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NEW HAMPSHIRE'S NEXT 10 YEARS A NEW! STATE ENERGY STRATEGY

By Kate Epsen

ONE YEAR AGO, the New Hampshire State Legislature passed Senate Bill 99, which directed the state to create a ten-year energy strategy. Championed by Governor Maggie Hassan and many state legislators as a critical step toward NH's innovation economy and energy future, this strategy—well-underway since the beginning of 2014—will set the tone for future policies, regulation, and private sector activity.

Unlike many of our neighbors, NH currently does not have a comprehensive plan or clear goals on energy use, production, or conservation. While we have many programs in place, such as a Renewable Portfolio Standard, utility-run efficiency incentive programs, and the Regional Greenhouse Gas Initiative, to name a few, NH lacks clear direction on energy policy. One might ask, why does NH need an energy strategy? Clear goals supported by a workable and effective strategy, many argue, is necessary because NH currently exports nearly \$4 billion annually on energy costs, mainly for fossil fuels. That represents about 7% of the state's GDP. In addition to this outflow of wealth, NH is not prepared for the energy changes that are already happening elsewhere, and is therefore missing profound economic and environmental opportunities.

In neighboring states, energy efficiency is being considered as a lowest-cost, first-tier resource; utility revenue models are changing to empower consumers, keep our grid reliable, while keeping utility finances sound; aggressive goals for renewable energy production are set and acted upon; and, leadership is strong. We see that jobs are flowing to those states with stable poli-

State Energy cont'd on p. 3



One year ago, the NH State Legislature passed Senate Bill 99, which directed the state to create a ten year energy strategy here at New Hampshire's State House. Photo courtesy of NH Sustainable Energy Association.

Rutland, VT Hosts First Energy Home of the Future

Ninety-Nine More to Come!

By George Harvey, staff

RUTLAND RESIDENTS Sara and Mark Borkowski got a nice surprise last March, when Mayor Louras and representatives of Green Mountain Power (GMP) contacted them to see if they might be interested in a complete home energy retrofit. Then they were asked if they would mind if US Energy Secretary Ernest Moniz, US Senator Bernie Sanders, US Senator Patrick Leahy, and US Congressman Peter Welch came over to see it when it was completed.

It seemed surreal to the Borkowskis, but now that it is done, it is a whirlwind memory with a legacy of lower costs, lower emissions, and a more comfortable life. Their home became the "Energy Home of the Future," the first representative of GMP's "eHome" pilot program.

Guided by CEO Mary Powell, GMP is promoting a unique holistic approach to effi-

"We expect to save up to
90% on fuel use because
of the affordable energy
efficiencies."

ciency. GMP's plan is to bring together homeowners and local businesses to provide complete retrofits, achieving efficiency of scale, reducing costs and simplifying financing and payments. GMP asked NeighborWorks of Western Vermont to collaborate, as they could help with financing and connections with local contractors.

The Borkowskis were chosen as the first participants in the program, partly because they were people most folks



This Baxter Street home is the first in the GMP eHome pilot program. Pictured are Sara and Mark Borkowski with their daughters.

could relate to, partly because their 94-year-old home needed a retrofit, and partly because of their neighborhood work. They are the first of one hundred homes intended for the pilot program.

NeighborWorks provided a home energy audit, construction management,

and financing for a \$15,000 loan for the Borkowskis' expenses. The loan will be paid off through their electric bills, which will be lower than their previous bills because of increased efficiency and reduced fuel costs.

Rutland Energy Home cont'd on p. 25

EXPLAINING CHANGE MITIGATION

By George Harvey, staff

THE IPCC has released the third part of its Fifth Assessment Report. The first two parts were a summary for policy makers, released in September of 2013, and a report on impacts and vulnerabilities of climate change, released in March of 2014. The third part is about mitigation – what we can do to make things better. A fourth part, a synthesis of all this, will be released in October.

These reports are the result of the work of several thousand experts in climatology, meteorology, and related studies. They are based on the available peer-reviewed liter-

ature; just the first part of the report referenced 9,200 of these.

We should bear in mind that there is broad agreement on the reality and causes of climate change among the scientists in the relevant fields, with virtually no denial that the problem exists and is important. Any impression to the contrary is almost certainly the result of inaccurate reporting, the causes of which are subject to speculation.

The first important point of the report is that we are all threatened by climate

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NET-METERING EXPANSION OFFERS A MODEL TO THE NATION

WHILE BATTLES RAGE with utilities taking on both solar customers and businesses around the country, Vermont has quietly expanded its net metering program by nearly four times without so much as a skirmish.

Net metering gives renewable energy customers full, fair credit on their utility bills for the excess clean power they deliver to the grid. Vermont's legislation, H.702, raised the state's net metering cap from 4% of a utility's peak load to 15%, significantly expanding participation in this critical program. The bill also notably expands the state's nation-leading ten-day solar registration program from 10kW to 15kW. It passed the Vermont House nearly unanimously and then the Vermont Senate 28-0. Governor Peter Shumlin quickly signed the bill into law on April 1.

Unlike net metering fights in Arizona, California, and Colorado, to name just a few, this major expansion of customer-owned distributed generation sailed through with broad support not only from the legislature but also from the state's utilities.

Some will be tempted to dismiss this solar win simply because it's Vermont, a small state that's known for its progressive policies. And yet, it's a state that also retains many more conservative energy characteristics including being the only state in the region without a Renewable Portfolio Standard and also a state with a whopping 17 utilities, including many

highly-cherished, small municipal utilities and coops.

So what made Vermont's process so different from what has transpired elsewhere around the country?

First, there was a broad recognition of the economic benefits of distributed solar generation. A 2013 study commissioned by the Public Service Department found no significant cost shift produced by net metering solar. This provided the foundation of an economic argument for the many benefits – from transmission savings to “peak shaving” – that the state could expect from expanding its net metering program. Bolstering that report, in the Vermont Governor's Budget Address earlier this year, Shumlin cited a newly-released \$400 million figure in savings from transmission line deferrals from distributed generation, noting that “our strategy of building local, renewable energy projects while maximizing our energy efficiency is working, already helping us defer nearly \$400 million of transmission costs which our region's ratepayers would otherwise have to pay.” The numerous economic benefits are right in line with studies and reports from around the country, from California to Texas to New York, on the benefits to ratepayers of distributed solar.

Second, distributed solar had the support of active and engaged leadership by the Governor's energy team. Vermont utilities hitting the state's net metering cap had the potential to send the industry into a

similar tailspin of net metering fights we've seen nationally. But thanks to early leadership by the Public Service Department in convening stakeholders, getting everyone in a room, and then through shuttle diplomacy among industries, they were able to artfully draft a compromise that preserved a policy that provided a predictable and fair path for the industry to grow uninterrupted through 2016.

Third, Vermont's investor-owned and largest utility not only embraced but actively championed expanding the state's net metering program. During those meetings to devise a path forward (where things could have spiraled into the same messy fights we've seen across the country) Green Mountain Power's CEO Mary Powell sat at the table surrounded by her utility colleagues and made clear that GMP valued solar, valued their customers' demand for solar, and had no intent to slow down their overt support for distributed generation — net metering cap or not. This card-carrying Edison Electric Institute utility, which serves close to 75 percent of the state, drove the conversation. They were the yardstick by which to measure other utility opinion. And very appropriately, GMP was recently honored as Vote Solar's 2014 Utility Solar Champion for their leadership.

Finally, the growth of local solar jobs and proliferation of new customers has strengthened the popularity of net metering among Vermonters. Vermont was recently ranked as having the most solar jobs per capita of any

state by the Solar Foundation. That means something to policy-leaders who are always seeking economic development opportunities. Vermonters and their elected officials are starting to recognize the real job creation benefits of pro-solar policies, from promoting in-state manufacturing to employing local installers and making solar customers more energy-secure. Further, the proliferation of towns, schools, as well as many prominent Vermont businesses, farms, and non-profits that are now net metering customers are an increasingly strong constituency for positive net metering policies.

Solar is having an impact in more and more communities in a very visible way. While we can't expect all states to have the support of pro-renewable governors or pro-net metering utility execs, Vermont's recent success in dramatically expanding its net metering program is a model to be emulated. To the extent that states are competing for good solar jobs, they will need to get their net metering policies right or else see the many wide-ranging benefits of solar pass them by. And our growing solar industry must use our strongest assets – namely the powerful voices of our employees, our customers and other supporters – to drive good future energy policy.

Andrew Savage is Chief Strategy Officer for Vermont-based AllEarth Renewables, manufacturer of the AllSun Tracker, and also serves on the Board of Directors for the Solar Energy Industry Association (SEIA).

A NEW STATE ENERGY STRATEGY cont'd from p. 1

cies and innovative financing opportunities; we see businesses that are retaining workers and adding new positions through controlled and reduced operational costs, of which energy use is a significant percentage; and, we see that individuals can better access programs and loans to weatherize their homes.

This is why New Hampshire needs strategy that looks decisively to the future and keeps our state competitive by removing market barriers to clean energy investments and the economic wealth generated by this sector, directly and indirectly. Retention of wealth by the reduction in importation of fossil fuels for electricity, heating, and transportation would have multiple economic, environmental and societal benefits, including greater disposable income, economic development and new job growth, and a reduction in the consumption of carbon-intensive fuels, with the associated environmental and climate benefits. So how do we do this, both practically and strategically, given limited public resources and absent clear legislative or executive goals?

The draft strategy, released this month (publicly available on www.nh.gov/oep) begins to answer that question. The draft



UNH installed a solar hot air system in Kingsbury Hall on the Durham campus, with support from NH's Renewable Energy Fund.

provides plentiful baseline information on what types of energy we use now, in which sectors, and what the associated costs are. The draft also reveals the enormous economic and technical potential that NH has for the development of renewable resources, biomass use for heating, electric vehicle infrastructure, and perhaps most important, the vast potential for energy efficiency and conservation.

In terms of strategies, the draft offers

a laundry list of options on how to reach those potentials, including how to deploy greater private capital through smarter leveraging of limited public resources, setting a state Energy Efficiency Resource Standard (NH is currently the only New England state without one), and adopting vehicle fuel standards that will help drive modern electric or compressed-gas vehicle infrastructure, just to name a few. As a draft, there is still much work to be done; it remains silent on important topics such as rail transit, both freight and passenger, and recommends many areas to “explore,” and “investigate,” rather than do. This strategy needs to be workable and practical, with clear measurable goals, and must inspire leadership to direct a transition to clean, local, and less volatile energy resources.

As a resident of NH, a local leader, a business owner, or a student, one can participate and influence the final strategy in many simple and direct ways. Our public officials want to hear from you. Throughout June, the Office of Energy and Plan-

STATE ENERGY *cont'd to p. 23*



New Hampshire's State House where NH's ten year energy strategy will be decided! Photo courtesy of NH Sustainable Energy Association.

In 2013, wind power prices averaged 2.1¢/kWh in Power Purchase Agreements, the long-term contracts for power provided by producers to utilities. Solar costs were about 5¢/kWh. Even without 2.3¢/kWh of support from the government, wind blows away natural gas, at about 7.1¢/kWh, and solar is competitive.

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RHOADES CAR

By George Harvey

Early in April, stories appeared in various new media with pictures of Prince Harry driving around the new Queen Elizabeth Olympic Park in London on a quadricycle. It would have been all too easy to dismiss the vehicle in the photo as an expensive toy, but a close look showed this certainly was not the case. The photo made it easy to spot its rugged construction. Looking closer, one could easily see the frame marked "Rhoades Car," after a manufacturer in Hendersonville, Tennessee.

We can be sure that some people buy Rhoades Cars to drive them around for fun. It is clear, however, that there

are many other reasons to drive them. Health is one. Getting out from under the expense of automobiles is another. A number of people have even given up their dependence on cars, with their environmental issues and huge expenses, choosing the healthier cycles as their sole means of personal transportation. Indeed, the company even has an industrial line.

The vehicles come in many sizes and styles. They range from one to five riders. Nearly all models can be had with an electric motor, and there are two different models that are solar-powered. All models can be pedaled. Those for two people

have them sitting side-by-side, with separate gearshifts for each person. Models for four or five people have two front seats, and either a bench seat or two in the back, with those in front doing all the pedaling.

There are five different models for personal transportation. One, the GoBoy, has a higher seat with pedals below like those on most bicycles, while the other models all have the seats lower with the pedals in front of them. The Cycle Car is the original model, and remains most popular. The SolarRide is derived from the Cycle Car, but has a motor and a canopy with a solar panel on it to charge the batteries (not included). The SportPed has a built-on UV-filtering curved windshield, which also serves as a windscreen. The SolarPed is like the SportPed, but has a motor and solar panel. Finally, there are the industrial models, specially built for a variety of purposes.



The Rhoades Car SolarPed is a human/electric hybrid with batteries charged by the sun.

There is a wide range of options that can be added. A canopy or motor can be added to nearly any model. Most vehicles are 7-speed, but a 42-speed option is available. There are options for seat styles, types of wheels, improved tires, arm rests, chain guards, fenders, headlights tail lights, and more.

The Rhoades Car web site is a really interesting place to visit and there's always a monthly special. It is at www.rhoadescar.com. The toll-free phone number is (800) 531-2737. Mentioning Green Energy Times will get you a nice 10% discount in June.



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VERMONT PROHIBITED IDLING OF MOTOR VEHICLES LAW— IS NOW IN EFFECT!

VERMONT BECAME THE LAST STATE

in the northeastern U.S. to enact a law to restrict the idling of motor vehicles, effective May 5, 23 V.S.A. § 1110. Prohibited idling of motor vehicles restricts the idling of all motor vehicles to five minutes in any 60-minute period. A penalty of \$10.00 will be assessed for a first violation; \$50.00 for a second violation; \$100.00 for a third and subsequent violations.

The law contains exceptions for when idling is allowed, including but not limited to: for police, fire or emergency vehicles, for commercial buses when passengers are on board, to ensure adequate windshield defrosting, to power work-related operations for trucks, for sleeper berth purposes, for maintenance, repair, service or diagnostic purposes, and on private property for vehicles of 10,000 pounds or less.

The law will serve to strengthen ongoing idle-free educational efforts, and provides a recourse for people enduring prolonged idling of heavy-duty vehicles in their neighborhoods.

To read the full law, Google: "Prohibited idling of motor vehicles" or visit: <http://bit.ly/Rc4Nhp>. More about idling laws, facts, and the significant benefits in avoiding unnecessary idling are at idlefreevt.org or 802-453-5857.



Vermont's new Prohibited Idling of Motor Vehicles law (limits idling of all

vehicles to five minutes in

any 60-minute period, with exceptions) will strengthen idle-free educational efforts.

Vermont, while overall a lower carbon-producing state, is transportation-intensive, with 46% of its greenhouse gas emissions coming from transportation, compared to 28% nationally. If just half of Vermont's vehicles reduced their idling while parked by five minutes per day, the total CO2 emissions reduction could exceed 42,000 tons per year, and the total fuel avoidance could exceed 4,300,000 gallons per year.

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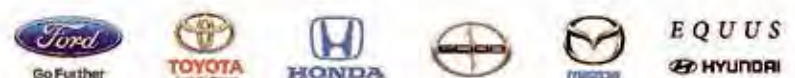
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GENERAL MOTORS' STATEMENT ON SUSTAINABILITY

By George Harvey, staff

"FACING AN AUTOMOTIVE INDUSTRY that is unsustainable in its current form, General Motors is restructuring its global vehicle portfolio, rethinking manufacturing and collaborating with unlikely partners to advance the industry." These are the first words of a statement GM issued on May 19.

The car manufacturer is revamping both its manufacturing and its fleet of car models along lines that emphasize sustainability. It emphasizes in its statement that it expects to increase its profits by doing this.

GM has sold 153,034 electrically-powered vehicles (EVs) up to the end of 2013. They are expecting to sell a total of 500,000 by 2017. To this end, they are introducing more models.

They have brought nine additional manufacturing facilities to the Energy Star® Challenge for Industry standards, bringing the total to 63. This meant scrapping old



Chevrolet Spark EV, chevrolet.com

coal-burning boilers, trapping and using landfill gasses, and reducing use of water and other resources.

GM has a series of specific goals to achieve by 2020, starting from a baseline of their usage in 2010. As of May 19, 2014 they were well on their way, achieving nearly 50% or more on four out of five goals.

You can see the statement at bit.ly/GM-may-19-release.

GREAT INTEREST FOR EVS

Drive Electric Vermont, Charging Stations, Bikes — all at the UV Electric Vehicle Forum & Demo

by Roger Lohr

THE UPPER VALLEY ELECTRIC VEHICLE Forum & Demo was held in mid-May attracting about 200 people at the Montshire Shire Museum in Norwich, VT. The attendees saw many of the electric automobiles on the market today from Ford, Toyota, Nissan, Mitsubishi, and the starring Tesla. Zoombikes was on hand with two brands of electric bikes for people to ride. The event was hosted by Sustainable Energy Resource Group (SERG), the Montshire Museum, and the Upper Valley Sierra Club.

The basics were covered in a presentation by Drive Electric Vermont, a statewide coalition of policy makers, industry leaders, and ordinary citizens dedicated to promoting the spread of electric transportation in the state. The website and organization is focused on infrastructure, regulation, codes and standards, policy, incentives, technology, education, and marketing. The presentation covered general info, EV technology, EV charging, and purchase considerations.

EVs come in a few categories including the hybrids, which are not plug-in (Toyota Prius); the plug-in hybrids (Chevy Volt has 10-40 mile range), and the all-electric vehicles (Nissan Leaf has 75 mile range and the Tesla S85 has a 265 mile range). Many of the vehicles at the demo were owned by individuals, who spoke to attendees about their personal EV experiences. The Norwich guy who owned a Tesla claimed he reached 300 miles on a charge during a trip to Florida.

There were tables available that compared the different EV statistics such as costs or the distance one can travel on a charge (Google it). Barriers to purchasing an EV include the range (the distance you can go before having to recharge), performance (how it handles, maintenance, or operation in inclement weather), the price, and the battery issues.

Currently there are 630 EV (either hybrids or all electric) that are registered in Vermont, which represents about .1% of the vehicles in the state. The cost ranges from leasing arrangements as low as \$249 for a Ford Fusion to more than \$70,000 for



The author, Roger Lohr next to a Tesla owned by Jason Cooper of Brattleboro, VT.

a Tesla available on line through a showroom. It is estimated that an EV can save up to \$4,300 of gasoline over five years. On fire-oriented concerns, they are safer than other vehicles. There are good warranties available on EVs and Federal tax credits, too (up to \$7,500).

Using the AC or heater will decrease the range on an EV (20 to 50%). Some of the EVs have regenerative braking, which will increase the battery output and range while braking.

EV's cont'd on p. 7

SMART COMMUTING IN NH & VT

Transportation emissions are among the worst offenders that add to the rising CO2 levels in our atmosphere. In recent months we have learned that our efforts have begun to reduce the detrimental air quality counts (NHDES), but as you may have learned from numerous other reports such as the International Panel on Climate Change (IPCC), <http://climatechange2013.org/>, global warming is still advancing faster than expected.

How do we get our emissions down now? By making New commuting choices! **LOTS OF CHOICES.** Smart Commuting is all about knowing your options and planning ahead. There are many choices to get around in New Hampshire and Vermont, The first place to start in Vermont is "Go Vermont" for statewide choices to travel more efficiently. Whether getting around town, commuting to work or school, or planning a day trip, share the driving or ride with someone else to help save our planet and to save approx. \$2,000 annually. The statewide VT site also lists services for commuters, tourist, and shoppers.

In New Hampshire you'll find a similar site at "NH Rideshare" where you can find car-pools, transit routes and schedules, bike and walk trails and links to statewide transportation information.

When carpooling, remember to use the local Park n Ride lots to meet your connections. Start your trip planning at connectingcommuters.org or nh.gov/dot/programs/rideshare/ for statewide choices.

IN NEW HAMPSHIRE
UPPER VALLEY RIDESHARE (UVRS) - Carpool matching, benefits and support for commuters in/out of Upper Valley. 802-295-1824 x208. uppervalleyrideshare.com.

ADVANCE TRANSIT (AT) - Free weekday bus for Lebanon, Hanover, Enfield, Canaan, NH, and Norwich and Hartford, VT. Dartmouth and DHMC Shuttles. ADA Services. 802-295-1824. advancetransit.com **CARROLL COUNTY TRANSIT** - Services and connections to Belknap County. 888-997-2020 tccap.org/nct.htm

CITY EXPRESS - Serves Keene. 603-352-8494 hcsservices.org/services/transportation/cityExpress.php

COMMUNITY ALLIANCE TRANSPORTATION - Services for Claremont & Newport. 603-863-0003

CONCORD AREA TRANSIT (CAT) - Serves Concord 603-225-1989 concordareatransit.org

CONTOOCOOK VALLEY TRANSPORTATION (CVTC) - Monadnock Rideshare for the southwest region 877-428-2882 cvtc-nh.org

COOPERATIVE ALLIANCE FOR REGIONAL TRANSPORTATION (CART) - Serving the Chester, Derry, Hampstead, Londonderry, Salem and Windham, limited service to Plaistow. 603-434-3569 cart-rides.org

DARTMOUTH COACH - Services to Boston, Logan Airport and NYC 800-637-0123 dartmouthcoach.com

MANCHESTER TRANSIT AUTHORITY (MTA) - Manchester, with links to Nashua and Concord. 603-623-8801 mtabus.org/services/local-buses

NASHUA TRANSIT SYSTEM (NTS) - Buses and trolleys with bike racks. 603-888-0100 RideBigBlue.com

WINNIPESAUKEE TRANSIT SYSTEM (WTS) - Services Belmont, Franklin, Tilton, Laconia. 603-528-2496 bm-cap.org/wts.htm

IN VERMONT
UPPER VALLEY TRANSPORTATION MANAGEMENT ASSOCIATION (Vital Communities) - Works with UV employers and communities to promote and improve commuting options. 802-291-9100 vitalcommunities.org/transport/index.htm

VERMONT PUBLIC TRANSPORTATION PUBLIC TRANSIT - Lists transit, ferries and more at aot.state.vt.us/PublicTransit/providers.htm

AMTRAK - Long distance train service. Discounts for AAA members and student advantage card. (800) 872-7245 amtrak.com

CHITTENDEN COUNTY TRANSPORTATION AUTHORITY - Burlington bus service with links to Montpelier, Middlebury and commuter route to Milton. cctaride.org

CONNECTICUT RIVER TRANSIT - Services in Bellows Falls and Springfield. crtransit.org

GO VERMONT - Offers carpool matching and commuter connections in VT 800-685-7433 connectingcommuters.org

GREEN MOUNTAIN RAILROAD - Day trips from White River, Champlain Valley, Bellows Falls and Rutland. rails-vt.com

GREEN MOUNTAIN TRANSIT AGENCY - Local service in Barre, Montpelier, Grand Isle, Stowe and Lamoille. 802-223-7287 gmtaride.org

GREY HOUND/VERMONT TRANSIT - Long distance bus services. 1-800-231-2222 greyhound.com/

LAKE CHAMPLAIN FERRIES - Transport between New York and Vermont via Lake Champlain. 802-864-9804 ferries.com

MARBLE VALLEY REGIONAL TRANSIT - For Rutland, Killington, rural Manchester, Poultney and Rutland to Bellows Falls. City routes Free on Saturday. 802-773-3244 thebus.com/

RURAL COMMUNITY TRANSPORTATION (RCT) - Buses, vans, and volunteer drivers. Routes via The Jay-Lyn, The Highlander (Newport - Derby Line); The US RT2 Commuter (St. J. to Montpelier) and Free routes to rural areas. 802-748-8170 ridertc.org

STAGE COACH - Buses from Randolph and Fairlee to Dartmouth, & local village. 800-427-3553 stagecoach-rides.org

SOVEREN SOLAR

By George Harvey, staff

WHY WOULD YOU SPEND more money and pay someone else for a service, when you can spend less money and put it into an investment you will own? More especially, why would you do this when the only difference is the amount it costs and who the money goes to?

