan

Berry, Upper Valley Rideshare program manager. "Now, all potential matches and services in either state, will be available in one screen, and carpool opportunities will be expanded for bi-state residents and employees and employers.

To open an account to find carpool partners and other transportation options, go to www.uppervalleyrideshare.com and click on the link to the new sign-up page. Participants will be directed to the NH Rideshare sign-up page. Please fill out the registration questions. New Hampshire residents will receive a welcome e-mail from NH Rideshare. Vermont residents will receive a welcome letter from GoVermont. And everyone will receive instant ride match results. For questions about this new Upper Valley region service, contact UVRS at 802-295-1824 x204. 

COMMUTING IN THE UPPER VALLEY

Stage Coach the public transportation provider for northern Windsor and Orange counties offers environmentally friendly commuter routes along 189 & 191, 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.crttransit.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>

Top Ten EPA-Rated Fuel Sippers (2011)

2011 Nissan Leaf (Electric, Auto)	City 106	Hwy 92
2011 smart fortwo cabriolet (Electric, Auto)	City 94	Hwy 79
2011 smart fortwo coupe (Electric, Auto)	City 94	Hwy 79
2011 Chevrolet Volt (Premium Gas Only)	City 35	Hwy 40
(Electricity Only)	City 95	Hwy 90

*Ranked by combined gas/electricity rating of 60 MPGge

2011 Toyota Prius (Auto)	City 51	Hwy 48
2011 Lexus CT 200h (Auto)	City 43	Hwy 40
2011 Ford Fusion Hybrid FWD (Auto)	City 41	Hwy 36
2011 Mercury Milan Hybrid FWD (Auto)	City 41	Hwy 36
2011 Lincoln MKZ Hybrid FWD (Auto)	City 41	Hwy 36
2011 Honda Civic Hybrid (Auto)	City 40	Hwy 43
2011 Honda Insight Hybrid (Auto)	City 40	Hwy 43
2011 Hyundai Sonata Hybrid (Auto)	City 35	Hwy 40
2011 Honda CR-Z (Auto)	City 35	Hwy 39
2011 Lexus HS 250h (Auto)	City 35	Hwy 34

source: www.fueleconomy.gov

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Upper Valley Rideshare is now offering on-line, bi-state, carpool matching. So, whether you live in one state and work in another, or you commute in one, beginning immediately, you can:

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- Enter ride searches for a single day, a special event or a regular commute to work or school
- Get INSTANT ride match results including both NH and VT data*
- Access your account from Face Book

Open an account and try it today! Go to www.uppervalleyrideshare.com/



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*NH residents will receive a welcome e-mail from NHRS, Vermont residents will receive one from GoVermont.

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SOLAR HARTLAND OFFERS INFORMATION, SITE ANALYSIS AND NETWORKING

As we move towards using energy more efficiently and creating it with more secure renewable sources, a problem is that many people do not understand how renewables fit into their life. Solar Hartland is an education program from Transition Town Hartland and Hartland Energy Committee focused on bringing solar down to earth.

The first step has been an information booth at 5 local farmer's markets and 4 larger regional events. Our interactive display included a blender making "Solar Smoothies", a comparison display of Incandescent/CFL/LED light bulbs with a watt meter, and a large model of an electric utility meter with the rotor spinning backwards, all powered by a small solar electric system, which was then used for teaching about solar electric systems. After talking to a few hundred people, we are now aware of the issues concerning wide-spread PV adoption, such as high up front costs, lack of knowledge about siting, load, or cost, and uninformed expectations.

The second step is currently underway with a free solar site analysis for 27 people in town who signed up at the booths. If enough people are interested after their site analysis, we will form a buyer's group and request bids. We have written a solar site analysis protocol that requires only a

compass, calculator, and a year's worth of electric bills, (it can also be used for off grid systems if the load calculations are done separately). The system size and cost results can be recalculated with different loads, thus encouraging efficient electrical use. Contact us if you live in the Hartland area and would like to be put on the schedule. The protocol is available free for other interested people and town groups to use.

The last step being put together now is a presentation for businesses and local groups about solar electric financial mechanisms and benefits. It will introduce rebates, incentives, tax credits, PACE, the new KWH tariff, group net metering, power purchase agreements, business equipment depreciation, peak rate offsetting, connecting with the smart grid, third party ownership, renewable energy credits, and leasing of packaged systems. If there is interest afterward a Community Supported Energy (CSE) net metering group will be formed, with the goal of installing a community array.

For more information please contact Karl Kemnitz: karl@solarhartland.org, or Chuck Fenton: chuck@solarhartland.org. We also have a general website at www.solarhartland.org

GEO THERMAL POWER PLANTS ARE PRODUCING OVER 8,200 MW OF ELECTRICITY IN 21 COUNTRIES, SUPPLYING ABOUT 60 MILLION PEOPLE - MOSTLY IN DEVELOPING COUNTRIES

Letters from the Editor

Cont. from page 2

05/31/11 Solar Harvesting is Agriculture. In my opinion, Solar Harvesting is not a form of agriculture. It is agriculture. This is a very important designation that we should be willing to fight for. While some prefer to view a Solar Array as a concoction of manufactured parts and pieces that scientifically converts sunlight into electricity, I choose to see it as another form of soil from which we harvest a crop.

I believe this is an important designation because it will prevent predatory taxation. Many towns in Vermont have applied a perceived increase in appraisal of property because an owner has invested into renewable energy of one sort or another. Some are quite vocal, claiming that Solar is only for the profit of the rich man. We have to get away from this mindset and motivate the next generation to view all forms of renewable energy as a type of farming. We can all have gardens in our backyards can't we? We don't get taxed for growing cucumbers and tomatoes do we?

A solar array is a garden. Instead of harvesting edible crops that give our bodies energy, we harvest sunlight to give our homes energy. The word, "Harvest" is a term that even the Solar Engineers and Scientists have designated to their monitors. During the day, our inverters display the "harvest" of kilowatts. If property owners aren't taxed extra for having gardens on their property, then why are we taxing them for having solar panels? On a large scale, I would argue even further that even the land that is used for an array should fall into agricultural designation and only taxed accordingly. In many cases, the appraised value of a piece of property, like IVEK should be taxed less than it was before, not more. This is because they have changed the use of it from industrial to farming. Instead of being punished with an increase in their appraisal, they ought to have their taxes reduced because their land has been changed from an industrial lot to an agricultural lot.

Their crop is then sent out to the market place just like any other crop. While some may say that this is money in the property owner's pocket, it is still no different than the farmer who receives income for his crops that he takes to market. He pays his income tax like anyone else at the end of the year. His profits may increase because he has a good crop of sunlight but who cares? If his profits increase, then he pays his taxes on his profit, just like the farmer does.

Finally, if we want common folks like myself and all my neighbors to consider investing into renewable energy, then we can't be threatening them all along the way with increases in taxes to the point where it neutralizes any purpose in doing it to begin with.

- Sincerely, Paul Biebel, Pres. Prudent Living Inc.

BOOK REVIEW - CATCH THE WIND, HARNESS THE SUN

22 Super-Charged Science Projects for Kids by Michael J. Caduto

Our children and grandchildren will play out the infrastructure that we are just now beginning to develop. They will understand the importance of energy awareness and independence with renewable energy playing a huge role in their lives. It will hopefully be the accepted norm. Catch the Wind, Harness the Sun is a great way to introduce today's children to a responsible tomorrow where renewable energy will be how they power their lives.

The book is filled with great science projects that are fun, while helping to show them the how's and why's of helping our planet survive. From simple projects like the Pie Plate Wind Maker, to building a small windmill and a solar cooker... it will serve to inspire and educate children from ages 8-13, who will definitely appreciate all of the fun activities while helping to address the imminent need for our planet to move into renewable energies for the future of mankind and the planet. The book would be a great addition to any classroom or just family activities.

The author lives here in Vermont and is the creator and co-author of the international best-selling Keepers of the Earth series and Native American Gardening, to name a few. You can visit him at www.p-e-a-c-e.net.



SAVE THE DATE FOR REDC'S 2ND ANNUAL "THE GREENER MOUNTAINS" EVENT

Rutland Economic Development Corporation is very excited to announce its second annual "The Greener Mountains" event.

"The Greener Mountains" invites community members and businesses alike to discover how "Green" can improve homes and businesses. This free admission event will take place from 10:00 a.m. to 4:00 p.m. on Saturday, November 5, 2011 at the Holiday Inn in Rutland, Vermont.

"The Greener Mountains" will showcase a wide variety of "Green" vendors. These will include home improvement, automotive, energy efficiency, new technologies, service providers and local food programs. The day will also include: children's activities, demonstrations, and workshops geared toward benefits for homes and businesses presented by Rutland Regional Planning Commission.

If you would like to become a vendor or sponsor of "The Greener Mountains", please contact Mary Kay Skaza at 802-773-9147 or visit www.rutlandeconomy.com.

Additional Support of "The Greener Mountains" is provided by Rutland Regional Planning Commission, Casella Waste Systems, Inc., Sustainable Rutland, The Bus, SolarFest, Rutland Area Farm and Food Link, and Rutland Herald. The event is also a project of the Rutland County Energy Challenge - www.rutlandcountyenerychallenge.com.

REDC is a private, not-for-profit whose mission is to encourage and enhance business success in Rutland County. It offers assistance in areas such as financing, site location, business expansion, business recruitment, business counseling by the Small Business Development Center (VtSBCD), and more.

BRADFORD ELEMENTARY

Last September, when VT Law School professor Patrick Parenteau agreed to be the Keynote Speaker at the Local Energy Alternatives Festival (LEAF) in Bradford, he specified one condition - that his normal speaking engagement fee be donated to a student-designed project that would make a positive change.

The Energy Committee of the Bradford Conservation Commission (BCC), which sponsored LEAF, then partnered with the Kids' Connect Program of Bradford Elementary School (BES) to offer a "Green Challenge":

Design or demonstrate a way for your home, the school or the Bradford Community to be more green.

Guidelines for this student-driven project included writing a proposal, researching the specific issue and providing visual models.

Fourth grade winners of the Challenge, Isabelle Yelle and Maria Reger, were presented with the \$250 award last week at BES to fund their project aimed at reducing the use of plastic bags. They will design and order reusable bags to be given to each BES family at the first school-wide gathering in the Fall.

Ms. Dubuque's second grade class's "Straw Project", aimed at reducing the use of plastic straws in area restaurants, and the "Support Green-Up Day" project completed by Emma Parkin, also received Honorable Mention.

Bill McKibben, world renowned author and climate change activist, will be the Keynote Speaker for the September 17, 2011 LEAF (changed to Local Energy & Agriculture Festival). McKibben has also stipulated that his usual fee be used to challenge youth in Bradford to create a positive environmental change in the community.

BCC's Energy Committee Chair, Ed Wendell said, "We're really excited to have Bill McKibben's participation in our 2011 LEAF, and especially pleased that he's offering this challenge gift to our young people."



AN ENERGY OPTIMIST: OPTIMIZED ENERGY LIFEBOATS

Gaelan Brown

The Oxford English dictionary defines "optimize" as "to make the best or most effective use of a situation as possible."

What choice do we have other than to make the best we can with what we've got? Should we not all call ourselves "optimists," then?

The good news for Vermonters is that we have the potential to survive, even thrive, in the age of energy descent and systemic collapse. We are not overpopulated and our natural resources could support a sustainable steady-state economy, even though we are currently dependent on external resources and economies that could be described as a "house of cards."

But as the global house of cards teeters, it's becoming obvious that we need to shed our dependencies and invest in contingency plans. We need to first be clear about our particular resources and opportunities.

- Vermont is not overpopulated. There are 6.5 million acres of land in Vermont, which equates to 26 acres of land per household. Eighteen of these per-household acres are forested and eight are open farmland. The average household needs less than four acres of farmland to supply their annual food needs. The average Vermont household needs less than 10 acres of forest to sustainably supply all the firewood they need in perpetuity, without the forest shrinking. Consequently, we have twice the farm and forest land we need to sustain our population – meaning there are ample land resources to devote to commercial activities.
- Vermont has more acres devoted to organic farming, per capita, than any other U.S. state. We have the most evolved local-food movement and we have a growing culture of young people who are getting into sustainable farming, food production, and permaculture.
- Vermont has highly developed composting infrastructure and productivity.
- Vermont is the healthiest state in the U.S. according to the "America's Health Rankings 2008" report.
- Vermont's economy has not suffered like other states'; our unemployment is still below 7 percent and Vermont has a higher percentage of its economy devoted to agriculture and manufacturing than most other states.
- Tourism from urban elites of the East Coast and Montreal will likely continue to bring money into Vermont. Even during a collapse, the rich will need places to recreate.
- There are an estimated 40,000 wild turkeys and 150,000 deer walking around our woods (according to Vermont Department of Fish & Wildlife biologists).
- Vermont leads the U.S. in efficiency programs and intellectual knowledge regarding biomass energy, renewable energy, and forestry.

However, we have challenges and risks ahead of us. Access to energy is the foundation of any economy, and right now Vermont is almost entirely dependent on imported energy sources such as Canadian hydropower and electricity from natural gas and uranium. And we are totally reliant on fuel oil and propane for winter heating.

Even though we have no in-state fossil-fuel production, we have a lot of untapped potential that could be developed quickly if we reincarnate the culture of innovation and Yankee ingenuity this state was known for in the 1800s.

Here are several proven lifeboat-resources and strategies that are close at hand and simply in need of investment:

- A transition to wood-fired heating as a bridge strategy to reduce Vermont's annual fossil-fuel imports would keep \$500 million to \$700 million in Vermont's economy. www.Sunwood-Systems.com, www.Pellergy.com and many other locally owned Vermont entrepreneurs are ready to provide you an affordable solution if you require an automated furnace instead of a normal woodstove.
- All Earth Renewables (www.AllEarthRenewables.com, Williston) and Sunward Solar Hot Water (www.GoSunward.com, Vergennes/Winooski) both offer Vermont-made solar PV and hot water systems, and they both offer affordable financing options.
- Northern Power Systems (www.NorthernPower.com, Barre), Vermont's original wind-turbine manufacturer, offers an industry-leading 100kW community wind turbine that is ideal for group net metering and institutional applications. Northern Power recently got a federal grant to develop a 450kW direct-drive turbine based on their unique design, and they installed North America's largest direct-drive utility-scale wind turbine (2.2 megawatts) in Michigan. All Earth Renewables makes home/farm-scale wind turbines as well.
- Avatar Energy out of South Burlington builds small-scale "cow power" systems that make cow dung into odor-free compost and eliminate storm-water runoff and pollution issues while generating large amounts of natural gas to generate electricity.
- www.CompostPower.org, www.HighfieldsComposting.org, www.VermontCompost.com, Burlington's Intervale, and many other composting organizations are developing high-value composting networks and processes to keep our farms productive without fossil fuel-derived fertilizers. These organizations are also exploring ways to harvest energy from the composting process, including a successful project to heat a greenhouse with a mound of bark mulch (check out Vermont Compost on Main Street in Montpelier).
- Biochar-gasification reactors from Victory Gas Works can produce electricity and heat, while

making biochar to build up our soils. Turn-key systems can be purchased for less than \$5,000 which can generate electricity by gasifying woodchips, at a cost that is lower than today's retail power rates (www.VictoryGasifier.com and www.GEKGasifier.com).

Micro-hydro diversion systems have enormous potential in Vermont (versus "run of river dams" that block fish flow or hurt river health). The Vermont Renewable Energy Atlas (www.VtEnergyAtlas.com) maps out thousands of feasible micro-hydro sites and provides estimates of their annual kWh productivity based on flow/head.

Vermont has 580 megawatts of large-scale hydropower on the Connecticut and Deerfield rivers, which is equivalent to Vermont Yankee's base-load capacity (at lower cost). Too bad then-Gov. Douglas allowed these U.S. Gen-owned dams to be sold in a bankruptcy proceeding to TransCanada in 2004, without the state attempting to purchase them. We should explore ways for the state, or for in-state entities, to gain ownership.

We have ignored the potential for harvesting fuel wood and/or switch-grass, for pellets, along Vermont's highways. Ben Falk and others have mapped this out, but where's the money that's needed to make this investment?

www.GreenWindMill.com, based in Brattleboro has a patented design for a residential-scale vertical-axis wind-turbine that offers impressive ROI potential. They are looking for investors to bring this to market.

Dear reader, I ask you this: how much money do you have invested in Wall Street casino-capitalism (a.k.a. 401k, IRA, mutual funds, stocks, bonds, derivatives, futures, etc)? Even if the average Vermont household has only \$25,000 in these paper-gambling investments, (the average 401k balance across America today is \$70,000), that would mean Vermont has a collective liquid resource of \$6.2 billion that could instead be invested in Vermont's re-localized food and energy economy.

Vermont's innovators and entrepreneurs offer real solutions, but they need financial partners and customers who are willing to invest in a sustainable future. It's time to walk (or run) the talk. ☘

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Keynote Address by Bill McKibben

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SOLAR PV

SOLAR PV SYSTEMS

By Ben Gordesky, DC Energy Innovations, LLC

How Does PV Work?

Solar electric or photovoltaic (PV) systems are a simple, relatively maintenance-free way to use the sun to generate renewable energy. Photovoltaic solar panels use the light energy of sunlight to generate electricity. They do not use the heat of the sun. There are no moving parts in most grid-tied (utility connected) PV system. Unless there is a need for backup when there is a utility outage, grid-tied PV systems do not use batteries. They typically last for 35 – 40 years and, during that time, they require very little attention by the system owner.

What Do They Look Like?

The typical system uses crystalline PV panels that consist of 60 or more small PV cells in a metal frame. The frame is covered in specially designed glass. Each panel is approximately 5.5 ft long by 3.3 ft wide. A small residential system will typically use at least 10 to 12 panels. But, PV systems can be installed in a variety of sizes to match a customer's electric usage, available shade-free space on the roof or the property and/or the customer's budget.

PV systems can be installed on rooftops or on pole mounted racks on the ground. Which type of system is installed depends on where there is available shade free space and which kind of system the customer prefers.

For rooftop systems, there are many mounting options depending on the slope of the roof and the type of roofing material. For sloped roofs, the racking or brackets holding the panels is fastened to the roof rafters or trusses. The roof penetrations are sealed to be watertight. For sloped standing seam metal roofs the panels can be clamped directly to the standing seams of the roof without penetrating the roof.



On flat roofs, typically on commercial buildings, the solar panels can be mounted in racks which are weighted down by masonry blocks. So, the entire system can be installed without penetrating the roof at all!

How much does the Utility Pay you for Your Solar Electricity?

Small to medium sized grid-tied PV systems are connected as net metered systems. The solar electricity goes directly into the electric panel in the building. If you can use it, it feeds electric loads in the house first. So, you avoid buying the power from the utility. If you have extra solar, it goes back to the utility and runs your meter backwards. When you need power and you don't have enough solar, you buy power from the utility and run your meter forwards. In this setup, the utility acts as your battery bank. If your meter shows a credit at the end of the month (typically in the summer), the utility will hold this credit for you to use up over the next 12 months. So, you get full retail credit for all the solar you produce. In addition, all Vermont utilities are now required to pay you an additional amount for all the solar electricity you produce (solar adder) so that your total benefit from the utility is 20 cents per kWh in 2011. Keep in mind, that as the utility rate goes up each year, so does the benefit you get from the utility.

Incentives and Tax Credits

The Vermont state incentive is currently at \$0.75 per watt of installed solar capacity for systems up to 10 KW (residential scale) and \$0.60 per watt from 10 KW to 60 KW. There are higher incentive rates for non-profits and religious institutions, since they cannot take advantage of tax benefits.

For residential customers, the incentive is paid directly to the customer, typically 4 weeks after the system is completed. For all other customers, the incentive is paid to the installer who does not charge the customer for the incentive.

The energy bill which passed the legislature this past May provided for stable funding for this program. So, these incentive rates are now likely to remain stable for quite a while.

There is a federal tax credit of 30% available for both residential



and commercial customers. This tax credit can be carried forward up to and including tax year 2016. So, for systems installed this year, you have six tax years to use up the 30% tax credit. For businesses who invest in a system by the end of this year, the 30% federal tax credit can be taken as a Treasury grant. Instead of having to take this tax credit off your business taxes, you can simply get a check from the US Treasury 30 – 60 days after the system is installed. You get your money back more quickly and you can save your tax liability for some of the other tax benefits available to businesses who own a solar PV system.

Businesses can depreciate the total cost of the PV system on their federal taxes in either one or five years, whichever works out best. So, if your business pays taxes at a rate of 20%, this benefit can reduce the system cost by 20%!

Businesses in Vermont can also take a 7.2% business solar tax credit. This tax credit, unlike the larger state tax credit that was available a year or two ago, does not require any kind of certification and is not at risk of losing funding.

The Economics of Solar PV

This year, 2011, is a very good time to invest in a solar PV system, for either your home or your business. The cost of solar materials has just taken another step down. This, combined with a stable state incentive program makes PV systems more affordable than ever!

Basic facts to think about:

By investing in a PV system you are, essentially, buying 35 – 40 years of electricity at a rate cheaper than what you are paying now for your electricity! At DC Energy, we call

this the Secured Cost of Energy. See the graphs showing what the Secured Cost of Energy looks like for a typical residential and typical commercial system.

When we talk to potential customers, we like to present them with a conservative economic analysis which includes the Secured Cost of Energy for their system. This assumes that the system will only last for the 25 year solar panel warranty period and will only perform at the warranted performance level. For residential systems, the secured cost of solar electricity, averaged over the 25 year period is typically in the 12 cent per kWh range. For businesses (who can take advantage of more tax incentives), this cost can be anywhere from 4 to 8 cents per kWh. Residential customers in Vermont will get 20 cents per kWh back from the utility for all their solar electricity. This 20 cents will increase every year as the utility rate increases. The cost of solar will not go up as it is based only on the initial investment in the system. Non-residential customers will typically get anywhere from 13 to 20 cents per kWh for their solar, depending on their electric rate structure. Again, the benefit

from the utility will go up every year, while the cost of the solar will remain stable.

Examples

So, here is the economics of a sample residential system. This is a 5 KW roof mounted system with a minimal amount of shading which is estimated to produce 5,200 kWh per year in the first year.

Installed Cost = \$25,000

State Incentive = -\$3,750

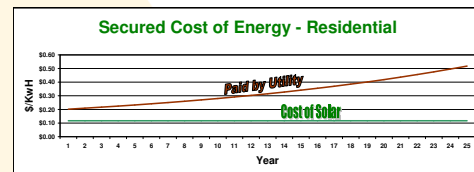
Federal Tax Credit = -\$7,500

Net System Cost = \$13,750

Cost of Solar Electricity = 11.7 cents per kWh

Net Benefit from the Utility = 20.0 cents per kWh

And here is the economics of a sample small business system. This is a 25 KW roof mounted system with a minimal amount of shading which is estimated to produce 26,500 kWh per year in the first year.



