

# green energy times

YES YOU CAN! ... BE ENERGY INDEPENDENT!

*Creating Energy Awareness & Understanding...*

free

## 100% SOLAR-ized PLAZA in Richford, VT!

**This summer** DC Energy Innovations completed the installation of a 30kW solar PV system at RTW People's Plaza, a small business in Richford, VT. The system is estimated to produce close to 100% of the electric demand of the building.

RTW includes several businesses, all in one building, which meet some of the basic needs of the community. Included in the building are a child care center, laundromat, fitness center and tanning salon. The busi-

ness manager, Tammy Ryea and her father, Richard Ryea, were interested in converting the building's energy usage to renewables to secure their long term cost of energy as well as to do their part in reducing the environmental impact of the business. As Vermont Electric Cooperative (VEC) customers, their electric rate is on the high side. After consulting with DC Energy it was decided that, although their location did not have the greatest wind resource, their building roof was close to ideal for solar.

The Ryeas' took advantage of a few grants to make the project more affordable. As a small business, they applied for and were awarded a USDA Rural Energy for America Program (REAP) grant for the project. In addition, they were able to take advantage of the US Treasury Section 1603 Renewable Energy grant and the VT Renewable Energy

>> Cont'd on p.18 >



## AN ENERGY OPTIMIST

By Gaelan Brown

## -Group Net Metering in VT!

**Many homes and businesses** don't have ideal roofs for solar power, & wind turbines don't usually make sense in someone's back yard. So even though solar and wind power now make economic sense, many people cannot easily become energy independent with these sources even if they have the money to make this kind of investment.

A few years ago the VT legislature made what was touted as a landmark change that would enable "group net metering" for wind & solar power. The idea was that a group of people can install a large solar or wind power system that feeds power directly into the grid vs. being located on their property, but each member of the group can apply their share of the monthly power production to their own residential/commercial power bill.

Generally, commercial-scale solar/wind installations are more cost-effective than residential-scale systems. With today's prices & incentives, members of a solar or wind-group should expect to see a cost-per-kwh over the 30+ year life of the system that is below today's utility prices.

I have been involved in organizing two

group-net-metering efforts in VT; one that aimed to install a 100kw NorthWind 100 turbine from local manufacturer Northern Power; and another that is focused on solar power. My initial conversations with power companies and state regulators implied that the administrative process was still unclear since the concept was new, but that it worked something like this:

Someone from the group informs the power company each month as to how many kwh credits should be distributed to each member's power bill, based on their share of ownership of the wind/solar system and how many kwh the system produced each month.

The power company would then apply credits to each member of the group, reducing or eliminating their power bill.

Since this sounded feasible, and since other group-net-metering projects in other states like Colorado have developed automated software to easily handle this monthly bill/credit accounting, we have been proceeding to find land and to setup

>> Cont'd on p.29 >>

## LARGEST PRIVATELY OWNED SOLAR

## IVEK CORPORATION

By Nancy Rae Mallory

Dec. 14, 2010 Springfield, VT

### IVEK Corp. Solar Celebration

**This** is officially the largest, privately owned "net-metered" system in VT, at 209 kW! It is expected to meet from 90-100% of their electrical needs!!

The sun came out, after the cloudy, gray months this year, along with some new snow that lasted into the morning. As I drove down to Springfield, VT, to attend this celebration, it was amazing - to see the sky open, revealing blue skies and the long lost sun - just in time to show guests how the IVEK solar works!

The ceremony was well-attended, including the installer, Paul Biebel, as well as his son, Tim - owners of Prudent Living of Windsor, VT. Mr Biebel explained that the project worked so smoothly because of the 'team effort'.

He thanked Mr. Tanny, CEO of IVEK and Mr. Blake, Operations Manager for entrusting this project to them. "It took some faith on their part. The journey through the jungle of paperwork and finances was more unpredictable than



any of us thought it would be. I am grateful to the whole Prudent Living and Biebel Builders and Brite-Lite Electrical Crew for their precision effort as well as Jerry and Don from ResTec, our good friends and partners. Many thanks, as well, to Doug Gurney for staying just ahead of us and also for Jim Williams for his beautiful fence work. Last, but not least, I'd like to thank Greg Heaton from CVPS - always available to answer questions." This team completed the project in just nine weeks from start to finish.

I'd like to also thank Mark for giving me this opportunity to express my passion for Renew-

>> Cont'd on p.34 >

## Sleepy Hollow - x-c ski with Solar!

By Eli Enman

### Sleepy Hollow Inn, Ski and Bike Center of Huntington, VT are skiing green.

We added two 4kw AllEarth solar trackers in November, 2009. These dual axis solar trackers have produced 60% of Sleepy Hollow's electric production in 2010

(Total annual solar production of 10,511 kwh). The solar panels are grid inter-tied, and pay just over \$0.15 per kwh, so our solar panels offset \$1584 worth of electricity for us in 2010. We received a 30% Federal tax credit, as well as a 30% VT tax credit which helped make the project more affordable. We paid \$24,800 total after tax rebates, giving us an approximate payback period of 15.7 years. The trackers are connected to the internet, allowing us to monitor their daily, monthly or yearly production at www.allearthrenewables.com (We are site ID #117)

Sleepy Hollow is a family run business.

We operate an 8 bedroom bed and breakfast, featuring 40km of Nordic ski and snowshoe trails and mountain biking in the summer. We also offer our Round Barn event center and host many weddings and events year round.

>> Cont'd on p. 35 >



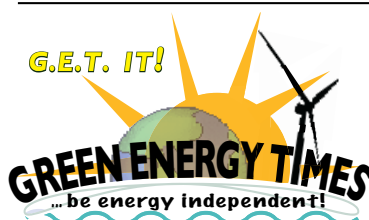
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HOW sustainable is your COMMUNITY? pg 24-25 >>

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## GREEN ENERGY TIMES (G.E.T.)

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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 save our planet. Think Solar, Wind, Hydro... and energy reduction! Believe in this earth! <Solar works!... anywhere! under the sun!>**

G.E.T. is published quarterly, Feb. 15, May 4, Aug. 5 & Nov. 5, by NRM Advertising Company. It is free and available throughout 85% of VT & 45% of NH: the Upper Valley-St.J. down to Brattleboro, Windsor-Ludlow, Barre-Montpelier-Burlington, Stowe, Mooretown-Waitsfield, Morrisville, Hardwick, Danville, NEK, Grand Isle, Woodstock-Rutland-Bennington; NH: Woodsville-Hanover-W. Leb.-Plainfield, Enfield-Claremont, Keene-Concord-Plymouth-Laconia, Littleton, & towns in between...

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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](mailto:info@greenenergytimes.org).

**We want to hear what you are doing to make a difference! Together we all can make the difference! Peace!**

**Green Energy Times wants to hear what YOU are doing to help to reduce your and our dependence on Fossil Fuels. Your example may be the one that makes the difference!**

**Next Issue of G.E.T.: May 4, 2011.**  
**Feature: How Sustainable Is Your Community?**  
**Different towns will be highlighted in each of our issues throughout the year.**  
**Let us know what your town is doing!**  
**Feature 2: Rte 100 Corridor - Action abounds!**  
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## Letters to the Editor

Nov. 8, 2010

Hi Nancy Rae -

Looks terrific! I know why your newspaper is doing well: 1) so much energy/enthusiasm in the pages, 2) truly grass roots - everyone gets a chance to have a story, if possible. Not full of big guys lecturing you and shots of huge installations no individual can afford, but stories from the little guys with attainable installations.

- Thanks, Todd (Walker)

P.S. Could you send me a couple of hard copies of this issue for my files?

Nov. 17, 2010

Nancy Rae -

If you have information on Thetford's Energy Committee, I would be interested in having it. I'm in the process of trying to get off of the Net Metering program we are on with CVPS and switch over

## SOLAR POWER WORKS ...ANYWHERE UNDER THE SUN!

### Biomass Concerns

Oct. 22, 2010

Dear Green Energy Times,  
Burning forests for electricity, aka biomass incineration, is being proposed as a "clean and green" power source, but questions remain concerning health, climate and forest impacts.

Unlike solar and wind, biomass incinerators put out harmful pollutants such as Carbon Monoxide, Sulfur Dioxide, Nitrogen Oxides, Hydrochloric Acid, Ammonia, Formaldehyde, Chlorine, Dioxins, and Particulate Matter.

The American Lung Association cites concerns about "severe impacts on the health of children, older adults, and people with lung diseases" from biomass, while the Massachusetts Medical society states, "biomass power plants pose an unacceptable risk to the public's health by increasing air pollution."

In June, Massachusetts released the "Manomet" study, demonstrating that biomass incineration will release more global warming gases than coal over the very timeframe climate scientists insist we must curb our carbon emissions.

Forests already act as the planet's best climate buffer through the sequestration and storage of CO2. According to NASA, logging forests is the #2 cause of climate change.

Instead of more biomass, let's ramp up energy efficiency and conservation-reports estimate that Vermont could meet 19-30% of electricity demand from efficiency measures alone.

The reality is that no combination of renewable energy can power the American way of life unless we transition our lifestyles to something the planet can sustain.

- Josh Schlossberg, Communications Coordinator, Biomass Accountability Project Editor, Biomass Busters newsletter ([www.StopSpewingCarbon.com](http://www.StopSpewingCarbon.com))

to a FIT program. I contacted CVPS and they acted as if they had never heard of "Feed-in Tariff" which is a scary response to be faced with, so I'm beginning to lose a little confidence in my ability to make this change. Any information you have that would help me would be most appreciated.

- Cheers, Bill Bassett

Hi Sue and Lawrence!

I received this from a family, whose solar home we featured in a previous issue of Green Energy Times. I realize this is an option for the differing Utilities here in VT & that GMP is the most agreeable. How would you suggest that I advise him? I have already encouraged him to contact the state legislature to express his opinion and to encourage all of the utility companies to follow GMP's example. Do you think that the rates will one day be

state-wide, following the example of GMP's net-metering rate?

Nancy, Bill,

The Standard Offer program (Vermont does not have a traditional - FIT for specific reasons and to avoid FERC jurisdiction) is administered through the SPEED program go to [www.vermontspeed.com](http://www.vermontspeed.com).

The utility has no jurisdiction, no information. Your experience is not a surprise.

The program has been full ever since it opened a year ago (Oct 24 2009). The list is long and I would assume you will not make it in.

In short, REV is working to change some of the net metering rules and potentially look to spread a GMP program across the state, but nothing yet.

Stand by, & please if not already, join REV!  
- Best, Lawrence H. Mott, New Generation partners And Chair -REV





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# RADIO

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Radio Free Vermont Attn: Artist Submissions P.O. Box 28 East St. Johnsbury Vermont 05838

Dear Josh,

Thank you so much for all of your efforts and your concerns about biomass.

While we appreciate what your concerns are, I would just like to make sure that our readers understand that these concerns are indeed of value when it comes to making electricity from biomass. Josh is 100% correct in that there are clean alternatives to meet our needs for electricity - Solar, Wind, Hydro...

But - when biomass is used to generate heat for a community, perhaps we need to look at it from another angle. If the same number of families use wood stoves to heat their homes or use fossil fuels, what would the impact be on our environment in comparison to a biomass facility for heating homes and businesses of that same number of buildings? The emissions would be higher if done individually and the forests would probably have less of an impact. A district biomass boiler burns low-emissions, carbon-neutral wood (the CO2 released by the gasification combustion process is no greater than the CO2 absorbed by the trees during their life). These facilities, if run in a socially conscious manner strive to use low grade and waste wood and encourage healthy forest management. The burning is much cleaner than many of the woodstoves that are currently being used. Biomass for heat can lead to a more sustainable future, if done right! Is it a solution that makes sense for now - until something else develops that might be better.

Josh is correct - when biomass is used for making electricity! He is right about our need to ramp up energy efficiency & conservation! We must learn to reduce our emissions now & transition into a truly sustainable future. Let's all work harder to turn our wasteful habits into a higher level of energy consciousness. ~ G.E.T.

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## Spain Generated 3% of its Electricity from Solar in 2010

- Despite Fallout--Spanish Solar Systems Delivering Billions of kWh
- Wind Now Bigger than Hydro or Coal
- Produces More Wind & Solar than California

By Paul Gipe

January 27, 2011

Red Electrica reports that Spain generated nearly 3% of its electricity from solar energy in 2010.

Despite withering criticism of Spain's once-thriving solar industry, projects installed during the boom years of 2007 and 2008 are producing commercial quantities of electricity.

The network operator's preliminary report on 2010 says that solar energy produced 6.9 TWh last year from 4,000 MW of generating capacity, mostly solar photovoltaics (PV), for 2.7% of supply.

- Wind turbines generated nearly 43 TWh in 2010 for 16.4% of supply, slightly more than hydroelectricity.
- Spain's hydro plants produced more electricity last year, 38 TWh, than anytime since 1997.
- The new renewables of wind and solar in combination provided 19% of supply.
- Together both new and conventional renewables delivered 34% of Spain's electricity.
- Spain's climate, geography, and population are similar to that of California. Spain's 46 million inhabitants consume some 260 TWh per year.
- California's 37 million people consume about 300 TWh per year. However, wind energy generates less than 6 TWh per year and solar less than 1 TWh per year. Together wind and solar provide only 2% of California's electricity.

### SPANISH RENEWABLES GENERATION 2010 Red Electrica

	Total TWh	Renewable %	Renewable GW
Hydro	38	14.6%	16.7
Nuclear	61.9	23.8%	7.7
Coal	22.4	8.6%	11.4
Fuel/Gas	1.8	0.7%	2.9
Combined Cycle	64.9	25.5%	25.2
Self Consumption	-6.7	-2.6%	
Wind	42.7	16.4%	19.8
Solar	6.9	2.7%	4
Other	40.9	15.7%	9.8
Pumped Storage	-4.4	-1.7%	
Exported	-8.5	-3.3%	
TOTAL DEMAND	259.9		

<http://www.wind-works.org/FeedLaws/Spain/SpainGenerated%203of%20itsElectricityfromSolarin2010.html>

## Hinesburg Becoming Solar Capital of VT

December 21, 2010

**The Town of Hinesburg, VT** and AllEarth Renewables, Inc. of Williston, VT have partnered to install 31 AllSun Trackers® on Lagoon Road, south of the town's wastewater treatment plant. Over the course of a year, the 141 kWt photovoltaic array is expected to produce 200,000 kilowatt hours (kWh) of electrical energy which will provide over 45% of the electricity used by Town-owned meters.

Hinesburg is quickly becoming the solar capital of Vermont. According to the Renewable Energy Atlas of VT, this project is the largest municipal solar installation in the state. When combined with other solar electric projects installed by Hinesburg residents and businesses, Hinesburg leads Vermont towns with over 500 kW of solar photovoltaic capacity which produces

enough electricity for over 75 homes.

"The Hinesburg community has been very active improving energy efficiency and rolling out renewable energy installations from solar trackers to small-scale wind turbines to solar powered parking lights," said Alex Weinhausen, Hinesburg's Director of Planning & Zoning. "This solar tracker installation is another excellent example of how the Town of Hinesburg is moving forward the conversation and

the actual implementation of Vermont's emerging energy future. Together with community members and our business partners, the Town is demonstrating that local and distributed renewable energy generation can and does work."

"Hinesburg has taken an important step towards energy independence and is leading the way for other VT towns," said David Blittersdorf, President and CEO of AllEarth Renewables. "This project shows great fore-

sight on the part of Hinesburg town government by finding an economical use for land that was otherwise not being utilized."

The AllSun Tracker is a complete grid-connected solar electric system which consists of photovoltaic panels mounted on poles installed in the ground. The system uses a GPS (Global Positioning System) and a dual axis rotation to keep the solar panels at a perpendicular angle to the sun's rays throughout the day.

This maximizes the amount of light reaching the panels, which in turn maximizes the amount of energy generated, providing as much as 40% more electricity than fixed panel installations of the same size. More than 340 AllSun Trackers have been installed in VT to-date, creating over one million watts of renewable power capacity. ♻️

AllEarth Renewables, Inc. [www.allearthrenewables.com](http://www.allearthrenewables.com)



# Advance Transit goes Beyond Solar

By N.R. Mallery

January 21, 2011

Today it was announced that Ontario has leapt to second position as a leader for Solar PV in No. America. "Of the total solar PV capacity in Ontario, 22 MWDC has been installed under the microFIT program for small rooftop systems less than 10 kW. The remainder of capacity has been installed under the province's Renewable Energy Standard Offer Program or RESOP, the forerunner of the current FIT Tariff and microFIT programs." (posted in G.E.T. 1.21.11)

Subsequently today, Green Energy Times attended the Solar FIT Celebration for Advance Transit, in Wilder, VT. Extending congratulations for the installation was Senator Sanders



Steve Tofel, Van Chesnut & Senator Sanders

who said that Vermont is the leader in Energy Efficiency in the US, but that we have a ways to go with renewable energy. He hopes to see us become the leader there in the near future. (We have to work hard to beat Ontario & CA, but we are making huge advances here in VT!)

The installation was a long time in coming... but is indeed an exemplary FIT project that we hope will lead to many more! Advance Transit has achieved a very responsible undertaking that goes beyond the Solar PV, which was installed by ReKnew Energy Systems, of South Strafford, VT.

Van Chesnut, Executive Director of Advance Transit, shared that they have also taken many other steps that will serve to help our planet

and the future of our children...

The project was designed by Weimann Lamphere Architects, Colchester, VT & constructed by D.E.W. Construction, Williston, VT to improve the operational efficiency of Advance Transit in order to provide more effective & reliable transportation to the surrounding community. The building size was increased by 14,300 sf, allowing the fleet of vehicles to be housed indoors in a sky-lit bus barn. The thermal envelope of the existing building and the new addition was improved and will allow reduced operational costs to maintain air quality & temperature.

A new membrane roof with a high Solar Reflectance Index (SRI) provides a surface that reflects much of the sun's solar radiation & thereby reduces the build-up of heat in the building during the summer. The building's bus-wash equipment uses rainwater from the roof's rain leader collection system, in underground storage tanks. After use, the water is then run through an oil/water separator before leaving the site.

The waste oil recouped from the bus fleet maintenance will be re-used in specialized waste-oil burners to partially heat the building during the winter, reducing environmental impact from the disposal of waste oil...

They have purchased a new electric bus, in an effort to reduce their emissions and wasted fuel usage. *Mr. Chestnut shared that they have plans for many other steps that will serve to help our planet & the future of our children.*

## Rooftop Solar on Advance Transit Building



# TRANSPORTATION



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Commuting Resources

Go Vermont is a free resource for commuters who want to reduce the cost and environmental impact of driving. The program features a carpool/vanpool matching service and lots of practical information about other ways to get around.

## Get Started

To learn more and sign up, visit [ConnectingCommuters.org](http://ConnectingCommuters.org) or call 800-685-RIDE. Be sure to ask around at work to find out if others are interested in participating, and if your employer offers any rideshare programs or incentives.

## Win Stuff

Register with Go Vermont and be automatically entered to win movie tickets, gas cards, restaurant or shopping gift cards, coffee and more.

## Guaranteed Ride Home

Registered Go Vermonters who share a ride two days per week or more are eligible for the Guaranteed Ride Home benefit. It pays up to \$70 to get you home in case of an unexpected change of plans.



ConnectingCommuters.org

A program of the Vermont Agency of Transportation • 800-685-RIDE

\*Based on 100% pass-through rates. Actual results may vary.

# Guilty!: transportation & buildings

By N.R. Mallery

The two worst offenders for our atmosphere are Transportation and Buildings. We are thrilled to know that GO Vermont and Upper Valley Rideshare understand this and have plans that should help move things in the right direction for our states.

The Go Vermont program has two such initiatives planned in FFY 2011 – "Direct to Business" and "Direct to School". These include: Web Development and management, Vanpool Program, Bike Rack program, Way To Go, Pool To School, Park & Ride Presence (sign project). Kudos to Go Vermont for their efforts.

There are good programs also happening in the state of New Hampshire, which include the Upper Valley Rideshare Program: [www.uppervalleyrideshare.com](http://www.uppervalleyrideshare.com). Upper Valley Rideshare is a FREE commuter matching service provided by Advance Transit. They are dedicated to find better ways for commuters to travel to and from work. "Driving alone is not only expensive, but it is a major factor in traffic congestion & air pollution."

To help commuters form carpools, UV Rideshare uses computer-matching software to locate potential partners & offer Emergency Ride Home benefits to everyone in a registered carpool too - Free! Kudos to UV Rideshare.

We look to a future that will automatically include public transportation. This is our future. We hope that you can figure out how to incorporate it into each of your lives...

We may not be able to 'fix' every situation with public transportation, but if we could just concentrate on mass transportation's large numbers of employees that work at the same place... and currently all drive separately!, it would make a huge impact on our environment. This is certainly a good place to start.

Green Energy Times would like to hear stories of your own experiences of incorporating public transportation in your life! Please share them with us at [info@greenenergytimes.org](mailto:info@greenenergytimes.org). It could be your example that helps someone else! ♻️

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# TRANSPORTATION

## Go Vermont helps reduce Air Pollution & Traffic

by Ross MacDonald, Go Vermont Program Manager

While you may be familiar with VTrans for its responsibilities maintaining the state's roads and bridges, you may not be aware that VTrans also manages a program designed to reduce their use. The Go Vermont program was developed for the dedicated purpose of helping people find alternatives to single-occupant car travel.

As we seek to make the changes necessary to

move toward a sustainable society, it makes sense to examine our individual transportation choices.

The fact is, no significant progress can be made in reducing air pollution without specifically addressing transportation, which accounts for over 44% of the VT's greenhouse gas emissions. Luckily, the framework and capacity to help significantly reduce vehicle miles traveled (VMT) exists right now!

Since 2007 (when the Go Vermont program replaced the VT RideShare program) it has undergone substantial changes in every facet of its services, including replacing the formerly labor intensive, manual ride-matching program with a faster, more efficient web-based program; expanding from the former carpool/commuter program to a total "alternative transportation clearinghouse", featuring a new vanpool program, an automated ride-matching service, and information for efficient transportation throughout the state.

Go Vermont has downloaded statewide public transit routes for the automated matching service, resulting in instant display of route options for carpool, vanpool, and public transit routes.

The direct promotion/marketing/outreach activities of Go Vermont are now far and away the largest expense for the program versus previous expenditures for human resources and manual processes. Go Vermont has reduced the steps necessary to qualify for the parking passes and the Guaranteed Ride Home benefit, and has added a self-service access component for the entire program. Active registrants for Go Vermont exceed 3,500; up from 2,700 in October of '09.

Go Vermont has recently launched a service for customers who are looking to carpool for "single trips" such as to a recreational opportunity, special event, or a ride home from college.

With the pieces now in place, Go Vermont is striving to improve on the current framework and hit the streets with a three pronged plan of Awareness, Information and Action.

### AWARENESS

Since 2008, two surveys have shown the overall brand awareness of Go Vermont has increased from just under 20% to almost 30% in 2011. While this is a positive trend, it is our goal to have over 75% of Vermont residents aware of this program. Through local media, direct-to-business / direct-to-school projects, and by presenting at social and business events, we've been able to reach thousands of Vermonters. But we cannot overlook the most valuable resource... the word-of-mouth advocacy from people who have investigated and/or participated in the program. Since transportation behaviors can be directly linked to economic conditions, we need to ensure these services come to mind and can accommodate as many people as necessary if/when there is a change in either economic conditions writ large (i.e. increased gas prices and costs of living, supply shortages) or in an individual's own situation (i.e. job loss, lack of a vehicle). The Go Vermont program is ready to serve one person or 100,000 people investigating carpool, vanpool, or public transit options today.

### INFORMATION

Transportation is paid for through so many different bills that the real totals tend to be underestimated. For example, as of Feb. 1, 2011 a year long estimate of a 30 mile commute to and from work would cost over \$1,575 in gas alone. Add the oil changes, other vehicle maintenance and all the related costs,

Reduction in:	Carpool	Transit	Vanpool
Carbon Monoxide	5.67 lbs	7.56 lbs	6.8 lbs
Oxides of Nitrogen	.91 lbs	1.22 lbs	1.1 lbs
Organic Compounds	.74 lbs	.99 lbs	.89 lbs
Particulates (PM25)	.03 lbs	.04 lbs	.04 lbs
Vehicle Miles	183	244.1	219.69
Cost savings	\$91.54	\$122.05	\$109.84

Table 1: Comparison for a 48 mile total daily commute, 5 days a week.

and one is looking at well over \$7,000/yr. (using the approximate Federal GSA rate of \$.50/mi.!) Carpooling with one person would save over \$700/yr in gas charges, and that's just the beginning of the associated savings. The bottom line is most folks think they spend far less than they actually do for a daily commute, and these costs represent the first or second largest cost to a Vermont family; on average that is approximately 16% of annual income, just under the 18% average of mortgage costs, and more than healthcare and food combined. It is critical that real-time costs and information are brought to people so that they know the full economic impact of their transportation choices (and how easy it would be to save significant dollars!). The environmental impacts are vast but are difficult to relate. The Go Vermont program also includes a "Commute Calendar" so customers can record their transportation choices and can actually see the financial and environmental benefits of their choices.

### ACTION

Go Vermont is ready to help you with all of your transportation options. Just click on [www.connectingcommuters.org](http://www.connectingcommuters.org) or give us a call at 1-800-685-RIDE. Your cost savings & improved environmental footprint can start right now!