The community solar model used by many solar farm developers allows electric utility customers to buy into a solar PV array for some or all of their power. The net-metering program provides these customers with credits that are worth more than ordinary retail electric rates. In fact, they are

makes installation much more cost-effective.

Thurrell has introduced a few innovations into the design, making the approach even more attractive. One very important advantage is that the members of the group own their own panels. This means they can take the tax credits for the installation, instead of allowing the developer to get them; the credits reduce the owners' income taxes directly by 30% of the amount invested. We might note that solar PV ownership is a much bigger advantage for people who pay enough income



Solar projects under construction in North Springfield and completed in Putney, Vermont.

worth sufficiently more that it is possible for ordinary utility customers to provide for all the electric power they use, rain or shine, day or night, even if they finance 100% of the cost of the solar PVs.

Part of the beauty of this is that once the PVs are paid off, they belong to the customer. So a person buying into such a solar farm can save money immediately because the monthly rate is lower than the cost of electricity, and when the investment is paid off there are no charges for electricity consumed at all.

Peter Thurrell of Soveren Solar, in Putney, Vermont, has been working on community solar projects in which numbers of people take advantage of better economies of scale to buy their solar arrays. Under such a system, people invest as a group in a solar project, with every member benefiting. The program currently seeking investors is a new Solarize Putney farm, but there are four other solar farms in Soveren's pipeline, and anyone in the Green Mountain Power service area can invest in most of them.

One advantage to this is that people who have no site to put up solar PVs can do so. A single suitable site is found, and everyone benefits. The costs of lease or purchase of the site are spread among the investors. The fact that the work is all done at one site

tax to make this worthwhile. (A similar advantage for people of lower income could be developed, and this would be a worthwhile exercise for someone willing to put work into it.)

Another innovation Thurrell has introduced is that 10% of the farm's income from solar power is donated to a local non-profit organization. In one case, this meant that the municipality got a boost to its income. In another, the recipient was a food co-op. Just about any local non-profit organization could be the beneficiary, with the income going on for many years.

Each solar farm developed by Soveren Solar is a separate corporation, with its own income providing for the upkeep, repairs, and other costs. The farms have 20% of their output reserved for this purpose. This means there will be virtually nothing for the owner to do and no risks, aside from the deductible costs from insurance for damage that might come from a natural disaster; insurance is included in the plan.

There are some downsides to investing in community solar, and Peter Thurrell is quite willing to talk about them. One is that the owner of the panels cannot as easily indulge in the pride of ownership by showing off his solar panels to guests or relatives. There are, after all, those who like to entertain dinner guests by showing them solar PVs. Another is that some people really enjoy doing their own maintenance. One such person would much rather go up on his own roof to sweep snow off his panels than pay someone else to do the job, and for such a person, Soveren Solar's PV farms might not work, because they offer no opportunity to use slippery ladders.

Soveren Solar is located in Putney, Vermont. The web site is soverensolar.com. The telephone number is 802-869-2500.

GREEN BIKE PROJECT

By Daniel Hoviss

THE PUTNEY GREEN BIKE PROJECT was conceived by the Putney (Vermont) Energy Committee. A lot of people had bikes going unused in storage, while others needed to get out of their cars and onto other forms of transportation. As the price of gas spiked to over \$4.25 a gallon, the program reached a total of 15 bikes in the summer of 2008.

The program was very successful in many ways. We raised awareness of non-automotive transportation, and the usefulness of bicycles in Putney. We provided new bike racks at a number of local institutions, making bike parking easier. We donated kids' bikes and helmets to the local elementary school bike program. People who used the program were very enthusiastic.

The Putney program also inspired a new and successful Bellows Falls Green Bike program, whose volunteers collect and repair bikes and offer programs. The Putney project has helped and donated several truckloads of bikes to the BF bike program. They have a wonderful downtown space for storage and repair. One unique feature of the BF project is that volunteers get hands-on training and can receive a bike in exchange for their hours. This gets people involved, teaches them new skills, and nets them a bike — all three great reasons to have a bike project in any town. Their website is bfbike.org

Two years ago, the Putney program entered a hiatus. The town has had road repaving and new sidewalk projects back to back, making biking conditions less than ideal and possibly dangerous. As the hiatus ends, the program awaits building finalization and improvements on a work-

shop and storage location in the town center. Bikes should again be available in Putney in mid-June.

We have reformulated the program. While no bikes were ever stolen, several bikes were "borrowed" for extended periods of time and returned needing work. The current program is set up to loan bikes to adult residents of Putney, and bikes will have locks.

As the Putney Program gets restarted, we are looking for additional volunteers, and will be implementing a free rental program as well as a volunteer repair and bike exchange service based on the BF project. We will be working on additional bike racks for area businesses, building improvements to our bike shed and getting the word out so more people can use the program.

One great benefit of such a program is that it reduces the number of car trips, and this lowers carbon emissions. This is particularly important because the short trips that can be made on bikes are the ones typically done with cold engines, which is when most vehicles produce their greatest emissions. In addition, bike programs keep used bikes out of landfills. People who ride bikes get the health benefits and joy of biking, people who volunteer get new skills in bike repair, and those who donate fund more bike-friendly travel lanes and parking areas.

Visit the Putney Bike Project online at bit.ly/putney_green_bikes

Contact Daniel Hoviss if you would like to volunteer, learn, ride or share bike knowledge. 802 387 4141 daniel@putney.net

Daniel Hoviss is the Co Founder and chair of the Putney Energy Committee, Transition Putney member and Town Energy Coordinator.

INTEREST FOR EV'S *cont'd from p. 6*

Charging stations come in three categories including the Level 1, which is a 120 volt outlet (five miles per one hour charge); Level 2 is a 240 volt outlet (20 miles per one hour charge); and DC Fast Charging, which will give the EV an 80% charge in 30 minutes. The Drive Electric Vermont website has a locator map of charging stations and there are phone apps such as PlugShare or ChargePoint to find charging locations. There are about 15 new charging stations opening in the next six months in Vermont and seven of them will be fast-charging. Most people charge their EV at home overnight.

There was great interest at the forum but are electric vehicles ready for prime time? Almost, but it's not quite there yet.

Roger Lohr is a freelance writer and the founder of XCSkiresorts.com.



Electric pedal assisted Zoombike, from Middlesex, Vermont

Effective Community Engagement to Support Energy Projects in NH

On July 16th, 2014, the New Hampshire Local Energy Work Group (NHenergy.org) will host a Local Energy Solutions Webinar in support of the energy projects in New Hampshire.

Are you looking for more community interest, understanding or support for your energy projects? Take your passion and expertise about energy issues and share it with your community. This will lead to greater community participation, better understanding, more support and stronger local decision-making. In this webinar, two community engagement experts from UNH Cooperative Extension will share the best practices in community outreach and engagement. You will learn how to reach out and how to engage (they are different!) We will help you identify community stakeholders and share the many ways you can engage with them. We will explain tools of engagement such as forums, charrettes, visioning sessions, key informant interviews and focus groups. You will finish the session with a plan for engaging your community in your work.

Presenters from UNH Cooperative Extension:

- Molly Donovan, Extension Specialist, Community Development
- Charlie French, Program Team Leader, Community and Economic Development
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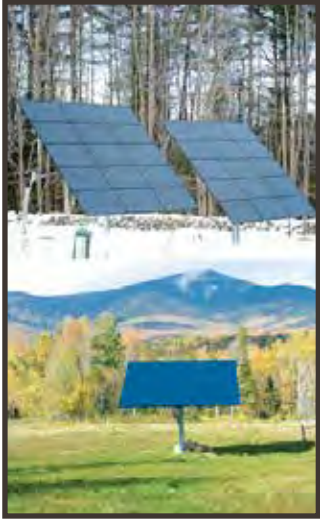
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G.E.T.TING TO KNOW YOUR SOLAR INSTALLERS

FRASE ELECTRIC

FRASE ELECTRIC is located in South Tamworth, New Hampshire, in the central part of New Hampshire. Frase focuses on commercial and residential electrical work, with licenses in Maine, New Hampshire, Vermont, and Massachusetts. There are two things that stand out, however, as special areas of interest. One is solar photovoltaics. The other is work on high-end housing in New Hampshire's Lakes Region.

The business has seven electricians, including founder Kim Frase. He graduated from CMVTI in Auburn Maine in 1976, and has lived in NH for 37 years. He studied residential and commercial wiring there, and then returned to New Hampshire to work. In 1990, he started his own business. He started working on solar PVs as a major



NH winter scene with solar PVs and an old stone wall. Photos by Kim Frase.

part of his business in 2009, as soon as he could see the economics of operating solar PV working out. Since then, the payback periods have been almost cut in half.

Frase designs entire electric systems for homes and businesses. They do the electrical work for buildings, including specifying and installing backup systems, generators, and inverters. Most of the work is on homes, where special consideration for the homeowners' needs provides interesting challenges.

We have seen some of Frase's work in earlier editions of *Green Energy Times*. The article, "Woodstock Inn Station and Brewery," appeared in the December 2013 issue, and featured an 18kW solar array by Frase.

Kim Frase says about half of his sales is PVs and the arrays are getting larger due to the increase in Heat Pumps, and he finds his business often partnering with heat pump installers. He told us, "It is a no-brainer to have a net-zero house if it is in the right location and can have the right orientation. Why would anyone do anything else?"

Frase Electric is at 789 Whittier Highway, So. Tamworth, NH 03883. The number is 603-284-6618, and the web site is fraseelectric.com

KW MANAGEMENT

KW MANAGEMENT has been in business since 1990, providing an extensive array of services to help with efficient resource management. In 2000, the company added both solar and wind installations to its services. The other services that stand out include system design, data and telecom wiring, heavy-duty uninterrupted power systems, power monitoring, and more.

One thing that might be of use to any customer is for ground-source heat pumps.

One thing company vice president Jack Leary stressed is that anyone looking for a solar installer should pay close attention to two things. One is reputation, and the other is licensing. Reputation is an important indicator of the reliability of the business you are dealing with, and can be checked by asking such organizations as the Better Business Bureau.

Licenses are important, as permitting and approvals have to be in order for net-metering, and this really requires a licensed installer. They are also important for reasons ranging from real estate value to insurance. As one might expect, Leary is very sure both of the company's reputation, and the quality and credentials of its workers.

KW Management takes a holistic approach toward any installation they work on, and this includes solar PVs and solar thermal systems as well as wind power and other types of work. This means that the customer can be sure that the installation is best suited to the unique situation of any site they work on. The company is excited about solar, but they are also excited about other technologies that can be integrated into a solution, and

they are in a position to suggest the most effective approach to energy for any building.

KW Management does work mostly in New Hampshire and Massachusetts, but can work in Vermont and Maine as well. They work on commercial, industrial, and residential systems.

KW Management - 55 Lake St, Nashua, NH 03060 - (603) 598-0181. The Website is www.kwmanagement.com/



A collection of projects by KW Management

Solar Installers cont'd on p. 9

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Solar Installers cont'd from p. 8

SOLARTECH

Solartech is a family-owned business in Sutton, Vermont, in the heart of the Northeast Kingdom. Rich and Donna Nicol run the company and have a well-defined vision of their company: Solartech has courteous, friendly, and skilled solar professionals installing quality photovoltaic (PV) systems benefiting the environment, the community, and the homeowner—renewable energy is the wise choice.

Rich says they strive to provide excellent photovoltaic service and the best employment in the Northeast Kingdom. They have seven regular employees and hire local sub-contractors when needed. Local products are used whenever possible from companies such as EcoFasten in Morrisville, VT and AllEarth Renewables in Williston, VT. Solartech installs US-made panels and racking.

Solartech works beyond the borders of northern Vermont, installing residential, municipal, and small commercial arrays around the state. However, their focus is solar electric installation for both grid-tied and off-grid installations.

Solartech has been in the solar PV business for about seven years making it one of the older PV installers in Vermont. They have had a broad range of experiences in that time.



Solartech installations of PVs in Vermont meadows. Photos courtesy of Rich Nicol

Rich Nicol clearly enjoys small off-grid systems. Asked whether there was any particular installation that really stood out in his mind, he said, "There was one in Norton, Vermont that was not only off-grid, but off-road. The only way we could get panels, mounts, batteries, tools, and workers to the site was in canoes."

Solartech is located at 754 Station Rd, Sutton, VT, 05867. The phone is 802-467-3500, and the website is www.solartechvt.com. Contact rich@solartechvt.com.

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SOLARIZE UPPER VALLEY RECRUITS ADDITIONAL TOWNS

By Allison E. Rogers Furbish

"You took down all the barriers and made it easy."

"What an exciting time for us – we've just become our own power company!"

"I've been thinking about solar for a while now. This program is helping me do something about it."

"We thought the program was just a great opportunity and were very excited to be able to jump right in. It's cool to see how much electricity we've already generated, too. We sure hope the enthusiasm keeps building and spreading throughout the communities."

These are all quotes from homeowners who have gone solar this spring thanks to Solarize Upper Valley, an initiative of Vital Communities. The accessible resources, easy process, support from local volunteers, and financial incentives offered through Solarize Upper Valley are all working together to move the initiative toward its ultimate goal: doubling the amount of residential solar PV in Solarize communities.

SOLAR CAPACITY IS GROWING

Homeowners in Thetford and Strafford, VT, and Cornish, Plainfield, and Lyme, NH – the first communities selected to take part in the pilot program – are really getting on board with Solarize Upper Valley. Working with partner installers Catamount Solar/ Integrity Energy, Solar Source, and RGS Energy, as of late May residents had:

- Requested 365 solar site visits
- Received 203 solar system proposals
- Signed 48 contracts, for a total of 228kW new capacity of residential solar energy!

One advantage of Solarize Upper Valley: as more people sign up to go solar in each community, the cost comes down for everyone. If you're interested in going solar in one of these communities, the deadline to take advantage of the special pricing is June 30. You can learn more and sign up for a free site visit at vitalcommunities.org/solarize.

GET YOUR TOWN INVOLVED!

More residents have the opportunity to get involved with the Solarize Upper Valley initiative right now, as Vital Communities recruits towns for the fall round. Vital Communities will host two Solarize Upper



These three homes in Strafford, VT are some of the solar installations in the Upper Valley that were involved with the Solarize Upper Valley Initiative.

Valley events in June for residents and installers interested in the program:

Community Information Session, June 12, 5:30-7 p.m., Montshire Museum of Science, Norwich, VT

Installer Workshop, June 24, 7:30-9 a.m., Kilton Public Library, West Lebanon, NH (RSVP to sarah@vitalcommunities.org).

Proposals from interested communities must be submitted by Monday, July 21. Installer bids will be due Friday, September 12, and volunteers in the selected communities will vet the bids and select their partner installer. The public outreach portion of the fall round of Solarize Upper Valley runs October 2014 through January 2015.

If you'd like to learn more, visit vitalcommunities.org/solarize to sign up for updates and review the request for proposals from towns, or contact Vital Communities Energy Program Manager Sarah Simonds at sarah@vitalcommunities.org or (802) 291-9100.

GRANITE STATE SOLAR HAS A MESSAGE:

Solar Is INEXPENSIVE

By N. R. Mallery and George Harvey

"IF YOU CAN afford your electric bill, you CAN afford to go solar," says Alan Gauntt owner of Granite State Solar.

Granite State Solar is a local, professional small company based in North Sutton, New Hampshire. They provide both solar hot water and solar electricity systems for homes and businesses. Gauntt likes to keep projects regionally local, within New England, but prefers to keep them in his own backyard, around Sutton, New Hampshire and the surrounding communities.

Granite State has been in business since 2008. All the systems they build are designed, installed, and maintained by certified technicians and engineers. Gauntt's own credentials go beyond certifications. They include, for example, being a consultant for the Natural Energy Group.

One Granite State Solar program currently in the works is to solarize Sutton, NH on a town-wide basis at a discounted cost to go solar. Gauntt intends to offer similar projects to surrounding towns, when Sutton is completed.

Granite State Solar has a goal of educating, as well as providing solutions. Gauntt wants people to understand that adding solar energy system to a home is one of the most rewarding investments one can make. Not only will it help generate clean energy and provide energy independence, it can also help save money, and increase the value of a home.

Owners of renewable energy improvements may be eligible to receive various solar rebates and solar incentives where available. Also, all tax-obligated U.S. homeowners are entitled to a solar Federal Tax Credit worth 30% of a system's value. Granite State Solar will help on paperwork for these.

Payoff on systems installed by Granite State Solar is five to six years, with a monthly bill close to the current electric bill. The company is able to offer a system for 75¢ a watt less than many other groups due to Gauntt's philosophy and desire to focus locally. As a family owned and operated business with low overhead he claims to be the 'most inexpensive guy around.' But, the low cost does not compromise in the quality of the installations.

Gauntt also wants people to under-

Inexpensive cont'd on p. 11

LET US ENLIGHTEN YOU on why now is the best time to consider solar for your home or business.



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Learn more at www.VitalCommunities.org/Solarize

Solar is Inexpensive cont'd from p. 10



Granite State Solar's team installed a 7.35 kW PV Solar System in Sutton NH.



stand the potential benefits from solar thermal. Anyone who uses large quantities of hot water, especially businesses, endure high fuel bills to do so. Solar thermal water systems can reduce utility bills by up to 70%.

Solar PV and thermal systems both reduce carbon footprints. Solar power cuts the need and use of fossil fuels, and they reduce the amount of site-generated, carbon-based greenhouse gases being released.

Duncan and Adrienne Domey, Wilmot NH have this to say of Granite State Solar:

"Thank you Granite State Solar! Solar panels are something that we long hoped to be able to do someday." Granite State Solar and their team made that dream a reality. Prices have come down and there are a lot of incentives out there from government and utilities ... a great deal on high-quality panels ... We tell all our friends it's a good time to go solar"

There is a lot of information on solar PVs and solar thermal systems at Granite State Solar's website, www.granitestatesolar.com. Call them at (603) 748-4114.

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SOLAR FEST

20th Year • July 18-20, 2014 • Tinmouth, VT

The Longest Running Solar-Powered Music Festival and Sustainability Conference in the Northeast

By Steve Goldsmith

TWENTY YEARS AGO Nance Dean had a dream about people coming to her farm for a solar-powered music festival. She told some friends, and together they transformed her dream into reality. SolarFest was designed to demonstrate the viability of renewable energy and start dialogs about sustainability and the environment. From its humble beginnings in the beautiful hills of Vermont, it has spread the message of sustainability and renewable energy throughout the Northeast.

Now, SolarFest is the preeminent sustainability event in New England. It will celebrate its 20th anniversary festival at Forget-Me-Not Farm in Tinmouth VT, just over the hill from where it began. SolarFest has been a Vermont Top Ten Summer Event, receiving the Governor's Award for Environmental Excellence and a Rutland Herald Reader's Choice award. This year Yankee Magazine named SolarFest an Editor's choice Top 20 Summer Event.

SolarFest brings renewable industry leaders, innovators, highly experienced users, and newcomers together in a family-friendly environment full of great music, food, theater and fun. It gives folks a week-end to relax and re-invent the way they look at energy, environment, and community.

SolarFest takes place July 18-20. All three days will have workshops for all skill levels, displays of new technologies, and opportunities to chat with experts. There's a full-blown music and theater festival, powered by renewable energy. The sustainable marketplace will feature vendors and equipment manufacturers demonstrating new renewable energy technologies, food, crafts, and sustainable products.

Musical highlights include Break of Reality (a cello rock band), Entrain, Bow Thayer, Dirty Dozen Brass Band, Lukas Nelson and P.O.T.R., Waylon Speed, Barika, Start Making Sense, Eastbound Jesus, SolarFest House Band and Soule Monde.



Music on stage at SolarFest. All photos courtesy of SolarFest



Puppet show at SolarFest



SolarFest racking competition, 2012

SOLARFEST *cont'd on p. 13*

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SOLARFEST *cont'd from p. 12*

Family stage performances include favorites Jennings & Ponder, Derek Burkins, Rick Davis, and Puppet Pageantry.

An all-new play by renowned author Frank Asch will debut in Theater in the Woods.

Alec Guettel, the co-founder off Sungevity, Inc., a world-leading residential solar company, is the Saturday keynote speaker.