Installed Cost = \$105,000

State Incentive = -\$16,500

US Treasury Grant = -\$31,500

VT State Tax Credit = -\$7,560

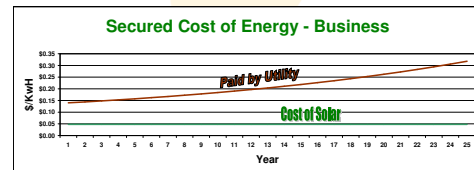
Depreciation Tax Benefit = -\$21,000 (assuming a 20% tax rate)

Net System Cost = \$28,440

Cost of Solar Electricity = 4.8 cents per kWh

Net Benefit from the Utility = 13 to 20 cents per kWh

As you can see, PV is a good long term investment for your home and a superb investment for your business! Remember, the above economics are meant to be conservative. But, each customer is

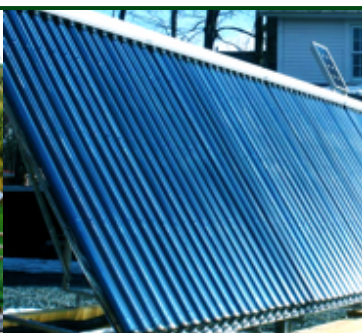


different. If you are interested in producing your own power from the sun, we are happy to work with you to figure out how solar PV can work with you.

Ben Gordesky is the Renewable Energy Manager at DC Energy Innovations, Inc. DC Energy is an installer of solar PV and wind energy systems as well as a full scale electrical contracting company. If you have any questions about the content of this article, feel free to contact Ben at 802-363-1474 or by email at bgordesky@dceivt.com.

Green Energy Times wants to thank DC Energy for their excellent efforts to gather this information that can help you in your decision to move into our future with clean, reliable, renewable energy! ☺





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MAKING SOLAR ACCESSIBLE

by Rustom Meyer, MEng and Jon Meyer, MID - Yeti Solar founders

Whole house solar systems are great for those who can afford them, but what about those who can't?

Several converging developments have recently made a new type of renewable energy installation affordable and practical. Due to the decreasing cost of electronics, a new breed of digital, low power, high-efficiency battery charge controllers have come onto the market. LED efficiency has increased and the price of solar panels has steadily decreased. In combination, these advancements allow for modular renewable energy. This is not a system that lights up a city, or an office, or a house, but a system that lights up a single room, to be installed directly where it is needed.

The latest generation of small charge controllers incorporates traditional features such as a charging light and overvoltage protection (which prevents the battery from being overcharged). More advanced models also include battery state-of-charge indicators and low voltage disconnects (which also protects the battery).

The most important advancement though is the incorporation of Pulse Width Modulation (PWM), which was previously unaffordable for low-power controllers. Pulse width modulation makes charging much more efficient by switching power delivered to the battery on and off very rapidly to create an average voltage lower than the full voltage of the panel.

Until recently LED outputs were low enough so it was difficult to obtain bright light (i.e. equivalent to one or more 60W incandescent) without a ludicrously large and electrically complex array of LEDs. Individual LEDs now approach 300 lumens (or about 1/3 as bright as a 60W incandescent) or more.

Photovoltaic panels are getting less expensive in large part due to economies of scale obtained because of ever-increasing demand. While this makes an individual solar panel affordable to the average person, what use is one solar panel? Clever people have certainly found practical uses for a single panel, but wiring one up with an inverter in order to add power to your home is not one

of them. At the same time, lighting companies are developing LED replacement lightbulbs, which must incorporate rectifiers to convert 120 volt alternating current (standard for houses in America) to direct current, which is what LEDs need. So, if you had a solar power system in your house, in order to use a light, you would be generating direct current, using an inverter to change it to alternating current, and then sending it to a lightbulb which is changing it back to DC current by using a rectifier. (Expensive and inefficient!)

A modular solar lighting product can cut out the 'middle-man.' It generates direct current, stores it with a small digital charge controller, and small sealed lead-acid battery (which have also developed in recent years to the point of being maintenance free over their lifetime). Take the direct current out of that battery, and send it directly to a small array of high-power, high efficiency LEDs. No converting to alternating current and back is necessary, which saves equipment costs and energy. Furthermore, these systems are very easy to install, typically taking only about two hours to complete.

These modular systems can't make a home energy-independent like a whole house system can, but they are a step in the right direction. They can also be particularly cost effective to light a basement, shed, barn, playhouse, camp, boat, RV, or added anywhere a new source of light is needed. Moreover, modular lighting systems enable those who cannot afford to buy a whole house system to purchase solar lighting for one room, and support renewable energy, while reducing our dependency on a fossil-fuel powered grid. Given the price range of modular solar products (mostly between 250 and 400 dollars), about 60-80% of U.S. households could purchase one without spending more than 1% of their annual income. Using similar criteria for a whole-house system, only the top few percent of the highest earning households could purchase one.

Obviously, there are plenty of people ready to shell out more than 1% of their annual income for solar, but this explains how modular solar could be easily and affordably adopted on a large scale.

The founders of Yeti Solar believe so strongly in the value of this technology that the production and distribution of low cost modular solar has become the company's primary mission. ☺

New England Solar Electric, Inc.

Solar Electric kits, gas refrigerators, replacement lightbulbs, which must incorporate rectifiers to convert 120 volt alternating current (standard for houses in America) to direct current, which is what LEDs need. So, if you had a solar power system in your house, in order to use a light, you would be generating direct current, using an inverter to change it to alternating current, and then sending it to a lightbulb which is changing it back to DC current by using a rectifier. (Expensive and inefficient!)

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SOLAR Q&A

Solar Uncertainty

Q&A with Howie Michaelson, Sun Catcher

While many of us have lived with solar for years, and many more are just delving in, there are questions and concerns that repeatedly come up around its day-to-day functioning. In this column, Howie will try to answer those questions in a simple clear fashion. Please submit your questions to: questions@suncatchervt.com or info@greenenergytimes.org, for inclusion in future editions!

1. My roof does not face due South – should I put my solar modules on a “ground mount”?

The best location for solar modules is dependent upon many factors, including whether you have a Solar Electric or a Solar Thermal (Solar Hot Water) system, a grid connected (“Net Metered”) or “off-grid” system, how far off South your roof faces and what pitch it is at, how much shading there is at the selected location, and how far it is to your electrical system or existing hot water system. Each of these questions plays a roll in deciding the optimal location for your solar array.

If there is significant shading on your roof between 9am-3pm, that would be a good reason to look at alternative locations. On the other hand, if your roof faces as much as 45° off South or more, it may still be the best location for solar modules depending on all the other factors involved. As it turns out, at least for grid-connected electric and solar thermal systems, being significantly off South doesn’t impact on overall production as much as one might guess. Whether you choose to put your solar collectors on a ground mount will also be influenced by aesthetic considerations for many people. Even if a ground location is better than a roof location for reasons of shading or roof angle, due to the changing economics of solar electric modules, it may still make sense to mount a larger array on the roof to accommodate the lower output if the ground mount ends up being more costly due to the additional expense of building a structure to hold it as well as more labor and “Balance of System” (BOS) costs.

In the end, the decision on where to place your array is best made through a collaborative process between you and your system designer/installer. While there may end up being a very obvious best choice, often it comes down to a series of choices specific to your location and needs, which an experienced installation company will be able to help you define and clarify.

2. Is it OK to have my Solar Electric modules at 2 different angles?

The short answer (per usual) is “It depends”. That’s because the way inverters and charge controllers work, they are smartly trying to maximize power output from the modules on a regular basis by regulating the voltage the module operate at. Depending on the technical specifications of the inverter, modules are placed in “series” strings of 1 to as many as perhaps 15, which means all those strung together modules need to work at the same current. As it turns out, the current fluctuates significantly with the solar angle of incidence. So if a string of modules has varying angles, the will not produce optimally. On the other hand, if the modules of varying angles are in separate strings, the overall production will not be effected much. This is why micro-inverters are advertised as putting out more power, since they each control only one module at a time, thereby not having their production limited by other modules in different orientations or degrees of shading.

LET OUR EXPERIENCE WORK FOR YOU

There's no question that you can find great prices on renewable energy products on the web but do you really know what you're getting or what to do with it when it arrives? Backwoods Solar has been designing and helping our customers set up their off-grid systems, step by step, for over 30 years. All of our sales techs live with the products that we feature on our website and in our catalog. When you order from us you're not just getting products we believe in, you're getting lifelong support from our team of experts. It's what has made us America's most trusted off-grid supplier. Let us work for you!

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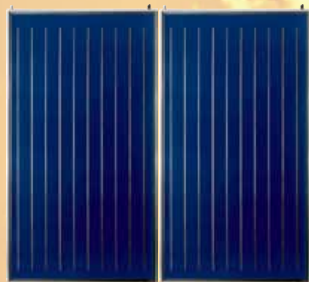
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SOLAR HOT WATER SYSTEMS – AN EASY FIRST STEP TO RENEWABLE ENERGY

Solar hot water systems have been accepted in most countries for many years and are widely used in Greece, Turkey, Israel, Australia, Japan, Austria and China. Because this technology has proven itself so well, it is an easy first step to begin the shift to renewable energy in the home.

Often, the biggest consideration in considering this option is the size of the initial financial outlay for solar water heating systems. Offsetting this expense can take several years.

On the other side of the equation is the fact that once the system is paid for, solar energy is free, thus greatly reducing the system operating costs, whereas other energy sources such as gas and electricity can be quite expensive over time, and their cost is only expected to rise.

Thus, when the initial costs of a solar system that is properly financed are compared with other energy costs, in many cases the total monthly cost of solar heat over the lifetime of the system can be much less than other more conventional types of hot water heaters.

Case Study

The family of 5 in the following case study financed their system with a low interest energy loan, now common in many states. After the system was in service for 2 years they computed their average monthly bill and compared it to the 2 years of bills before their system was installed. Fortunately, they had kept accurate records of their energy bills, which allowed the performance of their solar thermal system to be accurately analyzed.

It turns out that their monthly savings of roughly \$80 per month counterbalanced their \$80 monthly energy loan payments. The life of the loan being 7 years means that after the loan is paid off the system will have completely paid for itself and the family is left with a cost free energy generation system, which will last another 15 – 25 years. With results like these, the initial cost of purchasing and installation these systems is easier to justify.

This kit includes a circulator pump, all of the necessary check valves, temperature gauges, valves, and boiler drains for a single tank solar loop, a pressure relief valve, a flow meter, an automatic high vent, an expansion tank, and nipple adapters so the unit can be mounted directly on the tank – and a choice of mounting systems to fit any installation site.

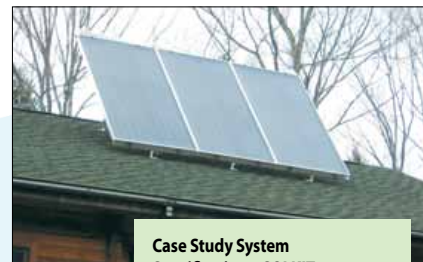
Installation Information

The manner in which this system is plumbed is common for this area of the country in that the house's boiler is used as a backup heating source for the domestic hot water. The most energy efficient way to use a boiler for backup when it is plumbed directly to the upper heat exchanger is to utilize what is called a cold start boiler rather than a tankless coil boiler or a boiler with a hot water coil.

The latter two types of boilers keep a receptacle of water at a very high temperature whether or not there is a need for it. Whereas the cold start boiler will not consume any energy unless there is a call for heat from either the hot water tank or one of the heating zones.

If the site in which a solar thermal system is to be installed has one of the tankless coil types of boilers it is possible to use slightly more complicated plumbing strategies, which utilize the circulation port on the Stiebel Eltron SBB series tank to minimize energy consumption.

It is also possible to convert a tankless coil boiler into a cold start boiler in many cases. This Shelburne Falls family originally had a tankless coil boiler that they used for backup during the heating season, and a standalone electric hot water heater that was plumbed in series with the solar storage tank during the warmer months. When the electric tank went bad they had their tankless coil boiler converted into a cold start boiler, optimizing their energy savings.



Case Study System

Specifications: SOLKIT 3

The SOLKIT 3 is fairly typical for families of 4 or more in the North-east, as it commonly achieves a solar fraction of 70 – 85%.

The kit consists of the following components

- 3 SOL 25 + collectors,
- 108 gallon dual heat exchanger storage tank
- Differential controller
- Flowstar pumping station kit.

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NORTHSHIRE BOOKSTORE GOING SOLAR

The Northshire Bookstore in Manchester Center, VT will be installing a 16kW photovoltaic system on its roof this fall. The bookstore was accepted into the Vermont SPEED (Sustainably Priced Energy Development) Program (vermontspeed.com) recently which spurred the project along. "I am thrilled to be able to do this. I see this as part of our community mission. Not only is it a way to offset our energy use, but it is a good investment," said Chris Morrow, owner of the bookstore. "Through the SPEED program, we are guaranteed payments at \$0.24/kW hour for the next 25 years," said Morrow. In addition, the Northshire Bookstore will receive both state and federal incentives or tax credits. The project is expected to generate about 10% of the bookstore's electricity needs.

Reknew Energy Systems from Hartford, VT will be installing the system which will use Canadian Solar 230 Watt PV panels. Because the panels will be on a flat roof with significant wind speeds the design calls for the panels to be at 10 degrees and be held down with a ballast system.

WattMetrics, a Randolph, VT based company, will

be supplying the monitoring and public display software. "Part of the goal of this project is to educate customers about solar power, so it is essential that we have a good way to do that," said Morrow. "Their program makes it easy see how much energy is being generated, how much carbon is being offset, how much coal it would take to generate the equivalent amount of electricity, and other measures of interest."

On the larger picture of distributed energy, Morrow said, "This project is a good example of how smart public policy can drive long-term decision making about our energy future. As a state and as a country we need to continue reducing subsidies for fossil fuel industries and directing those investments into renewables. It is the proverbial no brainer."



**NORTHSHIRE
BOOKSTORE**

SOLAR HOT WATER

AN IMPORTANT SOLUTION TO AMERICA'S ENERGY CHALLENGES

Every home with southern exposure should have a solar hot water system. Every dairy, every cheese maker, every inn, every hotel, every restaurant, every laundromat, every school, and every other business or institution that uses hot water should have a solar hot water system.

These assertions are not political statements. These declarations are not made for marketing purposes. These are statements founded on the author's well-informed opinion. Sure, I am a solar thermal professional, but I don't believe in solar hot water because I'm in the solar thermal business. Quite the contrary! I am in the solar thermal business because I believe in solar hot water. It is my personal mission to educate people about the importance of solar hot water as a key solution to our energy, economic, and environmental challenges. I won't rest until every south-facing roof in America has solar thermal collectors! (... Hopefully, I'll live that long!)

Since you're reading the Green Energy Times, odds are that you're a "green-minded" person. You probably recycle, you eat locally grown organic food, you're well educated about environmental issues, you're troubled about our dependence on fossil fuels, you believe in global climate change (and gravity!), and you are worried about your carbon footprint.

You have installed CFL and LED light bulbs in your home, and you may even drive a Prius or other fuel-efficient automobile. You're one of our planet's good guys! But...do you have a solar hot water system in your home? If you answered, "YES!...Thank you! You are already part of the solar solution. But, unfortunately, chances are good that your answer was, "NO."

I don't need to ask why you haven't installed a solar hot water system, because I know your answer would be, "I can't afford it!"

So, to further my mission as a self-appointed Ambassador for Solar Hot Water, I have provided the following

economic and environmental arguments. Hopefully, these arguments will help persuade you to add a solar thermal system to your home or business:

You use a LOT of hot water.

You probably use more than you realize. Hot water represents the second largest energy user in American households. Most people don't notice their energy bills for heating their water because those bills are mixed in with their total electric, fuel oil, propane, or natural gas bills. Statistics indicate that a typical conventional hot water system for an American family of four will consume approximately 150 million BTUs in its seven-year lifetime, and will cost from \$3,600 to \$7,000 to operate. That means we Americans consume more than 2,000 TRILLION BTUs and spend 75 BILLION DOLLARS to heat our domestic water every year. That number doesn't include hot water used by businesses, institutions, and industries!

WOW! Those are HUGE numbers! In these days of public discussion about

federal budget issues in the billions and trillions of dollars, we have become desensitized to enormous numeric terms. But, trust me. We Americans spend a lot of money, we burn millions of barrels of fossil fuels,

and we add megatons of carbon to our overloaded atmosphere for the purpose of heating water for our showers and washing our dishes. That practice is needlessly wasteful, because the sun provides abundant, pollution free, no-cost heat every day.

Solar hot water systems really work.

Solar thermal technology is simple. Solar hot water systems consist of collection, storage, and delivery of solar radiation. This simple formula can provide a significant, positive impact on our planet and our pocketbooks. A properly sited and sized solar hot water system in each home would save as much as 65 percent, or more, of conventional hot water expense!

Just think of the savings to our national economy if American households had solar hot water systems! We could save more than TEN BILLION DOLLARS a year if only 25% of American households installed solar hot water systems.

Yes, even in New England, solar hot water systems are very effective. The



Chauncey's Restaurant in Arlington, Vermont is now part of the solar solution!

sun provides thermal energy even on cloudy days in the form of ultraviolet radiation. Contemporary solar hot water systems provide highly efficient solar heat collection and storage, and are built to last 20 to 30 years. It is rewarding to me that our solar hot water customers say they are pleasantly surprised that their solar hot water systems work much better than they had expected. People are often amazed when their 50°F well water is heated by the sun to 140°F in just a few hours.

Solar hot water systems ARE affordable.

In addition to 30% federal income tax credits for qualified solar hot water systems, all New England states provide various types of financial incentives.

Several banks offer "Green Loan" financing programs with low-cost interest rates. Payment plans can be structured to cost less per month than you are paying now in conventional hot water heating expense.

If you invest cash in the installation of a new solar hot water system, you will earn more than a 12% return on your investment, the value of your home will be increased by more than the net cost of the system, and your system will pay itself off through energy savings in six to ten years. (Some experts say that solar hot water is actually "FREE" because your investment pays such high dividends over a 20 to 30 year period.)

Solar hot water is the most cost-effective, energy efficient form of renewable energy.

Renewable energy professionals agree on this fact.

After tightening your building to assure its energy efficiency, your next green step should be the installation of a solar hot water system.

Solar hot water is a No-Brainer for us Greenies!

Call a local solar thermal profes-

sional in your area today for a solar site evaluation, and start saving energy and money tomorrow!

You should become part of the solar solution. ☀

For a primer about the nuts and bolts of solar hot water systems, please refer to the excellent article published in Green Energy Times, Issue 8, page 11, contributed by Southface Design/Build of Brownsville, Vermont.

By Karen Lee, Solar Pro, Arlington, VT with many thanks from Green Energy Times for this and all that you do!



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HYDRO

HYDRO IS HAPPENING IN VERMONT

Cont. from page 1

of final permitting and commissioning. The road to reach this point has been long, challenging and mostly uncharted, but be assured it can be done.

The project, recently highlighted in the Bennington Banner, will consist of a 65kW run of the river Pelton turbine. We own and live on 450 acres that provide excellent site conditions including a steady stream and substantial vertical drop or head. When completed, the project will provide enough power to sustain 60 average Vermont homes.

Green energy projects and particularly hydro projects are a massive undertaking, especially for a private individual. As I began the project I was told, "Don't waste your time" when inquiring into the permitting process. Permitting alone could take a couple of years. Sorting through the information needed was overwhelming, and I sought the counsel of a reputable consulting firm familiar with large hydro projects. When I received a quote of nearly \$100,000 to assist in obtaining the required permits I knew I would handle

frustrations and roadblocks, it is very important that projects get on-line to help iron out the permitting process for a prosperous green energy future.

Juggling this along with raising a family with my wife (4 children under 6) and working full time created an interesting paradigm in the household. I may have the only children under 6 who know what CFS (cubic feet per second) is and how to measure stream flow. My wife and I often included our children in the daily flow measurements that we made over a 2 1/2 year period to establish a hydrograph and flow duration curves. After all aren't we doing this for them? A little help from the benefactors isn't a bad thing.

I am very satisfied with choosing this path, as I have gained a thorough understanding of all things hydro, and broken new ground with the project. It has given me the platform to promote clean, green, responsible energy. In fact, I now have the privilege of taking on clients to help others initiate and develop hydro projects throughout the state. Hydro is possible. Hydro is beneficial. And hydro is happening. 

*Photo: Peter Crabtree/Bennington Banner
Dennis Candelora and his family are proposing to build a hydro project in Pownal that could provide enough electricity to power the equivalent of 48.5 homes per year. With Candelora are his wife, Lani, are their four children, Maria, 6, Angelo, 4, Antony, 3, and Luccio, 31/2 months.*

Key pieces of info required when assessing your site.

- Flow-How much water do you have? Year round or seasonal flow? Smallhydro.com
- Flow can be expressed in Gallons per minute (GPM) and easily converted into other units.
- Head-Elevation difference between your intake and your turbine
- USGS Topo maps provide the quickest method-There are several online resources just Google
- Penstock distance-Distance from your intake to your turbine
- Lineal distance in feet. Again, a USGS Topo map or good old fashion tape measure
- Ownership-Do you own the land? Very helpful if you do, not impossible if you don't.
- Access to grid (if you intend to interconnect). Can be a substantial hurdle to bring in power to your site.

Having this info before reaching out to a hydro professional will allow for a quick assessment of your site. Thinking about what your goals are will help in the design as well.

BENEFITS OF HYDROPOWER

By Emily Marsh

Historically, hydro power was used for grist mills and lumber mills and eventually for producing electricity. Hydroelectric power can be viewed as having negative impacts because of large scale operations, such as Hydro-Quebec. Larger scale operations can inundate land on which surrounding communities live or use for sustenance, along with producing negative effects on aquatic ecosystems. However, small scale hydro power operations are a viable option for low impact renewable energy production. As with every aspect of energy consumption there are costs, but they are minor compared to the costs imposed by large scale hydro and especially fossil fuels. The environmental impact from small-scale hydro is minimal, the economic impact (in the long run) is somewhat reduced, and the negative effects on social well-fare that are common with large-scale hydro or fossil fuel usage are limited to none. Putting an end to our rampant consumption of both resources and energy is the best cure for our ailing planet. Renewable energy technologies are a necessary step toward a healthier environment. The challenge we face in implementing small-scale hydro operations is mainly political and social.

Small-scale, environmentally responsible hydro power has the ability to fill in much of the energy gap that will be created with the discontinuation of Vermont Yankee, if indeed we are lucky enough to be rid of it. The state of Vermont has many streams and rivers with a potential for hydropower. It is important to ensure the preservation of rivers and streams that are untouched and harbor endangered or rare species. If installed with conservation and sustainability in mind, we stand to gain a great source of clean and renewable power. Unfortunately, our current government is not supporting hydro power as it should be. In 1978, the Public Utility Regulatory Policies Act (PURPA) was passed to aid in the use of domestic energy. Amendments to PURPA have reduced the economic benefits of small-hydro as contracts with utilities have

Cont. on page 16

(FISH) FOOD FOR THOUGHT!

- The government will not easily permit even micro-hydro in VT, although it can be accomplished by measures that do not harm the fish or environment or anything because of the so-called 'water quality' regulations (Green Energy Times Issue 6, p13) ... YET - they allow nuclear power plants to be built along the rivers to use the water to cool the fuel rods...
- While micro-hydro is totally safe, the other has the potential for devastating catastrophes! A case in point is, of course VT Yankee. An enlightening experience by Christopher Swain who swam the CT River, in 1996, to alert awareness for water quality commented (NPR interview) negatively about his experience when he swam through the waters of the VY flow...
- What seems to be the problem here? Micro-hydro is an untapped gold-mine for clean energy production and should be included in the means to meet our energy needs for our future!