Thx to Ross MacDonald at Go Vermont for this material & efforts to reduce our CO2! ♻️



## COMMUTING IN THE UPPER VALLEY

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

**Rural Community Transportation Inc.** serves St. Johnsbury. <http://www.riderct.org>

**Advance Transit** will get you around Lebanon, Hanover & Dartmouth (802) 295-1824 <http://www.advancetransit.com/>

**City Express** services Keene <http://www.hcsservices.org/services/transportation/cityExpress.php>

**Chittenden County Transportation Authority** is Burlington's bus service with links to Montpelier, Middlebury & commuter route to Milton. <http://www.cctaride.org>

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

**CT River Transit** provides services in & around Bellows Falls & Springfield. <http://www.crrtransit.org>

**Green Mountain Transit Agency** Provides local service in Barre, Montpelier, Grand Isle, Stowe & Lamoille connecting with commuter services. <http://gmtaride.org>

**Green Mountain Railroad** has day trip specials available from White River, the Champlain Valley, Bellows Falls & Rutland <http://www.rails-vt.com/>

**Dartmouth Coach** (800) 637-0123 <http://www.dartmouthcoach.com/>

**Amtrak** <http://www.amtrak.com> (800) 872-7245 Long distance train service. Offers discounts for AAA membership & student advantage card

**Greyhound/Vermont Transit** Greyhound/Vermont Transit long distance bus services <http://www.greyhound.com/HOME/en/NewBuses.aspx>

**Cape Air** connects Lebanon & Rutland to New York & Boston. <http://capeair.com>

**Lake Champlain Ferries** <http://www.ferries.com/> Transportation between NY & VT via Lake Champlain

**Go Vermont** provides support for carpoolers [www.connectingcommuters.org](http://www.connectingcommuters.org)

**Upper Valley RideShare** provides support for carpoolers. <http://www.uppervalleyrideshare.com>

The ultimate websites for getting around in VT & NH are: <http://www.aot.state.vt.us/links.htm>. <http://www.nh.gov/dot/nhrideshare/links.htm> ♻️

## WVO TRANSIT PART II

By Todd Tyson

Over the slippery years of my immersion into the grease transit life, many operational issues have come up within the greasefleet...Friedrich, Petra & Aldo. It would be disingenuous to blather on about the upside of WVO as an alternative fuel without some cautionary words about performance & relative reliability.

Inadequate advance filtration, winter temperatures & engine fuel filter failure are the leading culprits in slowing or stopping your grease ride. As mentioned in Part I of this series, the care & consistency during the advance filtration will head off most problems when the WVO fuel is actually being combusted in your modified diesel engine. Quality feedstock, sufficient advance settling/drainage/heating combined with 1 micron filtering & clean storage containers all play key roles in ensuring reliability while on the road less traveled.

Almost all older diesel vehicles come equipped with an internal block heater to help keep the oil pan warm on the coldest winter nights (10 degrees or lower in my experience). When you throw WVO into the mix, additional heating elements need to be added to the grease tank & the engine to afford a quicker transition from diesel to WVO after start-up. "Greasers" in warmer climes like southern CA &

AZ can often slide by without any additional heating elements, & occasionally without any engine retrofits whatsoever. Here in VT, I have been able to changeover in about 10-15 minutes of running on diesel from a sub-zero start.

Despite my own inclination to push the envelope on temperature parameters, all prospective greasercar drivers should flow with the "urge to purge". Leaving warm grease in the fuel lines after shutdown for more than 15 min. on bitter cold days

is a recipe for an expensive tow job to the nearest heated garage. Try to envision your vehicle as possessing a sensitive digestive system that needs some TLC respective to its diet & overall metabolism.

On the fuel filter front, also part of your rig's intestinal fortitude, basic maintenance is as straightforward as developing the ability to change the maxed out filter (personal record of 4.5 mins. somewhere in central Iowa) after purging & re-starting in diesel mode.

By adhering to these simple oversight steps of the WVO world, grease

vehicle operators can limit the steady trickle of indigestible anecdotes that have become part of my own personal alt fuel saga.

**Next Issue:** WVO, alternative fueling & breaking the shackles of Peak Oil...a cost comparison

**Todd Tyson** lives in Tunbridge, VT - CGO (Chief Grease Operator) of the Tunbridge Grease Collective. He can be reached at [folkbloke@hotmail.com](mailto:folkbloke@hotmail.com) ♻️

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# Off-Grid System Overview

## THE PROCESS

Sun shining on solar modules, wind blowing a wind generator, or water running through a micro-hydro turbine generates DIRECT CURRENT electricity, or DC. This energy is stored in batteries, which give back electricity as needed, even when no power is being produced. Like a bank account, power put into batteries over a period of time can be taken out more quickly if a lot is needed. The total amount of power you withdraw cannot be more than you put in, or the account will be depleted. Moreover, lead-acid batteries need to be frequently 100% fully charged to remain in good condition. They should never be drawn completely down to empty (we recommend no more than 50%). Because of these needs, to get the most years from your batteries requires some supervision by the owner. An inverter converts this 12, 24 or 48 volt DC power from the batteries into 120 volt AC current, the same as utility power for standard household loads. Some homes incorporate both AC and DC wiring in cases where using DC can save energy.

There are many rebates available for renewable energy installations, visit [www.dsireusa.org](http://www.dsireusa.org) to see updated information for your state. Although most incentives are still geared for grid-tied installations, the Federal Tax Credit does apply to off-grid installations as well and can make renewable energy systems less expensive. Getting off the grid is much easier now than it ever has been as technology and experience in the field has grown.

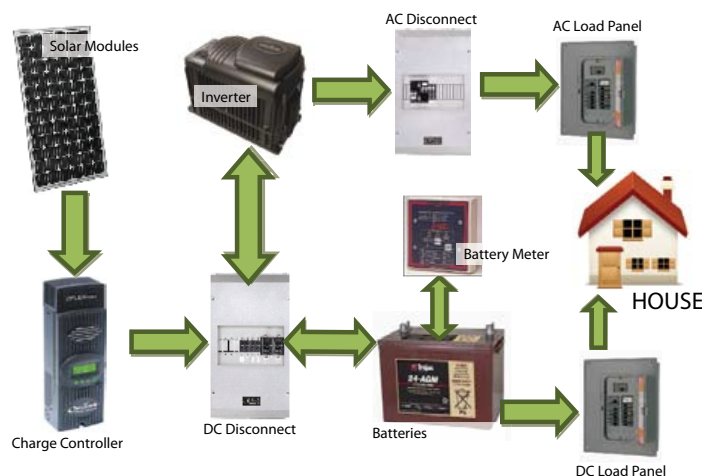
## THE HARDWARE

**SOLAR MODULES** are installed in groups of 1 to 18+ modules on a solar mount, which in turn attaches to a building, or atop a metal post in the yard. Together this is called a solar array. Each solar mod-



ule is wired to the other modules in that array by sunlight tolerant solar interconnect wiring. Several arrays may be wired to a solar combiner box where they are all connected to heavier underground wires taking the power to the battery and equipment room.

A **CHARGE CONTROLLER** is a small wall mounted component receiving the power from solar, wind, or micro-hydro generators, and controlling the flow of power to the battery. To prevent battery damage from overcharging, the charge control automatically cuts back, stops, or diverts the charge when batteries become full. A



charge control may have manual control switches and may have meters or lights to show the status of the charging process.

**BATTERIES** receive and store DC electrical energy, and can instantly supply large surges of stored electricity as needed to start or run heavy power appliances that the solar panels or hydro electric generator alone could not power. This large power capability can be a fire hazard just like utility company power, so fuses and circuit breakers on every circuit connected to a battery are essential. Battery size is chosen for both surge power requirements and for the amount of reserve power needed. Typically, 2 to 15 square feet of batteries weighing 150 to 5000 pounds are enclosed in a battery box with a vent pipe to the outside.

The **INVERTER** is the major electronic component of a power system. It converts DC power stored in batteries to 120 volt AC, standard household power. Short, heavy cables with a large fuse or circuit breaker carry battery power to the inverter. After conversion to AC, power from the inverter usually connects into the circuit breaker box of the house in place of utility lines. The house breaker box routes power to lights, appliances, and outlets of the house.

A **STANDBY INVERTER/CHARGER** is an inverter that also has a battery charger and transfer relay built in. When the input terminals of a standby inverter/charger receive power from an outside source of AC (a generator or utility power) the inverter stops producing AC power from the batteries and instead passes generator or utility AC power straight through to the house. At the same time it uses the generator or utility power to recharge the batteries. Some standby inverters even auto-start the generator when batteries need charging. A separate battery charger can be used instead of (or in addition to) a standby inverter/charger.

An **ENGINE GENERATOR** (not pictured) producing 120 volt AC power is usually part of the system. This is a second source of AC power and a backup for charging the batteries when there is a shortfall in solar or wind power, a temporary need for additional power for construction or visitors,

or in case of breakdown of other equipment. Just starting the generator begins the standby inverter charging process. The best generators start automatically or by push-button from the house.

A generator is located outside, usually in its own shed at least 30 feet away to avoid noise. For reasons of health and safety, it should not go in a basement or garage. 120V AC power from the generator goes through a circuit breaker, then is wired into the power room to run battery charger/s as well as supply the AC power to the house whenever the generator runs. Since both battery charger and AC transfer relay are usually part of a standby inverter, the generator power usually connects only to the AC INPUT terminals of the inverter, not to the house breaker box. A few special lower cost generators are made to produce only battery charging DC voltage instead of AC. These send DC power directly to the battery.

**FUSES** or **CIRCUIT BREAKERS** are necessary in all DC wiring between the batteries and other power system components described, but not shown in the drawing. This prevents fires and equipment damage in event of a malfunction. Breakers may be separate components in their own box, or might be built into a power center. In contrast, the AC breaker box for household wiring is part of the house wiring, not usually included with power generating equipment.

**METERS**, like the gas and temperature gauges in a car, are necessary to show everything is working. Solar charge indicating meters are often built into the charge controller to confirm the charging process instantly. Other meters show how much power is being consumed, and confirm how much power is available. These battery system monitors can be located in the power room, or at a convenient spot in the home for easier checking.

A **POWER CENTER** (pictured right) is a product including system meters, DC circuit breakers, and wiring connections for batteries, inverter, solar and other charging sources. Power centers are easier to install and to pass building code than would be selecting, buying, and installing

all those parts separately. The power room is simplified, with just a few main components: powercenter with charge control attached, a standby inverter-charger, and a battery box on the floor. Some powercenters, like the Outback or Xantrex XW, are shipped as a completely assembled power system.

## WHERE DO I PUT IT?

Batteries, inverter, and electronic controls should be installed in a utility room inside or near the residence. Electronic equipment mounts on 4 to 5 feet of wall within 8 to 10 foot cable length from the batteries. Equipment could be installed on the outside wall of a separate battery closet. Batteries take 2 to 15 square feet of floor space within the cable length from wall mounted equipment, and should be beside, rather than directly in front of wall mounted equipment. Allow ample working room to check batteries, and avoid cramping everything in a tiny closet. Electronic components need the same environment as a computer, TV, or stereo: a place that is clean, and away from moisture condensation.

Batteries should not be accessible to children or others unfamiliar with their hazards. Flooded lead acid batteries emit minimal amounts of flammable, (nonpoisonous) hydrogen and oxygen gas when charging, so should be enclosed in a box vented to outside by a plastic pipe. They should stay above freezing but avoid temperatures over 100 degrees F. An outside battery and equipment shed may be used in moderate climates, but avoid putting batteries on a wood floor vibrated by the generator engine.

Distance from the power room to generator and to the house AC circuit breaker panel is not critical. A generator should be in its own shed some distance away, to avoid the noise.

Distance from power room to solar module location is limited, due to wire loss and voltage drop over a greater distance. Modules are best pole mounted, or can be roof mounted if trees and buildings prevent good sunlight at ground level. A clear space free of shading is best.



Article submitted by Sequoya Cross of Backwoods Solar. Photo thanks to Jon Hightower II and Tom Eileen. [ref: information from [www.backwoodssolar.com](http://www.backwoodssolar.com)]

**GRID-TIED APPLICATIONS** can utilize batteries or not, but go down if the grid does..

# WIND

## ExxonMobil Says Wind is Cheapest Form of Electricity Generation

by Jerome Guillet, Friday, Jan 28, 2011

If you look at the fine print, you see two provisos:

- To be cheaper, wind requires that carbon emissions be taxed to some extent (with no taxation, coal and gas-fired electricity still look cheaper). At heart, putting a price on carbon is a political decision which will be taken and accepted to the extent people accept that they have a responsibility towards future generations and show a willingness to bear (some of the) cost for highly diffuse externalities.
- Someone will pay for all that carbon in the atmosphere, we just don't know who or when exactly; putting a price on carbon is a collective way to acknowledge that cost and integrate it to current modes of power production. What is certain is that wind imposes no such externality on future generations and that, even if that cost is not taken into account, the cost of wind power is not that different from that of coal or gas-fired power.

Exxon notes that the cost of wind excludes the cost for backup capacity and additional transmission. But this applies just as much to individual coal-fired or gas-fired plants: a big 2GW coal plant presumably needs the same capacity available on standby in case there is a production or transmission failure in that plant, yet you never hear the argument about backup costs made about coal-fired power, because the power system has long been designed to cope with such needs. But the reality is that this makes the system able to deal with wind intermittency just as well, for low and medium penetrations, at almost no additional cost.

Wind power is intermittent but predictable, just like daily changes on the demand side; so current systems can manage just fine. The real issue is the potential future scenario where wind penetration is so high that you could conceivably have times with high demand, low wind, and not enough remaining capacity to cope with such demand. In such cases, you would indeed need to pay for spare generation capacity to cope with the lack of wind power generation.

But beyond the fact that such scenarios are rather far off (you'd need wind at 30-40% penetration, rather than the 5-10% you have today), the price for such backup, even if borne exclusively by wind power assets, would be rather low (backing up each wind MW by a gas MW, which would represent a massive over-investment even compared to worst case needs, would only increase the price of wind kWh by 25% or so).

And of course, the cost of coal and gas ignores the massive indirect costs we bear today when producing and transporting gas and coal - the cost of military deployments in the Gulf (Qatar, the largest gas exporter in the Persian Gulf, is basically a large aircraft carrier for the US military) and elsewhere, the health costs from coal mining, and the unmeasured costs coming from depending on supposedly unstable suppliers (remember the "gas weapon" which we're putting in the hands of the Russians by buying their gas?)

So the conclusion can be that wind costs roughly the same as traditional power sources - with none of their drawbacks, whether troublesome exporters to deal with, dangerous mining practices for local communities or unhealthy, and durable, by-products. And it's ExxonMobil saying so.

### Did You Know?

**A Union of Concerned Scientists study found that a 20% Renewable Energy Standard by 2020 would create over 185,000 jobs.**

Each turbine provides about \$5,000 in lease payments per year for 20 years or more to farmers, ranchers or other landowners. **According to the Union of Concerned Scientists, a 20% national RES would result in approximately \$1.2 billion in lease payments to farmers and rural landowners by 2020.**

Wind projects in rural areas also significantly contribute to the local tax base. One large (108-turbine, 162-MW) project in rural Prowers County, Colorado, increased the county's tax base by 29%.

Source: American Wind Energy Association [www.awea.org](http://www.awea.org)



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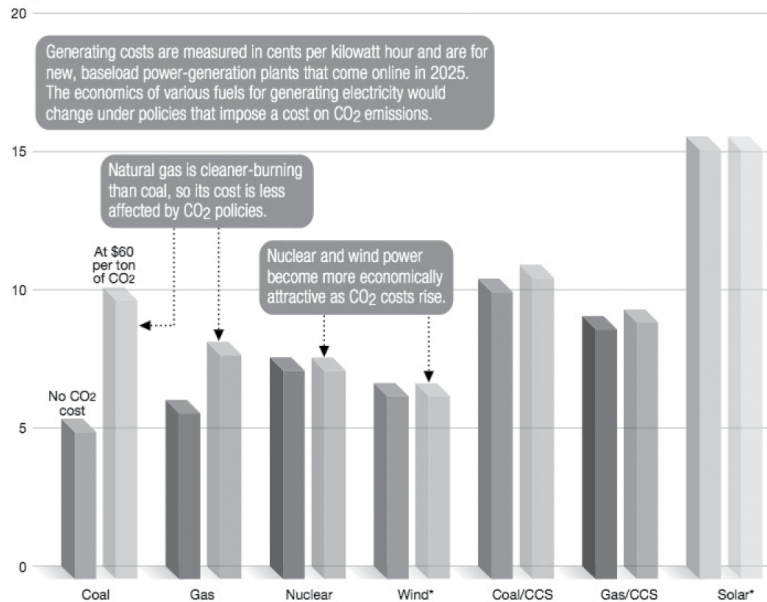


### Sometimes, a graph says it all.

This one is from ExxonMobil's yearly review of energy statistics and trends, called Energy Outlook: A view to 2030

#### Average U.S. cost of electricity generation in 2025

Cost per kilowatt hour in 2010 cents



\* Wind and solar exclude costs for backup capacity and additional transmission

### Update on Kingdom Community Wind hearings

**February 7, 2011.** The Public Service Board today heard from four witnesses regarding wildlife impacts. GMP's witness Jeffrey Wallin spoke at length about Green Mountain Power's proposal to mitigate for direct impacts of the project. The Company has proposed to conserve 180 acres of wildlife habitat permanently and another 400 acres for the life of the project, as well as paying for an additional 110 acres of property that the Green Mountain Club has preserved, allowing it to preserve additional land elsewhere.

The mitigation proposal preserves habitat important to bears such as beech trees and wetlands.

Adam Gravel spoke of effects on bird and bird habitat, concluding that there will not be undue adverse impact on breeding birds from the project.

Tomorrow's (Tuesday) witnesses will be Liz Pritchett regarding impact on historical sites, Gail Henderson-King for the town of Craftsbury, and David Raphael, GMP's expert witness on aesthetics. The hearing begins at 9:30 am at the Vermont Public Service Board hearing room.

The proposed Kingdom Community Wind project in Lowell is for 20 to 21 towers, with a capacity of up to 63 megawatts, enough electricity to serve 20,000 VT homes. The project is strongly supported by the local community, with 75% of a strong voter turnout supporting the project on Town Meeting Day in Lowell.

Dorothy Schnure, Green Mountain Power





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## TAKE ACTION!

### Rally Your Road Crew

Carpool and help relieve congestion on your daily ride to work. Did you know that Americans waste 2.3 billion gallons of gas every year while stuck in traffic. *Turn off your engine and don't idle if in stopped traffic!*

### Pump Up. Pump Less

Properly inflated tires can improve your gas mileage enough to earn you a free tank of gas every year.

### Mass Transportation

Ride public transit and help conserve and estimated 1.4 billion gallons of gas and curb the release of roughly 1.5 million tons of harmful CO2 a year.

### Jet Reset

Buy carbon offsets to help counteract the CO2 pollution from your next big trip.

### Power Down

The U.S. alone wastes over \$1 billion a year on computer monitors that are turned on when they shouldn't be.

### Shop Around

Lower the CO2 emissions of your appliances and electronics by up to 50% by buying the most efficient ones available.

### Bag For Life

Cut the amount of plastic bags you use when shopping by reusing bags or using a fabric shopper or 'bag for life'. Using fewer bag preserves resources needed to manufacture plastic bags.

### Reduce the Methane

Eat vegetarian foods as much as possible. Meat makes less efficient use of land, soil, water, and energy - and cows emit 300 liters of methane per day.

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# SOLAR Q&A

## Solar Uncertainty

with Howie Michaelson of Sun Catcher



This is the fourth edition of Solar Uncertainty. Again, if you have solar questions you'd like to have answered, for inclusion in future editions! please submit them to: [questions@suncatchervt.com](mailto:questions@suncatchervt.com) or [info@greenenergytimes.org](mailto:info@greenenergytimes.org).

**1. CAN A NON-PROFIT ORGANIZATION TAKE ADVANTAGE OF THE 30% FEDERAL TAX CREDIT OR GRANT?** Yes, but it can be complicated! The Tax Credit unfortunately is not available to any entity that does not have tax liability by statute (e.g. Non-profit organizations). However, there are ways for non-profits to take advantage of this incentive by enlisting the help of a private party (either a business or individual) that does have potential federal tax liability. Special agreements need to be established between the non-profit and private entity to allow for this transfer of tax advantage, but they are quite doable.

Additionally, two other options make accessing the Federal Tax Credit even easier for non-profit organizations. The Tax Grant Program (for the rest of 2011) allows businesses with little or no actual tax liability to still receive the 30% allowance, and do so immediately after installation of the system, as opposed to waiting till the end of year tax filing. The Group Net Metering mechanism now available in VT and potentially available in NH in the future (see other articles in this issue) allows a non-profit to set up a system on a taxable business or residence, and enter into an agreement with that party for sharing the electrical production of the system. These programs allow more ways for non-profits to take advantage of the 30% subsidy. This can get a little involved, so be sure to consult with your solar contractor to explore the various possibilities for financing systems.

**2. DOES GROUP NET METERING MAKE SENSE?** Group net metering is a way to pool your resources with other like-minded people or businesses buying electricity from the same utility company (see articles in other sections of this edition). There are other articles in this edition which speak specifically to this topic, but the program is an exciting new way to develop more solar energy projects on a local level. It allows various communities (defined by locale or mission or social connections) with members receiving their electricity from the same Utility (e.g. Green Mountain Power, CVPS, etc.) to work together to develop a Solar Electric Generation Facility on an appropriate site. This could act as great way to encourage more community focused activity, or a way for neighbors to get more involved in their neighborhood, etc. It is also a great way for individuals and businesses that are interested in capping their long-term electrical costs by investing in a solar electric system, but do not have an appropriate location for siting the system.

**3. MY SOLAR HOT WATER SYSTEM DOES NOT SEEM TO WORK AS WELL IN THE WINTER AS THE SUMMER - DOES THIS MEAN THAT MY SOLAR ELECTRIC SYSTEM DOESN'T WORK AS WELL THEN, TOO?** The short answer is yes. However, while your solar electric systems most-likely generates less electricity in the winter months than the summer months, that does not mean it isn't operating as well. In fact, solar electric systems in cold climates operate more efficiently in the winter than summer, because solar modules perform better, the colder they are. The reason systems produce less in the winter is the fact that there is just less available solar energy over our winters - the sun is up fewer hours per day, and it is lower in the sky meaning it has to travel through more atmosphere to get to us, diminishing its power. This is the same reason that Solar Hot Water systems produce distinctly less hot water during the winter months.

### IN FUTURE ISSUES OF G.E.T.:

- Are Halogen lights better than compact fluorescent lights for energy efficiency?
- What about LED lights?
- How often should I charge my batteries in my off-grid house?
- What about my grid-tied house with battery back-up?
- My Solar Hot Water system does not seem to work as well in the winter as the summer
- Does this mean that my solar electric system doesn't work as well then, too?
- Can I install a grid-tied Solar Electric system myself?
- How about a Solar Thermal system? ☼

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## It's Official! Putney School Fieldhouse IS BETTER THAN NET ZERO!

**A**fter a year The Putney School's Net-Zero Fieldhouse is officially Net-Zero. The Putney School's net-zero Field House has used 48,374 kWh of electricity while the sun-tracking photovoltaic cells that enervate it have produced 51,371 kWh. That's nearly 3,000 more kWh produced than the building used. Exciting news, esp. at the latitude of Putney, VT.

Designed by Maclay Architects in Waitsfield, VT and built by DEW Construction Corp., Inc., the Field House was opened for use in November of 2010. The first negative power bill, created because the photovoltaics continue to produce electricity regardless of the building's needs, came in April. At the end of the year, all of the usage and production numbers came together to make a zero (plus a little extra). Thus, they are officially a net-zero building.

The even better news, according to Business Manager Randy Smith, is that the differ-

ential in cost between what the building drew from the grid and what it sold back, because of a premium on green energy, was approximately \$3,800. In other words, the building was net-zero in terms of kWh, but became a money maker because of recent legislation in Vermont regarding green energy production.

The building is intended as a teaching tool. The message we really want to convey is that it is absolutely possible, even at this latitude, to affordably construct an institutional building that uses net-zero energy with current materials and technology. We're hoping that structures such as ours will serve as the model for building codes in the coming decades.

You can monitor the Field House's energy use and learn more about the construction details at [www.putneyfieldhouse.org](http://www.putneyfieldhouse.org).

Contact: Don Cuerdon, Director of Communications, The Putney School 802-387-6238

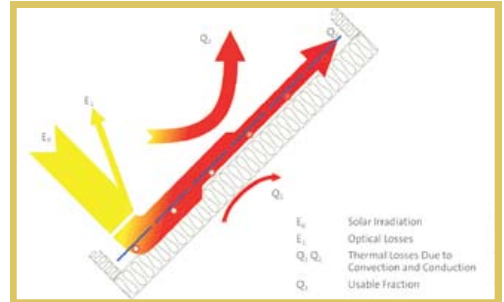


## FORGET GOING GREEN!!!

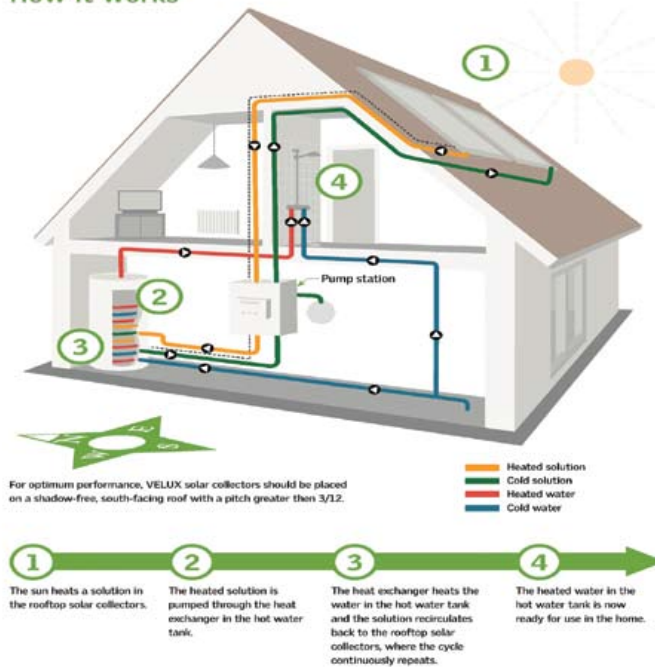
JUST THINK OF IT AS COMMON SENSE, BECAUSE THAT'S REALLY WHAT WE ARE TAKING ABOUT, OLD FASHION COMMON SENSE.