The Sunday keynote speaker is Sandor Ellix Katz, author of *Wild Fermentation: The Flavor, Nutrition, and Craft of Live-Culture Foods*—which *Newsweek* called “the

fermenting bible”.

More than 80 workshops will be offered in seven different tracks.

Renewable Energy workshops include several on solar energy ranging from introductory to advanced, compost heat recovery, heating with biomass, and the third Solar Roof Racking Challenge. Festival site tours will include visits to each of the solar and wind power systems used to power the festival. There will be demonstrations on solar cooking, off-grid PV, fuel cells, and a

SOLARFEST *cont'd on p. 35*

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HOW A COMMUNITY BECAME 100% RENEWABLE

G.E.T. Staff

Freiamt is technically a town, though in fact it is a collection of five small villages. It sits in the southwestern German state of Baden-Württemberg, the Black Forest, about 20 minutes from Freiburg am Breisgau. The 4300 citizens, like those of many

so people could become familiar with the technologies, their benefits, and the objections that might be raised. They were not asked to commit to a large project without knowing what the potential downsides might be.



The village of Freiamt, Germany, with its 4,300 inhabitants, is using a mix of renewable energy — a bio-gas plant, solar, wind and water — to produce more than 100% of their energy needs. Pictured is the Schneider family farm — dairy cows, schnapps making, 100kW of solar PV and two wind turbines.

other German communities, are moving toward 100% reliance on renewable sources for power and heat. They have taken a somewhat different approach to how this is to be done, however.

The unusual approach is not that they have worked with different combinations

They started with community projects. A wind farm was built, but it consisted of only two turbines to start with. Local people were able to buy shares of the turbines, at minimum price of €3,000 (\$4,170). While this required a level of commitment, the price was not so high that a person had to be wealthy to take part.

Along with the first wind turbines came solar arrays, which were added in steps. The town's municipal complex had an array of PVs installed to provide for the community. When they decided to add solar photovoltaics (PV) to complement wind, farmers were asked if their roofs could be used. They said they liked the idea, but wanted to own the roof arrays themselves. They now have three hundred solar PV systems that have been installed on the rooftops. In addition, around 150 solar collectors are now used for water heating.

The combination of PVs with wind has its benefits. PVs provide power during times of strong sunshine, and since these times coincide with those of low wind power, the wind and solar complement each other.

The local farmers also installed small bio-gas plants, which converted agricultural waste to methane, which could be burned to provide heat for homes in the town, as well as more electrical power.

The whole system was built gradually. This meant that after the first turbines were installed, people could test for themselves the truth of the ideas that wind turbines are ugly, loud, or destructive to wildlife. Having had that experience firsthand, they decided to add more turbines to the wind farm, and now have a total of five. They now are not only 100% renewable, but produce about 14 million kWh of energy annually — about 3 million more than needed.

Source: <http://www.renewablesinternational.net/the-role-of-energy-co-ops/150/537/78274/>.

Learn more (recommended): <http://bit.ly/1pEJTnN>

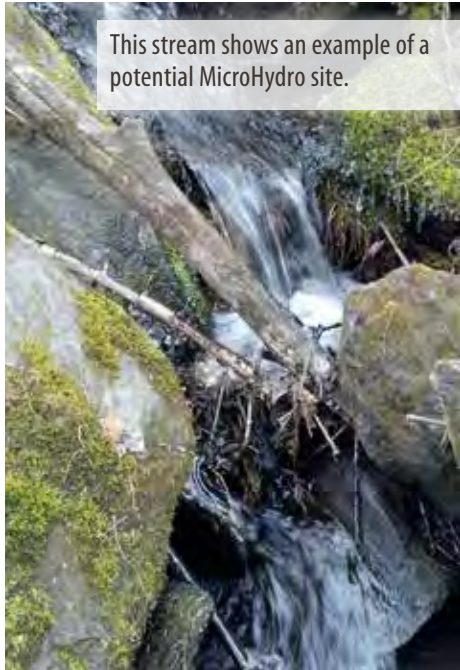
At an assumed price in Germany, of €500 per kilowatt, the projects in Freiamt probably cost around €1.7 million. The cost is covered by local community investment. Thousands of German communities have energy cooperatives, and these have a much larger renewable power output than the traditional utilities do.

of technology. Like many other German towns, they use a mix of solar, wind, and biomass, with a small addition of hydro-power. They use their biomass in a district heating system, but that is also not unusual.

The thing that makes Freiamt different is how the community accomplished this. They started this move in a series of steps,

On Farm Renewables with MicroHydro

Funding Opportunity!



This stream shows an example of a potential MicroHydro site.



This stream site uses a MicroHydro system that produces enough energy to heat the former office building for Backwoods Solar in Sandpoint, Idaho.

Little Green Hydro, LLC (LGH) seeks farms in Vermont and/or New Hampshire to install and use the EcoHydro System with funding provided by LGH and the U.S. Dept. of Agriculture.

LGH has successfully completed USDA-REAP programs in prior years based on our EcoHydro System and we are ready to partner with you to develop and submit a winning proposal for your farm (some small businesses may also be eligible).

Due to the tight proposal deadline with the USDA on July 1st, you must contact us by no later than June 25th to indicate your interest in this opportunity. There is significant effort involved in developing and preparing the proposal for submission, which we will complete with your assistance. We will prepare and submit the proposal for our farm partner at no cost to the farm.

The EcoHydro System™ is the first commercially-available MicroHydro renewable energy solution. No dams, no stream alterations, no negative environmental impacts – the EcoHydro System is highly environmentally-sustainable technology. With the right site, the EcoHydro System can be the lowest-cost renewable energy source available... even lower than today's fossil-fuel grid power!

The prospective farm partner will:

- Be an operating farm business, agricultural enterprise or qualified small business
- Have an appropriate stream or brook on the farm property
- Have an interest in renewable energy
- Have an economic justification (e.g. reducing farm energy input costs)
- Be willing to serve as an on-going demonstration/information site

The farm's brook can be of many different types, but good characteristics for the on-farm small stream or brook include:

- Terrain is generally hilly, steep or mountainous
- Brook is 4 to 10 feet in average width
- Elevation differential (head) of >150' over < 3,000' distance
- Reasonable proximity (<1,000') to electric usage point
- Generally year-round flow

Please see our website www.LittleGreenHydro.com for more information on site qualification.

LGH will provide the EcoHydro System, all system installation, configuration, commissioning, support services and obtain all required environmental and regulator permits. The farm partner will have regular reporting requirements, occasional maintenance duties and accept turn-over of the system upon commissioning.

Contact LGH at: USDA-REAP@LittleGreenHydro.com or call (802) 265-1004.



To the right, top to bottom: Top 2 pics are good potential MicroHydro stream sites. Bottom 3 pics: top: A MicroHydro Intake Unit in a small stream; middle: The interior of a Power Unit; bottom: Exterior view of an installed Power Unit. > >



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WHY VERMONT BUT NOT KANSAS?

By George Harvey, Staff

IN OUR LAST ISSUE of *Green Energy Times*, we talked about Greensburg, Kansas, a community that is chartered as a city, though the population is only about 800. When they rebuilt after being almost completely destroyed by an F5 tornado in 2007, they decided to take the opportunity to build a community that was as sustainable as possible. They put up a wind farm of 12.5 MW just three miles outside the city. Their wind farm became emblematic of the rebirth of the city.

Having had that experience, they kept the ball rolling and started putting up more wind turbines right inside the city. They did this quite fearlessly, as they understood fully what wind turbines were like. Now, there are at least fourteen wind turbines in the city's 1.75 square mile area.

Citizens of Greensburg live so close to wind turbines it is a bit astonishing. The local hospital's turbine is just across the driveway, only twenty yards or so from the building. The local Best Western provides power for its customers with three wind turbines on its property. In fact, if they were evenly distributed, the combination of the city's size and the number of wind turbines means that, on average, every house in the city is within a quarter-mile from at least four of them.

The people in Greensburg seem to delight in this. On the town's website, they boast that their goal is to be "100% powered by wind, 100% of the time."

By contrast, any discussion of wind power in Vermont is likely to produce heated antagonism. Many who do not live even remotely near wind farms take strong stands, advocating against what they call "Big Wind," which they believe imposes thoughtlessly on citizens near wind farms. They talk about the great physical suffering people go through because of the presence of wind farms, including migraines, nausea, insomnia, and a host of other symptoms.

We have to ask, "What gives? Why do people suffer in Vermont, but not in Kansas?"

A number of peer-reviewed papers have appeared recently on wind turbine syndrome, and two points can be made to sum them up. First, peer-reviewed medical papers are generally in agreement on the claims of physical symptoms, and the subject is not controversial among them. Second, they agree it cannot be shown that wind turbines directly produce the symptoms claimed. The conclusions of the Australian Medical Association on this appear in the last paragraph of this article.

This is not to say the symptoms do not exist. In fact, there is a strong suggestion that there are symptoms relating to certain wind farms in certain places. Furthermore, some medical publications go so far as to give a plausible cause-and-effect relationship. The problem is that the relationship is not directly between wind turbines and wind turbine syndrome.

An article that appeared in *Health Psychology*, a journal of the American Psychological Association, provides some insight into this. The paper is called "Can Expectations Produce Symptoms From Infrasound Associated With Wind Turbines?"

Fifty-four subjects were divided into two groups. One group, called the "high expect-



Vermont's Sheffield wind farm. Photo by From the Nek

tancy group," was shown a five-minute video of people complaining about how wind farms produced infrasound, inaudible low-frequency sound, which they said had given them symptoms of illness. The other, the "low expectancy group," was shown a video of experts saying that infrasound from wind farms could not produce symptoms.

Each group was exposed twice to what they were told was infrasound of the type that produced wind turbine syndrome. On one of these occasions, infrasound was actually present, and on the other it was not.

expectancy group members had little or no response to infrasound.

The conclusion is that the presence of wind turbines is not, by itself, sufficient to cause symptoms of illness. The symptoms can, however, be produced by the expectation that they will happen. The paper can be found at <http://bit.ly/wind-psych-paper>.

The Australian Medical Association (AMA) also recently published its position paper on wind farms and wind turbine syndrome. A report of this can be read online in the publication, *Energy Matters*, at <http://bit.ly/AMA-says-wind-farms-not-a-hazzard>. The



The Smoky Hills wind farm in Kansas. Photo by Drenaline

When they thought they were being exposed to infrasound, members of the high-expectancy group reported symptoms, and they had them to the same degree regardless of whether infrasound was actually present. By contrast, the low-

conclusion of the AMA is that wind farms cannot be shown to cause wind turbine syndrome, but the hysteria caused by what it refers to as "scare tactics" of anti-wind groups can produce anxiety, and the anxiety can lead to the symptoms.

POWER FOR DUTCH TRAINS WILL COME FROM THE WIND

G.E.T. Staff

UNDER A NEW CONTRACT between Vivens, the company that procures power for Dutch railroads, and Eneco, the power company, all electricity for powering trains in the Netherlands will be supplied from wind farms. Starting with 50% in 2015, the amount of power from wind for the trains will increase to 100% in 2018. The contract will continue to 2025.

Dutch trains currently use about 1400 gigawatt-hours of power per year. Some of this is already supplied in part by wind farms. The contract forbids sourcing the



CROWD-FUNDING A DUTCH WIND TURBINE

G.E.T. Staff

CULEMBORG IS A SMALL CITY in the central area of the Netherlands with a pop-



Wind turbine in Culemborg, Netherlands. Photo by CborG82

ulation of about 27,000. When a number of the people of the city decided to put up a wind turbine late last summer, they decided on a novel approach. They did not want to pay full price, so they went looking for a used turbine of 2.0 megawatts.

Used turbines are not easy to find, because people who put such equipment up are usually happy with it and do not want to sell. A company called Windcentrale, however, specializes in facilitating such purchases and was able to locate the right machine for the city.

The most remarkable thing about this particular transaction was not the fact that a used wind turbine was purchased. It was how the purchase was accomplished. The turbine was crowd-funded. That, however, is still not the most remarkable part of the purchase.

Buying and installing the wind turbine for Culemborg required an expense of € 1,329,600 million, which is about \$1,820,000 million. At €200 per share, 6648 shares had to be sold. This brings us to the remarkable part. The entire crowdfunding operation was completed, with all shares sold, in just 13 hours.

Now that the wind turbine is in place, people are already starting to plan for another.

electricity from existing wind power, however, so the expansion will depend on future wind farm construction. The new wind farms need not all be in the Netherlands, and the expectation is that a large part of the new power will come from Belgium and Denmark.

Left: Most of the old Dutch windmills were used to power pumps to keep the areas behind the dikes dry. Future wind turbines will power the railroads. Photo by Quistnix at nl.wikipedia

FEDERAL

FEDERAL INVESTMENT
TAX CREDIT

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

USDA RURAL
DEVELOPMENT PROGRAM

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

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

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

BIOREFINERY ASSISTANCE
PROGRAM

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

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

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

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

REGIONAL

NEW ENGLAND
GRASSROOTS
ENVIRONMENTAL FUND

MODEST GRANTS ARE AVAILABLE FOR COMMUNITY-BASED ENVIRONMENTAL WORK IN CT,MA,RI,NH,VT,ME

- Must be volunteer driven or have up to 2

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

VERMONT

CLEAN ENERGY
DEVELOPMENT FUND

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

SOLAR INCENTIVES – BASED ON
RATED CAPACITY OF SYSTEM

- <http://rerc-vt.org/incentives/index.htm>
- <http://www.dsireusa.org/incentives>
- residential (including leasing)= \$0.25/Watt up to 10 kW for PV; \$1.50/100Btu/Day up to 200kBtu for ShW.
- commercial/industrial = \$1.50/100Btu/day up to 1100kBtu/day for ShW
- special customer* = \$1.25/Watt up to 10kW. \$3.00/100 Btu/day up to 1500 kBtu/day for ShW. **Group net-metered projects are only eligible for residential customers with residential meters.
- PV and ShW Efficiency Adder - adder is calculated separately and added to standard incentive subject to customer caps (eligibility requirements apply, contact RERC)
- residential = \$0.15/Watt for PV; \$0.50/100Btu/day for ShW. Capped at a cumulative \$350, residential customers; \$450, commercial/industrial/special customer = \$0.15/W; \$0.50/100Btu/day up to a cumulative \$450 per customer

Micro-Hydro

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

***special customer category limited to municipalities, non-profit housing authorities, public schools. All incentives are subject to availability and may change.*

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

VT TAX CREDITS

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

EFFICIENCY VERMONT

Lighting (must be ENERGY STAR)

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

Home Efficiency Improvements

- improvements: air sealing, insulation

and heating system upgrades - up to \$2,100 in incentives - using participating* contractors

Appliances (must be ENERGY STAR)

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

Heating/Cooling

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

Residential New Construction

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

Other Opportunities To Save

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

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

NEW HAMPSHIRE

RENEWABLE ENERGY
INCENTIVES OFFERED
THROUGH THE NH PUBLIC
UTILITIES COMMISSION

Commercial Solar Rebate Program

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

- Rebates for solar electric/thermal projects 100kW (or thermal equivalent) or less
- Solar PV = \$0.80/Watt D/C up to \$50,000
- Solar thermal = \$0.07(or\$0.12 for systems of 15 collectors or fewer) per thousand-Btu per year, up to \$50,000

Contact jack.ruderman@puc.nh.gov

Commercial Bulk Fuel-Fed Wood
Pellet Central Heating Systems

- 30% of the heating appliance(s) and installation cost, up to a maximum of \$50,000. An additional 30% up to a maximum \$5,000 is available for thermal storage. Systems must be 2.5 million BTU or less

Residential Solar PV Rebate Program

- \$0.75/watt capped at \$3,750 per system, whichever is less. Systems must be

under10kW. Subject to funding availability.

Contact jon.osgood@puc.nh.gov

Residential Solar Water Heating
Rebate Program

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

Contact barbara.bernstein@puc.nh.gov

Wood Pellet Boiler or Furnace

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

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

LOCAL INCENTIVES

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

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

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

RENEWABLE ENERGY
INCENTIVES OFFERED
THROUGH THE NH
ELECTRIC CO-OP

Commercial Solar Thermal (Hot Water)

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

Commercial Solar PV

- \$0.50 per watt up to the lesser of 15% of installed cost or \$20,000

Commercial Fossil Fuel Program

- Incentives of 35% up to \$15,000

Residential Solar PV

- is 20% of the project cost up to \$2,500.

Residential Solar Hot Water

- is 20% of the project cost up to \$1,500.

Heat Pump Water Heaters

- is 50% of the project cost up to \$1,000.

Heat Pump Conversion

- is 35% of the project cost up to \$10,000 for Geothermal Heat Pumps.
- is \$450-\$900 per system based on SEER rating for Ductless Mini-Split Heat Pumps.
- is 35% of the project cost up to \$3,500 based on SEER rating for High Efficiency & Hybrid Central Heat Pumps.
- is 35% of the project cost up to \$25,000 based on SEER ratings for Commercial ground or air source heat pumps and ERV's.

PAREI

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

WWW.NHSAVES.COM

NH HOME PERFORMANCE
WITH ENERGY STAR

Sponsored by all NH electric and natural gas utilities in partnership by the U.S. Dept.

of Energy. Fuel-blind eligibility using the Home Heating Index (BTUs of heating fuel / conditioned square feet / heating degree days). Must provide at least 12 months of heating fuel history. Once qualified, eligible homes get a \$450 value comprehensive energy audit for \$100 (rebated if improvements installed), and 50% instant rebate for eligible weatherization improvements up to a \$4,000.

Visit www.nhsaves.com/residential/retrofit.html for more information and an online Home Heating Index calculator

NH ENERGY STAR HOMES

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

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

NH ENERGY STAR APPLIANCES & LIGHTING

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

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

Instant rebate coupons ranging from \$1 to \$7 for ENERGY STAR-rated CFL and LED light bulbs purchased through qualifying NH retailers.

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

NHSAVES LIGHTING AND EFFICIENCY CATALOG

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

Offered at discounted pricing for NH electric utility customers, and fulfilled by EFI. **Visit catalog.nhsaves.com/ for an online version of the catalog.**

2014 ENERGY STAR® RESIDENTIAL HEATING, COOLING, AND WATER HEATING EQUIPMENT REBATE

Rebates of up to \$1,500 on high efficiency Furnaces and Boilers, \$200-\$500 rebates on Mini Split Heat Pumps, up to \$800 rebates on water heaters, rebates on programmable and Wi-Fi thermostats

Program details and application at www.NHSaves.com/heatingcooling

OTHER NH ELECTRIC UTILITY PROGRAMS

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

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

Business Programs

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

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

NH Weatherization Assistance Income-Eligible Programs

Home Energy Assistance and NH community action Weatherization Assistance Program. Financial assistance paying fuel bills, and free weatherization improvements for qualified applicants. Funding from U.S. Dept. of Energy, NH utilities.

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

MASSACHUSETTS

COMMONWEALTH SOLAR HOT WATER (SHW) PROGRAMS

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

Residential Rebate: \$75/per collector X the SRCC thermal performance rating of the collectors (pls refer to kBtu/ panel/day for Category C, Mildly Cloudy climates)

Metrics for typical SHW system for 2-4 people, 2-panel roof-mounted plus 80 gal solar tank: materials/installation costs = \$10,000, MA CEC residential rebate = \$3860 including • Adder for moderate home value or for moderate income. MA State Tax Credit (use only once) = \$1000, Federal Tax Credit (30% system cost) = \$3000, Net Cost = \$2100 **Visit <http://www.masscec.com/programs/commonwealth-solar-hot-water>**

MASSSAVE HEAT LOAN SHW

Through this loan program, customers may borrow at 0% interest the costs of a Solar Domestic Hot Water and/or Thermal Heating system. Apply through receiving the MassSave Energy Audit. You can borrow up to \$25,000 at 0% interest for a 7 year term.

Efficiency

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

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

COMMONWEALTH SOLAR PV PROGRAMS

www.masscec.com

Commonwealth Solar II provides rebates for homeowners and businesses in Massachusetts who install solar photovoltaics (PV). Rebates are granted through a noncompetitive application process for the installation of photovoltaic (PV) projects by professional, licensed contractors at residential, commercial, industrial, institutional and public facilities. For Block 19 funding, in addition to the base incentive (.25/W), further incentives ("adders") are available for installations using components manufactured in Massachusetts (.05/W), for individuals with moderate income or home values (.40/W), and for those who are rebuilding in the wake of a natural disaster (1.00/W).

For all systems, rebates are calculated by multiplying the per watt incentive (base incentive plus adders) times the nameplate capacity of the system, up to 5 kilowatts (kW); projects are eligible for rebates only if their total capacity is under 15kW. Commonwealth Solar II program will sunset at the end of 2014.

Further eligibility requirements apply, and potential rebate recipients should read the full program documentation.

<http://www.masscec.com/programs/commonwealth-solar-ii>

DEPARTMENT OF ENERGY RESOURCES

Solar renewable-energy credits (SRECs) associated with system generation belong to the system owner and may be sold via the Department of Energy Resources (DOER) SREC program. Note: appropriate, approved Data Acquisition System monitoring must be utilized for PV systems >10kW in order to qualify to sell SRECs.

MA State Income tax credit for residential solar hot water or pv systems are eligible for a one time 15% off system cost, capped at \$1000 max tax credit.

No sales tax on residential solar hw or pv systems.

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

NEW MASSACHUSETTS SREC POLICY

Massachusetts has announced a new version of its Solar Renewable Energy Credits Program. The new version is informally being called SREC II.

Under the earlier version, which expired last year, credits were given regardless of where the solar system was installed. SREC II prioritizes sites, however, by using an SREC factor based on the type of installation. The credits provided for energy produced by a system are calculated by multiplying the factor times a full credit value.

Full credit is given for residential, parking canopy, emergency power, or community-based systems, or any other system of less than 25 kW. Larger systems get a factor of 0.9, if they are building-mounted or at least 67% of the power produced is used at the site. If a larger system meets neither of these criteria, but is built on a landfill or brownfield site, or if it is less than 650 kW, then it gets a factor of 0.8. Systems that qualify for none of the foregoing get a factor of 0.7.