Handling all Aspects of HYDRO DEVELOPMENT



green mountain
environmental consulting, inc.

Site Assessment
Permitting
System Design
Financing Assistance

Contact us for a free evaluation
denniscandelora@gmail.com
518-451-0095



the project myself. After all, why outsource thousands of dollars to a large consulting firm when the whole project is about just the opposite - local energy, local families and keeping money and innovation in Vermont. My wife and I both have degrees in natural resource management, and my wife has a law degree in addition, giving us a good educational and skills background for the project. We decided to tackle it ourselves.

Throughout the permitting process I have managed to satisfy all "stakeholders" (FERC lingo for interested parties) involved. This required hundreds of man-hours of flow measurements, head measurements, fish surveys, funding requests, grant requests, design work, price quoting and vast communication between local, state and federal agencies to name a few. We are lucky in Vermont to have the Vermont Agency of Natural Resources, specifically the folks in stream protection and fisheries, who were extremely helpful, cooperative and timely in my project. They helped provide needed guidance and feedback as the project developed.

It is a lengthy process and can be highly frustrating to be knee-deep in bureaucracy when you are trying to get a project on-line that has been determined to pose no adverse environmental impacts, and only stands to benefit our community, our children and our environment. Despite

WIND

THE "SMALL WIND" MARKET

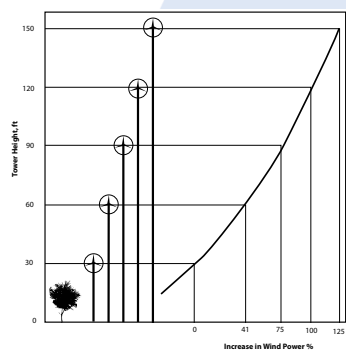
When the topic of wind energy generation is brought up, many people envision vast wind farms with hundreds of towering turbines occupying wide-open fields. This industry has been termed "large wind," and includes individual turbines of approximately 1MW or more. However, a similar industry has been developing right under our noses – one that seems to fly under the radar, yet should not be overlooked.

The industry is casually described as "distributed generation" or "small wind," and it includes turbines with less than a 100kW nameplate capacity. This technology is rapidly gaining popularity amongst rural homeowners, farmers, and other businesses with large, open areas at their disposal. With today's floundering financial market and skyrocketing energy prices (which are rising by 5% every year), more and more individuals are looking to harness their properties' natural resources – and wind is an obvious choice.

Is Small Wind Right for You?

If ideas such as lower electricity bills, energy independence, and a reduced carbon footprint strike a chord with you, you may want to look into investing in a small wind turbine. To make this technology worth your time and money, you must have at least one acre of unobstructed land so that the turbine can harness as much wind as possible. You should also have at least a 10mph annual average wind speed for the investment to be financially viable. For a wind turbine, output is proportional to the cube of the wind speed (doubling the wind speed will increase output by a factor of eight). Higher wind speeds lead to dramatically higher output.

Tower height is also critical to a turbine's energy output, as higher wind speeds can be found at greater heights. Optimal height for turbines is site-specific. It is helpful if your site is easily accessible for construction vehicles, and zoning ordinances and building codes should be consulted on a case-by-case basis. If the wind is strong enough to be bothersome most of the time, you should probably buy a wind turbine.



Turbine Height above Trees

So you want your own turbine...

Before making any long-term investment, it is important to know what you're getting and how it works. At the most basic level, wind

energy generation employs a very simple principle: as the wind blows, its energy turns propeller-like blades around a rotor. Through connections to a main shaft and a generator, a turbine will convert the wind's kinetic energy into mechanical energy, and ultimately to electricity. This electricity can then be transmitted via cables to the end user.

Most turbines consist of blades, a rotor, a shaft, a yawhead that allows the turbine to shift direction, and a tail that directs the rotor into the wind. The fewer components a turbine has, the better. Fewer moving parts mean that there is a smaller chance of malfunctioning, as well as lower maintenance costs.

When looking into wind energy systems, you'll want to make sure that you get not only the turbine, but also a comprehensive system for your money. There's nothing worse than buying a product only to find out the batteries aren't included. When talking to your turbine dealer, you'll want to find out which extra components come with your turbine, and whether they're included in the cost.

System Components for On- vs. Off-Grid Systems

The components in a wind energy system will vary depending on whether you want a grid-tied or off-grid system. You may decide that you want to have constant electricity even when the wind isn't blowing. In this case, your system would be "on-grid," giving you unlimited electrical capacity and allowing any excess electricity from your turbine to be redistributed back into the grid. If, on the other hand, you live far from a grid connection or simply want



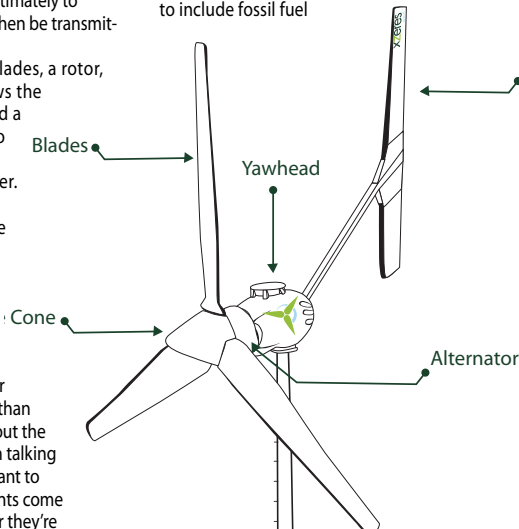
to eliminate electric bills, an "off-grid" system could be for you.

On-Grid Systems:

The cheapest option is a grid-tied system without battery-backup. However, if the wind stops blowing and the grid is down, you'll be left with no electricity. Some companies offer batteries as part of a standard package. The battery bank will store energy produced by the turbine and keep it ready for use during low wind speeds or power outages. In addition to a turbine and a battery, the systems also include a Turbine Controller with Diversion Loads, Lightning and Surge Protection, and AC/DC Distribution Panel, a Meter, and an AC/DC Inverter/Charger. You can also add a generator if you're a customer in need of high-availability – such as a medical emergency service or a company with extensive computer systems – where energy is needed at all times.

Off-Grid Systems:

Going "off-grid" requires slightly more commitment; you'll need to adjust your energy consumption habits to coincide with the limits of your system, and can opt to include fossil fuel



generators or solar panels (or both). If you find a package that already includes these components, it'll save you time, money and effort.

It All Comes Back to Financials

Generating your own energy without expelling any carbon emissions sounds like a dream come true. But, what will this cost?

There's no single answer. Prices vary depending on factors such as tower height. There will also be an installation cost involved, so ask your turbine dealer what the installed cost is, as well as the turbine cost. The quality of your turbine will have a significant impact on the price. For wind turbines, quality is an extremely important factor and should not be taken lightly. If you skimp on quality to save \$ in the beginning, you could be paying dearly for it in maintenance costs down the line.

Government Grants and Loans

The good news is, there are incentive programs that can help you out financially if you're looking to make this investment. While the federal government is phasing out its renewable energy grants by the end of 2011, there remain an abundance of state incentive for you to take

advantage of. Some of these incentives are based on your turbine's nameplate capacity or are performance-based, so you'll receive more money depending on how much power your turbine actually produces. Not all states offer incentives. Ask your dealer or visit dsireusa.org to find out which grants could apply to your installation.

There are other ways of saving – or even Tail earning money with your wind turbine with "net metering" for on-grid systems. Any electricity that you generate but do not use can be fed back into the grid and effectively turn your meter backwards.

Essentially, you are allowed to use any excess electricity to offset the electricity you use at other times. This can greatly reduce your electric bill, sometimes eliminating it altogether.

Don't Forget The Rate of Return

If you look at the sheer economics, you can actually see the financial benefit of investing in a turbine. Assuming you're paying about \$300/month for your electric bill, and assuming a conservative 5% annual increase in electricity prices, your turbine will pay for itself in approximately 6 years. 14 years before the estimated lifetime of a turbine. Beyond those 6 years, you will not only have paid off your turbine, but you will actually be saving money on your electricity. If a penny saved is a penny earned, you could be earning over \$150,000 in a turbine's lifetime. ➤

Years	Annual Electric Bill	Purchase Turbine	"Do Nothing" Approach
0			\$100,000.00
1	\$3,500.00	\$54,250.00	\$96,500.00
2	\$3,675.00	\$57,925.00	\$92,825.00
3	\$3,858.75	\$61,783.75	\$88,966.25
4	\$4,051.69	\$65,835.44	\$84,914.56
5	\$4,254.27	\$70,089.71	\$80,660.29
6	\$4,466.99	\$74,556.69	\$76,193.31
7	\$4,690.33	\$79,247.03	\$71,502.97
8	\$4,924.85	\$84,171.88	\$66,578.12
9	\$5,171.09	\$89,342.98	\$61,407.02
10	\$5,429.65	\$94,772.62	\$55,977.38
11	\$5,701.13	\$100,473.76	\$50,276.24
12	\$5,986.19	\$106,459.94	\$44,290.06
13	\$6,285.50	\$112,745.44	\$38,004.56
14	\$6,599.77	\$119,345.21	\$31,404.79
15	\$6,929.76	\$126,274.97	\$24,475.03
16	\$7,276.25	\$133,551.22	\$17,198.78
17	\$7,640.06	\$141,191.28	\$9,558.72
18	\$8,022.06	\$149,213.35	\$1,536.65
19	\$8,423.17	\$157,636.51	-\$6,886.51
20	\$8,844.33	\$166,480.84	-\$15,730.84

Rate increases 5% per year based on national average.
1st year payback includes \$30k grant from US Treasury & \$24,250
[25% tax bracket for accelerated 1 year depreciation] and 5% electric usage
"Do Nothing" approach assumes \$100,000 in the bank and \$300/mo. electric bill

RATE OF RETURN (ROI)

Receive Your Free Site Report Today
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Reports include your site's wind energy potential, complete installed cost and incentives available.
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THETFORD DOOR2DOOR WEATHERIZATION OUTREACH AND EXPO

Home weatherization reduces energy use, saves homeowners money, and increases home health, comfort and safety. SERG (Sustainable Energy Resource Group) is organizing a major effort with the Thetford Energy Committee to promote home weatherization in Town.

This September and October, volunteers from organizations, neighborhood groups and individuals throughout the Town will deliver energy-saving information and resources to every home in Thetford. Canvassers will hand out free compact fluorescent light bulbs and coupons for a \$150 discount off home assessments and improvements from Efficiency Vermont. They will provide homeowners with lists of contractors available to perform this work and information on financial resources to help pay for it. And they will help homeowners calculate the energy efficiency of their homes.

The Thetford Weatherization Expo, taking place Saturday, November 5th at the Thetford Academy gym, will allow interested homeowners to meet service providers and funders, attend workshops, see demonstrations of weatherization measures being installed, and talk with Thetford residents who have had this work done on their homes.

Later in the fall, we will hold an open house at the home of one or more Thetford residents whose homes have been weatherized in order to learn more about how these services have reduced energy use, saved money and improved the comfort of their homes.

To accomplish this we need the help from folks throughout Thetford. Anyone interested helping others in Thetford use less energy and save money or who want to learn more about this effort, please contact Bob Walker at 802-785-4126 or SERG@valley.net. ♻️



Photo: EarthTalk

Powering your life with energy from the sun is clean, efficient and less expensive over time than coal-powered electricity.

Local Transit Company Wins Governor's Award

by Shasta Small

Advance Transit of Wilder, VT has been chosen to receive the Governor's Award for Environmental Excellence. Governor Shumlin met with Van Chesnut, director of Advance Transit (AT), at the State House for the Award Ceremony. The award recognizes AT for the work completed throughout the past year under the Transit Capital Improvements program.

This project included the expansion of the bus storage facility and renovation of the existing administrative offices, as well as LEED Silver Certification work including a solar electric system, rain-water re-use, and comprehensive energy efficiency improvements. More efficient buses and new hybrid buses have also been added to Advance Transit's fleet of 30 buses and ADA vans. Advance Transit was nominated for the award by ReKnew Energy Systems of Hartford, VT who installed the solar electric system.

Advance Transit (AT) is a private, non-profit transit system that provides fare free transportation throughout the Upper Valley. Advance Transit carries over 800,000 passenger trips per year, making it one of the most productive transit systems in Vermont and New Hampshire. AT has been in service for over 25 years, and receives federal and local government support, as well as business and private contributions.

THE BENEFITS OF SMALL-SCALE HYDROPOWER

Cont. from page 14

run out. This leaves the small hydro operators susceptible to spot market prices and the high cost of regulations imposed by the Federal Energy Regulatory Commission (FERC). Large utilities can easily pay the costs of inspections and now are permitted to pay the small operations much less for their energy contributions. This creates a situation in which micro hydro in Vermont and elsewhere does not meet its potential. Pumping huge amounts of energy into our ailing grid is not the best solution to our energy woes, whether or not it's coming from fossil fuels or large scale renewables.

Currently, many people believe that renewables plugged into the grid are the direction we should be heading in; however, I would argue that the most viable way of ensuring energy security for our state is to localize it. We must stop exporting the energy we have and importing energy from elsewhere. Several different forms of renewable energy systems can be used to accomplish this, and hydro-electric power is one of them. Vermont has an abundance of streams and rivers whose energy can be harnessed to benefit our communities without degrading our environment. Some hydro power operations do not impede the flow of the stream or river, thus the impact is close to nothing. This method of energy production is also a proven technology.

Thus, our goal needs to be promoting government subsidies that will support small hydro. We must bring these issues to our local representatives in an effort to mobilize local energy and end our reliance on outside energy sources. If we are connected to the national grid we are using coal, oil, and other dirty fuels to produce electricity. Hydro power is just another step toward energy independence and responsible interaction with the natural world on which we depend. I love kayaking or hiking along untouched rivers and streams, but without clean energy those very same rivers and streams will be subject to the many negative effects of climate change. Will we make the right choice and embrace localized energy? My hope is that we cease acting in a way that degrades the environment, taking steps such as building micro-hydro, to ensure that our children live in world that is healthy and full of the diversity and plenitude we have enjoyed ourselves. 🌱

SOLAR MAKES A DIFFERENCE IN VT

Cont. from page 1

To smooth the sale, these new solar investors can access the low interest financing package VPIRG helps put together. Community solar programs have set up in Charlotte, Hinesburg, Shelburne, Waterbury (includes Duxbury and Moretown) and Williston including St George. Conant reports that in four months of Solar Montpelier they helped 65 families get solar hot water (there had been 13 in the previous decade). On the PV side, says Conant, they doubled installations with 40 in Waterbury and Williston in the first 4 months. They just signed up an entire county with the launch of Solar Addison County.

The Clean Energy Development Fund has certainly helped further solar installations through funding both the rebate program and the business tax credit. The business solar tax credit spurred the installation of 93 new solar systems and, since its 2003 inception, the rebate program has incentivized 2158 new systems (1741 have been installed). Finally, the solar industry too has worked to bring module prices steadily down. The module cost of about \$8-9/watt in 2002 is now about \$5/watt.

Through the gloom of climate change the sun shines brightly and is perfectly willing all day long to create electrons for our needs. Ever right at hand, it can be the solution to a huge portion of

our energy problem and we don't have to let it go to waste. More and more of us aren't. 🌞

All VT residential consumption in 2009 = 2,120,949 MWH. If 50% of this 2.1 million MWH was generated by solar, it would remove from the grid 1.06 million MWH.

GMP has 95,000 customers – if 400 have solar it's 0.42 %

HERE'S HOW "THE SOLAR ADDER" WORKS

(USING 500KWH/MO CONSUMPTION + GMP RATES)

Your house consumes 500KWH/mo and has no solar. Your bill is (500 KWH X 0.14271) \$71.35.

- **EX #1** – you install solar that generates 100KWH/mo. Bill is 500-100=400 kwh/mo and 400kwh X 0.14271 = \$57.08. Then you get the "solar adder" just for installing solar at all. It is 6¢/kwh your solar generates which is 0.06 X 100 = \$6.00.
- **EX #2** – install a system that generates more than you consume (say 700 KWH/mo) you get an even greater benefit. The bill for your consumption is \$0.00 (500 – 700 = 0.0KWH X 0.14271 = \$0.0). Then, because you have generated an extra 200KWH to grid (sort of like a power plant) you get paid for that at the commercial rate (200 X 0.13456 = \$26.91). Then, you also get the "solar adder" for every KWH you produce so that is 700KWH X 0.06 = \$42. So you pay nothing and earn \$68.91/month as if you were a little generation plant.

***customer rate is lower because costs a little less to serve a commercial customer because in general they use a bit more per customer, thus spreading the fixed costs over more kwh.*

Under the new law, all utilities now must provide a solar adder like GMP but only up to 20¢ (which is GMP's retail rate + 6¢). So, for example, VEC has a 2-tier rate system of \$0.0848 for the first 100KWH and \$0.17118 for the next KWH. VEC would pay at least \$0.02882 solar adder.

The solar adder reduces a customer's utility bills but only down to zero (including fees + effc charges). The customer must pay for meter. If the adder is 3¢ and later the utility raises their rate, the 3¢ remains.

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.*



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

A new program budget for FY 2011-2012 is currently under construction.

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:**

Thermal efficiency rating of 85% or greater

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>

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: 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:

- ARRA Home Heating System Rebate Program
- 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

NOTICE: NH Geothermal Rebate

The current offering for the geothermal program and the rebate is tied to the new construction program.

Unfortunately that program is currently oversubscribed and there isn't any additional funding through the remainder of the year.



DEALER NETWORK MAKES SOLAR AFFORDABLE



"As we look to future markets beyond Vermont, we are committed to continue innovating and growing the business here in state," said David Blittersdorf, president and CEO of AllEarth Renewables. "Homeowners and businesses are demonstrating their interest in the investment of affordable, local renewable energy. This new partnership with several strong businesses around the state will continue to help make solar possible to more Vermonters. The solar market has a bright future here."

The company's 4.2kW trackers can be installed through a Power Purchase Agreement for a low up-front cost with the option to buy the system after five years at a significantly reduced rate. A single tracker will produce an average of 490kWh of energy per month, enough to power the majority of a Vermont home.

AllEarth employs 26 full-time staff and five seasonal staff, and has manufactured and installed over 800 solar tracker systems. Their AllSun Tracker uses GPS technology to follow the sun throughout the day to boost solar energy production by over 40 percent.



The Williston-based renewable energy company and CEO was recently listed as among 25 of America's Most Promising Social Entrepreneurs of 2011 by Business Week and the company was ranked by Vermont Business Magazine as the state's fastest growing company over the last five years.

About AllEarth Renewables, Inc. www.allearthrenewables.com AllEarth Renewables is a Vermont company that specializes in the design, manufacture

and installation of complete grid-connected wind and solar renewable energy systems that lessen dependence on nuclear and fossil fuels and reduce greenhouse gas emissions. The company's goal is to provide turnkey products that harness the power of wind and sun for homes and businesses while creating sustainable, well-paying jobs.

POWER PURCHASING LOWERS THE BARRIER TO SOLAR

We know that AllSun Trackers are widely available and that now there are even more installers available. But what does that mean for your budget?

With the costs of solar panels coming down by as much as 40% over the past 24 months, while comparative fossil fuel prices steadily rise, solar energy is a more affordable option.

The AllEarth Power Purchase Agreement (PPA) allows you to pay only \$4,400 to get your own solar energy system up and running. After that, you pay AllEarth for your electricity (exactly as you would have paid your utility), and at 5 years you have the option to purchase the system. This program reduces the average out of pocket down payment from about \$15K to \$4K, making it even easier for you to go solar:

- The highlights of AllEarth PPA:
- The homeowner pays AllEarth Services (AES) \$4,400, half of which (\$2,200 is refunded at the end of the PPA).
- The homeowner agrees to purchase power from AES for at least 5 years at \$0.20/kWh. This is offset by the new net metering credit of \$0.20/kWh (base rate + adder) created by the newly enacted VT energy bill.
- After 5 years (or longer if the homeowner wishes) the system can be purchased for roughly 30% of the original price (approx \$32k), called the "fair market value", for about \$10K. After applying the \$2,200 from the original deposit it comes to a net cost of under \$8,000.
- AES is able to do this by monetizing the federal and state tax credits, and using the depreciation that's not available to homeowners.

Add this up and it means that with the PPA, for less than \$8,000 – and 5 breakeven years of electric costs – the homeowner can own an array producing 7,000+ kWh/year.

Commercial incentives for businesses are even more enticing. With a 100% bonus depreciation until Dec. 31, 2011, 30% Federal Tax Credit or Grant and 7.2% VT Business Investment Tax Credit, as much as 40% of AllSun Trackers can be paid for by incentives. VT Non Profits also get special incentives of up to \$100,000 or 50% of installation cost, making this an affordable solution for them as well.

The AllSun Tracker design gives you 40% more power for your money plus the opportunity to watch your utility meter spin backwards! With generous incentives, affordable payment plans, excellent warranties and a 30-year life span, the time to act is now.

WILLISTON, Vt., July 13, 2011 /PRNewswire/ — Williston, Vt.-based AllEarth Renewables has announced a new Vermont dealer-installer partnership, making their innovative solar tracker systems available around the state.

The dealer network expansion coincides with Vermont's new statewide solar customer benefit, enacted as part of Act 47, which assures net metered solar installations receive at least \$0.20 per kilowatt hour from utilities for the energy produced.

AllEarth Renewables, the local manufacturer and installer of the AllSun Tracker, will partner initially with four local solar installers to cover the state:

- Solar Tech, of Sutton, will serve the northeast
- ReKnew Energy Systems, of White River Junction, will serve the east-central region
- BackSpin Renewables, of Middlebury, will serve the western central region
- Integrated Solar, of Brattleboro, will serve the southern region
- AllEarth Renewables and their subcontractors, such as J.A. Morrissey, Inc. and Engineers Construction, Inc., will continue to provide installations in the northwestern region

We are a local company focused on personalized customer service with fair pricing on the highest quality components. Our home and shop are solar powered ... we are passionate about renewable energy!



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Recent legislation assures that net-metered solar installations receive \$0.20 per kWh hour from utilities for the energy produced.

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NEWPORT

How Sustainable is Your Community?

Newport. Genuine by Nature. "Genuine" refers to the people, experience, and unpretentiousness of the city. "By nature" references the beauty of the city's natural surroundings – on a lake near the mountains. Being warm, personable and real comes naturally to the people of Newport – rare qualities that flow through their blood and are ingrained in their soul.

Newport, Vermont is located just south of the Canadian border on the international Lake Memphremagog, in the Northeast Kingdom of Vermont. The Northeast Kingdom, comprising of the three northeast counties, is the most remote rural area of Vermont.

Since July 2007, when Newport received its Vermont Downtown designation, the community has been on a roll, creating and sustaining momentum, producing key results with positive impact on its community and economic development.

In 2009, Newport received Vermont's first American Institute of Architect's (AIA) Regional/Urban Design Assistance Team (R/UDAT) grant that engaged over 500 community members at town hall meetings and workshops.

In 2010, Newport used an integrated community-based approach to develop Form Based Code - the first Vermont municipality to adopt this regulation plan.