With the high cost of energy ranking as a top concern among American consumers, homeowners are turning their attention to renewable energy sources to lower energy costs and reduce consumption. This focus has led to a demand for products that make homes more energy efficient, including solar water systems. Seven years ago, when oil prices hovered around \$20 a barrel and the price at the pump was just above a dollar a gallon, energy costs barely registered among most of us as it wasn't costing us a good chunk of our paychecks to fill-up our cars. Today, you will find energy costs among

### PRINCIPLE OF SOLAR THERMAL COLLECTION



### How it works



the top concerns of most people and as most of us are trying to get the most out of every energy dollar we spend people are looking for solutions that can really save significant amounts of cash, not just the few bucks per year saved by putting air in your tires. Considering that the average household spends about 25 percent of its home energy costs on heating water, one would conclude that would be a good place to save by adding solar water heating. Solar water heating offers homeowners not only a solution to rising energy costs but also offers environmental benefits by offsetting your carbon footprint, it is just good old fashion common sense.

Studies have shown that owners of solar water heaters can save as much as 50-80 percent annually on their utility bills over the cost of conventional water heating. The benefits are so great that Solar Hot Water can even improve on the performance of tank-less hot water systems by reducing the amount of time they operate. I am often asked what can I do to, "Go Green", followed by a brief pause then, "Without having to changing my habits or lifestyle". See solar hot water is one of those painless changes that people can implement without altering their current lifestyle or energy use habits, while the efficiency won't be as great as someone that plans out their water use but it will still be significant. In fact, most Solar Hot Water Systems require no monitoring or setting of controls, it just does its thing and heats your hot water using the power of the sun, and no solar

rate hikes are planned that I know of, try saying that about propane, oil, or electricity. So how does it work you ask?

Solar water heating systems utilize one or more low-profile roof top solar energy collectors, (that look just like large skylights), containing a glycol (antifreeze) solution to gather heat. An electronic controller activates a pump to feed the heated solution through insulated tubing to a solar hot water storage tank. The heat is transferred through a heat exchanger from the hot solution to the cooler water in the insulated tank, where it is held until needed, and the cooled solution is returned to the collectors to be reheated and reused. In addition, the system includes an auxiliary heating source such as electric or gas to ensure a reliable supply of heat- ed water to combat New England weather.

While solar water heating systems usually cost more to purchase and install than conventional systems, the financial benefit of a solar system is realized over a long term of over 20 years. A typical solar installation for a three- to four-person household costs about \$8,000, but state and federal tax credits, state rebate programs and utility company incentives can reduce the final price tag by more than 50 percent. These savings, along with long-term savings associated from using the sun to heat the water, are causing those in the Twin States to take a serious look at the advantages of solar hot water.



## MAJOR SOLAR SYSTEM COMPONENTS

# ~ BATTERIES ~ Critical for Renewable Energy Systems

**R**apid growth in renewable energy markets worldwide has stimulated an increased focus on batteries. The battery bank in a renewable energy system is a key component whether you are grid-tied with battery backup or working completely off grid. The battery bank can represent a large cost of the system, so careful attention to selection, implementation and maintenance of batteries is critical to ensuring maximum return on your investment.

No matter the application, batteries used in renewable energy systems should be "deep cycle," meaning they are optimized for the deep discharge and recharge cycle characteristics of renewable energy systems. Very often, automotive batteries are selected for renewable energy systems due to their initial low price. Automotive batteries have a low cycle life and are designed to deliver high amperage over a very short period in order to start an engine. They are not designed to withstand the rigorous use inherent in deep cycling, renewable energy storage applications. Over time automotive batteries need to be replaced more often than deep cycle batteries ultimately costing the end user more money in the long run.

Deep cycle batteries typically used in renewable energy systems fall into two primary groups: flooded (FLA) and sealed-valve regulated (VRLA) such as AGM and Gel. Flooded batteries provide the best cycling performance of all deep cycle battery technologies and the most ideal option where lowest life-cycle cost is a key system design objective. However, to achieve their maximum potential life, FLA batteries require care and maintenance. For some applications FLA battery technology is not a viable option because maintenance cannot be guaranteed. For applications that require maintenance free battery technology

AGM or gel battery technology may be the best option. AGM batteries have a higher discharge current capacity and are often used as a backup power supply for a grid-tie system. Gel batteries provide better cycling performance in off-grid applications and are less sensitive to the high operating temperatures often found in hot climates. Both AGM and gel batteries are costlier than FLA batteries and do not provide the longevity of a FLA battery.

There are as many different battery manufacturers as there are battery technologies and choosing from the product offerings of different manufacturers is a matter of identifying the needs that are most important. Selection criteria often include the quality of the battery, product availability, ability to provide FLA and VRLA battery technologies, a dedicated technical support team, wide

distribution network, brand reputation and others. Companies like Trojan Battery Co. have been around for over 85 yrs, uniquely positioned

to provide all of these. The company has engineered a broad portfolio of flooded, AGM and gel batteries to specifically address the special needs of renewable energy applications.

Trojan offers expert technical support for questions about the right battery that will best fit your renewable energy system.

Dean Middleton is Director of R/E Sales-Americas, Trojan Battery Co. [dmiddleton@trojanbattery.com](mailto:dmiddleton@trojanbattery.com)

\*Green Energy Times recommends these batteries due to personal experience with them. Research prior to our purchase led us to T-105's. Trojan now carry a series developed exclusively for Renewable Energy. Trust them for quality & longevity! ♻️



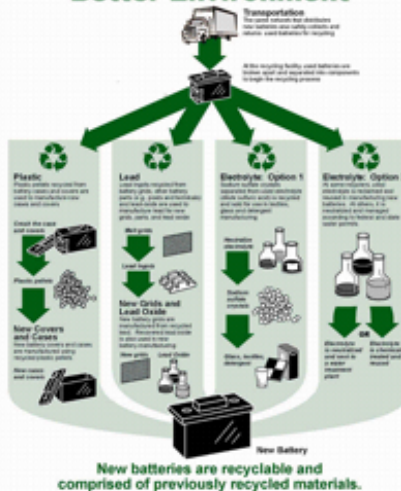
Trojan batteries provide reliable energy storage for homes located in the off grid community of San Felipe, Mexico.

## TIPS FOR MAXIMIZING YOUR BATTERY LIFE - FOR SOLAR APPLICATION

- Store and operate your batteries in a cool, dry place.
- For every 10°C (18°F) rise above room temperature (25°C or 77°F), battery life decreases by 50%.
- Charge your batteries fully after each period of use.
- Allowing your batteries to sit in a low state of charge for extended periods will decrease their capacity and life.
- If you store your batteries for an extended period of time, be sure to charge them fully every 3-6 mos. Lead acid batteries will self-discharge 5%-15% per mo., depending on the temperature of the storage conditions.
- Monitor battery voltage and specific gravity of the electrolyte regularly to verify full recharging. As a general rule of thumb, the total amps from your PV panels should be sized between 10% to 20% of the total amp-hours (Ah) of the battery pack.
- Many charge controllers have equalization settings that you can set to help ensure the health of your batteries. Equalize your batteries at least once per month for 2 to 4 hours, longer if your batteries have been consistently undercharged.
- Water your batteries regularly. Flooded, or wet cell batteries require watering periodically. Check your batteries once a month after installation to determine the proper watering schedule. Add water after fully charging the battery, using distilled water. With regular maintenance, batteries can last 10 yrs or more. ♻️

SYSTEM VOLTAGE	Voltage Settings	6V	12V	24V	36V	48V
	Daily Charge	7.4	14.8	29.6	44.4	59.2
	Float	6.6	13.2	26.4	39.6	52.8
	Equalize	7.8	15.5	31	46.5	62

## Recycling For A Better Environment



Graphic source: Battery Council International

## Did You Know? You Can Recycle Your Batteries!

The need to recycle all lead acid automotive batteries got us started on this mission. Green Energy Times is an off-grid solar-powered company, and the big bank'o batteries that stores the power from our panels is getting old. The batteries have reached the point where they need replacement, so we talked with the folks at the Interstate Battery distributorship in Wells River, VT, who helped us find the following information:

### Batteries, Batteries, Everywhere!

It seems like everything has a battery these days - cars, cell phones, computers, iPods, kid's toys, flashlights, even our watches! And when those batteries die, we have to replace

them ... at least if we want to keep using whatever was being powered. But then there's a problem: what do we do with the old batteries?

We all know some batteries contain some pretty scary stuff. Back before we had a clue about the dangers of heavy metal pollution, or the problems caused by acids and other chemicals leaching into our waterways, we just tossed them in the dump and assumed that meant the problem had gone away. But it turns out, there's no such thing as "away." It turns out landfills have a habit of leaking, and the bad stuff - mercury, lead, cadmium, lithium, and other heavy metals like to go with the flow, so to speak - running into our waterways, polluting our wells and municipal water supplies, and harming our families. So, lesson learned, we want to recycle those toxins, rather than drinking them (or eating them in our fish!)

### Lead Acid Batteries

A lead acid battery is the thing that makes your car start in the morning (or makes you ask a neighbor for a jump start after you leave the lights on all night). These are among the easiest batteries to recycle, and ALL components can be reused for new batteries. The plastic is cleaned and sent to a plastics processor who turns it back into pellets that will become new battery casings. The lead is smelted back into lead ingots, which can then be re-used to make parts for new batteries. The sulfuric acid is either neutralized with a baking-soda like substance, converting it to water, which is then tested and released into the sewer treatment system, or is turned into sodium sulfate, an ingredient in laundry detergents and glass and textile manufacturing. Check with your battery retailer for recycling information. In addition, some cities and towns accept lead acid batteries at the town recycling facility, or on the community's hazardous waste collection day, or at a local hazardous waste collection site. Any facility that accepts them should be EPA approved to assure proper handling.

### Rechargeable Batteries

Many retailers who sell electronics (especially "big box" stores and cell phone companies) now provide boxes for recycling cell phone and other rechargeable batteries. The box is usually somewhere near the main entrance or by the customer service desk. Keep an eye out the next time you shop! Can't find a box near you? There's always <http://www.Call2Recycle.org>, a neat web site where you enter your zip code to get a list of battery recycling locations near you.

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Dear Green Energy Times Readers,  
Little Green Hydro, L.L.C. is pleased to announce the start of microhydro project pilots in Vermont & New Hampshire for 2011.

Hydropower was the energy source for Northern New England's economic growth in the 19th Century. We at Little Green Hydro know that with today's microhydro technology our plentiful moving water can generate clean, environmentally-friendly, economically-viable electricity & contribute meaningfully to meeting our renewable, carbon-neutral energy needs.

We invite municipalities, institutions, non-profits & businesses to contact us to arrange a complementary consultation and site visit to discuss the potential for a specific hydro site. If your site qualifies, we will encourage you to consider participation in the pilot project program where your microhydro site will join others in demonstrating the environmental & economic benefits of microhydro & inspire others to action.



Potential Site

### MICROHYDRO ELECTRICITY GENERATION

can and is making environmentally-friendly power a possibility for small institutions, businesses, towns and individuals.

Northern New England's water offers an abundant, clean, renewable energy source that can be harnessed through microhydro in a sensible, responsible way to create clean hydropower.

#### Microhydro provides a renewable power source that is:

- Low-Impact, Environmentally-Friendly
  - Carbon Neutral
- Proven, Reliable Technology
  - Economically Viable

### Environmentally-Friendly

The environmental impact from microhydro can be exceptionally light. No dams, impoundments or watercourse alterations are typically required. All water used for power generation can be returned to the watercourse; no water is consumed, contaminated or altered. (It can even add power generation to drinking water supply systems). No aquatic life enters the system. No heavy civil engineering projects are necessary.

### Recycle Old Dams

Many old dams are found on our rivers and streams - some from the 19th Century - but most are damaged and disused<sup>1</sup>. Most cannot be renovated for conventional hydropower due to the prohibitive cost and time. **Until now**, retrofitting a legacy dam or dam residuals for power has not been economically viable.

Microhydro can overcome cost/time obstacles through a very light system design.

*As of 2006, in Vermont alone, D.O.E. counted over 1,200 legacy or "non-productive" dams.*

Because no new dam or diversion structures are required, environmental impact is drastically reduced. Therefore complying with regulatory authorities is significantly more feasible.

<sup>1</sup> In VT alone, the US Department of Energy counted over 1,200 legacy or "non-productive" dams as of 2006.

### Where Can This Work?

Many sites are suitable for low-head, high-flow configurations, such as small rivers and streams having unproductive, antiquated or derelict dams. Many of these old dams or dam sites were the energy engines for the growth of New England's towns and villages. This environmentally-friendly energy source can be recovered today by using microhydro at these sites.

Microhydro also works with high-head, low-flow sites such as many found in Northern New England, i.e. many town water supplies originate at higher elevations than the towns they serve. Microhydro can harness the gravity energy from the water supply to generate electricity while maintaining a high quality, potable water supply.

### MICROHYDRO

Microhydro is frequently defined as hydroelectric power generation under 100 kW. The components of this system and their functions (simplified) are:

- **Intake:** diverts and screens water from the watercourse
- **Penstock:** the pipe that conveys water from the intake to the turbine unit
- **Turbine:** converts water flow under pressure to rotational energy
- **Generator:** converts turbine output to electricity and conditions it for local consumption or a tie to the power grid, often integrated with the Turbine.
- **Tailrace:** returns water to watercourse.

The system works by:

- Diverting and screening useable flows of water from a river, brook or stream with the intake,
- Building water pressure in the penstock from gravity over the elevation drop,
- Using the energy generated by water pressure in the microhydro turbine to produce electricity via a generator with integrated electronics components.

### How Does It Work?

A key component for a very light environmental footprint is the intake. A tilted wedge-wire "Coanda Effect" intake, which is self cleaning, can screen and harvest water without dams or other civil diversion structures.

The intake can be installed to function with obsolete dams, dam vestiges or other man-made watercourse structures, as well with naturally occurring falls and rapidly flowing water, such as that often found in a rocky stream. It can be placed in the watercourse where water can be directed onto the inclined screen face. Much of the water passes over the intake, but some strikes the screen and passes through to be collected by the intake and transferred to the penstock.

The penstock delivers the collected water to the small turbine house where power is generated and the water is immediately returned to the stream.

The entire integrated system can be installed & operable in a very short period of time.



Intake

### THE ECONOMICS

From net metering to power production contracts, economic value ranges from electric bill reduction to a meaningful revenue source. The economics of each site vary due to physical characteristics and regulatory costs, which drive the variance in capital required for each site.

### REVENUE POTENTIAL

With growing public support for renewable power, states are now enacting policies to encourage power production from renewables. About half have adopted a Renewable Portfolio Standard and many have or plan to offer preferential renewable rates. Most energy experts agree that fossil fuel production costs and rates will continue to increase in the future. According to the U.S. Energy Information Administration, the average current New England retail rate is 16.5¢ / kWh. With rates in this range, a modest microhydro installation at a favorable site could generate several thousand dollars of monthly revenue. Larger sites could generate much more. Of course, not all sites are favorable and many regulatory complexities can increase costs and diminish the return potential. Exploration of your site is worth the effort.



Submerged Intake

### REGULATORY CHALLENGES

Regardless of microhydro's use of environmentally-friendly technology, all grid-tied power generation is heavily regulated by the State and Federal governments. Regulation of hydroelectric construction has evolved over many years to address damage to historical, cultural, and aquatic species from conventional,

large-scale, dam-based, hydropower projects. Unfortunately, navigating today's regulatory environment encompassing myriad state and federal agencies is daunting. Navigation of the permitting process requires significant time and cost in order to obtain approvals required prior to any project activities. (See Green Energy Times - Nov. 5, 2011 pg 13, provided to us directly from ANR). **Recently there are some signs that the permitting process may be on a path to rationalization due to the need for new, smaller, distributed, renewable energy sources.**

Federal authorities, such as the Army Corps of Engineers, may have jurisdiction in some instances. However, Federal Energy Regulation Commission (FERC) is the ultimate authority for all hydroelectric project licensing. States have principal jurisdiction over rivers and streams based on wildlife and environmental oversight. Approvals from multiple state environmental agencies must be obtained prior to any microhydro activities, requiring public hearings and substantial documentation.

*Of course, firm power purchase contracts must be negotiated & executed prior to project inception if economic viability is to be reached.*

### CAN IT WORK FOR ME?

Perhaps you know of an obsolete dam or a small river or stream that could help to meet America's need for environmentally-safe, renewable power.

\*Green Energy Times recently learned of this new local company that we would like to highly recommend: LITTLE GREEN HYDRO. Their knowledge, expertise and passion in the microhydro field can help you explore the possibility of your microhydro opportunity and take it from conception to fruition.

*We would like to thank LITTLE GREEN HYDRO, L.L.C. for providing us with the information for this Microhydro page.*

February 2011. Brian Fitzgerald (VT ANR) reported to Green Energy Times: "The projects that were actively in the permitting process last fall continue to work their way through the system, but haven't passed any major milestones. We've not received any new applications for water quality certifications. We've only received a handful of inquiries, perhaps a half dozen, about potential new projects. I believe some of the economic incentive programs are either winding down or have depleted funds, which may partially explain the decline in interest."

*We replied:* "My thoughts about the slow-downed interest in hydro applications are partly in agreement with you and partly might be due to how hard it seems to be to get approval for a permit. The majority of folks I talk to believe it is nearly impossible to get hydro approved in VT."

As you know, I believe that hydro, if done right, is a huge answer to meet our energy needs. Living with solar makes one aware of the cloudy winter this year. I heard that it is 25% cloudier than the worst year in recorded history. This leads to an understanding of the importance to utilize a balance of solar, wind and hydro!"

*It appears that we have lots of work to do if we are to see the needed changes!*

# RENOVATIONS

## GOT ICE????

By Allan Bullis, Energy Innovations

We all know that winter in New England involves lots of things including snow on our roofs and icicles. Well we cannot do anything about the amount of snow we get but we can control the amount of icicles.

When I was a carpenter, I would advise building owners with lots of icicles to install better attic ventilation. Since becoming an energy auditor (20 years ago), I learned attic ventilation only treats the symptom and not the root cause of icicles.

The root cause of icicles is heat loss and energy dollars literally going out the roof which melts the snow and the melted snow (water) runs down the roof to the edge where there is no more heat loss and it then freezes. This situation can be avoided by isolating the attic from the living space by proper air-sealing and insulation.

Some people say that the sun causes icicles. This is true to a very small degree. The vast majority of ice formation is caused by heat loss. For a good example, look at the roofs of un-heated barns, garages or well weatherized buildings. You will see they have very small icicles if any at all. If you like to waste money, damage your building and run the risk of death from falling ice, don't do anything at all.

If you want to save money and never have to worry about ice dams, INSULATE AND AIR-SEAL YOUR ATTIC!!! You could do this work yourself but I would recommend that you hire a certified energy auditor to evaluate your building and have it professionally weatherized. There are programs available to help pay for this work to be done. Go to <http://www.dsireusa.org/> to find what programs are available for your home or business. ♻️

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## Hey! There's A New Tool in Town!

Green Energy Times recently learned of a new tool that makes cutting foam insulation boards easy. We asked Jeff Finnell of AccuCutterVT, if we could do a review of this tool in an effort to bring you a real life opinion of this tool.

The AccuCutter is designed to make cutting rigid foam board fast, safe and accurate. It does not require electricity or any fossil fuel to run, so this got our attention right away. And it does not leave the dusty mess that is usually a

problem associated with the task of insulating between floor joists and the sill plate of buildings in efforts to weatherize.

John B. Unger Murphy, from Murphy's Cell Tech in St. Johnsbury, VT recently

purchased one of these tools, We asked him how he liked this 'groovy' new tool? John replied: "I already know it is a good tool. I have been cutting foam board by



hand for over a decade. This changes the effort and man hours needed to complete the task to about 25% of what I used to do, and totally accurate cuts. Faster & more exact.

What a mess to cut foam board with a table saw. My crew used the table saw to cut foam board and in one day the insulation dust compacted in around the electric motor and it burned up. This is no mess, no dust, no motor. I look forward to using it."

We questioned how to cut the foam board sideways - it is designed to cut lengthwise for 4'x8' sheets of foam board. Our project required that we needed the cut lengths to be cut to size for between the floor joists. Mr. Murphy offered this suggestion for cutting sideways: "When I have 16 on center joists, and the foam board needs to be installed between the joists (14.5" wide between the joists), I cut the foam board in half at the 48" length to create 48" x 48" squares, then I run them through the AccuCutter to cut them to size.

Our final consensus to report to you all is that this is indeed all that it was designed to be. Made out of steel & aluminum, in Brattleboro, Vermont - it appears to be a durable tool that might prove to be invaluable in the appropriate

situations. The blade actually sharpens itself when used with foil-backed board and should last for the life of the tool. It is certainly of value to any insulating job that requires the use of foam board that needs to be cut to length. It can make a messy job much easier... The AccuCutter does need to be clamped to a solid table or tailgate on a truck when ripping thicker pieces, but can generally be used by one or two people with ease.

You can watch this new tool in action and get more information on their website: [www.accucuttermvt.com](http://www.accucuttermvt.com) or contact Jeff at: [shineonsolar@gmail.com](mailto:shineonsolar@gmail.com). ♻️

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# LOANS: WIND, BIOMASS, LANDFILL METHANE RECOVERY & AGRICULTURAL CROP DIGESTER...

Wind turbines, biomass district heating, landfill methane recovery and an agricultural crop digester....what do they have in common? Yes, renewable energy, but they also joined hands with a creative Vermont team. They've been awarded loans through the Clean Energy Development Fund (CEDF) Loan Program. The CEDF, mostly recognized for its renewable energy grant funding, has partnered with the Vermont Economic Development Authority (VEDA) to also offer low interest loans.

Carbon Harvest of Brattleboro received its \$500,000 Loan in 2010 and is now producing electricity to the grid. Their methane recovery system is the first step in an ambitious CHP construction project to double its electricity generation and channel heat to a greenhouse algae growing operation which will ultimately both feed fish for sustainable food production & produce biodiesel.

CEDF Director Andrew Perchlik is pleased to have a loan program to complement the grant program. Grants are competitive and relatively scarce. And sometimes developers need assistance beyond the more limited grant funding. "With such favorable rates, these loans present a great opportunity for Vermonters to build clean energy projects. We want to partner with developers who could use this low cost financing."

Carbon Harvest president Don McCormick says the loan to the Brattleboro project proved to be pivotal to his company. By bringing this one project online, the resulting credibility has spawned, or leveraged, five more projects nationally.

"This loan was the start. It really was the CEDF along with VEDA that precipitated this whole opportunity. From an entrepreneur's point of view it made everything else possible" he said.

The CEDF Board approves the loans but the lending would not be possible without the financial expertise of VEDA.

"VEDA offers its underwriting capabilities which allows CEDF to make good financial decisions regarding the loans. We are so pleased to help out in that respect" said VEDA Executive Director Jo Bradley.

To learn more, contact Andrew Perchlik at 802-828-4017. For information & application forms go to [www.publicservice.vermont.gov/energy/](http://www.publicservice.vermont.gov/energy/).

## CEDF LOAN OVERVIEW

- **Types of Projects:** solar, geothermal, methane recovery, biomass, wind, hydro, efficiency (no studies, only installations)
- **Minimum Metrics:** over 15 tons geo, over 15KW capacity, over 1 million BTU (per day solar thermal, per hr combustion)
- **Borrowers:** individuals, organizations, businesses
- **Loan:** 2% interest rate, borrow up to 90% total project cost, fee= 1% of loan (capped at \$1,500)
- **Federal ARRA requirements** – NEPA, Buy American, Davis Bacon, regular reporting



## \* FINANCIAL \* INCENTIVES... \*

### Energy Efficient MORTGAGES

An Energy Efficient Mortgage (EEM) allows your lender to take into consideration the fact that you'll be paying less than normal to heat and cool your home, so they can loan you more money without increasing your down-payment.

Most EEMs are used to purchase a new home that is already efficient, such as an ENERGY STAR qualified home. However, one type of EEM is the "Energy Improvement Mortgage" (EIM), which is used if you want to roll the cost of new energy efficiency improvements into a mortgage that is used to purchase a non-efficient home - also without increasing the down payment.

To get either type of Energy Efficient Mortgage you must have a professional energy rating performed on the home before financing is approved. This energy rating verifies the home's current or proposed energy cost-savings for the lender.

Energy Efficient Mortgages are sponsored by federally insured mortgage programs (FHA and VA) as well as the conventional secondary mortgage market (Fannie Mae and Freddie Mac).

For more information, see: <http://bit.ly/engstarmortgages>

### NH REBATE PROGRAM FOR SOLAR FUNDING INCLUDES ALL BUSINESSES

NHPUC's commercial & industrial rebate program for solar electric (PV) and solar thermal installations is now accepting applications

Applicants need not be for-profit businesses; some non-residential entities are eligible.

Funding for this program is limited and applications will be processed on a first come, first served basis. Total funding for state fiscal year 2011, ending June 30, 2011, is \$1 million. Rebates are capped at \$50,000. The program will continue after June 30, 2011 only if additional funding becomes available next July.

This program will build on the success of our residential renewable energy rebate program, which to date has received more than 500 applications requesting a total of \$2.9 million in incentives for home PV and small wind installations with a combined net capacity of more than 1.5 megawatts. The net value of these facilities is more than \$10.4 million, which means our rebate funds are leveraging \$7.5 million in private investment. In addition to reducing our reliance on imported fuels and lessening emissions of greenhouse gases, these renewable energy installations are bolstering our economy and creating new jobs in the green energy sector.

For more info go to: <http://www.puc.nh.gov/Sustainable%20Energy/RenewableEnergyRebates.htm>

## INCENTIVES... INCENTIVES... INCENTIVES...

### VT STATE INCENTIVES

Rebates for any combination of the following. Can combine rebates from multiple technologies. \$25k lifetime cap on rebates. See: <http://bit.ly/VTIncentives>

#### ELECTRICAL (Solar PV, Wind, Hydro)

- 1) Grid-connected, not off-grid.
- 2) New system: must include all equipment for functional, independent system.
- 3) Inverters must be UL 1741 listed, or listed by equivalent national rating organization.
- 4) Must comply with requirements of applicable portions of VT Public Service Board Rule 5.100.

**Small Wind, \$6k for 1st 2 kW + \$1.60/watt:**

- 1) Upgrades: turbines w/at least 1 kW rated output.

**Solar Electric (PV), \$1.50/watt rebate:**

- 1) Upgrades: modules w/at least 1 kW rated output.
- 2) PV modules must be UL 1703 listed.