Information can be found at http://bit.ly/Mass_SREC_II

ENTERGY VY MAKES \$5.3 MILLION CLEAN ENERGY PAYMENT to VT

Montpelier, VT – Gov. Peter Shumlin and Public Service Department Commissioner Christopher Recchia announced today the receipt of \$5.3 million from Entergy Vermont Yankee (VY) for the development of clean energy, and confirmation that Entergy has deposited \$10 million as its first payment into the Vermont Yankee Site Restoration Fund. Both payments were part of the Settlement Agreement and Memorandum of Understanding (MOU) between Entergy and the State signed in December 2013.

The \$5.3 million will be administered by the Public Service Department's Clean Energy Development Fund (CEDF) to aid in the development of renewable energy sources across Vermont. As required by the MOU, the CEDF will spend at least 50 percent of these funds for clean energy development activities in or for the benefit of Windham County. The Site Restoration Fund will be held in trust and grow over time until it is needed to help restore the Vernon, VT site.

"We are pleased that with these deposits Entergy VY has completed its financial commitments for this year, all in accordance with the terms of the Agreements," said Recchia. "The Public Service Board's decision last week to uphold its earlier endorsement of the Agreement made moving forward with these payments possible."

The CEDF and its Clean Energy Development Board will be taking public comments to inform and aid in the creation of a plan for the deployment of the \$5.3 million. Specifically in order to obtain comments directly from Windham County residents the Clean Energy Development Board held a public hearing in Brattleboro on Wednesday, May 14th at 5:30 at the Brattleboro Union High School, in the Multipurpose Room.

The CEDF will be particularly interested in investing in the development of the distributed generation clean energy sector of the Vermont and Windham County economies in coordination with State and regional economic development organizations. Andrew Perchlik, Fund Manager of the CEDF said; "These are the last funds the CEDF expect to receive from Entergy and we want to be sure to leverage these dollars to achieve maximum economic and clean energy benefit to the State and Windham County."

CLIMATE SOLUTIONS:

Is "Cap and Trade" Helping to Reduce Greenhouse Gas Emissions?

"CAP-AND-TRADE," whereby big polluters must pay to emit greenhouse gases against a capped total amount that is reduced over time—has been in effect across the European Union (EU) since 2005. This so-called Emissions Trading System (ETS) requires 11,000 of the largest electric and industrial facilities in 28 European countries to participate. Some 45% of Europe's total greenhouse gas emissions are regulated under the system. Proponents say the ETS has succeeded in keeping greenhouse gas emissions in check and making Europe a global leader on climate. The EU reports that, by 2020, emissions from sectors covered by ETS will be 21% lower than they were in 2005 and 43% lower by 2030.

But critics argue that Europe's reduced emissions may be more due to the global recession than the ETS, and that the cheap availability of allowances has made it easier for companies to pay to burn coal than to switch to cleaner natural gas or invest more in carbon mitigation technologies. Early in 2014 the EU tightened up its system by cutting the number of new allowances it plans to issue over the next three years by a third while simultaneously creating a "market reserve" to absorb extra allowances as needed.

Meanwhile, Switzerland, New Zealand, Australia, Kazakhstan and South Korea have each set up their own national cap-and-trade programs to varying degrees of success, while regional versions have popped up within Japan, Canada and the U.S.

As to the U.S., whether or not to establish a nationwide cap-and-trade system here has been a hot topic of discussion in Congress. It last came up for a vote in 2010, but never found enough bipartisan support to become the law of the land. But in lieu of any federal system, two U.S. regions have undertaken their own attempts at reducing greenhouse gas

emissions through market mechanisms:

In 2009, 10 northeastern states came together to create the Regional Greenhouse Gas Initiative (RGGI), a cap-and-trade system with the goal of reducing regional carbon emissions from the power sector 10% from 2009 levels by 2018. Lower emissions than expected over the first five years of the program—thanks to many utilities switching over to cleaner burning and increasingly cheaper natural gas as well as less overall economic output due to the recession—led RGGI to lower its overall annual cap from 165 million to 91 million tons in 2014, with a 2.5% reduction every year thereafter until 2020. Analysts expect this rejiggering will drive the price of polluting five times higher than it has been and thus force utilities across the region to seek cleaner, greener alternatives to coal as an electricity feedstock.

The other major U.S. cap-and-trade player is California, which launched its own ETS in 2013 with a cap set initially at 2% below 2012 emission levels. The cap will then be reduced 3% per year from 2015-2020. Some 600 facilities are big enough polluters to qualify for participation in the system, which will cover around 85% of the state's total greenhouse gas emissions. Given that California alone is the 12th largest economy in the world, its forward-thinking commitment to cap-and-trade gives hope everywhere to fans of marshalling market forces to bring about environmental change.

Contacts: EU Emissions Trading System, ec.europa.eu/clima/policies/ets/index_en.htm; RGGI, www.rggi.org; California Cap-and-Trade Program, www.arb.ca.gov/cc/capandtrade/capandtrade.htm.

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The European Union reports that by the year 2020 emissions from sectors covered by the Emissions Trading System (ETS) will be 21 percent lower than they were in 2005 and 43 percent lower by 2030. Pictured: A coal-fired power plant in Germany. Photo: Arnold Paul

BANKING ON SOLAR

A Collaborative Effort To Improve Solar Lending

By Haresh Patel

EARLIER THIS MONTH, we had the pleasure of sitting in on the Banking on Solar working group organized by the Department of Energy's National Renewable Energy Laboratory (NREL). The working group included more than fifty participants who represent various stakeholders in the solar industry. The purpose was to address barriers banks face when lending money to homeowners for solar upgrades and equipment.

The conference showed clearly the progress of solar as a mainstream energy source. We are no longer discussing whether solar is a viable option, but rather what mechanisms to put in place to make it more accessible to more people. Working groups like Banking on Solar and NREL's Solar Access to Public Capital (SAPC) are excellent for advancing the industry.

Group members from the solar industry were joined by representatives from the banking, regulatory, legal, and financial industries. One focus was developing a standardized sets of documents for loans for residential solar improvements. Members also discussed ways the solar industry can better inform banks of the benefits of including solar lending in their product mix.

Banks want to diversify their asset base and gain exposure to a high-growth market. However, many banks don't know how to enter the market, facilitate loans, or gauge risk profile of solar projects.

Banking on Solar works to address these issues in parallel with efforts from SAPC. SAPC is focused on the backend of the bank's role in the solar market, examining barriers to banks' ability to securitize their solar loans, get them off their balance sheet, and free up capital for new projects. The two groups share information, ideas, and best practices.

For lending, document standardization was an object of focus. The industry is still so new that uniform language has not yet been developed. That means every bank uses its own process to underwrite solar projects. Standardized documents can help streamline processes,



As CEO of Mercatus, Haresh Patel is a leading solutions provider for the energy project finance industry.

eliminate duplicated work, and facilitate more lending, though uniform language alone can do much for custom documents and process. The group is working on standardized language to develop a set of processes and documents all banks can use.

Another challenge is a lack of historical data for operation of solar equipment,

because the industry is so new. Banks are hesitant to provide loans on equipment with little operational history and face resistance from investors when trying to package and securitize the loans.

One solution the group discussed is allowing for shorter-term securitizations for the time periods in which data is available. There are also innovations within the industry. Assurant has new warranty insurance that would cover all hardware and replicate a manufacturer's warranty. That could allow a bank to lend with confidence, knowing that the hardware will be covered even if it doesn't reach its full life expectancy.

Another major issue discussed was the need for a rating system to help banks and investors quickly determine the worthiness of a solar project. This is an especially urgent need for securitization. Banks want to get these projects off their balance sheet, but without any type of rating in place, it is difficult to present loans to investors. Any investor willing to take the securitized loans has to do their own due diligence to determine the loan's risk profile and return potential.

A widely accepted rating system could help an investor quickly sort through securitized loans to find those most consistent goals. The group discussed designing a rating that could be applied to a project on the front end and stay with the project through the entire process from credit application all the way to securitization. That kind of standard rating would not only help banks securitize the loans, it would also free up capital on their balance sheet so they could make more loans to consumers.

KEEP YOUR COOL THIS SUMMER - WITHOUT THE COST OF A/C

By N. R. Mallery

KEEPING INDOOR SPACES at comfortable temperatures requires huge amounts of electricity. In the U.S., it accounts for a full 16.5% of energy use.

There are many options that can help you keep cool while also conserving your energy.

SHADES. Window shades may help improve energy consumption and lower energy bills by keeping homes cooler in summer and warmer in winter.

Most Efficient Shades. There are many types of window shades available, but the U.S. Department of Energy states that dual shades are more efficient than regular shades. Dual shades have a white, heat-reflective side, and a black, heat-absorbing side. The white side should face the window during the summer, and the dark side should face the window during the winter. Quilted and honeycomb window shades contain several layers of material and are sealed on the end to provide insulation and prevent air seepage.

For the greatest energy efficiency, place the shades as close to the window and walls as possible. In summer, keep shades lowered on the southern side of the house during the day to limit the amount of heat entering the room. In winter, shades on the southern side of the house should be up during the day to increase the amount of heat entering the room. Window shades are particularly effective in improving the

LONG-TERM BENEFITS

In Sacramento, CA, the municipal utility helped plant approximately 450,000 trees in its area, helping to reduce the city's electric consumption by over 13 million kilowatts, saving customers more than \$1.5 million dollars!



Shade trees and window treatments can keep your home naturally cooler. Photo: Shutterstock.

TAX CREDITS

Many energy-efficient measures qualify for federal tax credits, and some brands of energy-efficient window shades are eligible for a 10% tax credit of up to \$500. Check with the manufacturer, however, to ensure that you are purchasing a qualifying brand.

thermal condition of inefficient windows.

Solar Screens are heavy-duty window coverings, used for reducing heat absorption and sun glare, reducing the absorption of heat through the window by about 80-90%. At the peak of summer, up to 230 BTUs per hour can hit each square foot of window. A solar screen operating at 80% efficiency would block 184 BTUs per square foot from reaching your windows each hour. Alone, they can reduce the temperature of a room by 10°F to 15°F. This means less use of the air conditioner during the summer months; consumers have reported a 15 to 25% reduction in their energy bill. Usually made up of heavy duty woven mesh, they absorb and reflect solar heat before it actually enters the windows. Sun-shielding solar screens add function, style, and efficiency to home and businesses, offering you the choice of how much sun to allow in your space, giv-

ing you control of light and heat gain. The darker shades are functionally more effective than the lighter color solar screens.

Awnings and Porches. Keep summer's hot sun out of overexposed windows. Awnings are cost-effective in blocking hot sun from radiating through windows and decrease air-conditioning bills in the summer. A commercial awning also protects patrons from the elements in front of a store. Retractable awnings allow solar gain in the winter. They also create shelter to stay out of the sun's rays for protection against the harmful UV rays. Porches are permanent, so if you want the heating advantage of solar after the summer, you will want to consider this and locate them with this in mind. Enclosing porches in the winter serves as a block from the elements on the north side of your building, helping to reduce heat loss.

Shades cont'd on page 35

Friends of the Sun can help make your outdoor living more relaxing and fun!

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Builders Take the Challenge for Energy Efficiency DOE's Zero Energy Ready Home Program

By George Harvey, staff

THE DEPARTMENT OF ENERGY (DOE) recently renamed the Challenge Home program as Zero Energy Ready Home. This program is worth taking note of. The questions of what a zero energy-ready home is, what it implies for comfort and life, and how to achieve it should be understood.

A zero energy ready home, whether of new construction or a retrofit, is a building that will consume very little energy and can be rendered into a net-zero energy building with the addition of a small amount of renewable power. A net-zero building is a building with zero net energy consumption, meaning the total amount of energy used by the building on an annual basis is roughly equal to the amount of renewable energy created on the site. Guidelines for the Zero Energy Ready Home are published by the DOE, and can be seen at http://bit.ly/zero_net_energy_guidelines. A builder of a zero net energy-ready home does not need to be a partner of the DOE program. Any builder who knows how to do it can build such houses; it is just that they will not be certified by the DOE as having been built as part of the program. They will perform the same.

Bob Irving of R. H. Irving Construction, who is a member of the DOE Zero Energy Ready Home program, shared information on both building and living in such houses. He pointed out, "Living in a home built to the standards of the Zero Energy Ready Home

program, and with true net-zero energy use, should require no sacrifices other than common care about waste. If you are not wasteful, you can be as comfortable as you like while using no net energy."

"Building to the standard is not all that hard," Irving says. Having started work in construction based in sound environmental principles, he learned the techniques commonly used to build energy-efficient housing. When he learned of passive house systems being introduced, he studied them and realized the basic principles could be applied with good effect in somewhat less costly construction, with the same tiny environmental footprint. All you have to do is come close to the standard and apply a renewable power system.

"Start with the passive house principle," Irving says. "This means insulating the whole envelope that you use. If you store a suitcase in the attic, that counts." He says that under most circumstances, insulating the basement is also very important. He uses windows of R-5, and ratings of R-20 for the basement, R-40 for outside walls, and R-60 for the roof.

Air-tightness is an important issue. He uses gaskets for structural insulated panels (SIPs), and sees that all penetrations are sealed. Everything has to be checked, and any leaks need to be given attention; this is commonly done with foam sealing. The goal for most of his construction is to get a blower door test showing an air exchange rate of 1 per hr or less. He



A Zero Energy Ready Home. Photo courtesy of RH Irving

says that if the customer wishes, he can easily get to the passive house standard of 0.6 air exchanges per hour, which is for houses requiring nearly no heat input at all.

Irving likes air-source heat pumps, or mini-splits, for heating. He says he believes ground-source heat pumps (GSHP) have an initial cost that is too high in most situations, and the efficiency of mini-splits has improved to the point that the payoff for the extra investment of GSHPs may not be great

enough to justify it.

What this boils down to is that to achieve the standard of the zero energy-ready home, it is simply necessary to learn to apply higher standards and more care to already existing building techniques. With thought and attention, zero net energy is perfectly achievable.

Learn more at energy.gov/eere/buildings/guidelines

RH Irving's web site is rhirvinghomebuilders.com.

GREEN EPIPHANY

By George Harvey

Robert Scarano, an architect with twenty-five years' experience, says there was a time when his buildings were energy hogs. That changed a number of years ago, when he had an epiphany from studying the DOE's Challenge Home and the Passive House. Now he runs Scarano Green Services. Some of the things he told *Green Energy Times* are worth repeating.

"Ninety percent of the energy used in buildings could be saved by effective design, without increasing costs. You add to the cost of insulation and air sealing, but eliminate the costs of things like furnaces. It comes out a wash."

"By far, the most important thing about reducing energy usage is air sealing. Insulation is not nearly as important."

Scarano is just now completing a new project called "Bright 'n Green," in the Brighton Beach neighborhood of Brooklyn. Each of the building's six units is so well weatherproofed that the standard heating consists of a warming mat in the bathroom.

The building is entirely self-sufficient for energy, because of its 38-kW solar array. The list of green features goes on, seemingly forever.

Scarano is aspiring to a 110-point score from LEED, for a platinum rating. First a period of occupancy is necessary for certification. What he really wants, however, is certification by the Living Building Challenge. The program is so demanding that every item specified in the building has to be vetted, not only for embodied energy and chemical content, but also for the social policies of the manufacturer. His daughter spent a lot of time researching that. For example, she would call carpet manufacturers, to ask about their policies on employee sick leave.

We expect to have an article on Bright 'n Green in the next issue. In the mean time, visit brightngreen.com. We could use some of that in downtown and on the waterfront in Burlington.



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Tedd Benson

SUSTAINABLE BUILDERS IN OUR MIDST: UNITY HOMES – WALPOLE, NH

By George Harve, staff

THIS IS NOT JUST another story about highly efficient homes. It is a story about the development of *affordable* highly efficient homes.

Tedd Benson started out in 1974 as a conventional builder, but soon began investigating the wonderful colonial timber-framed structures he saw in New England, impressed by their strength and resilience. With a view to improving the quality of current homebuilding, Benson found ways to combine time-honored building techniques with the best modern products and processes. It is an ongoing journey in which improvements achieved can be foundations of greater improvements in the future. So the story of his company, Bensonwood, is a history of a research and development program with fine homes being the visible result. A passionate green building advocate, Benson's journey continues to this day.

Benson started with the model of the handcrafted mortise-and-tenon buildings made by our ancestors, and modernized their design and manufacture using computers. To enclose the timber-frame structures, he developed a panelized system that incorporated the necessary insulation and mechanical systems for HVAC, plumbing, electrical, and communications. Centuries-old techniques of construction combine with new manufacturing techniques to make better homes.

Over the past forty years, Benson has written several pioneering books inspiring the timber frame construction movement, of which he is considered a leader. This company's work has repeatedly been celebrated on PBS's *This Old House* TV series and in numerous publications. His research is not just about better construction techniques. It is about better construction business models, with a continual drive for improvement in design, engineering and construction of sustainable housing for healthy living.

One enormous improvement is to take manufacture out of the field, eliminating the work of fashioning each piece individually at the job site during the prime construction season. Instead, most building is in a controlled environment out of the weather. Pieces are formed into highly finished, panelized construction assemblies that can then be transported efficiently and inexpensively to the home site. There, they are rapidly assembled in a matter of days, versus the weeks or months required for conventional stick-built construction. Work quality improves, efficiency improves, waste is reduced, costs are predictably managed, and final quality is consistently better.

The result is that custom-designed homes are more comfortable, and healthy living can be achieved at a competitive price. People can live in buildings clearly intended to last for centuries with very little or no outside energy needed.

Benson's goal, however, was not merely to make better, more energy-efficient, longer-lasting houses, but to make them affordable for ordinary homebuyers. And so, in the midst of the greatest housing crisis since the Great Depression, he started a new subsidiary, Unity Homes.

The goal of Unity Homes is to produce high-quality, comfortable homes that are healthful to live in while reducing



Three homes, all of Unity's Xyla design and different options

construction costs. There are four basic designs, ranging from the Varm, a traditional farmhouse, to the ultra-modern Zum, but the customer can choose from a large number of options, making the possibilities virtually limitless. The new homeowner is freed of the time and financial burden of traditional architectural design and benefits of designs carefully chosen for efficient construction.

While the home site is prepared, the panelized construction assemblies are built in Unity Homes' factory in Walpole, New Hampshire. The assemblies, like those from the Bensonwood parent company, are shipped as flat, wall, roof,

and floor components that are joined together at the building site. The elements arrive, and in a few days the weathertight shell of the building is complete, ready for the infill and finishes.

The Open-Built® design of the company's panelized assemblies is an impressive improvement. Each is a self-contained section, with all penetrations planned and prepared. Wiring and plumbing are organized into dedicated channels or chases, "disentangling" them from the structure and the insulation, for easy access in the future. The company's airtight, highly-insulated (R-35) OBPlus Wall®, a central component of all Bensonwood homes, is award-winning. Dense-packed cellulose insulation (9.5 inches) is pre-installed, giving recycled paper and cloth fibers centuries of valuable new life. The cellulose is given a natural borate treatment to discourage pests and act as a fire retardant. Roof insulation is R-44.

Benson is continuing to look for better ways to do things. What he foresees is zero-energy-ready housing, constructed on site in 20 days, built to last centuries, with total costs to the homeowner well below those of conventional new homes. He says of this, "We know this is our goal, and we know it is achievable."

Benson Woodworking's Unity Homes website is at <http://unityhomes.com/>.

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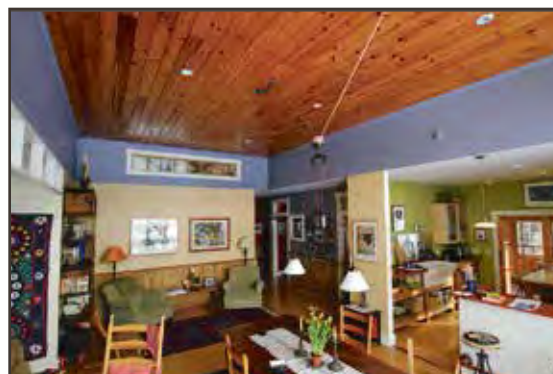
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THE LOW HANGING FRUIT

...Lead to Savings in Energy and Costs

“The single most beneficial thing you can do to make your building more efficient is air-sealing.”

By Mark Boudreau

Home energy efficiency is a vast subject rooted in much ongoing scientific study that is both laboratory and field-based. Every year we builders, design-

ers and building scientists advance our understanding and effectiveness. There are many technologies, methods and schools of thought around every aspect of energy efficiency.

There are so many efficiency measures you can do in your home and even more ways to do each of those things. Where do you begin? How do you know the investment you are making will pay back dividends? Where is the “lowest hanging fruit” when you are trying to save energy, stay warm and save costs? How do you sort the marketing gimmicks from the genuine and valuable changes you can make to your home’s efficiency?

There are specific measures that can be taken in just about every home that are simple and pay good dividends. You just need to be open to learning, a bit handy and moderately organized. Those measures will help you save money, have a smaller carbon footprint and will cut down on the number of blankets on the bed through the winter.

Even so the “low hanging fruit” of energy efficiency cannot be discussed very efficiently in one article.

So we decided to put together a series of “bite-sized” articles over the next several issues that will give you concrete explanations and ideas of things you can do that will have the greatest impact on energy efficiency in your home for the lowest upfront costs.

LOW HANGING FRUIT *cont’d on p. 24*



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BUILDING SCIENCE SERIES - PART 2

Air flow, Temperature and the Pressure Plane

By B. Adams

IN OUR SECOND ARTICLE on building science, we discuss air flow, temperature, and the pressure plane as it relates to the stack effect. The temperature difference between inside and outside as well as the height of the building determines how much stack effect a building experiences and where the interior pressure plane should exist. The presence of holes in the building envelope is another important factor determining stack effect, the location of the pressure plane as well as occupant comfort and energy costs. Air leakage is a major factor affecting the amount of energy waste related to heating and cooling the air in buildings, as well as in allowing higher volumes of water vapor to enter the building.