Today, Newport, Vermont is on the cusp of several major economic development tipping points:

- 2011 - Newport receives Foreign Trade Zone status
- 2011 - Canadian manufacturing firm co-locates here
- 2011 - 2012 - Vermont biotech firm re-locates here
- 2012 - 2013 - South Korean biotech firm co-locates here
- 2012 - 2013 - Senior residential resort is built
- 2013 - 2014 - Waterfront resort conference center opens
- 2013 - 2014 - Re-development of blighted block on Newport's Main St



With all of this in mind, Newport City Renaissance Corporation (NCRC), an accredited National Main Street Program®, is operating with a work plan that addresses the design, economic restructuring and promotion of the community. Woven into the work plan is improving the quality of life for the city's residents, people who work, play and visit Newport.

Members of the Design Committee and Newport's Planning Commission worked together to develop Form Based Code, a zoning regulation that honors the fabric of the city's downtown architecture. It's a positive approach, there are no 'set-backs' but there are 'build to' lines.

There are regulations for the glazing of the storefronts (80% of the street level floor on Main Street) and doorway entrances (every 36 feet). Form Based Code encourages mixed use in buildings. And if the building is over 100,000 square feet, there must be 5% of public access green space included (e.g., pocket park) on Main Street and 40% green space where a waterfront resort may be located (currently a strip-mall).

Parking spaces are regulated to no surface parking only parking below or above the building and if there is an adjacent parking building it must have retail on the ground floor.

Form Based Code can be an incentive for development in Newport's downtown because it streamlines the permitting process and thus is less costly in time and money.

Newport is currently working to secure Vermont Neighborhood status, which could also be an incentive for residential redevelopment, renovation and rehabilitation of current

buildings. This status will streamline the permitting process as well as Act 250 process.

One of the projects associated with this process is Grow A Newport City Neighborhood. A community garden has been established by the neighbors in one of the most economically challenged neighborhoods just off Main Street. The garden located in what was an extremely under utilized inner-block that was, six months ago, a haphazard, "left-over" parking area, is now a (organic compost amended) productive garden.

This is an inter-generational project with youngsters and seniors working together in the planting, growing and harvesting of vegetables; they are even growing herbs for downtown restaurants!

Healthy living also includes recreation and with Newport playing to its strengths, the Newport City Recreation Department has stepped up its programming and marketing of programs. The Department is responsible for managing Newport's major parks providing downtown Newport's greenspace. New programs include sailboat lessons on the lake, biking and cross-country skiing on the new recreation path that now connects downtown Newport with the Canadian border and the bike trail in Stanstead, Quebec.

Newport City Renaissance Corporation's partners include the VT Department of Health, Northeast Kingdom Area Agency on Aging, HealthWorks ONE, Green Mountain Farm to School, Farm Direct, Newport City Planning & Zoning, Newport City Recreation Department, Northeast Kingdom Travel & Tourism, local merchants, farmers and restaurateurs. This coalition will be working on two new projects, 'Complete Streets for Active Living' and developing and implementing Taste. Table. Newport. Fresh by Nature®.

Complete Streets addresses accessibility by walking, bicycling and motoring with a keen eye on safety and pleasant experience. It will capitalize on Form Based Code, which promotes compact incremental growth patterns, pedestrian-scaled development, increased sidewalks, increased green space, decreased travel lane width and enhanced connectivity. This plan also promotes compact incremental development (walkable growth patterns), and prescribes new walking/biking paths.

The Complete Streets project will connect the assets to solutions for real connectivity that is safe, accessible and usable for Newport's over-65 population as well as other generations.

Newport. Fresh by Nature®, funded by a USDA – Rural Development grant, will allow the Newport City Renaissance Corporation to provide the necessary outreach to local farms and restaurants located in downtown Newport and amplify cross-promotion that will allow them to enhance and expand their business and develop Newport into a hub for a fresh food network.

This project will establish Newport as a Farm to Table destination where people can eat here and visit farms. Taste. Table. Newport. Fresh by Nature® will coordinate the marketing message and marketing campaign for Newport as a farm

fresh food destination.

Newport offers a quiet beauty, friendly faces and an abundance of opportunities for outdoor adventure. In other words, a unique and genuine small town experience that residents can be proud of and visitors can be charmed by.

Today, Newport sets the table, lays out the welcome mat, and throws another log on the fire welcoming old friends and new acquaintances with the promise of an experience close to home yet far from the ordinary.

Today, Newport opens the doors and sings the praises of this geographical treasure chest that sits at the crossroads of America and Canada, straddling the border between old values and new beginnings.

Learn more about Newport, Vermont at www.discovernewportvt.com

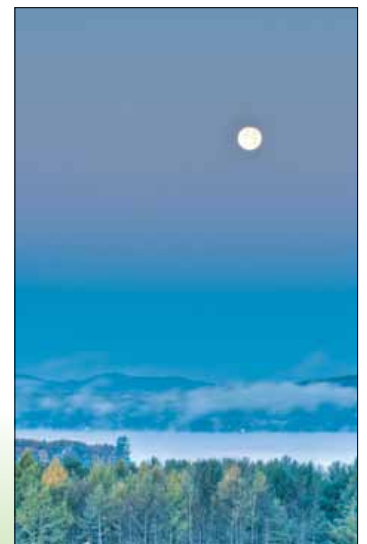
Welcome! Bienvenue!

Contact us for information for your visit to the Newport area in Vermont's Northeast Kingdom.



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NEW CERTIFICATE IN CORPORATE SUSTAINABILITY ANNOUNCED

"Become a certified sustainable change agent" is the promise of the new Certificate in Corporate Sustainability, a program of the University of New Hampshire's Whittemore School of Business, the Sustainability Academy and NH Businesses for Social Responsibility.

Launching its inaugural class October 4 - 6, 2011, the program is intended for mid to senior level executives looking to gain additional knowledge, skills and tools in corporate social responsibility (CSR), develop a cohort of peers, and grow sustainability practices within their business.

"The professional Certificate in Corporate Sustainability fills a gap that our members say has been missing for years," says Kate Luczko, interim executive director of NHBSR. "Sustainability is an integral part of how companies do business today. This program applies academic rigor with practical tools for professionals who currently work in sustainability but never had the opportunity to look at the subject from a systems perspective."

Topics cover people, profit and planet - from how to conduct materiality and stakeholder analyses to understanding how environmental trends affect the business world to employee engagement to developing a CSR report. A full agenda, instructor list and registration information can be found at www.sustainabilitycertificate.org.

After completion of the Institute, students will conduct an independent, mentor-supported workplace project. The program offers continuing education credit for professionals.

Timberland's new Vice President of CSR, Mark Newton, is a featured speaker of the conference, and Timberland is also the presenting sponsor of the Certificate program. "Timberland was built on the premise that our impact on the community around us matters - and that philosophy extends to every corner of our organization, not just one team," states Atlanta McIlwraith, Senior Community Engagement Manager at Timberland. "This certificate program is one way to ensure that the individuals who make up this brand understand the value of our values, and that they incorporate that into their work every day."

"Socially responsible business makes sense," says Tom Kelly, UNH's Chief Sustainability Officer and director of the university's Sustainability Academy. "Helping business leaders understand the full breadth of sustainability issues that affect their products, services and operations is part of our role as an educator within the business community."

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Orch Moore

photos: A. Blake Gardner;

SOLAR ORCHARD AT SHELBURNE FARMS

Sally Ballin

At Shelburne Farms, you expect to see pastures, gardens and orchards in abundance. The rolling 1,400-acre farm along Lake Champlain's shoreline is on land that has been continuously farmed since the 1760's and is a National Landmark property. So you might be startled to stumble upon the "solar orchard," just past the market garden, in what was once a pasture where sheep grazed and is now a large array of solar panels. The solar orchard was installed last September on two acres of an unused, six-acre field that is projected to annually produce 150,000 kilowatt hours of electricity. That is about 25 percent of the approximately 600,000 kilowatt hours a year that the Farm currently uses.

The solar orchard is a partnership project with Green Mountain Power, a major Vermont utility company. GMP installed the equipment, built the inverter house, and owns the power it produces which goes to the grid. The farm purchases the power at GMP's going rate but, "we know that the farm uses all of it before it can get back to Shelburne," says Marshall Webb, the Farm's Woodlands and Special Projects Manager.

The site is ideal for solar, according to Webb. It has good southern exposure, it's on a road, and it's near a three-phase power line. It's very close to The Inn where many of the Farm's visitors stay and to the Coach Barn where most events take place. "We want to produce energy right here and have people see it," Webb states, "because Shelburne Farms is committed to renewables, to pushing the envelope, and setting an example. We don't tout ourselves as a model, but we like to be in the forefront."

The project had a serendipitous beginning: The utility company happened to be looking for a place to construct a 150,000 kW solar field, and the Farm had both the perfect field and a commitment to renewable energy. Webb calls the project a "win-win" for both GMP and Shelburne Farms. Gradually, Shelburne Farms will expand the field for its own use, using the existing GMP infrastructure.

For GMP, not losing energy in the line has value too. Line loss can be significant and is reduced by distributing energy production throughout its service area. During peak usage in the summer, the solar orchard is cranking and offsets the need for the utility company to purchase expensive power on the spot market. For Shelburne Farms, the ultimate goal is to be 100 percent renewably powered by 2020, if possible.

Toward that goal, another 50 kW field adjacent to the GMP panels is planned for this fall. There's space for an additional 300 kW of panels in the field, and the Shelburne Farms portion of the orchard will grow incrementally over time. The Farm's new installation will use the existing 500 kW capacity transformer, saving on infrastructure costs—and more in mowing costs too: sheep will once again graze in that pasture among solar panels.

How's the project working out so far? Webb listed the criteria for success: It would "reduce the Farm's carbon footprint; it would have a sensible economic payback," and as a bonus, it would have "an educational value" which the Farm can share with everyone. So far, so good. ☺



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KINGSBURY MARKET GARDEN

284 Route 100 Warren, VT

Kingsbury Market Garden (284 Route 100 Warren, VT) is a unique agricultural venture. The historic farmstead on Route 100 in the Mad River Valley was conserved by the Vermont Land Trust in late 2007 and sold to the VT Foodbank (VFB) the following year. The conditions of the sale were the following: the owners would grant public access along the property to the Mad River Path, they would protect permanent riparian buffers through no till practice, and the remaining acreage would be used to produce food in an ecologically responsible manner, a portion of which would be distributed to food shelves and meal sites throughout the state of Vermont. The farm is now in its 2nd year of vegetable production. Bound by our lease with the VFB, we must provide 30,000# of produce to the



Foodbank annually. Having accomplished that, we are allowed to run our own for profit business off the farm.

Our business is twofold. We wholesale vegetables to local restaurants and stores and we manage a wonderful little farm store/bakery, right on the premises. 95% of what we sell

is either produced in our fields or in the surrounding region. Our tractors and irrigation pump run on B100 which is supplied to us by Nava Biofuels in Northfield, VT. Our hearth ovens are powered by the energy collected through

two solar trackers. Our walk-in cooler utilizes the Freeaire System which harnesses cold air from outside when the mercury drops. We have four movable greenhouses which allow us to extend the growing season by almost 5 mos. without any energy - save the sun. We have plans to build a Pain Mound System which will warm the radiant floor of



our starter house. We will soon be bringing in aged manure which will be combined with vegetable waste to produce our own compost. We put away stores of food all season so that we can cook with our own ingredients year round. And we are stocking the local food shed with a significant amount of highly nutritious calories.

Vegetables are our currency. The sun gives us power. Our waste gives us nutrients. The farm store is open Th, Fr, Sa, Su 11-6.

www.kingsburymarketgarden.com

GMC GREEN BUILDING INFORMATION SHEET FOR VISITORS

by Pete Antos-Ketcham, GMC Facilities Manager

GMC has certainly done their homework - GET is so impressed to learn about all they are doing. We can all benefit hugely from their example!

Type of Building: 5500sf (includes 1500 sf of old Herrick Building) Post and Beam Visitor Center, built in 2009 by Jeff Schoellkopf, Architect/Designer and JA Morrissey, Builder, with main contributors to the Post and Beam effort: Erik and Laurel Tobiason of Colby and Tobiason of Woodstock, Mike Elder of JA Morrissey of Williston, and Duncan Kier of Liberty Head Post and Beam in Huntington. Construction Cost: 1.8 million.

Fuel Type: High Efficiency Wood Boiler. Froling Turbo 3000 - 177,000 BTU cord wood boiler. Why cord wood and not pellets? Cord wood has a lower embodied energy/cord (less processing) and is available to GMC at little to no cost. Our current supply of firewood comes from GMC's Meltzer property in Lowell where we recently conducted a sustainable timber harvest as part of our State of Vermont Forest Management Plan (This plan allows the property to be in the Current Use Program and thereby reduces the property tax burden).

Annual Heating Fuel Consumption: 8 cords of firewood over 12 mos of domestic hot water heating and space heating - includes heating 1500sf of poorly insulated building.

Electricity Use: 35,000kWh/year. Our electricity covers lights, computers systems (servers), air conditioning, refrigeration, a work shop, our circulators and fans for the heating and cooling system, etc. We are open 7 days a week from 9-5 from Memorial Day through Columbus Day and M-F from 10-5 for the winter and spring.

Window Brand: Accurate Dorwin. Triple paned Argon gas filled. Our windows have a low U Factor (the lower the U-factor, the better) of .17

to .26 depending on whether they are designed to allow more passive solar energy or not. In the case of our building we utilized windows that shade sun on the south side of the meeting hall but units that allow passive solar on the western exposure of the Marvin B. Gameroff Hiker Information Center.

Insulation Type: Spray Foam Closed Cell. R 35 walls and R 40 Roof. Roof is made up of Structural Insulated Panels.

Building Feature Details:

Composting toilet: Clivus Multrum M-32 Compost Reactor with three dry toilet stools. We reduce our waste water by using a dry composting toilet system. Our minimal amounts of gray water go in to a conventional septic. Our Clivus Multrum system saves thousands of gallons of water a year.

Energy Star Appliances: Sun Frost 16 Cubic Foot Refrigerator/Freezer (most energy efficient refrigerator available today). Bosch Energy Star Dishwasher. Grid Tied PV. 2kW roof mounted array rated to produce 2000 kWh/year. Three AllSun Trackers each rated at 4kW

produce 12,000kWh a year. Given the excellent nature of our site for solar, our trackers could produce as high as 6kW per tracker and thus give us 18,000kWh/yr. Our ultimate goal is to be electrically neutral - producing as much as we use - and we hope to achieve this through three additional trackers planned for a fall 2011 installation.

Heat recovery ventilation: This unit helps keep our tight building's air clean and filtered while preventing heat loss.

All wood was locally and sustainably harvested in Bristol and Ripton Vermont.

Non-Toxic Products: Both in building and for cleaning purposes.

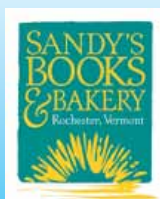
High Efficiency Lighting: Not only are all lights compact fluorescent, but many of them are on occupancy sensors (turns the lights off when no one is present) or on timers (outside lights) to reduce electrical demand. We have also just begun to replace our compact fluorescent bulbs with high efficiency LED bulbs to further reduce our lighting demand. Every effort was made to provide natural daylighting, reducing electric lighting.

Future Project:

Planned installation of second wood gasification boiler at our seasonal housing facility. This unit will cover the high demand for hot water in the summer and space heating in the winter. We plan to experiment with a clothes dryer that can use the hot water heat as the energy source rather than propane.

For questions on what GMC is doing, email Pete Antos-Ketcham.

pantosketcham@greenmountainclub.org



SEASONED BOOKS

Sandy's Books & Bakery is a little place with a lot of heart and soul. Located in scenic Rochester village along Route 100, the combination bookstore and bakery hot spot has become a gathering place for locals and travelers alike. Sandy's has been operating for about 10 years, growing from a book only enterprise to include the food and agricultural aspects they have today. It's a quirky place with reggae music in the

background and a "May All Be Fed" proclamation over the kitchen door. It's downright comfortable. The food is all made from scratch, a fusion of rustic and nouveau, with lots of local producers involved. The book part of the business specializes in materials on Yankee ingenuity, rural enterprise, renewable energy and sustainable agriculture. The values purported in such books are realized throughout the business such as the organic garden out back to supply ingredients for the kitchen. Owners Sandy Lincoln and Larry Plesent live in an off grid PV system, hand-built house up in the nearby hills.



Tom & Mary Evslin, Stowe.
13kW grid tied PV installed fall 2007, offsetting 95% of their electric bill. They use a geo-thermal heating system as part of this electric load.



David & Susan Johnson, Duxbury.
5.4kW grid tied PV with Sunny Island battery backup system. They produce 521kWh/month on average.



A SOLAR STORY

Late last April, here at Yestermorrow we took a huge step towards our goal of producing renewable energy on campus with the installation of a 28kW photovoltaic array. It wasn't just a token demonstration project, this was a statement—seven tracking units each measuring 22 feet wide and 17 feet tall right out in front of our main building on Route 100. One year later, we were curious to see how the performance of the PVs matched up with our projections. The AllSun Trackers which we used on the project are designed to change their angle and their orientation throughout the day so they are always directly facing the sun. This means they produce up to 40% more energy than a fixed panel. Each of our trackers is projected to produce 5,640 kilowatt hours per year. Multiply that times seven units, and our anticipated production is 39,480 kWh per year. The next question inevitably is... "so, how much did they really produce??" Between April 20, 2010 when the trackers went online, and April 20, 2011 they pumped out 37,367 kWh – pretty



close to our original projections! (You can check out the production day by day on the AER website at: <http://www.allearthrenewables.com/energy-production-report/detail/163>). This is enough electricity to supply 74% of the demand for our main building (just over 50,000 kWh last year).

So what's next? This year we're hoping for more sunny days :) but we're also looking hard

at what we can do to reduce our electricity loads—remember, conservation always comes before efficiency and renewables. We're working with folks from Efficiency Vermont and the Mad River Valley Localvolts to install a TED

energy monitor so we can track our consumption patterns more closely and identify trends over time. We're also using a Kill-a-

watt meter to identify energy-sucking appliances and tools so we can plan future upgrades. And thanks to great state incentives, we're also testing out some new LED light bulbs around different parts of the campus and looking into occupancy and day lighting sensors. **▶**



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I am sitting at my desk on a perfect high summer eve. Everywhere there are people. At the South end of the property a wedding party of a hundred or more are watching a first dance and celebrating the union of two families with the hope that love will nourish and last. At the North end, where the nineteenth century horse barn has evolved into a twenty-first century wood-fired bakery, another hundred or more people gather for simple pizza made with near-by ingredients. Out on the field kids run and shout and play and come when called because the calling is for food and drink that hopes to keep a promise; a promise that it's not only a joy to eat, but too, that it's nutritious, and that it's making was not a taking from the world or the generations that will follow.

The truth is, providing for so many people's needs on any given day takes a great deal of energy. The lights, refrigeration, and the many machines necessary in a modern competitive economy require about 100,000kW/yr. at Lareau Farm. Historically 1/3rd of that electricity came from nuclear, 1/3rd from Hydro Quebec, and 1/3rd from fossil fuels. This energy mix is unstable and in conflict with both our economy and our ecology.

Last August, after a great deal of reflection, for the propriety of the choice is not wholly self-evident, we chose to install twelve AllEarth Renewables solar trackers on 1.5 acres of our North hay field. We now produce a little bit less hay but about 80% of the farm's total energy requirements.

I do not know if this technology is the ultimate solution, I suspect it is not, but I believe it is an important step toward a necessary realization that our modern lives, with all of it's many wonders and benefits, will not prevail unless we move toward more ecologically responsible forms of energy.

SUNSHINE VALLEY BERRY FARM

Sunshine Valley Berry Farm is a 10 acre, certified organic berry farm, located on Rte 100 in Rochester, VT. Owned and operated by Rob Meadows and Patricia Rydle, it was established in 1999 and has been proudly certified organic since 2001. They raise blueberries (2500+ bushes), raspberries (3 acres), blackberries (1 acre), and sour cherries (1 acre). This Pick-Your-Own (PYO) enterprise offers healthy food on a local basis. They sell a small quantity of pre-picked berries out of our farm store, and weekly at the Waitsfield Farmers Market.

Rob and Patricia see their Pick-Your-Own farm as a community event and resource. The berries are not merely a food, but also a sense of enhancing the community experience in Rochester, as well as reaching out to draw others into the Rochester community. Keeping the farm organic is an environmentally healthy choice on many levels - for the land, for the berries that grow on it, for the people who pick and eat the berries, and for the branch of the White River that flows on their land, bordering the farm, thereby affecting many environs, far beyond the scope of their 10 acres, and beyond Rochester itself. 802-767-3989 **▶**



MAD RIVER VALLEY ENERGY PROJECTS

- Mad River Valley Energy Network is currently exploring the option of a 150kW community solar farm. Info: Peter Boynton (pboynton@madriver.com) or Gaelan Brown (gaelanb@gmail.com)
- \$225k+ Energy Efficiency & Conservation Block Grant (EECBG) funds providing energy efficiency retrofits to MRV towns & schools
- Waitsfield is currently working on developing a Property Assessed Clean Energy (PACE) Program
- Received EECBG funds to set-up program. Vote passed at Town Meeting 2011 to explore the concept.
- The Mad River Valley's Community Biomass - a partner project of the University of Vermont (UVM), Vermont Family Forests (VFF), and Northern Forest Alliance (NFA), is a multi-town effort to increase the sustainability of the MRV's local wood supply, as part of an overall goal of achieving energy independence in heating and power generation.
- Compost Power Network is based upon local experimentation at utilizing decomposing wood chips to heat hot water as a source for heating their home. (Jean Pain Method. see Green Energy Times Nov. 5, 2010 & Feb 15, 2011 "Shed, Don't Dread")
- Woodchip Boiler installed at Fayston Town Offices
- Mad River Valley Energy Wiki is a community created "living document" developed to serve as the go-to reference regarding energy information in the Mad River Valley

- Info contributed by Joshua Schwartz, Mad River Valley Planning District **▶**

CROSSETT BROOK MIDDLE SCHOOL

Crossett Brook Middle School (Waterbury/Duxbury) was among 10 schools around the state selected to receive \$50,000 through the Solar on Schools grant program for a 14.85 kW grid-tie solar installation. Students will learn to interpret, synthesize and manipulate these data to increase their understanding of energy production, usage and conservation from the monitor that streams live data. With this knowledge, students will be prepared better than ever to enter our world and shape it in ways that address our most pressing issues.

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GREEN MOUNTAIN COFFEE ROASTERS



Green Mountain Coffee Roasters has a long history of trying to reduce its energy use. A partnership with the State of VT Clean Energy Development fund and Green Mountain Power Corp. saw a 100, 100-watt solar array installed on our distribution center. This demonstration project produces about half the power the building needs. **▶**

EARTHTALK® FROM THE EDITORS OF E/THE ENVIRONMENTAL MAGAZINE

Dear EarthTalk: I recently saw a reference to "Enertia houses" that require little in the way of external sources for heating or cooling. Do you have any information on this housing design?

—Alan Marshfield, via e-mail

Enertia is a brand name for homes designed and sold in kits by North Carolina-based Enertia Building Systems (EBS). The idea essentially marries the concepts of geothermal and passive solar heating/cooling into what amounts to a highly energy efficient hybrid system. Architectural inventor Michael Sykes coined the term "Enertia" in the 1980s to describe the innovative homes he was designing that would store solar and geothermal energy and make use of it for most if not all heating and cooling needs.