**Micro-Hydro, \$3.50/3 ft-gal/min drop:**

- 1) Must comply w/state & federal hydro laws.
- 2) Upgrades: may include equipment to improve generating and water handling, permitted changes to intakes, penstock, or raceways that increase energy output.

#### HEAT & HOT WATER (Solar)

**Solar Hot Water Systems, \$1.50/100 BTU:**

- 1) Must be complete systems capable of serving domestic hot water loads.
- 2) Solar collectors must have an OG-100 output rating from (SRCC) or equivalent.
- 3) Upgrades: new collectors: at least 15 kBtu/day.
- 4) Swimming pool heaters are **ineligible**.

### NH STATE INCENTIVES

For information, see: <http://bit.ly/NHIncentives>

#### ELECTRICAL (Solar PV, Wind, Hydro)

##### Residential Renewables (Solar PV, Wind)

*No NH Funding until July 2011, at earliest*

#### HEAT & HOT WATER (Solar, Geothermal, Wood Pellet)

**Geothermal Heat Pumps, \$800/ton up to 5 tons; \$500 duct bonus. (- \$350 inspection fee). Limited funding, 1st come, 1st served:**

- 1) Up to \$4,000 on low temperature, hybrid, geothermal heat pumps & heat pump water heaters.

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

- 1) Thermal efficiency rating of 85% or greater
  - 2) Particulate emissions 0.32 lb/MMBtu heat output.
- MANY requirements. See <http://bit.ly/NHpelletReqs>

#### OTHER

##### Local Incentives

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

##### Solar Hot Water, Solar PV, and Wind education only

See <http://bit.ly/NHAlteForEd>

### FEDERAL PERSONAL TAX CREDIT for:

Solar Water Heat, Photovoltaics, Wind, Fuel Cells, Geothermal Heat Pumps, Other Solar Electric Technologies.

See: <http://bit.ly/FedTaxCredits>

#### What is it?

Credit applied to taxes owed (dollar for dollar reduction in taxes), up to 30% of cost of system. If you owe less than your credit, remaining credit can carry over to the next year's taxes.

#### ELECTRICAL (Solar PV, Wind, Hydro)

##### Solar Electric (PV) Systems:

- 1) Placed in service before 1/1/2009: \$2,000 maximum credit.
- 2) Placed in service after 12/31/2008: no max.

##### Wind Turbines:

- 1) Placed in service before 1/1/2009: \$4,000 maximum credit.
- 2) Placed in service after 12/31/2008: no max.

##### Fuel Cells:

- 1) Fuel cells: \$500 per 0.5 kW.

#### HEAT & HOT WATER (Solar, Geothermal)

##### Geothermal Heat Pumps:

- 1) Placed in service in 2008: \$2,000.
- 2) Placed in service after 12/31/2008: no max.

##### Solar Hot Water Heaters:

- 1) Placed in service before 1/1/2009: \$2,000 maximum credit.
- 2) Placed in service after 12/31/2008: no max.



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# Solar Thermal is HOT in New Hampshire

Solar thermal systems for domestic hot water have always been a great investment with rapid payback and long-term value. But in New Hampshire the deals are hotter than ever right now, thanks in large part to a great state rebate program. Launched in the spring of 2010, the rebate was recently increased, making the total amount available as much as \$2,900. Combined this with the federal 30 percent tax credit and homeowners can cut the cost of an average solar hot water system by nearly 60%. As a result, more and more systems are being installed all across the state—for domestic hot water as well as supplemental space heating.

In the greater Concord area, GreenSource Energy Solutions installed a dozen solar hot water systems in 2010 and the prospects for 2011 look even better. Most of the systems were for domestic



hot water, varying in size from households of two to families of five. In most cases we're able to size the systems to cover approximately 80 percent of the total annual hot water needs. In some cases, we've been able to size the systems to also provide supplemental space heating, primarily for the shoulder seasons (spring and fall).

Once they are introduced to the basic concept of solar hot water, most people want a system. The available rebates and tax incentives, combined with the rising cost of fuel, make for a very compelling fi-

nancial justification. In fact, we're seeing the average system pay for itself in three to five years. But the big hurdle is the initial investment. In New Hampshire, rebates are paid back to the homeowner after the system is installed. So where do people come up with the money?

For many of our customers, the answer is simply their savings accounts. Here's why: It's a fairly safe bet that fuel prices will continue to rise. The question then is, at what point do you forestall the inevitable and take ownership of your own resources—that is, the sun. The fact is everyone needs to make hot water one way or another. You can rent the heat source from your fuel company. Or you can own it in the form of a solar system. More and more people who understand the value of a dollar are choosing to own.

But what if you don't have enough savings right now?

Fortunately, a few smart financial institutions are starting to catch on and offer renewable energy financing at very favorable rates. A great example in New Hampshire is Holy Rosary Credit Union ([http://hrcu.org/go\\_green.cfm](http://hrcu.org/go_green.cfm)). It's not often you run across a financial institution that thinks outside the box. But Holy Rosary Credit Union understands when homeowners purchase a solar system, they're serious about improving the value of their home for the long haul. So HRCU has put together a set of financing options offering low fixed rates, flexible terms, and home equity loans up to 100% of the value of your home. The program is open to all New Hampshire residents.

As Kermit the Frog often said, "it's not easy being green." But homeowners all over New Hampshire are demonstrating that it's getting easier every day - with solar hot water. ♻️

< Cont'd from p.1 SOLAR PLAZA-Richford, VT



Incentive Program incentive for solar. As a result their long term secure cost of solar electricity was conservatively estimated to be below 6¢/kWh. Their current electric rate is more than 15¢/kWh. As you can see, solar was not only a wise choice for reducing the carbon footprint of their building but also a wise business investment!

Tammy Ryea, the system owner, has this to say about the project.

"We were very happy that we have the solar resource on our roof and were able to take advantage of several grants to make this project possible. The installation by DC Energy went very smoothly, even at the peak of last summer's hottest weather. We look forward to many years of solar electricity and very small electric bills."

For more information about this project and/or grant possibilities for solar, feel free to contact Ben at DC Energy at (802) 363-1474. ♻️

## NEW FUNDING FOR THE VERMONT ENERGY CLIMATE ACTION NETWORK



"Building the Power of Vermont Communities to Increase Energy Efficiency & Reduce Climate Change Impacts"

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leadership fostering and supporting energy and climate change strategies at the community level; to decrease community carbon footprints; and to increase carbon-free energy independence by supporting the implementation of community based energy projects.

Grants will range from \$1,000 to \$3,000, with an application deadline of January 31, 2011. A committee made up of the key VECAN support organizations and members of the VECAN Advisory Committee will review Grant applications. The VECAN grant program details are available at [www.grassrootsfund.org](http://www.grassrootsfund.org) and [www.vecan.net](http://www.vecan.net), or by calling the New England Grassroots Environment Fund's office at 802-223-4622.

The Vermont Energy Climate Action Network (VECAN) is a collaborative effort of six nonprofit organizations: Community Climate Action, New England Grassroots Environment Fund, Vermont Sierra Club, Sustainable Energy Resource Group, Vermont Energy Investment Corporation and the Vermont Natural Resources Council. ♻️

Senator Bernie Sanders recently announced that he secured \$90,000 in funding for the Vermont Energy Climate Action Network (VECAN) to support Vermont groups, municipalities and nonprofit organizations to work to transform the energy system in Vermont. A portion of the funding will go directly to fund Vermont energy groups by implementing a grant program to encourage local action on energy efficiency and sustainable energy. Senator Sanders said, "I know that investing in these local efforts will help our state make real and significant progress toward meeting our energy vision" while also noting that Vermont is leading the nation in electric energy efficiency.

Senator Sanders shared his vision for Vermont to be both a leader and model for the rest of the nation in reducing greenhouse gas emissions and creating jobs in energy efficiency and sustainable energy. The federal stimulus package Energy Efficiency and Conservation Block Grant program, which Senator Sanders authored, is bringing \$16.5 million into Vermont's counties and towns for efficiency projects. Overall, Vermont will receive an historic investment of \$150 million from the stimulus for weatherization, sustainable

energy incentives, smart grid technology, and other vital investments.

The VECAN Building the Power of Vermont Communities to Increase Energy Efficiency and Reduce Climate Change Impacts program will support Vermont groups working on energy efficiency and renewable energy projects in their communities that support local sustainability. Goals of the initiative are: to build Vermont's

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# Reduce the Costs of a Home?

**H**ow do you reduce the costs of a home prior to and after it is built? Even the best attempts of due diligence can result in hindsight being 20/20. The primary focus should be the housing envelope.

By optimizing components ranging from foundation ICF's (Insulated Concrete Forms), along with thermally efficient doors, windows, and a properly sized heating system, homeowners can save as much as 30-50% on heating and cooling costs. If you don't have that now, you can take steps to curb the air infiltration that accounts for significant heat loss in most homes. Here are some other steps you can take:

An energy audit can identify problems and determine corrections that can be accomplished. A blower door test and infrared cameras are commonly used, pinpointing envelope leakage and air infiltration.

A typical concrete basement attracts cold and is approximately 10 degrees colder than the atmospheric temperature. By using Insulated Concrete Forms (ICF) the R-value can jump from a 2.5R value to R24 and eliminate air infiltration. Since typical heat loss is approximately 33% through the basement portion alone, it pays for itself in a relatively short time.

Combining the performance and lower cost of fiberglass,

with the air sealing properties of SPF (spray foam insulation) offers a hybrid approach that is less costly than SPF alone, which can typically cost 3-4 times more.

Orienting your home to maximize solar gain in winter, adding generous overhangs, reducing windows and size on the north and west help block winter winds, as well as keeping your home cooler in summer.

Energy Star rated appliances and lighting use 10-50% less energy & water.

With a life expectancy up to 15 years, LED's (light emitting-diode) cost pennies per month and use 75% less energy. Compact fluorescent light (CFL's) are also a viable alternative to standard incandescent bulbs.

Strategic placement of trees, shrubs and native plants can serve as windbreaks and habitats offering biodiversity for flora and fauna. Creating bio-retention swales to slow, trap and filter water runoff ultimately directs water back into the aquifer and away from your foundation.

These options can be done large or small scale as your budget dictates. Small steps yield big results over the course of a single year and the lifetime of your home. ♻️



## Look Mom, No Icicles!



Bradford, Vermont's *Bradford Academy* building has had many lives. Originally a school, the historic structure currently houses the town offices, a public auditorium, a variety of small businesses, and the town's Teen Center. Like most buildings as old as this one, the "BA" was painfully expensive to heat and cool, resulting in one of the largest expenses in the town budget.

The town had an energy audit done, and found some surprises (such as windows above drop-ceilings) and some obvious places for energy savings. A group of hard-working volunteers took the audit results and got to work: insulating the ceilings, air sealing hidden windows, sealing off the bell tower, insulating, fixing the heating system settings, and training tenants on how to adjust the steam radiators.

The results are tangible, and can be seen in the photo above. There used to be significant heat loss through the windows and ceilings, causing the roof to form ice dams and grow large, dangerous icicles. Missing icicles mean the town is saving money on heat, reducing wear and tear on the beautiful slate roof, and keeping occupants more comfortable. It's a win-win-win scenario for Bradford!

## Interior Window Storms, Panels & Quilts

**You can further decrease heat loss** through your windows by installing window storms, panels or quilts inside. It is important to make sure all of these fit tightly to the window jams or trim to prevent warm moist house air from getting behind, contacting the cooler window where it might condense.

Several companies sell interior plastic window cover kits that consist of a roll of double sided adhesive tape and thin-film plastic. The tape is secured at edges of window, jamb or trim and the plastic is pulled tightly to tape and then heat shrunk with a hair drier. If you are very careful in removing the film, it might be used a second season.

"Tyz-All Plastic Interior Storms" and "Advanced Energy Panels" are reusable heavier gage plastic film panels available through Energy Federation Inc. ([www.efi.org](http://www.efi.org)) at: [http://www.energyfederation.org/consumer/default.php/cPath/21\\_2734](http://www.energyfederation.org/consumer/default.php/cPath/21_2734)

You can find detailed instructions and materials list for making reusable homemade double-sided interior wood frame inserts at: <http://www.arttec.net/Thermal-Windows/index.html>

"Warm Window"... make multi-layer quilted fabrics for window quilts. Google "window quilts". Unfortunately, many of these quilted fabrics have sewing penetrations through all layers, resulting in potential points of air and moisture leakage. This may cause condensation problems for you, so incorporating an unbroken air barrier into the quilt might be helpful. Quilts should be securely fastened at all edges using one of several optional methods: magnets, sliding track, or hinged clamps. Custom made quilts can be ordered from Window Quilt in Brattleboro, VT 802-246-4500 [www.windowquilt.com](http://www.windowquilt.com)

Homeowners can make rigid window insulation panels from foam board, sealed at the edges with weatherstripping.

By Bob Walker, Sustainable Energy Resource Group  
[www.SERG-info.org](http://www.SERG-info.org)

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#### Southern Windsor County Regional Planning Commission Announces an Energy Efficiency Event for Area Families, Home and Farm Owners, and Businesses

Ascutney, VT (February 4, 2011) – The Southern Windsor County Regional Planning Commission in conjunction with the Energy Committees of Springfield, Windsor, West Windsor, and Weathersfield are hosting a Home Energy Expo: a free, energy-efficiency event for area families, home and farm owners, and businesses, to learn more about programs and products that will reduce consumption, decrease energy costs, and improve the community. The event will take place on Saturday, March 19, from 9:00 AM – 3:00 PM at the River Valley Technical Center in Springfield, Vermont.

**The event will feature local experts and how-to workshops that include:**

1. Energy-efficiency rebate and assistance programs and how they work for homeowners and businesses
2. Easy ways to tighten up your home, office, barn, or building
3. Making the right investments in lighting, heating, appliances, and building structures
4. Solar, wind, and other options to consider

The all-day expo will feature hands-on displays, products, and door prizes from local vendors, schools, and recycling programs. Food and drinks will be available as a fund-raising event for Springfield school groups.

If you are a provider of energy-efficient products or services and would like to participate contact: Dan Potter ([dpotter@swcrpc.org](mailto:dpotter@swcrpc.org)) or Jason Rasmussen ([jasmussen@swcrpc.org](mailto:jasmussen@swcrpc.org)) at 802-674-9201.

Attendance is free of charge and more details can be found at [www.swcrpc.org](http://www.swcrpc.org)

**Media Inquiries:** Laura Polas; Media Relations (802.356.2077) [laura.polas@gmail.com](mailto:laura.polas@gmail.com)



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## How sustainable are YOU?

**What measures do you personally take to reduce your carbon footprint?**

**On January 5, 2010, G.E.T. sent out a mass e-mail to find out just what so many of you are doing, on a personal level, to reduce your carbon footprint. Following are some of the responses we received... Kudos to all of you! Keep up the good work..**

**January 5, 2011**

Here's my response. Thanks for asking the question.

I've chosen not to have children. I've been on a plane once in the past 10yrs. My partner and I own a 2002 Subaru that we plan to keep until it can no longer be repaired. I call the 800# for every company that sends me catalogs or unsolicited mail and I request that my name be deleted from the mailing list. If there's no 800 number, I use the postage paid envelope. Thanks to this technique, I receive virtually no junk mail. I bicycle or walk from my home in Montpelier to work, stores, church, friends' homes, etc. I bring cloth bags when I shop and I put items in my daypack and panniers.

I keep the thermostat at 65 (much lower when I'm not home or sleeping). I use a push



Montpelier, VT

reel lawn mower and no chemicals in my yard. I've converted all possible bulbs to CFLs. I have water restrictors on shower and sink. I compost food waste. I

recycle everything that is accepted by my local recycling depot. I re-use envelopes that I receive at home and work. I wear clothes until I've worn them out. I buy some clothes at local rummage sales and I give clothes, shoes, and rags to "drop 'n' swaps." I take shoes to be repaired rather than buy new shoes. I patronize locally-owned stores rather than chain stores. I donate to charities that are local and green.

In the interest of brevity, I'll stop here. If you decide you want to hear more, just let me know. Thanks.

~ Nancy Schulz, Exec. Director VT Bicycle & Pedestrian Coalition  
(802) 225-8904 [www.vtbikeped.org](http://www.vtbikeped.org)

**January 5, 2011**

Some of the things I do to try to reduce my carbon footprint:

- I have driven a Prius since Feb 2007
- Solar hot water installed in 2009 at my house
- More efficient boiler type furnace with radiant under floor installed in 2006
- 1" rigid foam insulation placed under radiant lines in floor
- Pellet stove in living room to supplement my oil furnace
- Wood cook stove in kitchen to supplement



- oil furnace
- All bulbs in the house have been replaced with CFL
- Several light fixtures have been replaced with LED fixtures
- Purchased energy star front load washer and gas dryer in 2008
- Purchased an energy star refrigerator with freezer on bottom in 2010
- Put a timer on the energy star freezer in my basement so it only runs about 1/2 the normal time
- Replaced three exterior doors and numerous windows with more energy efficient ones
- Insulated first floor and attic in house
- 2" rigid foam insulation in crawl space
- Additionally, I began a business (Polar Solar) to design and install SHW, PV, and Rainwater Collection systems.

~ Thanx, Cecil Smith Solar Polar N. Haverhill, NH  
Cecil has been a subscriber to Green Energy Times since discovering our first issue!

**January 5, 2011**

"I'm not very sustainable. I'm the one moving part at 350.org's big global grass-roots climate campaign, and hence have visited every continent

in the last two years, helping to organize what CNN called 'the most wide-spread day of political action in the planet's history.' Most of that travel was by plane, spewing carbon; I hope it was worth it; time will tell.

When I'm home, I'm reasonably sustainable. Our house won a prize as the most efficient in VT the year it was built, it's covered in solar panels, I drove the first hybrid Honda Civic in the state and it's still going strong a decade later, we eat mostly locally.

But given my travel, it doesn't amount to much. I suppose in a sense I think that the answers to our crisis are most likely to be political, and hence I work as hard as I can to build as big a movement as possible.

~ Thanks for your good work, bill"  
(Bill McKibben, 350.org)



Bill McKibben, w/ one of the solar panels from Jimmy Carter's White House



**January 5, 2011**

**Putney, VT**

On the individual level, my belief is that sustainability is in the details. I turn lights off when I leave the room. I unplug things. I recycle. More importantly, my kids recycle. It's their normal, unlike we boomers who had to learn how. Within my job, which allows me to have a broader audience, I promote ideas such as net-zero building, environmentally friendly planning, riding bicycles for transportation, and the localvore movement. And this isn't just whistling in the dark, fashion slavery, or some greedy urge to propagate humankind for eternity. I just think we don't need to live like pigs—that we'll be happier, more peaceful people if we just give up our addiction to "more" and use a travel mug instead of a million paper cups.

~ DC (Don Cuerdo, The Putney School, Putney, VT)  
<http://www.putneyschool.org>

## How Sustainable are you?

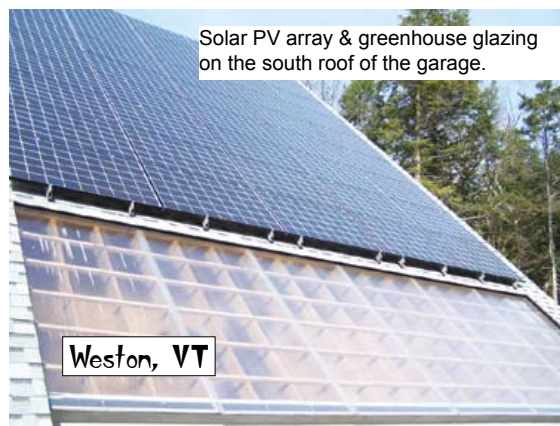
**January 25, 2011**

A friend of a friend sent me your request for sustainability feedback, so I thought I'd join in:

*I am an architect & planner from Weston who has been doing sustainable & green design since before those were in-vogue buzz words.*

It is great that clients now come to me already understanding why sustainability is

insulated building envelope. The windows are low -Value prototype fiberglass pultruded frames which I helped develop at Owens Corning Fiberglas in the 1980's. Through the use of task lighting, low wattage lamps & Energy Star appliances, the house uses an average of 295 kWh/mo. over the year. The average new home for a family of four uses



Solar PV array & greenhouse glazing on the south roof of the garage.

Weston, VT

about 850 kWh/mo. in VT. The My office is in my home in order to reduce my vehicle travel distances. The home has two back-up heat-circulating fireplaces & a back-up propane boiler which no longer sees much use. The primary source of space heat for the house, a detached garage workshop, the planting trays in the greenhouse & a loft apartment

important, allowing us to immediately get to work without much preliminary educating.

**How sustainable are you?** If you don't live it, you don't believe it. Talking about climate change & ecosystem impacts seem to carry less weight with others than actually building examples of good solutions & practicing sustainability in our own lives. The truth is, very few of us in the U.S. actually live a sustainable life style which does not take more from the planet's sustainable resource balance than we provide. When we were at 6.2 billion people, humans used about 20% more resources/yr than Earth could sustainably provide. We have now grown to be 7 billion. Presently, each human has the resource budget to build a 62 sf/person house one time in their life in order to even approach planetary sustainability. That's one 248 sf house for each "family of four" on Earth. In light of that, am I sustainable in my personal life? Despite being far greener than most, I am not even close. I am, however, active in doing everything I can to get there & help all of my architecture & planning clients to try to get there too. To get to true planetary sustainability in the US, our entire frame of reference as to what is environmentally acceptable needs to drastically shift. The frightening thing about a global effort toward actually solving climate change with a solution which matches the real world timeline & massive extent required to solve the problem is that even all of my efforts are not enough yet to say I have at least done my part as an individual citizen of the planet. I live in one of Earth's most free & wealthy societies with more capacity to initiate real change than many, but we have not yet found our way to global leadership in this most vital of all tasks.

**What measures do you personally take to reduce your carbon footprint?** I live in a 4-bedroom 32' x 32' super-insulated (R-44 walls & R-52 roof) house built in 1992. It is a well

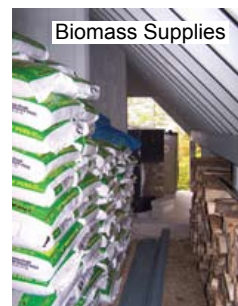
is a district biomass boiler which burns low-emissions, carbon-neutral wood (the CO2 released by the gasification combustion process is no greater than the CO2 absorbed by the trees during their life before being made into pellets) or corn pellets. After 3 years, this biomass system has reduced my winter heating bills by 55% while nearly completely eliminating the use of fossil fuel, the related pollution & my carbon footprint.

My garage houses a workshop, a



PV system inverter panel inside the garage

greenhouse (which allows me to eat more wisely & to reduce the embodied energy required to produce, process & deliver a large portion of the food I eat), a root cellar (to store vegetables & fruits from my orchard without a freezer) & a loft apartment (for future home office expansion space or rental income that frees up more personal income to become more self-sufficient & sustainable). The south roof of the garage holds 45 solar PV panels which provides an average of 920 kWh/mo., or 3.1 times a much power as I use annually to run everything, including the water well & septic pumps. The system is net metered to the grid so that it also benefits other grid users & provides more grid stability to a small degree. The surplus power from my system,



Biomass Supplies

or 7.5MW-Hrs annually, is enough to power a Chevy Volt electric car (rated at 2.2 mi./kWh) for 16,500 mi./yr. I plan to purchase an even more efficient EV (or plug-in hybrid, or hydrogen fuel cell) next year once the auto industry offers more options as part of their 2012 fleets. I hope to someday build a prototype lightweight 3-wheel EV which I have



been designing as well, once the conversion of the carbon footprint of my transportation to EV's is complete,

I hope to add a wind turbine to my property so that I am nearly completely free from fossil fuels or nuclear power & their related ethical, economic & environmental problems. Is it enough? No, but if my examples can show that any average Joe can make a better effort, maybe we can all make progress toward the most serious problem facing all of Earth's living species.  
~ Keith Dewey, Dewey & Assoc., Architects & Planners (802) 824-5612

#### January 5, 2011 Montpelier, VT

"The greenest home is the one that is already there". That pretty much encompasses my day to day and long term carbon footprint strategy in reduce, reuse, recycle and repair!  
~ JB (Jon Budreski, Alteris Renewables)

#### January 6, 2011 Bradford, VT

We at Farm-Way have, in addition to the solar array, replaced over two hundred light bulbs with ones that are up to 40% more efficient. We also have replaced our boiler heater with a 95% efficient one, and cut styrofoam products from our employees useage...and recycled printing paper.  
**What about at home - what measures do you take there?**

Not as much at home as we would like. {construction project put us behind on installing a solar project that would have subsidized 50% of our power consumption... maybe this or next year}. We did manage to upgrade all of our windows, doors, and insulation in 2010. We also are going to install a solar stock tank that we are now selling, thus eliminating a 1500W de-icer that runs for over 5 mos. a year. We have looped our electric hot water heater thru our outdoor boiler, so we now have diverted that useage..... and of course recycling of the usuals.  
~ Skip Metayer, Farmway, Bradford, VT

#### January 6, 2011 Warren, VT

I purchase the majority of the food I eat directly from farmers, so I know where it comes from and how it was raised or grown. In addition to a small garden at home, I subscribe to a year-round CSA, freeze and can produce for use throughout the winter, and eat seasonally. What started out as the "localvore challenge" a few years ago has become the status quo in our household.  
~ Kate Stephenson, Exec. Dir., Yestermorrow Design/Build School Warren, VT 802-496-5545

#### January 6, 2011 Greensboro, VT

I try to eat foods not fertilized with fossil fuels. I grow my food in Summer and take containers and shopping bags to farms, coops and stores when I shop, use them for storage, and/or recycle them. I use compact florescent bulbs and turn them off when I'm not using them. I heat my house with seasoned dry wood. My woods are used to teach forestry to students of the Green Mountain Technology Center. They prune trees to improve their quality and vitality (which reduces our carbon footprint). I use small quantities of kelp, fish and mushroom wastes to restore micronutrients to my

fields to help their soils resist blight caused by industrial farming. I try to help people understand that although it has been being done for centuries, outsourcing materials, money, labor and jobs increases rather than saves costs. I teach renewable energy generation and distribution, renewable civil engineering, sailing, restoring and reusing old buildings (instead of tearing them down), drawing, and creative listening.