A building envelope should be designed with a continuous air and thermal insulation barrier system that separates the conditioned space from the outside. All systems consist of individual parts. Air and thermal barrier systems are no different.

An air barrier system includes a principal air-stopping material, accessories that seal or fasten materials together and components like windows and doors. Air barrier material can be self-adhered, liquid-applied, sprayed or mechanically fastened building products tested by the American Society for Testing and Materials (ASTM). Air "permeance" is not the same as air leakage. Air permeance is the amount of air that migrates through a material, while air leakage occurs as a result of holes or gaps in the air barrier system (hence the need for air barrier system continuity). Air-barrier system accessories include products such as sealants, tapes, membranes and fasteners. An example of air barrier material and accessories applied in the field includes exterior walls built with green laminated ZIP wall sheathing sealed along its seam with an advanced acrylic adhesive tape.

If the goal is to achieve a continuously sealed air barrier, cutting large holes on every side of a building presents challenges. Windows, doors and other manufactured elements that a building must have to be considered habitable are components in an air barrier system. Each com-

ponent must be installed according to manufacturer's recommendations, if the product is to function as intended or qualify for under-warranty replacement. Air barrier accessories like the advanced acrylic adhesive tape work very well in sealing these components to the air barrier material, while mechanical fasteners secure the components to the building structure. Air barrier materials, accessories and components must be installed perfectly – no matter the weather conditions

of the day or the mood of the installer. A properly designed and installed, continuously sealed air barrier system is the primary defense against infiltration, exfiltration, outdoor pollutants and water vapor. To keep the hot side hot and the cold side cold, a building also needs a thermal insulation barrier fully aligned with the air barrier system. A thermal insulation barrier is not nearly as complicated as an air barrier system. The thermal insulation barrier is typically made of some type of insulating material designed to reduce the transfer of heat energy through materials of drastically different temperatures or from one area to another. The thermal insulation barrier reduces the effects of convection, conduction and radiation. Not all products are created equal when it comes to insulating against the transfer of heat energy. To determine which product carries the highest level of insulating value, refer to



This image of a multi family building with green sheathings depicts a good air barrier.

the product's R-value. R-value is the standard unit of measure that determines the heat-resistive properties of insulation. There exists a vast array of insulating products with varying insulating properties. If I could impart words of advice regarding insulation it would be: install it perfectly and in alignment with the air barrier system — otherwise you're wasting time, money and energy!

Wearing a wind breaker over a wool sweater on a cold day is an apt analogy that best describes the air barrier system and thermal insulation barrier. The openings for head and hands allow cold air into your personal space, thus increasing your personal discomfort and ability to stay warm. The same principles apply to buildings with holes and gaps in the air barrier system and thermal insulation barrier. If buildings were designed as windowless boxes the air and thermal barriers would be exceptionally easy to construct and align in perfect harmony. In the real world, buildings are edifices of human ingenuity, pushing the limits of form, function and height. No matter the style or size, continuously sealed air barrier systems with perfectly installed and fully aligned thermal barrier systems are as necessary as windows and doors.

Look for the next building science article discussing moisture management and how to prevent your building from growing old with mold.

Brian is a commissioning specialist with Cornerstone Commissioning based in Boxford, MA. He has a keen interest in increasing public health and safety in the built environment and creating comfortable, energy efficient buildings. With 10 years of experience in energy accounting, building audits, modeling and financial analysis Brian delivers compelling evidence for designing resilient and healthy buildings. <http://www.cornerstonecx.com/>



Spray foam insulation is a solid thermal barrier.

ponent must be installed according to manufacturer's recommendations, if the product is to function as intended or qualify for under-warranty replacement. Air barrier accessories like the advanced acrylic adhesive tape work very well in sealing these components to the air barrier material, while mechanical fasteners secure the components to the building structure. Air barrier materials, accessories and components must be installed perfectly – no matter the weather conditions

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STATE ENERGY cont'd from p. 3

ning (OEP) will be hosting several public meetings around the state, with dates and locations for those meetings posted on www.nhsea.org. Additionally, you can submit written comments directly to OEP from now until July 25th. The final version is due on September 1st of this year. And that is when the real action begins.

Kate Epsen is the Executive Director of the NH Sustainable Energy Association and member of NH's Local Energy Work Group.



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ENERGY-EFFICIENT WINDOWS PART 3

TIPS: WINDOWS

Windows can be one of your home's most attractive features. Windows provide views, daylighting, ventilation, and heat from the sun in the winter. Unfortunately, they can also account for 10% to 25% of your heating bill by letting heat out.

During the summer, your air conditioner must work harder to cool hot air from sunny windows. Install ENERGY STAR®-qualified windows and use curtains and shade to give your air conditioner and energy bill a break.

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

If you decide not to replace your windows, consider following these tips to improve their performance.

WARM WEATHER WINDOW TIPS

- Install white window shades, drapes, or blinds to reflect heat away from the house.
- Close curtains on south- and west-facing windows during the day.
- Install awnings on south- and west-facing windows.
- Apply sun-control or other reflective films on south-facing windows to reduce solar heat gain.

LONG-TERM SAVINGS TIP

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

SHOPPING TIPS FOR WINDOWS

- Look for the ENERGY STAR® label.
- Check with local utilities to see what rebates or other incentives are available for window replacement.
- Choose high-performance windows that have at least two panes of glass and a low-e coating.
- Choose a low U-factor for better insulation in colder climates; the U-factor is the rate at which a window, door, or skylight conducts non-solar heat flow.
- Look for a low solar heat gain coefficient (SHGC)—this is a measure of solar radiation admitted through a window, door, or skylight. Low SHGCs reduce heat gain in warm climates.
- Select windows with both low U-factors and low SHGCs to maximize energy savings in temperate climates with both cold and hot seasons.
- Look for whole-unit U-factors and SHGCs, rather than center-of-glass (COG) U-factors and SHGCs. Whole-unit numbers more accurately reflect the energy performance of the entire product.
- Have your windows installed by trained professionals according to manufacturer's instructions; otherwise, your warranty may be void.

Consider windows with impact-resistant glass if you live along a coast or in areas with flying debris from storms.

Learn More at <http://energy.gov>

COLD WEATHER WINDOW TIPS

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

HEAT-ABSORBING TINTS

Heat-absorbing window glazing contains special tints that change the color of the glass. Tinted glass absorbs a large fraction of the incoming solar radiation through a window, reducing the solar heat gain coefficient (SHGC), visible transmittance (VT), and glare.

Some heat, however, continues to pass through tinted windows by conduction and re-radiation, so the tint doesn't lower a window's U-factor. Inner layers of clear glass or spectrally selective coatings can be applied on insulated glazing to help reduce these types of heat transfer.

The most common gray- and bronze-tinted windows are not spectrally selective, and reduce the penetration of both light and heat. Blue- and green-tinted windows offer greater penetration of visible light and slightly reduced heat transfer compared with other colors of tinted glass. In hot climates, black-tinted glass should be avoided because it absorbs more light than heat. Tinted, heat-absorbing glass reflects only a small percentage of light, so it does not have the mirror-like appear-



ance of reflective glass. Note that when windows transmit less than 70% of visible light, indoor plants can die or grow more slowly.

REFLECTIVE COATINGS

Reflective coatings on window glazing or glass reduce the transmission of solar radiation, blocking more light than heat. Therefore, they greatly reduce a window's VT and glare, but they also reduce a window's SHGC. Reflective coatings usually consist of thin, metallic layers, and come in a variety of colors, including silver, gold, and bronze. Reflective window glazing is commonly used in hot climates to control solar heat gain. The reduced cooling energy demands can be offset by the need for additional electrical lighting, so reflective glass is used mostly for special applications.

Source: <http://energy.gov>

LOW HANGING FRUIT *cont'd from p. 22*

Here are the topics for our next issues:

1. Why taking energy-efficiency steps is fantastic for you, the planet and your wallet. Why making this investment is a "no-brainer."
2. What is an energy audit, why is it important, — and why it's the starting point for any upgrades you make.
3. Air-sealing: your house's "wind-breaker"!
4. Insulation: your house's "sweater"!
5. Heating and cooling systems — so many options, which ones are right for you?
6. Indoor air quality and the efficient home — a marriage between your health and your home's health.
7. Renewable energy — smart integration of renewable energy systems into existing homes.

In the end you will have a much better understanding about what to do and why you are doing it. Working with your house's current conditions and improving them step by step are among the most significant measures you can take to reduce your carbon footprint, get more comfortable and put money back into your pocket. It is a win-win-win. Stay tuned!

Mark Boudreau is Co-owner of Lewis Creek Company, a full-service design-build company consisting of both trades-women and men located in North Ferrisburgh, VT. They create homes that integrate a holistic approach to new building and renovating weaving together people, homes, the environment, beauty, economy, and performance.

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Rutland Energy Home cont'd from p. 1



The Energy Home of the Future will help people save money, have greater comfort and reduce fossil fuel use with energy solutions. Speaking is Mary Powell, CEO of GMP, with Secretary of Energy, Ernest Moniz. Vermont's congressional delegation stands behind.

Efficiency Vermont's participation brings in their partnerships with many contractors that they trained in high-efficiency. They also provide quality assurance and other efficiency services.

Weatherization Works Inc., from Pawlet, VT performed the energy audit. They installed the insulation and provided air sealing: closed cell spray foam in the basement at a minimum of R-18, a thermal barrier for fire protection, and R-60 in the attic by installing blown cellulose over the existing insulation, after targeted air sealing was completed in the attic floor. The combination of insulation and targeted air sealing reduced the quantified airflow from 3100 cfm to 1760 (a reduction of 43%!).

Excel Heating and Plumbing of Rutland installed Mitsubishi cold-climate heat pumps for heating, cooling, and hot water.

Rutland's own SameSun of Vermont installed twelve 275-watt SolarWorld PV panels on the garage roof. They also installed a new option for inverters, a Sonny Boy model 3000 TL-22, which can supply 1500 watts of emergency power to one outlet, as long as the sun is shining, when the grid is down.

Local independent contractors also worked on the project. Old knob-and-tube wiring was replaced. All lighting was replaced with LEDs.

The energy makeover is expected to reduce fossil fuel use by 80-90%. The sav-

ings should more than offset the project's costs. Besides enjoying a warm home in the winter, Sara is very excited that the heat pumps that now keep her family warm in winter can also cool their home in the summer, without fossil fuels.

The purpose of the eHome program is to demonstrate the feasibility of efficiency retrofits inexpensive enough for everyday people. GMP is running the project because they want people to know they can live more comfortably on renewable power at a lower cost. Mary Lamson, the Communications Director of NeighborWorks of Western Vermont, stresses, "We want to prove we can make this a reality anywhere."

The experience of opening their home to the US Energy Secretary, along with Vermont's two US Senators and its one member of the House of Representatives was not as intimidating as Sara Borkowski expected. She commented, "They are all real people who made us feel really comfortable to share our home."

The Borkowski's energy awareness also increased from the GMP app that displays their energy usage in real time. Sara said, "Although we have a new drier, we hang clothes out because we can see the energy it saves." Having gone through this experience, she appreciates that the cleanest and cheapest energy you have is the energy you don't use.

ENERGY EFFICIENCY: A Powerful Action Against Climate Change

By Fran Putnam

CLIMATE CHANGE has been a topic I could not bear to think about for many years. The enormity of the problem had me paralyzed with despair. When I became a grandmother in 2006, I realized that the bright future I envision for my grandchildren is seriously threatened by our changing climate. It suddenly meant a lot more to me that so little time remains to influence climate change, so I vowed to change my passive attitude to one of active engagement.

In October 2011, I started an energy committee in my small town of Weybridge, Vermont. We set a clear goal—to lower our town's carbon footprint. In 2013, we decided to focus on one of Vermont's most powerful actions against climate change: making our leaky homes and buildings more energy efficient. We enrolled Weybridge in the Vermont Home Energy Challenge; a yearlong competition to weatherize 3% of homes in participating towns. Five \$10,000 awards were reserved for the top finishers.

Our committee publicized the challenge widely. We completed over 50 free home energy visits, held education programs in the school and at public events distributed information about do-it-yourself home weatherization and much more.

Soon, residents began weatherizing their homes. By October, we had met our 3% goal, becoming the first town in Vermont to do so. We also stayed true to a core commitment of ours: helping qualifying neighbors learn about free, low-income weatherization so they could reduce their energy bill burden, be more comfortable in their homes, and devote their limited resources to food, medicine, and other essentials.

Our efforts worked. We helped our friends and neighbors save energy and money, we finished the Challenge at 180% of our goal, and we won that \$10,000 award!

While we still bask in our accomplishment, our committee has not sat idle. So much work remains. We need to ensure that all Vermonters' homes are energy efficient. (While it's not flashy like solar it's a powerful carbon-reduction strategy and cost-effective, saving \$1000 annually for the average homeowner who undertakes a comprehensive retrofit!)

As a state, we must make much faster progress to reach our goal of weatherizing 80% of our homes by 2050. That will require funding low-income weatherization programs and more support for financial incentives for all homeowners.

This is, of course, challenging, especially in times of fiscal restraint. But the urgency we face is real, and it will never get any easier. So we must each do our part. It also means that it's time for bold policy action, such as enacting a carbon tax. A price on pollution could serve as a funding source for efficiency and renewable energy programs and a powerful incentive for citizens to reduce fossil fuel use.

I know my efforts as a climate activist are small compared to the size of the problem, but I believe in the power of collective action. When those who care about our planet's future work together, we can be a powerful force for change.

Fran Putnam is the chair of the Weybridge Energy Committee, which recently was awarded the Vermont Governor's Award for Environmental Excellence.



Weybridge reaches goal in Vermont Home Energy Challenge

DEALING WITH SUMMER'S NOT-SO-WELCOME BUGS A REVIEW OF VERMONT SOAPWORKS' CAMPING AND GARDENING PRODUCTS

By N.R. Mallory

I AM A GARDENING FANATIC - and spend long hours in the evenings when the bugs are out. I was very excited to learn about Vermont Soap's Citronella Camp and Garden Lotion. It is formulated to keep you and your skin comfortable in the great outdoors. It is safe, nontoxic, long lasting and certified to USDA organic food standards by Vermont Organic Farmers (VOF). I like using it instead of the spray - with the added benefits to my dry skin. It is working to keep the bugs at bay, too!

The lotion is made from organic coconut and neem oils, natural citronella, citrodora, lavandin, and eucalyptus essential oils. It smoothes and moisturizes skin and hands and has a pleasant long lasting lemon-peppery scent that lasts up to four hours.

As I mentioned, I often find myself in the garden long after dinner time, and used to

end up becoming the dinner, as a consequence — with the bugs usually winning and driving me inside. Citronella Camping Spray to the rescue! An herbal perfume to help keep your campsite or garden site comfortable, it's made with a blend of citronella, catnip and citrodora essential oils, and NO toxic chemicals or pesticides. It might help to keep the unwanted bugs off the plants, too. I am planning to try it on the obnoxious rose chafers that demolish my plum and fruit trees. It's a perfect accompaniment to the lotion or as a double-whammy safeguard!

I prefer to go backpacking over camping and have taken castile peppermint soap, and use sand to scour the soot from pans. I also like to coat the bottom of pans with soap before cooking. I am excited to find Vermont Soap Organics Camp and Garden



Soap. This 100% natural liquid soap is safe and nontoxic and of course biodegradable. The ingredients include saponified organic oils of coconut, olive and jojoba, natural citrus essential oil blend with organic orange oil, organic aloe vera, and organic rosemary extract. It's going to be a staple in my backpack and camping supplies now.

It's also a gardening soap, so knowing I can trust Vermont Soap products, I am sure that it will also work well as a fruit and veggie wash, as well as getting my dirty hands and knees clean. After weeding, pruning and picking off or squishing the unwanted bad bugs, I need a good garden soap.

Summer is here, and so are the bugs, so if we are to enjoy the outdoors, one has to take measures. Let's keep ourselves safe with more healthful options. Thanks 'Soapman' for caring and sharing!

WEATHERIZATION IN NEW HAMPSHIRE - EASY AND AFFORDABLE

By N. R. Mallery, G.E.T. Publisher

NEW HAMPSHIRE HOMEOWNERS may qualify for a 50% incentive, up to \$4,000, to help pay for energy efficiency improvements including lighting upgrades, water conservation measures, air sealing, and insulation through the Home Performance with Energy Star program. Homeowners can find out more about the program at www.nhsaves/save-home, or by contacting their utility company.

J. Myers Builders, Inc., an insulating company in Lisbon, NH is owned by Jaime Myers. Working with the utility companies, they help reduce energy use with audits, improvements, and rebates. Here are three examples; an insulating company in Lisbon, NH is owned by Jaime Myers of J. Myers Builders. Working with the utility companies, they help reduce energy use with audits, improvements, and rebates. Here are three examples:

1. **Carol Waldron** bought a home in Bartlett and immediately sought to enroll in the home performance program through NHEC.

Improvements included: adding cellulose to R22 over the existing insulation for a total of R50 in the huge attic; significant attic air sealing over fans, around chimneys, and over can lights, pipe insulation for heat and domestic hot water pipes, and 6 CFL bulbs. The original blower door number of 2844 CFM50, was reduced to 2030 CFM50.

With program help, she replaced an inefficient fridge with an Energy Star model, cutting electric consumption from 1839 kWh to 652 kWh per year. That also earned a \$300 rebate.

The total project cost was \$5,849.15, reduced to \$2,401.26 by the rebate. The projected annual savings are 161 gallons of oil, 1,477 kWh electricity, and 4,377.4 lbs of CO2 emissions. The improvements are expected to save \$781.38 annually and payback is 3.2 yrs.

2. **Robert Longley** of Enfield, NH lives in 1800's cape house. He participated in the Home Performance with Energy Star program through Liberty Utilities.

Improvements include: sealing the flat attic over the 2nd floor, and adding R22 cellulose over existing insulation for a total of R50; adding dense packed cellulose to R11 in exterior walls where insulation had settled; spraying 3" closed cell spray foam to R19.5 on the slopes out to the eaves in crawl spaces behind the knee-walls; insulating 2"x6" sloping ceilings with dense packed cellulose; and insulating the single-story kitchen ceiling with dense packed R23 cellulose. The original blower



Weatherization done by Robert Longley of Enfield, NH on his home is estimated to save \$736.87/year on energy bills and pay for itself in 5.3 years, because of the rebates that reduced his costs measurably.

door number was 5954 CFM50 but the final number was 3850 CFM50.

The total job cost \$7,938.85, which the rebate reduced to \$3,838.85 plus \$100 for the energy audit. The project was completed in mid-February but he noticed a reduction in fuel used in his pellet furnace immediately. He received a \$200 rebate to replace his old inefficient fridge with an Energy Star model.

The projected annual savings is the equivalent in pellets of 2 cords of hardwood, 81 kWh electricity, and 3731.4 lbs of CO2 emissions. The improvements are estimated to save \$736.87 on energy bills and pay for itself in 5.3 years.

3. **John Northrup of Littleton, NH** took part in the Home Performance with Energy Star program through PSNH, improving a rental property.

Major improvements included air sealing the attic with R30 cellulose added over the existing insulation; installing a thermadome over the pull down stairs; replacing the thermostat with a digital non-programmable model; insulating rim joists and the top of the foundation walls in the basement; adding a CO detector, a low flow showerhead, and CFL bulbs.

The total project cost \$5,147.22. After the rebate, he paid \$2,253.05 plus \$100 for the energy audit. He also took advantage of a



John Northrup of Littleton, NH received \$1500 in rebates. The projected annual savings is \$553.34 on energy bills. The project should pay for itself in 4.3 years.

\$1500 rebate to replace an old oil boiler with a high efficiency propane system.

The projected annual savings is \$553.34 on energy bills and the project should pay for itself in 4.3 years. Other savings are replacing 133 gallons of heating oil with propane, cutting 3186.9 lbs of CO2 emissions, and eliminating 315kWh of electricity.

Frank Melanson, PSNH Residential Program Manager, said, "Our Home Performance program is designed to provide customers a complete project, from the energy audit and finding qualified contractors to ending with rebates to cut costs. Participants, like John, lower their monthly energy bills and increase their home comfort."

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FROM APPLE TO AMAZON ...

How are big tech companies addressing their carbon footprints?

Courtesy of EarthTalk®

Long criticized for its lack of commitment to sustainability—from supporting the dangerous mining of precious resources and exploiting factory workers to powering its data centers with energy derived from coal and not taking back products for recycling—Apple has really worked on turning things around over the past couple of years. Indeed, just this past month the company announced that 94% of its corporate facilities and 100% of its data centers now operate on power from renewable sources.

Environmentalists first took notice that serious change was afoot at Apple in May 2013 when the company brought in former Obama Environmental Protection Agency (EPA) administrator Lisa Jackson to head its corporate environmental initiative. Since then, the company has unveiled plans

showing how its new corporate headquarters—currently under construction in Cupertino, California—will use 30% less energy than an equivalent conventional building while playing host to some 7,000 carbon-sequestering trees. Apple also reports that it has decreased the material required to produce its iPhones, iPads, iPods and Macs. A new iPad Air, for instance, uses a third less material overall by weight than the original iPad. And all of the company's retail stores will now take back any Apple products for free recycling—U.S. and U.K. consumers can even earn gift cards for turning in old iPhones, iPads and computers.

Of course, Apple still has work to do. The nonprofit organization Friends of the Earth has been on the company's case to agree to a plan that will reign in the human and environmental toll of destructive tin mining in Indonesia and elsewhere. Tin is a major component of the solder in smart phones and other electronics and the popularity of such items has pushed miners to extremes and is linked to the destruction of tropical rainforests, coral reefs and commercial fisheries. Apple sent a team of investigators to the Indonesian islands

responsible for producing some 30% of the world's commercially available tin, but the company has yet to commit to any changes in the way it obtains this increasingly valuable raw material.

As for other tech or Internet companies, Greenpeace has been assessing and tracking environmental performance of the big players for more than a decade. "The Internet we love, and the companies that run it are at a crossroads in terms of where their

energy comes from," reports the group. "Many of these companies have already chosen the road to a green Internet and a sustainable future." Some of the best performers besides Apple include Facebook, Google, Salesforce, Rackspace and Box, each of which has committed to 100% renewable energy.