Under such a system, solid wood walls replace siding, framing, insulation and paneling, while an air flow channel—or "envelope"—runs around the building inside the walls, creating what Sykes terms a miniature biosphere. Inside the envelope, solar heated air circulates, pumping and boosting geothermal energy from beneath the house and storing it within the wood mass of the walls, where it is doled out gradually.

By harnessing the properties of thermal inertia—the ability of materials to store heat and give it off slowly—an "Enertia" house maintains a relatively fixed and comfortable temperature throughout the warmer day (when solar heat is collected and stored) and cooler night (when the wood walls give off heat to keep things toasty as the mercury dips).

The heart of the system is a south-facing sun space within the envelope that is dominated by windows and which therefore soaks up lots of solar energy, filling the house's wood walls with thermal energy that in turn radiates into the primary living space. The entire house functions like an electric heat pump—moving warm and cool air around to accommodate the comfort needs of the occupants. It works even throughout the seasonal changes of the year—with minimal to no fossil fuels consumed or pollution generated.

In one Enertia house in North Carolina, the only power bill the owners typically pay is \$35/month for electricity. They also have a back-up in-floor radiant heating system powered by natural gas for long cloudy stretches or unusually cold weather. Gas bills for heat typically total \$150 for the year, meaning the owners' total annual outlay for heating, cooling and electricity is less than \$600—some \$1,000 less than traditional homes in the same zip code are paying, according to data from the U.S. Department of Energy.

EBS markets several different designs for its Enertia houses, but all share the basic premise of primary



Photo: EarthTalk

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interior living space heated and cooled by air channeled in from a south-facing "buffer zone" envelope and from below grade. Smaller houses in the line top out at about 2,000 square feet over two floors of living space, while larger ones encompass some 4,000 square feet of living space over three floors. Depending on the model, you could spend anywhere from \$66,000 to \$292,000 for a complete plan and building materials kit. The rest—including the selection and cost of the land and the labor to build the house—is up to you.

CONTACTS: Enertia Building Systems, www.enertia.com.

SEND YOUR ENVIRONMENTAL QUESTIONS TO: EarthTalk®, P.O. Box 5098, Westport, CT 06881; earthtalk@emagazine.com. Read past columns at: www.emagazine.com/earthtalk/archives.php. EarthTalk® is now a book! Details and order information at: www.emagazine.com/earthtalkbook. ♻️

CHELSEA GREEN: BOOK REVIEWS

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 Hemerway
- 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
- 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.

NEW REVIEWS:

Smart Growth - From Sprawl to Sustainability

by Jon Reeds

People who live in compact traditional towns have far smaller environmental footprints than those who live in sprawling suburbs. Is urban sprawl inevitable? Are there better ways of getting about? And can people ever find ways of treating it with respect?

This book argues that the UK should look for the answer to America – that our country embraced urban sprawl and car dependency on a grand scale. There is much we can learn from its 'Smart Growth' movement, which is successfully arguing for compact cities, rail-based transit systems and restoring communities decayed by decades of self-centred suburban life.

Part 1 & 2 show how urban sprawl is unsustainable in an age of climate change and peak oil, including an Unsustainable Communities plan and Climate change and portrays America as the land of dreams. Part 3 takes the reader to where we need to be: Smart growth planning; Smart Growth transport; A Smart Growth vision.

Grow Your Food for Free (Well Almost)

by Dave Hamilton

This book is downright inspirational. In our endeavor to live more sustainable lives in an economically challenged time, the information that the author ingeniously details about how to garden on a budget and incorporating recycling into the plan of attack is brilliant, practical, creative and a joy to read with every turn of the page and will help to line yourself up for a future that reduces your expenditures to feed yourself and your family.



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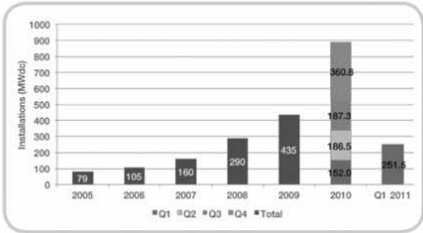
According to a Recent Report Published by the Solar Energy Industry Association (SEIA) in the US.

Great news, right? Right. Many of us have been waiting to hear such good news for a long time. But, so what? What does this mean for your property, business or job prospects? How can you use this information to your advantage?

Here are a few important takeaways from the report.

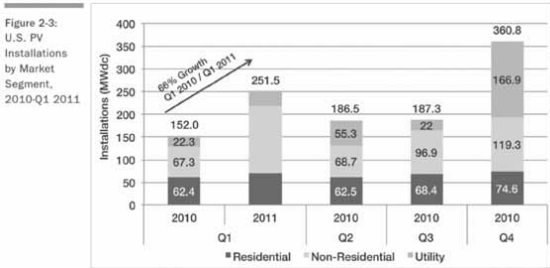
1) If you're a consumer, you can have 100% confidence that the technology works and it sounds. If you're in a state that have strong solar incentives it'll likely be a found investment and you can either own or lease the system. Always, make sure to find references for solar contractors. Some good site includes, Find Solar and Get Solar.

Figure 1-1: U.S. PV Installations, 2005-Q1 2011



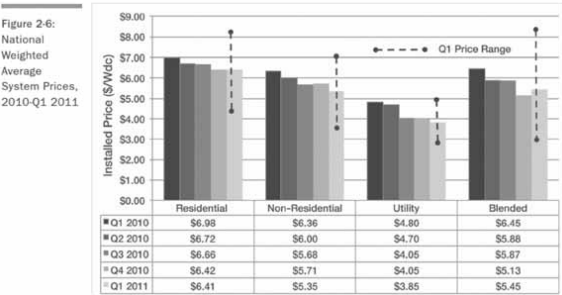
to another state it will be more likely to have companies quickly expand into your state because they're familiar with legal structure.

3. Prices are plunging, and investors don't like it. A great article on Alternative Energy Stocks "Wall Street's Irrational, Dangerous Hated of Solar Stocks" describes how although solar has been the highlight of the world economy in the past few years in terms of growth. Why? It's very competitive industry (good for installers and customers) and there is still a huge amount of supply, much more than demand. The fact that investors are weary of solar manufacturers because of competition is a good thing for you, the installer and the customer.



4. More Political Support. The report highlights that the number of green jobs is increasing drastically, which is increasing the amount of political support solar is receiving. A virtuous cycle for

sure. For example, in Pennsylvania there is are the same number of coal miners and solar installers -7,000 to be exact. However, solar installers are increasing while coal miners continue to die off. The benefit of solar, like wind, is that it is very public, and (Politicians love to visit installations). If you're an installer, invite your local representative to an installation and get much needed PR for all of us.



5. Even growth across segments. Just from skimming the executive summary of the report you can see that there is steadily and equal growth among utility scale, commercial and residential solar projects. Good news for entrepreneurs and contractors who are you looking to enter the industry in residential or light commercial or existing business looking to scale, there is demand in each segment.

6. Regional Activity. A negative, or positive depending upon where you live. Except for Colorado, the majority of solar activity and installations is happening on the west and east coast not the middle of the country. If you're a installer or consumer, your opportunity in solar will depend on if you're in a good region or not. If you're a politician in one of these state, this could be good news for you!

7. HUGE opportunity still exists for businesses, property owners, and politicians. The one item that struck me about the report, is that industry is growing so quickly because it was SO SMALL before. Also, if you look at the share of the global market, the US is still far under 20%.

Chris Williams works with HeatSpring Learning Institute Chris can be reached directly at cwilliams@heatspring.com

All Images Courtesy Solar Energy Industry Association 2010 US Solar Market Insight Report

MANY THANKS TO SOLARFEST FOR OUR FACTOIDS THROUGHOUT OUR PUBLICATION.

BUILDING GREEN

By Peter Nazarenko, Owner - Planet Hardwood - Saint George, VT

The definition of "green" is different from person to person, but eco-friendly building materials are pretty easy to identify. The material should satisfy at least two cornerstones of environmental responsibility: renewable and biodegradable. Remarkably, in your average home, wood is the only qualifier (or more broadly, anything plant-based). When grown in a responsible and sustainable manner, wood, cork, and bamboo pretty much cover all the bases. Cork and bamboo are easier to evaluate since they have a limited growing range and are not bio-diverse. Wood is more difficult as forests yielding species appropriate for hardwood flooring occur all over the world, with different criteria constitut-

ing responsible silviculture. The farther from home, the more one has to depend on third party certification to verify an environmental pedigree. The most widely accepted and respected criteria for wood comes from a world-wide non-profit organization called the Forest Stewardship Council (FSC for short). To quote their web site (fsc.org): FSC was "established in 1993 as a response to concerns over global deforestation... and through democratic process effects solutions to the pressures facing the world's forests and forest-dependent communities." Wood deserves the extra scrutiny since healthy forests are necessary for human survival.

What is often left out of the conversation is nearly every other element of the building, especially by comparison to wood (or bamboo, cork etc.), qualifies as an environmental disaster. For instance, the world's yearly cement production of 1.6 billion tons accounts for about 7% of the global loading of carbon dioxide into the atmosphere. Portland cement, the principal hydraulic cement in use today, is not only one of the most energy-

intensive materials of construction but also is responsible for a large amount of greenhouse gases.

Anything plastic is deleterious to the environment in every respect from cradle to grave and beyond. Vinyl, plastic laminate, PVC pipe are common plastics that will leach poisons in landfills for centuries beyond their lifespan. Plastic residue now outweighs plankton in our oceans.

Glass, any metal, quarried and mined material... they are not renewable or bio-degradable, they consume an enormous amount of energy to extract, fabricate, and transport, they leave a toxic trail in production, and are rarely recycled.

By contrast, wood is: non-toxic; leaves a small footprint in production and transportation; has a long life cycle with low maintenance; sequesters carbon dioxide; and contributes to an environment that does not harbor or promote potential allergens. Every part of the tree is used... there is no "waste" in production. And oh by the way... it's renewable and bio-degradable. Wood is the most

widely used eco-friendly building material with nearly 40% of industrial demand now satisfied by plantations. Plantation-grown does not necessarily translate to earth-friendly especially if the plantation requires unhealthy herbicides and pesticides, and/or if it replaced a diverse forest. Competing land use, like pasture and agriculture, account for more than 90% of forest degradation around the world. The rest can be attributed to development and illegal logging. The UN's Food and Agriculture Organization's (FAO) reports consistently that over half the world's harvest of wood is burned for fuel.

Since green has become popular in mainstream culture, many claims are made including so-called "improvements" to environmentally devastating products, thereby putting them in the company of legitimate eco-friendly materials. Renewable, biodegradable, non-toxic, low energy consumption, and durability. these are the cornerstones of eco-friendly building materials, and wood is the best example. ♻️

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THE MARINA RESTAURANT; BIGGER, BETTER, MORE EFFICIENT

Paul Malko - Chief Engineer, Foard Panel Inc.

In July, 2010 the popular Marina Restaurant in Brattleboro, Vermont was destroyed by fire. Beyond losing a popular gathering place, the Brattleboro community suddenly lost 40 jobs. Dennis Smith, the owner, knew the Marina Restaurant had to be rebuilt and reopened this summer.

winter had to be greatly reduced for the business plan to work.

The goal was to create a new building on the old site with more seating, more flexibility for events, cost-effective year-round operation, greater kitchen space, and a design that would provide the casual and comfortable atmosphere that Brattleboro deserved. Predictably, this challenge had to be met on a very modest budget.

Dennis had built and rebuilt enough buildings to understand the task at hand was aesthetically and technically unique so he assembled a team of professionals to get the ball rolling.



The 2nd floor dining area with its wood roof structure.

The old Marina building was so expensive to heat, the restaurant was only operated nine months a year. Dennis was confident that Windham County, VT and Cheshire County, NH would provide the business to run the restaurant year-round, but the energy consumption over the



The timber roof structure covered with Foard Panel SIPs during construction.

Bryan Louisel (Bryan Louisel Design, Brattleboro, VT) was the architect that designed the new building. Foard Panel (Chesterfield, NH), our company, was hired to provide the structure and building envelope from design through to installation. Bob Stevens (Stevens and Associates, Brattleboro, VT) and Annette Dey (Annette Dey Engineering, Walpole, NH) handled the civil and structural engineering for the project with Bob focusing on the site work, flood protection, and foundation and Annette handling everything above the ground floor level.

Because of the location of the old building right next to the West River, we couldn't increase the footprint of the foundation. This fact combined with the amount of seating needed, required that the dining room grow vertically to include a second story. This created another challenge, public buildings, like restaurants, that have more than a certain square footage on the 2nd floor, an elevator is required. The budget could never handle an elevator. The only alternative was to make the 1st floor larger without increasing the foundation size. The solution was to cantilever 8 feet of the building beyond the foundation, over the West River.

For cost and environmental reasons, the building has a wood structure. Cantilevering a 2 story building beyond the foundation with a wood structure was certainly a challenge. Fortunately, with great effort by the engineers, Bob and Annette, and a tremendous amount of 3D modeling by Foard, we came up with a solution that would work to support the building and resist the high winds common to the Connecticut River valley.

The preferred design for the main roof included a full cathedral ceiling, a large cupola, and a full hip design over the dining room. Again we relied primarily on wood for the roof structure,

even though it carries high snow loads across a 48 foot by 48 foot clear span. By thinking outside the box, we developed a truss & hip rafter design that used off-the-shelf engineered lumber. The black spruce glulam beams provided by Nordic Engineered Wood Products were attractive enough to be left unfinished.

The wall and roof SIPs (structural insulated panels) from Foard Panel all have solid polystyrene foam cores and have a bare minimum thermal bridges through the insulation. Even the structural headers above the windows and doors are thermal bridge free. Because of the required energy performance, Vermont energy code was only the starting point for the energy engineering. All of the SIP joints were injected with foam within the panel and then taped on the interior side to ensure the air sealing was far beyond code minimums. While polystyrene isn't as "green" a material as wood is, it's pretty good for a synthetic material. The embodied energy and CO2 emissions of manufacturing the SIPs will be completely offset by heating fuel savings in less than 4 years.

A high performance envelope combined with hot-water radiant floors, modulating/condensing boilers, and energy recovery ventilators ensures that not only will The Marina be able to stay open and comfortable all year, but it will do so while consuming less energy in 12 months than the old, smaller building did during its 9 month season. The cook-tops and ovens will burn more gas than the boilers do, even on the coldest winter days.

Everyone involved worked hard to make this project happen so fast. The "new" Marina opened almost exactly one year after the "old" Marina burned down. The design and engineering were done in the fall and early winter, the foundation was completed just before winter prevented concrete from being poured, and the structure



Bar picture: The Marina Bar, overlooking the West River and Harris Hill.

and SIPs were built while West River lay deeply frozen below. After Foard had the structure and envelope up, Bryan and Dennis led a crew of dozens of local tradesmen to finish and fit-out the building in record time.

The Marina opened on July 1st this year and has remained very busy all summer. Rumor has it that even the slowest weeks this summer have still served more people than the best weeks the "old" Marina ever had. There is still minor construction work going on throughout the summer, but the restaurant is open, doing a good business, and can continue sustainably for many, many years. All of the old staff are back plus some new faces and there are as many new guests as there are returning guests. 🌱

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SUSTAINABILITY, HIGH PERFORMANCE AND STYLE

Tom Moore, Owner of Tom Moore Builder, Inc., has long embraced the Green Building movement, recognizing sustainability and high performance as both the wave of the future and the right thing to do. So when he and his wife Deb decided to build their new home on the family's



land in northern Vermont, the project quickly focused on building the greenest home possible.

Two years later, the finished product is a beautiful, 2-bedroom home, built largely from local materials, that has received a HERS rating (Home Energy Rating System) of four, 2nd-lowest ever recorded in VT - and will also receive a LEED silver certification. The home's design is tasteful and distinctive with style and personality.

Another objective was to build a home appropriately scaled for the environment - everything essential, but in a smaller package. Effectively, the dual-usage rooms allow the couple to move comfortably from their 4-bedroom home to this efficient 2-bedroom layout.

An obvious key ingredient to any green home is the energy efficiency achieved through the structure's envelope, starting with the foundation with an R-25 value. "ICFs (insulated concrete forms) are the most cost-effective way to build foundation walls..." Moore states.

The basement slab is R-16, being insulated with two layers of 2" EPS foam, followed by a 6-mil poly vapor barrier. The second layer of EPS protects the poly and is sealed to the ICF walls.

One of the truly unique features, which helps give the home the high HERS rating is the double wall framing design, resulting in a final 13" thick shell. Using two separate applications of soy-based spray foam, the greenest of the spray foam products, the final result is a shell that keeps the quiet home not only toasty in winter, but also cool in the summer.

Moore chose high-efficiency triple-glazed Pella windows with between-pane shades. The thicker walls allowed Moore to include bevelled window openings and wide sills of recycled granite, which absorb the heat coming through the window.

Other green features include a Venmar heat exchange system, for a controlled fresh air system, high-efficiency LED lighting and appliances, European-style radiator units and a gas fireplace in the living room.

The site was carefully planned for solar gain, as well as the cooling breezes that move through Nebraska Notch. As a result of that and a large south-facing Otter Creek awning, the home relies on "natural ventilation," no air conditioning. Then, of course, the high-efficiency, super-thick wall system, 2" roof overhangs, plus two roof-mounted flat-panel solar collectors that will supply at least half the home's hot water demand.

High-efficiency wall-mounted Buderus propane boiler, being divided into five different heat zones to curb usage promotes efficiency, in combination with the heat recovery unit. On the roof, 367kW photovoltaic panels, which supply a majority of the home's electricity needs, along with a generator and a four-battery backup system to supply electricity, "you can go several days without power, if necessary."

This home is "totally integrated," Moore explained. "That means you not only build the home, you build everything in it. The bedroom sets, the built-in closets, the mirrors, the stairways, the kitchen," right down to Moore's distinctive inlays, in the form of a maple leaf using tiger maple, "one of our trademarks," says Moore. The home also features locally crafted iron railings, and reused materials that Tom had saved or



purchased from local salvage companies.

As an advocate of green building and sustainable practices, the ceilings, floors and trim are all from the wood from his land or the local area: ash wall and ceiling

paneling, pine and maple wall paneling, wide pine flooring, soft maple ceilings, cherry and tiger maple bedroom furniture, custom made by Tom Moore Builder's cabinet shop, and book-matched tiger maple inlaid kitchen cabinetry. All cabinetry and furniture for the home was built by master cabinetmaker Clark Sargent and Tom's son Lincoln Moore.

Now that Moore's new home is completed, he hopes it can help lead Vermont in the right direction for building in the future. The creativity and high performance of this home, that reaches far beyond just building green, sets a high standard for the quality of construction needed to achieve the sustainable future Vermont is striving for.

Tom Moore is certified as a Green Professional, Graduate Remodeler, Green Builder, Aging-in-Place Professional, and is a Registered Vermont Builder, through the HBRA.

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NEWFANE COURTHOUSE SPRAY FOAM

Superior Spray Foam Company, Bath, NH recently completed a weatherization project for the historic Windham County Courthouse in Newfane, VT. This project was made possible through an Energy Efficiency and Conservation Block Grant via the American Recovery and Reinvestment Act of 2009, which was received and administered by the Windham Regional Commission (WRC).

Retrofits included insulation and air sealing of the attic space as well as the foundation, weatherization of windows and doors and installing energy efficient electrical fixtures:

- Removed the blown-in fiberglass insulation from the attic.
- Sprayfoamed closed-cell foam onto the attic floor and then blew in more cellulose over the foam to achieve a total factor of R-50.
- Crawl space was completely spray foamed, including the stone foundations - from the sub-floor down to the vapor barrier that he installed, using closed cell foam to create an airtight envelope with a factor of R-21.
- Incandescent Lights were replaced with CFL's and the florescent lights were



changed to T-8's.

Russell Haney, the company's owner said that he "is proud to have been affiliated with the preservation of the integrity of such a grand landmark." Kate McCarthy, EECBG Project Coordinator for the WRC, states: "In our region of southeastern Vermont, many of the buildings in use every day are historic buildings that contribute to the fabric of Village centers. Through weatherization, we have been able to help our region's towns to use these buildings more efficiently and more affordably, which will make it possible to keep these buildings as centers of their communities long into the future. The ARRA funds have made this possible."

Superior Spray Foam Company is located in Bath, NH. (603)728-7880 www.superiorsprayfoam.com

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RIM JOIST AIR SEALING AND INSULATION

Convection is the single largest contributor to heat loss in conventionally designed and constructed residential buildings. This convective cycle is caused by the stack, or chimney, effect. Warm moist air leaves the upper portions of the building through holes in the envelope which causes a pressure change in the building which in turn draws cool dry air to enter the lower portions of the building to take its place. The rate at which this happens is measured in air changes per hour.

Too many air changes per hour mean that the building is not as efficient as it could be and this can be improved through air sealing. Too few air changes per hour leads to poor indoor air quality and this can be remedied with mechanical ventilation. It is important to get the balance between these two ideals (energy efficiency and adequate ventilation) correct. This balance point is 0.35 air changes per hour and can be determined by conducting a blower door test.

The amount of air infiltration in most residential buildings is higher than 0.35 air changes per hour. If the home has a basement and/or crawl space air sealing the rim joist is a good way to reduce the amount of air infiltration. This article describes two methods that require professionals to do the work and one that homeowners can do themselves. I've also included what I consider to be the pros and cons of each technique.

Professional Installation

Two-part Spray Foam

Pros:

- It has an R-value of 5-7 per inch, depending on the type of foam, so it can be used to maximize the insulation in a closed cavity.
- It acts as an air sealer and insulator.
- The installation process is relatively quick.

Cons:

- It outgases as it cures. Different manufacturers use different formulas to create their foam which in turn outgases at different rates as the chemical reaction takes place and introduce various chemicals into the air both inside and outside of the building.
- It can pull away from the surfaces onto which it is applied which can allow moisture vapor to get into the cavity and condense.
- It cannot be applied to cover more than six electrical wires. There are three wires in a piece of insulated Romex and if there are more than two pieces side by side the wires can heat up to the point of causing a fire if they are covered with spray foam.

Dense Pack Cellulose

Pros:

- It acts as an air sealer and insulator.
- It is made from shredded paper (usually recycled or over issue newspaper and

paperback books) treated with a borate solution so it is insect and fire resistant.

- When cellulose comes into contact with an open flame it smolders instead of melts.
- There is no curing process so it doesn't outgas. Some people have chemical sensitivities to the petroleum based inks used in the printing process so they need to make sure they don't come into contact with the product before it gets covered up.

Cons:

- It has an R-value of 3.7 per inch, so it requires a deeper cavity to achieve the insulation level of two-part spray foam.
- If the product is not installed at the proper density, it will settle which leaves gaps, which means it's not as effective.
- The preparation time necessary to create cavities that can be filled means that the job takes a little longer.

Homeowner or Professional Installation


Foam blocks sealed in place with one-part spray foam.

Pros:

- The products and tools to install it are readily available at most hardware stores and/or building suppliers.
- It doesn't require special training although attention to detail is important.
- It can be done as time and finances allow.

Cons:

- The one-part foam used to seal the edges of the blocks has a lower R-value per inch.
- The one-part foam needs to be installed carefully so there are no gaps to allow air to come in or moisture vapor to be trapped.
- Time consuming.