*Green Energy Times helps do what I do not do.*  
~ Peter Roudebush

#### January 6, 2011 West Rutland, VT

I can't do major things like solar panels because of my property limitation. I can do smaller things like reduce my consumer carbon footprint. Before I purchase an item I consider the total carbon footprint of that item- from production to purchase.

Sometimes buying a product -even if it's made from recycled material, just doesn't make sense if it was shipped from China to a distributor in New Jersey and then trucked to Vermont before it can be sold.

Also, while it is easier to buy a something online, it takes a whole lot of emissions to get that thing from a warehouse halfway across the country to your door step. A lot less carbon will enter the atmosphere if you just take the drive (even if it's a town or two away) to get the item rather than ordering it online and transporting it on trucks through multiple states. More reason to buy local!

~ Mary Lamson, NeighborWorks of Western VT.

#### January 11, 2011 Corinth, VT

"My family and I personally generate over 5 megaWatt hours of clean, environmentally-friendly electricity from our microhydro system each year combined with around 0.5 megaWatt hours of PV power. We generate all of the electricity used in our home through our hybrid system.

- A substantial portion of our home's heat comes from its passive solar design and panelized insulation system, complemented by the wood we harvest from our woodlot and burn in our catalytic-equipped woodstove.
- We limit excess travel, but when required to travel we drive vehicles that are suited to their purpose and as fuel-efficient as possible.
- We are big gardeners and grow a significant amount of our vegetables into which we input our composted waste and wood ashes.
- Lastly, we reuse everything practicable and recycle the materials once well-used."

~ Thanks, James Perkins, Little Green Hydro

#### January 7, 2011 Bradford, VT

Here's a list of our carbon footprint efforts:

- We buy and eat local, and have many very enjoyable meals that are local vegetables only.
- We have had our house insulated this fall, with a hefty layer of cellulose, which has made a huge difference in heat retention, & the overall comfort of our house.
- We have replaced our old drafty front door. It is a revelation to have a cozy front hall after these years.

- We turn off the TV, dvd player, the computers, with a power strip switch every night.
- Our thermostat is set at 60 during the day, 50 at night. But with the woodstove we can often turn down the thermostat during the day to 50 too.
- Our bedrooms are set at 50-55 all the time. We use hot water bottles to warm the sheets and have rediscovered the wonders of thermal long underwear!
- We have a new furnace too (oil, alas), replacing the 35 year old one. It doesn't come on much though with the woodstove, but it does heat the new hot water system, which is also super efficient at holding heat.
- We have an energy star washer & dryer, although we mostly dry our clothes on the line outside in summer, or on racks in the laundry room in winter.
- We try to remember to use reusable bags for groceries and other purchases.

*On our To Do list:*

- Thinking about installing a solar hot water or electric system.
- We foresee the need to build a good root cellar set up to hold produce grown over the summer.
- The one area that bothers us the most that we can't seem to easily solve is the automobile use issue.
- Still waiting for a hybrid or electric 4WD truck!
- I forgot the Neuton! Works great. Love the lack of fumes and noise.

~ Sandy Price, Bradford, VT

#### January 11, 2011 Waterbury, VT

I live in a small, well insulated house that we heat primarily with wood. There's a solar collector on the roof for hot water, and we're adding pv by this summer. Every light in the house is a cfl or other energy efficient bulb. We have a vegetable garden and buy as much local food as possible. We drive a Prius and a Honda Civic, & try to be as efficient as we can in planning trips to run errands or conduct other business. We try not to be wasteful (with respect to energy) with our leisure travel by focusing it more locally (*the Northeast*) & avoiding air travel as much as possible.

~ BT, Brian T. Fitzgerald Vermont Agency of Natural Resources Dep't of Environmental Conservation, Water Quality Division  
<http://www.vtwaterquality.org>

*"Conservation is a cause that has no end. There is no point at which we will say our work is finished."* - Rachel Carson

#### January 14, 2011 Middletown Springs, VT

I like to think of sustainability as a way of life. I'm always reminded of the ways my parents and grandparents lived in the old days. Habits that were normal and a part of their everyday lives have become virtually lost to the hustle and bustle world we live in today. Because of those old roots (and many thanks to them!), the old motto, make do or do without tends to ring true in our household.

But then there is always the exception to the rule - we are very proud to have recently installed a 4200 watt grid-tied solar electric system with a battery back-up on our circa 1790 home in Middletown Springs.

And aside from that huge leap and investment in sustainability, it's really about the day to day things we do, like bringing re-useable shopping bags to the market,

### CAN HUMANITY BECOME SUSTAINABLE?

[For humanity to survive the sustainability crises] we must rely on highly-evolved genetically-based mechanisms, as well as on supra-instinctual survival strategies that have developed in society, are transmitted by culture, and require for their application consciousness, reasoned deliberation and willpower.

- Antonio Damasio, *Descartes' Error: Emotion, Reason and the Human Brain* (New York: Avon Books, 1994), 123

- Excerpted from *The Post Carbon Reader* by Richard Heinberg & Daniel Lerch.

changing out incandescent light bulbs with compact fluorescents, using cloth napkins, recycling everything you can, buying local and eating organic as much as possible, heating with wood, and looking for energy star products when replacing appliances.

These are all things we try to do - day in, day out. Because I believe, at the end of the day, the small things really do add up and if we are to truly lessen our impact on the planet in today's society, these small steps must become the norm, just like they were for our parents and grandparents.

~ Patty Kenyon of Middletown Springs, VT  
Managing Director, SolarFest [www.solarfest.org](http://www.solarfest.org)

#### January 16, 2011 Fairlee, VT

My sustainability thought: We do try to be "sustainable" in our choices, where we drive, how often, whether we can "double up" with multiple chores, etc. Every time I load up our masonry stove I feel glee, happiness, pride. When I look up, out the window to see the chimney running clean, I feel great.

But, the truth is: it's hard to live with such a "dirty" fuel source as wood because of all of the bark, leaves, wood bits, etc. At every turn, there is an impulse to flip on the propane, even though it is more expensive.

So, what's to be done? it's important, that a lot of thought go into the design, placement, functionality and use requirements of a stove, making sure to design a system that is a pleasure in all stages of use and clean up, otherwise- click, on goes the propane.

Attention needs to be paid to create, not only the efficient stove itself, but also an efficient spacial and use planning that lets the stove do it's job.

Failure to plan for the entire act of efficiency leaves the door open to choosing another path, an easier, less planned path- exactly how we got ourselves and our world into it's current polluting, thoughtless state.

Let's do the work and really do the job right, plan ahead to create sustainability that is sustainable in the everyday.

*Planning ahead is the measure that I try to take personally to reduce my carbon footprint.*  
~ sean o, Fairlee, VT

... WHERE DO WE GO FROM HERE?

**How Sustainable are you?**



# BURLINGTON, VERMONT:

## A NATIONALLY-RECOGNIZED SUSTAINABLE COMMUNITY

The city of Burlington has been recognized nationally for its sustainable community efforts. That's great, you say, but what the heck is a sustainable community? Karl Benfield, head of the NRDC's Sustainable Communities initiative, has devised a nice, straightforward description:

*"A sustainable community reflects the interdependence of economic, environmental, and social issues by acknowledging that regions, cities, towns and rural lands must continue into the future without diminishing the land, water, air, natural and cultural resources that support them. Housing, transportation and resource conservation are managed in ways that retain the economic, ecological and scenic values of the environment. And they are communities where the consumption of fossil fuels, emissions of greenhouse gases, water resources and pollution are minimized."*

### A Brief History: Burlington's Sustainability Process

Burlington, Vermont has a long sustainability track record. According to the Climate Action Plan page on [www.BurlingtonClimateAction.com](http://www.BurlingtonClimateAction.com), the city began its sustainability journey by joining the Cities for Climate Protection in 1996. In 1998, eight years before the groundbreaking movie "The Inconvenient Truth" made us all aware of climate change, the City Council created a climate task force, and voted to reduce greenhouse gas emissions to levels below those in 1990.

Not long afterward, the Burlington Project, a separate effort, began seeking ways to keep Burlington "livable" for future generations. Livability was defined by an open community project to determine what people valued most about the city. This provided a blueprint for what would become the city's groundbreaking Legacy Action Plan.

Two years later, the Climate Action task force produced a comprehensive Climate Plan for the city.

In 2008, knowing that simply having a plan is not enough, the city commissioned an analysis of city-wide CO2 production to make it possible to measure the City's progress. The numbers were sobering: as a whole, the city had produced 430,000 tons of CO2 in 2007!

These and other data were used in a new open planning process, to create a list of ideas for cutting the city's carbon emissions. Those ideas were then shared at the 2008 Legacy Town Meeting, helping the Climate Action committee and Legacy Action project to develop a common focus. A local carbon-management consulting group, Spring Hill Solutions, was brought in to analyze the data and the ideas generated in the new process, and recommend ways to get the most carbon reduction for each energy-savings dollar spent. The result was a comprehensive climate report: <http://bit.ly/BVTCClimateReport>

As of today, the information in the report is being incorporated into an updated Climate Action Plan it to create updated goals and milestones.

### Community is a Key to Success

Both the Climate Action Project and the Legacy Plan share a common reason for their success: public involvement. A top-down, closed door planning process for large-scale projects requiring significant community buy-in rarely works. Success in Burlington involved extensive public meetings and brainstorming sessions. Having an open process allows more ideas to bubble to the surface and prevents many of the problems that some of us call "not invented by me syndrome." In an open, public process, everyone involved feels ownership and has a vested interest in seeing the project succeed. This tends to spur myriad new projects among different groups, all leading toward the same end goal. (See sidebar for samples and links for more info).

In their 1995 study, "Does Participation Improve Performance? Establishing Causality with Subjective Data," Jonathan Isham, Deepa Narayan, and Lant Pritchett conclude that, at least for some types of projects, community participation results in improved project performance. On other projects, professional project facilitators have anecdotally observed improvements in project performance when a community participation model is used.

### Goals and Metrics Also Keys to Success

Have you ever driven to someplace new - like a cool new restaurant - that turned out to be in an off-the-beaten-path spot? You remember the feeling of frustration as you drove back and forth, trying to catch a glimpse of a sign, or some other clue to its secret location? It would help to know the landmarks near the restaurant, so you'd know if you were close, and would have some way of gauging where you needed to turn, next. Metrics serve the same purpose in a community project - they are the landmarks that tell you whether you're near your goal, and whether you're going toward or away from it. Burlington has made an effort to ensure that the city understands not only where they're trying to go, but where they started and the landmarks along the way that will help ensure they arrive at their destination. The current goal is twofold: a 20% reduction in CO2 emissions in the next 10 years, leading toward an 80% CO2 reduction by 2050. Burlington's use of metrics was cited, specifically by Siemens Corporation (a solar panel manufacturer) in its 2010 Siemens Sustainable Community Award:

*A diverse group of steering committee members is appointed to monitor Plan progress. The work and inclusion of these partners is vital because, as the Plan clearly states, progress towards a sustainable Burlington requires the broad-based collaboration between businesses, government entities, educational institutions, health care providers, and individual citizens. Not only does this group meet regularly to track and monitor progress, it hosts an annual town meeting to share successes and consider how to best address on-going challenges.*

### Burlington Special: Economic Sustainability

Burlington takes sustainability one step further than most cities. Recognizing that many well-intentioned projects throughout history have faded into oblivion after bad economic tides washed them away, Burlington has included economic sustainability in its plan. This can enable the city to maintain its sustainability gains, and perhaps continue gaining ground even if the larger economy hits those inevitable bumps and slumps. Enabling local businesses to survive during "off" years can help keep the city on-track toward the environmental goals that will keep the city livable for future generations.

Burlington provides a terrific model for sustainability success. It's a walkable, vibrant city, with something for everyone. It is a strong community working together to preserve the good, while finding ways to improve what can be improved, all with an eye toward the long-term big picture - what a wonderful legacy to offer future generations.



### Addresses Climate Impacts in 8 Key Areas:

- Transportation - Community-wide & Governmental
- Local Gardens, Farms and Food Production
- Energy Efficiency in Buildings
- Renewable Energy Resources
- Urban Forestry & Carbon Sequestration
- Waste Reduction and Recycling
- Policy, Research and Education

### Samples of Progress So Far:

- Creating sustainability guides for individuals, businesses, and children.
- Burlington Electrical Department projects have held annual electrical consumption in the city to within 2% of 1989 use, saving rate payers \$10.1 million/yr.
- City Market's 136 solar panel project, providing 3% of co-op's electrical needs.
- Energy and lighting audits, and retrofits at Burlington International Airport.
- City Hall program to reduce solid waste, and increase recycling and composting.
- Implementing anti-sprawl urban planning - exemplified by the award-winning Burlington Cohousing East Village.
- Community gardening projects.
- Online community tools, including Front Porch Forum and Burlington Legacy Youtube channel.
- Bridges Out of Poverty training.
- Doing Business in Burlington Green Guide.
- Youth on Boards project, to involve city youth on city boards.
- Housing and community land trusts.
- Free programs and series at Fletcher Free Library.
- Clean Energy Assessment District (municipal loans at low interest for installing efficiency and alt energy upgrades).
- CarShare carpooling participation for city employees.
- and more!

### For more information see:

<http://bit.ly/BVTCClimate>  
and  
<http://bit.ly/BVTCClimateReport>  
and  
<http://bit.ly/BVTLegacy>  
and  
<http://bit.ly/BTVYoutube>



# 10 Yrs of Transition Putney - Looking Back... A SUSTAINABLE COMMUNITY

by Daniel Hoviss - Transition Putney


 REBUILDING  
COMMUNITY  
RESILIENCE AND  
SELF-RELIANCE

**TRANSITION**  
Putney  
05346

 TACKLING CLIMATE CHANGE AND PEAK OIL  
BRINGING THE HEAD, HEART AND HANDS  
OF COMMUNITIES TOGETHER TO MAKE THE  
TRANSITION TO LIFE BEYOND OIL

The Transition Movement in Putney has been very successful and surprisingly effective! Who would have dreamed we would make such a dramatic difference? Not only has Putney's Transition Movement expanded to help start other movements in several other towns, but people have been moving to Putney in droves to get involved and share in the community spirit. The population in town has swelled to 3210 which is 410 more people than 10 years ago!

We just finished our 1000th re-skilling workshop - making your own clothing dye from natural sources.

The Putney Farmers Market purchased their own land in 2012 and have just finished their 10th and most successful year ever, with over 110 vendors, and an acre of space. Most of the major farms are involved, and there is also a very successful Market Basket program that allows members of the community to purchase food at wholesale prices - directly from farmers each week for a set cost, similar to a CSA but more affordable.

The Putney Community Gardens reached the capacity of their first acre field early in 2013 and they created 6 other community gardens all around Putney. Each garden is a lovely work of art, unique to the location and micro-climate. It is interesting to see members swapping plots to be closer to home, and exchanging seeds to grow heirlooms we never thought could grow here. Perhaps there are some good parts of Global Warming.

The Putney Community Orchard Project that was started in the center of town in the Spring of 2011 has been bearing peaches, plums, cherries, apples, pears and other fruits for many years, and we are even experimenting with nut trees. The harvest from these trees is for everyone, and is donated to the Putney Food Shelf as well as being made into preserves for the Farmers Market.

The Greenhouse Project was a major success! While it took longer to get the greenhouses built, they are now in several areas in town. In some cases we have more than one greenhouse per neighborhood. Food grown in our greenhouses is donated to the Putney Food Shelf and sought after by local restaurants.

The Health and Well being groups have also been quite successful, with not just one but three groups at work. People now have the option to pay "insurance" directly to their healthcare provider, and this has created a cottage industry of sorts, with a wide range of healing disciplines available in town. The Healthy Aging group was instrumental in the creation of a really special retirement community that purchased and rebuilt the aging Putney Inn. It is now a wonderful assisted-living complex, with a solar heated pool and hot tub, a biofuel-heated sauna, trained staff that offer every kind of massage, and amazingly good local organic food. There is now a waiting list for the facility, and people really love to go out to eat at the "Inn".

The Inn and assisted-living facility are conveniently close to the new TRAIN STATION...yes, after a ten-year struggle, we now have local train service to Bellows Falls, Brattleboro and beyond! Our new train station is within walking and biking distance to the center of town, and the bus service now connects the station with other stops in town.



since the paper mill shut down. The Putney Coop really helped by going solar in 2011 with their large hot water system. The Coop system paid for itself in less than 4 years. In fact with the high cost of both propane, and fuel oil most homes and businesses that have good solar exposure now have hot water provided by the sun. Vermonters really stepped up installing solar-electric systems after Vermont Yankee closed. Many of the workers from the paper plant decided to stick around and learn a new trade.

Speaking of transportation, what a difference 10 years makes! The highway is quiet...

Not because people are no longer driving, but because automobiles have evolved. Tires have become much more efficient and no longer make noise as they roll. This improvement, born out of the quest for lower rolling resistance, was perfect for the electric car revolution. Most new cars are now battery electric, powered by the grid. Advances in battery technology has allowed longer trips and quicker charging to be the norm. Many people charge their own cars at home with solar-electric arrays, and then sell excess power back into the grid. Pollution has dropped dramatically, and idling is no longer an issue except with large trucks.

Community Solar really took off, too. The first 250KW project was installed in the Fall of 2012 and turned a profit for the investors in the Summer of 2013. Since then 8 other large solar arrays have been installed at good locations. Community Solar is now producing over 2 MW in Putney, we lead VT in the number of Photo-Voltaic installations up and running.

Southern Vermont Renewables created a Small-Systems division in Putney to install solar hot water and PV. They have been extremely successful, and are now one of the bigger employers in town,

these are at Landmark College for the students who ride to town on the new covered bike path. The college got involved because it was less expensive than purchasing new buses for the students, and that turned out to be a wise move. Students can shop in town and get exercise while getting to and from school. Also more students now live in town. There are bike racks at every store, and shelters at five locations. We do not even bother to lock bikes any longer as people have become much more respectful of the program. Besides being fun, biking saves money, provides healthy exercise, and is a tourist attraction.

The Local Currency Project was perhaps the most successful of all Transition Putney efforts. Many artists got involved and the currency was coveted for its artistic value, and even collected! At one point, after releasing \$10,000 worth of local currency, none of it was in circulation! Normally this would be a problem, since we wanted the currency to circulate. But since the purchase of the currency funded our PACE program for renewable energy and weatherization projects and the demand was growing, it really was a "problem of success." We printed more currency with new designs every few years. This allowed the town to weatherize all of our older building stock at a low cost, and provided funding for many of the solar projects around town. The local currency that started out as a Putney experiment quickly grew into a medium of exchange for all of Windham County and parts of New Hampshire. We are now considering what it will take to make the currency officially the Southern Vermont Renewable Energy Currency.

What will the next 10 years hold? Well, we are looking again at a micro-hydro facility on the Sacketts Brook and

other small streams in town. We already have an energy recovery system on the wastewater treatment plant, which has a 50' drop. The treatment plant is almost net zero now, with a methane production system, PV array, and energy recovery system. We have started construction on the new Eco Village in Putney. Using a holistic approach to development, with every available green technology and building practice employed to build a model sustainable community within our community. Some of the many features include shared office space, a conference facility, indoor parking, and a 35KW PV array as a parking shelter-charging station for electric cars. We plan to offer below-market rates for tenants for rent and power. We now have our 7th community garden there, along with commercial composting operations, mushroom growing, green builders, renewable energy companies, and 12 affordable super-insulated homes.

I don't know about you but these last ten years have been some of the most rewarding times in my whole life, I look forward to the next ten. What do you want to do next?



The Putney School  
Elm Lea Farm, Putney, Vermont

The satisfaction of pulling a carrot out  
of the ground or stacking hay in the hayloft  
or milking a cow or tending fresh maple syrup  
we learn by doing.

Putney is committed to sustainability.  
We invite you to come see our LEED-certified,  
"net zero" Field House!

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PELUS Farm, Homesteading & Sustainability  
Ages 14-17 Day & Boarding  
www.putneyatthehouse.org



## Green Guru

by Dave Bonta, founder and president of USA Solar Store, author of *The New Solar Home*, writes for GET as The Green Guru



### 350.ORG MEETS GREEN ISLAND

Sometimes, it feels like we're in a Stephen King novel- maybe 'The Stand.' There's a feeling from the gut, prompting us all to do ... something. To reach out. To try. To make a difference. I've been feeling it since at least 2001, and more so after reading "Eaarth", Bill McKibben's book on the challenges of the new world we have sleepwalked into. In the wake of Eaarth's publication, students from Middlebury, UVM, and other schools, under the banner of 350.org are on the road. A roving band of tech savvy Johnny Appleseeds, they're traveling the state of Vermont, seeking kinship, dialog, and action toward a greener future.

On January, 16<sup>th</sup> they came to Green Island - a new school for renewable energy/sustainability tech training on the Island in Bellows Falls. The school embodies a dream that arose from a bunch of people saying "Let's begin the work of transition." Green Island has 3 main principles:

1. Comprehensive student assessment and placement.
2. "Real World" skill development in the areas of conservation, clean energy and Permaculture.
3. Comprehensive job placement program for all graduates.

This is a training center for creating and renewing careers for the Transition economy. The Transition from waste to needs met, transition from burning Fossilized "Ancient Sunshine" to using renewable energy, from the 2,000 mile tomato to local foods and economically secure communities. This project has something different from so many other training programs: it has Jobs coming out the other end. We need to recognize that things are not returning to "normal" anytime soon,

and we need to help ourselves up and out of the hole this economy has fallen into. In this econ-omy, training someone and not getting them a job is a waste of time. So we will find out what they actually want to do, determine where their talents lie, and help them either find a job or create their own business.



*Green Island and 350.org: together, we can turn the solitary voices in the wilderness into a chorus of hope for the future. ☺*

## Did Iron Eyes Cody IMPACT LITTER?

By Roger Lohr

Remember the famous television commercial entitled "Iron Eyes Cody" about littering that includes the Indian with a tear falling from his eye and the tag line "People start pollution, people can stop it?" The ad showed garbage in many scenes. Robert Cialdini, a professor emeritus of psychology and marketing from Arizona State University has something to say about the effectiveness of that award-winning commercial (16<sup>th</sup> most famous TV commercial in history), and it will be a surprise to you.

Research of the ad showed that it was less than optimal and even negative with regard to the impact to help fight littering. The details of the finding and analysis of other calls for environmental action were recently offered on the Living on Earth radio program. The professor's study showed that while the commercial tried to act on an individual's guilt for screwing up the environment, another clear message that was conveyed was that

## NEWS, CLUES & REVIEWS

### Solar System Donated to Habitat for Humanity House

By Mitch Sidd

**HB Energy Solutions** of Springfield Vermont in collaboration with Stiebel -Eltron of West Hatfield Massachusetts has installed a solar hot water system in the Habitat for Humanity house in Springfield Vermont. The equipment was donated by Stiebel-Eltron and the installation was donated by HB Energy Solutions.

When I heard of the house being built I contacted Frank Stiebel, owner of Stiebel Eltron, and arranged for the generous donation of the equipment. The equipment consists of a 30 tube array of Thermomax evacuated tubes coupled with Stiebels 80 gallon storage tank with two heat exchange coils. The circulator and controller are also from Stiebel-Eltron. The secondary coil is connected to a wall mounted condensing boiler for make-up heat.

The installation, parts and labor was generously donated by HB Energy Solutions and carried out with the expertise of solar team members, Roland Farnsworth, Brian Hernon and myself.



The open house that was held on January 15 was well attended with members of the community and habitat officials present to offer their best wishes to the new owners, Troy Dubois and Amy Hebert.

The new owners, both of Springfield, were very excited about having a solar hot water system for their new house. On that day it was 5° and partly cloudy, the collector was at 105° and the tank was at 85° without any make up heat from the boiler. The solar contribution will be about 70% of the energy required to heat their hot water on an annual basis. That energy will be "free energy for life". ☺

WE DO PLENTY OF LITTERING. Taking the concept forward, if so many others litter, I might as well do it, too because the litter is already all over the place.

Professor Cialdini conducted research concerning the reuse of towels in a hotel room. One phrase used by the hotel to encourage reuse of towels was "If you reuse the towels, we'll make a donation to an environmental cause." This tact yielded no increase in the towel reuse.

The most effective phrase used was "We have already given to an environmental cause in the name of our guests, would you please reuse your towels to cover the cost of that donation?"

The challenge for psycho-marketers in the environmental activism field is how to address the view that people feel entitled to use energy because they feel that they worked

for it and made their contribution to society. Perhaps they even contributed to an environmental cause and saw that as justification when they purchased a gas guzzler SUV (also because they need the 4-wheel drive for the snowy roads or have two kids, who play ice hockey and have so much gear).

Cialdini has studied the psychology of dissuasion and conveying urgency in messaging. He suggests that some incentives do not work very well. In one study, he produced three different public service announcements about recycling in Arizona communities. One message was that a majority of the residents in the state (or neighbors) approve of recycling, but the more impactful message was that a majority of the residents disapprove of those few, who don't recycle.

In psychological terms, the disapproval commercial marginalized the incorrect con-

> Cont'd on p.34 >>

## Chelsea Green: BOOK REVIEWS

### RECOMMENDED READING

Visit [www.chelseagreen.com](http://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**
- **GAIA'S GARDEN A Guide to Home-Scale Permaculture** by Toby Hemenway
- **LIVING ABOVE THE STORE - Building a Business That Creates Value, Inspires Change, Restores Land & Community**, by Martin Melaver
- **Peak Oil & Climate Change**, by David Holmgren
- **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** -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:

#### Loving and Leaving the Good Life by Helen Nearing

In "Loving and Leaving the Good Life," Helen Nearing gives us a whirlwind tour of her own formative years: studying violin in Europe, a brief relationship with Krishnamurti, and more. These experiences laid the groundwork that later allowed her to give up the so-called "good life" in favor of the actual Good Life on a farm in rural Vermont. As the US slid into the Great Depression, Helen took the risk of leaving her well-heeled family and a future of economic security to join Scott Nearing, who by then had already been blacklisted from teaching, in a life filled with love, dignity, community, and satisfying work.