Greenpeace isn't as bullish on Twitter, Pinterest, Tumblr and Amazon, each of which relies heavily on coal-fired power sources for their data centers and other operations, but still says, "If Amazon and others want to stay innovative and relevant, it's high time they made the switch to the abundant, sustainable, renewable energy of today." Concerned consumers can sign Greenpeace's online #ClickClean petition asking these big players to step up and commit to renewable energy and environmentally responsible operations.

Contacts: Apple Environmental Responsibility, www.apple.com/environment; Greenpeace, www.greenpeace.org.

EarthTalk® is written and edited by Roddy Scheer and Doug Moss and is a registered trademark of E - The Environmental Magazine (www.emagazine.com).



The new Apple iPad Air, pictured here, uses a third less material overall by weight than the original iPad. Apple Computer has a new corporate headquarters under construction in Cupertino, California that will use 30% less energy than an equivalent conventional building, and has taken steps to decrease the material required to produce its popular products. Apple recently brought in former Obama EPA administrator Lisa Jackson to head its environmental initiatives. Credit: Sean MacEntee, courtesy Flickr

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PLANNING A VEGETABLE GARDEN THAT SUITS YOUR LIFESTYLE

by Lindsay Wilson in Food

When you start a new vegetable garden the most important thing is to choose the right garden

THE IDEAL VEGETABLE GARDEN for you looks unlike it does for anyone else. Your veg patch needs to fit that lifestyle and give you pleasure. Otherwise it simply won't last. Choose a style of veg patch that matches your levels of enthusiasm, time and money, as well as your physical space and local climate.

The following is a list of 8 types of home vegetable garden. A good garden for you is probably a hybrid of some of these elements.

THE ONE POT HERB GARDEN



The one pot herb garden is easy, cheap, beautiful and low maintenance. It might not produce that much, but the variety can be superb. This one has basil, rosemary, lavender, mint, parsley, dill and chives.

If you are just a beginner don't mess around with seed. Buy a mixed set of plugs, make sure the soil has decent drainage and stick it somewhere sunny you see a lot, so you remember to water. The kitchen window is ideal.

THE WINDOWSILL GARDEN



If you live in a flat, a windowsill garden (or balcony garden) could be great for you. Windowsills are superb places for growing stuff as they are often sunny, cool and have good airflow. They are fast and simple to water.

Herbs, salad, strawberries, peppers and hanging tomatoes are all ideal for this set up as their soil and space demands are limited. The windowsill is also brilliant for avoiding snails, slugs and other pests that you might get on ground level.

THE CONTAINER GARDEN



Container gardens are a super way to maximize both the yield and variety of food you can grow in a small space. If you are creative about it you can often get one going very quickly and cheaply by re-purposing old pots, boxes and crates to make functional growing space. They can also be really gorgeous because you get different heights and textures.

For people who are really busy 'self watering planters' are a good idea. The pic-

ture above is from www.verticalveg.org. uk, a guy renowned for growing a lot in a small space.

THE SQUARE FOOT GARDEN



Build a small bed (often raised with good drainage) and divide it up into square feet. You can pot this up with little plugs, but most people tend to do them with seed.

You can grow a lot of variety in one space and watering is simple and fast. The example above is from The Wealthy Earth.

THE POTAGER



If you like form as much as function then a potager might be for you. The 'jardin potager' is the traditional French kitchen garden that incorporates herbs, veg and fruit as well as flowers, shrubs and structure.

The DIY version is simply to plant all your stuff in mixed beds and to make it beautiful. It really helps with motivation if it's your view out of your kitchen window.

THE RAISED BED GARDEN



This is possibly the best option for newbies with some space. If you've got the

time to spend then a raised garden bed is a fabulous investment. The soil has better drainage because it is not compacted by walking on it.

You can grow most things in them, are good to water and easy to weed. This example is from www.gardenista.com.

THE GREENHOUSE



The author is surrounded by tomatoes, eggplant and peppers, basil... If you can't find time to water every day, a greenhouse is not for you. It takes months of consistent loving and care. They can also cost a pretty penny, so you only want to go for one. But the tomatoes are heavenly!

THE TRADITIONAL PLOT



The traditional vegetable garden is the tradition because it is a cheap, easy and

functional way to grow food. Their major feature is long rows of different crops: potatoes, onions, leeks, beans, zucchini, pumpkin, cabbages, broccoli, asparagus, carrots, beets, kale and corn (in blocks not rows).

The spacing between rows is important. You want it to be wide enough to hoe for weeds and walk along, but not so wide it wastes precious space. Improve your soil each year by adding compost, manure and drainage where necessary. Rotating crops is also recommended.

STARTING YOUR GARDEN

If you are just starting out and have limited time then why not think about growing some herbs and salads in containers. If you get a simple pack of herb and salad seedlings, one bag of compost (peat free) and some old containers you can have a veg garden in 30 minutes. And you'll be eating it in just a couple of weeks.

If you are getting more serious about it then both containers and raised beds are a great way to set out your garden and limit the amount of watering and weeding you'll need to do. You can grow all sorts in them! Finally if you're lucky enough to have the space and time then why not consider a traditional bed of vegetables or try your hand at a greenhouse?

What type of veg garden are you going for this year?

Source: <http://shrinkthatfootprint.com/how-to-start-a-vegetable-garden#AIWy6bavyYvA8mch.99>

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Supporting local saves energy, money, time, and the planet. *Support your local Farmers Market!*

Dorset, Vermont. Dorset Farmers Market. May 4 - October 12th. Sundays. 10 am-2 pm. Rain or shine. HN Williams General Store, Rt.30, Dorset, VT. (802) 768-1325. Email: marketmanager@dorsetfarmersmarket.com

Peterborough, New Hampshire. Fresh Chicks Outdoor Marketplace, every Monday 11-3, May-Oct., on the grounds of Monadnock Community Hospital. All local produce, plants, dairy, lobster, meats & poultry, baked goods, ice cream, fair-trade coffee beans, artisan crafts, music, fun!

Warner, New Hampshire. Warner Area Farmers Market. Town Hall Lawn, 5 E. Main St. **Saturdays, May-Oct., 9 am-1 pm.** Vegetables, fruits, flowers/plants, maple, baked goods, dog treats, soap, crafts. Spring into Warner, May 19; Christmas Market in December. Rain or shine. (603) 456-3724, suzbohman@gmail.com.

The Farmers Market of Keene, NH. Offering a wide variety of locally produced farm fresh produce, dairy, meat, delicious baked goods, maple syrup, plants, unique crafts, and more! Located at Gilbo Ave. behind Margarita's restaurant. **Open 9 am-1 pm Tues & Sat. May-Oct.** Residents on federal food assistance (SNAP/Food stamps) can get \$20/week free through Double Up Veggie Bucks to spend at the Farmers' Market of Keene & at the Walpole Farmers Market. Double Up Veggie Bucks doubles the money spent using EBT cards - by spending \$20/week from their EBT cards, shoppers receive tokens allowing them to bring home \$40 worth of fresh fruits, vegetables, meat, milk, eggs, and bread from the Farmers Market. More info: keenefarmersmarket@gmail.com. <http://harvesttomarket.com/farmers-market/Keene-Farmers-Market-NH>.



IS ORGANIC AGRICULTURE SUSTAINABLE?

From EarthTalk®

DR. HENRY I. MILLER'S May 15, 2014 opinion piece in the Wall Street Journal has indeed made waves in the organic farming community. Miller, former director of the Office of Biotechnology at the U.S. Food and Drug Administration, argues that conventional farming—which uses synthetic pesticides, herbicides and fertilizers and often genetically modified (GM) seed stock to maximize yields—is actually better for the environment, producing more food and using less water compared to organic farming.

“Organic farming might work well for certain local environments on a small scale, but its farms produce far less food per unit of land and water than conventional ones,” says Miller. “The low yields of organic agriculture - typically 20% to 50% less than conventional agriculture - impose various stresses on farmland and especially on water consumption.” Miller adds that organic methods can cause significant leaking of nitrates from composted manure - the fertilizer of choice for most organic farms - into groundwater, polluting drinking water. He also cites research showing that large-scale composting generates significant amounts of greenhouse gases and “may also deposit pathogenic bacteria on or in food crops, which has led to more frequent occurrences of food poisoning in the U.S. and elsewhere.”

“If the scale of organic production were significantly increased,” says Miller, “the lower yields would increase the pressure for the conversion of more land to farming and more water for irrigation, both of which are serious environmental issues.” He adds that conventional farming’s embrace of GM crops - a no-no to organic farmers - is yet another way we can boost yields and feed more people with less land.

But, the Washington, DC-based Organic Center takes issue with Miller’s allegations about nitrates polluting groundwater. “Most studies that examine nutrient run-off show that organic production methods result in reduced nitrogen losses when compared to conventional crop production,” the group reports.

The Organic Center also disputes Miller’s claims about the organic farming’s carbon footprint, arguing that overall energy usage and greenhouse gas emissions are much less from organic farming than for



Aside from its other benefits to our health and environment, organic agriculture — which eschews synthetic pesticides and fertilizers — can potentially reduce overall greenhouse gas emissions by 20% compared to conventional farming. Photo: CinCool, courtesy Flickr

conventional agriculture. The group also says that taking into account the greenhouse gas emissions that come from the production (not just the use) of synthetic fertilizer changes the equation entirely. The group cites a recent study by the UN Food and Agriculture Organization which found that organic agriculture can potentially reduce overall greenhouse gas emissions by 20% compared to conventional farming.

Also, Miller’s statements about GM crops overlook the ecological problems associated with their use. “For example,” the Organic Center reports, “transgene movement from GM crops to wild, weedy relatives could increase the invasiveness of weeds.” Also, genetic modification has led to higher pesticide use in agricultural systems and an increase in herbicide-resistant weeds. Some worry this is leading to a vicious cycle whereby farmers use more and more chemical herbicides to battle harder and harder weeds.

As the price of organic food continues to drop, more and more people will be able to afford it and the increased demand may well drive the conversion to organic agriculture more than policy or philosophy.

Contacts: Wall Street Journal, <http://online.wsj.com>; The Organic Center, www.organic-center.org.

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EMERGING FRONTIERS IN BIOENERGY GRASS FOR HEATING FUEL IN VERMONT

By Sarah Galbraith, program manager of the Vermont Bioenergy Initiative

GRASS BIOMASS could make a sizeable contribution to Vermont’s heating needs over time, and could be part of the renewable energy mix required to meet the state’s goal to meet 90% of Vermont’s energy needs through renewable energy and increased efficiency by 2050.

A new report released by the Vermont Sustainable Jobs Fund evaluates grass biomass energy as a potential heating fuel. *Grass Energy in Vermont and the Northeast* summarizes current research on the agronomy and usage potential of grass as a biofuel, and points to next steps for the region to fully commercialize this opportunity.

One important recommendation in the report was that an investment in grass pellets for the consumer market is not the right investment for Vermont. This is because grass pellets are lower quality than wood pellets, meaning they do not make good fuel for home heating stoves. While some boilers can accommodate grass, this fuel tends to make better sense for small-scale commercial and institutional markets.

While grass pellets for the consumer market are not ideal for Vermont, there are other models that do make sense. Regional and closed-loop processing were two models recommended, both involving farmers growing and harvesting grass, but differing in where the grass is processed into fuel and where it is used. The regional processing model calls for aggregating grass from a 50-mile radius at a central processing facility, where the grass is made into and used as fuel, or sold to local users. The closed-loop model suggests farmers growing and processing grass on-site for farm or community use.

Perennial grasses can be grown on marginal lands not well suited for continuous row crop production and in open rural land currently not in agricultural production. Recommendations of the report include a concerted effort in Vermont to plant grasses for energy on extended buffer strips along Lake Champlain, thereby reducing its nutrient load.

More information on grass for energy, and a full copy of the report, can be found on the Vermont Bioenergy Initiative website at www.vermontbioenergy.com/grass.



Switchgrass planted for fuel at Meach Cove Farm in Shelburne, Vermont. Credit: Vermont Bioenergy Initiative

The Vermont Bioenergy Initiative is a program of the Vermont Sustainable Jobs Fund and partners with other organizations expanding the use of renewable energy in Vermont like Renewable Energy Vermont and the Energy Action Network. The Vermont Bioenergy Initiative also coordinates crossover with the Vermont Farm to Plate Network by providing resources and technical assistance to farmers, facilities, and communities to support energy crops to be grown alongside food production. www.VermontBioenergy.com

Sarah Galbraith is program manager of the Vermont Bioenergy Initiative.

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SUSTAINABLE TEXTILES

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A farm to fashion challenge.

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WHAT IS PERMACULTURE? - A SIMPLE EXPLANATION

WHAT PERMACULTURE GURU Bill Mollison describes in his books is a totally integrated design system that's modeled on nature. If you design your garden or farm like a natural system you can save yourself a lot of work, save energy, and eliminate waste.

Think about it: nobody digs and sows, plants and weeds, or sprays bugs in a forest. Still, all those chores are taken care of somehow. The forest grows and feeds its inhabitants, doesn't it?

Permaculture is forest gardens, natural buildings, edible landscapes, community design, and more!

"The aim is to create systems that are ecologically-sound and economically viable, which provide for their own needs, do not exploit or pollute, and are therefore sustainable in the long term."

"Permaculture uses the inherent qualities of plants and animals combined with the natural characteristics of landscapes and structures to produce a life-supporting system for city and country, using the smallest practical area."

If any task in your garden is an unpleasant chore then there is definitely a better way to do it or to eliminate it. Learn from nature. Nature has already developed a solution to every problem that you could possibly encounter in your garden.

Nature is also the ultimate recycler. Everything goes round and round. There is no such thing as "waste." Everything is a resource.

And most important, it's sustainable. It's something that works in the long run, not something that is based on inputs that

will eventually run out, not something that creates waste and problems that will eventually upset the system.

Design is the key word. It's all about how you place the design elements together. Look at how things work together in nature, and then try to mimic that design in your garden.

You can find specific examples at www.tropicalpermaculture.com.

Permaculture cont'd on p. 31

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ELMORE ROOTS' Permaculture Tips

Know-How

PEARS, PERMACULTURE AND PERRY

By David Fried

PERRY DELIVERED THE MAIL in our neighborhood for about 40 years. Every once in a while I would give him a grape vine to plant at his place, or a fig tree (for indoors). Now he has retired and we miss him. Besides being the only one to connect the dots between each home, knowing and caring about each of us and touching our lives with his kind and gentle voice, who am I going to share the love of growing fruit with? In his native Greece, the local people always had fruit growing and harvested it and shared it. This is what I would like to see happen around here.

Perry is also the name of what used to be a well-known drink that you would make from pressing pears. The same way you make apple cider, you make perry, but you use pears instead of apples.

We get a lot of pears on our trees. The pears are usually perfect, which means stores will buy them and local Vermonters will be able to have local fresh tree-ripened pears. Our customers can grow them successfully in their yards without spraying. I think this is due to the fact that not too many people are growing pears so the insects and diseases that would bother them are not established around here. This is why they fit so well into a permaculture design—they are easy, and a great harvest is attainable.

The important steps to pear success are: (1) choose a well drained spot to plant them; (2) only grow varieties that thrive in our climate—find out what your neighbor is growing well or come taste our pears and see what kinds they are and which ones you like the flavor of; (3) plant them about 20 to 25 feet apart and put some good minerals in the planting hole to help the roots on their mining expedition; (4) plant three different pear varieties for pollination. (You can get by with two, but since their pollen is not so attractive to bees, compared to dandelions and apples often blossoming at the same time, you really improve your chances of a good crop.)

In a permaculture design, they go on the north side of an orchard or berry planting, as they get taller than other fruit trees. They are the Lombardy poplars of the fruit world—they grow upright no matter what you do. If you plant pears to the north, apples, cherries and then plums to the south, you will have a descending height progression where all will receive enough sunlight. It is like lining up in kindergarten in size order, but instead of having to respect the teacher, this time it is planning your fruit grove honoring the sunlight requirements. Within three to five years, you could be eating pears.

There is an old saying "plant pears for your heirs." I bring this up when custom-



ers tell me their pear tree has not made fruit yet and it has been a while. There are a lot of factors a fruit tree faces on its new Vermont hillside. But what I think this statement really means is that pear trees can live for two hundred years. Imagine if everyone planted pear trees—then everywhere we went, we could be eating pears and drinking perry.

When we get a lot of pears, we freeze them whole and then make sauce or jam in the winter when we have more time. I also love to slice them and dry them in a dehydrator. Kids love the sweetness and they are chewy and tasty all year round. When the pears are ripe, they will fall onto the soft grass below. Gather them up and share with your heirs, your mailman, whomever you like...you will have a lot of pears and a lot of friends!

David Fried is the owner-grower-poet of Elmore Roots Nursery, and it is their 35th year.

TEACHING YOUR TEENS TO EMBRACE A SUSTAINABLE LIFESTYLE

By Ryan McNeill

BESIDES FLUCTUATING HORMONES and insatiable appetites, many teenagers share another trait: wasting energy. Today's teens spend more time plugged in than any other generation in history. And teenagers have always been notorious for energy-wasting habits like hour-long showers and leaving the refrigerator door open.

Teaching your teens to reduce their carbon footprint at an age where waste and excess are common is critical to shaping their environmental awareness. However, it's important not to trigger their tendency to rebel. Here are a few basic ways to work with your teens to drastically reduce their carbon footprint, and maybe even enjoy an improved relationship with them, too!

Demonstrate a caring attitude. Perhaps the most important thing you can do to encourage teens to take care of the earth is to show that you care about them. At its deepest level, sustainability is much more than reducing carbon levels in the atmosphere. It's about ensuring well-being for all humans, indefinitely into the future. Our teens are the future. If they don't feel they are valued, how will they learn to value the environmental systems that sustain them?

In a recent study by the American Psychological Association, teens reported greater levels of stress than adults. Take the time to be with — and really listen to — your teen, not just when it's convenient, but when they need you.* This may be more often than you think.



PHOTO: Shutterstock

It's also important to respect their need for sleep. Most teens don't get enough. There is a real parallel between how we treat our bodies and how we behave toward the natural world. When their own natural cycles are respected, it's easier for teens to understand how to behave respectfully toward others and the environment.

Take them into Nature. Another thing you can do to encourage sustainability is to foster your teenagers' love of nature. This is the perfect age for outdoor adventuring. Take them fishing, camping or wilderness backpacking. If your teen isn't the adventurous type, try astronomy or bird watching. If they care deeply about the natural world, they will naturally want to protect it.

Guide them in sustainable practices. Finally, here are some practical things your teens can do to reduce their carbon footprint and live more lightly on the Earth:

- **Use a laptop rather than a desktop when possible.** Laptops use up to 80 percent less energy than desktops, according to Energy Star.†
- **Power down.** Save maximum energy by shutting gadgets down completely when not in use. Unplug to avoid phantom loads. Also, turn off the lights on bright days or when leaving a room.
- **Dress for the weather.** Set your thermostat at moderate temperatures, and encourage your teen to dress appropriately.
- **Recycle.** Challenge your teens to see how little waste they can produce. They are great at coming up with creative ways to re-use and recycle just about anything!
- **Use alternative modes of transport.** Don't let your teens get in the habit of driving everywhere. When possible, tell them to bike, walk or take the bus.
- **Use filtered water.** Get your teen a refillable water bottle and encourage him or her to keep track of how many plastic bottles are saved by using it.
- **Use equipment wisely.** E-waste has been referred to as a "global time bomb" by Professor Ming Wong, the Director of Environmental Sciences at Hong Kong Baptist University.‡ Help your teens understand that using equipment longer is a smart move, both for the planet and their pocketbook.

Of course, telling them to do these things will only work if you do them, too. In fact, if you are doing your job right, you may soon find your teenager taking the lead in showing you how to lead a more sustainable lifestyle!

* http://bit.ly/teens_more_stressed
† http://bit.ly/desktop_vs_laptop
‡ http://bit.ly/global_time_bomb

Ryan McNeill is the president of Renewable Energy Corporation and is an expert in the solar and alternative energy industry. The website is www.renewableenergysolar.net.

MT. KEARSARGE INDIAN MUSEUM — PATHWAYS TO A CONNECTED ENVIRONMENT

By Lynn Clark

Native American cultures draw us into a relationship with the environment. This is one of the most important lessons we have learned and that we teach at Mt. Kearsarge Indian Museum — both in our tours, and illustrated it throughout the museum grounds in Warner, New Hampshire.

That relationship is represented by a circle where all living things are connected: people, plants, animals, the land, air and water. The museum's founder, Bud Thompson, learned this lesson from Chief Sachem Silverstar of the Pequot nation during a school visit in the 1920s. It is the lesson that inspired Bud to devote his life to caring for the environment. When you visit, we hope you will also see your connection to the circle and be inspired to find your way to care for the environment.

Inspiration comes easily when you walk the two acres of paths in our Medicine Woods. The woods grow where a farm's dumping ground once stood. Instead of refuse, the landscape is now filled with living, breathing and growing plants and the animals they feed and shelter. The plants along the wood's trails are examples of those that Native Americans use for food, medicine, dye, shelter and tools. Markers identify the plants and a trail guide explains their usage. The plants change throughout the year so you will want to wander the paths many times.

In our garden we propagate heritage varieties of plants cultivated by Native peoples in the northeast. The main three cultivars are corn, beans and squash. The Abenaki, the indigenous people of New Hampshire, called these crops the Three Sisters. The corn supports the climbing beans and the broad squash leaves



Garden crops. Photo courtesy of Mt. Kearsarge Indian Museum

help keep moisture in the soil and control weeds. We receive seeds from seed savers and are happy to share them with others.

This year we are excited to grow a type of squash named Gete-okosomin, given to us by the Anishinaabe people of Minnesota. The original seeds were found in an 800-year-old pot on an archaeological site. We are honored to help this pre-contact variety proliferate once again.

We have many more food plants growing on the museum grounds, such as Jerusalem artichokes and ground nuts. We plan to identify them, harvest them, learn to cook them in traditional ways and share them.