These three methods are all viable means of air sealing and insulating rim joists. It is up to the installer (whether it be a professional or a homeowner) to decide which is the most appropriate to use for a particular situation and that it is done correctly. 

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THE MISSING ELEMENT IN ALL ENERGY AUDITS

May 17, 2011, by John Unger Murphy

The missing element in all energy audits continues to be the lack of an Energy Use Goal of any kind, ZEB being the best energy use goal for planning every project.

These energy audits are focused on short term return on investment without any energy use goals, except the general goal of some reduction on energy use. There is a note about savings increasing as the cost of energy goes up. Any 8-10% savings will be swallowed up by even a small increase in the cost of energy. So, although the return on investment looks good on paper, the reality of finite financial means coupled with increased cost of energy leaves the owner with little short term and no long term change in their financial stability. As soon as the cost of fuel goes up they are strapped to pay for it. So their reality is "I just invested to have this work done, I'm better off than I would have been, but heat is something I have to pay for and the recent 30% increase in the cost of heating leaves me strapped to pay it. What do I do now? Have another energy audit to see what is the next best return on investment?"

Note that within the 1st couple of sentences

of many energy audits there is a statement the shows the key driving force "someone is currently providing cash incentives". The energy audits seem to be focused on what minimum will get the incentives, not what will achieve an energy use goal. No client was asked what energy use goal they want to achieve, ZEB being an example of an energy use goal. All current energy audit training and field practice leaves the client separated from participating in any way that would establish their energy use goal as a foundation for the energy audit. How much energy use reduction is achieved by energy audit proposals is totally up to what the auditor seeks to "sell" the client as work worth doing. I guess the average decrease in energy use as a result of work proposed in energy audits is between 8% & 20%. There is an effort to get to 35% by giving some extra incentive \$ if it is achieved. So, if an existing home or building has a HERS Index of 350 and the improvements achieve 30% improvement, then the HERS Index will come down to 245. A substantial improvement, but lets look at it in context of other goals that make use of the HERS Index. If the same building achieved the performance of the energy

efficiency code, then it would achieve a HERS Index of 100. Energy Star requires achieving a HERS Index of 80 or less.

ZEB requires achieving a HERS Index of 30 or less. So this 245 Index for this building is about 1000% (10 times) more energy use than ZEB, or about 300% (3 times) more energy use than Energy Star threshold, or 245% more energy use than code energy efficiency. And the owner - client has no idea about this lack of achievement.

If ZEB was incorporated as the energy use goal for the energy audit (ZEB = HERS Index of equal to or less than 30), then the energy audit would include a list of all improvements to the building thermal envelope components and mechanical systems necessary to achieve the performance of HERS Index 30 or less. Those components and systems that can be upgraded for the shortest return on investment can still be done first, the available cash incentives will still be provided, the work for those components will be done to the ZEB level, the owner will know exactly what they can do next when pinched again by the increasing cost of energy, and when all items on the improvement list are completed the building will be performing at a HERS Index of 30 or less, nothing left to do but put the solar collectors on the building to eliminate the purchase of remain-

ing energy uses.

Nationally, the energy audits are slipshod with no energy use goal input from the owners. You get what the auditor decides to give you, driven most often by whatever incentives are being given. The auditor is free to do whatever, because there is no energy use goal that creates the environment to determine what is necessary to achieve the goal. As the purchaser of the audit, the client is given no say and no idea what five different energy auditors are going to propose, nor what that means in the overall picture of the HERS Index. All energy audits that I have had the honor of reviewing represent the way energy audits are done as described above.

Imagine the difference for owner participation and decision making when owners are given the opportunity to request an energy audit that will tell them their building's HERS Index Now, and what would be required to achieve a HERS Index of 30 or less. This will make the energy audit permanently useful for this building, instead of a slipshod in time. The owner will always know what to do next as the cost of energy goes up. And when they are done with all on the list in one year or ten years, then their building will be performing at ZEB, HERS Index 30 or less. 🌱

ENERGY SAVINGS WITH WINDOW TREATMENTS: THIS IS A TEST ... THIS IS ONLY A TEST!

With window shades provided by Gordon's Window Decor, Green Energy Times is in the process of monitoring their thermal performance.

The test is being performed on residential windows of an energy efficient home that is constructed with Structurally Insulated Panels and triple pane windows and doors. R-value in the roof is R-47 and the walls are R-38, with log siding. The passive solar, well-insulated home takes advantage of Solar Gain by it's orientation, which works extremely well during the winter. To counter the sun on the south facing side of the home, a 4' overhang is accomplished with a balcony over the 1st story windows, as well as a 4' overhang from the upper roof. The western 1st story has a full porch attached with skylights over some of the windows to allow lighting gain.

Most of the northern side of the house is blocked from the elements of the winter by the addition of a breezeway that leads to a double car garage. The northeastern corner of the house is still open to the elements with a double casement window arrangement in the bathroom. Some cold air could be felt when the temps dropped below zero, in spite of the fiberglass frame and triple panes, designed to perform with as little heat loss as was possible at the time of purchase. Gordon's Windows installed a single insulated beautiful blue EcoSmart shade with side tracks in March of 2011. Although we have not been able to put them through the test of the brutally cold January and February months, we were able to see a huge difference in the time that we were able to test them last winter. When we would open the shade, the temperature difference was unbelievably noticeable. They truly performed in a manner that made the comfort level in the room much warmer during the night. Clearly, the heat loss was lessened, as well as the cool air that was felt along some points in the windows.

What we never realized is that the cooling and heating of windows actually wears the windows down after time, which occurs on all windows. The EcoSmart shades are a welcome solution. They also look great, even if you are a fan of no curtains. During the day, when we want our solar gain and ability to keep our energy need for lighting low, they beautifully draw up to allow any level of light in. We are testing the highest insulated shade they offer, so when they are down, it is dark inside. Gordon's offers a light filtering shade, but we wanted to give them the ultimate test to be able to give our readers an option to reduce their energy usage that is much less costly than window replacements. Window treatments, after time will eventually be needed as your home settles and the seasons come and go, to keep your heating needs lower.

We also installed them on our eastern facing windows where we were feeling cold air coming in and also seeing some icing

in the corners and lower edge of the glass during the coldest nights, and with nor'easters! The shades performed the same as with the north facing window treatments.

The eastern windows do not have any overhangs for summer shading/cooling. It was nearly impossible to sleep in with the sunrise and immediate temperature increase in the mornings. An unexpected benefit of the shades is how they keep summer heat out. With the shades down at least 80% until the sun reaches overhead, they really keep the room cool, in spite of how hot it gets outside. When you pull the shades up it is unbelievable how scorching hot it is between the shade and the window (we tend to keep the windows open to let it out). We chose a color that matches the wide wooden sills and they look very nice as well. The ones on the south side of this room are under a porch roof, so we just appreciate their summer value of keeping the room darkened when we want to sleep in.

Now that we realize the huge benefit of their cooling abilities we need to deal with the upstairs 2nd story windows that only have a 2' overhang. We hope that Gordon's will allow us to test that side of the house and will let you know if it helps to keep it cooler in here when the temps reach to the 90's outside and there is no breeze anywhere. After that it should be cool sailing in here and our energy reduction measures will benefit all the more. - Written and tested by Nancy Rae Mallory 8.5.11




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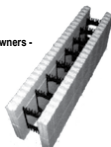
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DON'T GET STUCK ON THE STICK

The ICF industry has been manufacturing in America for over 40 years, concrete construction started around 2000 years ago, steel reinforced concrete maybe 130 years ago—but somehow ICF construction in New England is still considered a new concept. Stodgy old New Englanders are famous for being “late adapters.” That and the abundant forests around us keep us “stuck on the stick.” Cavity wall stick-framed construction uses the cheapest materials, and almost any half-skilled carpenter can frame a wall and stand it up. So it's easy to see the appeal to stay with the stick.

When I first took up carpentry in the 1970's wood was my thing and that was it. Hardwood, softwood, plywood, chipboard. That was my world. When I started contracting I had to open my mind to all materials: metal, glass, stone, concrete, gypsum, foam, vinyl—everything. But even as I got to know these other products I was still a carpenter at heart, and always tried to steer the job back towards wood whenever I could.

As my business and I matured I was asked to add a large 6000+ addition onto a local hotel. The existing building was masonry and concrete structure and the addition would be too, no stick framing allowed. I was anxious.

The plan called for exterior walls built with concrete blocks, 2" of foam applied over the exterior, and furring attached to the interior. I was getting a harsh education, as the masonry bids came back. All that money spent, and I still had to insulate and hook finishes on the wall.

Around this time a local guy I grew up with introduced me to Insulated Concrete Forms (ICF). The more I studied it the more sense it made. Structurally superior, more insulation, sound attenuation, fire resistant, and easy attachment for drywall. Everything done in one shot. Bang. Move On.

My customer, the owner with around 50 years of serious contracting experience, said in his thick Jersey accent, “yeah that'll work good, use that.” It wasn't a mystical leap of faith, he was just smart enough to grasp the obvious value of ICF.

As we begin to acknowledge the importance energy efficiency, durability and sustainability; we're finally demanding a higher performance from our


building envelopes. Yet we still cling to the to the stick. I see folks spending a lot of time on air sealing, with up to 3 layers of insulation. Infiltration barriers on the outside, vapor barriers on the inside, talk about laminations of labor. Consider this, wood is dead plant matter, organic material that you are encapsulating within synthetic materials in your attempt to boost thermal performance. Make one mistake with your moisture management and you've got serious, “who's your lawyer?” troubles.

Insulated Concrete Forms have no organic material trapped within. Steel reinforced concrete is used to build the strongest structures on this planet. Concrete is brewed from mostly local materials, water, sand and stone. Re-Bar steel is 100 percent recycled and the ICF that we sell is 70 percent recycled material by weight and provides an unbroken plane of expanded polystyrene (EPS) foam totaling five inches thick.

While the R-value is impressive, the absolute airtight quality of monolithic concrete should not be underestimated. No gaps, seams, joints, to seal. Equally important is the “flywheel effect” of all that thermal mass. It takes a lot of energy, be it hot or cold to change the temperature of a heavy mass wall. This has the effect of moderating swings in the indoor temperature and reducing cycles of heating and cooling equipment. Combine ICF walls in conjunction with ICF suspended concrete floors and/or slab on grade, and you create an incredibly stable heavy mass structure. The ability for concrete to store heat makes geo-thermal and solar heating much more viable. I've built ICF homes that can be heated with 90-degree water.

ICF's require a carpenter's skill set and are more cost competitive than ever before. Stack, brace, pour, DONE! The product allows considerable design flexibility. Walk-in coolers, hot tubs, pools, root cellars, multi-story housing, basements, schools, and the most comfortable home you can own.

Don't be afraid, un-stick yourself.

Joel Baker is President of VTICF, distributor of Amvic products. 



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MAINE'S GREENEST BUILDING DESIGNED BY A VERMONT ARCHITECT

The Bosarge Family Education Center at the Coastal Maine Botanical Gardens, to achieve Net Zero Energy

The recently opened Bosarge Family Education Center is situated at one of Maine's premier tourist destinations and is being hailed as the “greenest building in Maine.” Designed through a collaboration between MacLay Architects of Waitsfield, VT and Scott Simons Architects of Portland, ME, this project included input from design professionals, staff, board members and donors from across New England.

The Coastal Maine Botanical Gardens started the process of designing the Bosarge Family Education Center by laying out strict goals for both environmental performance and programming. The client set the high environmental goal of both net-zero energy and LEED Platinum, for this 8,000 square foot building sited next to their existing visitor's center.

The client's program included administrative office space as well as flexible classroom space that could be adapted for various larger events and gatherings.

From the beginning of the design process, creative ways of meeting the client's goals were explored by the design team. The client was restricted by both a tight budget and schedule, as a non-profit intent on preserving the visitor's experience during the summer season. To fulfill the client's expectations, a panelized construction system, produced by Bensonwood of Walpole, NH was utilized, which allowed for the majority of the building envelope to be fabricated off-site and then assembled rapidly on-site. Once the shell was in place, HP Cummings, construction manager for the project, was able to work through the winter months under cover. This construction approach allowed the project to be completed on

budget, on schedule and to meet the strict environmental goals set out by the client.

The Bosarge Family Education Center at the Coastal Maine Botanical Gardens boasts walls and a roof that are over a foot thick and achieve an efficiency rating of R-40 in above ground walls, R-60 in the roof and R-20 in below ground insulation. Triple-glazed, R-5 windows, designed and manufactured in Germany, provide passive solar gain in the winter while keeping out heat in the summer. To produce the energy load required to achieve net-zero, the building is equipped with 135 PV panels on the south facing roof as well as an additional 102 panel array on the ground, together capable of generating 55,148 kWh. This energy production will offset the



View of the Bosarge Family Education Center from the surrounding gardens


building's annual energy use, which is modeled at 19 kbtu/sf-yr, to make this building a net-zero building.

The Bosarge Family Education Center is one of a handful of net-zero non-residential buildings in all of New England,

and only the second commercial LEED Platinum building in Maine. This building stands at the next frontier of building design, surpassing LEED standards to achieve much greater energy savings and greenhouse gas emissions reductions.

Beyond the environmental goals, this new building at the Coastal Maine Botanical Gardens meets all of the programming requirements set out in the beginning of the project by connecting directly to the neighboring botanical gardens through views and access. A central gallery acts as

a transparent, breezeway-like, connector. The two wings spread out from this center, one housing administrative and staff functions and the other designed as a flexible multi-use space. This can function as a large performance space or be partitioned into acoustically separate classrooms that each open into the landscape and exterior teaching spaces.

The Gardens' vision of building a teaching tool for visitors that communicates the importance of resource and energy conservation is realized. The Bosarge Family Education Center is now open to the public. Meters inside the building and online track real-time data for lighting, mechanical systems, water use and electricity production to teach anyone who is interested in learning more about the technical aspects of the project. Through an integrated design process the strict environmental metrics were turned into a teachable mantra, one that describes the finished product, “If a plant designed a building...” Visitors to the gardens can now complete that sentence with first hand experience, “It would be powered by the sun, it would use natural materials as its building blocks, and it would harness the daylight.” If you are in the Boothbay region, be sure to visit. 

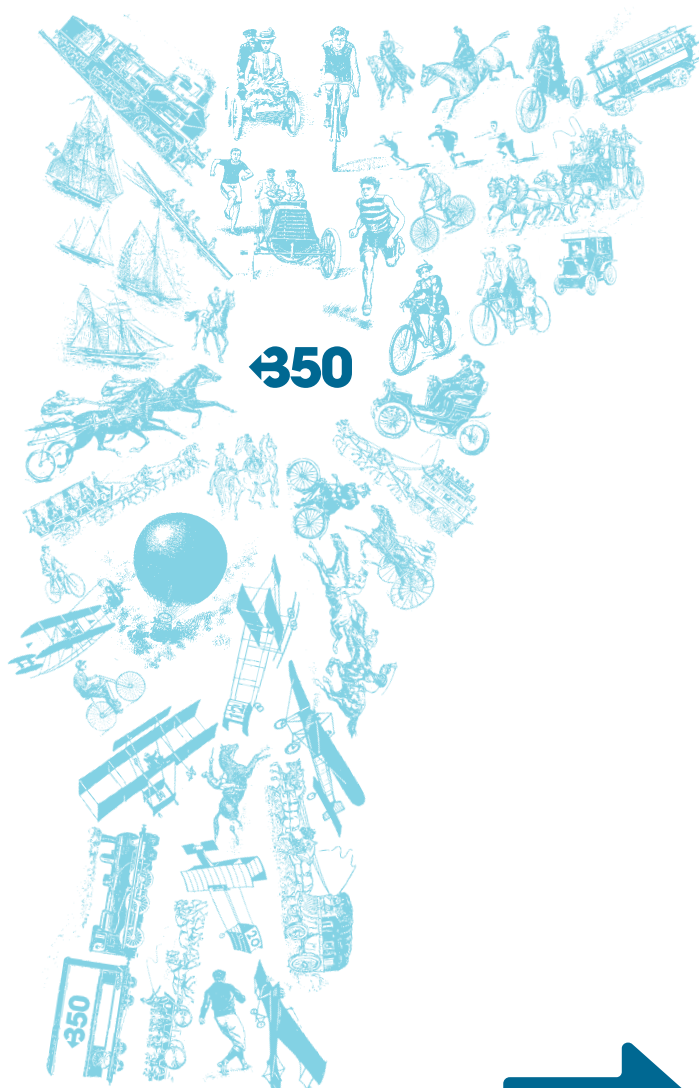
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Green Product Reviews

To-go ware repeat bamboo utensil set

These cute, portable utensils are made with 100% bamboo and are great for bringing to work for lunch, taking on picnics or just stashing in your purse for whenever! The set includes a knife, fork, spoon and chopsticks and even come in a recycled carry case with a cute carabiner to hook on to your bag (or your water bottle). The carry case comes in all sorts of pretty colors too! Although bamboo is durable, treat these gently as they can chip. Also, the knife is best used for spreading or cutting soft food, as it's not very sharp - but is safe for kids!

To-go ware 3-tier stainless steel food carrier and sling bag

I LOVE this company! This food carrier is perfect for bringing lunch to work or bringing home leftovers from that yummy restaurant. It even comes with a little container for salad dressings, hummus or whatever! The sling bag is made of durable fabric (green or brown) that can be tossed in the wash AND you can stick your utensil set in there too OR clip it to the side. The carrier is stainless steel and dishwasher safe. It also comes in a smaller 2-tier set. Forget those crummy plastic containers or glass that can break or leak- these are the best!

LAWN MOWING ISSUES

The following facts from various credible sources paint a grim picture of the negative impact typical gas mowers have on our environment.

Americans spend more than three billion hours per year using lawn and garden equipment. Currently, a push mower emits as much hourly pollution as 11 cars and a riding mower emits as much as 34 cars.

EPA ruled, non-road gasoline-powered engines, such as those used in lawn and garden equipment, would see an additional 35% reduction in HC and NOx* emissions beyond a 60% reduction that finished phasing. Those engines would also see a 45% reduction in fuel evaporative emissions.

The new standards would apply as early as 2011 for most lawn and garden equipment.

EPA has instituted a program requiring that "reduce hydrocarbon emissions from small spark ignition engines by about 35% by 2011 or 2012". (EPA.gov)

A gasoline powered lawn mower run for an hour puts out about the same amount of smog forming emissions as 40 new automobiles run for an hour. (Clean Air Foundation)

There are about 8 million gasoline powered lawn mowers sold per year in North America and Europe. If a typical person keeps his lawn mower for 7 years, it would mean that there are 56 million lawn mowers in operation. These lawn mowers produce around 3 million tons of greenhouse gas per year (106/2000 x 56

million).

The energy cost for an Electric Lawn mower is typically no more than \$5.00/yr. (Clean Air Foundation)

Each weekend about 54 million Americans mow their lawns using 800 million gallons of gasoline. (EPA Statistics)

Gas mowers represent 5% of overall US Air Pollution. (EPA Statistics)

During the refueling of gas powered mowers, spillage accounts for 17 million gallons each year, more than the Exxon Valdez disaster. (EPA Statistics)

*NOx is the generic term for a group of highly reactive gasses, all of which contain nitrogen and oxygen in varying amounts.



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The new Ultralite™ Lithium Powered **Recharge Mower®** is here to change the landscape.

The new Ultralite™ Lithium Powered Recharge Mower® is so lightweight compared to current lead acid and gas mowers, that we say it is virtually effortless. At only 35 lbs (16kgs.) the Recharge Mower® (Model PMLI-14) is so easy to use.

The Ultralite™ Lithium Powered **Recharge Mower®** has a fully moulded body that will not rust or dent and provides a 15" cutting path. The cutting height is easily adjusted to 6 increments using only 1 handle. The Ultralite™ design, allows the unit to be easily rolled even into tight spaces. Since the Lithium Powered Recharge Mower® is battery operated, there is NO gas, NO oil and NO fumes. Simply plug the battery pack into the Energy Star rated Smart Charger and in only a few hours you're ready to go again.

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The Ultralite™ Lithium Powered Recharge Mower® is available through the company website at www.RechargeMower.com or through a host of online retailers including:

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GRISTMILL BUILDERS ACTIVATES PHASE ONE OF THE ENERGY MILL

Some of the best news in the construction market is the continued growth of the green building sector. In an industry marked by a severe and prolonged downturn, experts predict that by 2013 the green building market will double in size to an estimated \$96-140 billion dollars.

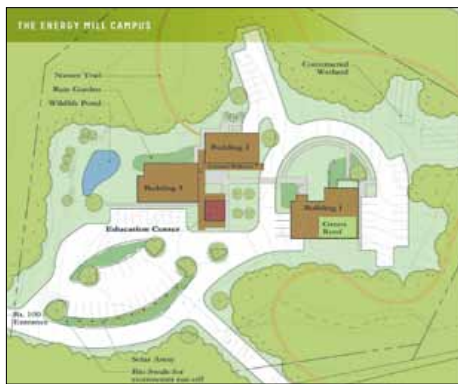
Moving right with this trend, Gristmill Builders Ltd. of Stowe, Vermont has embarked on an ambitious yet achievable mission to create Vermont's central resource for green building and alternative energy solutions. Located in Waterbury, Vermont off I-89, The Energy Mill is on the 10 developable acres of a 28-acre parcel that contains 18 acres of conserved land.


The unique campus style setting is planned as a one stop shopping opportunity for the green building community. The plan contains 30,000 SF of green building and alternative energy tenants, anchored by an educational center focused on providing green solutions for consumers and businesses. Visitors can expect to enjoy interpretive trails, winding around functioning sustainable solutions, including solar trackers, geothermal pumps and rainwater gardens.

The Energy Mill's mission is to connect Architects, Contractors, Designers, Engineers and Consumer with green building products and services in an environment that embodies the sustainable lifestyle Vermonters have embraced. The Energy Mill's LEED certified design objective of Net Zero energy consumption will enable the site to generate all the energy it consumes. To achieve this objective the plan is to utilize on-site renewable solar and geothermal energy sources, combined with highly energy efficient building technology and thoughtful consumption.

Earlier this year, ten solar trackers with the capability of generating 52,000 kWh were installed on the phase one 5-acre solar farm. The first phase of construction is a 14,000 SF commercial building that Gristmill owner and developer, Brenden O'Reilly projects to be finished by late fall.