In one of the more telling passages, Helen says that the title might be better written "with a comma after the first word" - because "Loving and Leaving the Good Life" is about more than simply loving the way she and Scott had lived, it was about love itself. "The Good Life" was merely the stage on which that love played out.

At the end, Helen writes of her final days with Scott - following his decision to die on his own terms, with quiet dignity, at the age of 100. The depth of respect and love between these two remarkable people shines through, providing yet more inspiration from a couple who provided inspiration to generations of Americans seeking a better way to live. ☺



# A DECENTRALISED ENERGY FUTURE

Greenpeace's Energy [R]evolution Scenario is a practical solution to our energy needs. > >

It offers a sustainable path to quit dirty, dangerous fuels by transitioning to renewable energy and energy efficiency.

## How it works

In this scenario, an ambitious energy efficiency program along with massive development of renewable energy happen in parallel, so that by 2050, the global energy system is 95% powered by renewable energy. Energy will move towards a decentralized system using local renewable sources such as wind, solar and geothermal. > > >

THE CITY CENTRES OF TOMORROW'S NETWORKED WORLD WILL PRODUCE POWER AND HEAT AS WELL AS CONSUME IT. THE ROOFS AND FAÇADES OF PUBLIC BUILDINGS ARE IDEAL FOR HARVESTING SOLAR ENERGY. 'LOW ENERGY' WILL BECOME THE STANDARD FOR ALL BUILDINGS. GOVERNMENTS COMMITTED TO TIGHT CLIMATE-PROTECTION TARGETS WILL HAVE TO IMPOSE STRICT CONDITIONS AND OFFER INCENTIVES FOR RENOVATING THESE BUILDINGS. THIS WILL HELP TO CREATE JOBS.



1. PHOTOVOLTAIC, SOLAR FAÇADES WILL BE A DECORATIVE ELEMENT ON OFFICE AND APARTMENT BUILDINGS. PHOTOVOLTAIC SYSTEMS WILL BECOME MORE COMPETITIVE AND IMPROVED DESIGN WILL ENABLE ARCHITECTS TO USE THEM MORE WIDELY.

2. RENOVATION CAN CUT ENERGY CONSUMPTION OF OLD BUILDINGS BY AS MUCH AS 80% - WITH IMPROVED HEAT INSULATION, INSULATED WINDOWS AND MODERN VENTILATION SYSTEMS.

3. SOLAR THERMAL COLLECTORS PRODUCE HOT WATER FOR BOTH THEIR OWN AND NEIGHBOURING BUILDINGS.

4. EFFICIENT THERMAL POWER (CHP) STATIONS WILL COME IN A VARIETY OF SIZES - FITTING THE CELLAR OF A DETACHED HOUSE OR SUPPLYING WHOLE BUILDING COMPLEXES OR APARTMENT BLOCKS WITH POWER AND WARMTH WITHOUT LOSSES IN TRANSMISSION.

5. CLEAN ELECTRICITY FOR THE CITIES WILL ALSO COME FROM FARTHER AFIELD. OFFSHORE WIND PARKS AND SOLAR POWER STATIONS IN DESERTS HAVE ENORMOUS POTENTIAL.

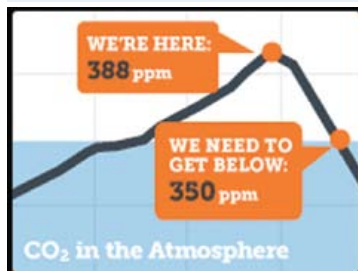
## suburbs



1. PHOTOVOLTAIC (PV) - ELECTRICITY  
2. MINI-COGENERATION POWER PLANT = COMBINED HEAT AND POWER (CHP)

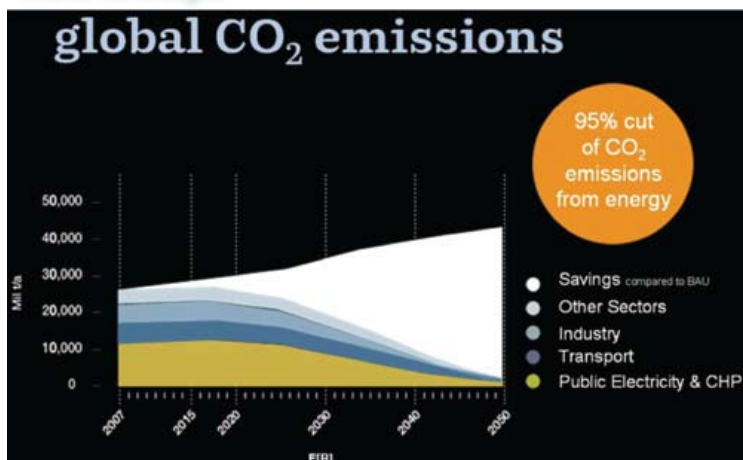
3. SOLAR COLLECTORS (HEATING)  
4. LOW-ENERGY BUILDINGS  
5. GEOTHERMAL HEAT AND POWER PLANT (CHP)

Scientists say that 350 parts per million CO<sub>2</sub> in the atmosphere is the safe limit for humanity.



<http://www.350.org/en/about/science>

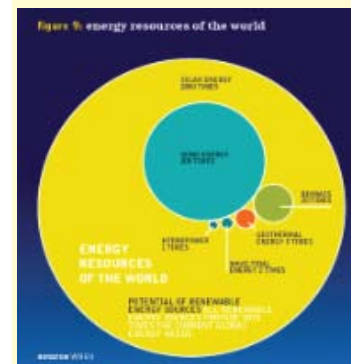
## How it helps



If governments apply this or a similar Energy Scenario, it becomes possible to reduce CO<sub>2</sub> emissions sufficiently to stop dangerous climate change. It also gives access to electricity to communities who currently don't have any, ensuring a just and sustainable transition for developing countries. It also provides secure and affordable energy supply to take into account economic growth.

<http://www.greenpeace.org>

All illustrations ©Greenpeace 2010



## AFFORDABLE ENERGY

The potential for renewable energy is far beyond what we need. See image.

In the business as usual scenario, electricity supply costs will nearly double by 2020. Unchecked growth in energy demand increases in fossil fuel prices and the cost of CO<sub>2</sub> emissions result in total electricity supply costs rising from today's \$1,450 billion/year to more than \$2,800 billion in 2020, and \$5,300 billion by 2050.

By moving away from fossil fuels and reducing carbon emissions, we can stabilize energy costs for consumers. Between 2015 and 2020, most renewable energy sources become cheaper than coal.

## WHAT GOVERNMENTS SHOULD DO

**No more dirty energy:** all plans for dirty energy power plants should be scrapped. The world simply cannot afford to go in the wrong direction anymore

**Stop fossil fuel subsidies:** coal & nuclear should no longer be encouraged by gov't's with interest-free loans & massive subsidies.

**Implement feed-in-tariffs:** these tariffs should help renewable energy to compete with dirty energy for the first years they are on the market. After a few yrs, the FIT's can end.

## WHAT YOU CAN DO

**Commit yourself** to move towards a clean energy future.

**Spread the word:** tell the people you know that a fossil-fuel free future is possible. Utilize facebook... Present full blown slide shows from [www.greenpeace.org](http://www.greenpeace.org)....

**Implement it:** change your light bulbs to the energy efficient type, insulate your home better, switch to a green energy supplier if they're available in your country.

**If you own your roof,** install solar panels on it. Research which panels and which orientation are the most efficient to get the most out of your solar panels.

**Ask your legislators to follow.** Research their position on energy. If they support coal &/or nuclear as energy sources, write to them. Keep asking them to support renewable energy!

# Masonry Heaters

by Emily Marsh

**OIL prices are rising** again, and this time they may not go down. Here in Vermont, many of us use oil to heat our homes, and this not only negatively impacts the environment, but our finances as well. Masonry heaters are an excellent alternative to oil, and to traditional wood stoves and furnaces because of their efficiency and use of renewable fuel. They have been in use for hundreds of years, though mainly in Europe and Russia. The only difficulty, aside from the up-front cost, is the weight of the heaters, which requires a home to have proper floor support. Installing a masonry heater is well worth the cost and effort.

A few years ago my parents' installed a masonry heater, and it has done a wonderful job of heating their small home. The house retains temperatures in the 70's, even on very cold days, though they do not use any other form of heat. A wonderful aspect of owning a masonry heater is that it only needs to be attended to twice a day. One fire is kindled in the morning and another in mid to late afternoon, which keeps the house warm for about 24 hours. Masonry heaters use an intense fire to create heat which is absorbed by the mass of the masonry and



then slowly released into the surrounding area. Air for combustion is allowed to circulate freely to enable the fire to burn at a higher temperature. When the fire is kindled the glass doors allow the radiant energy to pass freely into the room, unlike traditional wood stoves. Ash outtakes, at the bottom of the structure, only need to be cleared out every couple of months. For people who like to bake there are models that include bake ovens.

After the initial cost of installing a masonry heater, they are very cost efficient, as they use much less fuel than conventional wood stoves & furnaces. Wood is burned at about an 80-90% efficiency rate, which reduces firewood needs. Aside from the financial benefits there are environmental benefits, as well. Particulate emissions are greatly reduced, fossil fuels are not a factor. They are considered carbon neutral. Whether CO2 is released when a tree decomposes or is burned, the gases are reabsorbed by plant matter.

When my parents' installed their masonry heater I did not think much about it, except that it was aesthetically pleasing. However, I much prefer the masonry heater in my parents' house to the oil heat in mine. Sometimes it is more important to think about the long term investment, than the upfront cost. With a masonry heater you are not only investing in an efficient stove, but in a healthier environment for the generations that come after us. ♻️

## Mark Twain comments on Masonry Stoves

Apparently Mr. Twain travelled to Europe and experienced the heat-storing fireplace first-hand, and here's what he had to say:

*"All day long and until past midnight all parts of the room will be delightfully warm and comfortable...its surface is not hot; you can put your hand on it anywhere and not get burnt."*

*Consider these things. One firing is enough for the day; the cost is next to nothing; the heat produced is the same all day, instead of too hot and too cold by turns.*

*America could adopt this stove, but does America do it? No, she sticks placidly to her own fearful and wonderful inventions in the stove line. The American wood stove, of whatever breed, is a terror. It requires more attention than a baby. It has to be fed every little while, it has to be watched all the time; and for all reward you are roasted half your time and frozen the other half... and when your wood bill comes in you think you have been supporting a volcano.*

*It is certainly strange that useful customs and devices do not spread from country to country with more facility and promptness than they do." -Mark Twain*

Submitted by Royce Thompson - Roywood Masonry Heaters

Editors note: this comment was recently read & enjoyed by a local relative of Twain. ♻️

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## Shred, Don't Dread! PART II Compost-Based-Heat for Vermont

PART I can be read in GreenEnergy Times, Nov. 5, 2010

By Gaelan Brown, Energy Optimist

About a year ago, Ben Falk of Whole Systems Design, sent me a link to a YouTube documentary that showed exactly how Jean Pain built his "Mound de Pain," including in-depth interviews with him. It was a fascinating story, and I said, "I gotta have one of those!" Then a local arborist told me he had lots of woodchips to get rid of from his tree-service work, and that I could have as many truckloads as I wanted.

At that point there was no turning back for me. I had to see if we could make this work. So my wife, Jasna, and I got help building our Pain Mound from our friends at the Carbon Shredders, Vermont Commons, the Valley Futures Network, SunWood Systems and Whitney Tree Service.

Based on what we learned from our research, we figured out how to coil 400' of 1" waterline inside a large mound of soaked/packed wood chips. And it worked! The buried water loop – going from our basement, to our mound, and back to the household plumbing – could bring our 48° well water up to 110° plus, at about 1/2 gal/min., continuously.

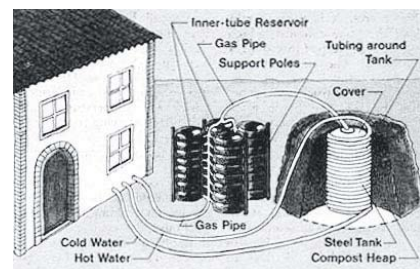
A couple of days after we completed our mound, its interior had heated up to 90°+. Within 10 days it reached 110° plus. The woodchip mound we built was 14' wide at the base and eight' tall. I was able to get 1/2 gal/min. of 110-115° water continuously, 24/7, without the mound cooling off. This equates to more than 500 gal/DAY of virtually free hot water. This flow rate, if maintained in the winter, could generate enough Btu-value to heat about 1,000 sf with a radiant-floor heating system, since radiant-floor systems work best with a slow but steady flow rate and temperature of 110-120°. This is assuming an average VT winter and a home with average insulation, according to several radiant-floor experts I spoke with. It would be simple to set up a few storage tanks in the basement, and circulate water through the mound at a slow but constant rate into the tanks, ensuring that we would always have a large amount of hot water on hand.

In the mound we recently built we will attempt to make methane now that I have some help from a couple of biogas experts. Imagine being able to produce a replacement fuel for propane and gasoline using only composted wood-mulch in a low-tech, do-it-yourself concept.

The internal temperature of our first mound held steady for the first five months, but then we learned why Jean Pain insisted that it was essential to use finely shredded material (mulch) as opposed to the 1" diameter woodchips that we used. Woodchips don't have enough surface area for the bacteria to sustain a high level of activity. So after four or five months and winter weather kicked in, the digestion process in our mound slowed down and it cooled to 65° by the spring. By early summer the temperature was back up to 115°. Jean Pain had several documented successes using finely shredded mulch in which the temperature held steady at 130° plus for between 18-24 months. That means one mound the size of ours could provide two winters' worth of heat and hot water, replacing around \$5,000 worth of fuel cost.

The mound we just re-built, using shredded mulch from a local processor who supplies garden stores and landscapers, should generate water up to 150°, throughout the winter.

I believe that the opportunities for these kinds of "innovations" are all around us, but that we must stop waiting for someone else to solve our problems. Will BP, the Bank of America, or Halliburton provide us this kind of energy solution that creates local jobs and uses our local renewable resources? Probably not. So let's get moving and realize that we can and must come up with our own solutions, ourselves. Shred, Don't Dread. [www.GaelanBrown.com](http://www.GaelanBrown.com) ♻️





# Expansion of Net Metering Program

**Renewable Energy Business Leaders Join Legislators and Homeowners to Call for Expansion of Successful Net-Metering Program to Create Jobs, Support Renewable Energy Development**



MONTPELIER, VT  
January 28, 2011

**H**omeowners, businesses, and renewable energy manufacturers, installers and developers

met today to call for the expansion of Vermont's net-metering program.

At a State House press conference, members of Renewable Energy Vermont (REV), the state's leading trade association for the renewable energy industry joined Vermont home and business owners and leadership from the House Natural Resources and Energy Committee to discuss the role of VT's net metering law in creating jobs and deploying home-grown renewable energy to Vermonters.

Afterward, the group testified before the House Natural Resources and Energy Committee. "Net metering has been a cornerstone program for Vermonters growing locally produced, renewable power," says REV Board Chair and VERA V.P. Martha

Staskus. "Expanding the program will spur the development of new renewable energy systems, produce additional economic growth, and create more jobs at no cost to the state."

Net metering allows Vermont rate-payers to generate their own power using renewable energy systems.

Excess power they generate can be fed back to the utilities, running their electric meters backwards.

This successful program originally enacted by the Vermont Legislature in 1998 has resulted in nearly 1,300 solar, wind, and digester installations across the state with a total capacity of over 11MW of local renewable power.

About Renewable Energy Vermont (REV), [www.revermont.org](http://www.revermont.org) REV is a nonprofit, nonpartisan trade association representing nearly 300 businesses, individuals, colleges and others committed to reducing our reliance on fossil fuels & expanding the availability of renewable sources of energy in Vermont. ♻️

David Blittersdorf's

## VIEW FROM THE TOP WE WON THE ENERGY LOTTERY- What Now?



It's tempting to sugar-coat the idea of energy policy change as — optional or gradual — something we can debate at length, — that

will eventually be resolved by another generation. But the harsh truth is that our energy future will not include cheap, easy or abundant resources, and we need to adapt now to be prepared.

The lives and lifestyles of modern humans are built around the one-time energy lottery winnings of fossil and nuclear fuels. These fuels, including uranium, are physically extracted from the earth, transported, and burned in engines, furnaces or reactors. Collectively, these fuels are the result of millions and millions of years of solar energy that very slowly was transformed underground into coal, oil and natural gas. We are at the peak production points of many fuels and mineral resources, and peak oil has already happened. This means from here on out, prices are going up, and supplies are going down. In the two centuries spanning 1900 to 2100, we will use up most of these finite energy sources, and when they're gone, they will be gone. Our energy situation is urgent, and requires honest, immediate planning for humanity's long-term future.

Vermont has a choice to make on the direction and speed of change in energy usage and production. We can continue to import and rely on the old finite fuels, or switch to an electric energy economy based on deep efficiency and local renewables. The short-term cost of renewables will always be higher than that of fossil fuels - renewable energy is free and abundant, but the equipment necessary to capture renewable energy from the wind, the sun or flowing water is not. Our current economic

system continues to lowball the long-term value of renewables, and it is essential that we correct this miscalculation.

We must ask our legislators in Montpelier to push ahead and take a chance on renewables. Push them beyond their comfort zones. Ask them to support the policy positions of Renewable Energy Vermont, and take serious steps to develop strong efficiency measures and a renewable energy infrastructure in our state. As citizens, we must also educate ourselves about the facts surrounding renewable energy, and take a keen interest in becoming informed about what I believe is the most important issue before our society today. For example, it's important to know that we will never be able to replace all fossil fuels with renewables. Only with massive decreases in energy use, by means of conservation and efficiency will we be able to power our modern lives with renewable energy.

Our future depends on renewables and efficiency measures. Our economy cannot survive long-term on finite energy sources, particularly given the rapidly increasing costs of those fuels, due to their depletion. Renewables and efficiency retrofitting create in-state manufacturing, installation and service jobs, and if a renewable energy infrastructure were to be implemented in a serious way, this green industry would employ far more people than are currently supported by the fossil fuel industry.

It is not easy to face the reality that the easy, comfortable ways of producing and using energy are no longer the right ways. But if we fail to transition away from finite fuels, our society will be in big trouble, and the time to act is now.

David Blittersdorf is the President/CEO of AllEarth Renewables in Williston, VT, specializing in the design, manufacture & installation of grid-connected wind and solar renewable energy systems. He is also the founder of NRG Systems in Hinesburg, VT. ☀️

### < Cont'd from p.1 > GROUP NET METERING

the Mad River Energy co-op to organize the group.

It turned out that our proposed wind-site didn't have enough wind-resource. But through this process we learned a lot about grid-connection and administrative issues, while we commissioned a wind-resource analysis that cost about \$1500. This analysis used a data-model to predict the wind-resource based on regional wind-data-streams, geographic information layers, and weather patterns.

Commissioning an anemometer and a test-tower (like what NRG Systems sells) is a more accurate way to measure the wind resource, but it takes at least 18 months and \$20,000 to go this route and this is usually only done for large wind-farm projects.

Because of the challenges of finding a good wind site, we moved toward a focus on solar power. And now it looks like the solar project may move forward since we've found a willing host who's graciously offering several acres of land for free. (I can't disclose who the land-donor is just yet)

STOP THE PRESSES! We recently learned, after having multiple meeting with utilities and state-regulators that the group-bill/credit process as prescribed by VT Title 30 section 219a, forces all members of the group to pay one combined power bill and get one combined credit from their system. Power companies do not have to distribute the monthly kwh credits to each member's individual power bill, even if the group gives the utility the monthly data.

So the only way group-net-metering can work is if the entire group of people agree to each month pay their overall power bill collectively, while somehow keeping track of how much power each group-member used each month and how much credit

each member should get from their share of ownership of the solar/wind system.

So far the only examples of group-net-metering in Vermont are a couple of business owners who have combined their business/residential power bill, and one neighborhood association that has had on-going billing and administrative headaches.

This puts what may be an insurmountable administrative burden on the idea, and at this point our emerging energy co-op is unclear if we should proceed until the regulations are changed.

Tony Klein, State Rep from Middlesex/Montpelier, is Chair of the House Natural Resources & Energy Committee, as well the Chair of the Joint House & Senate Energy Oversight Committee. Klein tells us through our local Rep Adam Greshin that he is well-aware of the onerous limitations on the current group net metering regulations, and that he is hopeful this will be improved via H 156, a bill he's pushing through committee this winter.

But this begs the observation that the interests of people and the environment don't always jive with the interests of the power company monopolies. Power companies don't want to have to handle any extra administrative functions like distributing monthly kwh credits to members of a group. Power companies don't want people to be energy independent, or do they? There's a reason the previous group-net-metering rules did not force the power companies to offer this, right?

Group-net-metering has a lot of potential in Vermont if we can get the regulations adjusted. Please call your local legislators and let them know this is important to you.

GaelanBrown.com; [GaelanB@gmail.com](mailto:GaelanB@gmail.com)



GREENPEACE

# Effective ENERGY

**Energy efficiency** has to do with the use of an appropriate energy source. The suitable measure is how much useful energy is provided by a system. It is the ratio of amount of energy available for a particular task divided by the total energy used.

The more times energy is converted from one form to another the more of it is wasted. The most economical method of saving energy is to match the source to the use. For example the direct use of sunlight to heat a living space is more efficient than using a photovoltaic cell to power an electric heater.

(See Table II. 1 & 2)

This is the result of laws of thermodynamics that govern all energy production and consumption. The first law states that energy can neither be created nor destroyed; it can only be changed from one form to another, e.g. from light to heat. The second law is that energy flows from the higher state to a lower state. You never get out what you put in.

The amount of energy wasted has increased since 1970, despite CFLs, higher car fuel mileage standards, and other energy efficiency standards. The US used 97.9 quadrillion BTUs (quads) of energy in 2005 of which only 43.7% (42.8) were useful and 56.3% (55.1) were lost. In contrast, in 1970, 49.2% (32.8 quads) of the 64.6 Quads of energy used did work with only 49.2% (31.8 quads) wasted. We

are losing the energy battle because we are not using the most direct source of energy for the task required.

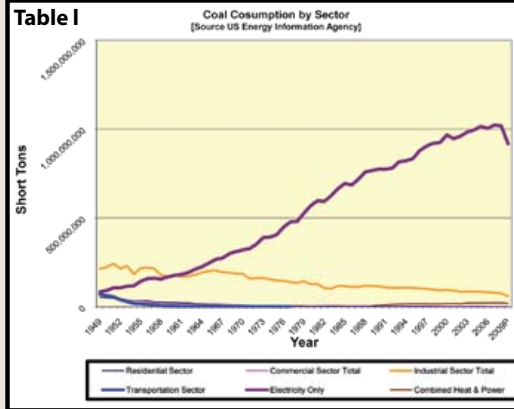
The electric plug-in car is the latest example of an inappropriate source. The US Energy Information Agency data shows that coal is the fastest growing source of electricity.

(See Chart to the right >

The lost energy in electric production dwarfs any efficiency gains in the vehicle. The major advantage of an electric car is that it gets a free ride on the roads because it does not pay the fuel tax for road maintenance. The energy flow diagrams for an electric car are on Table II. 3 & 4.

Only if the cars were charged directly from a wind turbine or a photovoltaic array does an electric car make sense. It is more logical to use biomass to heat buildings and to release the oil for

transportation use. Biomass is also more economical e.g. a bushel of corn (56 lbs) is equal to 2.8 gallons of fuel. Even at



the current market price of \$6.75 it is equivalent to \$2.41 heating oil.

(See Table I. 5) It is also the most effective because it is the most direct.

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1. Solar (radiant) → Chemical (corn) → Thermal (heat)	Table II
2. Solar (radiant) → Thermal	
3. Solar → Chemical (radiant) → Thermal (coal) → Thermal (Steam) → Mechanical (turbine) → Electrical (grid) → Chemical (battery) → Mechanical (motion)	
4. Solar (radiant) → Excite Electrons → Electricity → Thermal	
5. Solar (radiant) → Chemical (corn) → Thermal (heat)	

## EFFICIENCY VERMONT AWARDS

Best of the Best in Commercial Building Design & Construction Award Winners were recognized for their achievements at the Better Buildings by Design Conference in Burlington Feb. 9th & 10th at the Sheraton Hotel.

Green Energy Times would like to recognize the following Companies and extend a Congratulations! to all who won these outstanding awards.

Recognizing innovative and integrated design approaches for energy efficiency in Vermont's commercial, institutional, industrial, and multifamily buildings are:

- UK Architects, PC, Hanover, NH
- Washington Central Supervisory Union, Montpelier, VT
- Black River Design Architects, Montpelier, VT
- Scott + Partners Architects, Essex Jct, VT with HDR/CUH2A, Princeton, NJ
- Reiss Building & Renovation
- Black River Design Architects
- Stephen Goodrich, Wayne Construction
- Tom Wyckoff and Albert Chu
- Caleb Contracting LLC
- Weatherization Works
- EnergySmart of Vermont
- Ashton Thermal
- Building Performance Services

Details: [www.greenenergytimes.org](http://www.greenenergytimes.org) or Efficiency Vermont: <http://efficiencyvermont.com/pages/Business/BuildingEfficiently/Better-BuildingByDesignConferen/efficiencyvermontawardwinners/>

You can actually feel the heat from the summer sun stored in each kernel of corn as it burns!



**NATURE'S CLEAN HEAT!**  
[www.VermontBioFuels.net](http://www.VermontBioFuels.net)

**Vermont GOLDEN HARVEST Biofuels**

*Nature's Clean Burning Alternative: Grown in Our Fields to Heat Your Home!*

Of all the plant based forms of biomass fuel, corn is nature's natural and most efficient solar energy collector. It stores the sun's energy in little golden nuggets, and when burned, it releases that heat when you need it most - at night and throughout the winter. Corn is carbon neutral and more affordable than fossil fuels (which are finite, once the supply is gone - it's gone). Corn is also annually renewable, grown - every year.

We grow our corn locally - in Addison, Vermont; and dry it to 10% - 12% moisture content for *optimum heat*. To reduce dust common to other biomass fuels, our corn is cleaned & packaged in easy-to-reuse 40-pound recycled bags.

**Heat with the Sun for \$250 per ton!**

FREE Delivery within Addison & Chittenden counties.