Come join our circle. Share your talents. Volunteer in the woods and the garden. We'd love to hear from you. Call 603-456-2600 or stop in for a visit at 18 Highlawn Road in Warner, New Hampshire. Learn more on our website: www.IndianMuseum.org.

Lynn Clark is the Executive Director of Mt. Kearsarge Indian Museum

Permaculture *cont'd from p. 30*

The beauty of it is that permaculture principles work everywhere, in every climate and on every scale. They can be applied to whole villages or housing developments (though it takes a deeper understanding and more planning to do that), or to a tiny backyard or balcony (which can be done very easily).

If you think ahead and design your permaculture garden right, it won't take much effort, it will mostly look after itself, and it will also be incredibly productive, beautiful and attractive to wildlife.

Courtesy of Birgit "B" Bradtke, — Tropical Permaculture: www.tropicalpermaculture.com.

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CLIMATE-CHANGE MITIGATION *cont'd from p. 1*

change, and we must all act to get out of it. Those who fail to act by persisting in the old unsustainable practices are increasing risks and impeding progress. This is not something to let someone else take care of – we must all participate.

The good news is that we can limit the damage. Indeed, we can continue to live comfortably while we address climate change. Furthermore, as it happens, doing this will alleviate poverty in much of the world. This does not require an underlying change in our politics or religious beliefs – it only requires wise action.

One thing we need to do is to understand and implement the principles of sustainable growth. This is the antithesis of making as much money as possible, or getting as much power as possible, without regard to the remote future. This does not mean an end of profit. In fact many companies find that by becoming sustainable, their profits increase. It does mean addressing the issue. It means that cost-benefit analysis can be used, but it may imply that ethical values also be considered fully.

is limit the emissions of all GHGs to nearly 0. This may sound difficult, but the projection is that we can actually do better than that, getting to the point where we



Your new neighbor, brought to you courtesy of climate change: Tornado of June 1, 2011, bearing down on Springfield, Massachusetts. Photo by Mark Putzel

remove GHGs from the atmosphere faster than we put them in, if enough of us act quickly and wisely.

The key components of GHG reduction strategy are things we already know and already do. Reduction of fossil fuel use for generating power is vital. It is also immi-



Aerial view of tornado damage in western Massachusetts following the June 1, 2011 tornados. Photo by Massachusetts Department of Environmental Protection

Part of the problem we face is that greenhouse gas (GHG) emissions are growing, even as we address the problems. We are increasing efficiency and renewable power generation, but nowhere near as quickly as we need to do. The report summary says, "About half of cumulative anthropogenic CO₂ emissions between 1750 and 2010 have occurred in the last 40 years."

The report indicates that if we can keep the CO₂ concentrations below 500 ppm in 2100, then we will probably be able to keep overall global warming to less than 2° C. We are already at 400 ppm, and the number is growing. What we have to do

nently achievable using technologies we already have and use. Increasing the use of solar PVs, wind power, hydropower, and biomass are all well known, and can be done wisely. If wisely done, they will limit environmental damage without decreasing comfort. There may be other technologies that can be added to this mix, with the most promising possibly being geothermal power generation. But the key is to make wise choices quickly.

Heating buildings is another important issue for climate change. Here again, the issue can be addressed using known technologies. Increasing effectiveness of insulation and air sealing, and switching to more

FACING AN UNCERTAIN FUTURE

Book Review by N.R. Mallery, G.E.T. Publisher

Reason in a Dark Time

Why the Struggle Against Climate Change Failed — And What It Means For Our Future
By Dale Jamieson, Oxford University Press 2014, 266 pages, \$29.95

WHAT IS CLIMATE CHANGE? They are common words in our conversation and in the media today. Scientists' as early as 1992 at the Rio Earth Summit and at the Copenhagen Climate Conference, and the very recent International Panel on Climate Change (IPCC) reports are seriously warning us that we are facing the greatest problems that humanity has ever dealt with. We are treading into uncharted territory.

Some say there is no hope for our future – that while the planet will possibly survive, humanity and life on the planet as we know it today is in question. With the great majority of scientists and world leaders in agreement that we need to seriously address the problems, why are we still facing such doom and gloom?

Author Dale Jamieson has been involved alongside scientists with climate change for twenty-five years and is not only a philosopher, but is also a realist. And though he knows we are heading down a dangerous road facing these inevitable difficulties — such that the world has never seen — he also argues that there is so much that we can do as individuals and collectively to make the difference that will determine our future.

He explains why we have failed to stop climate change and just why it still matters what we all do. Jamieson argues that "our failure to prevent or even to respond to climate change reflects the impoverishment of our systems of practical reason, the paralysis of our politics and the limits of our cognitive and affective capacities."

Climate change challenges our ability to even believe it is real, and accept the consequential responsibility we each own for our actions, and that those actions really matter. He wrote, "Climate change risks putting an end to a great deal that we value, including much of humanity and its creations. We have brought about climate change that we do not want, but do not know how to stop."

From driving a car, to flying in a jet plane across the country – to nearly all that has become normal to us today in our day to day lives — it is hard to accept that we each are part of the problem.

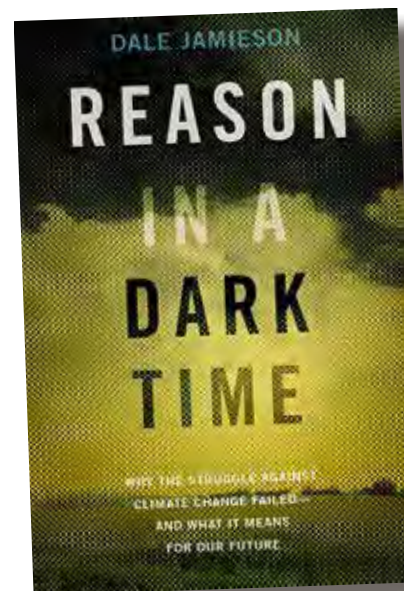
This book is about how it came to this and what we can learn from it — and in what ways our actions can have significance and meaning.

As early as on page ten, Jamieson says, "it matters what we do and how we live. We can cope with change, even when our resources are thin. This does not mean that we will 'solve' the 'problem' of climate change any time soon. We will have to manage and live the best we can and hope that the darkest scenarios don't come to pass. We will have to abandon thinking there is a decisive solution

and instead engage with the messy world of temperature victories and local solutions while a new world comes into focus."

The author thoroughly discusses the full problem, historically, ethically, scientifically and politically. His approach turns this doom and gloom that many say is our outcome, into an optimistic possibility that is very inspiring in these uncertain times. His words have the ability to help us reassess our attitudes towards the most far-reaching challenges and the reality of our prospects — if we are willing to make the necessary changes. The book does not offer a list of things to do to reduce our carbon footprint. His goal is to make us think. He states that "until the world or humanity comes to an end (literally), there will always be a chance to make a difference... and that "there is much that can still be done to slow climate change, to adapt to it and restore a sense of agency while living meaningful lives in a changing world."

This book is a must read by all who wish to bring reason to the challenges we are going to face very soon, whether we want to or not — and who want to know how to do something about it.



efficient GHG-free heating systems are key strategies. If we use biomass for heating, it has to be free of particulate emissions. *Green Energy Times* has run articles on Passive Houses and net-zero buildings, which require nearly no power for heat, and this approach has already been achieved, both for new buildings and for retrofits.

Transportation is another important sector in which improvements can be made. We already have electric vehicles. We also have cars that can be powered with biofuels. We can decrease our emissions while improving health and the condition of our pocketbooks by walking or biking more and using automobiles less. We can also switch to public transportation.

The IPCC report acknowledges that we could reduce some of our carbon emissions by increasing our use of nuclear power and switching from burning coal to burning natural gas. It also clearly states that there are difficulties with both technologies. In particular, natural gas, used in ever greater quantities, is still a fossil fuel, and if what are called "fugitive emissions" of its methane are not eliminated, natural gas can be even worse than coal in producing GHGs. Fugitive emissions are a problem in many places where fracking is done.

The briefest possible summary of the report is that we already know what to do now, and we already have the tools to do it. What we need is to act.

DINING ... IN THE GREEN AT ARIANA'S RESTAURANT IS MEMORABLE

By N. R. Mallery

MARTIN MURPHY is the chef/owner of Ariana's Restaurant, at the Bunten Farm in Orford, New Hampshire. A passionate lifelong goal and over thirty years of experience have finally allowed Chef Martin to create a nice warm and friendly space where people can enjoy each other's company and experience well-prepared food.

When asked where their name came from, Murphy answered, "Ariana is my daughter's name. It is an old Celtic custom to name your business or interests in the name(s) of your children."

Trained in classical French cooking, Chef Martin enjoys venturing into Asian and Mediterranean flavors as well. "My favorite food to prepare is seafood and you will always see an assortment of seafood selections on the menu and as nightly additions." He offers simple well-prepared choices, and also more complex options such as one house specialty: *Seared Sea Scallops on mushroom risotto finished with fresh arugula, gorgonzola cheese and truffle vinaigrette.*

The small menu focuses on seasonal, quality and local ingredients. Martin relishes creating his cuisine from many of the local farms, including the dairy farm, where he leases the restaurant, owned by the Balch family who raise Devon cows. It is also friendly to those with gluten intolerance or other allergies, and regularly features Vegetarian dishes.

Martin says, "My passion is fresh, seasonal, high quality ingredients. I work

Wine Dinners with changing themes are held every other month. They have become very popular and frequently book up a month or more in advance so call well ahead of time. The dinners are a 5-course meal, pairing a different wine with each course. Starting at 6 pm, the cost is \$65 per person, which includes meals tax but not gratuity..

closely with farms from the local valley for much of my vegetables, dairy and some meats. I still need to purchase some proteins from outside the local community but I do source healthy, sustainable and free of antibiotics ingredients for Ariana's."

The changing menu features the beautiful local produce (perhaps even some lettuce that he and his wife grow) and locally raised meats that are available in the Upper Valley. Some examples from his new menu include a Quinoa Pilaf featuring roasted garden-fresh beets, broccoli, peppers and tomatoes, sautéed Crab Cakes on a salad of local greens with a fresh herb vinaigrette, and, when available, a locally raised Veal Chop from either Robie Farm or Winsome Farm Organics, pan roasted and served with a red wine glaze and gorgonzola cream.

Hand selected wines at Ariana's are a nice mix of varietals, both red and white, that also change with the season. Beyond the beers (many from local breweries) and wines, they include natural sodas, sweetened with cane sugar, ice tea and lemonade on the menu.

When asked about her experience at Ariana's, Leslie Battistoni, from Bradford, VT replied, "Ariana's Restaurant is a local restaurant that is a unique place to celebrate a special occasion. We enjoy a birthday celebration each year with great anticipation and are never disappointed. The food is superb; the setting is pure rural



New Hampshire (including a stroll around the farm yard afterwards to see the farm animals). The steamed mussels, direct from Prince Edward Island -- in coconut and lemongrass, are memorable (I would drive to P.E.I. simply for their farmed mussels). Treat yourself and loved ones and make a reservation. You'll make it your special place to celebrate good times, too."

Ariana's was chosen as Best New Restaurant, 2012-13 from BestOfSurveys.com. We highly suggest you 'dine ... in the green' with them this summer to taste why they

were given this award! With only seven tables, it is a good idea to make a reservation, although they do take walk-ins whenever possible.

Ariana's Restaurant is located at 1322 NH Route 10, Orford, NH. 603.353.4405. www.arianasrestaurant.com.



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RESOURCES
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American Council for an Energy-Efficient Economy: Consumer guide to home energy savings - aceee.org/consumer
American Solar Energy Society (ASES): www.ases.org
Backwoods Solar: Specialty: solar, off-grid - www.backwoodssolar.com
Buildings Energy Data Book: buildingsdatabook.eren.doe.gov
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Find Solar: www.findsolar.com
Fossil Fuel Freedom: Group working to make Vermont's energy plan 100% free of fossil fuels: To join this group go to: groups.google.com/group/fossil-fuel-freedom-
Greywater Info: www.oasisdesign.net/greywater
Home Energy Saver: Interactive site to help you identify & calculate energy savings opportunities in your home. A lot of great information! - hes.lbl.gov
Home Power Magazine: www.homepower.com
IREC/ Interstate Renewable Energy Council: RE educational info. www.irecusa.org
NABCEP/ North American Board of Certified Energy Practitioners: This organization that tests & certifies PV system installers. Individuals are Certified, companies are not. www.nabcep.org
NESEA/ Northeast Sustainable Energy Assoc.: www.nesea.org
National Association of Energy Service Co. (NAESCO): www.naesco.org
National Renewable Energy Laboratory (NREL): www.nrel.gov
National Solar Institute: www.nationalsolarinstitute.com
NeighborWorks® Alliance of Vermont: Low-cost energy loans - www.vthomeownership.org
New Hampshire Sustainable Energy Assoc. NHSEA Focused on N.E. US, for consumers & industry- RE & clean building info, events. www.nhsea.org
New York Solar Energy Industries Association/NYSEIA www.nyseia.org
NFRC independent rating & labeling system for the windows, doors, skylights www.nfrc.org/
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Track the Stimulus Money: www.recovery.gov/Pages/home.aspx
Vermont Energy and Climate Action Network (VECAN): works to start and support town energy committees as a powerful, people-powered response to realizing a clean energy future. www.vecan.net .
Vermont Tar Sands Action: Group working to stop the XL Pipeline and any other developments stemming from the Alberta Tar Sands. To join this group go to: groups.google.com/group/vt-tar-sands-action
VPIRG: understand the clean energy resources available to VT - www.vpirg.org/cleanenergyguide
VT Energy Investment Corporation (VEIC): nonprofit organization that issues home energy ratings for new & existing homes. 800-639-6069 - www.veic.org
Weatherization, Energy Star & Refrigerator Guide: www.waptac.org
www.susdesign.com/tools.php Online info for solar benefit with house design. i.e. window overhangs, sun angle & path...

SAFER FOOD

for our Health and Environment

By EarthTalk®

Although we have come a long way in recent years with regard to the safety and sustainability of our food supply, we still have a long way to go. Toxic pesticides are still used on the vast majority of U.S. grown crops, while other hormone-disrupting chemicals are omnipresent in our food packaging. And excessive use of antibiotics in animal agriculture threatens to render many human drugs ineffective. Environmental leaders would like to see the federal government step up and institute regulations banning such substances in our food supply, but for now it's still up to individual consumers to make the right choices.

Fruits and vegetables grown on conventional (i.e. not organic) farms make up some 96 percent of the produce we eat—and expose us to many pesticides. Two of the most toxic, chlorpyrifoss and DDT, are also quite common: 93 percent of Americans carry trace amounts of the former in their bloodstreams, while 99 percent of us have DDT residue coursing through our



Green groups like the Pesticide Action Network of North America (PANNA) would like to see the U.S. trade-in its policy that treats chemicals as “innocent until proven guilty” for something akin to Europe’s regulatory system, where a “health-protective precautionary approach” dictates which chemicals are approved for widespread use. Photo Credit: Heather Buttrum, courtesy Flickr

veins. These chemicals on our food can be harmful to adults, but health experts are even more concerned about what they are doing to our kids. The non-profit Pesticide Action Network of North America (PANNA) points to recent studies showing that children with high pesticide exposures in the womb are at increased risk of being born with birth defects and are much more likely to encounter developmental delays, ADHD and autism spectrum disorders.

A related issue is the hormone-disrupting bisphenol-A (BPA) in our food supply as a result of its widespread use in the lining of cans and other food and drink containers. “Nearly every person in America has some BPA in his or her body,” reports the Natural Resources Defense Council (NRDC), a leading green group. “And yet, this food-packaging chemical may cause problems in developing fetuses, infants and children by altering behavior and increasing the risk of prostate cancer, as a government report concluded nearly two years ago.” Other studies have shown links between BPA exposure and a variety of human health problems including erectile dysfunction, breast cancer, heart disease and diabetes.

Another big hurdle to a safer, greener food system is our increasing reliance on antibiotics to fight bacterial infections in livestock. The U.S. Food & Drug Administration (FDA) has known since the 1970s that feeding large amounts of antibiotics to

Safer Food continued to p. 34

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By Larry Pleasant

By Larry Pleasant

This month's special ingredient is "PLASTICS IN THE FOOD AND WATER SUPPLY." People often ask me which plastics are the "bad" ones and which ones are safer to have in contact with our food and water and baby bottles. Let me make it easy for you. The short answer about any of the plastics you or I are going to find in our everyday lives and markets is NONE! However, if you MUST use plastics HDPE is your safest bet. Choose the translucent version rather than the white or colored bottles if you have a choice.

In a snapshot here's what's up with plastics.

Plastics are made from chemicals that migrate into food and liquids. They do not stay in the plastic. Freezing or heating plastics, or just exposure over time, dramatically accelerate the process of moving plastic chemicals into your food and drink. When you eat or drink food stored and cooked or nuked in plastic you are eating plastic.

Some plastics are made from Bis-Phenol-A. This is widely recognized as a carcinogen and estrogen mimicker found in the epoxy resin lining of nearly all canned food products, clear hard polycarbonate plastics and on your sales receipts and thermal fax paper. Nearly 95% of Americans have BPA in their bodies right now. They are being phased out of the food supply as No.7 plastic packaging but still leach out of PVC water pipes and numerous other sources.

The wide-ranging phthalate chemical family are plasticizers found in PET (#1), vinyl, PVC and PEX water pipes, water hoses, raincoats, many adhesives, and most hospital IV tubes and bags; and this is just a start. Nearly 100% of Americans have phthalates in their bodies right now. Phthalates do not cause cancer. They ARE potent estrogen mimickers busily turning our males into metro-men and increasing the risk for sex-organ-related cancers for both men and women. Phthalates love fat even more than they love water so our bodies have no trouble soaking them up and storing them.

On the positive side your body now takes an estimated 14 years to rot in the

Ingredient of the Month

PLASTICS



ground, double the time it took to rot 25 years ago. If the trend continues we could achieve a kind of plasticized museum-like immortality. Forget that ashes-to-ashes stuff. Just prop grandma up in her favorite chair and leave her there for the next decade as a conversation piece.

There is also a growing body of reliable scientific evidence that phthalates cause dramatic increases in the rates at which cancer cells reproduce. As in 40 times faster. I like to think of them as Miracle Gro™ for cancer.

So the picture here is that we Americans are swimming in tumor-inducing molecules every single day. At the same time our bodies are saturated with Miracle Gro™ for cancer.

How are you going to change your life in relation to this information? Are you going to be one of the 29% of Americans that will NOT get cancer?

We were given a free hand upon this planet and we have nearly blown it after only a couple of hundred years of Progress. This civilization is being run like a car full of drunken teenagers on spring break.

I don't know about you but I'm going to eat some bark and berries and go buy some solar panels.

Larry Pleasant is a writer, philosopher, part-time farmer and soap maker living and working in the Green Mountains of Vermont. Learn more at www.vermontsoap.com.

Photo credit: DailyPea.com.

Read more at: www.dailypea.com/is-your-garden-hose-toxic

SUNSCREEN CREAM RECIPE

Courtesy of VT Soap Organics.

THIS CREAM provides physical sun protection due to titanium or zinc oxide properties. Strength of this cream should correspond to approximately a 15 sun protection factor (SPF) of chemical protection creams.

Titanium dioxide is the main sun protection ingredient, but it can be mixed with or substituted with zinc oxide. Zinc oxide mineral powder works against harmful ultraviolet rays and protects from UVA and UVB rays.

If applying essential oils, be careful to choose something that does not sensitize the light. For example, the citrus oils such as bergamot, orange, lemon, and grapefruit are not a good choice. On the other hand, eucalyptus, lavender or mint oil is fine. Eucalyptus oil also moisturizes the skin and enhances the beneficial effects of other components.

Beeswax provides prolonged protection, keeping the cream on the skin when the cream would otherwise go away in the water. Even if you skip essential oils in this recipe, beeswax, cocoa and coconut butter guarantee a nice scent.

SheaButterGuide.com also has a recipe for a sunscreen lotion and a sunburn cream, so be sure to check out their website!



WHAT DO YOU NEED?

- 4 oz. (~120 ml) of shea butter
- 4 oz. (~120 ml) of cocoa butter
- 7 oz. (~200 ml) of coconut oil
- 2 oz. (~60 g) of beeswax
- 6 tablespoons of titanium dioxide or 4 oz. (120 g) of zinc oxide
- 15 drops of essential oils in total (optional)

First, melt the beeswax and cocoa butter on the steam using a double pot. Then, add the shea butter and coconut oil. When everything is mixed together, remove it from the steam and wait till it is cooled on a body temperature. Add essential oil(s) and mix thoroughly.

Finally, add slowly the titanium dioxide or zinc oxide. Stir it with the spoon or electric mixer (recommended).

After a couple of hours cream will become harder. The result is a creamy, well-spreading sun cream convenient to use on the hot beach.

Safer Food cont'd from p. 34

healthy livestock breeds antibiotic resistant bacteria, which can in turn render many of the antibiotics used for humans ineffective. In fact, antibiotic resistant infections are already killing 23,000 Americans each year. A 2012 FDA policy change calls on livestock producers to refrain from using antibiotics to boost growth rates for pigs, cows, sheep and chickens, but it remains to be seen if the industry will toe the line or use loopholes to keep up the steady stream of antibiotics.

PANNA is one of many voices demanding an overhaul of how the FDA regulates our food supply. "We all want to believe that government agencies are protecting

us and our food supply from chemical contaminants—but they are not," reports the group. "They do not have the regulatory framework to do so." The group would like to see the U.S. trade in its policy that treats chemicals as "innocent until proven guilty" for something akin to Europe's regulatory system, where a "health-protective precautionary approach" dictates which chemicals are approved for widespread use.

Contacts: PANNA, www.panna.org; NRDC, www.nrdc.org; FDA, www.fda.gov.

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Shades cont'd from p. 19

SHADING. Reduce summer electric bills with shade trees.

Shade trees can save you money! Scientists have shown that properly placed trees can reduce your summer electric bills by as much as 35%. Called "Tree-based Energy Conversation," they are a low-tech solution to a high-tech problem.