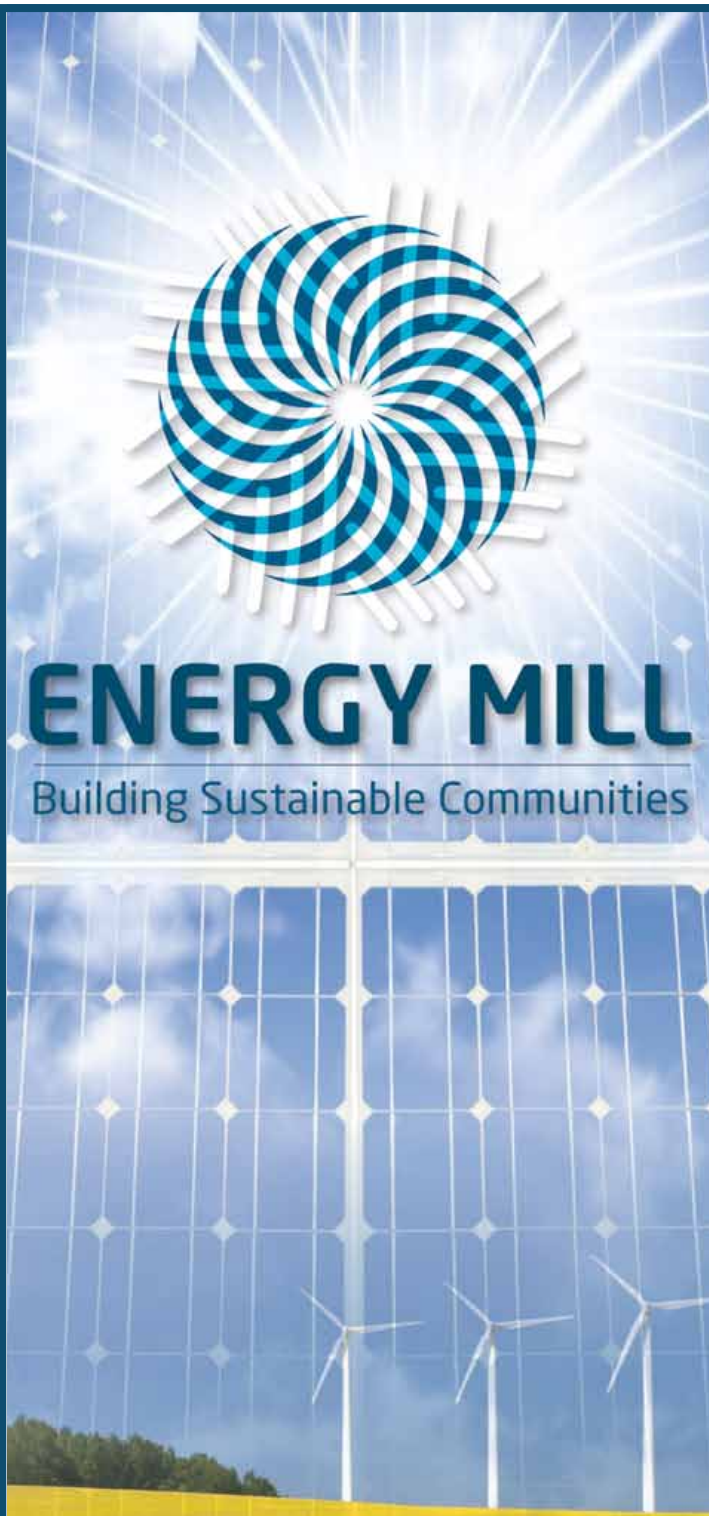
O'Reilly says a much larger solar farm is in the works for the southern 5 acres of the property that will power the second phase of development plus send excess current back to the grid. Phase two plans include 3 additional buildings totaling 20,000 SF of commercial space.





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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/oepp/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.backwoodsolar.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

CLEAN ENERGY DEVELOPMENT FUND TRANSITIONS TO NEW OVERSIGHT

Montpelier, Vt – The Vermont Department of Public Service is pleased to announce the appointment of the Clean Energy Development Fund (CEDF) board members, effective July 9, 2011.

The General Assembly established the CEDF in 2005 to promote the development of renewable energy and efficiency resources and, through this, to provide substantial economic and environmental benefits to Vermont. Since 2005, CEDF has awarded about \$18 million dollars in grants and loans to municipalities, farms, colleges, small businesses and other project developers in every county in Vt. This has resulted in the construction of farm digesters, solar photovoltaic arrays, wind turbines, hydroelectric and biomass projects in every county in Vermont, generating over 44.5 MWh. This is a substantial and positive economic impact for the State, as found by a recent study by Kavet, Rockler & Associates, LLC.

In accordance with the recently-enacted omnibus energy bill, the CEDF will become a program of the Department of Public Service. The new CEDF Board will have approval authority with respect to the plans, budgets, and program designs for the Fund. The Board will also serve in an advisory capacity to the Commissioner of the Department of Public Service on all other aspects related to the Fund. Commissioner Elizabeth Miller is responsible for appointing three members of the CEDF Board; Representative Tony Klein and Senator Ginny Lyons, the Chairs of the House and Senate Committees on Natural Resources and Energy, each appoint two members of the Board.

The following individuals have been appointed to the new CEDF Board:

- Jo Bradley, Chief Executive Office of the Vermont Economic Development Authority (VEDA). VEDA works collaboratively with the Fund to provide underwriting and oversight for the CEDF loans. Bradley has served on the CEDF Board since its inception in January, 2007. Responsible for VEDA's over \$160 million in assets, Bradley has applied her substantial financial and community development skills to her service on the CEDF Board.
- Sam Swanson, Senior Policy Advisor at the Pace Energy and Climate Center (PECC) at Pace University and former Board President of Renewable Energy Vermont. Swanson, with his strong renewable energy expertise, has been an integral member of the CEDF Board since October, 2007.
- Gaye Symington, Executive Director of the High Meadows Fund. Symington served 12 years in the Vermont House, her last 2 years as Speaker. High Meadows provides grants and research opportunities towards the goals of reducing the reliance on fossil fuels, improving the sustainability and viability of agricultural enterprises, and encouraging vibrant and compact communities. Patty Richards, Senior Consultant for La Capra Associates in Williston. Richards has worked in the energy industry for over 20 years on energy policy and economic analysis. She previously served on the CEDF Board from its inception in 2007 until July 2009.
- Elizabeth Caitlin, an attorney and financial advisor who resides in Dummerston. Caitlin has many years of regional and local planning experience serving on and chairing planning commissions, including the Windham Regional Planning Commission and her local Dummerston board.
- Jennifer Hollar, Deputy Commissioner for the Department of Economic, Housing and Community Development. Hollar will apply her Department's expertise in energy as it relates to economic development, job creation, land use and the affordability and sustainability of Vermont homes. William Wiquist, Green Mountain Club Executive Director. Wiquist brings both environmental stewardship skills and a strong public policy development background, based upon his work for both Congressman Peter Welch and Senator Bernie Sanders.
- Senator Lyons, Chair of Senate Natural Resources and Energy Committee enthusiastically supports the Clean Energy Development Fund appointments. Senator Lyons stated, "These folks will be a robust team, with expertise in renewable energy, economic development, and the environment. They will build on the strong foundation developed by previous Boards and continue to deploy Vermont's renewable energy infrastructure." Representative Klein echoed that sentiment, noting that "the CEDF has contributed to the vitality of our economy and of our clean energy sector for the past several years, and the new Board will help sustain the CEDF into the future." Commissioner Miller noted that the new Board would tackle the tough issues of strategic planning and long-term funding during the next year.

The Department also acknowledges the following outgoing Board members for their service: Mark Sinclair, Robert Dostis, Ellen Kahler, Mary Lintermann, Rich Sedano, Tom Evslin, and Elizabeth Pearce. The time and dedication they contributed to the Clean Energy Development Fund is greatly appreciated and has resulted in many successes for the Fund.



DC Energy Update COST OF SOLAR DROPS!

Ben Gordesky, Renewable Energy Manager

This is to keep you up to date on one of the latest, most exciting trends in the solar PV industry. Prices on solar PV panels have been dropping significantly this summer. Due to the end of some of the feed-in-tariff programs in Europe, the world-wide demand for solar PV panels has dropped. This happened at the same time that many manufacturers were ramping up production. The end result is a dramatic decrease in the cost of solar panels!

This means that we can now generally offer systems to people at 10% less cost than just last fall! Combined with a stable state incentive program and the extra solar adder passed by the legislature this past May, there has never been a better time to install a solar PV system.

If you have been waiting for the right time to consider solar, this could be it. Don't hesitate to give us a call and we can get you some detailed information for your house or commercial property.

Lastly, we have several small to large PV systems in the works for the end of this summer and into early winter. As these are completed, we'll share some of the details with you. All in all, we're having a great solar year!



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INGREDIENT OF THE MONTH

By Larry Plesent

Today's special natural ingredient is.....SOAP! Soap is amazing stuff. The exact same ingredients can become a bar, liquid, gel, paste or spray – different forms, yet all made with the same ingredients. How cool is that?

At Vermont Soapworks (kind of a Willie Wonka™ factory for soap) we take oils, which make you greasy, and turn them into soap, which make you clean. This process is called saponification (making soap). Soap is fascinating stuff. It is actually a salt that foams! This crystalline nature of soap allows it to be made clear as glass when boiled in alcohol with sugars. That's right! Your bar of soap (not detergent bar) is actually made of tiny soap crystals that grew in oil droplets.

When you mix oils, alkali and water, they chemically react and turn into soap and glycerin. At natural soap makers stir the glycerin back in to add to the moisturizing qualities of the final product.

Soap is a very unusual molecule, acting like a snake with two heads. The oily head hates water and the alkali head loves water. When you mix soap and water, this love/hate relationship causes soap to lather. Love water/hate water, love water/hate water...and then it foams!

In the old days, rainwater was filtered through hardwood ashes coconut husk and plantain ashes in Africa and South Pacific, oak and maple here in New England. In modern times electricity is run through salt water to make alkali.

If you have sensitive skin try handmade or "poured" soaps. These traditional, poured and cured bar soaps last nearly twice as long as most mass market bars. Handmade soap is typically mixed in small batches and poured into wooden molds. The soap hardens up over time, and is cut

into bars and air-dried for 3-4 weeks. The end result is a bar of soap that is mild enough for the most sensitive skin.

Different essential oil blends and base formulas alter the astringency of the soap and making it suitable for differing pore structures, while adding variety and individuality to your choices.

What about antimicrobial soaps? Do I need them? Soap and water kill 55% of all bacteria within 45 seconds, and even more if given additional time. This 55% kill rate encompasses most of the bad stuff like mold, mildew and surface fungus, various soil bacteria, staph, ecoli, insects and more. Unless you perform open heart surgery or work under extreme conditions, you will seldom need to use an antimicrobial soap product.

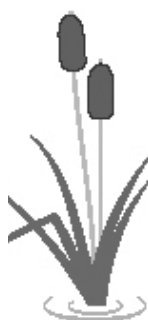
Unlike detergent chemicals, which have only been in common use in the past 75 years, soap is found in nature. Your own body makes it! And only soap kills most of the bad germs, while leaving the good ones your skin needs to stay healthy.

Organic soap is a natural way to keep you healthy, young looking and clean!

This is the Soapman urging you to visualize sustainability.

Larry Plesent is a writer, philosopher, farmer, bookseller and soap maker, living and working in the Green Mountains of VT.

Learn more at www.vermontsoap.com or www.seasonedbooks.com



A SOLARFEST VILLAGE

By Dave Bonta, aka the Green Guru

"It's a long, long road, from which there is no return. While we're on the way to there, why not share?"

He ain't heavy-he's my brother- Bobby Scott/Bob Russell

Once upon a time, there lived a group of like-minded people, who got along well and decided to help one another and help the planet too. They pulled their visions and resources together and created a community. They agreed that respect for each other and the Earth could be the foundation for a fuller life and they could recognize the talents and gifts that each person was capable of developing, no matter what age they may be. So, elders and youngsters could enjoy the mixture of wisdom and energy and both flourish in a social atmosphere that sponsored civility and love.

The economics of this arrangement allowed for huge across the board cost savings, as well considered design, sweat equity, barter and shared service decoupled the joy of living from money. They had gardens yielding healthy veggies for storage and security; they took fuel and food from a sustainable forest and meadow, working together with a sense of real progress, purpose and mission.

Money lost its domination over their lives, as did junk TV and idiot infotainment, theocratic fundamentalisms, political theater, rat race living and conspicuous consumption. There was time for culture, art and music. They had clean water and clean energy from Solar & Wind. They had a general store and a café. There was a health clinic that practiced preventative and alternative as well as conventional medicine. There was a tool library. There was a little schoolhouse. Most of the people worked in the village, helping to procure the necessities of living or running service businesses

out of their homes. They did not need cars to go to work, but had a couple of types of appropriate transportation options available if needed.

Where is this place? When is this time? I want to live there!

The place and time is yet to be for most of us, but if it all sounds so wonderful, what's keeping more people from living this way?

If you speak to anyone about this you'll hear a stream of pre-judgments and fear around this concept. But wait, we have 7 Billion people today on a Planet that can sustainably carry only 1 Billion. We can't continue using the same old models and practices that created the challenges we face today. I think Eco Villages can work, should work and do work, and there are more than 700 such places in the World today. They have valuable lessons to teach and can offer valid blueprints for the future. The State of Vermont already has a number of these communities in existence. The United Nations has said that these types of communities may well be the most important trend for the very survival of our species.

So let's begin serious conversations about how to move into this future. Do they need to cost \$100 to \$200 a square foot? Can we find a way to make it an affordable option without the "low income housing boogeyman" coming out of the closet? If these villages could be built in a way that the homes planned for privacy, as well as common area, used indigenous materials, invoked some shared labor (aka "Habitat for Humanity") and took advantage of the long term economics of renewable energy, isn't that at least part of the way forward? I invite all interested in helping to answer these questions to contact me thru the letters section of Green Energy Times care of The Green Guru. It's just an idea at this time...If you think it's a good one, I'd like to hear from you. ☺



SOLARFEST 2011 WENT OFF WITHOUT A HITCH...

The 17th annual SolarFest brought approximately 5,000 folks from all over the Northeast to Forget-Me-Not Farm. The horse pastures were transformed with high-top tents housing workshops on Renewable Energy, Green Building, Sustainable Agriculture, and Thriving Locally, and The Solar Generation.

The sun shone brightly over the entire weekend, helping the festival generate more power than ever before. This year's solar array, much larger than in previous years, easily handled all the festival's needs. The power generated was stored in battery banks and consumed over the three days and nights of music on the Main Stage, complete with professional lights and sound. Performers on the Main Stage included Jon Cleary's Philthy Phew, Roomful of Blues, Antje Duvekot and Sarah Lee Guthrie & Johnny Irion, just to name a few. Other entertainment during the 3-day event included Family Stage performances, Theater-in-the-Woods, contra dancing and a late night art-inspired bonfire.

SolarFest workshops offer practical information on a variety of relevant topics. This year's workshops included Batteries 101 & More, Timber Framing, Home Gardening Season Extension, Funding and Sup-



porting Community Change, Bike Repair 101, and myriads of others on similar topics. There were also workshops aimed at teens, such as How Solar and Hydro Power Work. Attendees could also take one of several tours of the festival site to demonstrate how sustainable practices were being used.

The vendors provide a great service at the festival as well. Attendees could get a first-hand look at photovoltaic panels, solar hot water systems, composting toilets and pellet stoves. Several local colleges were represented, many non-profits were providing

information, and the local bus service was rallying for support. Food vendors served up vegetarian and vegan fare, along with menu items that included locally sourced meat and produce.

Along with being powered by renewable energy, SolarFest is also a zero-waste festival. All food vendors are required to use recyclable or compostable service ware and the festival provides compost receptacles throughout the site. Numbers for 2011 are not yet available, but in 2010, we collected just 90 pounds of non-recyclable, non-compostable trash despite the thousands of people in attendance.

The generosity of corporate sponsors helps make SolarFest a reality. This year's major sponsors included Dark Star Lighting & Production, Radiantec, Forget-Me-Not Farm, Farmer Mold & Machine Works, Chaolyist, Rutland Herald, CV Solar, and WPTZ News Channel 5.

SolarFest, Inc.'s goal of blending art, education and outreach to inspire conservation, promote renewable energy and support sustainable communities is apparent in its execution of SolarFest. As always, this year's festival was a delight for all senses and a testament to what a group of thoughtful, conscientious individuals can achieve together. ☺

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VEGGIE POWERED RESTAURANT ENJOYS THEIR NET-METERED CREDITS!

In Warren, NH, across from the post office is a funky little gem called The Green House Restaurant.

Your first appearance does not reveal what is so unique about this friendly unique place.

"We may well be the first of it's kind - with a net metered, veggie-powered, electric Grid-Tied Biomass generator", said Anthony Divergigellis, "We are very excited to be Net-Metering and doing this after many months of hard work & research, he continued." They are now able to build up credits with the utility company.

The whole set up took 2+ years to build and now they are able to net meter 50 KW of power an hour - all from recycled veggie oils. Two days of running provides power for a full month at the Green House Restaurant!

Anthony's interest in Veggie Oil actually started when he bought a Waterville Valley shuttle bus, did his own Veggie Oil conversion, and it now boasts 23,000 miles, all on veggie oil!

"During that time I thought, Gee, that's a lot of power behind my trusted bus and after we made it back to NH, I started my next project using veggie oil: I have created a 50 KW BIOMASS generator (VEGGY OIL) that we now use here at the Green House Restaurant among other locations. This means that the generator is portable. It is now providing power to festivals throughout the summer, with the first one being the 16th Annual Jerry Jam (off the grid), in Bath NH. They had an excellent turn out, including 22 vendors, stage, sound, light shows, two big ice machines, for which he provided 100% of the power for.

To transport the diesel generator, he built a portable trailer with enclosure, from all recycled materials. This affords him the ability to rent this Veggie Oil powered generator for music festivals and events "off the grid".

Vegetable oil offers similar performance as petroleum diesel, but with fewer polluting



emissions. Veggie oil also leaves behind a more pleasant alternative to the black cloud of diesel engine smoke.

"The very first diesel engine was actually built to run on peanut oil", says Divergigellis. "Vegetable oil burned as fuel does not emit sulfur dioxide (SO₂), a main compound in diesel. We do not use bio-fuel. We use straight veggie oil.

But the uniqueness does not stop here. The exquisite flower beds in front of the building are cared for by a neighbor in this small town in New Hampshire. When you enter the restaurant, into a tastefully decorated restaurant, you will find that everything you see has been recycled! There are way too many novelties to mention, but worth the stop to browse around and to enjoy a wonderful meal, made completely from scratch. If you stick around on Thursday or Friday nights, you will be treated to some local music, to top the night off with. As we discussed the sign on the front of the building and that the building is not green colored, the owner made sure to point out that the "new roof is white, which makes it green because it helps to keep it cooler inside". If you happen to be going through this little town, be sure to stop by... and even if you are not going that way - it is definitely worth the short drive over to see what it's all about.. Tell them we sent you!

Motel 6 May Leave the Light on... but Tom Bodett thinks twice about it!

Cont. from page 36

Are you 100% solar powered? On or off grid? Do you meet all of your energy needs?

We are grid-tied and designed to produce about 25% more power than we use. We have a healthy credit with Green Mountain Power already. We have also taken other conservation measures around the house, primarily by installing CFLs and master kill switches on all of our electronics that will boost that equation somewhat. The cooler summer we're having hasn't hurt either as we've not been tempted to use our window-unit air conditioners in the bedrooms.



Above, potting shed which houses inverters and transfer switches with net metering equipment. Right, inverters in potting shed.



SO, you have a healthy credit with Green Mountain Power already. I'm impressed! Are you familiar with Group Net Metering?

Your excess credits can be shared with a friend, neighbor, relative - someone else.... Ben & Jerry did that, with solar in only one location.. You can read about it in our May 15, 2011 Issue of Green Energy Times, p.7.

Yes, I'm very aware of it. I am on the Dummerston Selectboard and Alex Wilson, who I'm sure you know, is on our Energy Committee. We share a vision of having some sort of community solar farm where people might buy-in. I'm also interested in the economics of it and finding ways to encourage investors to consider it as a safe and modestly profitable green energy investment.

Do you take any other sustainable measures in your life? ie: gardening, composting, fuel efficient vehicle - just your philosophy...

We have a great big energy sucking house on top of a hill with a professional recording studio, wood shop, tractor shed, and all the accoutrements of an all-American lifestyle. In other words, we're pigs. So what do you do when your lifestyle flies in the face of your values? Throw money at it. It's the American way. I'm almost serious when I say that. Although we have certainly taken additional conservation measures in terms of our energy usage, it is a small sliver of the resources we actually consume. Phase Two of our energy conservation will be to tear out the oil-fired boiler which heats our house and domestic water and replace it with an automated pellet boiler system. The pellets for these furnaces are made within thirty miles of here, so in terms of fossil fuel consumption, we should take our footprint from a size 13, to a 3. Car wise, we are a minivan and a Volvo - the official transportation of Vermont families. We owned a hybrid Highlander for two years and enjoyed it very much, although the actual fuel savings were somewhat nominal.

As far as philosophy goes, while conservation is a no-brainer and needs to be in any energy plan we have as a nation, the early adopters of alternative energy generation are going to be people like us who like their lifestyles, but want to maintain them more responsibly. Once people realize they can be responsible environmental citizens without giving up all their toys, this stuff will take permanent hold. The more of us who buy in, the more of us can buy in.



20.84KW grid tied system

How about Motel 6: When they leave that light on for us - are they CFL's or LED's?

Motel 6 uses CFLs in all guest rooms and public spaces; LEDs are used for much of our signage.

What is Motel 6's policy for sustainability? Are there any plans for solar or any renewable energy in the future or already existing?

Motel 6 strives to minimize our impact on the environment in all aspects of our operations. Here are a few examples:

- Motel 6 recycles all its CFLs and batteries.
- We have installed low-flow aerators on our faucets and shower heads to conserve water.
- We use environmentally sensitive cleaning products for our daily cleaning and laundry.
- At select locations, we use an energy monitoring system that senses when the room is unoccupied and sets the HVAC back to a pre-set energy-saving temperature setting.
- We use energy-efficient heating and cooling units.
- Motel 6 was the first economy hotel in the US to achieve LEED certification in 2010. The property features solar thermal panels, a salt-water pool and a heat recovery system for common areas.
- Motel 6 is committed to sustainability, and we have committed to certify all 1,100 locations via the Green Key program, which ranks facilities based on their level of sustainable and environmentally-friendly practices, by the end of this year.
- Lastly, we are testing solar at a few select locations (specifically solar panels to heat water) in Washington State and DFW. We are looking into testing more renewable energies later this year.

So there you have it - Not only is Tom Bodett an excellent example with his own journey towards sustainability, but I think Tom has had some influence with Motel 6, who is more than happy to leave their LED or CFL lights on for you!

Written and Interviewed by Nancy Rae Mallory

GREEN TIPS

COMPOST CAN HAPPEN

by Deborah de Moulpied, Bona Fide Green Goods

Compost is not rocket science. Compost, or the act of decomposition, will happen with or without your help, it's just a matter of time. Humans have been formally composting for a couple thousand years; so why all the apprehension and fuss today?

First, why compost? The two biggest reasons are: to create your own free amazing soil amendment, and to avoid greenhouse gas pollution by keeping food and yard waste out of the landfill.

If you want to get involved in composting, here are a few things you should know. Firstly, four things are necessary for composting – carbon, nitrogen, air, and water. The idea is to create an optimal environment so all the critters can work their fastest. Paying some extra attention to this ideal environment will keep these critters happy and expedite the process, but either way...compost happens.

For optimal composting, the pile should be between 3x3x3' to 5x5x5' – any larger and air can't get to the middle so the critters can breathe, any smaller and the heat-loving critters cannot heat up the pile. The ideal temperature should be between 90°-140°. If you are looking to kill pathogens and destroy seeds, the temperature should exceed 140°. This temperature won't happen in winter, but go ahead and keep adding to your pile and it will kick off again in springtime!