We also sell the line of **MAGNUM™** multi-fuel biomass stoves and furnaces by **American Energy Systems.**

*Don't trust your comfort to a stove that will burn just one form of fuel, buy an appliance that burns corn, as well as wood pellets!*

Office: 802-475-4007 • FAX: 802-475-2494

e-mail: [pboivin@gmavt.net](mailto:pboivin@gmavt.net) • web: [VermontBioFuels.net](http://VermontBioFuels.net)

Sales: 5994 Goodrich Corner Road, Addison, VT 05491 • Plant: 6286 Goodrich Corner Road, Addison, VT 05491





# Community-Scale Biomass Energy: THE FACTS

*When community-scale biomass energy systems are well-designed, well-run, and the fuel is harvested responsibly, it is a positive, proven, renewable energy option that can be practical and safe, can strengthen our economy and security, and can help ease the urgent strain on our planet's ecosystem. In regions throughout the U.S. with abundant resources, it is available now.*

Providing markets for low-quality wood, the main source of biomass fuel, is a key component of both sustainable harvesting and forest conservation. Without markets for low-quality wood, only high-quality trees are harvested, thereby degrading the forest quality over time.



Community-scale biomass systems use both woodchips, & further refined but more efficient, wood pellets.

**Modern community-scale biomass energy systems use sophisticated emission controls.**

These systems burn very hot, at 70-90% efficiency, producing about 1/10 of the fine-particle emissions of traditional wood stoves, with virtually no smoke or odor. Modern biomass energy is far cleaner than old-fashioned woodstoves or wood boilers, and is equipped with highly effective pollution-control technology, ensuring that final emissions meet and exceed the most stringent air-quality standards. Emissions-control technology continues to develop and improve. While in recent years most systems have made very effective use of fabric filters and collection bags (bag houses) to screen out particulates, today's state of the art control technology is electrostatic precipitators. These powerful filters use an electrostatic charge, similar to the pull of static electricity, to extract fine particles from system exhaust. Biomass energy systems emit 1/6 of the sulfur oxides, which contribute to acid rain, than do oil-fired systems. Nitrogen oxide emissions are about the same as oil.



Woodchips being conveyed (from the fuel storage area to the combustion system) at Vermont's Champlain Valley Union High School in Hinesburg, VT.



A dual woodchip conveyor system at the Crockett Mountain Rehabilitation Center in Greenfield, New Hampshire.

Community-scale biomass energy systems burn biological material - most often wood from low-quality trees - in highly efficient, high-temperature combustion systems to produce heat. Sometimes, these systems also produce a certain amount of electric power (this is called CHP, combined heat and power). But the most efficient use of biomass for energy is to provide space heating and domestic hot water. Community-scale systems typically provide this to single buildings, such as schools and hospitals, or to groups of buildings such as college campuses, industrial parks, or whole towns or cities through "district heating" systems.

Community-scale biomass systems that produce heat or CHP are different from electric power plants, which are generally much larger and mainly produce electricity for broad distribution. Biomass-fueled technology is only about 20-25% efficient at producing electric power; at producing heat, it is 70-90% efficient. Power plants sometimes (though this is rare) sell the excess heat they generate, where it is economically feasible and if there is an appropriate user nearby; this is only 40-45% efficient. Technology is also being developed that can use biomass to produce liquid biofuels.

*Community-scale thermal applications are the most efficient biomass energy technologies. They do the best job of turning biomass fuel into energy, with the least amount of waste.*

Community-scale thermal applications are the most efficient biomass energy technologies—they do the best job of turning biomass fuel into energy, with the least waste.

Systems of this type have been in use since the early 1980s, and have built a track record of safety and reliability. Today, a growing number of community-scale systems—most fueled with woodchips and some with wood pellets—are delivering

heat and hot water to schools, businesses, colleges, hospitals, city centers, and whole communities across the northern United States, Canada, and north and central Europe.

Biomass fuel can be used in a wide range of technologies, from home woodstoves to power plants. Because community-scale thermal systems combine high-efficiency combustion with sophisticated emission controls, this technology meets and exceeds all emission-safety standards while providing heat energy at relatively stable fuel prices from a local fuel source.

When wood fuel is harvested responsibly from well-managed forests, community-scale biomass energy is a sustainable whole system. It keeps energy dollars circulating in the local and regional economy, by using a renewable fuel that is harvested nearby—and its carbon emissions are re-captured as the forests that supply the fuel continue to grow. In contrast, fossil-fuel systems extract carbon that is buried underground in geological deposits, then add it to the atmosphere over time.

Finally, by developing a reliable, local market for low-quality wood, biomass energy can create a new financial incentive for forestland owners to manage their forests for long-term productive health, lessening the pressure to "high-grade" (cut only the most valuable trees and leave the rest). The revenue stream for biomass fuel can help landowners make ends meet, also relieving the pressure to sell woodland for development.



The Barre Town Elementary and Middle School has been using woodchip heating for more than 15 years.



The woodchip facility at Burlington College in Burlington, Vermont.



State-of-the-art biomass facility at Middlebury College.



The Montpelier headquarters of National Life recently installed a woodchip system. The covers to the underground bins (seen in foreground) roll open to accept woodchip deliveries directly from the truck.



All Souls Interfaith Gathering in Shelburne, VT is heated with wood pellets (pellet storage bin at right).

**When their fuel is harvested responsibly from sustainably managed forests, biomass systems can be low carbon or carbon neutral over time.**

Carbon dioxide (CO<sub>2</sub>) is a major contributor to climate change - and at the stack, biomass systems emit about twice as much CO<sub>2</sub>, per million Btu of energy produced as do oil-fired systems. But the CO<sub>2</sub> released by biomass combustion is drawn from forests, which are continually absorbing and releasing carbon over time. If the carbon dioxide that biomass systems release into the atmosphere is re-absorbed over time by new forest growth, then biomass technology can replicate this natural cycling and provide a low- or no-carbon source of renewable energy. In contrast, fossil-fuel systems, which burn fuel extracted from underground, add CO<sub>2</sub> to the atmosphere. For this reason, converting from fossil-fuel to biomass energy can help lower carbon emissions and reduce climate change over time.

Good forest management is essential to realizing the carbon benefits of biomass energy. Key factors include: where trees are harvested, how they are harvested, how this plays out over the landscape and over time, and whether management practices support long-term forest health. It is also important that biomass energy systems be well-designed and efficiently run. When these positive factors are in place, converting from oil- or gas-fired energy to biomass can reduce net CO<sub>2</sub> emissions by 75-90%.

**A well-managed biomass fuel industry, coupled with sustainable growth in demand, creates new incentives to protect and preserve the working forest landscape.**

The current growth in demand for biomass fuel is creating a vital new market for low-grade wood. This market provides a financial incentive for landowners to implement forest management plans, do ecologically sound forest management, keep their woods in production, and manage them for mixed use: fuel, timber, wildlife, recreation, and natural beauty. In this way, harvesting low-quality wood for biomass energy can support healthy forests as part of a working landscape.

In many regions of the United States, there is an abundant supply of low-quality wood for biomass energy. In the forested regions of the Northeast, annual new forest growth exceeds the current demand for wood fiber, including biomass fuel. As long as demand remains in balance with supply, using woody biomass for energy in the most efficient, community-scale applications can help us meet our energy needs in ways that make us less dependent on distant, not-always-stable, sources of fuel. ♻️







## Ask The Home Team Efficiency Vermont

**Q: Is it a good idea to move a freezer outside for the winter, to save energy? My new father-in-law wants to do it, but it'd be my husband and me who'd do the grunt work. Is it worth it?**

**A:** The appliance will run for shorter times when the temperature of the air outside of the freezer is close to the desired temperature inside the freezer. However, the mechanical parts of freezers are designed to work at room temperature. If you place a freezer in temperatures below about 45 degrees, the components may fail prematurely.

A good compromise, if possible, may be to keep the freezer in the basement year-round. If the basement is colder than the kitchen but stays above 45 degrees, you get the benefit of slightly lower electricity costs without creating as much risk for valuable components of the freezer (and components of your husband and your backs, from all that lifting). - Li Ling for The Home Team

**Q: I've been seeing ads for Amish or infrared quartz heaters. Are they really better at saving energy than other electric space heaters?**

**A:** No. All portable electric heaters produce the same amount of heat per kilowatt hour consumed. A claim of energy savings from any portable heater is based on the idea that you'll turn down your central heat and use the portable heater to keep you warm only in the room you're occupying. But electricity is one of the most expensive heating fuels in Vermont. So, the cost of the electric heat is likely to outweigh the energy savings from reducing your use of your central heating system unless you turn down the house thermostat substantially.

Unfortunately, the colder a house gets, the more you put it at risk of problems like frozen pipes, cracked plaster or drywall, and wetness on the inside of the home and the outside. As notable is the potential problem of condensation forming on cool surfaces. Without enough heat to dry them out, these surfaces can become ideal spots for mold and wood rot. This may happen where you can see it or where you can't -- within the walls, floors or attic.

A better approach is to make your central heating system work as efficiently as possible. Be sure your furnace filter is clean. Seal and insulate heating ducts, and have your furnace or boiler professionally inspected, cleaned and tuned as often as the manufacturer recommends. Vacuum or dust heating vents or baseboards and move furniture away from them so heat can circulate.

Efficiency Vermont offers financial incentives to homeowners for energy-saving improvements completed by these contractors. You can find a list of contractors near you at: [www.efficiencyvermont.com/homeperformance](http://www.efficiencyvermont.com/homeperformance). - Bob for The Home Team

## ORGANIC MONEY

By Emily Peyton, Putney, VT

**R**eal Green power is the power of loan/grant policy in the hands of the people. Call it "Organic Money", home-grown, compostable, and regrowable. Last year I ran as an Independent for governor to establish these viable ideas in the minds of Vermonters, of course I knew I would not be winning the election but they were received so excellently wherever they were heard, I will do what I can to continue to amplify them. I succeeded in getting many more people thinking about a very dry subject; how and why and where money comes from. I planted the plan to "grow our own Money Trees" right here in Vermont.

I proposed a Bank of Vermont so that interest from loans made by this public bank for the things we need to see here in Vermont would be returned to our State Treasury, rather than to the ultra wealthy too-big-to fail banks. With these loans new businesses can be launched, jobs can be created, and much more. In this way we continue to strengthen our economy and our State against an unpredictable wall street with the full faith and credit of Vermont backing our economy. Obviously this practice has already served North Dakota extremely well for nearly a century,

since they are the only state to weather the great recession with nary a scratch, indeed they had job and income growth! I suspect a deeply held overall enthusiasm exists still for a Vermont State Bank. Be certain to do your part to press our public servants to get one for us.

It would help Governor Shumlin to create many more jobs in green industry, if he had a Bank of Vermont at his back. My reason for putting myself out on a political limb simply to spread the idea was entirely environmental, born from my faith in Vermonters to lead towards a better relationship with nature.

We may be the greenest state in the union, but until we get Public Banking we are green on the surface only. Underneath we are still serving the rotten greed of major banking and financial interests. Real green is clean money issued by a State Bank of Vermont, made in Vermont, to put to work for Vermonters and returned to Vermont- Not Wall Street for God's sake! ☺

## INGREDIENT OF THE MONTH

Previous Previous "Ingredient of the Month" columns have focused on topical ingredients to avoid, generally petrochemical based materials and specific preservatives like Triclosan™ and Butyl Parabens.

Let's talk some GOOD ingredients to look for, like plant-based vegetable oils.

Remember; "Good ingredients" are non-irritating, healing; renewable/plant based and remain stable in product formulations.

Some oils are solid at room temperature; we call them stearins or butters. Shea butter, coco butter, pig fat (if that is all you have); you get the idea. These oils melt when applied to skin and help to keep one smooth skinned and young looking.

In Africa, the people I met who used shea butter cosmetically appeared 20 years younger than their counterparts. THAT got my attention! I am now an official "shea nut", one crazy about organic, village made shea butter.

Some oils are liquid at room temperature, olive oil, sunflower oil, soy oil - that kind of thing. I remember the word olein because it sounds like olive oil, which stays liquid at room temps. Oleins also help to keep one smooth skinned & young looking longer when used inside & out.

So, thousands of years of data suggests that under most conditions (exception: never oil a skin fungus, it will spread), oiling skin with

whatever is around is better than not at all.

You can oil yourself with petrochemicals like petroleum jelly too, but there are many potential irritations and reactions that can happen over time with these products. The obvious bias of this column is to encourage the use of plant based ingredients as much as possible. The closer to the plant the better!

Why? The closer to nature a material is, the closer to YOUR nature it is. That means lessened chance of reaction, better chance of a gentle healing effect, greater absorption, and lower carbon footprint.

Yrs of experimentation and use have showed me that certified organic oils have some different properties than their agrichemical-processed brethren. I have observed directly that topical applications of organic olive oil or shea butter are dramatically more anti-inflammatory and healing than refined oil based alternatives.

This makes sense because a higher percentage trace botanical based molecules remain in the organic product (listed as "other" in the analysis table). Molecules travel in packs - just like we do. They like to stick close to their buddies.

When a plant produces a vitamin or an antioxidant it produces a bundle of related molecules exhibiting a broader range of effectiveness than that achieved by one single member of the bundle alone. This is pretty much the opposite of the current pharmaceutical approach. Thank goodness we are still allowed a choice.

Many plants make oil based molecules that will come out of the plant and into the oil when the plant is steeped in it for a month. Calendula and St. John's wart oils are renowned for their anti-inflammatory properties, esp. in organic olive oil. Put this into soap for example, and you have a milder soap. Put it into a salve or lotion and it has an even greater soothing effect.

This is the Soapman signing off for now. Remember: Living naturally is a process - not a result. (And pay attention to the molecules!)

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

Learn more at [www.vermontsoap.com](http://www.vermontsoap.com) and [www.seasonedbooks.com](http://www.seasonedbooks.com)

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## First Solar Powered Brewery in NH Flying Goose Brew Pub Saves Thousands

January 24, 2011

**New London, N.H.** In addition to water, malt, hops, and yeast, brews at the Flying Goose Brew Pub & Grille in New London are getting a new ingredient: solar power.

Construction will soon be underway on a 126-panel solar electric system from groSolar, a national solar company that has been installing solar for more than a decade in New England. When completed, the solar panels will be in full view of the pub's main dining room along with expansive views of Mount Kearsarge.

"The decision to go with groSolar had to do with company experience and depth, value-added components, and price," said Tom Mills, owner of the Flying Goose. "The hard part was choosing one from the five companies, all of which gave good, qualified proposals."



The installation will lower the Flying Goose's rising \$24,000 annual electric bill by 25% with an expected Return on Investment (ROI) of five to eight years.

The solar installation is only part of the brewpub's \$250,000 renewable energy investment, which includes air sealing, insulation, kitchen air balancing, lighting, & compressor motor upgrades. The Flying Goose also just

completed a 25-panel solar hot water installation from Clean REsolution & Bright Light Solar.

A 30% federal tax credit and NH State rebates were motivation for Mills to make the investment, which he funded with a business loan from his bank. "The environmental benefit is significant, but we would not be making a \$250,000 investment unless it made good business sense," said Mills.

Mills also plans to use his investment as an educational tool by working with the installation companies to offer solar education seminars and providing a kiosk that shows the real-time performance of the solar power systems that will incorporate a feature provided by groSolar called "groEnergy Watch."

"It's truly commendable for an establishment as well known and respected as the Flying Goose to take the lead as the first solar electric powered brewery in the state," says Jeff Wolfe, CEO, groSolar. "We look forward to a long-term partnership with Tom and his management team to help educate businesses and homeowners in the Upper Valley and across NH about the benefits of going solar."

Learn more at [groSolar.com](http://groSolar.com) 800.374.4494. ☺

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**Look for Part II "Thermal Storage Applications"  
in the May Issue of Green Energy Times!**

## sun-powered beer!



Solar energy is on tap at Victory Brewing Company in Downingtown, PA - the result of a

partnership of the two PA companies with sustainable vision. It was unveiled at a ribbon-cutting ceremony Jan. 6 at the Victory Brewpub.

Victory Brewing founding partners Ron Barchet & Bill Covalleski have long been committed to responsible business, preserving traditional brewing methods & giving back to their community since it's founding in 1996. The Victory Brewpub has become a Downingtown community center and landmark. Its beers are distributed in 23 states. Famous Victory brands include Hop Devil, Prima Pils and Storm King.

SunPower Builders designed and installed the system as well as helping secure Federal and PA State grants and for the project, funded in part by the PA Sunshine Solar Rebate Program.

Adam Garber, field director for PennEnvironment, which has recognized the significance of the installation. The 66-kw installation shows that "businesses continue to turn to clean, renewable energy to protect the environment & reduce their costs," said Garber. Victory installed 12 energy-efficient fermenters in 2009 & 2010. Cooling & temperature monitoring of the fermenters will now be powered by solar photovoltaics.

The Victory project showcases for local homes & businesses of the benefits of renewable energy & provides opportunity for education & advocacy via a remote monitoring system manufactured by DECK Monitoring of Eugene, OR. Customers can enjoy their favorite beers while watching a large screen in the bar area that displays remote meters recording how much electricity the Victory system is generating and how much is being used. The monitoring system will showcase the project by giving live data and a detailed analysis of system usage including:  
Current solar generation  
Total energy used in kWh generated to date  
Solar emissions, cloud cover, temperature, humidity, and wind velocity and direction,

By Patricia Andrien [patricia@sunpowerbuilders.com](mailto:patricia@sunpowerbuilders.com)  
total usage data conversions into light bulbs not used, pounds of CO2 not generated, and gallons of gasoline saved.

The view will be optimized for public view and will allow Victory to monitor the facility's energy usage and will facilitate energy conservation by identifying high energy use periods.

Victory's new solar energy system consists of 345 roof-mounted solar panels and 1 commercial-scale inverter. It is expected to produce 81,000 kWh per year, offsetting nearly 5% of the brewery's annual electricity needs. The system will save the equivalent of approximately 105,000 pounds of CO2 every year.

"Victory & SunPower are a perfect fit for this project. Both of our companies sincerely believe in what we do, and we were excited to work together," said Jon Costanza, founder & president of SunPower Builders and Solar. "SunPower is pleased that we have not only been able to remain committed to our values by working with a company like Victory, but also contribute to their energy savings in a major way!"

SunPower Builders is a sustainable design-build firm working in the solar and green building industries for nearly 40 years in South-eastern PA. A leader in and advocate for solar power, SunPower Builders is a certified B-Corporation, addressing the triple bottom line and is committed to responsible business practices, including support for its non-profit partner, SunPower Afrique.

The solar partnership with Victory Brewing is not only sustainably-focused, but also produces tasty results. "Nothing better demonstrates our company's long-standing commitment to sustainability than this initiative to draw power directly from the sun," Covalleski asserts. "Solar powered beer sounds tasty to me!"



### < Cont'd from p.1 IVEK Corp. SOLAR

able Energy. As a General Contractor who does Renewable Energy, have said this before.

"I believe that the movement to synchronize Renewable Energy with Sustainable Design will prove to be as important to the 21st century as indoor plumbing, electricity and the telephone was in the last. Perhaps our children will look back and smile at our primitive dependency on fossil fuels in the same way we smile as we recall our own evolution from hand-cranked and party lines to I-phones and Internet." Renewable Energy is here to stay. The debate over its viability is over. In fact; it's pointless. Fossil fuel consumes and pollutes while Renewable Energy is clean. One pays for itself three times over. The other costs 3x as much. You own one. One owns you.

As surely as the sun shines on everyone, so is the potential for everyone to benefit from Renewable Energy. This is where the relationship between individuals and businesses and Vermont's Renewable Energy Program needs a strong heartbeat; not the weak pulse that has palpitated unpredictably from one year to the next or was only available to the sleekest or first in line. Communities will only unite around this important cause when it benefits everyone equally and without ration or preference.

We need to change the way we think about Renewable Energy. We need to do it now. Neighbors should encourage it rather than resist it. Passersby should nod in agreement rather than protest. We'll know we are making progress when the sight of windmills on ridges, hydroelectric generators in the waterways, pole mounts, roof and field arrays are all thought of as positive and natural in their settings as the fields & trees around them.

Let me finish by saying that I am proud of my home State & their commitment to Renewable Energy. I believe that we can lead the way in promoting Sustainable Lifestyles as we strive to make Renewable Energy equally available to all."

### < Cont'd from p.26 IRON EYES CODY

duct. There was an increase of 25.1% in recycling tonnage in the community where the disapproval commercial was aired. A normal response rate to an advertisement of this type is 1-2%, so this was viewed as a monumental impact.

The point of the study and Cialdini's efforts is that messages such as "please reduce your energy consumption" or "you can save money by reducing energy use" or "we must protect our environment" are not nearly as effective as "people disapprove of your not getting on board." By the way, this is clearly different from the peer pressure of "everyone is doing it."

So what do we think? Food for thought or indigestion? ☺



One of the most remarkable findings about this whole project is that the owner of IVEK went forward with the solar project, despite learning this summer that they were apparently excluded from the state's alternative energy tax credit program. Tanny said that they had not been notified of a new registration requirement and therefore missed a 9-day window that was included in legislation passed into law months after the company's Certificate of Public Good for the project had been filed.

Several legislators & members of the Clean Energy Development Fund Board had been very receptive to the situation and hoped that some action could be taken to remedy the situation and restore the credits, which would mirror the Federal tax credits for solar projects. Those credits required a project to be completed and functioning by the end of 2010.

Although CEDF's dedicated attempt to resolve this issue that led to them NOT receiving any state incentives \$, Mr. Tanny barely hesitated to say: "Let's Build It!" He went on to explain: "We love our country. We CAN become Energy Independent!"

The solar generation project not only benefits the environment, but also makes the company competitive in the global market and create jobs in the future. The estimate reduction in greenhouse gas emissions resulting from this new project over 25 years is 4100 T of CO2. Mark Tanny has truly left his 'MARK'!

Be sure to drive out to see this exemplary undertaking - just off of Rte 106, on Fairbanks Road, in N. Springfield, VT. And let this be just a 'small' beginning towards our energy independence! Where there is a will, there IS a way! ☺



# VPIRG Energy Program Makes it Easy and Affordable to Go Solar

By Duane Peterson

**VPIRG Energy is making it easy and affordable for Vermonters to go solar.**

In its first phase, the innovative program more than doubled the number of solar electric installations in its target towns.

VPIRG is the Vermont Public Interest Research Group, our state's largest consumer and environmental organization. Its organizers go door-to-door every year to engage Vermonters in real discussions about public policies that effect them. Last summer, VPIRG staff knocked on 60,000 doors in Vermont. There was tremendous support for renewable energy policies, not surprising here in Vermont. Yet many people said they'd like their own homes to get their electricity from renewable sources, but couldn't figure it out on their own. VPIRG decided to help.

Applying a community organizing model, VPIRG imagined gathering people who wanted to go solar – a throwback to the

and price, and negotiated among them the best deal for Vermonters.

The program launched in late September, 2010 with Solar Waterbury and Solar Williston – chosen because those communities have concentrated VPIRG membership and are serviced by Green Mountain Power which pays its customers a 6 cent/kilowatt-hour premium for all the solar electricity they generate (further driving down the cost of going solar to the consumer).

Two solar installers were chosen, Alteris Renewables which specializes in roof-mounted solar arrays and All Earth Renewables which developed the innovative ground-mounted solar tracker. Each offered discounts for the Solar Communities, bundled the federal and state incentives and handled all the permitting. The last puzzle piece was discounted financing which VPIRG negotiated through the VSECU credit union. VPIRG did the work for the consumer to figure all of this out, which together with its third-party validation, proved attractive.

VPIRG presented this opportunity by old-fashioned community organizing through the Selectboards, Town Energy Committees, downtown business associations, neighborhood associations and civic groups. And via modern marketing through email listservs, Front Porch Forums, news coverage and direct mail to solar-ready homes.

In the 3 mos. of this initial phase in the targeted towns, 42 homeowners benefited from the program and are going solar. After learning some good lessons from this start-up stage, VPIRG Energy will roll out this innovative program to the next round of Solar Communities soon. *To learn more about this effort to make solar easy & affordable, or to request your town be included, check out [www.VPIRGEnergy.org](http://www.VPIRGEnergy.org)*



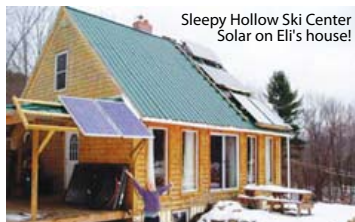
bulk-purchasing clubs from back in the day. And they would be clustered in close proximity. So VPIRG issued a competitive RFP to Vermont's solar industry through its trade association, Renewable Energy Vermont, asking for interest in this volume of new customers bunched together for easy site visits and installations. That generated tremendous interest and VPIRG vetted the vendors, their equipment, stability

< Cont'd from p.1 Sleepy Hollow X-C Ski with Solar  
By Eli Enman

Our main inn is heated primarily with a Traeger pb150 pellet furnace, and our inn is a Green Hotel in the Green Mountains (sponsored by the Vermont Business Environmental Partnership Program).

We operate with an eye towards efficiency here at Sleepy Hollow, and between our family we drive 4 Toyota Priuses and 1 Honda Insight. We also operate our tractor on biodiesel. Our land is enrolled in the current use program with the state of Vermont, and has a sustainable forestry plan in place.

The solar trackers are located in a field next to our driveway, so folks get a great view of them as they come and go from Sleepy Hollow. Many of our skiers, wedding & inn guests are curious about the solar trackers, and we love to talk about our good experience with them. I would guess we've helped inspire a half dozen people or so to go solar! Future plans include installing 1 or 2 more solar trackers, and possibly installing a solar hot water system for our inn. ☺



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## Community Energy Committees: Power to the People

Crossett Brook Middle School - Waterbury, VT, showing the solar array the energy committee helped come to fruition



The can-do Yankee spirit of Vermonters manifests itself in many forms and actions. One of the most powerful in the last few years has been the explosion of grassroots energy groups across the Green Mountain State.