Plant windbreak conifer trees on the west and northwest to provide mid-to-late afternoon shade in most locations. In winter these windbreak trees protect your home from cold north winds. But note that trees planted within 15 feet of the north side of a house actually increase summer electricity use, because they trap heat. For a windbreak, plant far enough away to prevent the trap effect.



Shade east and west windows with deciduous trees, but prune lower branches to prevent blocking the view. In winter, after leaf fall, warming sunlight comes through.

Plant shade trees over patios, driveways, and air conditioning units to cool areas around your home.

TREES FOR SAVING ELECTRICITY.

Tall maturing, deciduous trees (hardwoods) are generally recommended for shading because they cast the largest shadows. Importantly, they also drop their leaves in winter when you want the sun to help heat the house. Select trees with dense canopies. Planting a tree or shrub to shade your air conditioning compressor can increase cooling efficiency as much as 10%.

You can estimate the benefits, in dollars, provided by trees around your house by visiting arborday.org/calculator/index.cfm

SOLARFEST cont'd from pg 13

Prius drive system. A very big solar concentrator will melt stuff.

Sustainable Agriculture & Food workshops will be offered in partnership with Green Mountain College. Highlights include growing rice in Vermont, small farm energy use, fermentation, solar powered weed control, and urine as fertilizer. The Rich Earth Institute will be collecting urine for fertilizer from special port-a-potties.

Thriving Communities will highlight public banking and energy investment, forming member-worker owned cooperatives, creating a durable New England local economy, advancing community change, socially responsible investing, and stories from the Transition Towns movement in Vermont.

Youth & Family highlights include an opportunity to view solar activity, making sundials, building and racing solar cars, worm composting, and tie-dye. This year there is an expanded Kid's Corner in partnership with Wonderfeet Kid's Museum, and a musical petting zoo.

Green Building highlights include tiny house building, Button Up, solar thermal, hybrid home, deep energy retrofit and a look at modern yurts.

Climate Change workshops are being offered by 350.org, running their 2nd annual Climate Camp at SolarFest. Topics include where peace meets the environment, UN climate negotiations, and climate activist campaign strategy.

Green Transportation highlights include hands-on building an electric motorcycle, retrofitting vehicles to use cooking oil, and experiences with solar PV and electric vehicles.

The second SolarFest Mini Maker Faire® will happen on Saturday July 19th and Sunday July 20th. It will bring together regional Do-It-Yourself enthusiasts to learn from and be inspired by the makers' creativity and innovation. The SolarFest Mini Maker Faire® is independently organized and operated under license from Maker Media, Inc.

Steve Goldsmith is the president of SolarFest, Inc.

SWEET ORGANIC DREAMING!

Creating a chemical-free sanctuary in the bedroom

By Jessica Goldblatt Barber

SLEEP IS A TIME for our bodies to heal, renew, and rejuvenate and if you're going to make one room in the house as chemical-free as possible, make it your bedroom.

Start by clearing your bedroom of clutter and unwanted goods. No workspaces, electronics or exercise equipment in view—a bedroom is for rest and rejuvenation.

When redecorating, paint with natural paints or clay plasters—they have a wonderful feel, are easy to work with, and actually improve indoor air quality. Use natural fiber curtains such as cotton, hemp, wool or silk. If replacing floors keep in mind that many carpets off-gas chemicals. Some better choices are natural fiber carpets, wood, cork, and stone. Avoid the plastics and vinyl that many floors are made of.

Now, let's talk about where you snuggle up to get your zzzzs. An organic mattress can significantly make a difference in reducing your overall chemical exposure. In addition, they offer a superior sleep surface, so it is little wonder that organic mattresses are the fastest growing sector in the mattress industry.

There are two main types of organic mattress options: organic cotton and wool innerspring and natural latex foam.

Natural latex foam mattresses are similar in performance and price to a Temperpedic mattress, but unlike their synthetic, chemical-laden counterpart, are made from naturally occurring, sustainably har-

vested sap from rubber trees. Natural latex is mold-, mildew-, dust mite- and bed bug-resistant. It is perfect for those with allergies, pressure-point problems, or sensitivities. Latex mattresses are often recommended by chiropractors for persons with back and sleep issues as they gently give and cradle the body, for people who love a super soft mattress there are choices of toppers to create a pillow-like top. Transfer of motion (when the person next to you moves around) is very limited so they are really wonderful for

couples if one is a light sleeper and wakes up with motion.

Organic innerspring mattresses are constructed like conventional mattresses, but without the chemicals that are typically used in one non-organic mattress. They are made with organic cotton or wool. Organic cotton is chemical free, and looks and feels wonderful. Wool is naturally flame retardant, meeting the strictest California standards. It is antibacterial, dust mite-resistant, regulates your body temperature - keeping you warm in the win-



Sweet dreams dreaming of snowwhite and the seven dwarves - painting by Franz Schrotzberg. Photo: Wikimedia Commons, public domain

ter and cool in the summer. I

Additionally, most organic mattresses are still very much 'cottage industry' and often made in small factories in the USA, using USDA organic cotton or organic USA-produced wool. While it may not be the deciding factor in choosing an organic mattress, purchasing USA-made goods benefits our economy as well.

The facts are readily available, yet despite what we know about the harmful effects of chemicals, standard industry practices and laws to protect us remain slow to change. Do a bit of research before purchasing things for your home, and when possible, select the safer alternative. Safer, greener alternatives become more available as consumers demand them, and more affordable as supply and competition grows. We can create a healthier home and planet, one smart choice at a time!

If you have any questions on this article, or for more info on organic mattresses, please feel free to contact Jessica at Interiors Green: 603-616-6499.

Jessica Goldblatt Barber is the owner of Interiors Green — The Home & Living Store, located on Main Street in Bethlehem NH.



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ASK THE SOAPMAN

Dear Soapman,
Keeping clean naturally is all well and good. But I am tired of predicting the weather by the pain in my joints. Do you have anything for achy people?
Signed, The Human Barometer

Dear Human,
No need to hire yourself out to the Farmer's Almanac HB.


In our continuing quest to soothe the minor injustices of human existence, VT Soap now offers Old Fashioned Arnica Salve to soothe your everyday aches and stiffness.

Made from certified organic coconut oil, shea butter, hemp seed oil, wintergreen oil, beeswax, arnica, St John's wort and rosemary extracts. Every ingredient works together to provide gentle, soothing relief.

Vermont Soap manufactures both vegetarian products and vegan products. A few of our products, like Old Fashioned Arnica Salve include organic honey or beeswax. Look for 100% natural and organic Vermont Soap products at www.vermontsoap.com and a health food store near you!

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LOCALLY OWNED - COMMUNITY GROWN

Green Tips

By Deborah DeMoulied, Bona Fide Green Goods

THE NORTHERN HEMISPHERE'S CO2 appears to be officially now over 400 parts million. Last month Science magazine went into gory detail about the 6th extinction and how species loss is happening 1,000 times faster than previous mass extinctions. Both of these events are human-caused. The good news is, humans can still make a difference — if we act.

So back to basics - reducing our carbon footprint.

It's summer time, which means outdoors activities, from yard work to grilling. Many activities can be modified to reduce energy use. Here are some things to think about (and act upon) during the coming months:

1. Do an annual tune-up on all of your equipment, replace filters and sharpen blades so everything works most efficiently, thereby reducing emissions.
2. Use the right tools and equipment for the job – don't overkill! Do you really need a riding lawn mower for a small lawn?
3. Do you even need a lawn? Swap a lawn for natural growth that needs less mowing, or turn the land into garden beds or fruit trees.
4. Plant slow-growth grass. Use a long cut when mowing.
5. Use hand tools instead of gas or electric tools. Do you really need a leaf blower?

TO GRILL OR NOT TO GRILL— RATHER, WHICH ONE?

6. Reduce or eliminate chemical fertilizers and pesticides.
7. Collect rain water, and use it.
8. If you must grill, a gas grill produces half the carbon as charcoal. However, charcoal is from renewable resources. But over all, gas grills win.

Keep in mind, any type of grilling has a much larger carbon footprint than cooking indoors. In addition, the residue and chemicals produced during the grilling process are not healthful. Heterocyclic amines (HCAs) and polycyclic aromatic hydrocarbons (PAHs) are associated with cancers, particularly colon cancer. HCAs are formed from proteins (any food burned from broiling, oven or pan-frying) and PAHs are from the smoke created from dripping juices. Those yummy charcoal bits are just not good for you no matter how you cook it. If you must grill, keep the heat low, avoid burning and grill more vegetables.

Happy Outdoors!

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

THE GREENING OF EYE CARE

Staff Article with contributions from Michael McCord

OF RECENT TIMES, The eye care industry is coming onboard with sustainability awareness. A great example is the Miru lenses. The Miru brand of daily disposable contact lenses combines revolutionary levels of hygiene and sustainability. Miru lenses are made by Menicon, Inc. Menicon has a heightened concern for the environment, and takes pride in its green approach.

What makes these daily disposable contact lenses so revolutionary? The traditional packaging and boxing has been replaced by an innovative wafer-thin and exceptionally hygienic flat-pack. Miru (which loosely translates as to see or to look in Japanese) was developed over seven years to create the flat-pack which easily shows the wearer the side the lens is facing – and reduces most of the risk of touching the inner surface of the lens, making it less likely that skin oil or microorganisms will get trapped between the lens and the wearer's eye.

"There's nothing like it on the market," said Dr. Sarah Hudson of Harbor Eyecare center in Portsmouth, New Hampshire, who tested Miru lenses herself. Miru will have a national roll out in June at the AOA Optometry's Meeting in Philadelphia, PA. The lenses have become popular in Japan where they launched the lens under the name Magic in November 2011. The lenses are getting rave reviews for their ease of use and convenient, spill-free packaging.



Beth Ashley is checking Miru lenses out at Harbor Eye Care in Portsmouth, NH. Photo courtesy of Green Alliance.

Menicon estimates the Miru brand reduces the carbon footprint by two-thirds compared with other brands in the marketplace, due to:

- gas and energy are saved when shipped due to less packaging material
- all of the packaging is recyclable
- the 30-day supply of lenses are flat-packed and come in a small compact plastic container that is recycled from the patented molds used to make the lens

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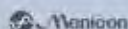


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ANNUAL WASTE GENERATION (SINGLE PATIENT)

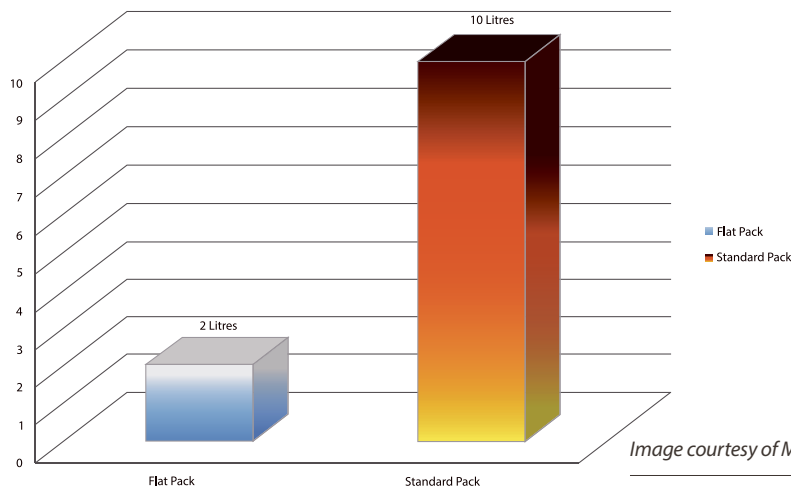


Image courtesy of Menicon.

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"Their storage and packing for transportation is minimal and the lenses work as promised. They are so easy to handle — you only touch the outside of the lens," Hudson said.

The next time you are in need of contacts, ask your eye care professional if Miru lenses are a good fit for you. The earth will be happy you did!

For more information about Miru one-day lenses, visit meniconamerica.com/miru

For more information about Harbor Eyecare Center: visionsource-hec.com.

Source: Michael McCord is a Green Alliance Correspondent. www.greenalliance.biz.

KEEPING YOUR EVENT OUT OF THE LANDFILL

A little planning goes a long way towards keeping your event out of the landfill.

By Clare Innes

With festivals, parties, and outdoor gatherings starting to fill your calendar, follow these simple steps to keep as much material from your event as possible out of the landfill – and keep your event in compliance with the law.

Take control of your event's waste stream. Require that your staff or vendors use truly recyclable and compostable or – better still – reusable serving and promotional items.

Be sure that you are using materials that can actually be recycled or composted. There are many products that manufacturers claim to be recyclable or compostable but are not, due to misleading labeling or because they simply can't be handled in local composting facilities. In Chittenden County, Vermont, check the recyclable and compostable food-service item list at the Chittenden Solid Waste District's (CSWD) Green Mountain Compost website (greenmountaincompost.com), or contact Green Mountain Compost at compost@greenmountaincompost.com or 802-660-4949. In other areas, contact your local facility.

If you're managing disposal yourself, you'll find out quickly that trash costs money to dispose of, no matter how you handle it, while proper disposal of recyclables and 'compostables' is free if you haul it yourself to CSWD facilities. Again, check with your local facilities in other areas.

Best use of recycling, composting, and trash collection containers:

- Determine how many containers you need. A good average is at least one set of recycling-composting-trash containers for every 25 people. If there will be lots of food and giveaways, you may want to provide more three-container sets, including some for vendors and kitchen staff. We strongly suggest that you use blue containers for recycling,



Don't let the waste go to the landfill. Photo by Katie Chan

green containers for compost-ables, and black or gray for trash. Always properly label containers. For consistency, please use signs available at www.cswd.net. You can borrow what you need for free from CSWD if your event is in Chittenden County.

- Determine best bin placement. Create "sort stations" by positioning all three containers side by side. Studies show that when recycling, composting, and trash containers are not side by side, attendees stop using them properly. Hot tip: NEVER have solitary collection container. People will throw whatever they're carrying into the nearest collection container if you don't offer all options in the same place.
- Monitor use of bins. Assign someone to monitor the containers to help people understand what to put where, and to empty them when full.
- Use clear bags for recyclables to ensure that recycling, compostables, and trash aren't mingled with each other when you're aggregating the bags. For compostables, only certified compostable bio-plastic bags are accepted for composting.

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

SUSTAINABLE SPORTS DESERVE GREEN OPTIONS

A PRODUCTS REVIEW

By N. R. Mallery and M. Harrison, Green Energy Times Staff

GREEN LAYER SPORTS offers environmentally conscious clothing options that you can actually feel good about wearing, as well as supporting — and get the performance you need.

The company states "Our mission has been to continually increase the environmentally responsible products in our collections with each season. We strive to shift the thought process of consumers into understanding that environmentally conscious products do not mean a sacrifice in performance, style, and comfort."

Michelle, our "awesome sauce girl" here at Green Energy Times, is a runner and put the Women's Evolution Long Sleeve Tee-Pink Glo that she received to the test. Here are some of her comments.

"The shirt washes well with no fading and is light weight... great for those border-line days when short sleeves may not be warm enough, but you do not want something heavy. It breathes well due to the soft, moisture-wicking fabric and makes a good base layer for the colder or rainy weather. The soft material prevents chafing."

Green Layer claims "to create apparel for the athletes who are performance-driven, aesthetically-minded, and environmentally aware, and... their brand is about an evolution in performance apparel, simple aesthetics, and functional comfort." Sounds like they passed the test with Michelle.

The publisher of G.E.T., who also is athletically oriented, tried out Green Layer's Evolution Short Sleeve Tee - Bluefish. "The shirt is super lightweight and very comfortable to wear and definitely works great to keep you cool and comfy while riding a bike, hiking,



Green Energy Times Staff trying out the Green Layer shirts. Pictured are Michelle Harrison, stretching for a run and Nancy Rae Mallery on her solar-charged electric bike.

walking, and even while paddling a kayak. Passes my test. Can't wait to try out their organic tees and a hoodie next."

Green Layer also has a casual-lifestyle apparel line that is made with the same quality and design simplicity, including hoodies, warm-up pants, and track jackets, all made with performance materials, integrating environmentally responsible fabrics, such as recycled polyester. Organic cotton is also used in their t-shirts.

Greenlayer was founded by former Division 1 swimmer and triathlete Kim Bilancio, and former elite triathlete and developer of competitive running's top timing system, Arash Kia. You can learn more at www.greenlayersports.com.



This is what Sustainable Sports is all about:

Pedal Power for Solar Power

By Patrick Martin

JOSH ANDREWS AND CHRIS PAMBOUKES are Portsmouth, N.H. residents who share a deep love of cycling. This summer they will put that passion to work for positive change for the Seacoast area.

On July 14th the two will begin a 2,000-mile bicycle trek down the Pacific coast from Vancouver to San Diego. The ride is for a donate-per-mile bikeathon fundraiser called Pedal for Power to cover the installation cost of a solar system Cross Roads House on Route 1 in Portsmouth.

Cross Roads House is a 96-bed shelter serving homeless men, women and children in the Seacoast area. Since 1982, it has provided an estimated 500,000 shelter nights to over 5,000 individuals and families. The facility offers a wide range of support services for those in need, including case management, telephone and Internet access, daily warm meals, on-site health care, dental care and much more.

Both Andrews and Pamboukes have years of experience working on both

philanthropic events and athletic challenges. In 2004, Pamboukes did volunteer work at Cross Roads House through a tutoring program, Students Helping Students in Need, for which he was recognized by the Greater Portsmouth Education Partnership Council.

Now, Pamboukes plans to help out once more, with the aid of his employer, ReVision Energy, a Green Alliance Business Partner. The Green Alliance is an entity that connects like-minded green businesses and the community that supports them.

ReVision Energy will build a new 16-kW solar array of 62 panels on the south-facing roof at Cross Roads House. The installation is projected to save Cross Roads House about \$3,200 a year for the next 30 years, approximately the cost of 3,000 meals each year. The system will also cancel out 27,000 pounds of annual carbon dioxide emissions – equaling the carbon-absorbing capability of 560 trees planted per year.

Through their website, community



Josh Andrews and Chris Pamboukes of Portsmouth, N.H will begin a 2,000-mile bicycle trek for a solar fundraiser called Pedal for Power on July 14th, 2014. Photo courtesy of Green Alliance.



events, and media outlets, the two aim to raise \$50,000, to cover the cost of ReVision Energy's installation.

Pedal for Power is currently asking for Penny-Per-Mile and Nickel-Per-Mile donations, at \$20 and \$100 respectively. Businesses and other organizations also can sponsor the initiative.

So far, large donations have been made by Port City Peds, New England Printing, Bowl-O-Rama, The Thirsty Moose Taphouse, Flat Bread Pizza Company, the Green Alliance and many others. However, Andrews and Pamboukes are looking for another lead sponsor to join ReVision Energy in putting a bigger dent in the \$50,000 goal.

"We at ReVision Energy want the solar industry to grow not only because it helps our business, but we genuinely believe in its ability to curb the over consumption of finite fuels that pollute our environment. ...It's one thing to try and raise \$50,000 dollars in six months, but the real challenge is developing a sustainable future filled with opportunity that everyone can prosper in," said Pamboukes.

To learn more or donate to the Andrews-and-Pamboukes mission, www.PedalForPower.com.

ReVision Energy: www.revisionenergy.com;
Green Alliance: www.greenalliance.biz

G.E.T. OUTDOORS!

Local Trail Systems Offer Pathways to the Environment

By N.R. Mallery, G.E.T. Publisher

NEW ENGLAND is a destination vacation — to the many tourists who come from all over to “g.e.t.” outdoors in a clean, healthy environment right here where we live. And aren’t we fortunate to be able to live here with all that our outdoors offer?

Hiking, mountain and road biking and camping on our own trail systems keeps it local and sustainable by using our muscles and not motors — a great way to help to reduce our own carbon footprint. Leave your footprint on the ground and not into the atmosphere.

There are trails for all levels of ability, from the beginner to Olympians. From day hikes to backpacking, it’s just great fun.

Here is a list of some great regional trails:

Kingdom Trails in Northeast Vermont is a multiple-use trail system unlike any other and has been voted as the Best Mountain Bike and Trail Network in North America by *Bike Magazine*. There are hiking and biking trails for all levels of ability. East Burke in Vermont’s Northeast Kingdom. 802.626.0737, kingdomtrails.com.

Great Glen Trails Outdoor Center offers 45 km of trails at the base of Mt. Washington for enjoyable biking, running or walking. Spectacular panoramic views of the Presidential Mountain Range. Pinkham Notch, NH. 603-466-2333, greatglenhills.com.

The Appalachian Trail (AT) has 1,800 miles of trails in our region for hiking and summer fun from Maine to Georgia.

Lodges, huts, swimming, camping — this is the famous trail system in our own backyard. 617-523-0636, 603-466-2721, 413-528-8003, www.outdoors.org.

The Long Trail (LT) is Vermont’s “footpath in the wilderness,” and the oldest long distance hiking trail in America. With its 273-mile footpath, 175 miles of side trails, and nearly 70 primitive shelters, the LT offers endless hiking opportunities for the day hiker, weekend overnigher, and extended backpacker. 802-244-7037, www.greenmountainclub.org

The Catamount Trail (CTA) has 300 miles trails through Vermont, from the MA border to the Canadian border, and offers all levels of terrain for nearly everyone. The trail is well maintained and open to the public. (802-864-5794, www.catamounttrail.org).

Sleepy Hollow Inn Ski & Bike Center is solar-powered and as sustainable as it gets, with 35 km of trails for hiking and mountain biking. Huntington, VT (802-434-2283; www.skisleepyhollow.com)

Craftsbury Outdoor Center in Craftsbury, Vermont is big with sculling in the summer, is solar-powered and teaches sustainable practices for managing the surrounding environment. (802-586-7767, www.craftsbury.com)

Stump Sprouts in Hawley, MA also has solar and is located in rural northwest Massachusetts. They are described as “Home grown...Unique, Sustainable.” There are 25 km of trails on 450 acres. The summit of Lone Boulder Hill has a scenic vista of three

states. (413-339-4265, www.stumpsprouts.com)

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