The compost container can be anything including: a plain plastic bin with a locking lid, an open slatted box, a self contained tumbler, or even a hole in the ground. It doesn't have to be a spaceship!

Aeration, or stirring or flipping your pile, speeds things up by providing oxygen to the critters and moving the middle to the outside and the outside to the middle. This allows the heat loving critters to do their thing in the middle of the pile where it is the hottest. Also, a moist pile is ideal since critters get thirsty too. Aim for a pile that is not too dry, not too wet – think damp sponge.

So what can go into your compost bin? Just about any plant based material, which includes paper and cardboard since they are made from trees! Dairy, fats, meat, and bones should be omitted mostly due to the unwanted flies and wildlife they attract and the heat needed to break them down. The smaller the size of items you add to your pile, the faster it will turn into compost. So, chop up that watermelon rind!

Getting the ideal carbon to nitrogen ratio seems the most daunting to newbies. Also called browns (carbon) and greens (nitrogen), the basic rule is half and half by volume, or more browns than greens. Too many greens creates the "garbage" odor, and too many browns will slow the process down. Some people layer their browns and greens, but it really isn't necessary since everything is mixed up with aeration. You would be surprised by the huge variety of "things" that can be composted. A search online will give you lists of well over 100 things you can compost.

To help start the compost, all you need is a couple handfuls of dirt thrown on the pile. No need to buy fancy "starters", as Mother Nature provides all the billions of microbes necessary for a compost pile with just a handful of good soil. Plus, the necessary organisms find their way to the compost pile through the ground.

If you create ideal conditions for your compost pile, you will have finished compost or "black gold" within two to four weeks. At some point you should stop adding to your pile if you want a uniform finished product, so you might have to create another pile or a temporary holding place for your other kitchen scraps.

No matter what your goals are for composting – quick soil amendment or keeping household waste lean and mean – these basics will get you well on your way. Composting is kind of magical when you really think about it. It's even better than rocket science, so have some fun! ♻️

BUILDING TOWARD 2012: THE INTERNATIONAL YEAR OF CO-OPS

By Erbin Crowell

In the wake of a global recession that continues to devastate communities and livelihoods, people are hungry for alternatives to corporate greed and stock market speculation. As we look at continuing challenges such as climate change, unemployment and growing disparities of wealth and ownership, many in our communities are searching for models that will help us grow more just, sustainable, and resilient regional economies.

The fact that the United Nations (UN) has declared 2012 the International Year of Co-ops is an unprecedented opportunity to talk about the co-operative alternative. In establishing the Year, the UN recognized that co-ops "in their various forms, promote the fullest possible participation in the economic and social development of all people, including women, youth, older persons, persons with disabilities and indigenous peoples, are becoming a major factor of economic and social development and contribute to the eradication of poverty". UN Secretary-General Ban Ki-moon puts it more simply: "Co-operatives are a reminder to the international community that it is possible to pursue both economic viability and social responsibility."

Co-ops represent a viable model of enterprise and a tangible expression of economic democracy, self-help, and community enterprise — a way of doing business that puts people and community before profit. Co-ops are also more common than one might think. The International Co-operative Alliance estimates that a billion people worldwide are members of co-ops, and an estimated 1 in 4 Americans are members of about 29,000 co-ops across our country. The co-operative model is also adaptable to all manner of purposes. Some common examples in our region include food co-ops, agricultural co-ops, credit unions and — yes — energy co-ops.

How can we take the opportunity of the Year of Co-ops to talk about people in our communities who have become "co-opreneurs" — innovators, activists and businesspeople engaged in the development of enterprises dedicated to meeting member needs and goals, and the advancement of

their communities? How can we tell the stories of our businesses and remind people in this difficult economy and with so many challenges on the horizon of what it is possible to do together?

A few months ago the Neighboring Food Co-op Association (NFCA), a network of more than 20 food co-ops in our region, took a first step in this effort by approving a resolution recognizing the Year and dedicating itself to "efforts to raise the profile of co-operative enterprise, to demonstrate the benefits of co-ops in building local ownership and wealth, and to apply the co-operative model to new challenges and opportunities in our communities." Partners such as the Valley Alliance of Worker Co-ops and the Cooperative Fund of New England quickly joined in as did the New England Farmers Union, which noted "a majority of our country's 2 million farmers are members of about 3,000 agricultural co-ops, helping them to sustain their farms, livelihoods and communities."

Our region is home to a vibrant co-operative community including producer co-ops and food co-ops, credit unions and worker co-ops, energy co-ops and artisan co-ops. As we look toward 2012, we have the opportunity to demonstrate the contribution of co-ops to our communities and to explore how we can use the co-operative model in new ways to help us realize visions of a more just, sustainable and resilient regional economy. To learn more, please visit www.nfca.coop/vc.

Erbin Crowell is Executive Director of the Neighboring Food Co-op Association, a network of over 20 food co-ops in our region that are locally owned by more than 90,000 people. He also serves on the board of the National Cooperative Business Association. ♻️

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We are more than 20 locally-owned food co-ops across western New England, including the following area stores. For more information and a map of locations, please visit www.nfca.coop.

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City Market / Union River Co-op, Burlington
Co-op Food Stores, White River Junction
Dottie's Discount, Brattleboro
Hunger Mountain Co-op, Montpelier
Middlebury Natural Foods Co-op, Middlebury
Plainfield Food Co-op, Plainfield
Putney Food Co-op, Putney
Rutland Area Food Co-op, Rutland
Springfield Food Co-op, Springfield
South Royalton Food Co-op, S. Royalton
Upper Valley Food Co-op, White River Junction

New Hampshire

Concord Co-op Market, Concord
Co-op Food Stores, Hanover
Co-op Food Stores, Lebanon
Kearsarge Co-op Grocer, New London
Littleton Food Co-op, Littleton
Monadnock Community Co-op Market, Keene (Opening in 2012)
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Compost Toilets Go Portable

Two regional composting toilets designers are teaming up to take composting toilets to a new level. "We're making composting porta-potties: aka Porta-Posters, said Ben Goldberg and Abe Noe-Hays about this ingenious socially responsible new invention.

Q: What is the difference between these and an outhouse?

Outhouses just dump waste into a hole in the ground where it sits in an anaerobic blob, potentially leaching into the ground water. The porta-posters are self-contained and aerobically compost the humanure along with wood shavings. They are much more like porta-potties than outhouses, but without the smell or the slop of a porta-potty. Porta-posters are zero-discharge, and let you recycle the nutrients.

Q: Just how portable are they?

They're similar to a small garden shed, but they can be moved around on a utility trailer. The accessible one in the picture rolled up the ramp onto a flatbed equipment trailer. They are heavier than the conventional porta-potties. They could be loaded and unloaded with a tractor with sufficient length loading forks.

Q: Where would one want to consider using one?

Right now, of the two we have in the field, one is, in a field at a remote residence who's owners host a lot of gatherings, and a seasonal outdoor education center. We have had inquiries from farm stands and CSA's who want facilities for their visitors and apprentices, a beach on Cape Cod, where the unit will be moved inside for the winter storm season. Some of the original ideas were for green building construction sites. I'm exploring whether they would be able to contribute to LEED credits for green job site practices. They could be placed along bike paths and hiking trails, where they could easily be serviced by pedal power or on foot.

Q: What is the required maintenance, and how often is it done?

Wood shavings need to be added frequently, ideally with each user tossing a small scoop of shavings down the toilet as a "dry flush" after each use. The 50 gallon solids drum we had in use lasted for the equivalent of two community fairs and still had room left over. The urine is diverted into a separate container and collected more frequently.

Q: Do they smell?

No, they don't smell, as long as wood shavings are added regularly. The urine, which is the smelly stuff, is separated from the solids in a sealed container so the porta-potty smell is eliminated. The solids are covered with pine shavings after each use. The building is vented and could be supplied with a solar vent fan, though it hasn't seemed necessary.

Q: Do they draw bugs?

Both times we had them in use, there were no flies. The collection drums are in a sealed chamber.

Q: Can you put toilet paper in them?

Yes. We encourage using 100% Post-Consumer Waste recycled toilet paper to discourage bleaching agents, plus, it's just good practice.

Q: How do you collect the nutrients and what do you do with them?

Once full, the solids drum is exchanged with an empty one and capped with a vented cover. They are then sequestered for at least one year to compost. The compost can then be used on landscaping or buried, depending on local and state regulations. While one drum is composting, the other is filling.

Q: Do you have any testimonials?

They've not been in use that long to accrue many official testimonials, but the majority of feedback we got from the two festivals, was either about how people expected it to smell but it didn't, and how cute it was. And the homeowner in Plainfield, MA does not use her indoor plumbing anymore.

They are made from as many recycled and reused products as we can find, and assembled using built to last techniques, using weatherproof fasteners and sealed or pressure treated lumber when necessary. Roof is made using a continuous sheet of Thermo-clear panel for lighting, and each unit can be crafted to any size or style.

The sequestering drum system was designed by Abe Noe-Hays of Putney. Each drum has interior screening and a raised floor to allow oxygen flow and evaporation. This allows the contents to remain aerobic and thus non-smelly. They can be constructed using any size drum or even a whee bin. A Separett urine diverting privy seat does that part of the work for us, and I convert a recycled 5 gallon water jug for the urinal. www.separett.eu/default.asp?id=2473&ptid=2052.

For more info, you can reach Ben and Abe at: 413-586-3699 or compostingtoilet@gmail.com

ENSURING A SUCCESSFUL GARDENING SEASON

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Now that you have planned for your future harvest and planted your crops, proper care during the growing season becomes the most important success factor. Proper care involves meeting your crop's water needs, weed control, and pest management.

Water management can be as easy as recording rainfall amounts and supplementing with additional irrigation if needed. Most crops will need about 1" of water per week. This amount can vary slightly based on soil type and the crop being grown. Sandy soils will require more frequent irrigation than heavier soils. Keeping the soil moist but not saturated is important.

Controlling weeds can be accomplished by using various mulches or cultivation practices. Plastic mulch works great for crops such as tomatoes and peppers that like the additional warming associated with its use. Organic mulches such as straw, leaves, and hay can be used and then incorporated after the season to further enrich the soil. Cultivation can be as simple as a hoe wielded with vigor, right up to a multi-row, tractor-mounted implement. Whatever method you choose, weed control can make or break your harvest. Every drop of water and plant nutrient the weeds consume is not available to your crops.

Many insect and disease infestations can be reduced by utilizing basic integrated pest management principles. Such as setting action thresholds, identifying the pest, prevention, and control. Action thresholds, the levels at which pests become an economic threat, are critical to guide



future pest control decisions. Sighting a single pest does not always mean control is needed. Identifying and understanding the specific pest is necessary to determine the best control methods. Protecting plants from insect damage can be achieved by using fabric row covers or a surface applied protectant. This method works well for controlling flea beetles and striped cucumber beetles. Botanical and biological insecticides work well but most are very specific to the pest needing control. Again, knowing your pest is the first step in controlling it. Here is an informative website to help identify your insect pests <http://vegipm.tamu.edu/imageindex.html>. Utilizing resistant varieties will also help prevent many disease issues. We recommend that you contact your local Cooperative Extension agency for information specific to your area: <http://www.csrees.usda.gov/Extension/index.html> or <http://www.extension.org/>.

GROWING LOCAL FOOD SOVEREIGNTY TOWN-BY-TOWN

by Robb Kidd, Rural Vermont Organizer

As global energy resources are becoming ever more scarce and costs are exponentially increasing, many Vermonters have been taking the charge in converting the local economy to one that is sustainable and self-reliant. The first discussion toward developing a proper solution to this world energy crisis, for a lot of Vermonters, tends to be one that is seeking out alternative energy sources such as wind and solar. However, as much as these efforts are producing, Vermont has a long way to go in becoming sustainable. In particular, as global energy costs increase so does our food cost, and with diminishing resources Vermont needs to do everything it can to enhance our "food security," therefore creating local food sovereignty.

To create this vision of "local food sovereignty," Rural Vermont is seeking communities to place articles on their town meeting day ballot to bring about greater awareness and create widespread dedication toward preserving Vermont's local food economies.

In the spirit of Vermont's long tradition of freedom and unity, Rural Vermont is encouraging citizens to assert the rights of communities to purchase and sell local foods.

Historically, Vermont towns were built upon the belief that one ought to be able to procure food for themselves or from their neighbors. Yet, with the advent of the modern industrial and energy-intensive food system, our communities have been stripped of the ability to feed themselves. Rural Vermont is looking for town leaders to build upon the past foundation of local food systems and restore local food sovereignty throughout Vermont.

Over the past twenty-five years, Rural Vermont has been advocating locally, statewide, and nationally to ensure that agricultural policies strengthen family farms, sustain rural communities, and promote local food sovereignty. Rural Vermont's commitment to grass roots advocacy has resulted in recent considerable gains at the state level, including more marketing opportunities for raw milk, statewide recognition of the value and importance of on-farm slaughter, and the legalization of hemp in Vermont. While these are significant steps getting us closer to Rural Vermont's Vision for Food with Dignity, farmers are still hog-tied by many regulations and corporate practices that restrict our independent communities' rights to sell and purchase food to and from our neighbors. What can You Do? Organize Your Town to Pass a Town Meeting Day Resolution!

As these issues become more complex, Rural Vermont realizes that concrete systemic change will not happen unless individuals and their communities assert their rights and continue to support local food systems at the town level. Rural Vermont is recruiting leaders in towns across Vermont to pass resolutions and articles that recognize your right to sell and purchase food within your community, thereby enhancing local food systems.

Call Rural Vermont today at (802) 223-7222 or email robb@ruralvermont.org and get what you need to begin organizing your town in support of local food governance or to connect with others in your community who are already involved. Rural Vermont is looking forward to working with you and your community as we move forward towards living green.

THE "NEW ECONOMY" CAN STRENGTHEN VERMONT'S WORKING LANDSCAPE

The July 10, 2011 issue of Time Magazine ran an article titled "Want to Make More than a Banker? Become a Farmer! It is about the resurgence in the value of Midwest grain farms as food and energy (with the impact of ethanol) prices rise globally.

VT farms and forest must find new sources of income if our celebrated working landscape is to survive and thrive. While Vermont farmland, with our dominant dairy industry and fast-growing diversified vegetable and value-added farms, is not seeing a doubling in value in the past 6 years like the Midwest, our farmers and foresters are likely to see better income opportunities in coming decades.

It's my view that in the coming years of slower, "peak petroleum" economic growth, Vermont's farms and forests can play a key role in enhancing economic prosperity and resilience. I have focused on the food side of this equation for almost 30 years through Gardener's Supply and the Intervale Center; and through board membership with VNRC, VT Land Trust, VT Sustainable Ag Council, and helping VT Businesses for Social Responsibility launch Farm to Plate. VT Sustainable Jobs Fund just completed the Farm to Plate statewide plan for our food system. It concluded that the direct economic impact of increasing farming and food production in Vermont by just 5% (by Vermonters buying more local food and/or selling more to New England) would generate \$135 million in

annual output for the VT economy.

The best way to bolster the economic viability of working landscapes is to generate a higher return on investment per acre of working lands, both financial ROI and return to nature's capital. The Farm to Plate plan offers many smart strategies for this outcome, and the good news is that State leadership in Montpelier understands this opportunity and is committing to work with the private sector to get there.

As the Time magazine article notes, in addition to food, the renaissance in farm value and employment is being triggered by another major force in today's economy that can help VT landowners increase their financial return beyond food: Clean Energy!

"Peak oil" has arrived and we are also approaching "peak coal" and "peak natural gas." Energy costs will increase. But VT has been innovating in the area of land-based renewable energy for decades with the McNeil wood-fired electrical generating plant, BEREC showing the way to optimize our biomass resources for heating, dairy farmers generating electricity from manure bio-digesters, and biodiesel replacing on-farm fossil fuel use.

This transition to a locally owned, more resilient and more affordable (as fossil fuel costs rise) energy system can accelerate with the right policies and incentives. Innovative Group Net



Metering programs, State tax credits and financing support for clean energy projects, and the VT Standard Offer (the SPEED program sets the nation's first statewide price for renewable energy projects) are birthing hundreds of new of clean energy projects – owned by

Vermonters – all across the State.

VT energy experts suggest VT's working landscapes offers the potential for wind, solar, biomass and methane projects to generate over 50% of our electrical energy by 2030 (they generate 5% now). This clean, safe, local energy would more than replace the 30% of our electricity we get from VT Yankee. Solar and wind projects will be the key to making this happen.

To learn more about this "new economy" opportunity I developed a 150 thousand kWh solar array last year to provide all electrical power for Farm at South Village, a CSA farm I started in 2009. Excess power from this array is provided through Green Mountain Power and their Group Net Metering program to the City of South Burlington (for traffic and street lights) and to South Village Community. Plus, the CSA has locked in energy prices for the next 25-30 years...there's a long term competitive advantage vs Calif tomatoes and lettuce!

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to develop an exciting wind project in Derby Line under the VT SPEED program. This project is comprised of two 2.2 MW turbines located on adjacent farms, the Chase Farm and the Grandview Farm, in the Northern Plateau among the corn rows. It is projected to generate 8 million kWh of carbon-free electricity each year. Besides helping the two dairies control their energy costs and generate extra income, these wind turbines would keep 4,000 metric tons of CO2 out of the atmosphere...comparable in CO2 terms to keeping 700 cars off Vermont roads each year.

The nearly \$100 million we currently pay to get almost 1/3 of our electricity from a risky and aging power nuclear plant also sends a substantial flow of profits to corporate owners outside Vermont while we bare the risk. Instead, we can start using that money to fund Vermont's transition to clean energy and keep these dollars circulating in Vermont, helping to build a more resilient economy. 🌱

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unlike any other place in the world. This year, try buying goods at second hand shops like Goodwill, Salvation Army or a local gently used clothing shop. Often one can buy better quality, awesome, cool retro styles and even designer clothing and gear for much less money, while supporting charity organizations. And, you are not directly supporting the many manufactures that use unfair labor practices in underdeveloped countries, poor farming methods for fibers and chemical processes that harm the planet. Possibly, with money saved, there will be enough left over to buy some, albeit more expensive items that are certified organic, fair trade and USA made like organic wool long john sets, new VT Darn Tough socks or, my personal favorite, anything made by Prairie

September: Back to school – It has been commented by my European friends that in the USA we possess a used clothing culture

Underground, an OG clothing designer.

October: Harvest: Summers bounty is almost over and the first frosts are beginning to be seen on our crisp North country mornings, so starting in August try freezing and canning away some of that wonderful local food that is so abundant in our region. The most complete book I have found to teach the best and safest methods is Stocking up-by Carol Hopping- we have so many wonderful farms and meat producers that it makes sense to have energy star freezer and try to keep some of the local foods available all winter. Of course there is some up front costs, but buying in bulk is cheaper in the long run for example if you buy half of a grass fed beef from a local farm it can cost up to \$1200 for that 1/2 but that may be all the meat your family needs for the entire winter, berries picked at a local farm may be \$3/# but it is so quick and easy to reach into your freezer for food and only go to the grocery for needed fresh items like dairy. In the long run you can save time and money by stocking on local food for winter.

GREENBOX MAKES ITS MOVE

When it came time to move tons of clothes for the annual Clothes Exchange, Alana Lowery knew she didn't want to throw away, store, or recycle stacks of cardboard boxes after just one use. So she turned to Greenbox, a new Vermont company that provides sturdy plastic reusable moving boxes for residential and business moves. "These are truly the best boxes and the only way to move these days," she said.

Anybody that has ever moved a home or business knows that the \$16 billion U.S. moving industry is based almost exclusively on the use of corrugated cardboard boxes. About 78% of used cardboard is recycled in the U.S. every year, but that's only part of the story. Oil and water can easily contaminate cardboard, rendering it virtually unusable or non-recyclable. Cardboard that is not recycled makes up more than 40% of the composition of landfills.

"And between 15 and 40% of every box you set out for recycling ends up in a landfill anyway because not all the fibers can be re-used and those end up in landfill as cardboard sludge," said Greenbox founder Ian DeGalan. "Recycling is not a free pass. There is a huge amount of

resources involved in producing a new box from recycled materials."

DeGalan left a job practicing environmental law to be his own boss, basing his plan off similar concepts in California. His brand-new enterprise rents boxes and sells other green moving supplies. Each box is good for about 400 moves, DeGalan estimates, after which it is recycled.

Greenbox currently serves North-western VT, with a focus on Addison, Chittenden, Franklin, and Washington Counties. The company delivers boxes to its customers a week before their move. His customers pack and move the boxes, and a week later, Greenbox picks up the empties.

In addition to the environmental benefits of his service, DeGalan estimates that his custom-



ers will spend about 50% less renting his boxes than finding and buying cardboard and related supplies. "There's no question that this is cheaper when you factor in the time spent driving around to get cardboard, taping up and breaking down cardboard boxes, and the up front cost of the cardboard itself."

Greenbox also has a social mission, donating its services to the Clothes Exchange and other non-profits. Lowery calls Greenbox a "great company to work with."

With his company's recent growth, DeGalan hopes to expand his service to all of Vermont and beyond. He concedes that moving will likely never be fully "green," because of the fossil fuels powering large moving trucks. "I don't pretend I'm going to be saving the world or anything like that," DeGalan said. "But I like to think that I'm making life a little better for people while having positive impact on the planet." 🌱

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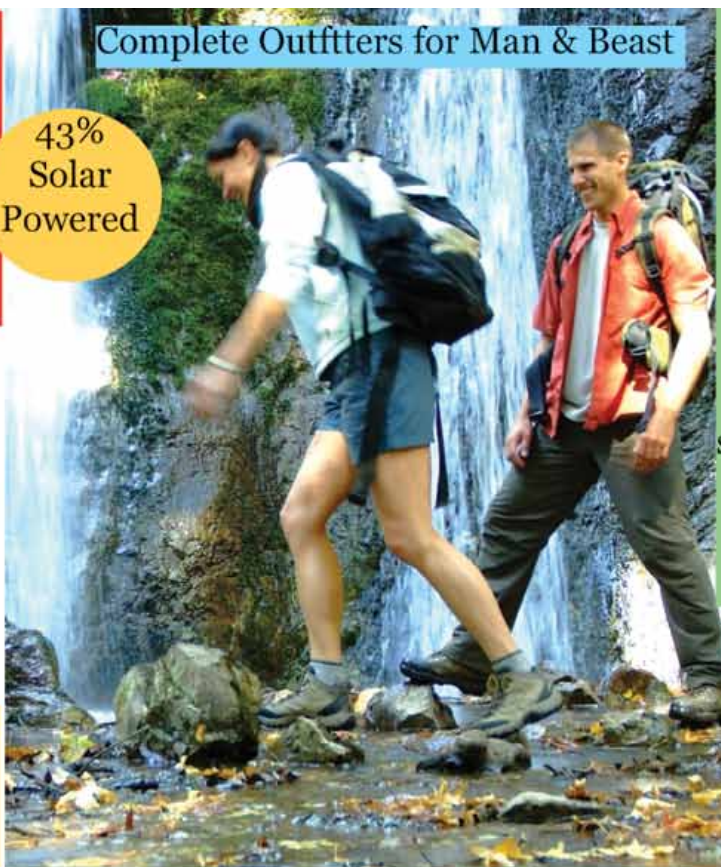
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