In the absence of needed state and federal leadership to help save energy, transition to renewables and reduce our contribution to climate change, Vermonters have mobilized. There are now about 100 communities across the state which have formed energy committees. These primarily volunteer groups are harnessing the vision, passion and expertise of their neighbors, partnering with organizations like mine and advancing successful projects that are increasing public awareness, reducing electric bills, getting solar panels on homes, weatherizing municipal buildings and much more.

The list of these groups' accomplishments is long and diverse. Here is just a snapshot of some of their inspiring people-powered efforts:

1. The Middlesex Energy Committee's "21<sup>st</sup> Century Barn Raising," where the committee partnered with the local school and professional energy consultants to undertake an ambitious, 2-day volunteer-driven effort to weatherize seven attics in the elementary school. The result? A savings of about 2,000 - 2,500 gal. of fuel oil a year, reducing taxpayers' costs by thousands of dollars.
2. The Ripton Energy Committee's wildly successful 'community energy mobilization' initiative, where trained volunteers made targeted energy-saving changes — installing low-flow showerheads, programmable thermostats and more - in over 50% of the community's households. The result? The project helped Ripton residents save about 39,000 kWh in one year for a combined annual savings of over \$5,700.
3. An effort largely led by the local energy committee, Waterbury LEAP, to successfully get solar PV panels installed on the roofs of both the elementary and middle school. LEAP is now working to make solar energy generation a reality for interested homeowners too by partnering with the Vermont Public Interest Research Group on their new 'Solar Communities' initiative.
4. An 'Energy Fair' in Hardwick that drew over 1,200 people to the rural region when the local energy committee - HEART - piggybacked on the town's annual 'Spring Fair' to co-host the event.

5. After removing ¼ of the town's streetlights about five years ago, the Thetford Energy Committee got an EECBG grant to replace its remaining streetlights with LEDs. The town also just removed several more lights. Once the LEDs are in place, Thetford's energy use for streetlighting will have been reduced by about three quarters.
6. The Norwich Energy Committee's work with the town on a project aimed at installing a 75-100kW solar array on town land, with significant funding from the Clean Energy Development Fund. The goal? Produce enough electricity to support a good portion of municipal electricity use.
7. Among many projects, the Colchester Energy Task Force helped develop an "eco-driving" curriculum and facilitated the purchase of a 2010 Prius for the High School Driver Education Program.

The work of energy committees has been powerful. Now, with a governor who understands that Vermont must take aggressive action on energy and climate change, their work and their dedication is potentially transformational.

Johanna Miller is the Energy Program Co-Director at the Vermont Natural Resources Council. VNRC is a founding partner in the Vermont Energy and Climate Action Network, a group working to start, support and strengthen community energy committees in Vermont. For more info about VECAN or how to start or join an energy committee visit [www.vecan.net](http://www.vecan.net) or contact [jmiller@vnrc.org](mailto:jmiller@vnrc.org)



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# resources

## SOLAR & RENEWABLES LINKS:

- **Efficiency VT** This is a must go to site for immeasurable amounts of info. [www.efficiencyvt.com](http://www.efficiencyvt.com).
- **SEIA/ Solar Energy Industries Association:** The SEIA Tax Manual to answer your solar related tax questions. <http://www.seia.org>
- **Dsireusa.com** [www.dsireusa.com](http://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](http://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](http://www.nabcep.org)
- **NESEA/ Northeast Sustainable Energy Assoc.** [www.nesae.org](http://www.nesae.org).
- **New Hampshire Sustainable Energy Assoc.** **NHSEA** Focused on N.E. US, for consumers & industry- RE & clean building info, events... [www.nhsea.org](http://www.nhsea.org).
- **New York Solar Energy Industries Association / NYSEIA** [www.nyseia.org](http://www.nyseia.org).
- **Clean Power Estimator:** [www.consumerenergycenter.org/renewables/estimator](http://www.consumerenergycenter.org/renewables/estimator)
- **Find Solar:** [www.findsolar.com](http://www.findsolar.com)
- **Energy Star Federal Tax Credits;** [www.energystar.gov/taxcredits](http://www.energystar.gov/taxcredits).
- **Tax Incentives Assistance Project (TIAP):** [www.energytaxincentives.org](http://www.energytaxincentives.org).
- **American Solar Energy Society (ASES):** [www.ases.org](http://www.ases.org).
- **Energy Efficiency & Renewable Energy Clearinghouse (EREC):** [http://eedt.lbl.gov/newsletter/CBS\\_NL/nl6/Sources.html](http://eedt.lbl.gov/newsletter/CBS_NL/nl6/Sources.html).
- **Federal Energy Regulatory Commission (FERC):** [www.ferc.gov](http://www.ferc.gov).
- **National Association of Energy Service Co.** (NAESCO): [www.naesco.org](http://www.naesco.org).
- **National Renewable Energy Laboratory (NREL):** [www.nrel.gov](http://www.nrel.gov)
- <http://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... <http://www.nfrc.org/>

- **Energy Efficiency & R/E Clearinghouse (EREC):** [http://eedt.lbl.gov/newsletter/CBS\\_NL/nl6/Sources.html](http://eedt.lbl.gov/newsletter/CBS_NL/nl6/Sources.html).
- **Federal Energy Regulatory Commission (FERC):** [www.ferc.gov](http://www.ferc.gov).
- **Solar Living Source Book:** [www.realgoods.com](http://www.realgoods.com)
- **Home Power Magazine** [www.homepower.com](http://www.homepower.com)
- **Solar Components:** [www.solar-components.com](http://www.solar-components.com)
- **www.backwoodssolar.com** Specialty: solar, off-grid.
- **NEsolar.com**
- <http://www.nationalsolarinstitute.com/>
- <http://www.vthomeownership.org/> Low-cost energy loans
- **www.energyguide.com** Unbiased advice about today's energy choices. Find ways to save, lower your bills & help the earth's environment.
- <http://hes.lbl.gov/> Interactive site to help you identify & calculate energy savings opportunities in your home. A lot of great information!
- <http://aceee.org/consumerguide/index.htm> Consumer guide to home energy savings...
- <http://energyfreegreenhomes.com/>
- **VT Energy Investment Corporation (VEIC)** nonprofit organization that issues home energy ratings for new & existing homes. 800-639-6069. [www.veic.org/](http://www.veic.org/)
- <http://www.smartpower.org/>
- **Greywater info** [www.oasisdesign.net/greywater/](http://www.oasisdesign.net/greywater/)
- **Weatherization, Energy Star & refrigerator guide** <http://www.waptac.org/>
- <http://buildingsdatabook.eren.doe.gov/>
- **The Office of Energy Efficiency & Renewable Energy (EERE)** <http://www.eere.energy.gov/> develops & deploys efficient & clean energy technologies that meet our nation's energy needs.
- **VPIRG** - understand the clean energy resources available to VT. <http://www.vpirg.org/cleanenergyguide>
- **U.S. Department of Energy (DOE)** Energy Efficiency & Renewable Energy: [www.eere.energy.gov/consumer](http://www.eere.energy.gov/consumer), Guide to energy efficiency
- **Track the stimulus money-** <http://www.recovery.gov/Pages/home.aspx>
- **Dept. Public Svc. (CERF)** [http://publicservice.VT.gov/energy/ee\\_cleanenergyfund.html](http://publicservice.VT.gov/energy/ee_cleanenergyfund.html)
- **Renewable Energy World** [www.renewableenergy-world.com](http://www.renewableenergy-world.com)
- **Renewable Energy VT-** [www.REVermont.org](http://www.REVermont.org)
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## Calendar Listing

**March 5, 2011 Citizens in a Connected Age** - Internet Skills Training Day. Lyndon State College, Lyndonville, Vermont 9 to 4 Sponsored by e-Vermont Community Broadband Project. Fee: \$12 Details at [www.e4vt.org](http://www.e4vt.org) or **802 225-6091**

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For more Info: [www.backwoodssolar.com](http://www.backwoodssolar.com)

## State & Federal Weatherization Incentives Extended

**VERMONT:** Efficiency Vermont is offering up to \$2,500 in incentives for Home Performance with ENERGY STAR (HPwES) assessments and improvements on single & multi family homes and small commercial & public buildings completed by certified BPI contractors, including heating system upgrades. [www.efficiencyvermont.com](http://www.efficiencyvermont.com) (888) 921-5990. SERG is one of several certified BPI contractors working in the Upper Valley. [www.uvheat.org](http://www.uvheat.org).

**NEW HAMPSHIRE:** The four major NH utilities, NHEC, National Grid, PSNH & Unitil, are offering up to \$4,000 in incentives plus financing options for work completed by a Home Performance with ENERGY STAR contractor for qualifying homes. The utilities are also offering 0%, on electric bill financing up to \$7,500 to qualified customers that can be used within the NH HPwES program to pay for their 50% co-pay for any cost effective work recommended by the auditor beyond the \$4,000 rebate cap. NH support is limited to homes with higher than average fuel bills that include a primary or back up central heating system. Limited Funding. Current status of incentives: [www.nhsaves.com](http://www.nhsaves.com) or your electric utility company.

**FEDERAL TAX INCENTIVES:** Homeowners can receive federal tax credits at varying levels, some up to \$500, off the cost of weatherization materials, efficient space heating, ventilation & air conditioning equipment, water heaters, roofs, doors & windows through 12/31/11. There are also 30% federal tax credits with no upper limit off solar PV systems, geothermal heat pumps and small wind turbines through 12/31/16. [www.nhsaves.com](http://www.nhsaves.com).

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**B**ecoming "green" seemed like a natural progression for my husband Larry & me. When I moved to VT in the mid 1970s, I had a dream of building a house & living off the land. Although I had gone to college in VT, I grew up on Long Island, a suburban girl with dreams, but no idea of what VT life would be like.

After acquiring almost 50 acres of land, a friend helped me build a small wicki-up covered with plastic. My dog & I spent our first night in the woods. I remember lying there wondering, "How the heck am I gonna pull this off?"

The next day I ran into my friend Larry in town. He offered to help me build a small 16'X20' two story camp. Since there was no electricity, it was strictly chainsaw construction. We eventually purchased electricity & acquired running water.

Larry & I were married in Sept., 1977. The next spring, disaster struck. Our home burned to the ground. We lost everything. With very little money, starting over was a slow process. We started by having a 24'X30' foundation built. We had three sides buried & exposed the southern side, taking advantage of the sun with several windows. The earth kept us insulated & the sun warmed us, along with our woodstove.

After 5 yrs, we finally felt ready to build up. We chose to build an 'envelope' style house. This took us all summer since we built it ourselves, with the occasional help of friends & family. It also rained all summer long!

We built the house with double studded

walls, with the second set offset from the first. This gave us 9.5" of insulation in the walls. There is a continuous vapor barrier inside the walls & ceiling. We minimized the amount of holes in our vapor barrier by not installing electrical sockets or fixtures in our exterior walls. We then put 12" of insulation in our roof trusses.

Our house is two stories, above the exposed basement. It has double pane, solid windows on the southern side & only one north facing window. Our east & west double hung windows open for some airflow. On a sunny winter day,

even if it is 30 below, our home stays warm & cozy, with sunlight flooding in the windows.

We have a woodstove in the



basement & a wood cook stove in the kitchen. We burn 4 cords of wood during the winter.

Throughout the yrs, Larry & I have enjoyed a plentiful harvest from our garden, raised two wonderful children & occasionally raised our own meat. Even though there are many ways to become energy efficient these days, we feel that we have successfully kept our expenses to a minimum due to the efficiency of our home & our frugal lifestyle. *My dream has become a reality for me, & I'm sure, for my husband Larry, as well.* ♻️



## "What do I do in my daily life to reduce my carbon footprint?"

"Three years ago I sold my car and did not replace it. I rent a downtown apartment. All of the services I need are within walking distance. I walk to and from work. Unfortunately I have to get a ride to western Massachusetts most weekends. I signed up for Ride Buzz but never received a reply about sharing a ride. My theory, carpooling has not taken off (though there are organizations like Ride Buzz and Go VT because people are afraid of riding with strangers, and people like the flexibility of arriving at a certain time. That is why I have been working on getting a car sharing service going in Brattleboro, VT. I borrow a friend's car when I can to eliminate one back and forth trip to MA. I joined the Brattleboro Time Trade in order to sidestep the paper money economy a bit and to help build a sense of community.

I bought a metal cart with wheels (I call it a pedestrian cart and the Brattleboro Food Co-op is now offering them at a discount to the public on my suggestion) to use for transporting groceries and my laundry. When I shop I buy organic, but



more importantly locally produced when I can. I reuse cloth and plastic shopping bags. I have not eliminated packaging, but I recycle and compost what I am able to at home. In the fall I worked with co-

workers to set up a compost system and expanded recycling. I set my thermostat at 62 most of the time. I am currently creating a permaculture garden workshop to share with community groups so that in the spring we can work together to create ecological gardens around town. I just started reading The Transition Handbook which stresses that we cannot deal with climate crisis in isolation from peak oil. The two are intertwined."

~ by Jessica Tanner, Brattle, VT Jan. 23, 2011 ♻️

**From a reader:** "Statistics show that the United States still derives 90% of its electricity from pollutants such as coal and nuclear power plants. Coal-burning power plants are the country's largest emitter of carbon dioxide, a greenhouse gas that traps heat in the atmosphere causing global warming. Coal is also responsible for several other health risks such as asthma attack and other lung ailments. It worsens the decade-long environmental problems that we still fail to address nowadays."

We ALL need to listen NOW and do our part and encourage everyone to do likewise and then do some more! What have you done TODAY to reduce your carbon emissions? ♻️

# THE GREEN LIFE

## Environmentally friendly FLOORING

Browse through any flooring store or home improvement magazine and you'll see all sorts of "green" or environmentally friendly products advertised. Many advertisements are distorted and misleading, appealing to consumers emotions in order to sell products. There are many factors that need to be considered to truly assess how "green" a product is.

Let's start by looking at what a floor is made of. Cork and Bamboo are made from renewable resources. Many hardwood floors come from FSC managed forests. Wool carpet is made from sheep's wool; 30% of Smartstrand carpet fiber is made from corn; PET carpet fiber is made from recycled plastic. Carpet pads often contain industrial waste. Many glass and porcelain tiles have recycled content. VCT tiles and Jumpstart resilient flooring from Mannington have recycled drywall in them. Marmoleum is made from all natural ingredients- limestone, pine rosin and jute.

Easy, select one of the above and you've purchased a "green" floor, right? Not necessarily. How was your product produced, and where? Is the company manufacturing flooring with recycled content consuming fuel resources for production or creating emissions and waste that pollute the planet? Many products made from renewable resources are shipped from distant locations across the globe, which also requires fuel consumption and creates carbon emissions and pollution.

Now let's think about the longevity of your floor. What happens to the old flooring that gets torn out when it's worn out? It usually goes to a landfill; taking years to break down and leaching toxins into the earth. A floor that lasts a long time is better for the environment than one that has to be replaced every few years. Hardwood floors can be re-

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finished multiple times- many homes in our area have hardwood floors 100 years old (or more). Commercial carpet manufacturers like Patcraft are producing a carpet fiber that can be completely recycled back into its original material, a concept called cradle to cradle. Ceramic/Porcelain tiles installed properly will outlast any vinyl floor.

Indoor air quality of our homes and workplaces is another important aspect to consider. Carpets trapping allergens can cause a lot of problems for people with asthma. A product made with harmful chemicals can release harmful VOC's into the air.

Life cycle assessment is an evaluation method to determine the environmental impact of a product during its total life cycle. The factors discussed above are just a few of the areas considered. Products labeled with third party verification such as FSC or LEED credits have undergone complete scrutiny. These are the labels to look for, not just a green leaf or picture of the planet.

Socially responsible businesses are proud of their commitment to producing sustainable products and happy to provide educational information. Do your research and find the companies who have invested in this instead of flashy marketing, and you'll be on the right track.

By Jen Broughan, Valley Floors, Bradford, VT  
www.valleyfloorsinc.com ♻️



## WWW.RECORK.ORG

ReCORK by Amorim is a natural wine cork recycling program, sponsored by Amorim of Portugal (the world's largest producer of natural wine corks) and SOLE (a leading manufacturer of footwear products). Corks from individual consumers are collected and recycled into flooring tiles, shoes, sports equipment, etc....

Visit the web to learn more and start saving those corks!

Bring your corks to the collection bin at Valley Floors in Bradford VT!



# Saving Energy With Compost Toilets IN YOUR COMMUNITY

The best-known virtue of composting toilets is that they save water. But while last summer's drought might have people thinking twice, most green-minded Vermonters are probably more concerned with saving energy and reducing carbon emissions than with conserving water. So do composting toilets make sense in this relatively wet region?

My favorite thing about composting toilets is the incredible alchemy they perform, recycling nutrient-rich human manure into hygienic fertilizer that can be safely reused in agriculture. It gives us the power to create closed nutrient loops where plants feed people and people feed plants. Widespread recycling of all manure back to cropland would actually eliminate the need for most chemical fertilizers. This is truly a vast, untapped resource! But what if you don't have your own garden, don't have a like-minded farmer



Activated sludge tank; cr: Abraham Noe-Hays.

as a neighbor, or live in a place where regulations make it to difficult to legally use the compost? Do composting toilets still make sense?

To answer that question, let's look at the alternatives - sewage plants and septic systems - and talk about what happens if you flush your manure down the drain instead of composting it. If it goes to a typical sewage plant, your manure likely ends up in an activated sludge tank. This is where major treatment takes place, as microbes greedily devour and digest the organic matter in the sewage. As they do so, they use a vast amount of oxygen to support their metabolism, which must be replaced by enormous air pumps, or blowers, that keep the tank seething with bubbles. These air pumps are the biggest energy user at the sewer plant, and the amount of energy they use is proportionate to the amount of manure in the water. Since composting toilets keep manure out of sewers, they can conserve not only water, but also energy.

The energy used by the blowers, while considerable, is dwarfed by the energy re-

quired to build a new sewer plant. These highly engineered systems contain huge quantities of concrete and steel, both of which are very energy intensive to manufacture and result in large carbon emissions. (They are also expensive. One extreme case that recently came to my attention for an advanced plant in a coastal community was in the range of \$60,000 per house.) Every plant has a maximum capacity of organic matter it can handle - so since composting toilets keep manure out of the sewer, composting toilets can delay or eliminate the need for enlarging sewer plants, at considerable savings in money, energy, and emissions.

Most septic systems use little or no energy to operate, but the energy to construct them is significant, and varies widely depending on the type of leachfield. Lucky homeowners on good soils can pay as little as \$5,000

for in-ground systems, but poor sites require the monumental earthworks known as mound systems, and these can cost over \$25,000. Much of this cost is to dig, process, truck, and distribute the tons upon tons of crushed rock and sand that are required, and all of this heavy work requires large amounts of fossil fuels, resulting in high carbon emissions. Because the size of the leachfield ultimately depends on the volume and concentration of the wastewater going into it, some states allow homeowners to reduce the size of their leachfields if they install composting toilets. Massachusetts allows a 50% reduction, resulting in considerable savings of money, energy, and carbon emissions.

So, it is apparent that composting toilets do much more than save water. Provided that they are energy efficient, and that they require only a modest amount of energy and materials to build, composting toilets can save energy and reduce emissions, compared to flush-based systems - all while turning our least-appreciated waste into a valuable resource.

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## On the Permaculture Path

by Mark Krawczyk

**P**ermaculture provides individuals, families, businesses and communities with a holistic philosophy and practice to build resilience into their lives, livelihoods and landscapes. People employ permaculture to design their homes, lives and landscapes; reduce their reliance on manufactured goods; and become active, conscious producers and conservers. Based on a suite of universal design principles and directives, permaculture helps us make sense of complex problems. Applying permaculture design principles in your life can help reduce your ecological impact while creating opportunities for productive growth.

Becoming an active conserver is one of the simplest ways we can consciously transform our ecological impact. As the saying goes, 'the cheapest (gallon of gas, BTU, kilowatt hour) is the one you never used'. The design principle 'Produce No Waste' embodies this concept on several levels. In the natural world, there is no 'waste' - it's a concept that is entirely human. In this sense, 'waste' isn't a noun - it's an active verb. Constant cycling of energy and resources characterize natural systems. The waste products from one creature (oxygen released by plants, manure from all living organisms, leaves shed by trees) become critical food and energy sources for other organisms (animals, plants and microbes, respectively).

According to the EPA, 'Yard trimmings and food residuals together constitute 26% of the U.S. municipal solid waste stream.'

Not only does this 'waste' represent a missed opportunity to rebuild the vital topsoil that supplies our food, but when buried in a landfill, it releases methane, a greenhouse gas four times more potent than CO<sub>2</sub>. Simply starting to compost organic materials at home breaks this backwards cycle, turning refuse into resource. For most of us, composting represents some of the most potent 'low hanging fruit' to restore health and fertility to the landscapes that support us. Taking it one step further, consider the fundamentals of waste management.

While recycling is certainly far better than throwing something 'away', is that really the best we can do? Instead, consider the 5 Rs - 'Refuse, Reduce, Reuse, Repair, Recycle' as a gradient of impact-reducing choices. When we examine the role 'waste' plays in our lives, 'producing no waste' becomes at least as much a change in perspective as a change in behavior. So next time you're looking for a place to toss out 'waste', remember that 'one being's trash is another's treasure (and food)'. Learn more about the 'Essence of Permaculture' design principles at <http://www.holmgren.com.au/html/Writings/essence.html#principals>

Mark Krawczyk is a permaculture educator, designer and consultant in Burlington, VT and manages the ecological design and consulting firm Keyline Vermont LLC. Find him on-line at [www.keylinevermont.com](http://www.keylinevermont.com) and [www.burlingtonpermaculture.org](http://www.burlingtonpermaculture.org)



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## Greening Your Winter Driving

Greening your winter driving is mostly about fuel efficiency – good for the environment and good for your wallet. Aside from getting a regular tune up, the most important things to consider in winter are tire pressure and snow accumulation on your car.

A 10° drop in temperature can reduce tire pressure by up to 2#psi. The change from summer to winter can mean a drop of over 10# of tire pressure! It is best to add air when your car tires are still cold. Properly inflated tires reduce drag (better fuel mileage), are safer, and offer better control.

You may wish to think twice before driving off with snow on your roof. For every additional 100 lbs, you reduce fuel efficiency by approximately 1-2%, equivalent to 3-6¢/gal. A sizable amount of snow and ice can quickly add up to hundreds of pounds. Now, add the drag from a snowy hood and roof and your total fuel efficiency can drop by as much as 10% or as much as 30¢/gal! Invest in a long handled snow brush to keep in your car for the entire winter season. Think of the savings!

The last winter green tip is for driving emergencies. Consider a hand crank flashlight that uses rechargeable batteries. These batteries typically never need replacing so you'll never be stuck in the dark again.

So be ready, be safe and be green!

~ By Deborah DeMoulpied,  
bonafide real green goods. ♻️



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**Interiors green Shots!**  
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**This is our 2nd column for Interiors Green Shots,** featuring healthy home & living tips for you, your family, your home & our planet. If we act locally & think globally, we make our homes, our lives, & our planet a healthier, happier place.

We hope that you find this monthly information to be useful in your life.

**MARCH:** Green Flooring Choices a quick overview of some of the choices for green beautiful floors for the home or office:

- **Cork:** Resilient, durable, comfortable and insulating. A long thriving cork industry has saved jobs and forests.
- **Bamboo:** A fast growing grass harvested every 6 years, milled into durable flooring comparable to hardwood.
- **Stone and Local Slate:** Create timeless durable floors that never go out of style.
- **Natural Linoleum:** Tough, visually compelling floor coverings that have been used for hundreds of years.
- **Local and reclaimed hardwood and softwood:** The classic beauty of solid wood, finished on-site with durable non-toxic finishes, if trees are harvested using proper forest stewardship in our area in the northeast, using solid wood is a great and "green" choice.
- **Carpets:** Made of 100% pure wool, not treated with harmful dyes, pesticides, stain protections, fire retardants.

**APRIL:** Interior Walls If these walls could talk: smart, beautiful, enviro-friendly interior wall finishes. For natural, organic, beautiful walls: try one of these wonderful products

- **American Clay Earth Plaster:** Beautiful, textural, earthy, simple and elegant, from warm Tuscan golds to serene Tahoe blues, earth plasters infuse any interior space with life. Non-toxic and made in the USA.
- **Milk Paints:** Traditionally produced milk paints are made using milk protein, lime, clay, and earth pigments such as ochre, umber, iron oxide, lampblack. Clay Paints made by the Biosheid company lovely colors and easy to work these paints add beauty to any room.

**MAY:** Building Choices As home-improvement season hits, some smart building choices...When we think about remodeling or building new this is the perfect time to think about using eco-friendly and energy efficient products to think about purchases and choose some of the wonderful green and durable building products available in today's market place.

By Jessica Goldblatt Barber, owner of Interiors Green, The Home & Living Store, located on Main Street in Bethlehem NH. [info@interiorsgreen.com](mailto:info@interiorsgreen.com) 603-616-6499.  
Interiors Green - helping you create a healthy & beautiful home, one smart choice at a time! ♻️

## THE GREEN LIFE

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## ENERGY Facts from SolarFest

<http://www.solarfest.com/>

- The earth receives more energy from the sun in just one hour than the world uses in a whole year.
- The average American produces 4.5 lbs of solid waste on a daily basis, a 150% increase since 1960. (Source: U.S. Energy Information Admin.)
- Over eight million tons of trees are consumed each year in the production of paper catalogs. ([catalogchoice.org](http://catalogchoice.org))
- In the 1830s, the British astronomer John Herschel used a solar collector box to cook food during an expedition to Africa. Now, people are trying to use the sun's energy for a lot of things. [www.eia.doe.gov/kids/energyfacts/sources/renewable/solar.html](http://www.eia.doe.gov/kids/energyfacts/sources/renewable/solar.html)
- The USA is the world's largest single emitter of carbon dioxide, accounting for 23% of energy-related carbon emissions worldwide.
- Recycling one aluminum can saves enough electricity to run a TV for 3 hours.
- Recycling just 1 car saves 2,500 lbs of iron ore, 1,400 lbs of coal & 120 lbs of limestone.
- Over 75% of all trash can be reused, reduced or recycled.
- Americans go through 2.5 million plastic bottles every hour.
- Homeowners use up to 10 times more toxic chemicals per acre than farmers.



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